



IN REPLY REFER TO:

United States Department of the Interior

NATIONAL PARK SERVICE
Great Smoky Mountains National Park
107 Park Headquarters Road
Gatlinburg, Tennessee 37738



September 30, 2016

Memorandum

To: Regional Director, Southeast Region, National Park Service

From: Superintendent, Great Smoky Mountains National Park

Subject: Happy Valley Ridge, Burned Area Emergency Response (BAER) plan

Please find attached a copy of the Happy Valley Ridge Wildfire Burned Area Emergency Response (BAER) plan. This document summarizes the resource impacts and rehabilitation needs at Great Smoky Mountains National Park due to a wildfire on September 14, 2016 that was caused by lightning. A total of \$16,400 in Burned Area Rehabilitation (BAR) funding is being requested in FY2017 to complete non-native invasive plant detection and removal within the fire site. Because this fire occurred during a pronounced drought and along the park boundary, there is a high degree of certainty that one to several non-native species may proliferate on the site.

Burned Area Rehabilitation (BAR) projects are non-emergency post-fire funds. They are distributed to projects that restore or improve lands unlikely to recover to a management approved condition as a result of a wildfire; or to repair or replace minor facilities damaged by the fire. BAR projects are limited based on the appropriation and submitted through a competitive process. Funding for BAR is provided in one-year increments for no more than five years following containment of a wildland fire. An approved plan can be submitted within three years and negotiated up to five years to compete for funding.

This project was evaluated against current Burned Area Emergency Response policy (620 DM Part 3) and guidance from the Interagency Burned Area Emergency Response Guidebook by National Post-Fire Programs Coordinator, Richard Schwab, Southeast Region BAER Coordinator, Melissa Forder and Southeast Region Fire Management Officer, Shawn Nagle.

Sincerely,

Clayton Jordan
Deputy Superintendent
Great Smoky Mountains National Park

Cc: Rich Schwab, National Post-Fire Programs Coordinator
Shawn Nagle, Southeast Region Fire Management Officer
Melissa Forder, Southeast Region BAER coordinator

Sandra Mallard, Southeast Region Budget Analyst
Greg Salansky, Appalachian/Piedmont Zone FMO
Rob Klein, Appalachian/Piedmont Zone Fire Ecologist
Larry Glover, Appalachian/Piedmont Zone FPMA

HAPPY VALLEY RIDGE FIRE

BURNED AREA REHABILITATION PLAN



UNIT: GREAT SMOKY MOUNTAINS NATIONAL PARK

LOCATION: *Blount County, Tennessee*

DATE: *September 26, 2016*

PREPARED BY: *Rob Klein, Fire Ecologist - and - Kristine Johnson, Supervisory Forester*

Introduction

This Burned Area Rehabilitation Plan has been prepared in accordance with Department of the Interior and National Park Service policy. This plan provides rehabilitation recommendations for all lands burned within the Happy Valley Ridge Fire perimeter and downstream impact areas including: public lands administered by the National Park Service and other jurisdictions if necessary. The primary objectives of the Happy Valley Ridge Fire Burned Area Rehabilitation Plan are:

- To repair or improve lands unlikely to recover naturally from severe wildland fire damage by emulating historic or pre-fire ecosystem structure, function, diversity, and dynamics according to approved land management plans.
- Restore or establish healthy, stable ecosystems, even if these ecosystems cannot fully emulate historic or pre-fire conditions as specified in approved land management plans.

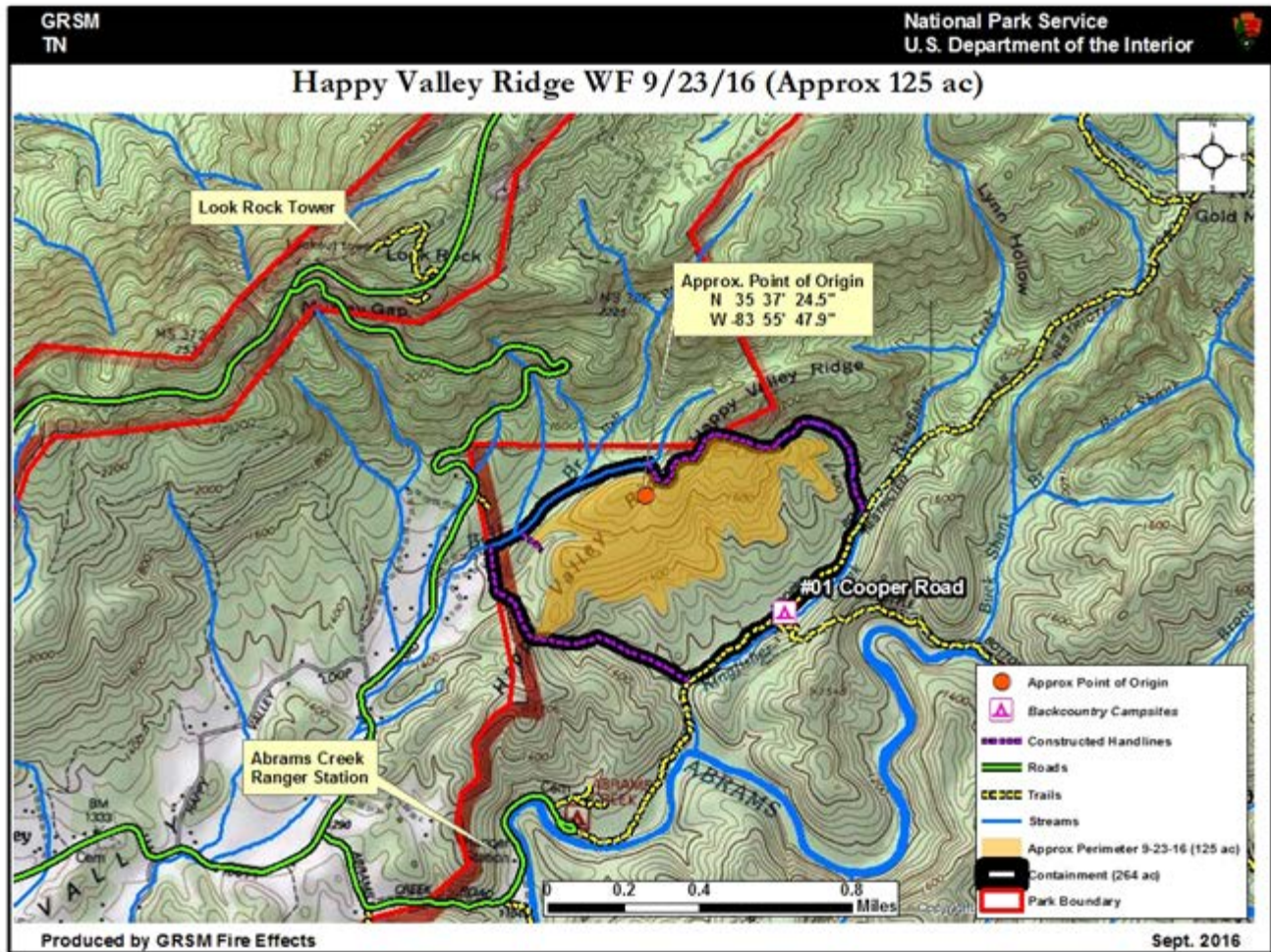
This plan addresses rehabilitation treatments, primarily non-native plant survey and treatment. The burned area response team consisted (informally) of Rob Klein (Fire Ecologist), Kristine Johnson (Forester), Greg Salansky (Fire Management Officer), Bill Stiver (Wildlife Biologist), Chris Corrigan (Fire Planner), Wylie Paxton (Lead Fire Effects Monitor), and Matt Wood (Assistant-Lead Fire Effects Monitor). The burned area emergency response team conducted an analysis of fire damages throughout the lands impacted by the fire. The fire ecologist evaluated and assessed fire damages and suppression impacts to natural resources, and identified values at risk associated with vegetative and soil losses. The wildlife biologist assessed potential changes to threatened and endangered (T&E) species habitat. The lead fire effects monitor documented the presence of nearby non-native invasive plant populations. The assistant-lead fire effects monitor created maps of the fire area, and submitted a request for burn severity mapping from USGS cooperators. The forester evaluated the risk of invasion by nearby non-native species, and provided specifications and costs for eradication of these species.

Fire Background

The Happy Valley Ridge Fire was reported on the evening of Wednesday, September 14, 2016. The fire is believed to have been ignited by lightning, however arson has not been ruled out. The location of the fire was on the Park's western boundary, approximately one mile north/northeast of the Abrams Creek Ranger Station (see map below). A squad of firefighters from GRSM responded to the wildfire on September 15, and the initial size-up indicated a 2-3 acre smoldering fire. The IC for the fire was FMO Greg Salansky, and he made the decision to suppress the fire, based on its proximity to the Park boundary and numerous private structures. Resources initiated direct attack on the fire, but increases in fire activity outpaced the production capability of the assigned resources, which included firefighters from GRSM and Tennessee Department of Forestry. The fire was estimated to be 15-20 acres at the end of 9/15. Additional resources were ordered that evening.

The following day (9/15), a 10-person module from the Cherokee NF IHC arrived on the fire. The GRSM squad and Cherokee IHC improved existing hand-line on the northern edge of the fire and began to build indirect firelines on the east and west flanks. The southern containment line was the Cooper Road Trail. These lines are indicated on the fire map. The total containment area was approximately

250 acres. On 9/17, the GRSM fire crew constructed a small hand-line and conducted burnout operations to stop fire spread toward private homes in the northwest corner of the fire. The fire continued to grow on 9/15 – 9/17, achieving a size of 70 acres. The fire received approximately 0.5 inches of rain on 9/18, which effectively stopped fire spread on the majority of the perimeter. Cherokee IHC conducted small burn operations to secure the east and west lines on 9/23 and 9/24. The fire received additional rain on 9/26 and the final fire size is estimated to be 125 acres.



Fire Damages and Threats to Human Safety and Natural and Cultural Resources

The Happy Valley Ridge Fire falls into a growing list of late-summer/drought-year fires that have occurred at GRSM during the late fire-exclusion era. These fires are notable because, unlike the more frequent dormant-season fires that occur in the Park, the summer/drought fires exhibit longer-term burning and smoldering behavior which results in much greater total fuel consumption. For example, monitoring data show that a “typical” dormant-season fire occurs when the Keetch-Byram Drought Index (KBDI) is less than 200, and produces an average total fuel reduction of 10-30%, whereas a typical late-summer/drought-year fire occurs when KBDI is greater than 400, and produces total fuel reduction of 60-80%.

During these drought-year fires, a high percentage of long-accumulated heavier fuels such as coarse woody debris, stumps, and duff are consumed. These types of fires tend to produce higher levels of tree mortality and leave large areas of mineral soil exposed. The combination of forest gaps and exposed mineral soil provide ideal conditions for many non-native invasive species, and this type of invasion has occurred repeatedly in GRSM and in the larger Southern Appalachians region. The KBDI during the Happy Valley Ridge Fire was between 550-600, and there were numerous instances of smoldering and high fuel consumption observed throughout the fire site (see attached photos). There are known to be many occurrences of non-native invasive species in the home-sites and along the roads in the area surrounding the Happy Valley Ridge Fire, and there is a high probability of invasion into the fire site in the coming years. The burned area assessment completed by the GRSM team recommends detection and eradication actions for invasive exotic species such as mimosa, princess tree, oriental bittersweet, and miscanthus.

Great Smoky Mountains National Park Management Requirements

The primary concern for burned area rehabilitation and long-term recovery of the Happy Valley Ridge Fire site is preventing invasion by non-native plants. Sections that experienced a high severity burn will be vulnerable to invasion from nearby seed sources. Fires in similar forest types in the near vicinity have been invaded quickly and required extensive control. GRSM has actively managed exotic plants since the 1940s and most of the 900 plus known sites are under control, but new invasions are a constant threat.

Several guidance documents dictate the need for the park to take actions to address these current threats to its resources. The GRSM Exotic Plant Management Plan clearly indicates that immediate action be taken to control these target species. NPS 77 also clearly dictates the need for removal of exotics. The Fire Management Plan calls for timely monitoring and control measures to address exotics and stabilize areas impacted by fire. In addition, Management Policies (2006) states that high priority for exotic invasive species control should be given to areas that can reasonably be expected to be successfully controlled and would have a substantial impact on park resources. This site fits those categories well, and with rehabilitation would have a much more successful long term prognosis than if left to be addressed under the park’s normal control program

FIRE LOCATION AND BACKGROUND INFORMATION

Fire Name	HAPPY VALLEY RIDGE
Fire Number	TN-GSP-16043
Agency Unit	GRSM
Region	SER
State	TN
County(s)	Blount
Ignition Date/Cause	9/14/16 - Lightning (assumed)
Date Fully Contained	
Jurisdiction	GREAT SMOKY MOUNTAINS NATIONAL PARK
Acres	125

NATURE OF PLAN

Type of Action (check one box below)

☒	Initial Submission
☐	Amendment to the Initial Submission

REHABILITATION ASSESSMENT

Rehabilitation Objectives

- Prevent the degradation of high-quality examples of shortleaf pine woodland by preventing establishment of non-native invasive plants
- Prevent the degradation of known Pine-Oak habitat for Federally Endangered Indiana Bats
- Detect at least 95% of non-native invasive plant occurrences within the Happy Valley Ridge Fire site
- Use IPM to prevent the establishment of non-native invasive plants within the Happy Valley Ridge Fire site
- Use standard effectiveness monitoring protocols to ensure success of non-native invasive plant removal treatments

TEAM ORGANIZATION, MEMBERS, AND RESOURCE ADVISORS

Burned Area Emergency Response Team Members: *(List of technical specialists used to develop the plan)*

Position	Team Member (Agency)
Team Leader	<i>Kris Johnson (NPS)</i>
Fire Ecologist	<i>Rob Klein (NPS)</i>
Wildlife Biologist	<i>Bill Stiver (NPS)</i>
Fire Management Officer	<i>Greg Salansky (NPS)</i>
Lead Fire Effects Monitor	<i>Wylie Paxton (NPS)</i>
GIS Specialist	<i>Matt Wood (NPS)</i>
Fire Planner (NFPORS)	<i>Chris Corrigan (NPS)</i>

SUMMARY OF ACTIVITIES AND COSTS

The summary of activities and cost table below identifies rehabilitation costs charged or proposed for funding from subactivity 9262 funding sources.

REHABILITATION ACTIVITIES COST SUMMARY TABLE - HAPPY VALLEY RIDGE Fire

Spec #	Title	Unit	Unit Cost	# of Units	Work Agent	Cost
<i>1</i>	<i>Exotic Plant Control</i>	<i>Burn Site</i>			<i>FA</i>	<i>\$16,400</i>
TOTAL COST						\$16,400
Work Agent: CA=Coop Agreement, FA=Force Account, G=Grantee, P=Permitee, SC=Service Contract, TSP=Timber Sales Purchaser, V=Volunteer						

INDIVIDUAL SPECIFICATION

TREATMENT/ACTIVITY NAME	Invasive Plant Control	PART E SPECIFICATION #	
NFPORS TREATMENT CATEGORY*	Invasive Species	FISCAL YEAR(S) (list each year):	2017, 2018, 2019
NFPORS TREATMENT TYPE *	Chemical Control	WUI? Y / N	Y
IMPACTED COMMUNITIES AT RISK	Happy Valley, Top of the World	IMPACTED T&E SPECIES	Indiana bat

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

Number and Describe Each Task:

A. General Description: Detect, control, and monitor non-native invasive species in burned areas and prevent the expansion of known populations into newly disturbed sites

B. Location/(Suitable) Sites: Sites to survey for paulownia, ailanthus, mimosa, coltsfoot, privet, Japanese honeysuckle, oriental bittersweet, woolly mullein

Hot spots as identified on map for Happy Valley fire.

Stream corridors, old homesites and other likely areas for pre-existing exotic plants

Vector corridors and sites to survey for early detection of non-native species:

Boundary with adjoining residential developments

Cooper Road Trail

Nearby burned areas of Lynn Hollow and Buck Shank

C. Design/Construction Specifications:

1. Delineate treatment areas and search for pre-existing exotic populations – fall/winter 2016/17

2. **Paulownia, mimosa, privet and ailanthus** : Starting March 2017, monitor sites and treat using hand removal; treat plants that cannot be hand pulled with low volume basal spray application of Garlon 4® and JLB oil or cut and stump treat. **Coltsfoot, oriental bittersweet, and woolly mullein** will be hand pulled if small or foliar treated with 2% Garlon 4.

3. Other Species control: Survey vector corridors and sites for early detection of invasive species including any listed on the TN Exotic Pest Plant Invasive Plant list. . Survey, map and control all invasive exotic plants within the burned areas.

Surveying includes:

- Inspecting interior fire, trails and stream corridors
- Recording location and routes of surveys; GPS and data files provided to park GIS staff
- Collecting data regarding species found, abundance, and photo-documentation

When feasible, non-native species shall be controlled. Control includes:

- Removal of species using approved IPM methods as suggested above
- Plants in seed must be bagged and removed off site

D. Purpose of Treatment Specifications: Control spread of non-native invasive species into susceptible burned areas that will change the native plant composition. Protect the ecological integrity and site productivity of the burned area and associated habitats on lands administered by NPS. Prevent spread of invasive exotic weeds into critical habitats on unburned lands within and adjacent to the Park. This project will be complemented by a grant from TAPOCO to control exotic plants in the nearby Lower Abrams watershed.

E. Treatment Effectiveness Monitoring Proposed: Spot checking of invasive non-native plant sites to ensure control methods are meeting management objectives. Survey crews will visit treated sites within one week of treatment; this is especially important for weed populations that are sprayed to ensure effectiveness of herbicide application. Surveyed and treated sites should eradicate. Results are incorporated by park staff into long-term integrated pest management programs. Data is provided to NPS Exotic Plant Management Team (EPMT) for future project planning. Initiate follow-up treatments if additional non-native species or large populations are discovered.

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
2 GS-5 seasonal Forestry Technicians for 4pp@\$1500/pp=12000 1 GS-6 forestry tech 1pp@\$2200 TOTAL PERSONNEL SERVICE COST	 \$14,200
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	COST / ITEM
Crew cab truck rental 2 months@\$850/month TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	 \$1700
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
Herbicide, hand tools, PPE TOTAL MATERIALS AND SUPPLY COST	 \$300
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
Backcountry per diem TOTAL TRAVEL COST	 \$200
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
 TOTAL CONTRACT COST	

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY__17	11/1/2016	9/30/2017	FA	sites			\$16,400
FY__18	11/1/2017	9/30/2018	FA	sites			\$16,400
FY__19	11/1/2018	9/30/2019	FA	sites			\$16,400
FY__							
TOTAL							\$49,200

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1.	Estimate obtained from 2-3 independent contractual sources.	
2.	Documented cost figures from similar project work obtained from local agency sources.	M
3.	Estimate supported by cost guides from independent sources or other federal agencies	
4.	Estimates based upon government wage rates and material cost.	P
5.	No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-Reference Location within the Accomplishment Report.
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TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
NPS	1	\$49,200
	TOTAL COST	\$49,200

BURNED AREA ASSESSMENT REPORTS

Objectives

To determine extent of area likely to be invaded by exotic plants and treat for exotics.

Issues

Large populations of invasive exotic plants are located nearby (within a mile) of the fire site just outside the park boundary and a several documented sites are within the park near the burned area.

Observations

Background information: The burned area is dominated by pine, oak and hickory. Some southern stands of pine were already killed by southern pine beetle, and other areas burned hot enough to kill the overstory and expose bare soil.

Reconnaissance Method: The initial reconnaissance was from nearby roads and overlooks. Documented exotic plant sites proximal to the fire include mimosa, princess tree, oriental bittersweet, mimosa and miscanthus.

Findings: Several areas burned with sufficient severity to warrant continued monitoring and control of exotic plants. Funds are requested for FY17 to survey severely burned areas more precisely, and complete eradication efforts for exotic plants in the same growing season. **Funds for subsequent 3 years will be sought as well.**

Recommendations

Management (specification related):

Restoration funds are requested to completely delineate sections of the fire most vulnerable to colonization by invasive exotic plants. These areas will be systematically scouted for exotic plants and any found will be treated and documented.

Specification Monitoring (specification related)

Treated areas will be entered into the existing GRSM exotic plant management database for subsequent monitoring and additional treatments as needed.

Documentation of Previous Successes with Methods Proposed

Previous fires in the required extensive exotic plant management for new invasions following fire: Invasive Trees on Fire Sites, Princess Tree (*Paulownia tomentosa*), and Tree of Heaven (*Ailanthus altissima*)

- Tabcat fire-(burn date)– 8/1997
- Wedge Ridge – 10/1998
- Blacksmith – 8/1999
- Bunker Lead 9/1993

Princess Tree Removal At Each Fire

	2001	2000	1999	1998	total	
Bunker Lead	4	10	80	130	224	
Tabcat	944	307	623	307	2190	
Blacksmith	2806				2806	Not finished 683 Tree of heaven, also removed
Wedge Ridge	45	95			140	Not finished, also 350 Coltsfoot removed

PHOTO DOCUMENTATION



Moderate intensity surface fire resulting from burning in heavy fuel "jackpot" of dead and down trees. This intensity occurred in numerous areas within the burn, and will result in the creation of small to medium-sized canopy gaps.



Long-term smoldering of duff fuels at the base of large shortleaf pine. This deep burning could result in mortality of numerous trees.



Long-term smoldering of heavy duff accumulations. Drought indices during the burn coupled with long-term fire effects monitoring data suggest that a high percentage of duff was consumed during the Happy Valley Ridge Fire.



A "combi" tool helps to illustrate the depth of duff and duff consumption during the HVR Fire. Resulting exposed mineral soil is susceptible to non-native plant invasion during subsequent years.