USDA-FOREST SERVICE

FS-2500-8 (7/00)

Date of Report: 9/20/17

BURNED-AREA REPORT

(Reference FSH 2509.13)

Part I - Type of Request

1. Type of Report
   a. ☒ Funding request for estimated WFSU-SULT funds
   b. ☐ Accomplishment Report
   c. ☐ No Treatment Recommendation

2. Type of Action
   a. ☒ Initial Request (Best estimate of funds needed to complete eligible rehabilitation measures)
   b. ☐ Interim Report
      i. ☐ Updating the initial funding request based on more accurate site data or design analysis
      ii. ☐ Status of accomplishments to date
   c. ☐ Final Report (Following completion of work)

Part II - Burned Area Description

(A) Fire Name: Mission Fire

(B) Fire Number: CA-MMU-018115

(C) State: CA

(D) County: Madera

(E) Region: 5

(F) Forest: Sierra National Forest

(G) District: Bass Lake

(H) Fire Incident Job Code:PNLBQ8

(I) Date Fire Started: 03/Sept/2017

(J) Date Fire Contained:09/Sept/2017

(K) Suppression Cost: estimated 2m

(L) Fire Suppression Damages Repaired with Suppression Funds

   a. Fireline (Mil es): 3.7 miles rehabbed.

   b. Fireline Seeded (Miles):

   c. Other (Identity):

(M) Watershed Number:
180400061103 - South Fork Willow Creek-Willow Creek
180400061102 - Whiskey Creek

(N) Total Acres Burned 999

NFS Acres: 849 Other Federal: State: Private: 140

Vegetation Types: Vegetation types within the Mission Fire perimeter are a mixture of the following major vegetation types: **foothill chaparral / montane chaparral** dominated by mariposa manzanita, greenleaf manzanita, poison oak, buckbrush, deerbrush, birchleaf mountain mahogany, coffeeberry, hollyleaf redberry, chaparral honeysuckle, and more; **montane hardwood/ponderosa pine forest** dominated by ponderosa pine, incense cedar, black oak, canyon live oak, and some white fir and sugar pine with primary understory shrubs being mariposa manzanita, greeleaf manzanita, mountain whitethorn, deerbrush, and bear clover – this vegetation type is where the highest burn severity occurred. In addition to forested and shrubland types, there are **open meadow-like areas** dominated by native graminoids and a diversity of herbs such as: soap plant (*Chlorogalum pomeridianum*), sedges (*Carex* spp.), wood rush (*Luzula* sp.), California brome (*Bromus carinatus*), blue wildrye (*Elymus glaucus*), five-spot (*Nemophila maculata*), narrow-leafed mules ears (*Wyethia angustifolia*), large-flowered agoseris (*Agoseris grandiflora*), Hall's mule's ears (*W. elata*), California helianthella (*Helianthella californica*), tincture plant (*Collinsia tinctoria*), popcorn flower (*Plagiobothrys nothofulvos*), small-flowered miner's lettuce (*Claytonia parviflora* ssp. *parviflora*), western buttercup (*Ranunculus occidentalis*), lace pod (*Thysanocarpus curvipes*), snakeroot (*Sanicula bipinnatifida*), sulphur pea (*Lathyrus sulphureus*), baby lupine (*Lupinus bicolor*), and leatherroot (*Hoita orbicularis*).

Some of the non-native plants present in the open meadow-like areas and scattered throughout in disturbed understory areas are: smooth cat's ear (*Hypochaeris glabrata*), plantain (*Plantago lanceolata*), sheep sorrel (*Rumex acetosella*), spreading hedgeparsely (*Torilis arvensis*), bulbous bluegrass (*Poa bulbosa*), velvetgrass (*Holcus lanatus*), ripgut brome (*Bromus diandrus*), cheatgrass (*B. tectorum*), red brome (*B. madritensis* var. *rubens*) rattail fescue (*Festuca myuros*).

(O) Dominant Soils: Holland (526 Acres - 53%), Chaix (404 Acres - 41%), and Auberry (59 Acres - 6%)

(P) Geologic Types: Granodiorite, Granite, Tonalite

(Q) Miles of Stream Channels by Order or Class: **Order 1: 11.91, Order 2: 3.41, Order 3: 0.59**

(R) Transportation System

Trails: None

Roads: **4.63 miles**

Part III - Watershed Condition

(A) Soil Burn Severity (Acres)

a. Unburned / Very Low: 144 Acres

b. Low: 251 Acres

c. Moderate: 451 Acres

d. High: 142 Acres

(B) Water-Repellent Soil (Acres): 320 Acres

(C) Soil Erosion Hazard Rating (Acres)

a. Low: 128 (13%)

b. Moderate: 208 (21%)

c. High: 303 (31%)

d. Very High: 350 (35%)

(D) Erosion Potential (Tons / Acre): .01t/acre

(E) Sediment Potential (Cubic Yards / Square Mile): 3.9

Part IV - Hydrologic Design Factors

(A) Estimated Vegetative Recovery Period (Years): 3-5 yrs.

(B) Design Chance of Success (Percent):

(C) Equivalent Design Recurrence Interval (Years):

(D) Design Storm Duration (Hours):

(E) Design Storm Magnitude (Inches):

(F) Design Flow (Cubic Feet / Second / Square Mile:

(G) Estimated Reduction in Infiltration (Percent):

(H) Adjusted Desgin Flow (CFS / Square Mile):

Part V - Summary of Analysis

(A) Describe Watershed Emergency

Background: The Mission fire started on the afternoon of September 3 and spread quickly up to and through the Cascadel woods neighborhood east of North Fork. Overall, 3 three structures were destroyed while 4 were damaged burning approximately 1035 acres. This fire occurred while the Railroad fire was burning further stretching suppression and Forest resources. This fire burned both on Private and National Forest Lands.

The soil burn severity (SBS) map shows approximately 37% burned at high and moderate soil burn severity. 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 high and 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, water quality, and downstream infrastructure.

Based on historic precipitation patterns, it can be expected that frontal storms in mid-late September are the first wetting events following the Mission Fire. General after the first rains in September there is drying period until mid-Nov. 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.

Soils/Erosion Response
The Holland soils are moderate and moderately slowly drained and with roads high susceptible to gully erosion when unsurfaced. They have a "B" hydrologic soil group meaning they have a moderate infiltration rate – pre-fire.
Erosion response is heavily influenced by soil burn severity, hillslope geomorphology, slope and surface texture. The burn affected soil aggregate stability, canopy cover, ground cover and infiltration rates. Before the fire, most of the forest areas had protective ground cover in the form of litter, duff or ground vegetation. Shrub dominated areas had ground cover mainly within the "dripline" of the shrubs, withbare ground between the shrubs and grasses. In areas of moderate and high burn severity, it is highly likely that increased rates of soil erosion and sediment delivery to stream channels will occur, for two or three years after the fire, particularly on steep slopes that contained shrubs and are slow to recover. Much of the area experienced tree mortality in the last several years limiting the amount of needlecast potential in the moderate and even low severity areas.

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 high burn severity areas is generally slower because little or no ground cover remains, the potential for needle cast is low and soils may be impacted by fire effects. High burn severity in riparian areas (small areas within Clark Canyon) should recover faster than hillslopes given the higher water table and the ability of riparian vegetation to rapidly resprout.

Watershed Response:
The fire occurred within the Whiskey Creek and Willow Creek. Given the size of the fire and proximity to the main stream channels, adverse watershed response in Whiskey Creek and Willow creeks is not expected.

Water Quality

There will likely be short-term impacts to water quality to Whiskey creek within and directly below the fire area due to ash and soil movement during the first few runoff producing storms. In addition, short-term minor amounts of ash and sediment are likely to reach Willow and Peckinpah Creeks. A tributary to Whiskey creek flows into Cascadel Ranch Pond. There will likely be ash and sediment deposited into the pond. The pond will also capture sediment that would otherwise be transported to Whiskey Creek. Whiskey Creek eventually drains into Willow Creek above the confluence with the San Joaquin River below Reddinger Lake. Minimal ash and sediment are expected in the San Joaquin River. The risk for adverse effects to water quality in the effected waterbodies is consider **Low.**

Geology/geologic response:

Rock Fall: There is rockfall potential on the 8S09 road. Rock fall occurred under pre-fire conditions along steep cut sections. Rock fall will continue at an increased rate for the next 3-5 years following the fire due to loss of groundcover and will increase temporarily during runoff events. The risk for rock fall occurrence as a result of the fire is considered to be **High.**

Debris Flow: USGS modelling was not performed on this fire. Potential for increased flows mobilizing stored sediments and debris in stream channels will increase for at least two years. The risk for small debris flows/accelerated sediment mobilization in stream channels is **High**, especially above road 8S09.

Threats to Life and Property

National Forest System Roads:

Forest Roads 8S09 (level 2) and 8S092 (Level 3) traverse through approximately 2.45 miles of high and moderate burn severity. 8S09 traverses steeply through the fire area and is bisected by numerous drainages.

The roads are constructed on decomposed granite of various grading's, ranging from ¾" to fine sand. This material is very susceptible to erosion degradation. As a result, uncontrolled runoff can result in significant damage and potential loss to the road system.

a) The roads are at increased risk due to:
   i. Erosion damage as a result of increased storm water runoff velocity and volume on and across the road templates.
   ii. Degradation of road surfaces resulting from fire suppression activity.

b) The consequences of the fire on the roads will be:

   i. Primarily manifested as increased storm water runoff creates erosion damage, including total loss, to the road surfaces and road templates.

   ii. Secondary consequence of the fire related to the road system is the increase adverse effect of storm water runoff and decreased control of storm water runoff to adjacent watersheds.

   iii. Public Safety is affected due to a increased hazard resulting from destabilized rock slopes, falling trees, and ash, sediment, debris on the road bed.

c. Emergency Determination

Imminent hazards to the roads system vary from minor sloughing and culvert blockage to partial or total loss of road template. A risk assessment was conducted on the assessed roads and the following roads rated as **"high"** risk:

Threats to Natural and Cultural Resources

Ecosystem Stability and Vegetation Recovery

Invasive/noxious weeds: There is an emergency related to native vegetation recovery and native plant diversity should invasive weeds have been introduced or spread during fire suppression within the burned area and along fire lines outside of it. A washing station was set up during the fire, but was not in place for the first several days of the fire. The fire vehicles were most likely not washed before entry to the fire area during that time Native vegetation cover and diversity is identified as a Critical Value by the BAER team. Despite the high levels of conifer mortality resulting from the 2012-2015 drought and subsequent beetle kill; healthy live stands of black oaks and canyon live oaks remain and will sprout back if burned, and much of the native understory vegetation was intact and functioning prior to the fire (e.g. native shrubs, native grasses and herbs). Because the vegetation of the burn area evolved with frequent fire, and will respond positively by producing seedlings and sprouts of native herbs, shrubs, and trees; the concern for its recovery is primarily that non-native weeds could hamper this recovery. If this occurs without monitoring and rapid control, invasive non-native weeds such as bull thistle, Italian thistle, Spanish broom, yellow starthistle, velvet grass, medusahead, and others could gain a foothold and prevent the natural processes that provide vegetation resilience and critical soil cover after this and future fires.

The invasive weed species known to occur in and near the Mission Fire area are:

- Bull thistle (*Cirsium vulgare*)
- Italian thistle (*Carduus pycnocephalus*)
- Klamathweed (*Hypericum perforatum*)
- Medusahead (*Elymus caput-medusae*)
- Spanish broom (*Spartium junceum*)
- Stinkwort (*Dittrichia graveolens*)
- Yellow starthistle (*Centaurea solstitialis*)

On top of the probability that weed seeds or other propagules were introduced on firefighting equipment; freshly burned landscapes are especially vulnerable to the establishment and rapid spread of invasive weeds should seeds have been introduced on fire fighting equipment, gear, vehicles, etc. This BAER emergency can be mitigated by surveying for, and promptly detecting and treating any newly established infestations to dramatically limit fire-related population growth. The first year is the most crucial time for early detection/rapid response (EDRR), when native, fire-adapted plants have not re-established significant ground cover and the bare burned soil with abundant nutrients, sunlight, and water presents a perfect seedbed for invasive non-native weeds. If invasive weeds reduce or eliminate the presence of fire-following plants like whispering bells, golden eardrops, and bush poppy (which are cued to germinate by smoke), a unique aspect of floral and insect diversity may be lost, further compromising the future diversity and ability to rapidly recover after fire within the Mission Fire area.

Emergency Determination:

Probability of damage or loss: Likely

Magnitude of Consequences: Moderate

Risk Level: High

No TES or sensitive plant species are found in the fire area therefore additional analysis or treatments are not needed.

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

(B) Emergency Treatment Objectives

- The objective of early detection surveys and rapid response treatment (EDRR) is to reduce the potential for expansion of invasive weeds by detecting plants early in the invasion stages. Prompt eradication of new infestations allows for optimal native vegetation recovery by eliminating competition from invasive species.

- Protect route infrastructure by minimizing erosion of the road surface, provide for water control and reduce excessive flooding potential

(C) Probability of Completing Treatment Prior to First Major Damage-Producing Storm

a. Land %: NX weed survey and rapid response is conducted during the spring

b. Channel %:

c. Roads %: 75

d. Trails %:

(D) Probability of Treatment Success

Treatment	Years After Treatment		
	1	3	5
Land			
Channel			
Roads	70	85	100
Trails			

(E) Cost of No-Action (Including Loss): See attached VAR table. If no action is taken to detect and stop the spread of invasive weeds inadvertently introduced or spread during fire suppression; aggressive, damaging weeds could establish and spread rapidly in the burned area within and adjacent to the dozer lines and other disturbed and high burn severity sites.

(F) Cost of Selected Alternative (Including Loss): See attached VAR table, costs are justified.

(G) Skills Represented on Burned-Area Survey Team

☐ Hydrology	☒ Soils	☐ Geology	☐ Range
☐ Forestry	☐ Wildlife	☐ Fire Management	☒ Engineering
☐ Contracting	☐ Ecology	☒ Botany	☒ Archaeology
☐ Fisheries	☐ Research	☐ Landscape Architect	☒ GIS

Team Leader: Kellen Takenaka, Todd Ellsworth

Email: ktakentaka@fs.fed.us

Phone: 406 781-9612, 760-920-5648

FAX:

1. 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.)

a. Land Treatments:

Noxious/Invasive Weed detection: Detection surveys for invasive weeds would be conducted in spring (or as soon as the weed species are identifiable) to detect and control early season invasive weeds and in the summer to detect and control late season invasive weeds. Infestations will be mapped with GPS, photographed, and flagged with invasive weed flagging tape. Single plants or small isolated infestations would be manually removed during survey and mapping (EDRR). For most invasive non-native species likely to occur in or near the Mission Fire area, hand pulling consists of pulling the plant up by the roots and bagging for disposal if flowers or seed heads are present.

Surveys and treatments would be conducted by a two-person crew, making one or possibly two trips to dozer lines, staging areas, and drop points. Depending on phenology, infestation size, and treatment strategy, some infestations may be treated more than once. Emergency surveys and treatments will be conducted for one year only with BAER funds per BAER policy. Surveys and treatment in subsequent years may be

accomplished through a combination of Forest Service allocated funding or coordination with Pacific Gas & Electric Company, Cascadel Woods Property Owners, Yosemite-Sequoia RC&D, Coarsegold RCD, Madera County and/or other partners.

*As a rule, invasive plant surveys and control must occur in spring and summer AFTER major damage producing storms because those storms bring the main source of water for germination of weed seeds. However, in some cases, early, gentle rainfall allows for fall surveys to proceed. On September 11, 2017, thunderstorms brought 0.25" of rain to the Mission Fire area, thus some fall 2017 surveying may occur, especially if more rain falls. To the extent possible, surveys and invasive weed removal would be conducted before plants have the opportunity to produce seeds, or if plants are flowering/seeding they are bagged and removed. Because BAER funding only provides for 1 year of survey and control (rather than the 3 years previously authorized), the strategy may be to prioritize where to control new or expanding infestations, and plan for Forest-funded weed control in future years

Dozer lines on NFS lands to be surveyed for invasive weeds include:

- 1.4 miles of dozer line at approx. 6000' outside the fire perimeter on the ridge between Gertrude and Roush Creeks; accessed by Roads 7S07 and 7S76,
- 0.80 miles of dozer line outside the fire perimeter mostly along Road 8S09A, then extending to the N where 8S09A meets 8S09
- 0.67 miles of dozer line outside the fire perimeter from 8S09FA northward up the ridge to junction with 8S26.
- 0.20 miles of dozer line at about 3200' outside the fire perimeter, just due west of Trail MAD233T1.75
- 0.21 miles of dozer line outside fire perimeter parallelling or directly along Trail Mad233T1.28
- 0.41 miles of dozer line outside fire perimeter at about 3400', going from Madera County Road 233 across a tributary to South Fork Willow Creek northward to Peckinpah Creek (combined two dozer lines as there was very little distance between their termini).
- In addition, staging areas and drop points will be surveyed.

Invasive Weed Detection and Eradication:
The recommended treatment is to conduct early detection / rapid response surveys on 3.7 miles of dozer line, drop points, staging areas, ICP, and water drafting sources; as well as a sampling of high burn severity areas, burned stream courses. Estimates to complete priority EDRR surveys for the Mission Fire $5,081;

.Weed Surveys and Rapid Response Costs				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
1 GS-11 botanist (surveying, supervision, training and reporting)	Days	$388	8	$3.104
1 GS-7 Biological technician	Days	$164	8	$1,312
Supplies	Each	$500	1	$500
Vehicle gas mileage	Miles	$0.55	300	$165
Total Cost				**$5081**

b. Channel Treatments: N/A

Road Treatments:

1. Improve drainage by improving rolling dips and leadoff ditches to and installing critical dips, along approximately 2.1 miles of 8S09 within high and moderate burn severity areas. . The existing structures will be improved to address the post-fire change in watershed response. In addition, clean approximately 36 culverts along the 2.1 miles section of 8S09.

   Improve drainage on approximately .35 miles of 8S092 by improving rolling dips and lead-off dtiches, install a critical dip within high and moderate burn severity areas. Clean approximately 5 culverts along this section of the road.

   The Forest has force account crews to complete this work in a timely manner. The table below outlines costs per road/per treatment type.

Road	Risk	Treatment	Cost
8S09	High	Restore drainage function, restoring existing dips, and overside drains and installing critical dips	$11,500 (includes Heritage clearances)
8S09	High	Culvert Cleaning (36)	$6,300
8S092	High	Restore drainage function, restoring existing dips, and overside drains and installing critical dips	$1,900 (includes Heritage clearances)
8S092	High	Culvert Cleaning (5)	$750.00
Total			**$20,450**

2. Road warning signs: Strategically place approximately 6 BAER warning signs on access points to the fire These signs will warn users of the hazardous conditions entering and traversing through the fire area. Road 8209 is a highly travelled road that access popular recreation areas such as Whiskey Fall campground and in the winter the Snoplay area at Whiskey.

Warning signs				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
1 engineering Tech	Days	$220	2	$440
Signs	each	$200	6	$1,200
Misc	each			$30
Total Cost				**$1,670**

3. Storm inspection and response: Inspect treatments after a runoff producing storm event. When safe to do after a storm event. The inspectors would repair and maintain storm proofing treatments and clean culverts (if necessary) to ensure a functioning condition Information gathered during these site visits may also be used to

submit an interim funding request to the region. This treatment would be applied in the same zones of concern identified in the storm proofing section, above.

Storm Inspection and Response				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
Equipment + Personnel	each	$2000	4	$8,000
Total Cost				**$8,000**

4. Culvert Risers (Snorkels): Install 3 risers on culverts at high risk of plugged and overtopping and damaging 8S09. Risers are a quick, low cost option to facilitate storm flow passage under the road. A culvert plugged this past winter on 8S09 above the fire area, with water and debris overtopping the road and eventually creating a large gully at the crossing. The Forest is in the process of repairing this crossing with an estimated cost of $300,000.

Culvert Risers				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
Equipment + Personnel	each	$5,000	3	$15,000
Total Cost				**$15,000**

5. Structures: N/A

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.)

Part VI - Emergency Rehabilitation Treatments and Source of Funds by Land Ownership

			NFS Lands				Other Lands				All
Line Items	Units	Unit Cost	# of Units	WFSU SULT $	Other $	# of units	Fed $	# of Units	Non Fed $	Total $
A. Land Treatments										
Nx Weed Detection	days	635	8	$5,080	$0		$0		$0	$5,080
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$5,080	$0		$0		$0	$5,080
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										
Warning Signs	ea	278.33	6	$1,670	$0		$0		$0	$1,670
storm Proofing	Mi	8,542	2.4	$20,501	$0		$0		$0	$20,501
Storm inspection	ea	2000	4	$8,000	$0		$0		$0	$8,000
Risers	ea	5000	3	$15,000						$15,000
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road & Trails				$45,171	$0		$0		$0	$45,171
D. Structures										
				$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										
BAER team	EA	1667	3		$5,000		$0		$0	
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Evaluation				$0	$5,000		$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				**$50,251**	**$5,000**		**$0**		**$0**	**$50,251**

Part VII - Approvals

(A) _____ 9/21/17
Forest Supervisor (Signature) Date

(B) for _____ 10/06/2017
Regional Forester (Signature) Date