

Date of Report: December 22, 2016

**BURNED-AREA REPORT**

(Reference FSH 2509.13)

**PART I - TYPE OF REQUEST**

This 2500-8 report is for Clear Creek Fire on the Pisgah National Forest.

**A. Type of Report**

- ☒ 1. Funding request for estimated emergency stabilization funds  
☐ 2. Accomplishment Report  
☐ 3. No Treatment Recommendation

**B. Type of Action**

- ☒ 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 Names:** Clear Creek**B. Fire Number:** NC-NCS-160054**C. State:** North Carolina**D. County:** Marion and McDowell County**E. Region:** South (8)**F. Forest:** Pisgah National Forest**G. District:** Grandfather RD**H. Fire Incident Job Code:** PNKT4K 1502**I. Date Fire Started:** 11/20/16**J. Date Fire Contained:** 12/3/16**K. Suppression Cost:** As of Dec 13, 2016: \$4,800,000**L. Fire Suppression Damages Repaired with Suppression Funds**

Suppression Repair				
Line Type	Needs Repair	Repair Complete	Grand Total	% Repaired
Completed Dozer Line	7.8	4.7	12.5	38%
Hand Line	1.1	1.5	2.6	57%
Road as Completed Line	7.3	0.7	8.0	9%
<b>Grand Total</b>	<b>16.2</b>	<b>6.9</b>	<b>23.1</b>	<b>30%</b>

**M. Watersheds:**

HUC 6 subwatersheds affected by the Clear Creek fire.

Subwatershed	Total Subwatershed Acres	Acres Burned
	(Percent Burned)	
Buck Creek	16,433 (13%)	2,124
Mackey Creek-Catawba River	24637 (4%)	1,040
<b>Grand Total</b>	<b>41,070</b>	<b>3,164</b>

**N. Total Acres Burned:** 3,164

**NFS Acres (1740) Other Federal (0) State (0) Private (1424)**

**O. VegetationTypes:** The vegetation types on USFS lands were determined based on current and previous field reconnaissance, previously mapped rare plant communities, mapped forest vegetation types, modeled and plotted plant communities, older aerial imagery, and discussions with fire personnel. Of the 3164 acres within the burn perimeter, 1740 were in the Grandfather Ranger District. Within the burn perimeters the elevation range varies from around 1500 feet around Lake Tahoma to about 4000 feet on Poplar Ridge of Mackey Mountain. The USFS service portion of the burn perimeter is a roadless area and has not had any recent timber harvests. Most of the stands are between 80-100 years of age. Over 15% of the area is greater than 150 years of age.

The two dominate plant communities within the Clear Creek wildfire were rich cove and mesic oak forests, consisting of 22% and 27%, respectively (Table 1). The former type is primarily dominated by tulip poplar and has the greatest diversity of herbaceous understory. Red oak, white oak, and a diversity of hickories dominate mesic oak forest. Acidic cove forest represented 12% of this wildfire perimeter. Like rich cove forest it is often dominated by tulip poplar but covered in the midstory and shrub layer with a dense evergreen *Rhododendron maximum* component and a sparse herb layer. All three of these mesic types generally experienced low fire severity or were unburned. An exception is the area upslope of the Marion drinking water intake on Clear Creek. Patches of moderate soil severity were noted.

Vegetation for Clear Creek wildfire on the Pisgah National Forest.

Wildfire	Clear Creek
<b>Elevation Range (feet)</b>	<b>1500-4000</b>
<b>Shortleaf Pine</b>	94
<b>Acidic Cove</b>	199
<b>Rich Cove</b>	400
<b>Mesic Oak</b>	471
<b>Dry-Mesic Oak</b>	18
<b>Dry Oak</b>	306
<b>Pine-Oak/Heath</b>	240
<b>High Elevation Red Oak</b>	7
<b>Montane Cliffs</b>	5

**Totals**

**1740**

Dry oak, chesnut oak and scarlet oak primarily, and pine-oak/heath forests occur on the steepest south and west-facing ridge and slopes. The presence of either pitch pine, table mountain pine, shortleaf pine, or Virginia pine indicates fire-adapted plant communities. About 31% of the wildfire burn perimeter consists of these two dry types. Both types have a scattered to dense mountain laurel shrub layer. The fire intensity within this area was low to moderate except for the southern slopes of Feds Mountain. Mountain laurel was completely top-killed in scattered patches while only singed within other burn areas.

Dry-mesic oak forest occurs across about 1% of the burn area. It is dominated by chestnut oak, red oak, white pine, and various hardwoods. Primarily a low intensity burn occurred across this habitat resulting in patchy consumption of the leaf litter and partial scorching of tree bases and shrub leaves.

Within the lowest elevation a smaller dry component, less than 6%, of shortleaf pine forest occurs. It resembles dry oak and pine-oak/heath forests in structure and diversity. On the highest elevations, around 4000 feet, a small portion of high elevation red oak forests is present. The former type is dominated by yellow birch, sugar maple, and yellow buckeye. Stunted and wind-swept red oaks dominate high elevation red oak forest. It consists of less than 1% of the Clear Creek wildfire. This community type did not have high fire activity as the fire started to die with some rain activity when it reached the highest elevation.

Rock outcrops, montane acidic cliffs, are prominent along the south-facing slopes of Feds Mountain. This rare community had probably the highest fire intensity within the adjacent forests. Small patches of canopy gaps were created in the surrounding dry oak forest.

**P. Dominant Soils:** The dominant soils within the water intake watershed are primarily the Chestnut and Edneyville (map units CaF, EcF) soil series which are loamy soils formed on steep slopes of biotitic gneiss.

**Q. Geologic Types:**

Biotite Granitic Gneiss (Middle Proterozoic): 2178 (69%)  
Alligator Back Formation (Late Proterozoic): 986 (31%)

**R. Miles of Stream Channels by Order or Class:** See Table Below

Pour Point Shed	Stream/River	Artificial Path	Grand Total
Clear Creek Watershed	7		7
Lake Tahoma Bucks Creek	172	4	176
Grand Total	179	4	183

**S. Transportation System**

**Trails:** No Trails

**Roads:** No NFS

County and State Road: 2.6 Miles

### **PART III - WATERSHED CONDITION**

- A. Soil Erosion Hazard Rating (acres):** No Soil Burn Severity was produced for this fire so no Erosion Hazard Rating could be assessed.
- B. Erosion Potential:** We assessed the watershed above the intake for the Marion water system. Only 40% of the watershed burned and, according to local fire fighters, much of what did burn happened after precipitation fell on the fire. Without the necessary Soil Burn Severity map and an inability to walk the watershed, the team assumed that much of the watershed burned with very low to low soil burn severity with adequate soil cover to minimize erosion. It is likely the erosion response for the watershed will be less than 2 tons/acre.

### **PART IV - HYDROLOGIC DESIGN FACTORS**

A	Estimated Vegetative Recovery Period	2 Years
B	Design Chance of Success	90%
C	Equivalent Design Recurrence Interval	50%
D	Design Storm Duration	24 hour
E	Design Storm Magnitude	3.64 in
F	Design Flow	152 cfs
G	Estimated Reduction in Infiltration	25%
H	Adjusted Design Flow	190 cfs

#### **Summary of Watershed Response**

**Hydrologic Response:** One area of concern however, was the 25 acre watershed directly north and above the intake. This area burned on November 23<sup>rd</sup>, the day before precipitation fell over the area. The slopes are generally greater than 50% slopes with areas that had burn severities of moderate and high. Patchy areas of ground have less than 50% soil cover and most of the area had the high water holding capacity organic layers burned off. Erosion potential will remain low for low frequency storms, however, there is a chance that surface sediment could challenge the settling basin during low frequency, high intensity storms.

The risk of sediment input associated with geological events has increased. This is a geologically active area with slumps and slides likely dated to the Hurricane Ivan event. The channels draining this watershed have clear evidence of debris flows. The soils had very little water repellency which will reduce erosion and sediment potential during less intense rainfall events, however, with less organic material there will be greater deep soil water storage, increasing the chance for slumping and sliding during large cyclonic events.

**Mass Wasting Response:** Heavy rainfall events are the most common trigger for landslides in western North Carolina, especially rapidly moving debris flows and debris slides. Seven and probably eight major storm events that triggered numerous landslides across western North Carolina have occurred since 1916. These regional storm events occurred in 1916 (3), 1940 (2), 1977 (1), and 2004 (2). Reports of landslides triggered by the early July 1916 storm have not been located; however, that storm did increase moisture on slopes prior to the July 15-16, 1916 storm. Other rainfall events have triggered landslides in more localized areas. Localized landslides are expected in areas where there is around 5 inches of rainfall within a 24-hour period. Less rainfall, on the order of 3 inches within 24-hours, may be required to trigger landslides slopes where human activity has had a destabilizing effect. More widespread landslides are expected in areas where there is around 10 inches or more of rainfall within a 24-hour period. Storms within periods of above-normal rainfall is a weather scenario prone to induce landslides, as was the case when record rainfall amounts from January through July 2013 triggered over 300 landslides in western North Carolina.

## **PART V - SUMMARY OF ANALYSIS**

### **A. Describe Critical Values/Resources and Threats:**

#### **Values at Risk:**

*The table below is Exhibit 02 from FSM 2523.1. This matrix was used to evaluate the risk level for each value identified during this BAER assessment. See FSM 2523.1 for additional information.*

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

The table below is a summary of the values (some of which were not identified as 'critical' per Exhibit 01 from FSM 2523.1) within and along the Nantahala National Forest Fires, as well as, the threats to those values, the probability of damage or loss, magnitude of consequences and the resulting level of risk. Red shaded cells are those values that rated out as "very high" or "high" risk. Yellow shaded cells rated out "intermediate" risk and white cells rated out "low" or "very low". **This assessment was based on those risks associated with the 2 year design storm (50% chance of occurrence in any given year) over the burned areas. This risk assessment is not applicable to other larger storm events.**

### **Nantahala NF BAER - Forest Service Values At Risk Tracking Table**

High / Very High Risk	
Intermediate Risk	
Low / Very Low Risk	

Value (Life/ Property/ Resources)	Value at Risk	Threat to Value at Risk	Probability of Damage or Loss	Magnitude of Consequence	Risk	Treatment	Notes
Property/ Resources	City of Marion water supply at Clear Creek	Intake infrastructure and water quality on Clear Creek	Likely	Moderate	High	Ongoing communicatio n with the city of Marion, <b>No Funding Requested</b>	City gets its drinking water supply from three creeks located west of the city: Buck Creek 3 mgd, Mackey Creek 0.84 mgd, and Clear Creek 0.41 mgd. 9.6% of the total water supply comes from clear creek. There is increased potential for suspended sediment City should monitor and potentially avoid use during larger storms.
Natural Resources	Native plant communities (pine- oak/heath and dry oak forests) where invasive plants are documented in minor amounts on NC 80, Clear Creek Road, and Old Clear Creek Road	Spread of invasive plants into upland and riparian native plant communities. Known upland species posing threat include, but not limited to, princess tree ( <i>Paulownia tomentosa</i> ) and Chinese Silvergrass ( <i>Miscanthus sinensis</i> ).	Likely	Moderate	High	<b>L1</b> -Early Detection Rapid Response Treatment	Concern for rapid spread of known non-native plants into fire area from small infestations on nearby private roads (McDowell County #s 1422 and 1431, and NC 80); establishment in native habitats. Approximately 70 acres of survey/detection

## B. Emergency Treatment Objectives:

The primary objective of this Burned Area Emergency Response Report is to recommend prompt actions deemed reasonable and necessary to effectively protect, reduce or minimize significant threats to human life and property and prevent unacceptable degradation to natural and cultural resources. The application of these BAER treatments are expected to minimize on-site and downstream damages to the identified values at risk previously mentioned. The emergency treatments being recommended by the BAER Team are specifically designed to achieve the following results.

### Proposed Land Treatments

The objective of the land treatments are to:

1. Promote and protect native and naturalized vegetative recovery by reducing the spread of noxious weeds (L1).

### Proposed Road and Trail Treatments

None

### Proposed Protection/Safety Treatments:

None

### Proposed Channel Treatments

None

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

Land 75 % Channel NA % Roads/Trails NA % Protection/Safety 90 %

## D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	70	80	90
Channel	NA	NA	NA
Roads/Trails	NA	NA	NA
Protection/Safety	NA	NA	NA

**E. Cost of No-Action (Including Loss):** Critical values identified in Section A would be damaged or lost. Cost of the no action is estimated to be \$32,000.

**F. Cost of Selected Alternative (Including Loss):** Total cost of the action alternative (including loss) is \$8,385.

## G. Skills Represented on Burned-Area Survey Team:

**Team Leader** – Kyle Wright - Zone Hydrologist, Deschutes NF

**Email:**

kylewright@fs.fed.us

559-359-2261 / 458-292-6027 (c)

[X] Botany/Invasives- Gary Kauffman

[X] GIS – Dorothy Thomas

[X] Soils – Eric Nicita

### Contributing Local Resources

## H. Treatment Narrative:

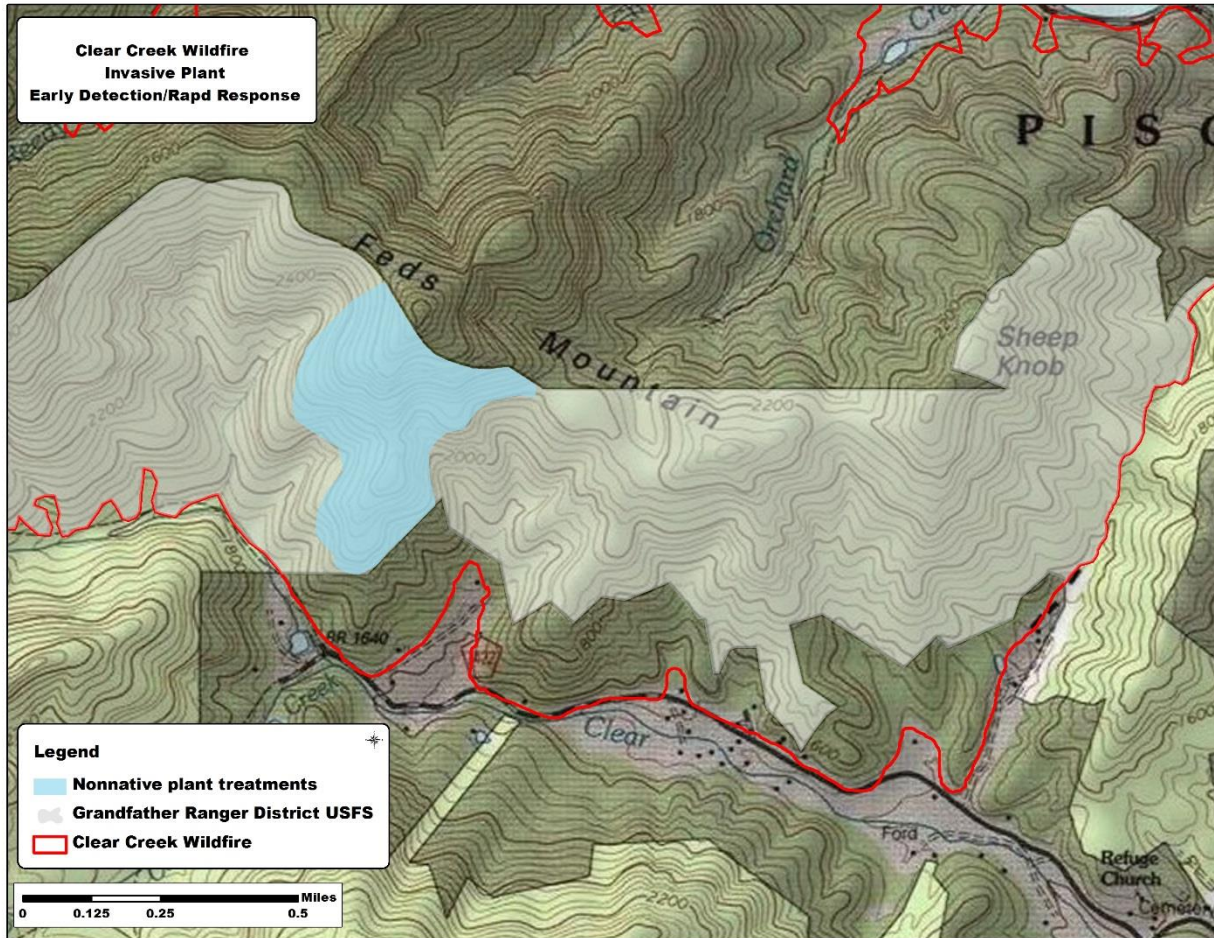
### Land Treatments:

**L1 - Invasive Weed Detection and Treatment** Scattered occurrences of princess tree (*Paulownia tomentosa*) and Chinese silvergrass (*Miscanthus sinensis*) were observed along the perimeter of the wildfire on McDowell County roads # 1422, 1431, and NC 80. Previous wildfires on xeric sites have been invaded by these two species following the reduction in the duff layer and removal or partial removal of the overstory layer. The steep south-facing ridge on Feds Mountain surrounding several rock outcrops experienced higher burn severity with several had ½ - 1 acre gaps with total to partial consumption of the canopy. It is important to assess any new invasions in these open areas before any invasive becomes established. The proposed treatment is for early detection and rapid response.

Survey and potential treatments will focus on the USFS property on the south-facing dry ridge amounting to about 70 acres (Figure 1). While 70 USFS acres will be surveyed, it is anticipated only a portion, 20 acres, will be infested. These potential 20 acres would be treated if any other non-native invasive plant species is located. Total treatment and survey request for Clear Creek is \$6,450.

Treatment	Units	Unit Cost	# of Units	Total Cost
Invasive Plant Surveys/detection	acres	\$25	70	\$1,750
Invasive Plant Treatments	acres	\$150	20	\$3,000
Herbicide	gallons	\$100	2	\$200
COR contract development/review	acres	\$22	70	\$1,500





**Road and Trail Treatments:**

None

**Protection/Safety Treatments:**

None

**Channel Treatments:**

None

**Monitoring Narrative:**

None

## Part VI – Emergency Stabilization Treatments and Source of Funds

Line Items	Units	NFS Lands				Other	# of units	Other Lands	
		Unit Cost	# of Units	BAER \$	\$			Fed \$	Non Fed \$
<b>A. Land Treatments(L)</b>									
L1-Invasive Survey/ Detection	Lump	\$92.14	70	\$6,450	\$0			\$0	\$0
				\$0	\$0			\$0	\$0
<i>Subtotal Land Treatments</i>				<i>\$6,450</i>					
<b>B. Channel Treatments</b>									
				\$0	\$0			####	#REF!
<i>Subtotal Channel Treat.</i>				<i>\$0</i>	<i>###</i>			<i>####</i>	<i>#REF!</i>
<b>C. Road and Trails (R-T)</b>									
				\$0	\$0			####	\$0
<i>Subtotal Road &amp; Trails</i>				<i>\$0</i>	<i>###</i>				<i>#REF!</i>
<b>D. Protection/Safety (R-P)</b>									
				\$0	\$0			####	\$0
				\$0					
<i>Subtotal Structures</i>				<i>\$0</i>	<i>###</i>			<i>####</i>	<i>#REF!</i>
<b>E. BAER Evaluation</b>									
Clear Creek BAER				\$6,236	\$0			\$0	\$0
<b>F. Monitoring (M)</b>									
				\$0	\$0			\$0	\$0
				\$0	\$0			\$0	\$0
				<i>\$0</i>	<i>\$0</i>			<i>\$0</i>	<i>\$0</i>
<i>Subtotal Monitoring</i>								<i>####</i>	<i>#REF!</i>
<b>G. Totals</b>									
Previously approved									
Total for this request				\$6,450					

## PART VII - APPROVALS

\_\_\_\_\_  
Forest Supervisor (signature)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Regional Forester (signature)

\_\_\_\_\_  
Date