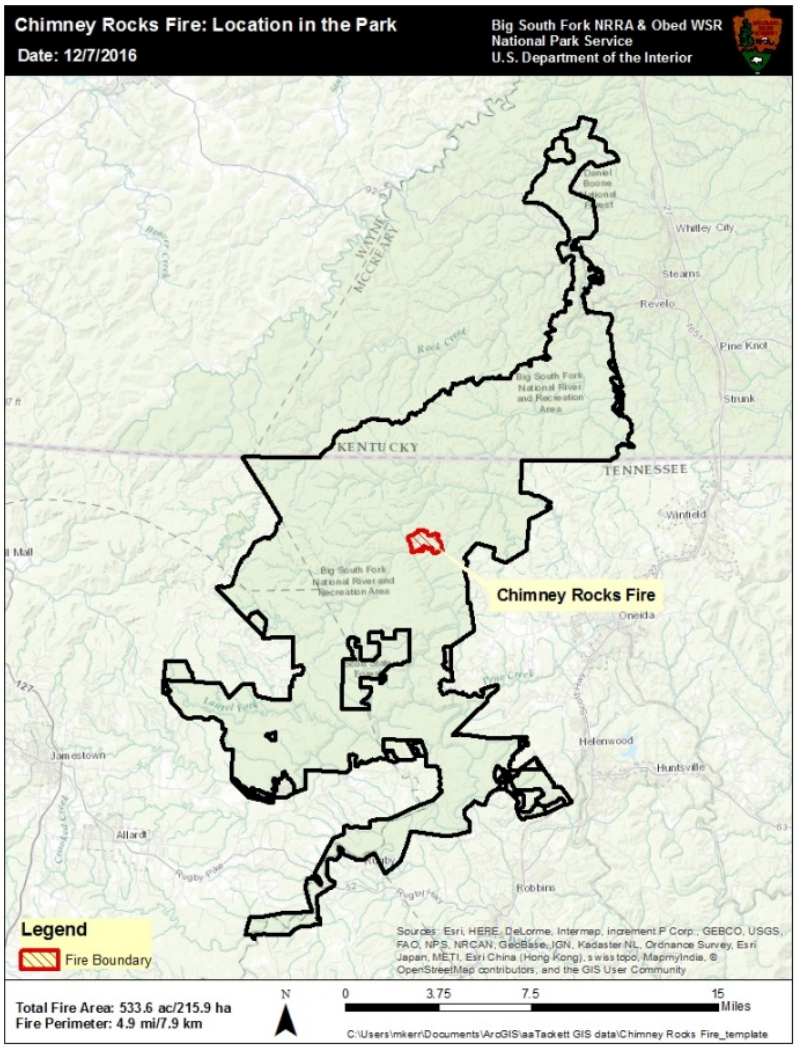
Chimney Rocks Fire Burned Area Response Accomplishments in FY-2018

DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
Big South Fork National River and Recreation Area
Kentucky and Tennessee

September 10, 2018

Overview of the Chimney Rocks Fire

The Chimney Rocks incident, located in the Big South Fork National River and Recreation Area (BISO) and within the Mississippi River Fire Management Zone, was discovered on November 18, 2016. The ignition was determined to be human-caused. The Chimney Rock Fire burned 533 acres, all on lands administered by the National Park Service and managed by BISO. The fire occurred in an area popular for day use and overnight camping, which offers numerous horse and hiking trails, boating, swimming and fishing access, picnic areas and a concessionaire-run campground that accommodates visitors with horses. Though the fire burned around the Chimney Rocks sandstone geologic features and the nearby Slaven cemetery, neither were damaged. The location of the fire within BISO is depicted in Map 1.



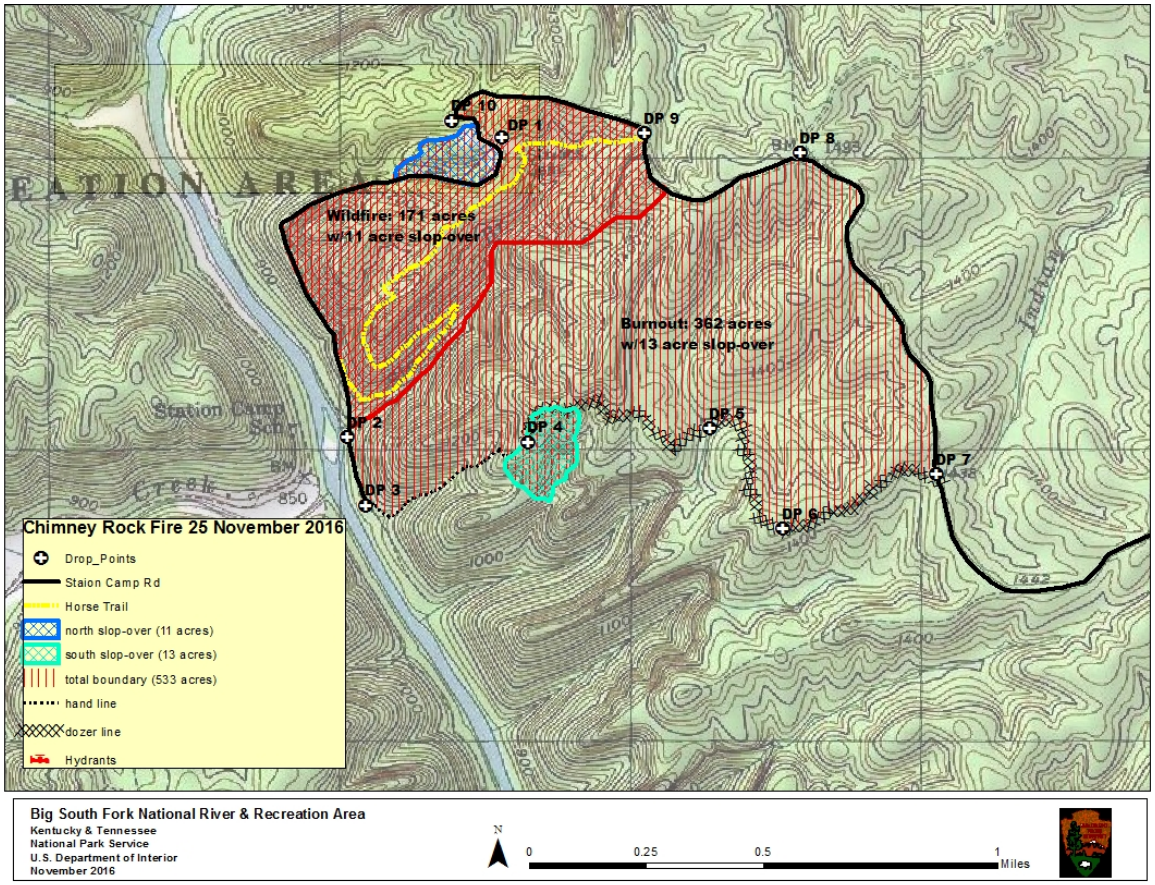
Map 1. Location of the Chimney Map Rocks Fire in Relation to the Park's Jurisdictional Boundary.

Approximately two-thirds of the fire is bordered by Station Camp Road, which comprises the north, east and northwest boundaries. Two miles of dozer and hand line combine to make up the southern fire boundary and the Big South Fork of the Cumberland River provided a fire break along the southwest boundary. One slop-over, totaling 10.9 acres, occurred north of the Station Camp Road holding line. Another slop-over, totaling 12.6 acres, occurred south of the dozer/hand line (Map 2, below).

Objectives for FY-2018 Chimney Rocks Fire Burned Area Response (BAR)

The primary objectives were to:

- revisit cultural resource sites to observe site recovery after one full year of seasonal changes;
- inspect and retreat, as needed, areas treated for exotic plant control in 2017;
- inspect additional areas of disturbance and treat new infestations, as needed; and
- continue to protect native plant communities, sensitive plant habitat and rare plants from the invasion and/or spread of exotic plant species.



Map 2. Chimney Rocks Fire Operational Map (operational map used in November, 2016)

Chimney Rocks Burned Area Response (BAR) Accomplishments

Cultural Resources

Throughout the month of May 2017, twenty cultural sites within the Chimney Rock Fire burn scar were visited as part of the BAER efforts following the fire. It was determined immediately following the fire that these sites had the potential for increased risk and a condition assessment (CA) and follow-up recommendations were prescribed as mitigation. Sites were visited and photographed by Big South Fork Resource Management staff and data gathered was entered into the Archaeological Site Management Information System database.

As part of the follow-up recommendations put forth after the 2017 assessments, all sites were prescribed one additional condition assessment in spring 2018 to observe site recovery after one full year of seasonal changes had occurred. These condition assessments were undertaken during May of 2018 by K. Owenby. All sites were visited, received a CA, follow-up recommendations, and were photographed. This information was entered into ASMIS and is detailed in this report.

Site #	Site Type	Date of Visit (2017)	Burn Severity (2017)	% of Site Impacted (2017)	Condition Assessment (2017)	Date of Visit (2018)	Condition Assessment (2018)
	Cemetery	5/8/17	Light	20	Fair		
BISO 721	Rock Shelter	5/9/17	Light	10	Fair	5/21/18	Fair
BISO 847	Historic Foundation	5/9/17	Light	10	Fair	5/21/18	Good
BISO 1158	Prehistoric Open Site	5/9/17	Light	100	Average	5/21/18	Good
BISO 1759	Rock Shelter	5/2/17	Light	10	Average	5/21/18	Good
BISO 380	Rock Shelter	5/2/17	Light	25	Average	5/21/18	Good
BISO 722	Rock Shelter	5/2/17	Light-Moderate	20	Fair	5/21/18	Good
BISO 1760	Rock Shelter	5/2/17	Light	5	Fair	5/21/18	Good
BISO 853	Rock Shelter	5/8/17	Light	20	Fair	5/21/18	Fair
BISO 1669/1706	Rock Shelter	5/10/17	Light	20	Fair	5/23/18	Good

Site #	Site Type	Date of Visit (2017)	Burn Severity (2017)	% of Site Impacted (2017)	Condition Assessment (2017)	Date of Visit (2018)	Condition Assessment (2018)
BISO 1388	Rock Shelter	5/10/17	Light-Moderate	30	Fair	5/23/18	Good
BISO 727	Rock Shelter	5/10/17	Light	20	Fair	5/23/18	Good
BISO 1049	Rock Shelter	5/10/17	Light	70	Fair	5/23/18	Good
BISO 728	Rock Shelter	5/10/17	Light	10	Fair	5/23/18	Good
BISO 1047	Rock Shelter	5/10/17	Light	10	Fair	5/23/18	Good
BISO 726	Rock Shelter	5/17/17	Light-Moderate	100	Fair	5/23/18	Good
BISO 725	Rock Shelter	5/17/17	Light-Moderate	25	Average	5/23/18	Good
BISO 724	Rock Shelter	5/17/17	Moderate	30	Fair	5/23/18	Good
BISO 723	Rock Shelter	5/17/17	Light-Moderate	20	Fair	5/23/18	Good
BISO 1048	Rock Shelter	5/17/17	Light-Moderate	15	Fair	5/23/18	Good

***Condition Assessments are based on the change in condition since the last site visit. The scale is as follows: Good: No Change in Disturbance, Fair: 1-25%, Average: 25-50%, and Poor: 51-99%.**

There were a total of seventeen rock shelters visited, one historic stone foundation site, one cemetery, and one open prehistoric site. In 2017, thirteen sites were identified as having a light burn severity, with just leaf litter, grasses, and surface fuels burned. Six sites were identified as having light-moderate burn severity, with the same characteristics as light severity and a few patches with medium sized fuels burned (brush, small trees, dead and down logs). One site was identified as being moderately burned, with medium sized fuels and dead and down consumed over most of the area. During the 2018 condition assessments it was noted across all sites that vegetation regrowth looks good and the soils seem stable. Some sites did experience tree mortality but generally any resulting tree fall would be downslope and away from the rock shelters and no additional risk is expected.

Site BISO 721 was listed as “Fair” with a slight change in condition due to the location of an established trail through the site. The disturbance was caused by routine trail use and was not exacerbated by the fire. Site BISO 725 was noted as having erosion threats during the 2017 CA and dead and down limbs were placed along contours to mitigate erosion on the east and west sides of the site. These areas have since had excellent vegetation regrowth and are no longer at risk for increased erosion. Site BISO 853 was also listed as “Fair” with a slight change in condition due to the location of Station Camp Road adjacent to the site. The disturbance was caused by routine road use and visitation and was not exacerbated by the fire. As part of the post-fire hand line mitigation, a gate was put up to stop horseback traffic on the southern portion of the hand line. This gate was installed within the boundaries of BISO 1049 after the 2017 CA. The hand line that was located within BISO 1706 was not observed on this visit and seems to be fully rehabbed.

All recorded sites located within the Chimney Rock Fire perimeter have received two condition assessments, one year apart, since the fire. All sites were listed as stable with good vegetation growth during the last CA in May 2018. There are no further recommendations or monitoring prescribed in regards to post-fire mitigations.

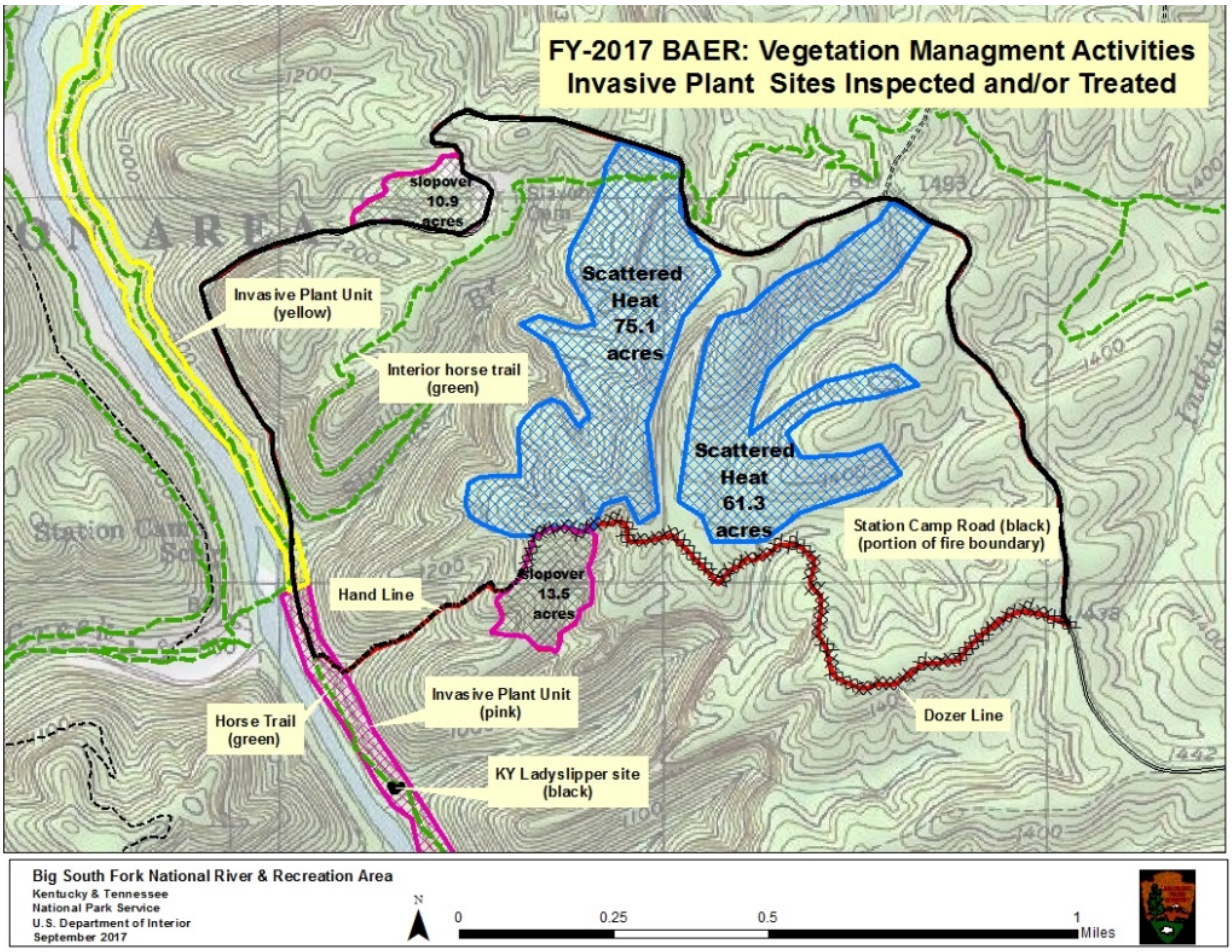
Chimney Rocks Burned Area Response (BAR) Accomplishments

Natural Resources (Vegetation)

Protection of native plant communities, sensitive plant habitat and rare plants from invasion/spread of invasive plant species is the top priority for management of vegetation resources affected by the Chimney Rocks Fire. Prior to the wildfire, the site included mostly second-third growth forest. Vegetation is typical of the oak-hickory and mixed mesophytic forests of the Cumberland Plateau, with the majority of vegetation within the burned being mesic oak-hickory, and drainages with more protected species such as beech, northern red oak, hemlock, tulip poplar, magnolia and sassafras. Rich herbaceous diversity occurs throughout this area. The xeric ridgetops with sandstone caps are typical dry oak species with Virginia pine.

Priority Targets for Invasive Plant Control

In FY-2018, invasive plant control was focused on monitoring and retreating, as needed, sites treated in FY-2017 (Map 3). Specific actions taken for individual target areas are described further, below.



Map 3.. Chimney Rocks Fire non-native plant management areas inspected and treated in FY-2017.

Roads and Trails

Station Camp Road is a narrow, two-lane gravel road used to access the Station Camp Horse Camp, Chimney Rocks, Slaven Cemetery, the boat launch/river crossing and picnic areas at Big South Fork River, and access to riverside trails within the park. During the incident, the road served as both a fire line and the main access route for suppression activities for vehicles, ATVs and UTVs. In 2017, approximately 1.5 acres were treated to control multiflora rose (*Rosa multiflora*) and Japanese spiraea (*Spiraea japonica*). In 2018, pretreatment monitoring revealed that very little follow-up treatment (0.2 acres) was necessary for sites treated for multiflora rose and Japanese spiraea in 2017. As a result of the high efficacy of the FY-2017 treatment efforts, BISO focused on control of secondary target species, serecia lespedeza (*Lespedeza cuneata*) and Japanese honeysuckle (*Lonicera japonica*). Approximately 6.2 acres of roadside on the lower 1.5 miles of Station Camp Road were covered in search of invasive plants. In total, 1.6 acres of serecia lespedeza, Japanese honeysuckle and scattered others, were treated on August 26, 2018. Over the next five years, the park will continue to monitor and treat, as needed, invasive plants along Station Camp Road.

The Big Island Loop is a fourteen mile horse trail that can be accessed from the Station Camp horse camp. The loop runs along the shore of the Big South Fork of the Cumberland River for 3.2 miles, accessing both the Big Island and Station Camp crossings. A 1.6 mile segment of the loop runs through the interior of the burned area. In late summer of 2017, this segment was inspected to assess future needs for invasive plant management, hazard tree removal and repair of waterbars or other trail-stabilization structures. No immediate issues were observed in 2017 and no invasive plant treatments were made. However, due to the success of treatments made to higher priority sites in 2017, BISO had the time to treat secondary targets along the horse trail in 2018. Approximately 10 feet on each side of the trail (3.9 acres over the entire length of trail) were covered in search of invasive plants. Infestations were widely scattered and totaled less than 0.25 acre. Species treated in 2018 include multiflora rose, Japanese spiraea, Japanese honeysuckle and autumn olive (*Elaeagnus umbellata*). Over the next five years, the park will continue to monitor and treat, as needed, invasive plants along this burned-over segment of the Big Island Loop horse trail.

The Dozer Line (1.3 miles long) was constructed on an old road bed that runs across ridge tops, providing most of the southern boundary used for burnout activities. The dozer was primarily used to clear downed trees and other vegetation from the road to create a fire break. Very little soil removal occurred; however, dozer activity was significant enough expose mineral soil in places, and crush or otherwise damage native vegetation. In 2017, inspections of the line revealed that nearly every place where soil disturbance occurred was infested with Japanese stilt grass (*Microstegium vimineum*), an annual grass that quickly colonizes in disturbed sites, floodplains, forest edges and roads/trails. In 2017, nearly 80 gallons of 1% Rodeo (glyphosate formulated for use near water) were applied with backpack sprayers to treat over 2.2 acres of Japanese stilt grass scattered over 7.9 acres along the dozer line. Japanese stiltgrass decline was obvious in 2018, with less than 0.25 acre requiring retreatment.

In addition to treating Japanese stiltgrass, the park planted 250 Virginia pine (*Pinus virginiana*) and 250 shortleaf pine (*P. echinata*) seedlings, scattered along the dozer line. Pines were planted the first week of May, followed by 2 weeks with less than 0.1-inch of rain. Rainfall was heavier in the latter part of

May, with a total of 2.5 inches for the month. Monitoring of the entire site occurred between June 19-21, 2018. During that period, survival of pine seedlings planted along the dozer line was estimated at 25%, which was considered good based on the lack rainfall two weeks post-planting.

Though a gate was installed in 2017 in an attempt to deter horse riders from riding on the dozer line, some simply ride through the woods around the gate. Fortunately, only local riders know about the entrance to the dozer line off of Station Camp Road, so disturbance is minimal in comparison to similar disturbance on the hand line, which departs from a well-used horse trail (see below).

The Hand line (0.4 mile long) was constructed from the southern end of the dozer line, down a small draw, linking the dozer line with the southernmost fire line. Though a gate was installed in 2017 in an attempt to deter horse riders from riding on the hand line, they simply ride through the woods around the gate. As a result the area remains disturbed. The hand line was the only site treated in 2017 that appeared as bad or worse one year after treatments. The park treated 0.3 acres along the line on August 13, 2018, compared to 0.25 acres in 2017. Over the next five years, the park will continue to monitor and treat, as needed, invasive plants along both the hand line and the dozer line.

Slop-overs and Heat Pockets

Burned areas within the two slop-overs (24.5 acres total) and areas throughout the westernmost of the two scattered heat pockets (136.4 acres total) delineated in Map 3, were inspected in 2018 to assess needs for invasive plant control and identify areas in need of soil stabilization and/or replanting. As in 2017, non-native plants were not observed in these areas. These areas are considered stable and will not be monitored with the same regularity as the above sites.

Protection of State-endangered Rare plants

In 2017, a population of state-endangered plants, which occurs on the River Trail East horse trail just east of the burn area, was slated for protection as part of the burned area rehabilitation plan. Dense pockets of Japanese spiraea covering approximately 1.3 acres were treated in 2017, greatly reducing the overall population of invasive plants. Treatments required in 2018 were minimal in comparison, with less than 0.25-acre of invasive plants requiring treatment.

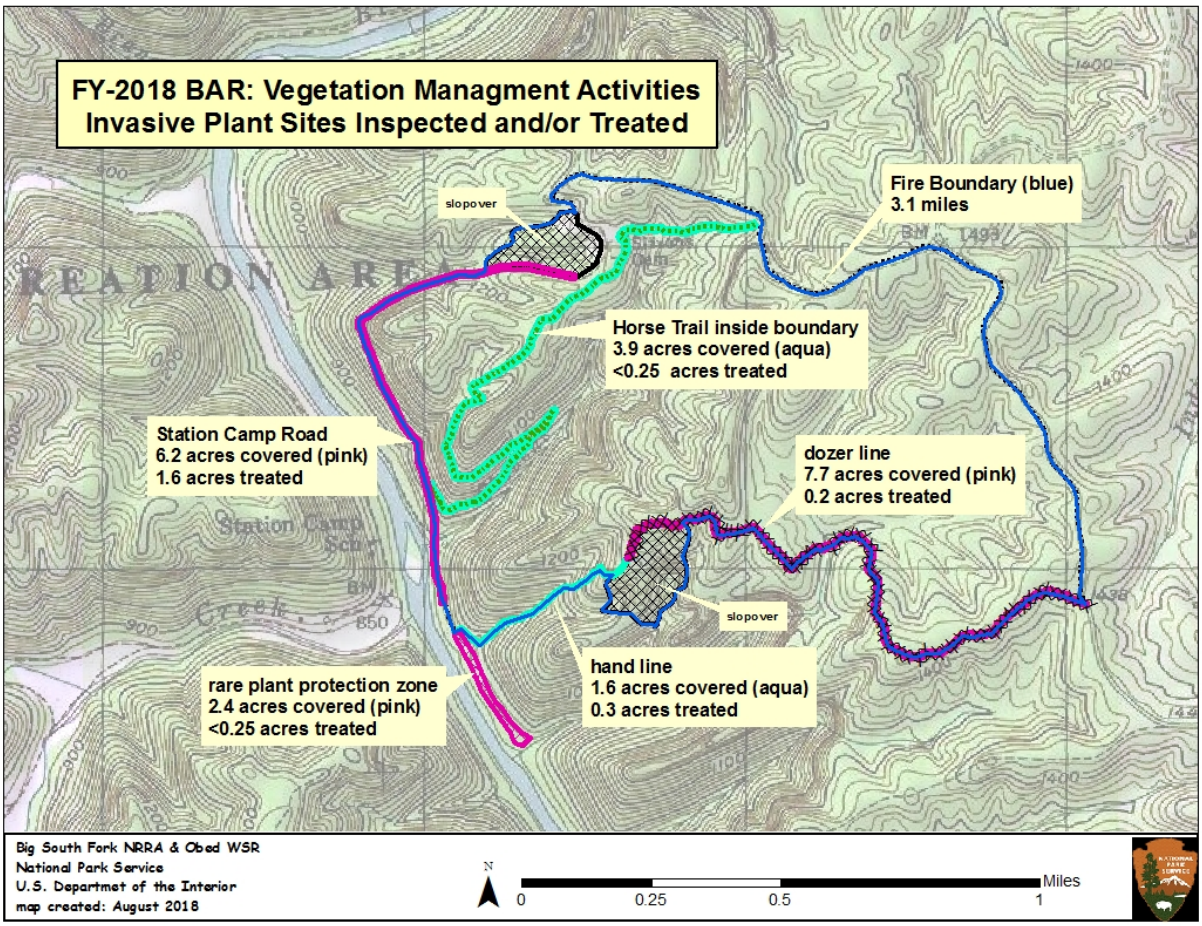
Summary of Vegetation Management Activities in FY-2018

Table 2, below, summarizes vegetation management activities for FY-2018.

Table 2. Summary of acres covered in FY-2018 and comparison of acres treated in FY-2017 versus FY-2018.

SITE(S)	ACRES COVERED IN FY-2018	ACRES TREATED IN FY-2018	ACRES TREATED IN FY-2017	DIFFERENCE FROM ACRES TREATED IN FY-2017
Station Camp Road (retreat 2017 area)	2	0.2	1.5	**1.3 acres less**
Station Camp Road (newly treated in 2018)	4.2	1.4	0	N/A (not treated in 2017)
Big Island Loop Horse Trail (in burned area)	3.9	0.25	0	N/A (not treated in 2017)
dozer line	7.7	0.2	2.2	**2 acres less**
hand line	1.5	0.3	0.2	**0.1 acre more**
slop-overs	24.5	0.0	0.0	no change
pockets with low/moderate heat intensity	136.4	0.0	0.0	no change
state-endangered rare plant protection site	2.4	0.25	4	**3.8 less**
established invasive plant treatment units	0.0	0.0	1.2	N/A (not treated in 2018)
miscellaneous sites	0.0	0.0	0.5	N/A (not treated in 2018)
TOTALS:	**182.6**	**2.6**	**9.6**	**N/A (see discussion below)**

Overall, 9.6 acres were treated in FY-2017 compared to 2.6 in FY 2018. Of 9.6 acres treated in 2017, approximately 1 acre required retreatment, thus indicating that areas treated in 2017 were successfully controlled. Areas along the fire perimeter where secondary target species were treated make up the additional 1.6 acres treated in 2018 . Monitoring and treatment of these sites will be conducted, as needed, over the next 5 years. Map 4, below, illustrates further the areas monitored and treated in FY-2018.



Map 4.. Chimney Rocks Fire non-native plant management areas inspected and treated in FY-2018.

Summary of FY-2018 Accomplishments and Expenditures Using BAR Funds

A portion of the FY-2018 BAR funds for the Chimney Rock Fire were used to revisit cultural resource sites to observe site recovery after one full year of seasonal changes. All sites are listed as stable with good vegetation growth. There are no further recommendations or monitoring prescribed in regards to post-fire mitigations.

The remaining funds were used to monitor the burn area and treat/retreat invasive plants as needed. A total of 182.6 acres of roads, trails and forest were surveyed for the presence of invasive plants, soil stability, potential hazard trees and potential repairs to erosion control measures constructed during post-fire clean-up. Overall, 2.6 acres of invasive plants were treated in FY-2018, with the most common

species being serecia lespedeza, Japanese honeysuckle, Japanese spiraea and multiflora rose. No issues or sites in need of repair were noted. In general, observations revealed that the Chimney Rocks Fire had beneficial effects on the plant communities throughout the burned area. For example: some sandstone outcrops were cleared of surrounding vegetation, opening the sites up for growth and/or establishment of rare or uncommon heliophytes typically found in fire-maintained communities; a few sites experienced enough heat to create natural openings due to mortality of small patches of overstory trees; and on mid- to upper-slopes, dryer, oak-hickory communities experienced fire runs hot enough to favor fire-adapted species. A summary of BAR expenditures for both cultural and natural resources is provided in Table 3.

Table 3. Summary of acres surveyed and acres of invasive plants treated in FY-2017.

ARCHAEOLOGICAL RESOURCES (personnel services: $6,816; Supplies & Materials: $0.00)	$6,816
NATURAL RESSOURCES (personnel services: $5338; Supplies & Materials: $0.00)	$5,338
TOTAL BAR EXPENDITURES FOR FY-2018:	$12,154