Date of Report: 25 AUG 2020

HOG FIRE BURNED-AREA REPORT

Figure 1 View from Little Fredonyer Photo: Jesse Merrifield

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: Hog Fire

B. Fire Number: CA-LMU-003874

C. State: California

D. County: Lassen

E. Region: 5

F. Forest: Lassen

G. District: Eagle RD

H. Fire Incident Job Code: PNM93Y20 (1502)

I. Date Fire Started: 7/18/2020

J. Date Fire Contained: 8/17/2020

A. Fire Name: Hog Fire **B. Fire Number: CA-LMU-003874**

K. Suppression Cost: CalFire incident, cost not reported yet

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

1. **Fireline repaired (miles): 67 miles of dozer line, 6.3 miles of handline**
2. **Other (identify): 22 miles of cut roadside vegetation was chipped**
   Note: Approximately 0.5 miles of dozer line remains to be repaired

M. Watershed Numbers:

Table 1: Acres Burned by Watershed

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
180800030206	Crazy Harry Gulch	13,866	6,350	46%
180800030208	Cheney Creek	14,981	926	6%
180800030205	Hog Flat Reservoir	16,645	443	3%
180800030207	Willard Creek	21,222	848	4%
180800030401	Piute Creek	22,199	1,000	5%

N. Total Acres Burned: 9,567

Table 2: Total Acres Burned by Ownership

OWNERSHIP	ACRES
NFS	2,946
OTHER FEDERAL (LIST AGENCY AND ACRES)	BLM 0.39
STATE	0
PRIVATE	6,621
TOTAL	9,567

O. Vegetation Types:

P. Dominant Soils: Soils are predominantly inceptisols, alfisols and lithic mollisols. Surface textures range from loamy sand to sandy loam to loam.

Q. Geologic Types: Miocene silicic volcanic rocks, predominately lahar, and coarse clastic sedimentary rocks (conglomerate and sandstone). Basaltic andesite, basalt, and a smaller area of Cretaceous granodiorite underlies the Northwest corner of the fire.

R. Miles of Stream Channels by Order or Class:

Table 3: Miles of Stream Channels by Order or Class

STREAM TYPE	MILES OF STREAM
PERRENIAL	9.0
INTERMITTENT	9.0
EPHEMERAL	26.0
OTHER (DEFINE)	Siphon 0.09 Artificial Path 0.07

S. **Transportation System:**
Trails: *National Forest (miles):* 13.71 *Other (miles):*
Roads: *National Forest (miles):* 4.42 *Other (miles):*

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

Table 4: Burn Severity Acres by Ownership

Burn Severity	NFS	Other Federal (BLM)	State	Private	Total	% within the Fire Perimeter
Unburned	47	0	0	188	235	2.46%
Low	818	0.39	0	1,916	2,734	28.58%
Moderate	1,468	0	0	3,898	5,366	56.09%
High	613	0	0	619	1,232	12.88%
Total	2,946	0.39	0	6,621	9,567	

Note: Soil burn severity was not assessed but rather the BARC map was modified where appropriate based on vegetative cover.

B. Water-Repellent Soil (acres): Not enough field assessment was done to estimate acres of water repellency. However, slight to moderate, patchy repellency was observed at 2cm depth in soils in the Fredonyer Butte vicinity, and strong repellency at 2 cm was noted in the granitic soil in the northwest corner of the fire.

C. Soil Erosion Hazard Rating:

	Erosion Hazard Rating			
	LOW	MODERATE	HIGH	VERY HIGH
Acres	853	643	611	788
% of Fire	29	22	21	27

D. Erosion Potential: The Forest Service Water Erosion Prediction Project (WEPP) Post-fire model predicts 2.7 tons per acre hillslope soil loss for a 5-year storm in the Hog Fire area.

E. Sediment Potential: Sediment potential is about 7673 tons for a 5-year storm.

F. Estimated Vegetative Recovery Period (years): Based on post-fire monitoring conducted on the Lassen NF about 50% plant cover can be expected within one year. Full cover is expected within five years.

G. Estimated Hydrologic Response (brief description):
Wildcat was used to estimate pre and post fire discharge based on a storm with a 5 year recurrence interval over 1 hour. Due to hillslope gradient and loss of vegetation, the first, large runoff-producing storms will likely increase surface flows in many streams within the Hog Fire. The highest increases are predicted at the spring culvert crossing on the 30N84 road, the ephemeral stream 36 in. culvert crossing on the 30N03 road, the ephemeral stream 24 in. culvert on the 30N03 road, the perennial stream double barrel culvert crossing on the 30N03 road, and the burned out bridge culvert crossing with loss of planks on the Bizz Johnson NRT at 10.2, 12.8, 8.7, 5.7, and 7.2 times increases respectively. The highest amounts of sediment yields from the burned watersheds are expected during the first year after the fire and reducing over time as vegetation recovers.

The Hog Fire burned in a highly mosaic pattern where nearly 50% of the fire burned with moderate to high soil severity. In areas of low and unburned soil severity significant patches of intact riparian vegetation, ground cover, and standing dead and dying trees that will contribute needle cast as ground cover remain. Threats to hydrologic function and water quality were considered high due to the likelihood of degraded channel condition and bank erosion from increased flows and the potential of significant sediment contributions and degraded water quality.

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):**
   Protection of human life and safety is required due to falling trees, rocks, increased flood and debris flow potential, stump holes, unstable ground, and damaged box culverts on the Bizz Johnson Trail.
2. **Property (P):**The Bizz Johnson trail is the most iconic property, and historic site within the Hog Fire. This National Recreation Trail is a converted railroad so its trail tread has been well engineered to withstand most of the typical risk associated with post-fire effects mainly increased flow under the trail. Despite its robust construction the drainage features of the trail are starting to show their age and the fire has destroyed several of its wooden box culvert structures and the heat from the fire made several of the concrete box culvert erode more rapidly. Several roads were impacted by the fire that are now at an increased risk due to increased flows.
3. **Natural Resources (NR):** Critical Natural resources such as soil productivity and hydrologic function are expected to recover naturally after the fire. There is an emergency related to native vegetation recovery and diversity due to the likely introduction and expansion of non-native invasive weeds on at least 90 acres within the burned area and 115 acres that were impacted by suppression related activities outside the fire perimeter. The Hog Fire provided conditions conducive to the establishment and rapid spread of weeds known to be within and adjacent to the fire area. In addition, suppression activities have likely vectored weed seeds into the area, or spread them further through the burned area. Mechanized equipment was not cleaned prior to fire line construction or at any time during the incident. Weed propagules may have arrived from elsewhere on contaminated equipment, then introduced into the fire area. The results of the botany BAER assessment of the Hog Fire conclude that there is a high risk of considerable or long-term effects to native vegetation and native species diversity, and a reduction in the rate of native vegetation recovery. This BAER emergency can be mitigated by detecting and treating new occurrences of noxious weeds and controlling known infestations to limit the spread of weed species that may be exacerbated by fire and/or fire suppression activities. During the first year after the fire, the high risk areas are expected to lag in the recovery of their respective native plant communities with reductions in both native plant cover and diversity, rendering these areas as highly vulnerable to weed invasion. However, the early detection and rapid response (EDRR) of noxious weeds can mitigate these fire effects if this weed detection and removal method is implemented aggressively within the first year post-fire.
4. **Cultural and Heritage Resources:** Several small sites were identified during the BAER assesment but they are determined to not be at an unacceptable level of risk due to the fire. However the Bizz Johnson trail has many features that are at risk due to the fire mainly an increased risk of looting newly exposed artificats.

B. Emergency Treatment Objectives:

Land Treatments: Retard the spread of invasive weeds into areas of high and moderate severity where few to no weeds currently exist. Retard the spread of invasive weeds as a result of suppression repair activities, mainly dozer lines.
Proposed Road and Trail Treatments: Protect and stabilize Forest Service infrastructure at risk of damage as a result of increased sedimentation, stream diversion, and erosion from the fire.
Proposed Protection/Safety Treatments: Caution recreating forest visitors and administrative users about the potential hazards that exist within the burned area. Provide short detour trails around damaged box culverts on the Bizz Johnson Trail.

C. Probability of Completing Treatment Prior to Damaging Storm or Event:
Land: 95%
Channel: NA
Roads/Trails: 75%
Protection/Safety: 90%

D. Probability of Treatment Success

Table 6: Probability of Treatment Success

	1 year after treatment	*3 years after treatment*	*5 years after treatment*
Land	80	75	70
Channel	NA		
Roads/Trails	70	80	90
Protection/Safety	85	90	90

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

Potential damage to roads		$153,981.58
Additional cost of controlling weeds later		$114,750.00
	Total	$268,731.58

Additionally, potential loss due to increased human life and safety risks isn't estimated.
Potential local economic loss due to closure of the Bizz Johnson trail not estimated.

F. Cost of Selected Alternative (Including Loss): $84,750

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Doug Peters
Email: douglas.w.peters@usda.gov **Phone(s)** 530-251-6432

Forest BAER Coordinator: Doug Peters
Email: douglas.w.peters@usda.gov **Phone(s):** 530-251-6432

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

Skill	Team Member Name
Team Lead(s)	Doug Peters, Kyle Wright
Soils	Doug Peters
Hydrology	Jesse Merrifield, Kyle Wright
Engineering	Todd Orange
GIS	Lauren Enriquez, Mark Schug
Archaeology	Jake Martin
Weeds	Tim Kellison

H. Treatment Narrative

Road and Trail Treatments:

Uncompromised railroad trail box culverts pose a possible loss with consequence being moderate and overall risk of intermediate. The weathered and deteriorated railroad box culverts may have some fire damage. The box culverts serve brow ditches that contour around fill areas for the railroad trail- some of the brow ditches have filled in from hill slides. With expected post-fire increased flow of water and debris, the box culverts will possibly fill with sediment and/or the abutments will crumble/fall in. The box culverts would still function for the drainage in the case of a failure.

30N03 has two compromised culverts- one 36" and one 24". Both will receive increased flow of water and debris. Bottom portions of the culverts are missing therefore probability of loss is likely with a major consequence for an overall risk of very high. For a main aggregate surfaced roadway, loss of the roadway would be major and replacement of the culverts is necessary. Since the culverts are sized right for the watershed, replacement is considered the Forest's responsibility. The next best alternative is to install aggregate surfaced critical rolling dips. Similarly, 30N84 has an 18" culvert that serves a spring and burned watershed above. The recommended size is 48" therefore installing a critical rolling dip is the next best alternative.

29N09Y, 30N03, 30N03B, 30N03C, 30N03E, 30N82, and 30N84 have culverts with associated inlets, outlets, barrels, and ditches that are likely to fail with a moderate consequence and an overall high risk. Failures are expected to wash out a small section of road or overwhelm the next drainage structure. Cleaning the culverts and associated features will help prevent the expected increased flow of water and debris from damaging infrastructure.

Additionally, storm response and hazard tree remediation will help ensure culverts are free from debris, catch basins are free of sediment, drainage features function properly, and fallen road hazard trees are cleared. Storm inspection will help detect the hazards such as fallen trees across the road and culverts needing to be cleaned. Inspection along the Bizz Johnson trail will help identify effects to the trail after a storm and subsequent maintenance, cleaning and slide removal needed to provide an open and passable trail.

Life and Safety:

Compromised railroad box culverts are likely to fail with a moderate consequence and overall high risk. Structures have already completely failed or failure is imminent. Increased peak post-fire storm water flows will exacerbate already fire-damaged, weathered, and deteriorated structures. Drainage will still function, however a detour is required for public pedestrian, bicycle, and horse traffic to safely navigate around the damaged structures. Safety signing and barricades are required as there is a vertical sudden drop the entire width of the trail.

Falling trees and minor burned trail structures pose a possible threat with a major consequence for an overall high risk to the public. Safety informational/warning signage and barricades will help the public be aware of

vertical side drop-off edges at box culverts, burnt railings, burnt holes through decks, falling trees, detours, and expected hazards ahead.

Land Treatments:

Early detection and rapid response (EDRR) treatments for noxious weeds are necessary due to fire suppression activities. Treatments would be completed in locations determined to be high risk areas, which represent dozer lines, mechanical equipment concentration areas, and moderate-to-high severity burned areas near locations disturbed by suppression activities. EDRR is a strategy developed to increase efficiency of weed work by combining surveying, mapping and immediate treatment of new weed infestations as they are discovered.

The objective of early detection surveys and rapid response treatments is to reduce the potential for the expansion of noxious weeds by detecting plants at the early stage of invasion, in order to promptly eradicate new weed infestations and prevent the spread of noxious weeds beyond known pre-fire occurrence boundaries which, in turn, would assist in the successful recovery of native vegetation by eliminating competition from noxious weeds.

High Priority Areas - EDRR treatments for noxious weeds on LNF lands would primarily occur at locations within the fire perimeter where equipment operated (i.e. dozer lines), and around areas where equipment intercepted weed infestations. EDRR treatments would focus on approximately 90 acres within the fire boundary. These areas have the highest potential for detrimental effects to native plant communities from noxious weed invasion.
Priority Areas Outside Fire Perimeter – EDRR treatments for noxious weeds on LNF lands would occur in these areas after surveys within the High Priority Areas have been completed. These EDRR treatments would only occur near locations where equipment intercepted known weed infestations and/or where suppression activities directly created an opening/disturbance that facilitates the introduction or expansion of invasive plants into areas where they were not present prior to the disturbance. These areas include dozer lines, drop points, sections of FS roads used as dozer lines (where vegetation was removed), and helispots on a total of approximately 115 acres.
Within both of the above priority areas, weed detection surveys would be conducted in the spring (or as soon as the weed species are identifiable) of the first year post-fire to detect and control early-season noxious weeds and/or in the summer to detect and control late-season noxious weeds. Large weed infestations that cannot be immediately removed during their detection will be mapped with a Global Positioning Systems (GPS) unit, photographed and flagged. Small, new or isolated infestations would be manually removed during detection surveys. For most noxious weeds that are likely to occur within the fire area, hand pulling would consist of digging up individual plants, pulling them up by the roots and, if flowers or seed heads/fruits are present, bagging entire plants for proper disposal.

D. Treatment Cost

Noxious weeds

High Priority Weed Treatments within the Fire Perimeter

Item	Unit	Unit Cost	# of Units	Cost
GS-5 Technician	day	$160	5	$800
GS-5 Technician	day	$160	5	$800
GS-9 Crew Leader –planning & implementation	day	$350	2	$700
GS-11 Botanist - coordination & reporting	day	$430	2	$860
Total Cost for FY2021				$3,160

Priority Weed Treatments outside the Fire Perimeter

Item	Unit	Unit Cost	# of Units	Cost
GS-5 Technician	day	$160	5	$800
GS-5 Technician	day	$160	5	$800
GS-9 Crew Leader –planning & implementation	day	$350	2	$700
GS-11 Botanist - coordination & reporting	day	$430	3	$1,290
Total Cost for FY2021				$3,590

The total treatment cost to mitigate the emergency is $6,750

Roads and Trail Treatments:

Table 3 - Emergency stabilization treatments

Infrastructure	Treatment	Unit	Quantity	Unit cost	Estimate
Bizz Johnson Trail	Install 6' wide native trail (4' path and 1' shoulders) detouring around failed railroad trail box culvert with 3" minus rock at drainage including placing safety barricades at failed box culverts	ea	3	$8,000	$24,000
All	Safety signing- including hazard tree, entering burn area, safety informational, barricades / carsonites on trail and roads	ea	30	$300	$9,000
30N03, 30N84	Install aggregate-surfaced critical rolling dips for deteriorated/rotten culverts	ea	3	$2,000	$6,000
29N09Y(1), 30N03(5), 30N03B(2), 30N03C(1), 30N84(11+)	Clean culverts- outlets, inlets, barrel and associated ditches	ea	20	$500	$10,000
29N09Y, 30N03, 30N03B, 30N03C, 30N03E, 30N82, 30N84, Bizz trail	Storm inspection, response, and trees	week	4	$4,000	$16,000
All	Mobilization – 3 pieces of equipment X 4 locations.	Per move	12	$500	$6,000
All	Overhead/Administration	LS	1	$7,000	$7,000
				Total Roads and Trails:	$78,000
				Total Weed Treatments:	$ 6,750
				Grand Total:	**$84,750**

I. Monitoring Narrative: No monitoring is proposed.

PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS

Total cost of treatments on Forest Service:

Line Items	NFS Lands Units	Unit Cost	# of Units	BAER $	Spent $	Other Lands # of Units	Fed $	# of Units	Non Fed $	Mo L To
A. Land Treatments										
Invasive Weed ERDD within Fire Perimeter - Fire Suppression	project	$3,160	1	$3,160	$0		$0		$0	$
Invasive Weed ERDD outside Fire Perimeter- Fire Suppression	project	$3,590	1	$3,590	$0		$0		$0	$
Subtotal Channel Treatments				$6,750	$0		$0		$0	$
B. Channel Treatments - none										
				$0	$0		$0		$0	
Subtotal Channel Treatments				$0	$0		$0		$0	
C. Road and Trails										
Road Stormproofing & Inspection	project	$4,000	4	$16,000	$0		$0		$0	$1
Construct critical dips 30N03, 30N84	project	$2,000	3	$6,000	$0		$0		$0	$
Clean culverts- outlets, inlets, barrels and associated ditches	project	$500	20	$10,000	$0		$0		$0	$1
Equipment Mobilization	project	$6,000	1	$6,000	$0		$0		$0	$
Overhead/Administration	project	$7,000	1	$7,000	$0		$0		$0	$
Subtotal Road & Trails				$45,000	$0		$0		$0	$4
D. Protection/Safety										
Safety signing- including hazard tree, entering burn area, safety informational, barricades / carsonites on trail and roads	ea	$300	30	$9,000	$0		$0		$0	
Construct three detour routes on the Bizz Johnson Trail	ea	$8,000	3	$24,000	$0		$0		$0	
Subtotal Protection				$33,000	$0		$0		$0	$3
E. BAER Evaluation										
Assessment Team	0520	H5BAER	---	---	$22,417	---	$0	---	$0	
	---	---	---	---	$0	---	$0	---	$0	
Subtotal Evaluation				---	$22,417	---	$0	---	$0	
F. Monitoring										
Trail Treatment Monitoring	ea	$0	-	$0	$0		$0		$0	
Road Treatment Monitoring	ea	$0	-	$0	$0		$0		$0	
Heritage Treatment Monitoring	ea	$0	-	$0	$0		$0		$0	
Subtotal Monitoring				$0	$0		$0		$0	
G. Totals				**$84,750**	**$0**		**$0**		**$0**	$8
Previously approved						Comments:				
Total for this request				**$84,750**						

PART VII - APPROVALS

1. Dale Bumpus — September 11, 2020

Forest Supervisor — Date