2018/19 Stand 18 Sparta Mountain Wildlife Management Area Report

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Site Description and History

This site is located along the northeast part of Sparta Mountain Wildlife Management Area (SMWMA), north of the powerline and accessed using an existing unpaved road from Edison Road to the powerline (Fig. 1). The parcel that includes this site was purchased by the state in 2007 through a grant from the Forest Legacy Program.

Before treatment, the site consisted of a maturing mixed upland oak forest with an average 358 trees per acre averaging about 7 inches in diameter. Most canopy trees on the site consisted of red oak and chestnut oak, and most saplings consisted of maple indicating the oak forest is converting to a northern hardwood forest. Deer densities appeared to be below 20 individuals per sq. mi., evidenced by patches of oak seedlings in the understory with little to no browse, as well as a deer fence erected in another area of SMWMA with no differences in vegetation diversity and height inside and outside the fence. Non-native invasive plants were not observed in the site.

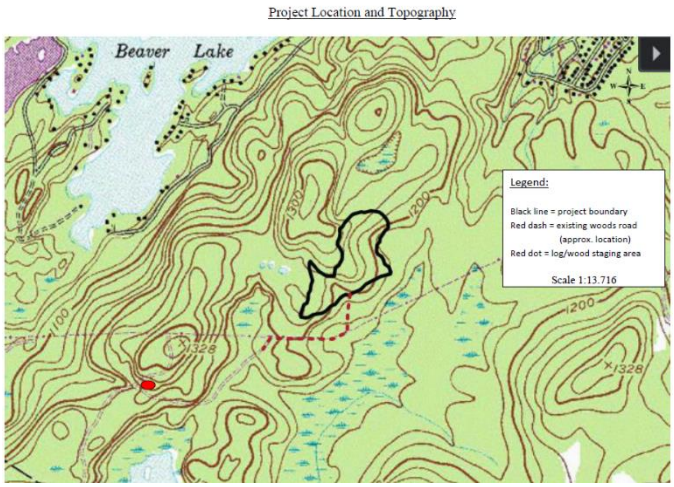

Figure 2. Map of the location of the site in Stand 18 (black bold) and existing access road (red dash) on SMWMA.

2018/2019 Treatment

Activities proposed for this year were one year behind the schedule in the 2017 Sparta Mountain WMA Forest Stewardship Plan and included a modified seed tree treatment on 5-10 acres and a shelterwood treatment on 5-10 acres in Stand 18.

NJ DEP Fish & Wildlife incorporated site-specific feedback provided during months of stakeholder engagement and planning. Changes based on this feedback included not conducting the shelterwood treatment, changing the boundaries of the seed tree treatment and including exclusion areas where trees were not cut (Fig. 2). This reduced the size of the site to 12.2 acres, of which 9.3 acres were treated. A state-approved forester provided the details of the 9.3-acre seed tree treatment in accordance with the approved 2017 Forest Stewardship Plan.

The intent of a seed tree treatment is to open the forest canopy by 60-90% to enable the

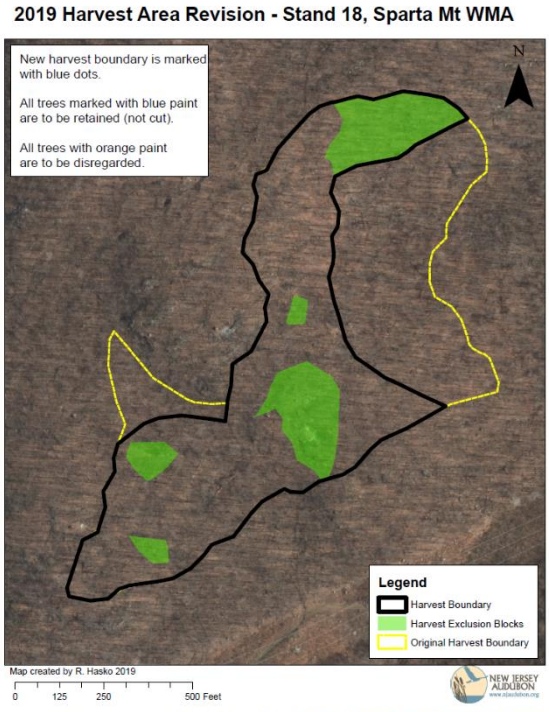

Figure 1. Map of the revised site (black) and exclusion areas (green) in Stand 18 on SMWMA.

regeneration of shade-intolerant and mid-tolerant native vegetation (such as oak trees) while also maintaining mature "seed" trees. The objectives for this activity are to increase structural and age-class diversity of forests across the larger landscape scale, regenerate the oak-hickory forest type, and create critical habitat for rare, endangered, and declining wildlife. The seed tree treatment was conducted in the winter and tree felling was completed March 2019.

In order to meet the goals of the seed tree prescription with the addition of the no-cut exclusion areas, the treatment involved cutting the majority of trees outside the exclusion area regardless of size class while many small-stemmed trees were retained in the exclusion areas (Figs. 3 & 4). After treatment, about 64 trees per acre (residual BA=10 ft^2/ac) were retained on site with an average DBH of 8 inches.

Figure 3. Photo showing the treated area and one of the exclusion areas in the site in Stand 18 on SMWMA after treatment (May 2019).

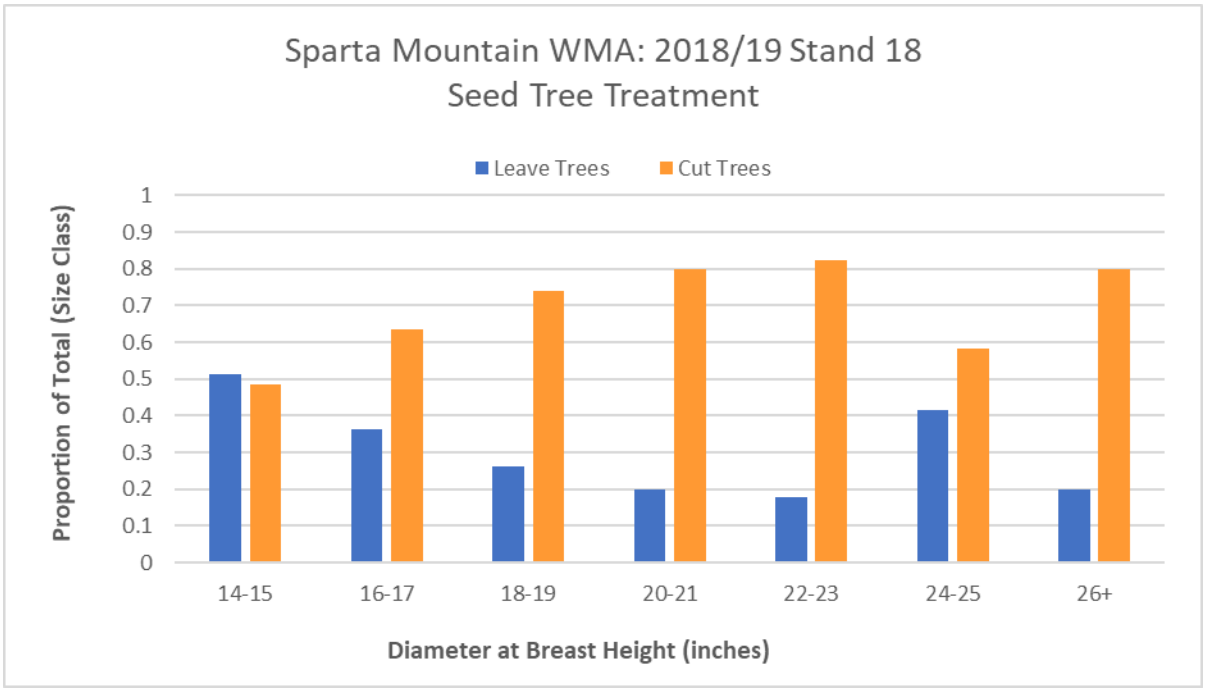

Figure 4. Proportion of trees retained (blue) vs cut (orange) by diameter size class for the 2018/19 seed tree treatment in Stand 18 on SMWMA.

Stand 18 Bird Survey Results (2019-2024)

This site was surveyed for all bird species during the breeding season (May 15 – June 15) in 2008 and then once a year after treatment. Before treatment, six species of birds were observed, two of which were Species of Greatest Conservation Need (SGCN), giving the site a bird conservation score of 17. A few months after treatment, the total number of species more than doubled, the number of SGCN increased, and conservation score more than doubled. Two years after treatment the total number of bird species quadrupled to 25 bird species (12 SGCN) and a bird conservation score of 127 (Fig. 5). All of bird species observed before treatment were also observed after treatment, while birds like the eastern towhee and other species that have been steeply declining and considered to be at their Tipping Point, were observed afterwards because of the treatment done.

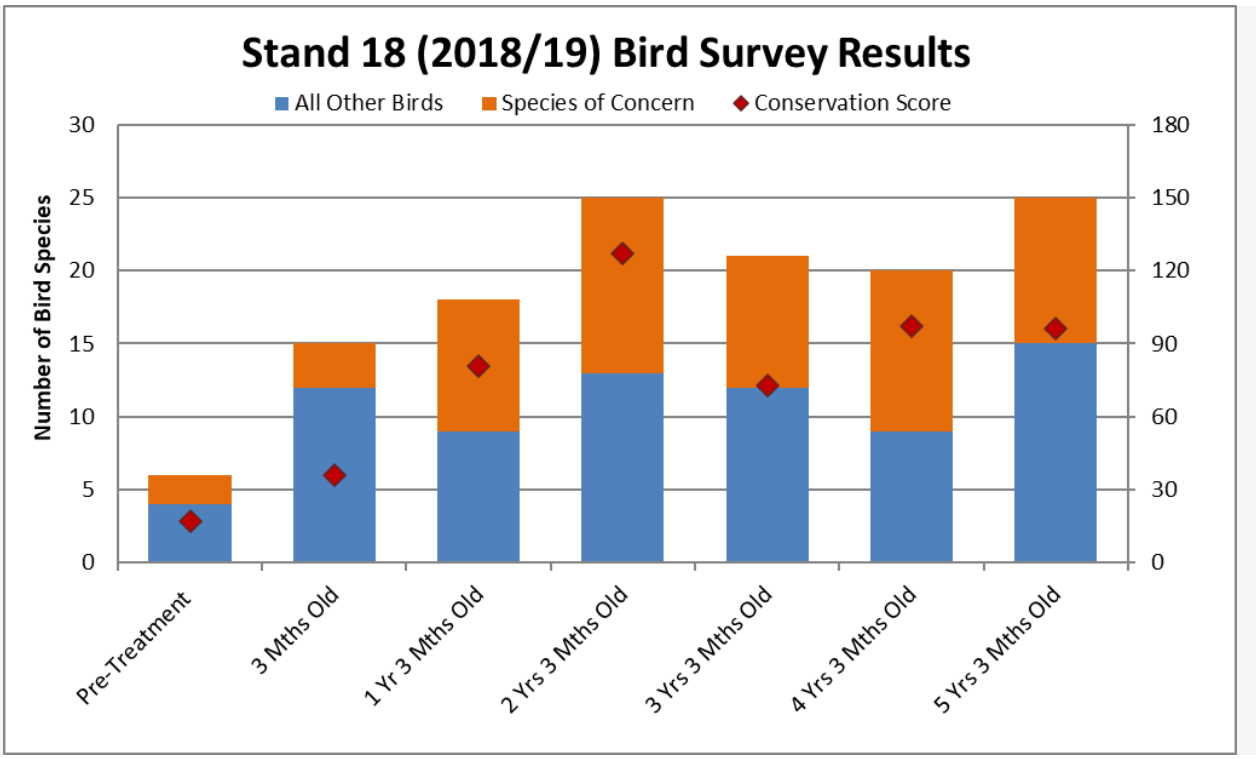

Figure 5. Number of bird species of concern (orange bar), all other bird species (blue bar), and bird conservation score (red) observed during breeding bird surveys in Stand 18 on SMWMA. Bird conservation scores are the sum of the scores of each individual bird species detected, which were determined for each species based on federal, state, and regional statuses and rankings.

Stand 18 Vegetation Survey Results (2019 – 2024)

A regeneration survey was conducted in this site in September 2019, six months post-treatment, which sampled the number of live seedlings within plots uniformly distributed within the treated area. An average of 2,760 seedlings per acre were observed, 85% of which were oak seedlings. Other species included sweet birch, black cherry, red maple, mockernut hickory, and tulip poplar (Fig. 6).

Rapid vegetation surveys are conducted during the same time and location as the bird surveys (center of the site) post-treatment to assess the vegetation cover and dominant species of vegetation before and after treatment (Table 1). No non-native invasive plants were observed during the forest inventory before treatment. The treatment resulted in opening the canopy in the non-exclusion area by about 80%. The shrub and herbaceous cover grew in quickly after treatment (Figs. 7) and consist of a

diverse mix of vegetation. Witch hazel and maple-leaf viburnum are still growing on the site but oak and blueberry responded quickly to the increased sunlight, as did blackberry. Non-native invasive plants were observed a few years after treatment adjacent to an unsanctioned trail created by dirt bikes within this site. This area will continue to be monitored and non-native invasive plants treated as needed.

Table 1. Vegetation cover and the dominant trees, shrubs, herbaceous, and non-native invasive plants observed during the rapid vegetation surveys on Stand 18 in SMWMA after treatment and an estimate based on the inventory of the site before treatment.

Vegetation Type	Before Treatment (estimate)	3 Months After Treatment	1 Year 3 Months After Treatment	2 Years 3 Months After Treatment	3 Years 3 Months After Treatment
Tree (% cover)	90	10	20	30	30
Shrub (% cover)	5	20	20	25	40
Herbaceous (% cover)	5	30	30	30	20
Non-native (% cover)	0	0	0.5	0.5	2
Dominant 3 Trees	Oak, hickory, maple	Oak, hickory, maple	Oak, hickory, maple	Oak, hickory, maple	Oak, hickory, maple
Dominant 3 Shrubs	Witch hazel, blueberry	Viburnum, sweet birch, blackberry	Maple, witch hazel, cherry	Blackberry, witch hazel, hickory	Sweet birch, witch hazel, blackberry
Dominant 3 Herbaceous	Fern, grass/sedge, forb	Fern, forb, grass/sedge	Grass/sedge, forb	Grass/sedge, forb, fern	Forb, grass/sedge, fern
Dominant 3 Non-native Invasive	None Observed	None Observed	Stiltgrass along dirt bike trail	Stiltgrass along dirt bike trail	Stiltgrass, multiflora rose along dirt bike trail

Figure 6. Photo of herbaceous vegetation and oak seedlings during regeneration surveys in the site in Stand 18 on SMWMA, 6 months after treatment (September 2019).

Figure 7. Photo of the forest in the site in Stand 18 on SMWMA 5 years, 3 months after treatment (May 2024).

In summary, while the number of species detected during surveys can vary year to year, there is a treatment effect that results from opening the forest canopy. The bird conservation score, which represents both the number and conservation concern of species observed, is highly correlated with less tree canopy cover (Fig. 8), even before the end of the first growing season post-treatment. The seed tree treatment on Stand 8 in SMWMA opened the forest canopy to allow for herbaceous and small woody vegetation (shrub and saplings) to grow, specifically vegetation that cannot grow or thrive in the shade of closed-canopy forests. This resulted in many more bird species using the area during the breeding season compared to before treatment, especially SGCN in NJ. This treatment also increased the diversity of vegetation which will help this forest be more resilient and less vulnerable to future climate conditions.

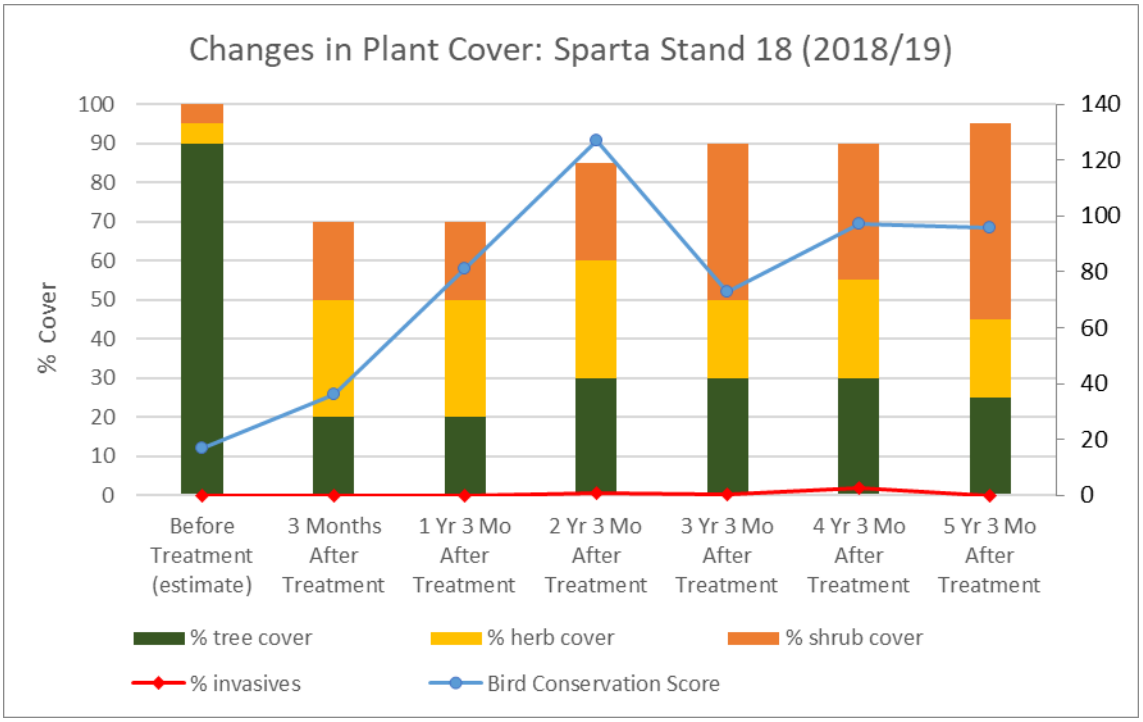

Figure 8. Bird Conservation Score (blue line) and vegetation cover (columns, red line) observed during breeding bird surveys on Stand 18 in SMWMA before and after treatment. Trees include all woody vegetation >4m tall, shrubs include all woody vegetation <4m tall, and herbs are all non-woody vegetation. The red line represents the percentage of the area with non-native invasive plants (tree, shrub, and herb).