Rock Mountain Fire December 2016

USDA-FOREST SERVICE

FS-2500-8

(6/06)

Date of Report: 12/14/2016

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: Rock Mountain

B. Fire Number: GA-CHF-160079

C. State: Georgia and North Carolina

D. Counties: Clay and Macon (North Carolina), Rabun and Towns (Georgia)

E. Region: 8

F. Forest: Chattahoochee-Oconee, Nantahala

G. Districts: Chatooga River, Nantahala, and Tusquitee

H. Fire Incident Job Code: P8KTE7 0803

I. Date Fire Started: 11/09/2016

J. Date Fire Contained: Unknown

K. Suppression Cost: $11.7 million

L. Fire Suppression Damages Repaired with Suppression Funds:

Chattachoochee NF:
1. Fireline waterbarred (miles): approximately 9.8 miles
2. Fireline seeded (miles): approximately 9.8 miles
3. Other (identify): N/A

Nantahala NF:

1. Fireline waterbarred (miles): approximately 14.2 miles
2. Fireline seeded (miles): approximately 14.2 miles
3. Other (identify): N/A

M. Watersheds:

The Rock Mountain Fire is located in the South Atlantic Gulf and Tennessee Regions, largely within the Headwaters Tallulah River 6th-Field watershed in Rabun County, GA. Portions of the fire also occurred in the 6th-Field watersheds identified in the following table:

TABLE 1. Rock Mountain Fire Acres and Soil Burn Severity by 6th-Field Watershed					
6th-Field Watershed	**Total Area**	**Rock Mountain Fire**	**High SBS**	**Moderate SBS**	**Low/Unburned SBS**
ID	**Acres**	**Acres**	**Acres**	**Acres**	**Acres**
Headwaters Tallulah River	19,719	12,277	10	18	12,249
Headwaters Nantahala Creek	23,559	4,848	0	1	4,847
Bettys Creek	23,188	4,223	0	7	4,216
Plumorchard Creek	12,839	2,054	0	0	2,054
Persimmon Creek	11,950	1,015	0	0	1,015
Hightower Creek	21,329	276	0	0	276
Other	N/A	32	0	0	32

N. Total Acres Burned:

TABLE 2. Georgia Burned Acres by Ownership	
Total Georgia Acreage	**12,980 acres**
Forest Service	12,398 acres
Private	582 acres

TABLE 3. North Carolina Burned Acres by Ownership	
Total North Carolina Acreage	**11,770 acres**
Forest Service	11,383 acres
Private	387 acres

O. Vegetation Types:

The Rock Mountain Fire area lacks specific botanical survey data. In general the burned landscape has a mosaic of habitats including: Pine-Oak Woodland and Forest, Cove Forest, Low to Mid-elevation Mixed Oak Pine Forest, Northern Hardwood and Boulderfield Forest as well as Floodplain, Bottomlands and Riparian Zones. Several habitat types are declining and considered rare. Fire carried through most habitats burning areas that normally would not carry fire, however, fire intensity was highly variable and the fire effects will be highly variable.

Pine-Oak Woodland Forest types occur on sites that are sub-mesic, xeric, south-facing, rocky, thin-soiled convex and narrow ridge tops. The habitat requires fire maintenance to maintain an open structure and for the dominant vegetation to maintain a competitive advantage. Overstory species

include pitch pine (*Pinus rigida*), Virginia pine (*P. virginiana*), table mountain pine (*P. pungens*), post oak (*Quercus stellata*), blackjack oak (*Q. marilandica*), rock chestnut oak (*Q. montana*), and scarlet oak (*Q. coccinea*). In some cases the midstory and shrub layer are occupied by a dense evergreen rhododendron (*Rhododendron maximum*) component and a sparse herb layer. Generally post fire leaf litter was observed in this forest type and fire effects on the vegetation are mostly beneficial. However, many pine-Oak woodlands habitats have been declining due to the lack of fire on the landscape, resulting in deep accumulation of duff and invasion off site species such as white pine (*Pinus strobus*). Fire adapted communities that have a greater departure from natural fire conditions may have more severe effects on vegetation. Fire likely damaged less fire adapted species and in some fire suppressed areas duff had accumulated around the base of fire adapted species. In some areas the consumption of duff may have heated the cambium of fire tolerant species, possibly resulting in mortality of some desirable overstory species.

Cove Forest generally occur on mesic sites with canopy composition that includes tulip-tress (*Liriodendron tulipifera*), basswood (*Tilia americana*), white ash (*Fraxinus americana*), American beech (*Fagus grandiflolia*), northern red oak (*Quercus rubra*), eastern hemlock (*Tsuga canadensis*), white pine (*Pinus strobus*), and sourwood (*Oxydendrum arboretum*). The midstory of rich cove forest is often covered with a dense evergreen component of rhododendron. Eastern hemlock dominated coves are scattered within the acidic cove type, although many of the hemlocks have succumbed to the exotic pest hemlock wooly adelgid. Cove Forest do not have species that are generally fire adapted, however, several Cove Forest habitat types did burn with relatively high fire intensity. It is likely that some species such as American beech will suffer fire scars and possibly be killed. Cove Forest within the burn area had generally dropped the majority of leaves prior to fire, resulting in minimal leaf litter left on site.

Low to Mid-elevation Mixed Oak Pine Forest occurring below 3500 on drier sites that support rock chestnut oak, white oak (*Q. alba*), southern red oak (*Q. falcata*), northern red oak, scarlet oak with conifers such as loblolly pine (Pinus taeda), shortleaf pine (*p. echinata*),Virginia pine, white pine and eastern hemlock. Fire did not greatly affect the vegetation of this habitat type and post fire leaf litter has generally accumulated.

Northern Hardwood and Boulderfield Forest generally occur above 3500 feet in elevation and support canopy species with northern affinities including yellow buckeye (A*esculus flava*), striped maple (*Acer pensylvanicum*), American beech, basswood and yellow birch (*Betula alleghaniensis*). While these are not generally fire adapted habitats, fire generally burned across these habitats, consuming all leaf litter and is likely will damage some overstory species.

Floodplain, Bottomland and Riparian Zones occur along rivers and streams with some floodplain development with typical species assemblages including: sycamore (*Platanus occidentalis*), river birch (*Betula nigra*), red maple (*Acer rubrum*), sugarberry (*Celtis laevigata*) and some oak species. The midstory is often covered with a dense evergreen componet of rhododendron. Eastern hemlock have succumbed to the exotic pest hemlock wooly adelgid. Fire burned across most floodplain habitats at a very low intensity and is not likely to have seriously damaged the overstory vegetation.

P. Dominant Soils:

Inceptisols are soils of cool to very warm, humid and subhumid regions. The largest area is one that includes the southern New England States and the Appalachian Mountains.

The central concept of Inceptisols is that of soils of humid and subhumid regions that have altered horizons that have lost bases or iron and aluminum but retain some weatherable minerals. They do not have an illuvial horizon enriched with either silicate clay or with an amorphous mixture of aluminum and organic carbon.

- North Carolina
  - 11.9% of burned area, Plott fine sandy loam, 15 to 95 percent slopes, fine-loamy, isotic, mesic Typic Humudepts.
  - 11.3% of burned area, Edneyville-Chestnut complex, 15 to 95 percent slopes, coarse-loamy, mixed, active, mesic Typic Dystrudepts.
  - 6.4% of burned area, Cullasaja-Tuckasegee complex, 15 to 95 percent slopes, loamy-skeletal, isotic, mesic Typic Humudepts.
  - 4.2% of burned area, Chestnut-Cleveland-Rock outcrop complex, 15-95 percent slopes, coarse-loamy, mixed, active, mesic, Typic Dystrudepts.
  - 3.0% of burned area, Evard-Cowee complex, 15 to 95 percent slopes, fine-loamy, parasesquic, mesic Typic Hapludults.
  - 2.5% of burned area, Cleveland-Chestnut-Rock outcrop complex, 15 to 95 percent slopes, loamy, mixed, semiactive, mesic Lithic Dystrudepts.
  - 2.4% of burned area, Burton-Craggey-Rock outcrop complex, 15 to 95 percent slopes, fine-loamy, isotic, frigid Typic Humudepts.
  - 2.0% of burned area, Cullasaja very cobbly fine sandy loam, 15 to 50 percent slopes, loamy-skeletal, isotic, mesic Typic Humudepts.
  - 1.4% of burned area, Rock outcrop-Cleveland complex, 30 to 95 percent slopes,
  - 1.3% of burned area, Wayah sandy loam, 15 to 95 percent slopes, fine-loamy, isotic, frigid Typic Humudepts.

Percentage of Rock Mountain burned area in North Carolina 47.7%

- Georgia

- 14.0% of burned area, Tusquitee-Haywood association, steep, coarse-loamy, mixed, mesic Umbric Dystrochrepts.
- 8.3% of burned area, Porters association, steep to very steep, coarse-loamy, mixed, mesic Umbric Dystrochrepts.
- 8.2% of burned area, Edneyville-Ashe association, steep, coarse-loamy, mixed, mesic Typic Dystrochrepts.
- 7.6% of burned area, Ashe association, very steep, coarse-loamy, mixed, mesic Typic Dystrochrepts.
- 3.2% of burned area, Tusquitee loam, 4 to 25 percent slopes, coarse-loamy, mixed, mesic Umbric Dystrochrepts.
- 2.3% of burned area, Ashe-Porters association, moderately steep, coarse-loamy, mixed, mesic Typic Dystrochrepts.
- 1.9% of burned area, Saluda association, moderately steep to steep, loamy, mixed, mesic, shallow Typic Hapludults.
- 1.6% of burned area, Bradson fine sandy loam, 2 to 25 percent slopes, clayey, oxic, mesic Typic Hapludults.
- 1.6% of burned area, Edneyville sandy loam, 10 to 25 percent slopes, coarse-loamy, mixed, mesic Typic Dystrochrepts,
- 1.1% of burned area, Evard association, steep, fine-loamy, oxidic, mesic Typic Hapludults
- 1.0% of burned area, Saluda and Ashe stony soils, very steep, loamy, mixed, mesic, shallow Typic Hapludults.

Percentage of Rock Mountain burned area in Georgia 52.3%

Potential for Damage to Soil by Fire: This interpretation provides an indicator for the potential for damage to nutrient, physical and biotic soil characteristics by fire. The ratings involve an evaluation of the potential impact of prescribed fires or wildfires that are intense enough to remove the duff layer and consume organic matter in the surface layer. The ratings are based on texture of the surface layer, content of rock fragments and organic matter in the surface layer, thickness of the surface layer, and slope.

TABLE 4. Potential for Soil Damage by Fire from Soil Survey Data

Rating	Acres	Percent
Low	22,968.2	92.9%
Moderate	1,209.3	4.9%
Not Rated	542.5	2.2%
Total	*24,720*	*100.0%*

Q. Geologic Types:

TABLE 5. Geologic Types		
Geologic Map Unit	**Acres**	**Percent**
bg1 - Biotite gneiss	7,429	30%
ZYbn - Biotite gneiss and amphibolite	6,209	25%
q1a - Quartzite and mica schist	5,574	23%
Zco - Gneiss and metasedimentary rock	5,509	22%

R. Miles of Stream Channels: 58 miles

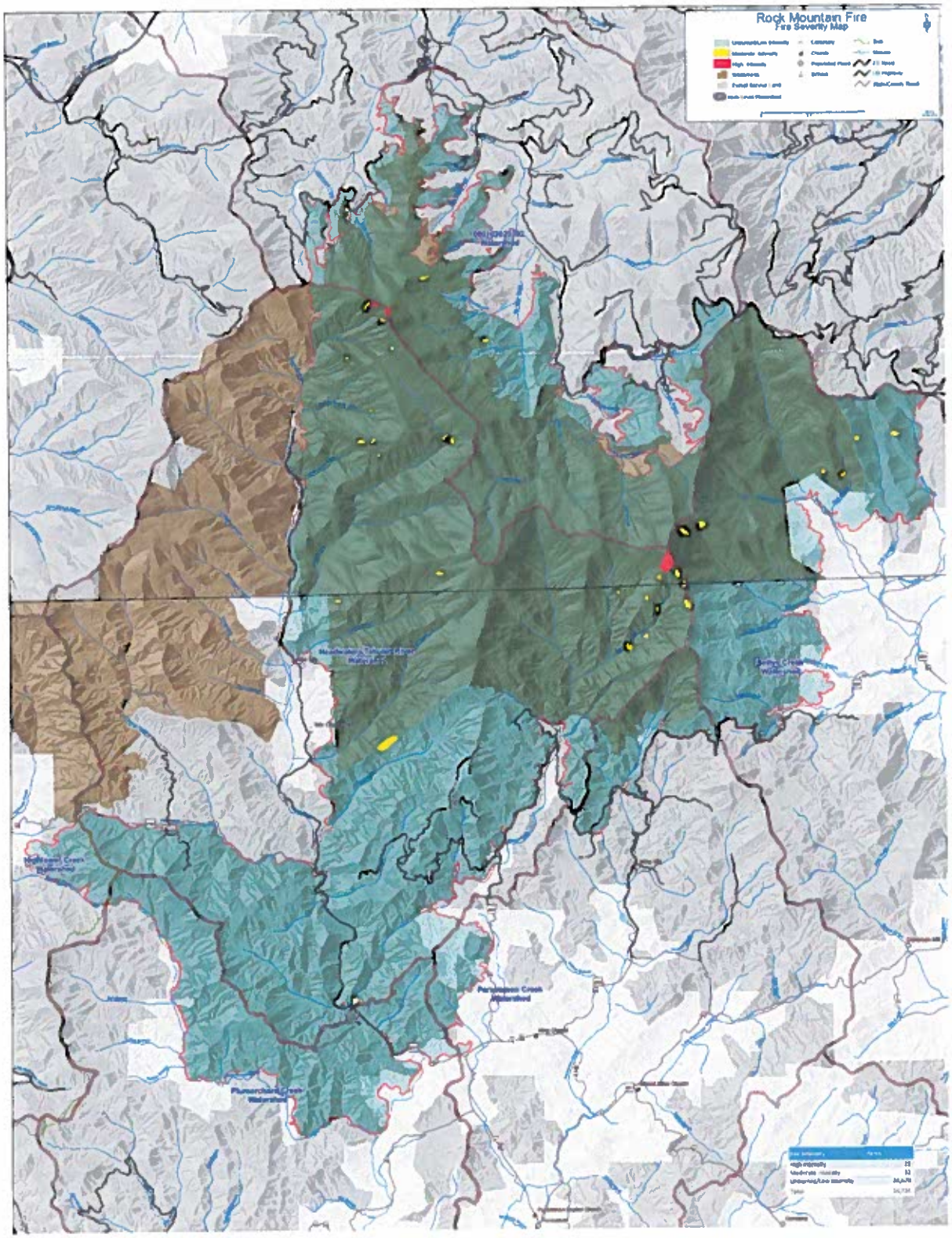
S. Transportation System:

Trails: 35.4 miles Roads: 32.2 miles (NFS) 4.3 miles (County) 0 miles (Private)

PART III - WATERSHED CONDITION

A. Burn Severity

TABLE 6. Soil Burn Severity for the Rock Mountain Fire		
SBS	**Acres**	**Percent**
High	15	0.07
Moderate	31	0.13
Low	24,673	99.8
Total	**24,720**	**100**


Rock Mountain Fire
Fire Severity Map
Persimmon Creek Watershed

The following photographs on the left show charred but not consumed ground cover, minimally impacted forest duff and fine roots and minimal, if any, impacts on the soil. The following photographs on the right show high consumption of ground cover and forest duff. Impacts on the top ¼ to ½ inch of soil were also observed.

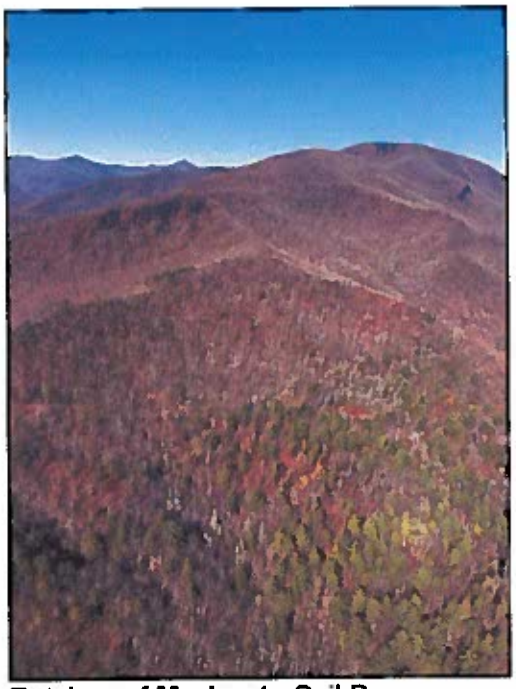
Example of low burn severity effects on landscape (above)

Example of moderate to high burn severity effects on the landscape (above)

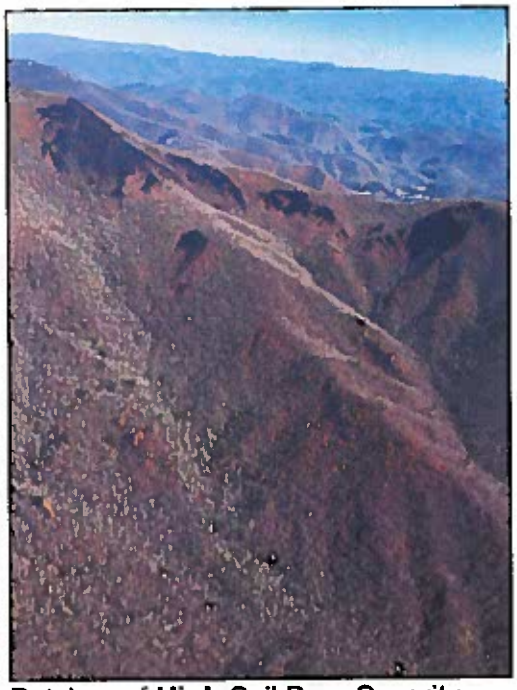
Example of low burn severity effects on the soil (above)

Example of moderate to high burn severity effects on the soil (above)

Soil Burn Severity and Ancillary Characteristics:
The following photographs show small, isolated patches of canopy consumption (moderate and high soil burn severity) in a matrix of underburned forest (low/unburned soil burn severity).



Patches of **Moderate** Soil Burn Severity (Chestnut Mountain, NC)



Patches of **High** Soil Burn Severity (Ridgepole Mountain, NC)

B. Water Repellent Soils and Increased Runoff: The degree and extent of water repellent soils is largely unknown because BAER assessment Water drop penetration tests were conducted at multiple locations. Frozen surface soils impeded data collection efforts in some places. Water repellency was identified directly below the duff layer in multiple low burn severity areas, one moderate soil burn severity area and several unburned areas. Infiltration of recent rainfall indicates that formation of water repellent layers is minimal. The extent of water repellent soils is not known but, if water repellency occurs, the pattern is likely to be patchy and mosaic. If water repellent layers did form, they would likely rapidly degrade by plant root action and frost heaving.

Example of Water Repellancy (above)

C. Soil Erosion Hazard Rating (acres): Erosion Hazard Rating (EHR): Pre-fire erosion hazard for burned area soils was obtained from existing soil survey erosion hazard rating information. The EHR interpretation is based on soil properties such as soil texture, slope, aggregate stability, infiltration rate, subsoil permeability, depth to restrictive layers, and soil rock content. The ratings indicate the hazard of soil loss from off-road and off-trail areas after a disturbance assuming 50 to 75 percent soil exposure. No evidence of such a high percentage of soil exposure was observed on low soil burn severity areas during the field survey. Therefore, the erosion hazard ratings shown are likely higher than the actual erosion risk on low soil burn severity hillslopes. Actual pre and post fire erosion potential is better reflected by the ERMiT modeling runs for this project (See ERMiT model results section).

TABLE 7. Erosion Hazard Ratings

EHR	Acres	Percent
Not rated	534	2.2%
Slight	466	1.9%
Moderate	9,502	38.4%
Severe	6, 402	25.9%
Very Severe	7,816	31.6%

D. and E. Erosion and Sediment Potential: Erosion and sediment potential was assessed by ERMiT modelling, field observations following a post fire rainfall event and review of local applicable field based research studies.

Discussion of Erosion Potential and Summary of Representative ERMiT Model Results
ERMiT allows users to predict the probability of a given amount of sediment delivery to the base of a hillslope following variable burns on forest, rangeland, and chaparral conditions in each of five years following wildfire. The ERMiT model and background documentation can be accessed at http://forest.moscowfsl.wsu.edu/fswepp/. The following ERMiT results indicate that rates of erosion are very low **(generally close to zero)** in unburned forested areas. The model results also indicate that rates of erosion will increase on forested hillslopes that were mapped at low, moderate or high soil burn severity.

Representative ERMiT Model Results

Unburned

- There is a 25% chance that sediment delivery will exceed **0.03 ton / ac** in the first year on 15% slopes
- There is a 25% chance that sediment delivery will exceed **0.04 ton / ac** in the first year on 50% slopes

Low Soil Burn Severity
There is a 25% chance that sediment delivery will exceed 4.54 ton / ac in the first year following the fire on 15% slopes

Moderate Soil Burn Severity

- There is a 25% chance that sediment delivery will exceed 11.89 ton / ac in the first year following the fire on 50% slopes

High Soil Burn Severity

- There is a 25% chance that sediment delivery will exceed 14.64 ton / ac in the first year following the fire on 50% slopes

ERMiT Model Assumptions and Inputs:

- Slope length was 150 feet for all ERMiT runs
- Soil surface texture was sandy loam
- Soil Rock Content was 25%/Volume

Ground Based Observations

Ground observations indicate that actual post fire ground cover patterns over most of the fire area are mosaics of unburned, very low and low soil burn severities. Therefore, rates of post fire hillslope erosion are not likely to be as high as the numbers generated by the low soil burn severity ERMiT runs. However, significantly higher rates of erosion are expected to occur on the relatively small areas impacted by high and moderate soil burn severity. Other factors which mitigate actual post fire erosion risk include high infiltration rates and minimally impacted dense roots throughout the surface soil layers. In the unburned/low soil burn severity areas, it is likely that, the hillslope scale, erosion could increase slightly above unburned conditions. The relatively small and disconnected moderate and high soil burn severity areas are likely to experience higher rates of erosion but it appears unlikely significant damaging sedimentation of stream channels will occur.

Following the fire, a rain event of approximately two inches occurred over a two day period (November 29th-30th). Data from four weather stations in and around the burned area revealed peak rainfall intensities on November 30th.

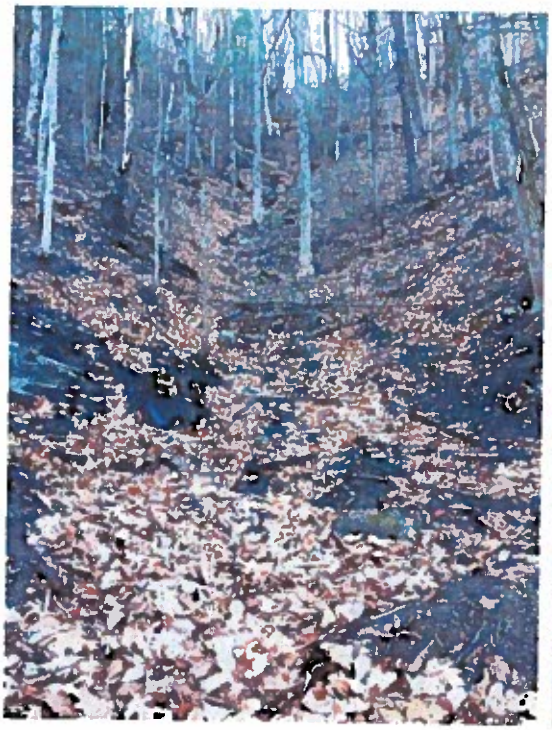
TABLE 8. Peak precipitation intensity from local weather stations for rain event on 11/30/16

Weather Station	Peak Intensity (inches/hour)
Brasstown Bald, GA (outside burn)	0.97
Tallulah, GA (outside burn)	0.44
Wayah, NC (outside burn)	0.28
PRAWS9 (within burn)	0.77
PRAWS10 (within burn)	0.94
PRAWS11 (within burn)	0.76

Following these rainfall events, BAER personnel observed infiltration down to at least 12 inches within the soil profile in several locations. Throughout the burned area, minimal, if any, evidence of hillslope erosion, sedimentation or ash mobilization was observed on or downstream from low soil burn severity hillslopes. Localized erosion was observed on a high soil burn severity area but sediment delivery to the stream channel did not occur.

Local/Applicable Field Based Research

Multiple studies have reported little to no erosion after light to moderate intensity fires in the southeastern United States (Goebel et al., 1967; Neary and Currier, 1982; Van Lear and Waldrop, 1986; Van Lear and Danielovich, 1988; and Shahlee et al., 1991). A literature review done by Yoho 1980 indicated the range of sediment yield from a periodically burned forest was between 0.01-0.23 tons/acre/year. The small amounts of sediment transported within these studied burn areas required a storm with rainfall intensities of approximately two inches per hour lasting for at least 15 minutes (Swift et al., 1993). See appendix for full article citations.



No effects on water movement observed over the vast majority of the burned area

Example of rills in one localized high severity burn area

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period (years): 0-1 years
Full vegetative recovery is anticipated to occur next spring.

B. Design Chance of Success, (percent): 80

C. Equivalent Design Recurrence Interval, (years): 5

D. Design Storm Duration, (hours): 1
Based on Swift et. al. 1993.

E. Design Storm Magnitude, (inches): 2
Based on Swift et. al. 1993.

F. Design Flow (cubic feet / second/ square mile): See Table 2, below.

G. Estimated Reduction in Infiltration, (percent): 0

H. Adjusted Design Flow (cfs per square mile): See Table 2, below.

PART V - SUMMARY OF ANALYSIS

Introduction:
Costly and dramatic rehabilitation efforts are typically not required even after severe fires. Rates of recovery in southern appalachian watersheds are much faster than western forests due to rapid vegetation regrowth (Clinton Vose 2000; Elliott et. al. 1999).

Soils/Erosion Response:
Please refer to the soils section of this document for a description of the soil and erosional response resulting from the fire.

Watershed Response:
The Rock Mountain Fire is located entirely within the Blue Ridge Physiographic Province. The landforms of the area are generally characterized by steep, dissected mountains and narrow valley bottoms. Headwater streams steep are typically underpinned by bedrock, boulder, and cobble channel beds. These channels are high energy and normally characterized by low sediment supply. The fire area also encompasses limited broader alluvial valley areas such as along the Tallulah River at Tate City, GA and Betty's Creek in the vicinity of Andy's Trout Farm in Rabun County, GA. These broader valleys contain lower-slope, sometimes meandering stream channels.

Refer to Part II (M) and Table 1 for a description of watersheds within the Rock Mountain Fire

Burn severity was low for over 99% of the area within the fire perimeter (Table 6). Potential values at risk identified for watershed response include hydrologic function and water quality.

Hydrologic Function

Three watershed pour points were established within or adjacent to the Rock Mountain Fire for hydrologic analysis and to assess potential risk to infrastructure in Tate City, GA and Tallulah River Road which is the primary access to the city:

- Unnamed Tributary
- Beech Creek
- Coleman River

Channel peak flows for a range of frequencies were determined using the USGS StreamStats web application tool (http://water.usgs.gov/osw/streamstats/index.html) based on Gotvald and others (2009) and Feaster and others (2014). A 5-year (or 20% annual exceedance probability) flow event was selected as the benchmark for hydrologic assessment because Swift and others (1993) determined that a rainfall event in excess of 50 mm per hour was required to mobilize surface material following prescribed fire in the southern Appalachians. Five-year peak flows and yields for the pour points are summarized in Table 9.

TABLE 9. Drainage areas, burn severity acres, and estimated 5-year peak flows and peak yields for three analyzed pour points in the Rock Mountain Fire

				Estimated Pre-Fire		Post-Fire	
	Total Area	High SBS	Moderate SBS	5-Year Flow	5-Year Yield	5-Year Flow	5-Year Yield
Watershed Pour Points	Miles^2	Acres	Acres	CFS	CFS/Mile^2	CFS	CFS/Mile^2
Unnamed Tributary[1]	0.4	0	0	105	263	No Change	No Change
Beech Creek[2]	2.8	0	1	445	162	No Change	No Change
Coleman River[3]	6.9	6	7	887	129	No Change	No Change

1-Unnamed tributary at hairpin bend in Tallulah River Rd

2-Beech Creek at Tate City Rd

3-Coleman River at Tallulah River Rd

The Rock Mountain Fire is not expected to alter the 5-year peak flows (or flows of other magnitudes) for the analyzed pour points because of the very limited extent of moderate and high-severity soil burn acres. While duff material was consumed by the fire in some areas, soil structure was not degraded and thus soil infiltration capacities should retain pre-fire function. Additionally, valley bottoms along Beech Creek, the Coleman and Talullah Rivers, and other channels have considerable floodplain area that function to attenuate peak flows.

Water Quality—Turbidity and Sedimentation

Little to no evidence of post-fire increased hillslope runoff, erosion, or sedimentation was observed by the BAER team during field investigations of the Rock Mountain Fire. Evidence of ash mobilization and loading to surface waters was not observed by the BAER team but anecdotal observations described temporary turbidity in the Tallulah River during storm events. However, it was not possible to attribute this response specifically to changed post-fire conditions. While localized increased erosion and sedimentation may occur in areas of moderate and high soil burn severity, overall risk to water quality from turbidity and sedimentation at the watershed scale (Beech Creek, Coleman River, Tallulah River, etc.) is not expected to increase as a result from the Rock Mountain Fire.

Water Quality—Nutrient Loading
A literature review by Ranalli (2004) stated that the studies reviewed "have shown that nutrients and cations released from the combustion of organic matter can follow several pathways to streams and lakes: (1) volatilization followed by diffusion and dissolution of smoke into a stream or lake or the dissolution of smoke in precipitation; (2) erosion of ash by wind and water from hillslopes to a stream or lake and subsequent leaching of the ash in a stream or lake; or (3) leaching of ash left on the soil surface by precipitation and subsequent movement over or through the upper soil horizons by storm runoff or through the entire soil profile to ground water.

Pathway (1) described above is not viable in the Rock Mountain Fire area. Field observations made by the BAER team indicate that pathways (2) and (3) are unlikely except in localized areas, and not likely to change nutrient loading at the watershed scale. As such future impacts to water quality are not anticipated.

Beneficial uses
Four river or stream segments in or adjacent to the fire appear on the State of Georgia's 303d list of impaired waterways as not supporting fishing or recreation beneficial uses as of 2014:

- Coleman River
- Tallulah River
- Betty Creek
- Hightower Creek

However, since no increased risk to water quality is anticipated as a result of the fire, the Rock Mountain Fire is not expected to affect designated beneficial uses.

Geology/Geologic Response: Risk of debris flows risk in the Rock Mountain Fire area is low and has probably not increased significantly following the fire. Historically, landslides have occurred in the area during/following periods of heavy rainfall. 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. Based on the fact that the vast majority of the area was mapped as low or unburned soil burn severity, it is unlikely the risk for landslides has increased significantly as a result of the fire. However, if future monitoring indicates tree mortality at larger scales than expected occurs, landslide risk could be re-assessed.

Rock Fall: The fire has increased the risk for rock fall along burned area roads and trails.

A. Describe Critical Values/Resources and Threats:

*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. Only values at risk that had a risk of Intermediate or above are discussed.*

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**

Threats to Life/Safety and Property

National Forest Roads: There are approximately 14.6 miles of maintenance level 2, 9.2 miles of Level 3, and 4.7 miles of level 4 roads and .27 miles of level 5 roads within or bordering the fire area. Many of the roads leading into the fire area on the Nantahala are gated and are covered in vegetative debris. The main Forest Road going through the fire area contains rolling dips, gravel (hardened) and over-side drains providing for road drainage. Some were damaged due to suppression activity. The Chattooga engineering technician developed a detailed rehabilitation plan. Culverts will also be cleared of debris during as part of the rehabilitation plan.

Uncontrolled runoff can result in off-site damage and potential negative impacts to the transportation system. A secondary consequence of post-fire runoff to the transportation system could be increased adverse effects of storm water runoff and decreased control of storm water runoff, which could deliver high volumes of water and sediment onto adjacent hillslopes.

Trees and shrub burned along the cut-slope and above the road cut on the major roads in and adjacent to the fire area on the Chattahoochee N.F. Suppression efforts mitigated many of the hazards, however in many areas the root systems are shallow due to rock outcrop. The roots and above ground vegetation could continue to smolder and fall on the road. Trees and shrub could continue to fall on the roads for several years

Although little to no impacts are expected, annual or major storm checks of the culverts are recommended for a couple of years to check for accumulation of fire debris in the channels at the road crossing and rolling dip/lead-off ditch locations on both National Forest and County Roads.

Emergency Determinations – National Forest Roads:

Threat: Runoff, sediment, debris flows

Probability of Damage or Loss: **Unlikely**

Magnitude of consequences: **Minor**

Risk Level: Low

Threat: Rock fall and trees falling on the road

Probability of Damage or Loss: **Likely**

Magnitude of consequences: **Major**

Risk Level: High

Trails: There are approximately 2.2 miles of non-motorized trails on the Chattahoochee NF There are approximately 33.3 miles of non-motorized trails on the Nantahala NF including portions of the Appalachian trail (1.3 miles and 12.8 miles, respectively) on both Forests. The Appalachian Trail (AT)

receives approximately 3+ million visitors per year and is one of the premier hiking trails in the United States. It is considered the "crown jewel" of hiking trails in the Eastern United States. The BAER team assessed a variety of trails to characterize the condition of the trails and potential post-fire effects affecting the trail system over a three (3) day period. The BAER team did not walk or assess every section of trail due to limited personnel and time In some instances, organic material burned under the trail comprising trail tread and tread retention structures, especially on the AT. This can also lead to localized erosion (ash and sediment) adjacent to the trail.

Sections of the Appalachian Trail from Drop Point 70 to the ridge top experienced sections of high and moderate burn severity. The majority of sections assessed contain appropriate erosion control structures that survived the fire and are functioning other than noted. Other than the section noted above on the AT, the BAER team expects little to no post-fire watershed response adjacent to the trails that would impact trail tread or lead to increased watershed efficiencies. Burned trees can present a hazard to recreationists throughout the fire areas but especially in areas of high and moderate burn severity. See Tables 11 and 12 below for a summary of the trails visited and all trails within the fire area. Although little to no impacts are expected from post-fire runoff, it is recommended that water bars and leadoff ditches are checked and cleaned out to ensure proper drainage.

TABLE 11. Trails on the Chattahoochee NF within the Rock Mountain Fire Area and Risk Determinations

Trail	Assessed on the Ground?	Miles within burned area	Threat	Risk	Notes
Coleman River	No	.81	Hazard trees,	Unknown- Likely Intermediate	Risk from Hazard Trees.
Appalachian Trail	Yes	1.34	Rock fall, hazard trees, runoff erosion	High	Risk from Hazard Trees. Burned wood walls and tread stabilizing wood structures

TABLE 12. Trails on the Nantahala NF within the Rock Mountain Fire Area and Risk Determinations

Trail	Assessed on the ground?	Miles-burned area	Threat	Risk	Notes
Appalachian Trail	Partially	12.8	Rock fall, hazard trees, runoff erosion	High	Western section at risk from runoff/erosion and hazard trees
TR13	No	.39	Hazard trees	Unknown- likely intermediate	Place warning signs at the trail.
20 Timber Ridge	No	1.5	Hazard trees	Unknown- likely intermediate	Place warning signs at the trail.
28 – Lower Ridge Trail	No	2.63	Hazard trees	Unknown- likely intermediate	Place warning signs at the trail
TR29	No	.3	Hazard trees	Unknown- likely intermediate	Place warning signs at the trail
TR31 (Mooney Falls)	No	.03	Hazard trees	Unknown- likely intermediate	Place warning signs at the trail
TR31A	No	.06	Hazard	Unknown- likely	Place warning signs at the trail

(Mooney Falls spur)			trees	intermediate	
TR34 (Big Indian Loop)	No	6.31	Hazard trees	Unknown- likely intermediate	Place warning signs at the trail
TR35 – (Beech Gap)	No	.41	Hazard trees	Unknown- likely intermediate	Place warning signs at the trail
TR35A (Beech Gap Spur)	No	1.1	Hazard trees	Unknown- likely intermediate	Place warning signs at the trail
367	No	.19	Hazard trees	Unknown- likely intermediate	Place warning signs at the trail
377	No	.64	Hazard trees	Unknown- likely intermediate	Place warning signs at the trail
378	Partially	5.9	Hazard trees	High	Observed many trees across the trail and burned snags adjacent to the trail.

Emergency Determinations - Trails:

Threat: Erosion, hazard trees and rock-fall from the trail system. The threat from erosion and falling rocks is generally not as great as the threat from hazard trees.

Probability of Damage or Loss: **Likely**

Magnitude of consequences: **Moderate**

Risk Level: High

Hazard Trees Trailheads: There are approximately 13 trailheads affected by the fire on both Forests. Burned trees surround many of the trailheads. It is unknown where the trees survived the fire until leaf out next spring.

Emergency Determination - Trailheads:

Threat: Hazard trees adjacent to trailheads.

Probability of Damage or Loss: **Likely**

Magnitude of consequences: **Major**

Risk Level: Very High

Private Land: Based on the burn severity pattern and the location of the private land the BAER team found the risk to homes and other structures is **very low** as the potential increase in peak flows and runoff from hillslope do not a pose a threat. The BAER Team leader contacted the local NRCS offices and discussed the BAER team findings with them on Friday December 9, Monday December 12 and Tuesday December 13.

Runoff from Betty Creek flows into private land on the eastern boundary of the fire. Ponds are found on private land that could experience slight, episodic increases in ash or nutrient loading. Based on the burn severity the BAER team found the risk to the trout ponds is **very low**.

Threats to Natural and Cultural Resources

Off Highway Vehicles (OHV's): Suppression operations created dozer lines and pull outs, creating highly visible areas of disturbance, these areas are currently being repaired as part of suppression repair. However, the disturbance will be highly visible for several years even after repair. Unauthorized OHV use is a threat to many Values at Risk including Wildlife Resources, Native Vegetative Recovery, Hydrologic Function, and Soil Productivity.

***Note**: The BAER team recommends that the District monitor dozer lines, check for OHV incursion and keep the "P" code open. If that occurs, additional repairs and disguising will be completed under the "P" code.*

Federally-listed Wildlife Resources: There is suitable habitat for two federally-listed bat species: Indiana bat (endangered) and northern long-eared bat (threatened). However, there has been no documented evidence of either of these bats within the Rock Mountain Fire area nor are known roost caves within the fire area. Threats to federally-listed bat species including hillslope erosion, non-native invasive plants, Off Highway Vehicle (OHV) incursion, and feral swine were considered by the BAER interdisciplinary assessment team.

It is likely that, at the hillslope scale, erosion could increase only slightly above unburned conditions. Therefore, damage to forested habitat utilized by these bat species as a result of hillslope erosion is not anticipated.

The introduction and/or expansion of non-native invasive plants is not expected to appreciably change forest structure. With implementation of a BAER treatment to survey and treat non-native plants within the fire area the risk of adverse impacts from non-native invasive plants is further reduced.
OHV incursion may increase within the fire area, particularly in areas adjacent to private lands where control lines were established. OHV use could result in increased disturbance impacts that could negatively affect bat species. The BAER team has provided a recommendation to the local Forests to monitor and mitigate such incursions if they occur.

Based on a review by the interdisciplinary BAER team, it was determined that the risk to federally-listed bats from feral swine is not expected to change relative to pre-fire conditions.

The overall risk determination for all evaluated threat types for federally-listed bats is presented in Table 13:

Table 13. Risk Determinations for Federally-listed Fish and Wildlife Species

Value at Risk	Potential Threats/hazard type	Probability of Damage	Magnitude of Consequence	Risk
T/E Bats	Runoff/Erosion/ Sedimentation	Unlikely	Moderate	Low
T/E Bats	Invasive/Noxious Weeds	Likely	Minor	Low
T/E Bats	OHV Incursion	Possible	Moderate	Intermediate
T/E Bats	Feral swine	Unlikely	Moderate	Low

No BAER treatments are specifically proposed for federally-listed wildlife resources. However, any treatments to reduce the threat associated with non-native invasive plants would indirectly benefit these values.

Other Wildlife Resources: Several fish and wildlife resources that are not considered BAER Critical Values were also evaluated because they were identified as potential concerns by the local Forests. These include green salamander (which has been petitioned for federal-listing), native populations of brook trout, and ruffed grouse food plots. Threats to these resources including erosion/sedimentation/turbidity, nutrient loading, non-native invasive plants, Off Highway Vehicle (OHV) incursion, and feral swine were considered by the BAER interdisciplinary assessment team.

Localized and short-term impacts to green salamander and native populations of brook trout from erosion/sedimentation/turbidity and nutrient loading are possible. However, overall risk to water quality from erosion/sedimentation/turbidity at the watershed scale is not expected to increase as a result of the Rock Mountain Fire and future impacts to water quality from nutrient loading (ash) at a watershed scale are not anticipated.

While the introduction and/or spread of non-native invasive terrestrial plants is unlikely to be of substantial concern to native brook trout populations, it could negatively affect both the green salamander and the ruffed grouse food plots. With implementation of a BAER treatment to survey and treat non-native plants within the fire area the risk of adverse impacts from non-native invasive plants is reduced.

Adverse impacts from OHV incursion to green salamander, native brook trout, and ruffed grouse food plots are possible. The BAER team has provided a recommendation to the local Forests to monitor and mitigate such incursions if they occur. Furthermore, the BAER team recommends that the Chattahoochee monitor and mitigate for potential OHV incursions within ruffed grouse food plots. The BAER team determined that the risk to green salamander, native populations of brook trout, and ruffed grouse food plots from feral swine are not expected to change relative to pre-fire conditions.

Ecosystem Stability and Vegetation Recovery: The Rock Mountain Fire lacks specific botanical survey data. Weeds with known occurrences within the Rock Mountain Fire in Georgia include Japanese stiltgrass (*Microstegium vimineum*), princesstree (*Paulownia tomentosa*), autumn olive (*Eleagnus umbellata, E. angustifolia, E. pungens*), multiflora rose (*Rosa multiflora*), sericia lespedeza (*Lespedeza cuneate*), bicolor lespedeza (*Lespedeza bicolor*). There has been no mapping of weed occurrences. Many of these species were found in association with maintained wildlife openings. Generally these species are responsive to canopy gaps and soil disturbance and would therefore be expected to invade dozer or hand lines most aggressively. Dozer lines were connected to wildlife openings. While these species are capable of establishing in burned areas, without soil or canopy disturbance most would be less likely to invade the interior forest with closed canopy.

In North Carolina, an invasive plant inventory was conducted in 2010. The relevant findings of this study are include below. The highest concentration of invasive plants exists on the southern side of the Tennessee Valley Divide, primarily along the Tallulah River. In this area, there are high concentrations of Japanese meadowsweet (*Spiraea japonica*) and to a lesser extent, multiflora rose. Though in smaller concentrations, there are also existing patches of Japanese love grass, Japanese honeysuckle (*Lonicera japonica*), Chinses privet (*Ligustrum sinense*), and autumn olive. These plants are generally found in proximity to the Tallulah River and Tate City Rd. where there are several private residences. Also found along Tate City Rd. are small patches of Hedera helix and one isolated occurrence of Chinses yam (*Dioscorea oppositifolia*). Japanese meadowsweet and Multiflora rose, and Japanese stiltgrass were found throughout the southern portion of the wilderness, but the one patch of oriental

bittersweet (*Celastrus orbiculatus*) appeared to be isolated to the old trail near the Coleman River in the southeastern portion of the wilderness. This same trail had an abundance of autumn olive, possibly indicating the presence of more invasive plants in the surrounding areas that were not inventoried.

Two campsites (Cottonwood Patch and Little Bald Mountain) and 9 designated parking areas are located around the perimeter of the fire, providing easy access to hikers and horse riding groups. Authorized trails cross the wilderness area. Unauthorized equestrian trails have been established throughout the wilderness area. Horses can be a significant source of invasive species. Due to frequency of use, all are possible weed vectors.

Emergency Determination – Ecosystem Stability and Native Vegetative Recovery:

Probability of damage or loss: **Very Likely**

Magnitude of Consequences: **Moderate**

Risk Level: Very High

Federally-listed Plants: Rock gnome lichen (*Gymnoderma lineare*) is found growing on shady rock or shady moss-covered rock. It can persist on high-elevation cliffs, on vertical rock faces, where seepage water from forest soils above flow or in deep river gorges at lower elevations growing on large stream side boulders. Generally in areas of high humidity, where it is often moistened by fog, with a moderate amount of sunlight with low-intensity solar radiation. The rock gnome lichen is threatened by habitat change, especially by heavy recreational use of its habitat.

One location is known from within the burned area near the peak of Standing Indian Mountain. An attempt was made to locate the known occurrence and to evaluate the fire effects on the habitat. The BAER team was unable to locate the lichen. This could be because the site was not easily accessible or because it was destroyed by the fire.

Impacts from the fire (burned vegetation and soil burn severity) around potentially suitable rock outcrop habitats varied. For example, high intensity fire and high soil burn severity was observed on Standing Indian Peak around and within rock outcrops. At this location, an estimated 70% of rock outcrops were directly impacted by fire resulting in mortality to lichen and moss species and nearby vegetation.

Changes in microhabitat conditions directly related to the fire including litter cover, litter depth, and overstory canopy cover may have resulted in localized negative impacts to rock gnome lichen where fire intensity was moderate to high. The removal of canopy trees or direct burning of the lichen may result in impacts that are potentially severe.

Where moderate to high soil burn severity occurred within or above suitable habitat, some impacts from localized erosion/sedimentation and nutrient loading (ash) may occur. This will also vary based on the availability of pathways of sedimentation and ash into rocky habitats.

Additional post-fire impacts to rock gnome lichen that were evaluated include non-native invasive plant introduction/spread, OHV incursion, and feral swine abundance and distribution. Introduction and/or spread of non-native invasive plants could potentially cause localized negative impacts on rock gnome lichen. A BAER treatment to survey and conduct rapid treatment of non-native invasive plants is expected to mitigate this effect. OHV incursion may increase within the fire area, particularly in areas adjacent to private lands where control lines were established. The BAER team has provided a recommendation to the local Forests to monitor and mitigate such incursions if they occur. Based on a

review by the interdisciplinary BAER team, it was determined that the risk from feral swine is not expected to change relative to pre-fire conditions.

Emergency Determination – Federally-listed Plants:

Threat: Runoff/Sediment pathways

Probability of damage or loss: **Possible**

Magnitude of Consequences: **Major**

Risk Level: Very High

Threat: Nutrient loading/Chemical Changes

Probability of damage or loss: **Likely**

Magnitude of Consequences: **Major**

Risk Level: Very High

Threat: Increased solar exposure

Probability of damage or loss: **Likely**

Magnitude of Consequences: **Major**

Risk Level: Very High

Cultural Resources: Prehistoric and historic sites within the fire perimeter could be at risk to loss of archaeological deposits or stratigraphic integrity as a result of post-fire erosion, flooding, and/or debris flows. However, it is unlikely, as the BAER team observed that the burn scars were shallow and root systems were generally undamaged and it is likely that the cultural deposits of sites are intact with little post-fire effect. If a treatment is proposed for the Appalachian Trail there will have to be a cultural treatment.

B. Emergency Treatment Objectives:

Threats to Life and Property
Inform the public on hazards within the fire area and mitigate hazard trees.
Work to improve trail tread

Threats to Ecosystem Stability
Determine if new invasive species have been introduced in and adjacent to the fire area due to suppression activities

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

Land **N/A** % Channel **N/A** % Roads/Trails **95** % Protection/Safety **95** %

D. Probability of Treatment Success

TABLE 14: Probability of Treatment Success			
	Years after Treatment		
	1	3	5
Land	90	100	100
Channel			
Roads/Trails	95	100	100
Protection/Safety	95	100	100

E. Cost of No-Action (Including Loss): See VAR spreadsheet costs are justified, especially since most of the treatments address threats to life

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

G. Skills Represented on Burned-Area Survey Team:

[x] Hydrology	[x] Botany	[ ] Fisheries	[x] Archaeology
[x] Soils	[x] Wildlife	[ ] Forestry	[ ] Research
[ ] Geology	[x] Ecology	[ ] Landscape Arch	[x] Recreation (adjunct)
[x] Engineering (adjunct)	[ ] Range	[x] GIS (adjunct)	[ ] Fire Management

Team Leader: Todd Ellsworth

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H. Treatment Narratives:

Land Treatments

Invasive weed early detection and rapid response: At minimum, survey 7.1 miles of dozer line and 2.6 miles hand line on the Chattahoochee and 8.9 miles of dozer line and 5.3 miles of handlines on the Nantahala should be surveyed for invasive species. Trail heads and drop points surrounding the burned area can be surveyed.

The burned areas, in particular those with duff consumption (moderate and high severity burn sites), could experience invasion or spread of wind-dispersed seed or from buried seed or re-sprouting stems, if a few individuals are present. If these invasive species increased post burn, the result would diminish the level of plant species diversity and the integrity and resilience of the natural community. Several of the wildfires have some areas of moderate soil severity and adjacent or nearby infestations that will result in a greater risk of invasion. The proposed treatments for early detection and rapid response are individually outlined below.

Total treatment and survey request is $18,840.

Inside the wilderness areas small infestations will be eradicated by hand pulling and disposing of plants in garbage bags taken off site. It may not be possible to reverse the long-term trend in

non-native invasive species expansion where it is already present in high densities unless new treatment options are discovered. Dense infestations of non-native invasive species may be impossible to control without herbicide or other methods beyond hand pulling.

Chattahoochee National Forest - Weed Surveys and Rapid Response Costs				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
1 GS-12 botanist	Days	$443	10	$4430
1 GS-7 weed technician	Days	$317	10	$3170
Travel	Days	$150	10	$1500
Supplies	Each	$500	1	$500
Vehicle gas mileage	Miles	$0.50	440	$220
Total Cost				**$9420**

Nantahala National Forest - Weed Surveys and Rapid Response Costs				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
1 GS-12 botanist	Days	$443	10	$4430
1 GS-7 weed technician	Days	$317	10	$3170
Travel	Days	$150	10	$1500
Supplies	Each	$500	1	$500
Vehicle gas mileage	Miles	$0.50	440	$220
Total Cost				**$9,420**

Channel Treatments

None

Road and Trail Treatments

Chattahoochee National Forest Trail Tread Improvement/Retention: Improve trail tread and tread retention on a section of the AT that burned a wood stabilizing wall and log retaining structures. This poses a risk to trail users and can lead to minor amounts of increased off-site erosion. Funding request is for a small force account crew to help complete the work. The Recreation specialist will work in conjunction with Heritage Resources during project layout to ensure heritage resources are protected.

Chattahoochee National Forest – Appalachian Trail Tread Retaining Stabilization				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
1 GS-9 Recreation specialist	Days	$275	3	$810
1 GS-9 Heritage resource specialist	Days	$275	1	$275
3 person crew (GS-5)	Days	$450	3	$1,350
Misc. supplies	each	$100	1	$100
Vehicle gas mileage	Miles	$0.50	150	$75
Total Cost				**$2625**

Nantahala National Forest Trail Tread stabilization: Place water bars or other appropriate tread stabilization structures on approximately 300 feet of trail in the Standing Indian Mountain area where the fire burned with greater severity. Place logs along approximately 200 feet of trail

for tread retaining stabilization in the Standing Indian Mountain area. This area burned with higher severity and the downslope areas of the trail are subject to higher erosion risk.

Nantahala National Forest – Appalachian Trail Tread Retaining Stabilization				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
1 GS-9 Wilderness Tech	Days	$275	5	$1,285
1 GS-9 Heritage resource specialist	Days	$275	1d	$275
Hazard tree assessment/mitigation	each	$300	5	$1,500
Misc. supplies	each	$100	1	$100
Vehicle gas mileage	Miles	$0.50	300	$150
Total Cost				**$3,310**

Protection/Safety Treatments

Chattahoochee National Forest:

Appalachian Trail (AT) - Hazard signs and public (website) information: Place Burned area hazard signs at AT access points at Drop Point 40 and the southern access point into the fire area. . Approximately 2 signs are needed on access points to the AT. Communicate with the Appalachian Trail Association about potential new hazards in the fire area and insert information on trail hazards on the Forest public facing website

Other Trails - Hazard signs and public (website) information: Place Burned Area hazard signs at the Coleman River trail head. Insert information on trail hazards on the Forest public facing website Approximately 1 signs are needed.

Chattahoochee National Forest - Hazard signs at trail access point and public information				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
1 GS-9 Recreation Specialist	Days	$275	2	$550
1 GS-11 Recreation/web site manager	Days	$350	2	$700
Misc. supplies	each	$200	1	$200
Vehicle gas mileage	Miles	$0.50	150	$75
Total Cost				**$1,525**

Roads - Hazard signs and public (website) information: Approximately five (5) road signs are needed.

Chattahoochee National Forest - Hazard signs at road access point and public information				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
1 GS-07 Tech	Days	$260	8	$1,560
Materials	each	$500	1	$500
Vehicle gas mileage	miles	$.5	200	$100
Total Cost				**$2,160**

Nantahala National Forest:

Appalachian Trail (AT) - Hazard signs and public (website) information: Place Burned area hazard signs at AT access points at Drop Point 70 and at Mooney Gap along road 67. Approximately 2 signs are needed on access points to the AT. Communicate with the Appalachian Trail Association about potential new hazards in the fire area and insert information on trail hazards on the Forest public facing website

Other Trails - Hazard signs and public (website) information: Place Burned Area hazard signs at trailheads for the other trails outlined above that enter the fire area. Insert information on trail hazards on the Forest public facing website Approximately 8 signs are needed.

Costs include sign replacement due to weather and/or vandalism. Insert information on trail hazards on the Forest Public facing website and/or press releases. A picture of an example sign is provided below:

Nantahala National Forest - Hazard signs at trail access points and public information				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
1 GS-9 Recreation Specialist	Days	$275	5	$810
1 GS-11 Recreation/web site manager	Days	$350	2	$700
Misc. supplies	each	$200	1	$200
Vehicle gas mileage	Miles	$0.50	150	$75
Total Cost				**$1,785**

Hazard Trees: Assess and mitigate imminent hazard trees along treatment areas to protect the crews working in this area.

Nantahala National Forest - Hazard tree mitigation on AT				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
1 GS-9 Wilderness Tech	Days	$260	3	$1,300
1 GS-11 Wildlife Biologist	Days	$425	1	$425
Hazard tree assessment and mitigation	each	$200	10	$2,000
Misc. supplies	each	100	1	$100
Vehicle gas mileage	Miles	$0.50	300	$150
Total Cost				**$3,975**

Roads - Hazard signs and public (website) information: Place an appropiate sign on two (2) Forest Roads when entering the fire area. See an example of road hazard sign below:

Nantahala National Forest - Hazard signs at road access points and public information				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
1 GS-07 Tech	Days	$260	3	$780
Materials	each	$500	1	$500
Vehicle gas mileage	miles	$.5	200	$100
Total Cost				**$1,380**

Hazard Tree mitigation at Trailheads:
Identify and mitigate immenent hazard trees at 10 trailheads affected by the fire. We anticipate up to 10 trees. There is a LOP for bats in and around the fire area.

Nantahala National Forest - Hazard tree at trailheads				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
1 GS-9 Recreation Specialist	Days	$260	3	$1,300
1 GS-11 Wildlife Biologist	Days	$425	1	$425
Hazard tree assessment and mitigation	each	$200	10	$2000
Misc. supplies	each	100	1	$100
Vehicle gas mileage	Miles	$0.50	300	$150
Total Cost				**$3,975**

I. **Monitoring Narrative:** N/A

Part VI –Emergency Stabilization Treatments and Source of Funds

Chattahoochee N.F.			NFS Lands				Other Lands				All
		Unit	# of		Other	# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	BAER $	$	units	$	Units	$	$
A. Land Treatments										
Weed detection	days	942	10	$9,420	$0		$0		$0	$9,420
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$9,420	$0		$0		$0	$9,420
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										
trail tread improv.	Mi	875.00	3	$2,625	$0		$0		$0	$2,625
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road & Trails				$2,625	$0		$0		$0	$2,625
D. Protection/Safety										
Hazard Signs (trail)	day	270	8	$2,160	$0		$0		$0	$2,160
Hazard Sign (road)	day	762	2	$1,330						$1,330
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Structures				$3,490	$0		$0		$0	$3,490
E. BAER Evaluation										
BAER Team	ea	40,943	1				$0		$0	$0
Insert new items above this line!				---	$0		$0		$0	$0
Subtotal Evaluation					$0		$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				$15,535	$0		**$0**		**$0**	**$15,535**
Previously approved										
Total for this request				**$15,535**						

NANTAHALA N.F.			NFS Lands				Other Lands				All
Line Items	Units	Unit Cost	# of Units	BAER $	Other $		# of units	Fed $	# of Units	Non Fed $	Total $
A. Land Treatments											
Weed detection	days	942	10	$9,420	$0			$0		$0	$9,420
				$0	$0			$0		$0	$0
				$0	$0			$0		$0	$0
Insert new items above this line!				$0	$0			$0		$0	$0
Subtotal Land Treatments				$9,420	$0			$0		$0	$9,420
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											
trail tread improv.	Mi	667.00	5	$3,335	$0			$0		$0	$3,335
hazard tree mit	each	397	20	$7,940	$0			$0		$0	$7,940
				$0	$0			$0		$0	$0
Insert new items above this line!				$0	$0			$0		$0	$0
Subtotal Road & Trails				$11,275	$0			$0		$0	$11,275
D. Protection/Safety											
Hazard Signs (trail)	day	357	5	$1,785	$0			$0		$0	$1,785
Hazard Sign (road)	day	460	3	$1,380							$1,330
				$0	$0			$0		$0	$0
				$0	$0			$0		$0	$0
Insert new items above this line!				$0	$0			$0		$0	$0
Subtotal Structures				$3,165	$0			$0		$0	$3,115
E. BAER Evaluation											
BAER Team	ea		1					$0		$0	$0
Insert new items above this line!				---	$0			$0		$0	$0
Subtotal Evaluation					$0			$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				$23,860	$0			**$0**		**$0**	**$23,810**
Previously approved											
Total for this request				**$23,860**							

PART VII - APPROVALS

1. _____ 12/16/16
Chattahoochee Forest Supervisor (signature) Date

2. Kara L. Chadwick (for) _____ 12/21/2016
Regional Forester (signature) Date

PART VII - APPROVALS

1. _____ _____
Nantahala National Forest Supervisor (signature) Date

2. _____ _____
Regional Forester (signature) Date

Appendix A: Cost/Benefit spreadsheet

Fire Name	Rock Mountain Fire
Location	Georgia/North Carolina
Date	12/14/2016

SUMMARY	**Total Treatment Cost**	**$ 41,425**
	Expected Benefit of Treatment	**$ 36,000**
	Implied Minimum Value (IMV)	**$ 16,358**

	Value Type	Value at Risk	Implied Value and/or Benefit Cost
MAP ZONE A	Life and Safety	**Yes**	
	Non-Market: Cultural Values	No	
	Non-Market: Ecological Values	**Yes**	
	Market Values: Direct	No	$ -
	Market Values: Loss of Use	**Yes**	$ 30,000
	Total Market Resource Value		$ 30,000
	Proposed Treatment		$ 27,815
	Reduction in Probability of Loss		0.60
	Expected Benefit of Treatment		$ 18,000
	Exp B/C Ratio of Treatment for Market Resources Only		0.6
	Implied Minimum Value (IMV) of Protecting Non-Market Resource Values		**$ 16,358**

	Value Type	Value at Risk	Implied Value and/or Benefit Cost
MAP ZONE B	Life and Safety	**Yes**	
	Non-Market: Cultural Values	No	
	Non-Market: Ecological Values	No	
	Market Values: Direct	**Yes**	$ 30,000
	Market Values: Loss of Use	No	$ -
	Total Market Resource Value		$ 30,000
	Proposed Treatment		$ 13,610
	Reduction in Probability of Loss		0.60
	Expected Benefit of Treatment		$ 18,000
	Exp B/C Ratio of Treatment for Market Resources Only		1.3
	Implied Minimum Value (IMV) of Protecting Non-Market Resource Values		**$ -**