

**Date of Report:** 08/25/2012

## PART I - TYPE OF REQUEST

☒ 1. Funding request for estimated emergency stabilization funds  
☐ 2. Accomplishment Report  
☐ 3. No Treatment Recommendation

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

☐ 2. Interim Report #\_\_\_\_.

☐ Updating the initial funding request based on more accurate site data or design analysis

☐ Status of accomplishments to date

☐ 3. Final Report (Following completion of work)

A. **Fire Name:** Red Ledges

B. **Fire Number:** UT-WCF-000783

C. **State:** Utah

D. **County:** Utah ... # 049

E. **Region:** R4 / Intermountain

F. **Forest:** 19

G. **District:** Spanish Fork

H. **Fire Incident Job Code:** P4G6K0

I. **Date Fire Started:** 19 August, 2012

J. **Date Fire Contained:** 24 August, 2012

K. **Suppression Cost:** \$ 1,291,000

L. **Fire Suppression Damages Repaired with Suppression Funds**

1. **Fireline waterbarred (miles):** 1.0

2. **Fireline seeded (miles):** 0

3. **Other (identify):** na

M. **Watershed Number:** HUC\_160202020304 Upper Diamond Fork  
HUC\_160202020306 Middle Diamond Fork

N. **Total Acres Burned:**

[1,658] NFS Acres [0] Other Federal [0] State [0] Private

**O. Vegetation Types:** The major vegetation types within the burn perimeter include gambel oak (*Quercus gambelii*) with maple (*Acer glabrum*), curl-leaf mountain mahogany (*Cercocarpus ledifolius*) and small amounts of both mountain big sagebrush and pinyon - juniper intermixed throughout the burned-area. Grasses and forbs are also present in open areas and as understory vegetation. A very small amount of aspen were observed during the helicopter flight at higher elevations.

**P. Dominant Soils:**

SC4 – Crowd and Redcan families – (13% of the burn area) – SC4 is found in lower stream canyon areas, and formed from colluvium and residuum from bedrock on site. These soils have cobbly loam textures at the surface, and extremely cobbly, clay loam textures in the subsurface. Slopes range from 35% to 85% and are shallow. The depth of Crowd soils ranges from 0-25 inches, and 0-4 inches for Redcan soils. Soil erosion hazard is moderate if undisturbed, and high if disturbed.

SC6 – St. Mary's family – (22% of the burn area) – SC6 is found along stream canyon sidewalls. These soils formed mainly from colluvium and residuum from bedrock (quartzite, limestone, sandstone) on site. These soils have a gravelly loam texture at the surface, and a very gravelly loam to loamy sand texture in the sub-horizon. The soils are poorly developed, and have a Bw horizon at 10-19 inches. Slopes range from 35% to 70%. Soil erosion hazard is moderate if undisturbed, and high if disturbed.

SC7 – Redcan family (1% of the burn area) – SC7 is found along very steep stream canyon sidewalls. These areas have a dominant cliff and rock outcrop structure with little soil development. Where soils developed, they are shallow and have a gravelly, silty clay texture. The soils formed from colluvium from bedrock on site. The C horizon is at a depth of about 4 inches, and bedrock is at about 11 inches. Slopes are greater than 80%. Soil erosion hazard is high for both undisturbed and disturbed soils.

SC12 – Snyderville family (2% of the burn area) – SC12 is found along stream canyon sideslopes. These soils formed from colluvium and residuum from bedrock on site. The soils have a loam to fine sandy loam texture at the surface, and sandy clay loam in the subsoil. The soils are moderately deep. Slopes range from 55% to 75%. Soil erosion hazard is moderate to high for undisturbed soils, and high for disturbed soils

TM9 – Lilsheep family – (11% of the burn area) – TM9 is found along canyon sideslopes. Soils have extremely rocky loam textures. The soils are shallow, ranging from 0-11 inches in depth with bedrock at about 23 inches. These soils formed on 25% to 100% slopes. Soil erosion hazard is moderate to high for undisturbed soils, and high for disturbed soils.

TM11 – Patplace family (51% of the burn area) – TM11 is found along lower mountain sideslopes. The soils are deep, and most are of colluvial origin. Soils have a loam to silty clay loam textures at the surface, and silty clay loam textures in the subsoil. Slopes are generally 35% or less. Soil erosion hazard is low to moderate for undisturbed soils and moderate to high for disturbed soils.

**Q. Geologic Types:** Major landforms in the fire perimeter include steep slopes mixed with gentle terraces and knolls. Elevations range from approximately 7,700 feet on the Red Mountain ridgeline to approximately 5,600 feet elevation along the Diamond Fork River. Geology in the

area is primarily sedimentary siltstone and sandstone intermixed with massive conglomerate beds of the Price and North Horn Formations.

**R. Miles of Stream Channels by Order or Class:**

Perennial – 0      Intermittent – 0      Ephemeral – 5.3

**S. Transportation System**

Trails: 0 miles      Roads: 0 miles

**PART III - WATERSHED CONDITION**

**A. Burn Severity (acres):** 1564 ac (low) 94 ac (moderate) 0 ac (high)

**B. Water-Repellent Soil (acres):** 0 acres (caused by fire)

**C. Soil Erosion Hazard Rating – Disturbed (acres):**  
0 acres (0%) (low)      0 acres (0%) (moderate)      1,658 (100%) (high)

**D. Erosion Potential:** 0.18 tons / acre / year

**E. Sediment Potential:** 85 cubic yards / square mile / year

**PART IV - HYDROLOGIC DESIGN FACTORS**

A. Estimated Vegetative Recovery Period, (years):	<u>5</u>
B. Design Chance of Success, (percent):	<u>80</u>
C. Equivalent Design Recurrence Interval, (years):	<u>5</u>
D. Design Storm Duration, (hours):	<u>1</u>
E. Design Storm Magnitude, (inches):	<u>0.758 in.</u>
F. Design Flow, (cubic feet / second/ square mile):	<u>see Table 1.0</u>
G. Estimated Reduction in Infiltration, (percent):	<u>see Table 1.0</u>
H. Adjusted Design Flow, (cfs per square mile):	<u>see Table 1.0</u>

Table 1.0 Design Flow estimates for a selected drainage for the 2009 Red Ledges Fire.

Drainage	Area (mi <sup>2</sup> )	<sup>1</sup> Design Flow (cfs/mi <sup>2</sup> )	<sup>1</sup> Adjusted Design Flow (cfs/mi <sup>2</sup> )	Estimated Reduction in Infiltration (percent)	Estimated Prefire Discharge from Design Storm (cfs)	Estimated Postfire Discharge from Design Storm (cfs)
Unnamed Trib to Diamond Fork	0.5	0.0	0.0	0.0	0.0	0.0

<sup>1</sup>Discharge estimates were calculated using WILDCAT4 computer model

## **PART V - SUMMARY OF ANALYSIS**

- A. Describe Critical Values/Resources and Threats:** The fire burned in a mosaic pattern along Red Mountain north of Diamond Fork River. Most of the fire created low burn severity areas with about six percent of the area in moderate burn severity. No areas had high burn severity. Low to no burn occurred in most of the drainage bottoms. Slopes throughout the fire area are steep and average 60-80%. Interspersed with steep slopes are terraces and knolls that have low angle slopes ranging from "flat" to 30%. Ephemeral channels are small and confined in deep drainages. Large portions of the area show evidence of recent landslides and slumps. The area is susceptible to debris flows/slides in its natural state as evidenced by the amount of material that has been removed from the Diamond Fork road.

Based on hydrologic modeling, there is a low potential over the next five years that a large-magnitude summer thunderstorms or heavy spring runoff will occur. However, if a high intensity storm event were to occur before the burn area revegetates, increased surface erosion (above natural conditions) is expected to occur due to the loss of ground cover, reduced soil strength as juniper roots decay, and subsequent risk of landslides and/or debris flows. If a high intensity storm were to occur there is a potential that culverts and detention basins would fill with debris and could potentially impact sensitive aquatic species found in Diamond Fork, including Bonneville cutthroat trout, Columbia spotted frog, and southern leatherside chub due to deliver sediment to spawning and rearing habitat that is present downstream of the fire.

Evidence of several big game species and raptors were observed using this area. These include mule deer, elk, and moose. Raptors are known to utilize several cliff bands on the southwest perimeter of the burn. These species have the ability to move away from the burned areas and will not be affected by this fire.

No known populations of TES plant or wildlife species occur within the fire perimeter and none should be impacted. Effects to Ute Ladies'-tresses orchid and habitat, which occurs down stream from the Red Ledges Fire, are expected to be so small as to be unnoticeable and possibly minimally beneficial.

There is a high potential that noxious and invasive weeds will invade currently uninfested areas within the fire area if not monitored and treated. During an on-the-ground visit to the Red Ledges Fire area numerous noxious, (Federal, State, and County designated), invasive plant species were observed within and/or adjacent to the burned area. Approximately 500 acres have a high potential to contain noxious weeds.

Other noxious and invasive weeds are known to infest locations near the burn area as well. These species include the following: musk thistle, common mullein, cheatgrass, Japanese brome, broom snakeweed, houndstongue, bull thistle, Scotch thistle, jointed goatgrass, field bindweed, kochia, curlycup gumweed, Dyer's woad, Myrtle spurge, squarrose and Russian knapweed, Dalmation toadflax, whitetop, leafy spurge, Canada thistle, tamarisk and perennial pepperweed (Belliston et al 2009; NRCS 2012).

Of high concern are infestations of musk thistle (*Carduus nutans*), which is the most common noxious weed in the Diamond Fork drainage. It can form large, dense patches and has been located along the entire Diamond Fork drainage. This noxious weed was located within the Red Ledges fire area and is highly likely to spread into areas throughout the fire area which are not infested. There is a need to monitor and treat the fire area to control the spread of this noxious weed. Some common mullein was also found within the fire area and should also be inventoried, mapped and treated to prevent it from spreading within the fire area. Knapweeds would be of grave concern if located within the fire area. These species have been documented within the Spanish Fork River and Sheep Creek drainages, and areas to the north of this fire area. These species are aggressive and very environmentally detrimental. The knapweeds, including spotted knapweed, produce thousands of wind dispersed seeds which are hearty and remain dormant in the soil for up to five years. Knapweeds establish rapidly in disturbed areas and have been known to rapidly invade burned areas.

Myrtle spurge has been documented in the lower Diamond Fork drainage and is rapidly encroaching on wildlands. This species is very hardy, grows very well in dry, harsh conditions, and is adapted to rocky, cliffy habitat. Dyer's woad is located in the main Spanish Fork Canyon drainage as well and is a potential invader. Leafy spurge has been reported to occur in the Ray's Valley area just west of the fire area. Dalmation toadflax is also of concern. Dalmation toadflax was not found within the fire area, but the fire area is large and not all areas were visited by the BAER team. Toadflax is likely to be top killed by fire; however, its deep and extensive root system is likely to survive even severe fire and allow reestablishment of the population from vegetative buds on roots. Many root-sprouting plants, including toadflax, have high fire survival rates, regardless of burn severity.

Canada thistle is located near the fire area. Although it is likely to survive fire and sprout vegetatively from its extensive perennial root system, it is generally located in riparian areas and none was located within the fire area.

The 2003 Uinta National Forest Plan (UNF LRMP) identifies objectives for control and treatment of noxious weeds. The objective (Objective 2-8, item a) for leafy spurge, spotted knapweed, squarrose knapweed, and Russian knapweed is to: "Allow no increase in acreage and, to the extent feasible, eradicate highly aggressive species that have not yet proliferated (are not present or are present only as small, scattered infestations) on the Forest." The objective (Objective 2-8, item b) for Dyer's woad, Scotch thistle, jointed goatgrass, and Dalmatian toadflax is to allow no further expansion. The objective (Objective 2-8, item c) for musk thistle, Canada thistle, and houndstongue is to contain infestations to currently occupied acres, with a focus on prevention and reduction of density within existing populations.

Diamond Fork Road (Forest Service Road 029) is adjacent to the Diamond Fork River and below the burn area. Below the burn area, eleven 24-inch culverts and one 48-inch culvert

cross this road. These culverts have the potential to jam with debris and cause water to flow over the road that may result in road erosion and damage.

From discussions with Spanish Fork Ranger District personnel, it was determined that this fire will not have any lasting impacts on domestic grazing or recreation due to its location and limited size.

**Within NFS lands:**

- 1) Water Transmission Facilities: As part of the Central Utah Project, a large pipeline occurs directly below the perimeter of the fire along Diamond Fork Road (Forest Service Road 029). This pipeline is buried and is highly unlikely to be impacted by events associated with this fire.
- 2) Special Status Areas: The Department of the Interior has withdrawn areas along Diamond Fork for completion of the Central Utah Project. The withdrawn areas are outside of the fire perimeter.
- 3) Roads/Culverts: Diamond Fork Road (Forest Service Road #029) is adjacent to the Diamond Fork River and below the burn area. Below the burn area, eleven 24-inch culverts and one 48-inch culvert cross this road. These culverts have the potential to jam with debris and cause water to flow over the road that may result in road erosion and damage.
- 4) Heritage Resources: Known archeological sites are located outside the fire perimeter at Red Ledges picnic site. This site would not be impacted by an event associated with this fire. Since no post-fire ground disturbing activities are being recommended (other than previously disturbed areas associated with roads/culverts) it is believed that no heritage resources will be affected.
- 5) Soil Productivity: There is a risk to the ecological integrity and future soil productivity of the burned area. Soils in the fire perimeter in general have low productivity potential. The soils here generally occur on steep slopes, are not well developed, and easily erode. Loss of vegetation has increased the erosion potential and accelerated erosion in the future would further reduce productivity. Even after vegetation has re-established it will take many years for the duff and litter layers to accumulate, and decades for the soil stability and soil nutrient stores to rebuild. In addition, there is the potential for the area to be compromised by invasive weed species. Invasive weeds have the potential to cause a decline in soil productivity by altering soil nutrient availability, water holding capacity, and erosion potential.
- 6) Threatened, Endangered and Sensitive Species:

No aquatic or terrestrial TES species occur within the fire area.

Along Diamond Fork downstream of the burn area, Ute Ladies'-tresses orchid [ULT] (*Spiranthes diluvialis*), a threatened plant species, occurs as scattered populations, or colonies, in riparian areas, generally within the river's 100-year floodplain. The plant is believed to be dependent on disturbances such as flooding to create bare stream bars that are suitable habitat to establish seedlings. It is expected that sediment moving from the burn area to Diamond Fork stream would not be excessive and the amounts

anticipated would beneficially produce habitat on bare gravel bars. Effects to this species and habitat from the Red Ledges Fire are expected to be so small as to be unnoticeable, to possibly minimally beneficial.

Bonneville cutthroat trout and Columbia spotted frog, both Forest Service sensitive species, are found downstream of the fire in Diamond Fork. In addition, southern leatherside chub, another Forest Service sensitive species may also be present downstream of the fire. They are known to occur in lower Fifth Water Creek, a headwater tributary of Diamond Fork River, and are also found in Soldier Creek. In 2006-2008, southern leatherside were re-introduced to the Diamond Fork drainage.

Debris flows that occur during the spring pose the greatest threat to these species because both Bonneville cutthroat trout and southern leatherside chub are spring spawners. Columbia spotted frogs also breed in early spring. Fine sediment can impact spawning habitat by filling interstitial spaces between gravel and cobble causing suffocation of fry and eggs. Southern leatherside chub spawn over small cobbles and suspended sediment can either coat the eggs preventing adhesion to the substrate or fill in interstitial spaces leaving eggs on the substrate surface where they are more vulnerable to predators. Turbidity that results from a debris flow can also cause changes in fish feeding behavior and reductions in insect larvae. The severity of the impact will be a function of the concentration of sediment and duration. If sediment reaches Diamond Fork, the severity of impact will likely be greater upstream closer to the fire perimeter because downstream dilution from other streams will gradually reduce the concentration of sediment in the water column. Impacts to Columbia spotted frog will be similar to fish, but will depend on the location of breeding areas. If breeding areas are off-channel the impacts should be minimal. Debris flows caused by thunderstorms in the summer and fall would likely be of short duration but of varying intensity depending on the amount of rain in fire-impacted areas. Impacts on fish would be short-term and primarily to feeding behavior and food availability.

- 7) Invasive/Noxious Weeds: Invasive and weedy plant species were observed within and/or adjacent to the burned area. The risk of increased infestations of noxious weeds is high due to existing populations within the fire perimeter, it is likely that some treatment will be necessary.

**On Non NFS lands:** No critical values or threats are identified.

**B. Emergency Treatment Objectives (narrative):**

Two emergency treatment objectives are in response to potential noxious weed expansion and potential damage to the main Diamond Fork road just below the burn area from debris plugging existing culverts.

Objective 1 is to provide "Early Detection and Rapid Response" of noxious weed infestations in order minimize their establishment and/or spread within the fire perimeter. Prevention is the first line of defense against aggressive invasive and noxious weeds.

Objective 2 is to provide for proper drainage of this area and minimize any potential road damage. By cleaning the culverts and catch basin, maximum passage of water flow will occur and reduce the likelihood of damage to the road.

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

**Land 90%   Channel na%   Roads/Trails 90 %   Protection/Safety na%**

**D. Probability of Treatment Success**

	Years after Treatment			
	1	3	5	
<b>Land</b>	90	30	10	
<b>Channel</b>	na	na	na	
<b>Roads/Trails</b>	90	30	10	
<b>Protection/Safety</b>	na	na	na	na

**E. Cost of No-Action (Including Loss): \$124,000**

**F. Cost of Selected Alternative (Including Loss): \$30,835**

**G. Skills Represented on Burned-Area Survey Team:**

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

**Team Leader:** Charlie Condrat, Forest Hydrologist

**Email:** [ccondrat@fs.fed.us](mailto:ccondrat@fs.fed.us) **Phone:** 801-999-2173

**FAX:** 801-999-2187

**H. Treatment Narrative:**

**(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.)**

Road Treatments include the cleaning and armouring of each culvert catch basin. This actions will provide for proper drainage and help stabilize the inlet by armoring each catch basin with 12-inch rock. Having a clean and stable catch basin will help minimize any potential road washout damage.

Invasive/noxious weed invasion is an emergency situation caused by the Red Ledges Fire. Treatments to mitigate the emergency on lands managed by the Uinta-Wasatch-Cache NF



would be to implement “Early Detection and Rapid Response” for weeds. This would include: inventory, mapping, and treatment of any existing infestations found. It is certain that expansion of noxious and invasive species will occur after the fire if no monitoring and treat occurs. Monitoring would occur during first year after the fire to determine the presence of noxious weeds and if new infestations of weeds are found, spot-treatment would occur to prevent noxious weed spread on National Forest System lands. Monitoring will be focused in (but not limited to) burned areas adjacent to existing known populations and in areas where fire containment activities occurred on National Forest System lands.

**I. Monitoring Narrative:**

**(Describe the monitoring needs, what treatments will be monitored, how they will be monitored, and when monitoring will occur. A detailed monitoring plan must be submitted as a separate document to the Regional BAER coordinator.)**

In order to minimize establishment of noxious weeds, monitoring will consist of visually observing the burned area over several weeks during the spring and summer of 2013 and will be focused in (but not limited to) burned areas adjacent to existing known populations, in areas where fire containment activities occurred on Forest Service lands.

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

Interim #

Part IV - Emergency, Stabilization Treatments and Control of Invasives										
			NFS Lands			Other Lands				All
		Unit	# of		Other	# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	BAER \$	\$	units	\$	Units	\$	\$
A. Land Treatments										
weed treatment (GS-5 8-hr day)	120	129.18	60	\$7,751	\$0		\$0		\$0	\$0
Materials (Chemicals/Tru	1	2000	1	\$2,000	\$0		\$0		\$0	\$0
GS 11 Botanist	6	360	6	\$2,160	\$0		\$0		\$0	\$0
Vehicle	1	800	1	\$800						
Insert new items above this line!				\$0	\$0		\$0		\$0	\$0
Subtotal Land Treatments				\$12,711	\$0		\$0		\$0	\$0
B. Channel Treatments										
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
Insert new items above this line!				\$0	\$0		\$0		\$0	\$0
Subtotal Channel Treat.				\$0	\$0		\$0		\$0	\$0
C. Road and Trails										
Culvert cleaning, basin installation & riprap for 6 culverts	1	2000		\$2,000	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
Insert new items above this line!				\$0	\$0		\$0		\$0	\$0
Subtotal Road & Trails				\$2,000	\$0		\$0		\$0	\$0
D. Protection/Safety										
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
Insert new items above this line!				\$0	\$0		\$0		\$0	\$0
Subtotal Structures				\$0	\$0		\$0		\$0	\$0
E. BAER Evaluation										
				---			\$0		\$0	\$0
Insert new items above this line!				---	\$0		\$0		\$0	\$0
Subtotal Evaluation				---	\$0		\$0		\$0	\$0
F. Monitoring										
				\$0	\$0		\$0		\$0	\$0
Insert new items above this line!				\$0	\$0		\$0		\$0	\$0
Subtotal Monitoring				\$0	\$0		\$0		\$0	\$0
G. Totals				\$14,711	\$0		\$0		\$0	\$0
Previously approved										

**PART VII - APPROVALS**

1. /s/ <Cheryl Probert> (for) David Whittekiend 8/30/12  
Forest Supervisor (signature) Date
2. /s/ Frank Roth (for) 10/12/05  
Regional Forester (signature) Date