

Date of Report:**7/25/2022****BURNED-AREA REPORT****PART I - TYPE OF REQUEST****A. Type of Report**

- ☒ 1. Funding request for estimated emergency stabilization funds
- ☐ 2. No Treatment Recommendation

B. Type of Action

- ☒ 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)
- ☐ 2. Interim Request # _____
- ☐ Updating the initial funding request based on more accurate site data or design analysis

PART II - BURNED-AREA DESCRIPTION**A. Fire Name:** Dry Creek Fire**B. Fire Number:** PNPT3722 (1522)**C. State:** Utah**D. County:** Millard**E. Region:** Intermountain 04**F. Forest:** Fishlake 08**G. District:** Fillmore**H. Fire Incident Job Code:** PNPT3722 (1522)**I. Date Fire Started:** 7/8/2022**J. Date Fire Contained:** 7/15/2022**K. Suppression Cost:** \$715,000**L. Fire Suppression Damages Repaired with Suppression Funds (estimates):**

1. Fireline repaired (miles): 5
2. Other (identify):

M. Watershed Numbers:*Table 1: Acres Burned by Watershed*

HUC 6	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
160300051503	Upper Oak Creek	20,075	1,769	8.81

N. Total Acres Burned:*Table 2: Total Acres Burned by Ownership*

OWNERSHIP	ACRES
NFS	1,716
OTHER FEDERAL (LIST AGENCY AND ACRES)	0
STATE	0

OWNERSHIP	ACRES
PRIVATE	53
TOTAL	1,769

- O. Vegetation Types:** The fire started in grass on private land then quickly moved into the pinyon-juniper, sagebrush, mountain brush and riparian vegetation on Forest. Mountain Big Sagebrush (214 Acres), Gamble Oak/Maple/Pinyon-Juniper (294 Acres), Seral Pinyon-Juniper (515 Acres), Stable Pinyon-Juniper (652 Acres), Riparian (41 Acres)
- P. Dominant Soils:** Soils within the burned area are located on slopes ranging from 5 to 70 percent. Soils are generally shallow (less than 16 in) and moderately well drained due to high rock fragment contents (many are skeletal) with loamy to sandy loam textures throughout. Soils located in some of the gentler sloping alluvial fans and along streams can be very deep, well drained yet still meeting skeletal criteria for rock fragments often barely meeting (or falling short of) being Mollisols. Rocks armor the surface of many slopes throughout the fire. See table 3 for soil types and acres.

Table 3: Soil Types

Soil Types	Acres	Percent
Lithic Haploxerolls	12	0.68%
Calciorthidic Haploxerolls	30	1.73%
Aridic Calcic Argixerolls	110	6.28%
Aridic Calcic Argixerolls	104	5.91%
Lithic Haploxerolls	1017	57.61%
Pachic Argixerolls	110	6.25%
Argic Pachic Cryoborolls	380	21.54%

- Q. Geologic Types:** The dominant geology type is igneous with Precambrian and quartzite making up the majority of the fire area.

Table 4. Geologic Types

Geology Types	Acres	Percent
Ajax Dolomite	284	16.09%
Alluvium and Colluvium	478	27.05%
Precambrian Rocks	610	34.53%
Tintic Quartzite	394	22.33%

R. Miles of Stream Channels by Order or Class:

Table 5: Miles of Stream Channels by Order or Class

STREAM TYPE	MILES OF STREAM
PERENNIAL	1.1
INTERMITTENT	4.8
EPHEMERAL	
OTHER (CANAL/DITCH)	0.2

S. Transportation System:

Trails: National Forest (miles): 2.7

Other (miles):

Roads: National Forest (miles): 4.0

Other (miles):

PART III - WATERSHED CONDITION**A. Burn Severity (acres):***Table 6: Burn Severity Acres by Ownership*

Soil Burn Severity	NFS	Other Federal (List Agency)	State	Private	Total	% within the Fire Perimeter
Unburned	34	-	-	0	34	2%
Low	1,296	-	-	53	1,349	76%
Moderate	342	-	-	0	342	19
High	44	-	-	0	44	3%
Total	1,716	-	-	53	1,769	100%

B. Water-Repellent Soil (acres): 391

Hydrophobicity was difficult to detect across all burn severities. Where hydrophobicity did occur, it was categorized as Shallow & Weak. Many of the soils in the burned area have very little organic matter (Soil Organic Carbon) to volatilize the hydrocarbons out of and onto soil particles resulting in a hydrophobic layer.

C. Soil Erosion Hazard Rating: 0 acres with high; 410 acres with moderate; 1354 with low.

D. Erosion Potential: Estimates of channel and hillslope erosion from WEPPcloud modeling are reported below in Table 7. The values show despite erosion and deposition on the hillslopes, most of the sediment discharge will derive from drainage channels.

Table 7: Erosion Potential

Analysis Watershed	Hillslope soil loss (tons/year)	Channel soil loss (tons/year)	Outlet sediment discharge (tons/yr)
Oak Creek	180	360	400
Dry Creek	130	370	500

E. Sediment Potential: Estimates of sediment delivered to the modeled catchment outlets are reported above in Table 7. The additive effects of hillslope slope-wash contributing to bared channels is modeled to produce from 130 to 500 tons of sediment per year.

F. Estimated Vegetative Recovery Period (years): Most of the fire area has had multiple fires in the past two decades which has changed the ecosystem from PJ/Oak to a mosaic of PJ/Oak/Grasslands. Most of the grasslands will recover within 1-2 years, while the Gambel oak communities will begin to resprout within the first year and achieve stable communities within 3-5 years.

G. Estimated Hydrologic Response: The primary watershed responses of the Dry Creek fire are expected to include: 1) an initial flush of ash and small debris, 2) some rill and gully erosion on steep slopes within the burned area, and 3) potential flash floods and debris flows during summer monsoonal precipitation events (July – September). In steep areas with high soil burn severity, storms will likely create increased surface flow that could trigger floods or debris flows. However, most of the fire scar has a very high amount of embedded rock and bedrock that acts as ground cover and armour. Along with highly armored and stable slopes, much of the ground cover in the form of litter and duff was retained and is infiltrating water rapidly. In the areas that could produce some flooding, it is expected to be most pronounced during the first 1- 3 years after the fire and will become less evident as vegetation and soil-hydrologic function recover. Post-fire runoff modeling was conducted on two analysis watersheds across the Dry Creek fire. The WILDCAT 5 model was used to predict post-fire flows for 2, 5, 10, 25-year precipitation events of 30-minute duration. These increases in peak-flows are expected to occur in response to short duration, high intensity thunderstorms. The Oak Creek analysis watershed has the most significant increases in magnitude, while the Dry Creek analysis watershed had limited

fire impacts. Oak Creek analysis watershed is predicted to see increases in magnitude of approximately 3-4 times greater than pre-fire conditions for the 2 to 5-year events, while the Dry Creek analysis watershed is predicted to see increases in magnitude of approximately 0 to 0.3 times greater than pre-fire conditions for the 2 and 5-year events. Although this model predicts water runoff, some degree of flow bulking is likely to occur in the watersheds affected by the Dry Creek Fire over the next few years. These elevated post-fire flows and bulking could lead to plugged culverts, erosion of road infrastructure, decreased soil productivity and hydrologic function, as well as threats to human life and safety. Previous debris flow mitigation work has been done just below the NFS boundary on both analysis watersheds in the form of 3 debris basins that can capture 45 to 60 acre-feet of water and sediment.

PART V - SUMMARY OF ANALYSIS

Introduction/Background

The Dry Creek Fire was human caused on private land and burned onto the Forest after a windy event. Nearly all of the area burned in the Dry Creek Fire on NFS lands burned in the Devins Den (2006) and Clay Springs Fire (2012). Repeated fire activity has resulted in a shift of vegetative communities away from large, contiguous areas of juniper to an open grass, oak and shrub dominated landscape. Some of the remaining pockets of juniper and riparian areas were consumed in the Dry Creek Fire and especially on the southside of Oak Creek where most of the high severities are located.

A. Describe Critical Values/Resources and Threats (narrative):

Much work has been done in the vicinity from previous BAER funds. As a result of a now shorter fire return interval, much of the area is not forested (small areas of Juniper, mountain brush, and riparian exist), nor is there a high amount of downed coarse wood. The low timber quantity and lack of woody fuel load has resulted in the majority of the burned area to be dominantly comprised of grasses and shrubs that burned primarily in the low and secondarily in the moderate soil burn severity classes.

Table 8: Critical Value Matrix

Probability of Damage or Loss	Magnitude of Consequences		
	Major	Moderate	Minor
	RISK		
Very Likely	Very High	Very High	Low
Likely	Very High	High	Low
Possible	High	Intermediate	Low
Unlikely	Intermediate	Low	Very Low

1. Human Life and Safety (HLS):

- a. Human life and safety of Forest visitors and employees traveling on NFS roads and trails, in the burn scar is threatened due to the potential for injury or loss of life from hazard tree strikes, falling rocks, flash floods, debris flows, and other burned area hazards. The probability of damage or loss is **possible** since the fire is along a county highway, fishing stream, and campground. The magnitude of consequence is **major** since an overhead hazard strike, entrapment in a flood or debris flow, or motorized vehicle collision with downed trees or fallen rocks could result in serious injury or loss of life. The risk level is **high**. Warning signs and storm patrols are recommended.

2. **Property (P):** NFS Trails such as the Spencer Koyle Memorial Trail is a NFS asset that is threatened by soil/water erosion. This trail could be impacted by excessive rilling and sheet erosion traversing the trail. The probability that some damage in the form of erosion, rilling, and/or sedimentation is **likely**. The magnitude of consequence is **moderate** since the use of the trail is important for many people in the public and it would be costly to fix the trail. The risk level is **high**. The recommended treatment is trail armoring and drainage installations.

- a. NFS Roads in Oak Creek, Dry Creek, Cascade Canyon, Mahogany Hollow ATV Trail, FSRD 1816 (Cave RD) all have potential impacts from debris flows and erosion. The probability that damage and erosion occur is **likely** in the form of plugged or damaged culverts, sedimentation on roadways, erosion of road prism, etc. The magnitude of consequence is **moderate** as plugged culverts and damage to road prisms could indirectly be a safety concern for public traveling on these NFS roads. The risk level is **high**. Treatment recommendations include drainage installation on roadsides and road armoring (fords).
- b. Oak Creek Campground is within the fire perimeter and is threatened by debris flows from previous and current fire impacts. The probability of damage or loss of the campground is **unlikely** due to the very limited amount of recent burn on the upstream side. The southern flank of the fire has potential for debris movement, but very little due to a ridge blocking debris flows from impacting the campground. The magnitude of consequence is **major** as an extreme precipitation could destroy an NFS cabin and other infrastructure. Because the risk level is **intermediate**, no treatments are recommended.

3. Natural Resources (NR):

- a. *Soil productivity and hydrologic function* within the Dry Creek Fire burned area are threatened by increased runoff and erosion. While a proportion of eroded soil will remain on the hillslope, delivery of eroded soil to stream channels could occur. The probability of damage is **possible** due to the consumption of ground cover by the fire in moderate and high severity burn areas. However, the magnitude of consequence is **minor** because any soil damage is expected to be recoverable and localized. Because of this, the risk is **low**, and no treatments are recommended.
- b. There is an increased risk to *native or naturalized plant communities* on NFS lands from invasive species and other weeds. The probability of damage to native or naturalized plant communities is **likely** due to multiple factors: 1) newly disturbed areas, such as the 11 miles of dozer line are highly prone to weed invasion; 2) there were no weed mitigation tactics in place during fire suppression; and 3) there is moderate or high SBS adjacent to road corridors that experience high use. The magnitude of consequence from this damage is **moderate** because there will be long-term effects of weed invasion to existing intact native plant communities. The risk is **high**. Treatment recommendations include early detection, rapid response.
- c. The aquatic species habitat in the high severity areas below the campground are threatened by debris flow and decreases in water quality. The probability of damage is **possible** as most high severity soils are adjacent to the stream bottom. The magnitude of consequence from potential damage is **moderate**. Impacts to water quality are usually temporary and coincide with total suspended sediment (usually during precipitation events). The area of aquatic habitat is relatively small as Oak City has a water diversion structure just downstream that diverts all water in the system. The risk level is **intermediate**. No treatments are recommended.

4. Cultural and Heritage Resources: a. None

Minor Facilities & Infrastructure: Forest Sign (two-sided 'Entering and Leaving'), Fence (Campground)

<u>BAR Project Request</u>					
<u>BAR Buck and post Campground Fence (1,000 feet: qty 50-20 ft sections)</u>					
Treatment	Need	Cost	Quantity	Unit of Measure	Total
Installation	GS-5	20	40	cost/hour	\$800
Installation	GS-4	18	160	cost/hour	\$2,880
Fence Post	Materials	25	150	cost/post	\$3,750
Fence Rails	Materials	45	100	cost/rail	\$4,500

Materials	Misc. all thread Bolts/washer/nuts /drill bits	500	1	job	\$500
Total					\$12,430
<u>BAR Oak Creek Entrance/Leaving</u>					
<u>Sign</u>					
Treatment	Need	Cost	Quantity	Unit of Measure	Total
Installation	GS-5	250	2	Cost/day	\$500
sign entering	Sign	750	1	cost/sign	\$750
sign exiting	Sign	750	1	cost/sign	\$750
Materials	Posts /hardware	200	1	Cost/posts	\$200
Total					\$2,200

BAR Project requests form has been completed and added to this 2500-8 requesting funds to replace Forest two-sided portal sign, and fences that were burned. Requirements for funding approval will accompany that request.

B. Emergency Treatment Objectives:

Public Users fo FS Roads & Trails: Warning Signs & Storm Patrols

We are requesting funding for "Burned Area Ahead" (or similar) warning signs (materials & labor) to be placed at the main Forest entrances & thru-ways notifying the public of potential hazards resulting from the fire.

Property (P):

FS System Roads: Road culvert and ditchline cleanout along heavily used Oak Creek Road (FS0089).

FS System Trails: Trail Armoring & Drainage Installation on Spencer Koyle Memorial Trail. This trail is used annually by numerous Firefighter groups as a facilitated learning experience regarding the topics of firefighter safety and fatalities.

We are requesting funding (materials & salary) to armor and improve drainage on NFS road (0089) and the Spencer Koyle Memorial Trail in the burned area. Armoring and improving drainage on NFS road (cleanout culvert and ditches from Devils Den Culvert to Oak Creek Campground within the burn perimeter) and trail would reduce the threat of significant erosion or total washouts during heavy flow events. It will allow for safer travel on the road as well. The trail has numerous steep sections that have the potential to form gullies and wash the trail out. Since the area burns at a high frequency, not all roads and trails within the burned area require treatment. Storm patrol funding is requested to respond to flood incidents, as needed, in lieu of, upsizing or installing multiple new culverts. Patrolling during rain events and responding with equipment, when necessary, is a more cost-effective option.

Natural Resources (NR):Soil Productivity, Hydrologic Function, Native & Naturalized Plant Communities:
Noxious Weed Treatments

We are requesting funds to detect, treat emerging noxious weeds and monitor treatment effectiveness. Monitoring would analyze the effectiveness of treatments within the burned and suppression disturbance area. Funds requested would be used for treatment supplies (i.e. herbicide) and salaries to conduct treatments and monitoring.

C. Probability of Completing Treatment Prior to Damaging Storm or Event:**Land:** 80%**Channel:** N/A**Roads/Trails:** 75%**Protection/Safety:** 95%**D. Probability of Treatment Success***Table 9: Probability of Treatment Success*

	1 year after treatment	3 years after treatment	5 years after treatment
Land	85%	90%	90%
Channel	N/A	N/A	N/A
Roads/Trails	80%	90%	90%
Protection/Safety	90%	80%	70%

E. Cost of No-Action (Including Loss):

The values at risk directly lost through No-Action includes;

- Human Life and Safety – Signs
 - o People unfamiliar with local conditions entering the burned area. The burned area is very popular for campers and ATVers year-round, and hunters in the fall. They may be in danger of roads washing out or access being blocked out of the fire area.
 - o Closure of the area is not appropriate because the threat only exists during infrequent weather events
- Property – Road and Trail Armoring
 - o Significant damage to roads and trails very likely resulting in the Forest having to undertake much more reconstruction of the road and trail prisms
 - o Loss of soil productivity and hydrologic function due to extensive erosion for which there is no replacement
- Natural Resources – Noxious Weed Treatment
 - o Without aggressively addressing weeds expansion to bare and exposed soils, noxious weed and invasive exotics will expand into sites previously dominated by native plant communities. Knowledge and research surrounding the detriments of this to soil productivity, hydrologic function and other non-BAER values (wildlife forage, general ecology, etc.) are widely available. Once infested with non-native undesirable plants, treatments to reestablish desirable species are nearly impossible.

F. Skills Represented on Burned-Area Survey Team:

- ☒ Soils ☒ Hydrology ☒ Engineering ☒ GIS ☒ Archaeology
☒ Weeds ☒ Recreation ☐ Fisheries ☐ Wildlife
☐ Other:

Team Leader: Adam Solt**Email:** Adam.Solt@USDA.GOV**Phone(s)** (435) 896-1079**Forest BAER Coordinator:** Stan Andersen**Email:** Stan.Andersen@USDA.GOV**Phone(s):** 435-896-1050**Team Members:** *Table 10: BAER Team Members by Skill*

Skill	Team Member Name
<i>Team Lead(s)</i>	Adam Solt and Doug Robison
<i>Soils</i>	Daniel Lay and Adam Solt

Skill	Team Member Name
<i>Hydrology</i>	Daniel Lay and Adam Solt
<i>Engineering</i>	Garon Sandall
<i>GIS</i>	Maggie Toone
<i>Archaeology</i>	Angela Rooker
<i>Weeds</i>	Doug Robison
<i>Recreation</i>	Doug Robison
<i>Other</i>	

G. Treatment Narratives

Protection/Safety Treatments:

Funds requested for Protection/Safety Treatments are as follows to reduce the threat of to Critical BAER values; Human Life and Safety:

<u>Dry Creek BAER Human Life and Safety Treatments</u>					
Treatment	Need	Cost	Quantity	Unit of Measure	Total
Sign Installation	GS-5	\$250	2	days	\$500
Large Warning Signs	at portals	\$100	2	each	\$200
Small Orange/and Black Warning Sign	egress from canyon	\$113	1	each	\$113
Storm Inspection and Response	Portals, Roads, Trails	\$5,000	1	Job	\$5,000
Total					\$5,813

Signs would be installed at the main portals that provide the most heavily used access into the burned area.

Land Treatments:

Funds requested for Land Treatments are as follows to reduce the threat of impact to Critical BAER values; Native & Naturalized Plant Communities, Soil Productivity and Hydrologic Function:

<u>Dry Creek BAER Land Treatments</u>					
Treatment	Need	Cost	Quantity	Unit of Measure	Total
Weed Treatment	GS-11	\$37	24	cost/hour	\$888
Weed Treatment	GS-5	\$20	80	cost/hour	\$1,600
Weed Treatment	Herbicide	\$45	21.6	cost/acre	\$972
Weed Treatment	Equipment Use	\$36	4	cost/day	\$144
Weed Treatment	FS Vehicles	\$1	450	cost/mile	\$450
Weed Treatment	PPE	\$300	1	job	\$300
Total					\$4,354

Weed treatments would limit the expansion of noxious weeds within the burned area especially on areas disturbed during suppression. Treatments are focused on areas that were bladed as control lines. Those lines on or outside of the fire perimeter make up 9.9 miles and 21.6 acres of the total treatment and are limited to the disturbed area only. Additional benefits of the treatment would be to identify any new establishment of weeds on the forest for rapid response in the first year and follow up treatments after BAER work is completed.

Roads and Trail Treatments:

Funds requested for Roads and Trails Treatments are as follows to reduce the threat of impact to Critical BAER Values; FS System Roads, FS System Trails, Soil Productivity and Hydrologic Function:

Dry Creek BAER Road and Trail Treatments					
Treatment	Need	Cost	Quantity	Unit of Measure	Total
FR089-Oak Creek	Backhoe	\$125	6	cost/hour	\$750
Spencer Koyle Memorial Trail	GS-5	\$20	40	cost/hour	\$800
SKMT	GS-4	\$18	160	cost/hour	\$2,880
SKMT	GS-11	\$37	16	cost/hour	\$592
Mobilization- Demob	Equipment	\$12	246	cost/mile	\$2,952
Total Road					\$3,702
Total Trail					\$4,272
Total					\$7,974

Road treatments would include cleaning one culvert near the mouth of Devils Den and ditches from near Devils den culvert up to Oak Creek Campground to preserve the road infrastructure investment in Oak Creek. The work includes 1 mile of roads with 1 main culvert and all of the ditches on the northside of the road from the campground down to the culvert. Ditching is to prevent flooding from using the road as a channel. Armoring the trail at low spots and installing water bars are proposed on the Spencer Koyle Memorial Trail using onsite rock materials since the area has rocks readily available. There are very steep sections on this trail. With all of the trail being within the burn area and the amount of area burned in moderate severity proactive protection treatments are recommended.

Trail treatments are proposed to preserve the trail infrastructure on 1.6 miles of Spencer Koyle Memorial Trail in Devils Den Canyon. The canyon contains many pockets of moderate and high intensities surrounding the trail. Waterbars should be installed every 25 to 50 feet on grades on 20 to 40% and every 100 feet at lower inclines. Native materials will be used to reinforce these structures and it is advised to use cobble or vegetation, where available, at the outlets to dissipate water energy.

H. Monitoring Narrative:

PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS

Line Items	Units	Unit Cost	# of Units	BAER \$	Other \$	# of units	Fed \$	# of Units	Non Fed \$	Total \$
A. Land Treatments										
Weed Treatment	acres	202	21.6	\$4,352	\$0		\$0		\$0	\$4,352
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
Subtotal Land Treatments				\$4,352	\$0		\$0		\$0	\$4,352
B. Channel Treatments										
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
Subtotal Channel Treatments				\$0	\$0		\$0		\$0	\$0
C. Road and Trails										
Road	miles	3,702	1	\$3,702	\$0		\$0		\$0	\$3,702
Trail	miles	2,136	2	\$4,272	\$0		\$0		\$0	\$4,272
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
Subtotal Road and Trails				\$7,974	\$0		\$0		\$0	\$7,974
D. Protection/Safety										
Signs	Qty.	271	3	\$813	\$0		\$0		\$0	\$813
Storm Inspection & Response	Job	5,000	1	\$5,000	\$0		\$0		\$0	\$5,000
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
Subtotal Protection/Safety				\$5,813	\$0		\$0		\$0	\$5,813
E. BAER Evaluation										
Initial Assessment	Report	\$15,110		---	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				---	\$0		\$0		\$0	\$0
Subtotal Evaluation				\$0	\$0		\$0		\$0	\$0
F. Monitoring										
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
Subtotal Monitoring				\$0	\$0		\$0		\$0	\$0
G. Totals										
				\$18,139	\$0		\$0		\$0	\$18,139
Previously approved										
Total for this request				\$18,139						

PART VII - APPROVALS

1. _____
 Forest Supervisor Date _____