Date of Report: 9/15/2021

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: Chaparral

B. Fire Number: CA-CNF-002791

C. State: California

D. County: San Diego

E. Region: 5

F. Forest: Cleveland

G. District: Trabuco

H. Fire Incident Job Code: P5N87R21

I. Date Fire Started: 9/28/2021

J. Date Fire Contained: 9/9/2021

K. Suppression Cost: approx. $4,500,000

L. Fire Suppression Damages Repaired with Suppression Funds (estimates):

1. **Fireline repaired (miles): 2**
2. **Other (identify): N/A**

M. Watershed Numbers:

Table 1: Acres Burned by Watershed

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
180703010203	Middle San Mateo Creek	29,972	1427	4.75%

N. Total Acres Burned: 1427

Table 2: Total Acres Burned by Ownership

OWNERSHIP	ACRES
NFS	1064
OTHER FEDERAL (LIST AGENCY AND ACRES)	0
STATE	0
PRIVATE	363
TOTAL	1427

O. Vegetation Types: Grassland, Chamise Chaparral, Ceanothus Chaparral, Coastal Sage Scrub, Oak Woodland

P. Dominant Soils: Cienaba Rock outcrop complex - 32%; Las Posas sandy loams – 27%, Rough Broken land – 12%, and variety of other soil types

Q. Geologic Types - Several geological formations are present, these include:

• Bedford Canyon Formation (Jurassic). Composed primarily of dark gray argillites and slates.
• Santiago Peak Volcanics (Jurassic). Mildly metamorphosed dark green to black andesite with sporadic outcrops of olive-green slate.
• San Marcos Gabbro (Cretaceous). Dominant in the Miller Mountain area.
• Granitic Rocks similar to Bonsall Tonalite and Woodson Mountain Granodiorite (Cretaceous).
• Aplite Dikes (Middle Miocene).
• Arkosic Deposits and Potential Paleosols (Tertiary). The arkosic deposits consist of greenish gray siltstone, micaceous siltstone and sandstone, and gravel set in a coarse arkosic matrix.
• Santa Rosa Basalt (Late Miocene). Olivine-basalt comprised of a lower alkalic series and an upper tholeiitic series. Dominant in the Miller Mountain area.

R. Miles of Stream Channels by Order or Class:

Table 3: Miles of Stream Channels by Order or Class

STREAM TYPE	MILES OF STREAM
PERENNIAL	0
INTERMITTENT	0
EPHEMERAL	17.4
OTHER (DEFINE)	0

S. **Transportation System:**
Trails: *National Forest (miles):* 0 *Other (miles):* 0
Roads: *National Forest (miles):* 1 *Other (miles):* 3 (private)

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

Table 4: Burn Severity Acres by Ownership

Soil Burn Severity	NFS	Other Federal (List Agency)	State	Private	Total	% within the Fire Perimeter
Unburned	83			41	123	9%
Low	796			265	1061	74
Moderate	182			60	242	17
High						
Total						

B. Water-Repellent Soil (248 acres, 17% of the fire):

Hydrophobic soil conditions are common in pre-fire conditions in chaparral dominated landscapes. Only moderate soil burn severity soils are estimated to have increased the level of hydrophobicity. Given the patchy nature of the burn and vegetation type (grasses and brush) the increase in hydrophobicity probably won't contribute too much to watershed response in most of the fire. The exception is the area draining to PP2, East Culvert where the majority of moderate soil burn severity is concentrated.

C. Soil Erosion Hazard Rating:

Percent of fire area:
Severe: 50.6% ; Moderate: 28.6% Slight: 4.8% Not rated: 16% (Rock land)

D. Erosion and Sediment Potential (F):

Rowe, Countryman, and Storey (1949) developed estimates of annual erosion rates for watersheds in the burn area based on measurements of sedimentation in reservoirs. On average, across the burn area, annual sediment delivery is estimated to increase 3.7 times greater than normal with an average of 3,247 cubic yards per square mile.

3,247 cubic yards/square mile (2-year runoff event) – Pre-fire 880 cubic yards/square mile

Table 5: Modeled Erosion Rates

		Percent Mod and High SBS	Post-Fire Sediment (cubic yards)	Pre-Fire Sediment (cubic yards)	Times Increase
PP1	West culvert	38%	1,700	284.6	6
PP2	East Culvert	12%	1,411	558.3	3

Slope and burn severity are dominant drivers of erosion rates in this fire. Moderate burn severity had a heavy rock component to mitigate some erosion response, but there is still high erosion potential. Erosion results by pourpoint are shown in the table above (table 5).

E. Debris Flow Potential:

The burn area has moderate slopes, minimal soil, and minimal contributing area to cause a significant debris flow. The channel is capable of mobilizing cobbles but there is a vegetated buffer to help arrest overland flow and carrying capacity of the flow. The road could be subject to a minor debris flow if one is generated in the catchment above.

G. Estimated Hydrologic Response (brief description):

Watershed Response

Damaging Storms: Annual precipitation ranges between 12 to 14 inches, primarily arriving between December and April although summer thundershowers are common in August and early fall. Although not the only types of storms that could occur, two common storm types that could cause post-fire damage within the burn area are monsoonal thunderstorms and storms related to atmospheric rivers. Short duration, high intensity storms (such as a monsoonal thundershowers) frequently trigger debris flows. The second storm type is a long duration storm, commonly linked to atmospheric rivers. Major flooding events have occurred across Southern California due to atmospheric rivers which contain large amounts of water vapor. One such weather system is known as the “Pineapple Express," which moves subtropical moisture from the latitudes of the Hawaiian Islands to Southern California.

Hydrologic Processes: Fire causes impacts to several hydrologic processes including reduction in interception, transpiration, and infiltration, and the rate of runoff (due to lack of litter and decreased surface roughness). Removal of vegetation and changes to soil such as increases in hydrophobicity, changes in soil structure, and removal of duff, organic matter, and roots alters these processes and ultimately lead to increases in runoff, peak flows and erosion. These alterations are typical of soils classified as having incurred moderate to high soil burn severity. Given the percentage of moderate soil burn severity and pattern of burn in the Chaparral Fire, watershed response will be high to moderate in some catchments (Table 6) and low in others (not modeled). Increases in runoff and bulking of flows in select pour points are expected to be 153% to 208% compared to normal. Dry ravel is pre-loading channels and existing latent sediment will be mobilized in post-fire flows increasing runoff volume.

Table 6: Modeled pre- and post-fire flows at select pour points for the 2 yr and 10 yr peak flows (normal flow is equal to 100%).

			2 yr. RI Peak Flow				10 yr. RI Peak Flow			
RCS Watershed	Modeled Pour Point	% of Mod & High SBS	Pre-Fire Q (CFS)	Post-Fire Q (CFS)	Post-Fire Bulked Q (CFS)	Percent of Pre-Fire Q (bulked)	Pre-fire Q (CFS)	Post-Fire Q (CFS)	Post-fire Bulked Q (CFS)	Percent of Pre-fire Q (bulked)
San Mateo Creek	P1. East Culvert	38%	15	23	31	208%	59	75	99	166%
San Mateo Creek	P2. West Culvert	12%	24	31	37	153%	108	126	152	141%

Watershed response in the burn area will pose a high risk to life, safety, and infrastructure. The combination of increased flows, sediment loads, and woody debris increase the volume of post-fire flows, which could negatively impact culverts and roadway in the burn area designed to pass

"normal" flows. It is important to note that culverts that experience difficulty controlling drainage during small storms will be very likely to experience flooding and/or failure in post-fire storms. Bulking and increased flows may cause culverts to back-up, divert, or wash out roads in areas that do not usually flood.

Water Quality: Wildfires primarily affect water quality through increased sedimentation. As a result, the primary water quality constituents or characteristics affected by this fire include color, sediment, suspended material, and turbidity. The loss of riparian shading and the sedimentation of channels by floods and debris flows may increase stream temperature. Luckily the channels with the fire are ephemeral drainages so impacts to riparian habitat are limited. Fire-induced increases in runoff can result in increases in floatable material such as woody debris. Post-fire delivery of organic debris to stream channels can potentially decrease dissolved oxygen concentrations in streams. Fire-derived ash inputs can increase pH, alkalinity, conductivity, and nutrient flux (e.g. ammonium, nitrate, phosphate, and potassium), although these changes are generally short lived.

PART V - SUMMARY OF ANALYSIS

Introduction/Background

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

Table 5: 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):** The probability of a post fire event causing damage or loss to life and safety is **likely,** and the consequences of such an event are **moderate.** The level of risk is **high.** This is related to the risk of loss of Cold Springs Road, see discussion below.
2. **Property (P):**Cold Springs Road 8S02 - Cold Springs Road is the only road in this part of the Forest, and the only ingress and egress. It is threatened by post-fire increases in stream flow and erosion. The probability of damage or loss is **likely**, and the magnitude of consequences is **moderate** due to potential loss of culverts and the road at stream crossings. There is some history of past blowouts at the culverts. Due the **high risk**, treatments are proposed, focused on armoring and stabilizing culverts and doing storm patrols to protect culverts.

Cold Springs Road (National Forest System Road NFSR 8S02)

8S02 is a native surface level 2 Forest System road, and a historic road.
Two sections of 8S02 are within Forest boundary, one section is 0.3 mi, and another is 0.7 mi. A section of 8S02 approx. 0.9 mi is in between the two above mentioned sections

and on private land. All three sections are within burned area. (Map attached separately).

Structure & function

This road is the only access to several private properties and also used as FS administrative route for land management and patrols.
The roads has two major road stream crossings:

a. The first crossing is on the Forest with 3 footer culvert and approx. 5 ft. fill. This crossing had under capacity slope stability issues. Probability of Damage or Loss is **Likely** and Magnitude of Consequences **Moderate**. Risk of this crossing is **High.**
b. The second crossing is on the same channel with the first and is on private property. This crossing functions as a low water crossing. Probability of Damage or Loss is Possible and Magnitude of Consequences Minor. Risk of this crossing is Low.

Existing conditions:

Road prism

8S02 is single lane with average width 12 ft., native surface; driving surface in average to good condition with no ruts or gullies. Road grade is average to steep, up to 18%. Mostly out-sloped. There are few full cut sections, some sections have out slope berm.

Drainage features:

Most of the road surface is out-sloped for appropriate sheet flow. There are many cross drains accommodated by culverts, un-armored low water crossings, and overside drains. Surface water on the road is drained off with rolling dips.

Drainage features is properly designed and spaced for normal use under normal conditions. Some rolling dips need repair. First major crossing has downstream scour and evidence of fill stability issue.

Findings of Field Reconnaissance

Resource condition resulting from the fire: Field reconnaissance revealed no immediate damage to the road and its components.

Consequences of the fire on values at risk:
The main consequence of the fire to transportation values at risk is that the amount and velocity of surface flow from burned hillside with high debris/suspending material will very likely overwhelm all drainage capacity with associated eroding power.

While most sediment and debris placed on the road surface during first few storm events after the fire can be cleaned up with small equipment, the crossing with large culvert and deep fill if washed out requires major repair/reconstruction with heavy equipment, high cost, and long road closure. Large sediment movement is likely to occur in case of crossing blowout. The culverts are situated within oak woodland and chaparral areas where there is a high risk of woody debris creating blockages at culverts, putting them at increased risk of blowouts.

Emergency Determination - An emergency exists with regard to loss of road culverts and consequent loss of road.

3. Natural Resources (NR):

Hydrologic Function:

Fire impacts proper functioning of hydrologic processes with the greatest and longest lasting impacts occurring from high soil burn severity and anthropogenic activities (such as failure of drainage control on roads). No high soil burn severity was observed in the Chaparral Fire. Fire impacts within moderate, low, and very low burn areas are recoverable and expected to diminish as vegetation reestablishes. The greatest threats to recovery are threats from OHV incursion and failure of infrastructure to control drainage (including roads and trails). Increased sediment delivery and mobilization of woody debris increase the risk of channel diversions down roads and ditches. Channel diversion could lead to complete road prism (or infrastructure) loss and irrecoverable damage to hillslopes.

Soil Productivity:

It is **possible** that soil productivity will be impacted in larger storms (5-year or greater runoff event) due to elevated surface erosion in moderate soil burn severity. The magnitude of consequence of this soil loss is **moderate** due to the risk of failure of culverts that could increase erosion. Moderate and low soil burn severity areas will not result in irreversible damage. The overall risk to soil productivity is **intermediate**. No treatment is recommended because there is a large portion of low soil burn severity, vegetation type, and mosaic burn pattern. Road work will mitigate risk of damage to soils from loss of drainage control.

Three threatened and endangered species are present in the vicinity of the fire - Thread-leaved Brodiaea, Southern Steelhead, and Arroyo Toad. The probability that these species will be affected by post fire erosion is **likely,** and the magnitude of consequences is **minor**. The risk to these species is **low.** No emergencies were identified for these species due to the distance from the fire to occupied habitat, and the anticipated timing of ash and sediment transport to the stream.

Risk to Native Vegetation

Minimal dozer line was constructed. There is no emergency with regard to risk of weed invasion. The probability that native vegetation will be affected by post fire effects is **unlikely**, and the magnitude of consequences is **minor**. The risk to native vegetation is **very low.**

Cultural and Heritage Resources:

Fourteen Critical Heritage Values were evaluated using the BAER Risk Assessment matrix to determine to risk or probability of damage or loss for each resource. Given the low to moderate soil burn severity, and location of thirteen of sites outside the burn area on ridge tops, terraces

and other protected areas, the majority of sites in the vicinity of the Chaparral Fire are unlikely to be at risk from potential watershed response following major storm events modeled for this incident. Despite a **Major** Magnitude of Consequences if damage were to occur to these sites, the probability of damage or loss is **Unlikely**, resulting in an "**Intermediate**" level of risk.

Cold Springs Road (05025200300) was the only Critical Value at Risk determined to fall into the **High** level of risk based on the potential for **Moderate** Magnitude of Consequences if portions of the road are washed out following a storm event, which is considered **Likely.** This road dates back to the Mexican land grant period and is eligible for inclusion on the Historic Register.

Proposed Road Treatments are expected to be sufficient to address concerns, provided that it is conducted in accordance with Approved Standard Resource Protection Measures within historic properties. One newly recorded site (05025200301) that was not considered a BAER Value at Risk, may require standard resource protection measures from proposed treatments under Section 106.

B. Emergency Treatment Objectives: Stabilize and protect culverts and drainage features on Cold Springs Road; storm patrols to prevent storm-related damage to road.

C. Probability of Completing Treatment Prior to Damaging Storm or Event:
Land: N/A
Channel: N/A
Roads/Trails: 90%
Protection/Safety: N/A

D. Probability of Treatment Success

Table 6: Probability of Treatment Success

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

E. Cost of No-Action (Including Loss): $300,000 to rebuild road and mitigate effects such as illegal OHV activity likely to arise if existing road is lost.

F. Cost of Selected Alternative (Including Loss): $ 25,290

G. Skills Represented on Burned-Area Survey Team:

☒ Soils	☒ Hydrology	☒ Engineering	☒ GIS	☒ Archaeology
☒ Weeds	☐ Recreation	☒ Fisheries	☒ Wildlife	

Team Leader: Kirsten Winter
Email: kirsten.winter@usda.gov **Phone(s)** 858 674 2956

Forest BAER Coordinator: Emily Fudge
Email: emily.fudge@usda.gov **Phone(s):** 619 430-3092

Team Members:*Table 7: BAER Team Members by Skill*

Skill	Team Member Name
Team Lead(s)	Kirsten Winter
Soils	Tori Stempniewicz
Hydrology and Geology	Tori Stempniewicz, Emily Fudge
Engineering	Trien Le
GIS	Eraina Nossa, Lance Criley
Archaeology	Eraina Nossa
Weeds	Kirsten Winter
Recreation	N/A
Wildlife and Botany	Kirsten Winter

H. Treatment Narrative:

Land Treatments: N/A

Channel Treatments: N/A

Roads and Trail Treatments: Repair dips and drains, armor culverts to stabilize Cold Springs Road. Conduct storm patrols and post-storm repairs to maintain the road.

Treatments to mitigate the emergency:

a. Stabilize fill for first large culvert to reduce risk of blowout by scouring from high flow events.
b. Storm patrol and post-storm repairs to keep road in place.
c. Coordination with local agencies

Road stabilization and storm patrol

Treatment	Cost
Armor culverts	11,200
Storm patrol, response and repair	9,990
Contract prep cost	1,600
TOTAL	$ 22,790

Monitoring/Other Treatments:

Treatment	Cost
Coordination with local agencies	2500

PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS

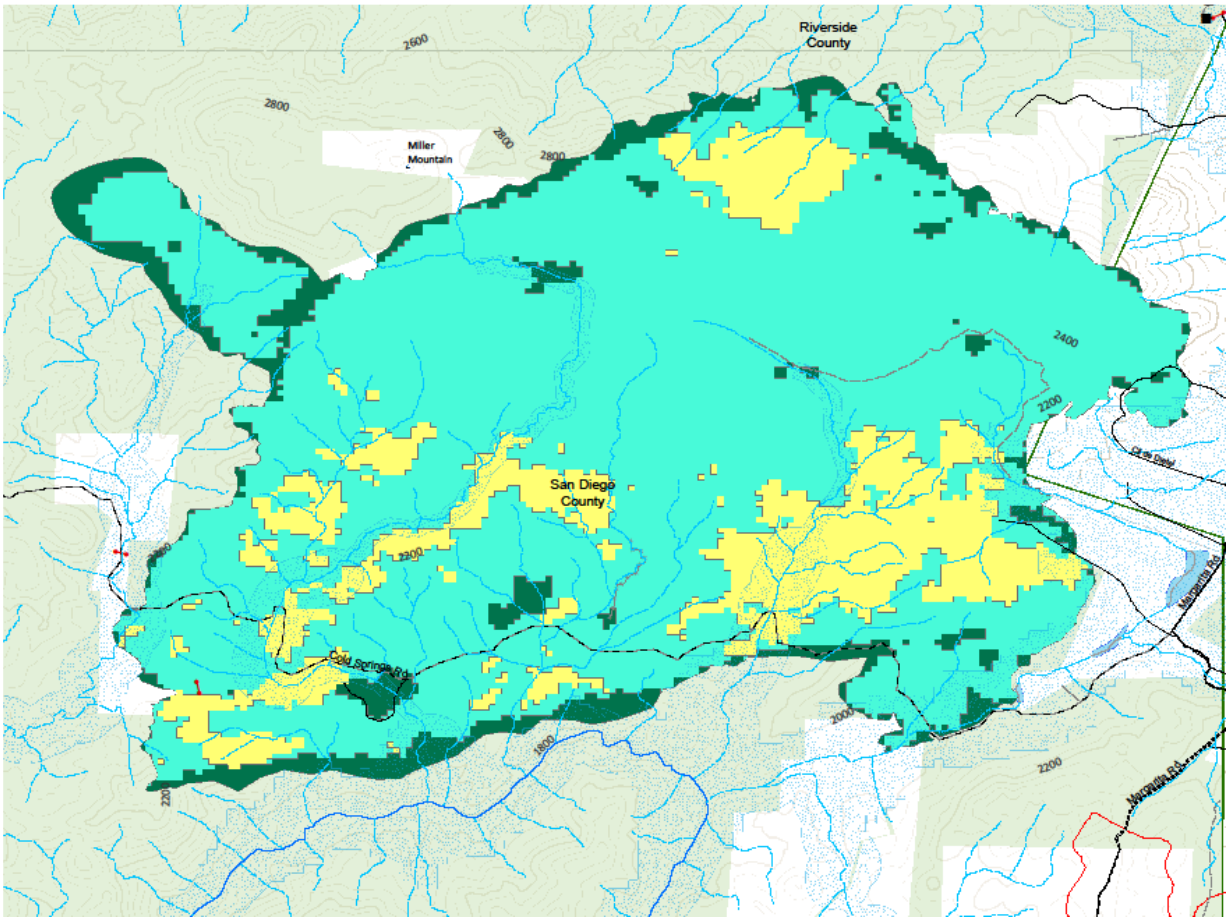
Line Items	Units	Unit Cost	# of Units	BAER $	Other $	# of units	Fed $	# of Units	Non Fed $	Total $
A. Land Treatments										
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$0	$0		$0		$0	$0
B. Channel Treatments										
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Channel Treatments				$0	$0		$0		$0	$0
C. Road and Trails										
culvert armoring				$11,200	$0		$0		$0	$11,200
storm patrol and repairs				$9,990	$0		$0		$0	$9,990
contract prep				$1,600						$2,000
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road and Trails				$22,790	$0		$0		$0	$23,190
D. Protection/Safety										
					$0		$0		$0	
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Protection/Safety				$0	$0		$0		$0	$0
E. BAER Evaluation										
Initial Assessment	Report			---	$0		$0		$0	$0
					$10,000		$0		$0	$10,000
Insert new items above this line!				---	$0		$0		$0	$0
Subtotal Evaluation				$0	$10,000		$0		$0	$10,000
F. Monitoring										
Coordination w agencies				$2,500	$0		$0		$0	$2,500
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Monitoring				$2,500	$0		$0		$0	$2,500
G. Totals				$25,290	$10,000		**$0**		**$0**	**$35,690**
Previously approved										
Total for this request				**$25,290**						

PART VII - APPROVALS

SCOTT TANGENBERG Digitally signed by SCOTT TANGENBERG
Date: 2021.09.15 14:53:07 -07'00'

Forest Supervisor Date

Figure 1 – Soil Burn Severity map



Dark Green - very low/unburned – 9%
Blue - low 74%
Yellow – moderate – 17%

Figure 2 – treatment map – road stabilization, storm patrols – treatments focus on major culvert only at 0/30 mark, other road features are noted for reference