USDA-FOREST SERVICE

FS-2500-8 (7/08)
Date of Report: 9/9/2018

MODOC STONE FIRE 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: Modoc Stone Fire

B. Fire Number: CA-MDF-001193

C. State: CA

D. County: Modoc

E. Region: 5

F. Forest: Modoc

G. Districts: Big Valley and Devils Garden

H. Fire Incident Job Code: Stone - 0509 – P5L3GU18

I. Date Fire Started: August 15, 2018

J. Date Fire Contained: August 29, 2018

K. Suppression Cost: approximately $17 million

L. Fire Suppression Damages Repaired with Suppression Funds:

Dozerline repaired / waterbarred: 159 miles

M. Watershed Numbers and Names – Table 1

Watershed	Watershed Acres	Acres Burned Within Watershed	Percent Burned
Lower Turner (21103)	11,134	7,140	64%
Stone Coal Creek – Pit River (21204)	29,131	11,725	40%
Rose Canyon – Pit River (21205)	18,157	3,210	18%
Canby – Pit River (21203)	38,866	3,210	8%
Washington Creek (21101)	21,722	2,690	12%
Upper Turner (21102)	15,935	959	6%
Service Gulch (21305)	18,871	28	<1%

N. Total Acres Burned:

Total: 39,387 acres: 35,851 ac USFS; 3,300 ac PVT; 315 ac BLM

O. Vegetation Types:

Eastside Pine type dominates the vegetative matrix within the Modoc Stone Fire perimeter. In the northern portion of the fire, there is a pine/western juniper/sagebrush association that intergrades with the Eastside Pine stands. In addition, there are stands with Ponderosa pine with bitterbrush in the understory. Other associations include low sage/invasive annual grass, Sierran mixed conifer, and small inclusions of montane chaparral. Greenleaf manzanita dominated chaparral stands in the warmer sites with snowbrush dominant in the cooler areas.

P. Dominant soils:

All of the dominant soils within the fire perimeter were categorized as Mollisols; all but one were Argixerolls. Over a third of the soils in the area had lithic contacts ranging from 12 to 24 inches. Many of the soils that sustained high Soil Burn Severity (SBS) had the steepest slopes (35 to 70%).

Dominant Soils within the Modoc Stone Fire Perimeter – Table 2

Dominant Soils	Acres	MUSYM
Deven-Pass Canyon-Keating (15-35% slopes)	4,455	156
Deven-Pass Canyon-Keating (35-60% slopes)	3,191	157
Lawyer-Elmore (1-20% slope - deep)	2,586	201
Jacket-Deven-Hibner (15-35% slopes)	2,070	188
Gwen-Pass Canyon-Lithic Xerorthent (20-40% slope)	1,882	176
Lawyer-Elmore (1-20% slope)	1,808	204
Elmore (1-15% slope - deep)	1,773	164

Deven-Bieber-Pass Canyon (1-15% slope)	1,733	153
Elmore (15-40% slope - deep)	1,710	165
Pass Canyon-Fordice-Gwin (1-20% slope)	1,634	224

Q. Geologic Types:

The Modoc Stone fire lies within the Modoc Plateau Physiographic Province, which is a volcanic table land with gentle slopes (elevation 4,000-6,000 feet above sea level) consisting of a thick accumulation of lava flows and tuff beds with many small volcanic cones. The plateau is cut by many north-south faults. The Modoc Stone Fire area is underlain predominantly by undifferentiated Quaternary Basalt flows (Qbu), Tertiary Basaltic andesite of Manzanita Ridge (Tmra), several tuffs units of Turner Creek, City Rock, Stone Coal Valley, and the Breccia of Gerig Camp Unit.

R. Miles of Stream Channels by Order or Class - Table 3

	Unburned	Low	Moderate	High	Totals
Intermittent	31.2	52.7	29.6	2.2	115.7
Ephemeral	8.7	27.9	22.6	3.4	62.6
Perennial	2.8	2.6	.1	0	5.5
Totals	42.7	83.2	52.3	5.6	183.8

S. Transportation System:

Trails: 10.3 miles Roads: 113 miles

PART III - WATERSHED CONDITION

A. Burn Severity by total and FS (acres):

The BARC imagery typed the moderate and high soil burn severities fairly accurately. However, the unburned/very low was mistyped especially in the northern portion of the fire. The acres of Low burn severity was agumented using forest vegetation data (based on field observations, the low occurred in the areas dominated by pine). See Table 2 for the final acres of SBS by type.

Final SBS (ac) – Table 4

SBS	Acres
Unburned/Very Low	10,256
Hotspots Untyped	101
Low	18,881
Moderate	9,219
High	930
Total	**39,387**

B. Water-Repellent Soil by total and FS (acres):

There was no water repellency detected in control areas within the fire perimeter. Water repellency was scattered throughout the fire area primarily in the areas sustaining high soil burn severity. Repellency occurred in less than 5% of the test pits at the surface. It commonly started at the 2 inch depth mark. The thickness of the water repellent layer varied from ½ to 1 inch. Repellency will be largely responsible for moderate soil burn severity expected to have a watershed runoff response similar to high. Without repellency, it is estimated that about 15% of the fire area has water repellency, due to the fire.

C. Soil Erosion Hazard Rating by total acres:

Per discussions with the Regional BAER coordinator, EHR modelling is available upon request. See section below for erosion and sediment potential.

D. Erosion Potential:

Erosion potential was estimated using the WEPP-ERMiT model (Robichaud, Peter R.; Elliot, William J.; Pierson, Fredrick B.; Hall, David E.; Moffet, Corey A. 2014. **Erosion Risk Management Tool (ERMiT).** [Online at <https://forest.moscowfsl.wsu.edu/fswepp/>.] Moscow, ID: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station). Stated model accuracy is +/- 50%.

Potential sediment delivery is detailed in Table 5. The 10 year runoff event values were included, since they were similar to what was observed after various storm events in the Cove Fire in 2017. As to be expected, soils with clay loam textures had the highest potential. Although loam dominated the across the landscape, there was a significant amount of soils with clay loam textures in areas sustaining high and moderate SBS. The runs seen below were modelled at 50% slope; these same slopes are found in the areas of concern above the transportation system segments at risk.

Modelled potential sediment delivery (tons/ac) – Table 5

Texture	SBS	2 year (tons/ac)	5 year (tons/ac)	10 year (tons/ac)
Loam	Moderate	0	0.86	2.56
	High	0.19	2.48	4.98
Clay Loam	Moderate	0.15	2.05	4.44
	High	0.65	3.59	5.37

E. Sediment Potential:

ERMiT estimates account for sediment production numbers delivered to the bottom of the hillslope. The modeled hillslopes in the Modoc Stone fire had streams at the base of the slope; therefore, erosion potential was assumed to be the same as sediment potential.

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years):	**3-5**
B. Design Chance of Success, (percent):	**90**
C. Equivalent Design Recurrence Interval, (years):	**2**
D. Design Storm Duration, (hours):	**3**
E. Design Storm Magnitude, (inches):	**0.75**
F. Design Flow, (cubic feet / second/ square mile):	**4.05**
G. Estimated Reduction in Infiltration, (percent):	**15%**
H. Adjusted Design Flow, (cfs per square mile):	**4.45**

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

Background:

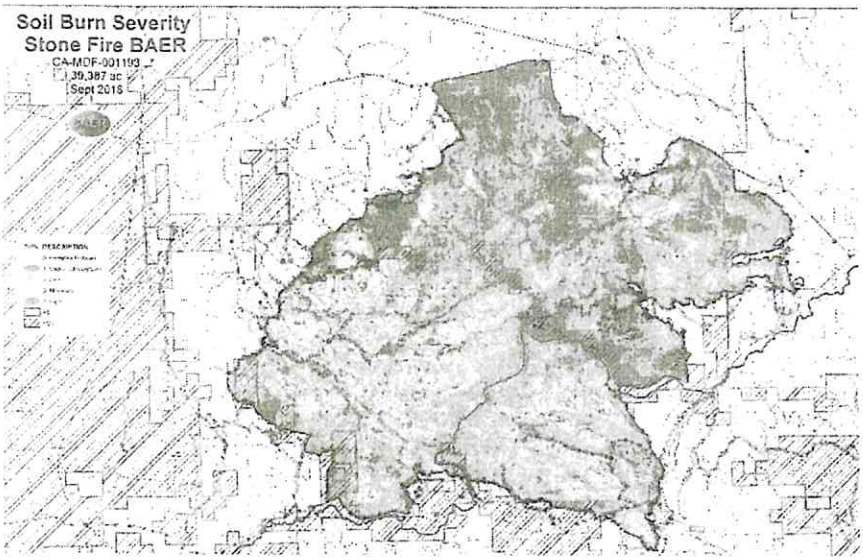
The Modoc Stone Fire was started by a lightning event on 15 August 2018. The fire quickly grew out of control, due to strong gusty winds and low relative humidity. The low intensity underburn characteristic of the northern portion of the fire occurred in stands that had been previously thinned under multiple vegetation management projects. The areas that sustained the highest fire intensities were east of the Happy Camp Lookout and north of Stone Coal Mountain.

It is very important to understand the difference between *fire intensity* or *burn severity* as discussed by fire behavior, fuels, or vegetation specialists, and *soil burn severity* as defined for watershed condition evaluation in 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 analysis, we are not only mapping 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.

Modoc Stone Fire Soil Burn Severity Map:

Figure 1 below is an image of the final Soil Burn Severity (SBS) map. Low internsity SBS dominated the Modoc Stone Fire SBS, due in part to previous thinning efforts. There was a marked contrast in the stands with doghair understories in these previously treated areas.

Figure 1. Soil Burn Severity



Soil Resource Condition Assessment Sections:

Severe soil heating was concentrated in forested areas sustaining high SBS, which occurred on 930 acres. All of the high and most of the moderate soil burn severity classes resulted in near complete vegetation canopy and organic horizon removal, leaving surface rock as the only effective ground cover.

A series of storm events affected the Cove Fire area, which is directly adjacent to the Modoc Stone Fire. A marked watershed response was observed. According to Modoc NF Forest Engineer, Chris Bielecki, the BAER treatments in place during the time of the storms helped save the transportation system in the Dutch Flat and Fox Mountain areas. It is likely that the same hazards to the transportation system could be seen in the Modoc Stone Fire within the next year before vegetative cover begins to re-establish itself.

Erosion rates are elevated high enough to constitute an emergency situation to soil productivity. However, no hillslope treatments are proposed, since the hillslope treatments to ameliorate this issue are cost prohibitive. Point treatments on roads are recommended to protect the transportation system. See engineering section below.

Hydrology:

Seven watersheds overlap with the fire perimeter; percentages burned in those watersheds range from 64% burned (Lower Turner) to less than 1% burned (Service Gulch). Those watersheds that burned at a higher percentage, Lower Turner and Stone Coal Creek, present the greatest risk to values at risk due to the post-fire watershed response. Although all systems are expected to have increased post-fire

flows, those two drainages will likely have a greater response due to the high burn severity and acreage of burn within them. Lower Turner, for example, is expected to see an increase in post-fire flow of 22%, from 80 (cubic/feet per second) pre-fire, to 97 cfs post-fire. Althought this increase appears slight, the topography of the drainage and rate at which it burned may pose a significant risk to road infrastructure.

While Lower Turner saw the most acreage burned by the Modoc Stone Fire and thus should be expected to produce more of a post-fire risk, all drainages within the fire's perimeter are at an increased risk of damage caused by post-fire run-off. Historical data shows that the areas within the fire's perimeter can see upwards of 15 inches of rainfall within a 24-hour period. For comparison, Alturas sees an average annual rainfall of 12.5 inches, and areas within the fire perimeter see averages between 12.5 and 22.5 inches. This means that a storm producing 15 inches in a 24-hour period will pose a severe risk. However, these storms are infrequent and do not present themselves as storms that necessarily need to be modeled. Using a 2-year storm event more closely represents what can be expected to occur during the time the area within the fire perimeter recovers. However, it is recommended that individuals who live near the fire perimeter pay attention to weather forecasts.

Debris Flow Potential:

The Modoc Stone Fire is directly adjacent to the Cove Fire, which burned in the summer of 2017. A field review of the Modoc Stone Fire was conducted by a local retired geologist and a geology/engineering intern. A remote analyses of the debris flow potential was conducted by Alan Gallegos, Regional Geologist for the Pacific Southwest Region.

The Modoc Stone Fire is expected to have some potential for debris flow as was seen on the Cove Fire, since the bedrock, soils, and climate would mirror each other. Values that are at risk include channel crossing along multiple road segments. Additional analyses will be conducted as staffing permits.

Rock Fall Potential:

There is a potential for rockfall hazards occuring along the transportation system in the Stone Coal Mountain, Rucker Hill, and Cuppy Butte areas. There is a large amount of cobbles, boulders and lose material susceptible to rock falls.

Values at Risk:

Potential Risks to Human Life along the Transportation and Trail System

Life: High Risk (*Possible, Major*) – Hazard trees are located throughout the fire perimeter with the various SBS. Areas classified as unburned/very low SBS still have some potential hazardous trees, although the vast majority occur with the moderate and high SBS. In addition, it is likely that storms would provide increased runoff and sediment deposits to various roads within the Modoc Stone Fire, due to the moderate to high SBS in the area. If not mitigated, runoff and sediment

deposits to the road prism would cause a safety issue to road users and increase the chance of injury. Potential rock fall could also occur on roads. Signing is recommended on major access points within the fire to alert forest users of the heightened risk of travelling within the fire perimeter.

Property: High Risk (*Likely, Moderate*) – It is likely that storms would provide runoff and sediment deposits in the Stone Coal Mountain, Rucker Hill, Washington Mountain, and Cuppy Butte areas, due to the moderate to high burn severity in the area. Protection of the cross-drain culvert inlets and road prism is necessary to handle the increased runoff and sediment delivery. In addition, these roads lack the drainage structure to handle the increased runoff and sediment delivery. If not mitigated, the cross-drain culverts would not function as intended and cause damage to the road prism. Potential washouts could occur on road segments where there is a lack of drainage structures for the increased runoff and sediment delivery.

Water Quality and Quantity

Hydrology Values at Risk

Surface water in the fire area will be bulked by ash, debris and other floatable and transportable material during storm events. It is likely that stream flows from the first post-fire runoff producing rain events will see high concentrations of ash and fine sediment. Forest roads will be impacted by the increased runoff.

Storm events will increase turbidity and contribute to pool filling. Due to the moderate and high burn severity, water quality and quantity is expected to be significantly affected. However, this is expected to have short term impairment to water quality as vegetative recovery is restored.

Although modelling did not indicate a specific concern for potential flooding risks, flooding could occur if storms similar to those discussed above do occur.

Lower Turner - Road infrastructure, namely Road 21 has been determined to be at moderate risk of damage (see Engineer Specialist Report.) Culverts and drainage dips may be overwhelmed by the post-fire watershed response to this drainage.

Stone Coal - Although a high percentage of the Stone Coal Creek watershed was burned, damage to the watershed poses less of a risk than Turner Creek. In the areas where Stone Coal Creek was burned there was little infrastructure and where there is significant infrastructure, near County Road 85, the risk is low due to the burn severity and distance from the fire's perimeter.

Washington Creek - Although most of this drainage did not burn, the areas that did burn, burned at a low or moderate severity, this drainage still poses a risk to Forest Road infrastructure.

Threatened and Endangered Aquatics and Terrestrial Species

There are no federally listed terrestrial wildlife species within the Stone Fire perimeter. One federally listed species, the Shasta Crayfish (*Pacifastacus fortis*), is found downstream of the Modoc Stone Fire within the Pit River Drainage. Due to the distance of the fire from known occurrences, the effects to water quality are not expected to cause any take of individuals or critical habitat. Therefore, no emergency exists for aquatic or wildlife habitats as result of the Modoc Stone Fire.

Native Plant Communities and Federally Listed Plant Species:

Native Vegetation Recovery and Diversity
There is an emergency related to native vegetation recovery and diversity due to the likely introduction and spread of invasive and nonnative weeds on at least 18,603 acres of landscapes disturbed by high soil burn severities and/or fire suppression activities on FS lands (Table 3). Native vegetation was identified as a Critical Value by the BAER team, as there is the potential for weed incursion in the majority of the burned area. The Modoc Stone Fire provided conditions conducive to the establishment and rapid spread of weeds known to be within and adjacent to the fire areas. Furthermore, suppression activities have likely vectored weed seeds into or spread them further through the burned area.

Federally-Listed Plant Species
No federally-listed (i.e., Threatened or Endangered) plant species occur within the Stone Fire perimeter. However, a dozer line north of the fire was constructed less than 0.2 mile away from two occurrences of the Threatened species slender Orcutt grass. Although the dozer line did not directly impact any slender Orcutt grass individuals or their vernal pool habitats there is a very high risk of noxious weeds invading the vernal pool.

Threats to Cultural Resources:

A preliminary record search in response to the immediate need for cultural resource field work and analysis in association with the Stone Fire resulted in identifying 136 known archaeological sites, of which 130 sites are located are lands managed by the Modoc National Forest and 6 are located on lands managed by the Bureau of Land Management, Applegate Field Office.

Field assessment of known sites for the Stone Fire BAER was conducted over the span of a day. Nineteen [19] sites identified as very high priority or high priority were visited. Treatment recommendations for seven other sites that were not visited are also provided. In total, 23 sites are recommended for additional monitoring and/or treatment. Installation of signs at strategic locations within or near the fire perimeter would be used to decrease potential looting and vandalism. Of the 23 sites, five have been identified at "very high" risk and 18 have been identified at "high" risk. For these sites, the probability of damage or loss is "Very Likely;" there is clear, repeated, and recent use of looting and vandalism of cultural sites within the fire area. The magnitude of consequences for these sites ranges from "Moderate" to "Major." This places the risk for these sites from "High" to "Very High."

B. Emergency Treatment Objectives: To allow safe passage of water to protect infrastructures and watersheds from accelerated sheet and rill erosion. To protect watersheds from the spread of noxious weeds and unfettered OHV access. To protect cultural resources from damage and looting.

Risk determination is dependent on the design storm selected and downstream values at risk. By using an average storm (2-year event) emergency planning measures can be designed to mitigate and minumize anticipated risks. Using a 2-year design storm the values at risk can be evaluated to

determine if an emergency exists. Emergency determination matrix displayed below shows if an emergency exists, probability of failure if untreated or treated, and treatment proposed to mitigate the emergency.

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

Land 90 % Channel N/A% Roads/Trails 90 % Protection/Safety 90 %

D. Probability of Treatment Success - Table 7

	Years after Treatment		
	1	3	5
Land	80%	85%	90%
Channel	-	-	-
Roads/Trails	95%	90%	85%
Protection/Safety	95%	90%	85%

E. Skills Represented on Burned-Area Survey Team:

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

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Summary of Modoc Stone BAER Values at Risk

Based on field observations and assessment of the burned area watershed conditions and expected responses the BAER team identified potential for post wildfire impacts on the following BAER values at risk:

Human Life and Safety

- Increased risk for the general public to be impacted by rolling rocks, flooding, landslides, debris flows and hazardous trees along roads and trails

Property

- USFS system roads

- USFS trail
- USFS campground

Natural Resources

- Water for domestic and agricultural uses
- Native or naturalized plant communities
- Soil productivity and hydrologic function

Cultural Resources

- Prehistoric sites
- Historic sites

Risk Assessment Process:

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:

Table 8.

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

Values at Risk Matrix:

The values at risk (VAR) matrix displayed in Appendix C below summarizes values at risk, post wildfire threats and risk ratings for forest service lands. Other lands that are not forest service (BOR, State, County, and Private) were noted but not evaluated for risk. Values with high or very high risk ratings are addressed, where possible, with BAER response actions (treatments). Generally, response actions are not recommended for values with low and intermediate risk ratings (except in the case of life).

Table 9.

Value (Life/Property/ Resources)	Value At Risk	Probability of Damage or Loss	Magnitude of Consequences	Risk	Treatment	Cost
Property	Transportation System	Likely – Washouts at stream crossing, road inaccessible due to sediments and debris	Moderate – loss of part of the road bed and water / sediment deposition onto road	High	New Drainage Dips, Armored Fords, Storm Inspection and Response	$ 129,665.00
Human Life and Safety	Traffic on open roads and hiking trail	Possible – Fallen trees, snags, rocks, prism failure, culvert failure/overtopping	Major – Loss of human life	High	Warning Signs	$3,000
Resources	Noxious Weeds – Native Recovery and Diversity	Likely that introduction will occur on dozer, hand line, and other ground disturbed locations	Moderate-	High	Early detection and rapid response, treatment as needed	**$31,340**
Resources	Cultural Resources	Very Likely- Increased exposure and access	Moderate- looting of sites may occur	High	Provide ground cover to reduce visibly/ Cultural Monitor to check status of sites.	**$9,385**

F. Treatment Narrative for Forest Service:

Land Treatments:
The proposed treatments on National Forest System lands can help to reduce the impacts of the fire, but treatments will not completely mitigate the effects of the fire. The treatments listed below are those that are considered to be the most effective on National Forest System lands given the local setting including topography and access.

Invasive weed detection surveys:
On Modoc National Forest lands Early Detection Rapid Response (EDRR) treatments of invasive species in native vegetation communities are proposed to mitigate the threat from noxious weed invasion. The establishment of a weed washing station was not implemented and this is expected to increase the threat of the introduction and/or spread of invasive weed species that exist within and adjacent to the Modoc Stone Fire. This specification outlines the application of manual and chemical treatments to reduce the competitive pressure of invasive weeds, including yellow star thistle, spotted knapweed, dyer's woad, Klamath weed, musk thistle, Canada thistle, Scotch thistle, Mediterranean sage, lenspod whitetop, whitetop, bull thistle, and summer pheasant's eye on the establishment of native plant communities within the Modoc Stone Fire.

Treatment Type

EDRR treatments for noxious weeds would be completed in locations determined to be Very High, High, and Intermediate risk areas, which represent fire lines, mechanical equipment concentration

areas, and moderate or high severity fire near anthropocentric disturbance. EDRR is a strategy developed to increase efficiency of weed work by combining surveying, mapping, and immediate treatment of new weed populations as they are discovered.

Treatment Objective

In a disturbance situation such as wildfire, noxious species can outcompete existing vegetation and lead to an altered plant community that serves less ecological function and has less resiliency than its pre-wildfire condition. 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 would, in turn, assist in the successful recovery of native vegetation by eliminating competition from noxious weeds.

Treatment Description

Weed detection surveys across the 18,603 acres disturbed by high soil burn severities and/or fire suppression activities 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. These surveys would also occur 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.

Hand pulling will be conducted on small invasive species populations located during inventory (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). Apply herbicides at the recommended rate listed in the label for the targeted species with a non-ionic surfactant and a blue dye. Treatment will be timed to apply herbicide to actively growing invasive species in fall of 2018 (FY2019) after the first rains (so that herbicide does not bind to ash), but prior to green-up to maximize efficacy. Applications will be made by truck/UTV boom sprayers or backpack sprayers as specified by the herbicide label.

Estimated Cost for Weed EDRR Surveys and Treatments – Table 10

Item	Daily Wage or Mileage Rate ($)	# Days (10 hours/day) or Total Mileage'	Total ($)
PERSONNEL			
GS-11 Botanist (hiring, training, supervision, and reporting)	$400	20	$8,000
GS-7 Lead Botany Technician (GIS data analysis, surveys and manual treatments)	$220	40	$8,800
GS-5 Temporary Botany Technician (GIS data analysis, surveys, and manual treatments)	$180	40	$7,200
MATERIALS AND SUPPLIES			
Vehicle Mileage (surveys and treatments)	$0.65	3,600	$2,340
Supplies & Materials (e.g., tablet with accessories, trash bags, shovels, gloves, flagging, safety items, batteries and botany field guides.)			$2,000
CONTRACT			
BLM Herbicide Treatment (including labor, equipment, chemicals, and travel)			$3,000
TOTAL COST			$31,340

'Total mileage is estimated as 90 miles per day for 40 days

Road Treatments:

Modoc Stone Fire:

Safety – Within the Modoc Stone Fire, warning signs would need to be installed to warn road users of the fire area. Warning signs will be placed on the main access to the Modoc Stone Fire: NFSR 42N60 (Loveness Road), NFSR 41N44/County Road 84, and County Road 85.

Storm Proofing – Due to the moderate to high burn severity and steep terrain of Rucker Hill, NFSR 41N12, 41N14, and 41N14A would need drivable waterbars to mitigate against increased runoff and sediment delivery. At the water crossing locations, erosion is evident downstream of the road. Treatments would include - provide armoring of the road and outlet to mitigate against potential road washouts at these water crossing locations.

On NFSR 41N17, 41N17A, 41N144, 41N44C, 41T17A, 42N21, and 42N35A, the lack of additional drainage structure could compromise the road infrastructure. To mitigate against the increased runoff and sediment delivery, it is recommended to install rolling dips, waterbars, and provide ditch reinforcements to provide additional relief and cross-drains for these roads. At stream crossings, vegetation clearing is needed around the culvert to allow water and debris to pass through.

Storm Inspection and Response – In addition to the roads receiving treatments, additional roads that are within a moderate to high burn severity would need to be monitored after a storm event. Storm inspection and response would allow the forest to monitor the road drainage structure treatments to ensure the treatments are functioning, clean the area to ensure they continue to function in the future, and maintain and/or repair any damage to the road surface due to the sediment delivery.

Road Treatments Cost Estimate:

Treatment Objectives – Tables 11 and 12

Treatment Type	Treatment Objective	Treatment Description	Treatment Cost
Storm proofing	To protect the road infrastructure, by reducing likelihood of culverts plugging up and road washouts due to increased runoff and sediment delivery.	Construct rolling dips and waterbars, armor existing stream crossings, reinforce existing ditches, vegetation clearing around culvert. The forest will also do a storm inspection and response after storm events to monitor and/or repair treatments as needed to prevent further damage to infrastructure. Storm inspection and response are included in the cost of the road treatments.	$129,665.00
Safety	To protect the lives of people by making them aware of the hazards they may encounter in the burned areas.	Install warning signs that describe hazards that can be encountered such as hazardous trees, falling rocks, and road debris.	$3,000.00
		Total Cost	**$132,665.00**

	Ditch Reinforcement			Rolling Dips			Driveable Waterbars			Culvert Armoring			Armored Ford			Vegetation Clearing at Stream Crossing			
Road Segment	Miles	Each ($)	Total Cost	Qty (each)	Each ($)	Total Cost	Qty (Each)	Cost Each	Total Cost	Each	cost/each	Total Cost	Each	cost/each	Total Cost	Each	cost/each	Total Cost	Overall Total
41N12			$ -			$ -	10	$ 1,000.00	$ 10,000.00			$ -	1	$ 2,500.00	$ 2,500.00			$ -	$ 12,500.00
41N14			$ -			$ -	10	$ 1,000.00	$ 10,000.00			$ -			$ -			$ -	$ 10,000.00
41N14A			$ -			$ -	10	$ 1,000.00	$ 10,000.00			$ -	1	$ 2,500.00	$ 2,500.00			$ -	$ 12,500.00
41N17	0.46	$ 3,500.00	$ 1,610.00	10	$ 1,250.00	$ 12,500.00			$ -			$ -			$ -			$ -	$ 14,110.00
41N17A			$ -	5	$ 1,250.00	$ 6,250.00			$ -			$ -			$ -			$ -	$ 6,250.00
41N44	2.73	$ 3,500.00	$ 9,555.00	20	$ 1,250.00	$ 25,000.00			$ -	2	$ 1,000.00	$ 2,000.00			$ -			$ -	$ 36,555.00
41N44C			$ -	4	$ 1,250.00	$ 5,000.00			$ -			$ -			$ -			$ -	$ 5,000.00
41T17A			$ -			$ -	5	$ 1,000.00	$ 5,000.00			$ -			$ -			$ -	$ 5,000.00
42N21			$ -	15	$ 1,250.00	$ 18,750.00			$ -			$ -			$ -	2	$ 500.00	$ 1,000.00	$ 19,750.00
42N35A			$ -			$ -	3	$ 1,000.00	$ 3,000.00			$ -			$ -			$ -	$ 3,000.00
42T35A			$ -			$ -	5	$ 1,000.00	$ 5,000.00			$ -			$ -			$ -	$ 5,000.00
	3.19		$ 11,165.00	54		$ 67,500.00	43		$ 43,000.00	2		$ 2,000.00	2		$ 5,000.00	2		$ 1,000.00	$ 129,665.00

Protection/Safety Treatments:

Posting signs in areas burned to alert the public to potential dangers of falling trees and rolling rocks. Repair of burnt road signs will insure public safety (see treatment map and treatment cost table below).

Heritage Treatments:

Signs: Posting signs to inform the public of federal laws protecting cultural resources to reduce potential looting and vandalism at sites and increase effectiveness for law enforcement offices to enforce the Archaeological Resource Protection Act (ARPA).

Treatment Cost: Signs

Line Item	Units	Unit cost	Total Cost
Signs	12 Signs	$40	$480
Installation	3 Days	$240	$720
Mileage	150 Miles	$0.54	$81
Total			**$1,281**

Stabilization: Strategically fall and cover portions of two cultural sites to reduce impacts from erosion.

Treatment Cost: Stabilization

Line Item	Units	Unit cost	Total Cost
Crew (includes all costs)	3 Days	$1,100	$3,300
Total			**$3,300**

Monitoring: Monitoring cultural sites to discourage looters from damaging sites.

Treatment Cost: Implementation Monitoring

Line Item	Units	Unit cost	Total Cost
Law Enforcement Officer	4 Days	$400	$1,600
Cultural Monitor	8 Days	$360	$2,880
Mileage	600 miles	$0.54	$324
Total			**$4,804**

Part VI – Emergency Stabilization Treatments and Source of Funds
The table below provides the costs for both treatments and assessment.

Stone Fire BAER	NFS Lands					Other Lands				Money Left
Line Items	Units	Unit Cost	# of Units	BAER $	Spent $	Units	Fed $	Units	Non Fed $	Total $
A. Land Treatments (L)										
Heritage Treatment	each	$3,300	1	$3,300						
NX Weed Det. Survey - Modoc NF	acres	$2	18,603	$31,340	$0		$0		$0	$0
Subtotal Land Treatments				$34,640	$0		$0		$0	$0
B. Channel Treatments (L)										
Subtotal Channel Treatments				$0	$0		$0		$0	$0
C. Road and Trails (R&T)										
Stone Fire - Stormproofing	mile	$40,670	3	$129,665	$0		$0		$0	$0
Subtotal Road & Trails				$129,665	$0		$0		$0	$129,665
D. Protection/Safety (P&S)										
Heritage Site Protection	each	$1,281	1	$1,281	$0		$0		$0	$0
Stone Fire - Safety (warning signs and barriers)	each	$500	6	$3,000	$0		$0		$0	$0
Subtotal Protection				$4,281	$0		$0		$0	$0
E. BAER Evaluation										
Assessment Team/Trainees	0520	H5BAER	---	---	$15,180					
Assessment Team	0520	H5BAER	---	---	$44,437	---	$0	---	$0	$0
Subtotal Evaluation				---	$59,617	---	$0	---	$0	$0
F. Monitoring (M)										
Road Treatment Monitoring	each	$1,000	1	$1,000	$0		$0		$0	$0
Heritage Monitoring	each	$4,804	1	$4,804	$0		$0		$0	$0
Subtotal Monitoring				$5,804	$0		$0		$0	$0
G. Totals					**$0**		**$0**		**$0**	
Previously approved						Comments:				
Total for this request				**$174,390**						

PART VII - APPROVALS

1. Chris Bielecki
-for- Forest Supervisor (signature) 9/11/18 Date

2. Bonnie J Dysart
Regional Forester (signature) 9/17/18 Date

APPENDICES: Supporting Information:

Appendix A: Modoc Stone Fire BAER Team

Appendix B: Monitoring for Roads, Cultural Site and Plants

Appendix C: Values at Risk Spreadsheet

Appendix A: Modoc Stone Fire BAER Team:

POSITION	Name	Home Forest/Unit	Email
FOREST SUPRVISOR	Amanda McAdams	Modoc	amcadams@fs.fed.us
DISTRICT RANGER	Nicole Longfellow	Modoc	nlongfellow@fs.fed.us
Regional BAER Coor	Jeff TenPas	Vallejo	jtenpas@fs.fed.us
Forest BAER Coord	Cathy Carlock	Modoc	ccarlock@fs.fed.us
Lead/Soils	Mary Flores	Modoc	mflores@fs.fed.us
GISS	Celia Yamagiwa	Modoc	cyamagiwa@fs.fed.us
Rec Trainee	Kat Smith	Modoc	krystinasmith@fs.fed.us
Rec on Call	Hannah Stone		
Hydrologist Trainee	Andrew Montgomery	Mt.Baker/Snoq	andrewmontgomery@fs.fed.us
Hydrologist On call	Chris Stewart	Mt.Baker/Snoq	
Geologist ad hoc	Joe McFarlan	BLM - retired	scr1338@yahoo.com
Regional Geologist	Alan Gallejos	RO/Sierra NF	
Geologist Intern	Mylo Grote	Modoc	mgrote@fs.fed.us
Engineering	Christopher Bielecki	Modoc	csbielecki@fs.fed.us
Engineering Intern	Keith Lester	Modoc	klester@fs.fed.us
Engineering	Alvin Sarmiento		alvinsarmiento@fs.fed.us
Botany	Mike Dolan	AD	heremusgramen@gmail.com
Botany	Heidi Guenther	Modoc	hguenther@fs.fed.us
Heritage	Jennifer Rovanpera	Applegate BLM	jrovanpera@blm.gov
Veg Management	Glenn Martin	Modoc	glmartin@fs.fed.us

Appendix B: Road, Heritage and Plants Protocols:

See pages below for various protocols.

Modoc Stone Fire
Road Effectiveness Monitoring

The 2500-8 report requests funds to monitor the effectiveness of road treatments within the Modoc Stone Fire perimeter.

1. Monitoring Questions
   - Is the road-tread stable?
   - Is the road leading to concentrating runoff leading to unacceptable off-site consequences?

2. Measurable Indicators
   - Rills and/or gullies forming of the road
   - Loss of road bed.

3. Data Collection Techniques
   - Photo documentation of site
   - Inspection Checklist (attached)

4. Analysis, evaluation, and reporting techniques

   - Monitoring will be conducted after storm events. If the monitoring shows the treatment to be ineffective at stabilizing road and there is extensive loss of road bed or infrastructure an interim report will be submitted. A several page report would be completed after the site visit. The report would include photographs and a recommendation on whether additional treatments are necessary.

Road Inspection Checklist

Date: _____ Inspector_____
Time: _____ Forest Road_____

Describe locations reviewed during inspection: _____

_____

_____

Was there road damage?

Was culvert plugged? _____.

GPS _____

Describe damage and cost to repair? (GPS)_____

Photo taken of road damage_____

Recommended actions to repair: _____

Modoc Stone Fire
Cultural Site Monitoring

The standard cultural resource monitoring form (available from the Modoc National Forest Heritage staff) will be used to monitor cultural sites by cultural monitors. The following form may be used by Law Enforcement Officers or other monitors:

Heritage Protection Inspection Checklist

Date: _____ Inspector_____
Time: _____ Forest Road Nearby_____

Describe locations reviewed during inspection:

Is there evidence of looting, vandalism, or other damage to the site? If so, please describe:

Are there exposed/visible artifacts or features? If so, please describe:

(GPS Location if available)_____

Photo #s and Description:

Recommended Actions:

This information was provided to _____ (from the Modoc National Forest Heritage Staff) on _____ via _____ (email, hard-copy, etc.)

Describe locations reviewed during inspection:_____

_____

_____

Was there artifact damage?

Was artifacts covered or eroded?_____.

GPS)_____

Describe damage and cost to repair? (GPS)_____

Photo taken of artifact damage_____

Recommended actions to repair:_____

Plant Monitoring Narrative:

Invasive weed inventory of the disturbed sites within the Modoc Stone Fire boundary will be conducted and reported under the current standards utilizing NRIS. The monitoring protocol will be at the discretion of the Modoc National Forest. Invasive species treatment sites will be monitored to determine the effectiveness of the treatment and recovery of the native plant communities. Control effectiveness will be evaluated the year following treatment to determine effectiveness of the treatment and if follow-up treatments are necessary. Monitoring methods will involve repeated visits to infestation sites to give ocular estimates of the infestation. Photo-points during flowering periods can also be utilized. Long term monitoring of the area using methods such as line point intercept will also add more quantitative data for analysis to post-fire rehabilitation (see Elzinga et al., 1998 and Herrick et al. 2009 for example monitoring designs). Monitoring will occur in years 1 through 3.

Appendix C: Values at Risk Spreadsheet

Value (Life/Property/ Resources)	Value At Risk	Probability of Damage or Loss	Magnitude of Consequences	Risk	Treatment	Notes
Property	Structures within Stone Coal Valley	Unlikely to cause damage to property	Minor- Property damage is limited in economic value	Low	None	No homes affected in drainage
Property	Subdivision West of 139 and 299 Intersection	Unlikely to cause damage to property	Minor-Property damage is limited in economic value	Low	None	No homes affected by drainage
Property	Stone Coal Valley Rd.	Unlikely to cause damage to property	Minor – Property damage is limited in economic value	Low	None	No homes affected by drainage
Property	Bushey's Ranch	Unlikely to cause damage to property	Minor – Property damage is limited in economic value	Low	None	No homes affected by drainage
Resource	Vernal Pools	Very Likely-noxious weeds invading the vernal pool	Moderate-loss of endangered plant habitat	Very High	Early detection and rapid response	
Resources	Traditional Cultural Areas	N/A-No traditional use areas were identified by Tribal Council members to the BAER team	N/A	N/A	N/A	Continue to work with Pit River Tribe during monitoring phase.
Human Life and Safety	Traffic on open roads	Possible – Fallen trees, snags, rocks, prism failure, culvert failure/overtopping	Major – Loss of human life	High	Warning Signs	
Property	NFSR 41N12	Likely – Washouts at stream crossing, road inaccessible due to sediments and debris	Moderate – loss of part of the road bed and water / sediment deposition onto road	High	New Drainage Dips, Armored Fords, Storm Inspection and Response	
Property	NFSR 41N14	Likely – Washouts at stream crossing, road inaccessible due to sediments and debris	Moderate – loss of part of the road bed and water / sediment deposition onto road	High	Waterbars, Armor Crossing, Storm Inspection and Response	
Property	NFSR 41N14A	Likely – Road inaccessible due to sediments and debris	Moderate – loss of part of the road bed and water / sediment deposition onto road	High	Waterbars, Armor crossings, Storm Inspection and Response	
Property	NFSR 41N17	Likely – Road inaccessible due to sediments and	Moderate – Roadbed loss and culvert	High	New Drainage Dips, Reinforce	Provide access to private property

		debris, block culverts with sediments and debris	damage resulting in expensive repair		Ditches, Armor Culvert, Storm Inspection and Response	
Property	NFSR 41N17A	Likely – Road inaccessible due to sediments and debris	Moderate – loss of part of the road bed and water / sediment deposition onto road	High	New Drainage Dips, Storm Inspection and Response	Provides access to private property
Property	NFSR 41N44	Likely – Road inaccessible due to sediments and debris, block culverts with sediments and debris	Moderate – Roadbed loss and culvert damage resulting in expensive repair	High	New Drainage Dips, Culvert Armoring, Reinforce Ditches, Storm Inspection and Response	Main access road through fire, provides access to private land and the Cottonwood Flat Campground
Property	NFSR 41N44C	Likely – Road inaccessible due to sediments and debris	Moderate – loss of part of the road bed and water / sediment deposition onto road	High	New Drainage Dips, Storm Inspection and Response	Provides access to Forest Service Rock Pit
Property	NFSR 41T17A	Likely – Road inaccessible due to sediments and debris	Moderate – loss of part of the road bed and water / sediment deposition onto road	High	Waterbars, Storm Inspection and Response	
Property	NFSR 42B07AA	Possible – Road inaccessible due to sediments and debris	Moderate – loss of part of the road bed and water / sediment deposition onto road	Intermediate	Storm Inspection and Response	
Property	NFSR 42N07	Possible – Road inaccessible due to sediments and debris	Moderate – loss of part of the road bed and water / sediment deposition onto road	Intermediate	Storm Inspection and Response	
Property	NFSR 42N07A	Unlikely – Road inaccessible to sediments and debris	Moderate – loss of part of the road bed and water / sediment deposition onto road	Low	No Treatment	
Property	NFSR 42N21	Likely – Road inaccessible due to sediments and debris, block culverts with sediments and debris	Moderate – Roadbed loss and culvert damage resulting in expensive repair	High	Vegetation Clearing at Stream Crossings, New Drainage Dips, Culvert Armoring, Storm	

					Inspection and Response	
Property	NFSR 42N35	Possible – Road inaccessible due to sediments and debris	Moderate – loss of part of the road bed and water / sediment deposition onto road	Intermediate	Storm Inspection and Response	
Property	NFSR 42N35A	Possible – Road inaccessible due to sediments and debris	Moderate – loss of part of the road bed and water / sediment deposition onto road	Intermediate	Waterbars, Storm Inspection and Response	
Property	NFSR 42N60	Unlikely – Road inaccessible to sediments and debris	Moderate – loss of part of the road bed and water / sediment deposition onto road	Low	No Treatment	
Property	NFSR 42T35A	Possible – Road inaccessible due to sediments and debris	Moderate – loss of part of the road bed and water / sediment deposition onto road	Intermediate	Waterbars, Storm Inspection and Response	
Resources	Soil Productivity	Very Likely- Will occur due to loss of vegetation	Moderate- Long effects resulting in low productivity	Very High	No proposed treatments	
Resources	Noxious Weeds – Native Recovery and Diversity	Likely that introduction will occur on dozer, hand line, and other ground disturbed locations	Moderate- loss of native plant community integrity and endangered plant habitat	High	Early detection and rapid response, treatment as needed	
Resources	Cultural Resources	Very Likely- Increased exposure and access	Moderate- looting of sites may occur	High	Provide ground cover to reduce visibly and monitoring sites	
Property	Lassen Trail	Possible – some moderate burn severity on trail can cause damage	Minor- Fire resulted in irreversible damage	Low	No treatment recommended	Evaluated for arch interest.
Property	Burned Cabin	N/A-remains of the cabin suggests that it burned in previous fire	N/A	N/A	No treatment needed	
Life	Road Damage and Risk To Life	Possible- Fire weakened trees	Major- Potential loss of life	High	Warning signage	
Life	Trail Damage and Risk to Life	Possible- Fire weakened trees	Major- Potential loss of life	High	Warning signage	
Life	Campground Damage and Risk to Life	Unlikely-Damage to road from loss of water control	Major- Roadbed loss resulting in expensive repair	Intermediate	Warning signage	

Resources	Water Quality	Very Likely-Will occur due to increased sedimentation	Minor-Short-term effects	Low	No proposed treatments	