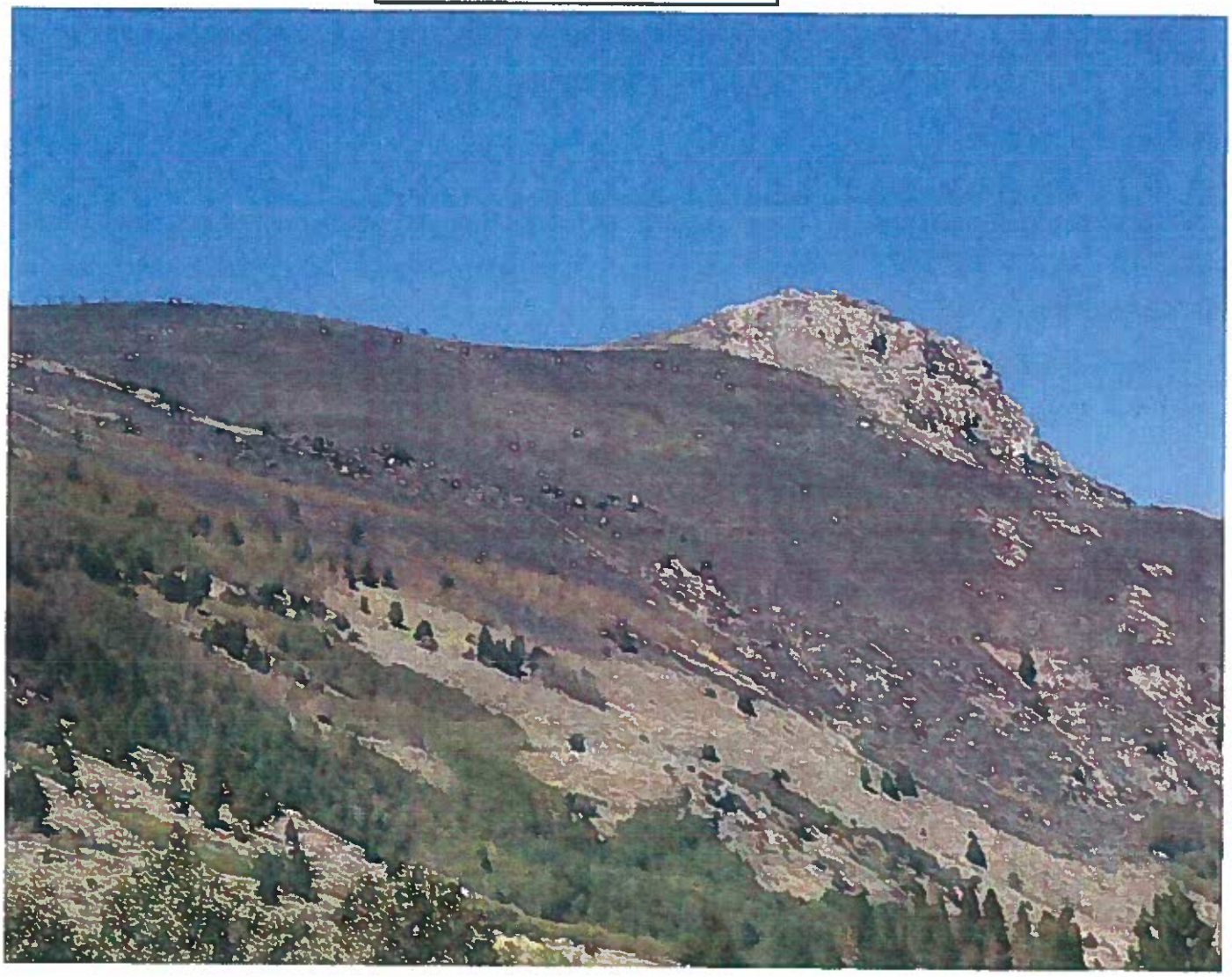
Grant Fire August 2017
BAER – 2500-8 Report
Inyo National Forest



USDA-FOREST SERVICE

FS-2500-8 (6/06)

Date of Report: 8/11/2017

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

[x] 1. Funding request for estimated emergency stabilization funds
[ ] 2. Accomplishment Report
[ ] 3. No Treatment Recommendation

B. Type of Action

[x] 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)

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Grant

B. Fire Number: CA- INF-001235

C. State: CA

D. County: Mono

E. Region: R5

F. Forest: Inyo

G. District: Mono

H. Fire Incident Job Code: P5K8PB

I. Date Fire Started: 7/31/2017

J. Date Fire Contained: August 4, 2017

K. Suppression Cost: $325,000

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): Approximately .50 miles of handline.
2. Fireline seeded (miles): 0
3. Other (identify): 0

M. Watershed Number: 180901010301 Lower Rush Creek

N. Total Acres Burned:
NFS Acres: (391) Other Federal ( ) State () Private ()

O. Vegetation Types: Sage, Heavy Shrub, Grasses, Aspen, Pinyon Pine, Lodgepole Pine

P. Dominant Soils: Biglake

Q. Geologic Types: Meta-Sedimentary, Conglomerate

R. Miles of Stream Channels by Order or Class:

Perennial: 0 Intermittent: 1.20 Ephemeral: .30

S. Transportation System

Trails: 0.9 miles of Level 3 trail Roads: ½ mile of State Highway ¼ mile below fire edge

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 40 (v. low), 176 (low), 175 (moderate) 0 (high)

B. Water-Repellent Soil (acres): 175

C. Soil Erosion Hazard Rating (acres):
176 (low) ___175_(moderate) ____ (high)

D. Erosion Potential: 2.5 tons/acre

ERMiT allows users to predict the probability of a given amount of sediment delivery to the base of a hillslope following variable burns on forest, rangeland, and chaparral conditions in each of five years following wildfire. The ERMiT model can be accessed at http://forest.moscowfsl.wsu.edu/fswepp/
ERMiT Model Assumptions and Inputs:

- Slope length was 200 feet for all ERMiT runs
- Soil surface texture was sandy loam
- Soil Rock Content was 35%/Volume
- There is a low (20%) probability the rates of erosion will exceed the amounts shown in the preceding table in the first year following the fire.

Conclusions:

- High intensity, short duration summer thundershowers are storm events of concern. Additionally, longer duration medium intensity storms over the winter months are like to generate erosion and flooding within and downstream from the burned area.
- In addition to fire, existing ground disturbance (trails) influence soil erosion and watershed response to precipitation events within the burned area.

Soil Burn Severity and ancilliary characteristics:

Forested: Small clusters of Aspen trees burned completely, most of the Aspen stands were partially burned, or singed. Most of the widely spaced conifers in the fire area did not burn as the fire burned understory around the trees without causing ignition to trees.

Shrub: Most of the shrub vegetation within the burned area was mapped as low to moderate soil burn severity given that the shrub commmunity is composed of Sage, Rabbit brush, Manzanita and Bitterbrush and to a lesser extent Mountain Mahoghany. Although these areas had areas of bare ground before the fire, removal of ground cover was often high and it is expected that erosion and sediment delivery to stream channels from these slopes will be moderate to high. Vegetative recovery is likely to occur through sprouting of shrubs and establishment of grasses and herbaceous vegetation.

Recovery of watershed hydrologic response depends on many factors and is likely to take at least 3-5 years.

Grass, Bare Ground and Rock Outcrop: Grass, bare ground and rock outcrop areas within the burn were mapped as unburned or low burn severity. Soil heating in these areas was low to very low and, although minimally affected by the fire, recovery of watershed response is expected to occur rapidly.

E. Sediment Potential: 1,600 cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years):	3-5
B. Design Chance of Success, (percent):	80
C. Equivalent Design Recurrence Interval, (years):	5
D. Design Storm Duration, (hours):	.5
E. Design Storm Magnitude, (inches):	.54
F. Design Flow, (cubic feet / second/ square mile):	79
G. Estimated Reduction in Infiltration, (percent):	45
H. Adjusted Design Flow, (cfs per square mile):	143 See below for additonal info

PART V - SUMMARY OF ANALYSIS

Introduction:

The Grant Fire started the afternoon of July 31, 2017. The fire burned approximately 391 acres, partially within the Ansel Adams Wilderness.

The soil burn severity (SBS) map shows approximately 45% burned at moderate soil burn severity. There was no high burn severity noted during field observations. Soil and vegetation moisture levels were higher than normal for August due to the record winter of 2017. Fire consumed upland vegetation most fully but did not burn soil at a high severity, and riparian areas (grasses, Aspen stands, etc) resisted burning and burned at low severity. Soil samples for hydrophobicity taken in moderate burn areas did show elevated levels of water repellency, likely due to vegetation types that when burned tend to add to soil hydrophobic propeties. The rest of the fire was either very low, low soil burn severity or unburned. It is very important to understand the difference between *fire intensity* and *burn severity*, and *soil burn severity* as defined for watershed condition evaluation in Burned Area Emergency Response BAER analyses. Fire intensity or burn severity as defined by fire, fuels, or vegetation specialists may consider such parameters as flame height, rate of spread, fuel loading, thermal potential, canopy consumption, tree mortality, etc. For BAER analyses, mapping is not simply vegetation mortality or above-ground effects of the fire – soil burn severity considers additional surface and below-ground factors that relate to soil hydrologic function, runoff and erosion potential, and vegetative recovery. Areas of moderate soil burn severity are present throughout the fire. Areas of high and moderate soil burn severity (especially high) are considered "flood source" areas and can produce accelerated runoff

and sedimentation affecting roads, trails, water quality, and downstream infrastructure.

Based on historic precipitation patterns, it can be expected that late season monsoon rains or frontal storms in mid-late September are the first runoff producing events following the Grant Fire. Generally, at the first rains in September there is drying period until mid-November. The risk of flooding and erosional events will increase as a result of the fire, creating hazardous conditions within and downstream of the burned area. These hazardous conditions may be worsened in the case of a rain-on-snow event, where long-duration rainstorms falling on a shallow snowpack can produce very high peak flows.

The fire was divided into three sub-watersheds with a "pourpoint" established at the bottom of burned watersheds, or where values at risk were located. Watershed runoff response is referenced to these points.

Soils/Erosion Response

Soils in the fire area have a sandy and gravelly non-cohesive surface texture, with various amounts of gravel and cobble. Erosion response is heavily influenced by soil burn severity, hillslope geomorphology, slope, rock outcrop and surface texture. The burn affected soil aggregate stability, canopy cover (low amounts in fire area), ground cover and infiltration rates. Erosion hazard is greatest below rock outcrops, generally located mid-slope above Highway 158. These soils are susceptible to sheet, rill and gully erosion after the fire due to their low cohesive strength, though this is partially mitigated by the high surface rock content and a large area of unburned vegetation below the fire area above Highway 158.

Pre-fire slope stability and recovery of watershed hydrologic response is dependent on many factors and typicaly occurs within 3-5 years following the fire. Recovery of moderate burn severity areas is generally slow for the first 1-2 years and usually recovers quickly afterwards because vegetation was not severely burned.

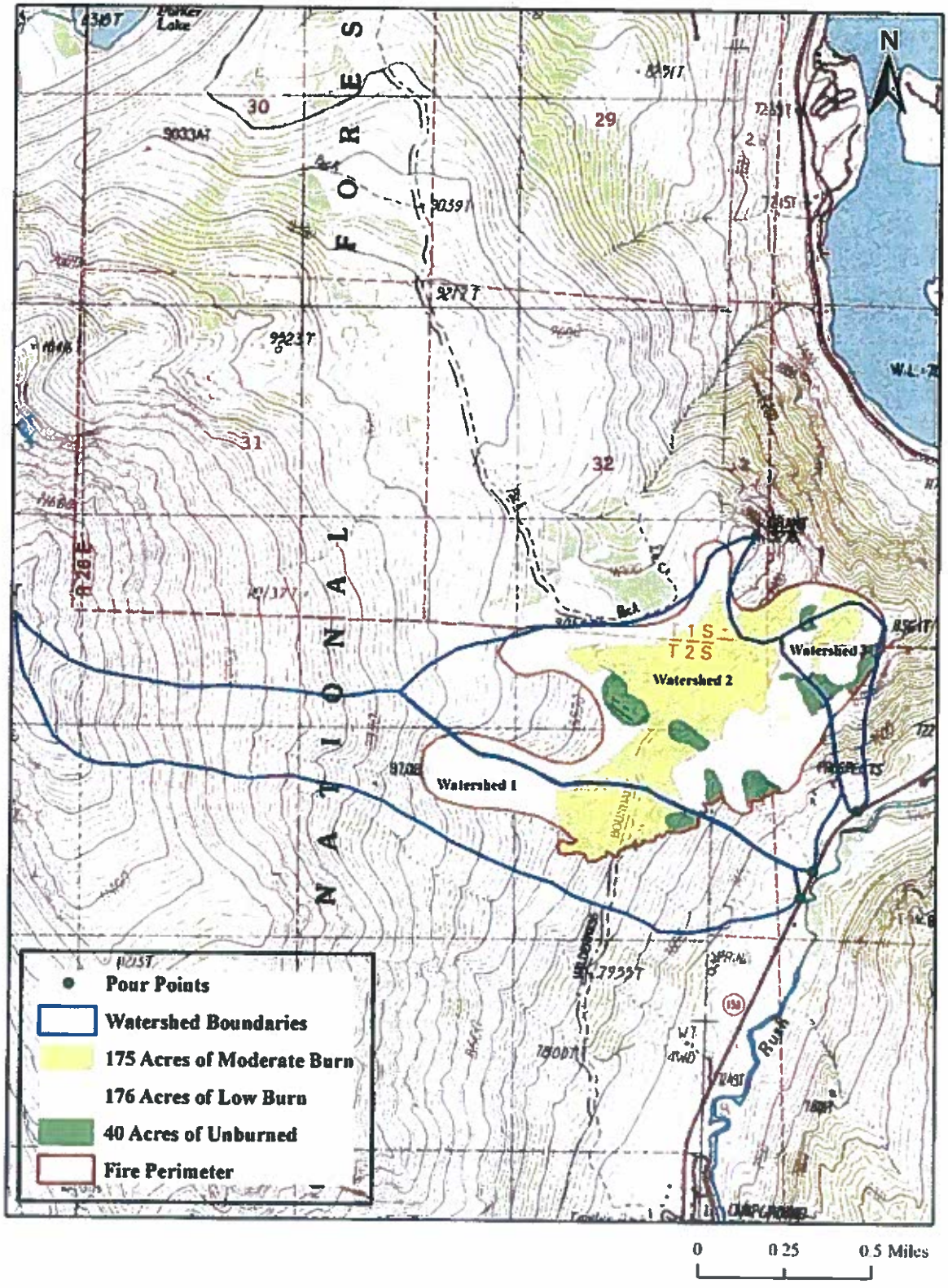
Watershed Response:

The fire occurred within the Lower Rush Creek (HUC 12) watersheds. . Three sub watersheds in the fire area were delineated and hydrologic modeling conducted during the BAER assessment.

Hydrologic modeling was conducted for the fire area and all the watersheds modeled have an expected increase in the Q5 discharge compared to pre-fire conditions. In Watershed 2 we expect an increase in Q5 discharge by 43% more than the pre-fire conditions. This is due to the amount of moderate soil burn severity in the watershed.

(See **Table 2** for the results of the hydrologic modeling).

Inyo National Forest: Grant Fire Burn Severity Map



Map 1: Soil Burn Severity and Analysis Watersheds of the Grant Fire

Table 1: Displays the amount of burn severity and acres burned throughout the fire area

Watershed	Total Acres	Unburned Acres	Low Severity Acres	Moderate Severity Acres	High Severity Acres
Watershed 1	409	334	37	38	0
Watershed 2	374	153	114	107	0
Watershed 3	55	25	18	12	0
All Fire Totals	838	512	169	157	0

Table 2. Hydrologic modeling for select watershed in the Grant Fire.

Grant Fire BAER - Inyo NF

**Design Flow for 5 year storm (South Lahontan/Colorado Desert Region)

			Pre-Fire Peak Flow in cubic feet per second (cfs)				Soil Burn Severity (acres)				In Cubic Feet per Second (cfs)						
Pour Point Analysis Watersheds	Drainage Acres	Drainage Area (mi2)	Q2	Q5	Q10	Q25	Unburned	Low	Moderate	High	Pre fire Q5	Q from unburned	Q from low	Q from moderate	Q from High	Post fireTotal Q5	Change in Q5 Flow
Watershed 1	409	0.64	5	46	123	322	334	37	38	0	46	33	4	4	0	33	-13
Watershed 2	374	0.58	9	46	115	297	153	114	107	0	46	15	14	33	0	66	43
Watershed 3	55	0.09	3	17	44	116	25	19	12	0	17	9	5	3	0	15	-2
		0.00	0	0	0	0				0	0	=D6-D5	=D6-D5	=D6-D5	=D6-D5	=D6-D5	=D6-D5
													Total Post Fire Flow			115	31

From: Methods for Determining Magnitude and Frequency of Floods in California, Based on Data through Water Year 2006
By Anthony J. Gotvald, Nancy A. Barth, Andrea G. Veilleux, and Christa Parrett, 2012

*Change in flow is the increase in flow resulting from the reduction in soil infiltration after a fire based on a paper by Tom Hann
Acres of unburned and low soil burn severity are modeled at Q5. Acres of moderate soil burn severity are modeled at Q10 and acres of high soil
are modeled at Q25. A weighted average is then calculated to derive at post fire Q5

*Spreadsheet prepared by Derek McCombs US Forest Service

Water Quality

Three small intermittent streams originating from springs are found in the fire area. It is likely that post-fire ash, fine soil, and debris will temporarily degrade water quality in these streams. The streams do not have hydrologic continuity to Rush Creek, a large perennial stream below the fire area unless unusual hydrologic events/flows occur. If this occurs, a slight to moderate and short lived episode of sediment and ash could enter Rush Creek, but the effect would be minor because the much larger flow in Rush Creek would tend to dilute the relatively small amounts of sediment entering the stream. **Table 2** above shows that there is a 43 % increase in peak flow Watershed 2, the largest burned watershed in the fire, as compared to pre-fire conditions with a five year return interval event.

Geology/Geologic Response:

Rock Fall: Rock fall hazards are low in the fire area, and exisitng rock outcrops are mostly intact. The open slopes are comprised of deep soil , rooted vegetation and exiting loose rock is unlikely to roll out. A developed area of unburned vegetation below the fire area and Highway 158 will likely slow or capture any fugitive rock falling from the burned area above and the threat to vehicles and pedestrians are low.

Debris Flow: Evidence of recent pre-fire debris flows within the burned area were not observed. Debris flows from the fire area are possible but unlikely because the burn severity overall was not high and there are no channel formations present with the type of shape and length to carry debris flows from the burn area. With the large unburned area below the fire and Highway 158, any mobilized materials from the fire area would likely be mitigated within the vegetation buffer.

The risk for mud flow occurrence because of the fire as a result of the fire is considered to be LOW two years following the fire and will decrease in year three.

A. Describe Critical Values/Resources and Threats:

*The risk matrix below, Exhibit 2 of Interim Directive No.: **2520-2010-1** was used to evaluate the Risk Level for each value identified during Assessment. Only values at risk that had a risk of Intermediate or above are discussed.*

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**

Threats to Life/Safety and Property

CA State Highway 158: There is approximately 1/2 mile of State (Caltrans) highway directly adjacent and below the fire area. Large areas of moderate burn severity occurred above the highway. The highway is paved and provides access to the June Lake Loop Recreation Area on the Inyo National Forest, is a important connector to the June Lake resort corridor from Highway 395 and a very popular summer use area; and accesses trailheads leading to the Ansel Adams Wilderness. There are 3 culverts or inlets along Highway 158 below the fire that could get overwhelmed with post-fire debris and could cause minor flooding to the highway. The culverts are currently partially plugged with sediment and are in need of maintenance.

Emergency Determination:

Imminent hazards to the road system vary from nuisance sediment to minor flooding if culverts are blocked with sediment and debris, as the culverts drain the watersheds of the fire area.

Probability of Damage or Loss: Possible

Magnitude of consequences: Minor

Risk Level: Low

Treatment: Communicate and provide information with Caltrans personnel on condition of culverts and expected increases of sediment due to the fire.

Forest System Trail # 2603 (Parker Bench Trail): The Parker Bench Trail traverses through the Grant Fire area for 0.90 mile. Approximately 0.60 miles of the trail is located in and below moderate burned slopes. The trail has not been keep up to standards with trail maintenance (Level 3 standard trail) and existing erosion control features are in poor condition. The trail will likely channel runoff from burned slopes and concentrate flows that could lead to severe trail incision, off site soil impacts and introduce increased sediment to the intermittent channels in the area. Without treatment, the trail could become unstable for stock and hiker use, and could lead to the creation of undesirable use trails or multiple trails. The trail is frequently used by stock riders and hikers from the June Lake loop recreation area, and if badly degraded could be a safety issue for stock and stock riders. With expected increases of runoff as a result of the fire the trail could be severely impacted and result in increased repair costs if not treated.

Emergency Determination:

Probability of Damage or Loss: Likely

Magnitude of consequences: Moderate

Risk Level: High

Threats to Natural and Cultural Resources

Big Horn Sheep (*Ovis canadensis sierra*)_ The Grant Fire burned 300 acres of critical SNBS habitat and part of the acres burned was located within the Ansel Adams Wilderness administered by the INF(see table below). Elevation of the Grant Fire ranged between 7600 feet to 9600 feet which is within SNBS summer range.

GRANT FIRE				
Total Acres	Inyo NF Acres	Wilderness Acres	Private Property	Critical Habitat Acres
391	391	118	0	300

The entire portion of the Grant Fire within Critical SNBS Habitat caused a neutral effect, where some loss of forage occurred as a result of the fire, but forage and habitat will be enhanced after fire recovery.

Emergency Determination:

Probability of damage or loss: Unlikely

Magnitude of Consequences: Minor

Risk Level: Very Low

Cultural Resources:

No threat to cultural resources exists due to the post-fire environment. Potential impacts to cultural resources will be evaluated during project implementation.

Ecosystem Stability and Vegetation Recovery

Invasive weeds:

Inventory: Botanical survey data is lacking for the area impacted by the Grant Fire. There are no botanical resource concerns related to the Grant Fire that would necessitate BAER treatment actions. There are no known sensitive or high priority invasive plant species mapped within the fire area. No TES plant species are found in the fire area therefore additional analysis or treatments are not needed. In addition, there was little ground disturbance (e.g. no dozer line, minimal hand line) during fire suppression.

The fire burned primarily in Aspen, Mountain Mahogany, Manzanita, and Sagebrush. Small portions of dry to wet meadows have burned.

The fire burned partially within the Ansel Adams Wilderness (118 acres) and no dozer lines were constructed. Approximately 0.50 miles of hand line roughly one foot in width was constructed out of wilderness.

Emergency Determination:

Probability of damage or loss: Unlikely

Magnitude of Consequences: Minor

Risk Level: Very Low

B. Emergency Treatment Objectives:

Threats to Life and Property

1. Communicate and provide information to State Highways Department (Caltrans) on non-functional culverts and potential for debris and minor flooding caused by post fire runoff.

2. Protect trail infrastructure by minimizing runoff concentration that can cause soil erosion, off-trail soil and water quality impacts and damage to existing trail water control features. Install fire hazard warning signs at trailhead in to the fire area.

Threats to Critical Natural and Cultural Resources

Minor threat of short term ash and sediment delivery to Rush Creek below the fire area with low impact to water quality and fisheries. Communicate with Los Angeles Water and Power on threat (domestic water supply).

Threats to Ecosystem Stability

None

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

Land _ % Channel __ % Roads/Trails 90 % Protection/Safety 90 %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land			
Channel			
Roads/Trails	90	90	100
Protection/Safety	90	95	100

E. Cost of No-Action (Including Loss): $9,000 + increased risk of accelerated runoff on burned hillslopes, additional degradation of soil productivity and water quality.

F. Cost of Selected Alternative (Including Loss): $5,751

G. Skills Represented on Burned-Area Survey Team:

[x] Hydrology [x] Soils [ ] Geology [ ] Range [ ]
[ ] Forestry [x] Wildlife [ ] Fire Mgmt. [ ] Engineering [ ]
[ ] Contracting [ ] Ecology [x] Botany [x] Archaeology [ ]
[ ] Fisheries [ ] Research [ ] Landscape Arch [x] GIS

Team Leader: Casey Shannon

Email: cshannon@fs.fed.us Phone: 760-873-2407 FAX: 760-873-2458

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.)

1. **FS Trail #2603**

FS Trail # 2603 Stormproofing and stabilization, hazard signs: Improve drainage characterisitics on the trail to improve water control efficiency, remove outside berms to reduce flow concentration to the trail, maintian all existing water control features (rock waterbars, checks, outside drains, etc.) for best efficiency over 0.60 mile of trail in moderate burn area with steep slopes, and install additional dips on trail to increase drainage and reduce erosion potential. A watershed specislist will be present with trail crew during implementation to ensure adequate prescriptions are met.

Land Treatments:

N/A

Channel Treatments:

N/A

Protection/Safety Treatments:

Caution Signs FS System Trail # 2603				
Item	Unit	Unit Cost	# of Units	Cost
1 GS-9 Hydro	Days	1	1	$320.00
Signs	Each	$50	2	$100.00
Posts	each	$25	2	$50.00
Vehicle gas mileage	Miles	$0.75	100	$75.00
Total				$ 545.00

FS System Trail # 2603 Stormproofing and Stabilization				
Item	Unit	Unit Cost	# of Units	Cost
5 person trail crew	Days	$1375	2	$2750.00
Watershed Specialist Coordination	1	$325	2	$650.00
Crew Overhead (travel, tools, vehicles)	1	$412	1	$412.00
Vehicle gas mileage	Miles	$0.75	300	$225.00
Post-implementation Monitoring/Maintenance-Hydro Specialist	Days	320.00	2	$640.00
Total				$ 4675.00

Interagency Coordination: There is a need to continue the interagency coordination initiated during the BAER assessment. This involves communication and coordination with other federal, state and local agencies with jurisdiction over lands where life and property are at risk from post-fire conditions. Actions include but are not limited to cooperating with other agencies on hazard notification systems, exchanging information and coordinating the BAER implementation plan as needed when subsequent recovery plans are developed by other agencies. Follow-up phone communication and possible field meetings are anticipated with Caltrans, Los Angeles City Department of Water and Power and the National Weather Service.

Interagency Coordination				
Item	Unit	Unit Cost	# of Units	Cost
1 GS-12 Forest BAER coordinator	Days	$431	1	$431
Vehicle gas mileage	Miles	$0.50	200	$100
Total Cost				**$531**

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.)

Forest personnel will conduct a Level 1 Effectiveness monitoring of the trail treatments to check that treatments are present and functioning properly. The purpose is to ensure the action is meeting site-specific objectives or if there is a need for follow-up or re-treatment. Monitoring will be conducted after storm events. The report would include photographs and a recommendation on whether additional treatments are necessary. If the monitoring shows the treatment to be ineffective at stabilizing the trail and there is extensive loss of trail bed or infrastructure an interim report will be submitted. A several page monitoring report would be completed after the site visit.

Part VI – Emergency Stabilization Treatments and Source of Funds

Interim #

Subtotal Land Treatments				$0	$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										
FS Trail# 2603	0.6 mile	4675	1	$4,675	$0		$0		$0	$4,675
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road & Trails				$4,675	$0		$0		$0	$4,675
D. Protection/Safety										
Trail hazard Signs		545	1	$545	$0		$0		$0	$545
Interagecy Coord	day	531	1	$531	$0		$0		$0	$531
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Structures				$1,076	$0		$0		$0	$1,076
E. BAER Evaluation										
BAER Team	ea	3100	1	$3,100			$0		$0	$3,100
BAER implementation	day									
Insert new items above this line!				—	$0		$0		$0	$0
Subtotal Evaluation				$3,100	$0		$0		$0	$3,100
F. Monitoring										
Road	day		2	$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				$8,851	$0		$0		$0	$8,851
Previously approved										
Total for this request				$8,851						

PART VII - APPROVALS

1. Forest Supervisor (signature) — Date: 8/11/2017

2. Regional Forester (signature) — Date: 8/15/2017