



### Avian Monitoring in the Allegheny Highlands

A fourth year of avian monitoring was completed within the 18,000-acre Warm Springs Mountain Restoration Project (WSMRP), a collaborative initiative spanning lands owned by The Nature Conservancy (TNC) and the George Washington and Jefferson National Forest (GWJNF). Developed by the Central Appalachians Fire Learning Network (FLN) partnership, the WSMRP strives to restore the historical fire regime in Appalachian pine-oak forests through controlled burns and to monitor the landscape-scale responses of associated bird and plant communities. Since 2008, FLN partners have conducted controlled burns on four units totaling nearly 7,400 acres within the project area. An additional 880 acres were burned by a managed wildfire.



Volunteer Allen Hale records all species detected during a point count conducted two years post-burn. Photograph © Nikole Swaney/TNC

### Forest Structure Before and After Burning

Left: Photo of Plot 09-05 in the Mare Run burn unit taken before burning in April 2008. Right: Photo of same plot taken one year after the unit's second controlled burn.



### Methods

Using the same permanent plots sampled for pre- and post-burn forest structure and composition monitoring, one hundred seven avian point counts were conducted during peak breeding season (mid-May through mid-June). All individual birds detected within a 100 meter fixed radius circle over a ten minute survey period were recorded. Through a time of detection protocol, individuals were tracked across ten subintervals to account for differences in detectability (e.g., differing rates of song, observer effects, time of day effects) using standard mark-recapture analyses in Program MARK.



Chestnut-sided Warblers breed in early-mid successional forest. In 2014, 17 individuals were recorded, an increase from previous years. Photograph © Dick Rowe

Table 1: Summary of 2011-2014 Avian Monitoring

|                         | 2011 | 2012 | 2013 | 2014 |
|-------------------------|------|------|------|------|
| Species                 | 52   | 48   | 52   | 56   |
| Individuals             | 780  | 893  | 949  | 1119 |
| Shannon Diversity Index | 3.19 | 3.16 | 3.23 | 3.25 |

## Results

A higher number of individuals was recorded than in previous years with a total of 1,119 individuals detected this spring (Table 1). Species diversity increased slightly from 2011 to 2014 (Table 1) and is higher in burned plots. Relative abundance estimates for seven focal species have remained relatively constant across the entire project area (Figure 1) while demonstrating species-specific responses to areas that have been burned (Figure 2). These preliminary results suggest that although avian species can show positive and negative responses to prescribed fire, their populations are resilient in both in geographic space and over time.

### Relative Abundance of Focal Species by Year

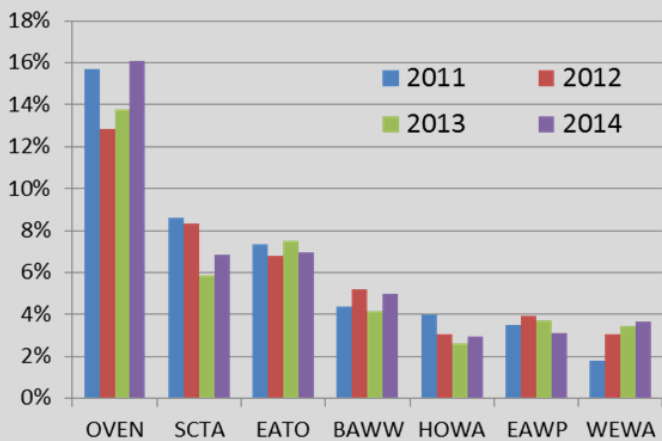


Figure 1: Mean relative abundance of focal species from years 2011-2014 throughout 107-plots in the avian monitoring program. Relative abundance indicates what percent of the total population a species represents. Although there are yearly fluctuations, none of the focal species is showing significant annual trends.

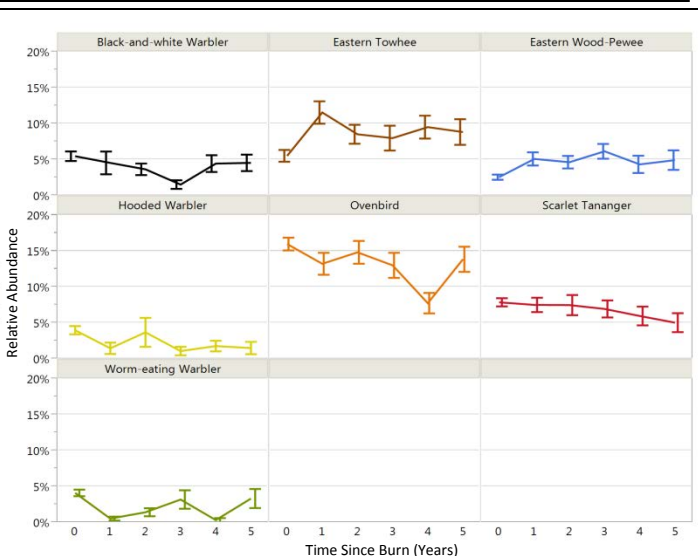


Figure 2. Mean differences in relative abundance of seven focal species since the last fire entry (error bars indicate 1 standard error).

## Focal Species

All individual birds detected in plots were recorded, however, analysis of relative abundance and density was conducted for seven focal species chosen for their abundance, high detection probabilities, foraging niches, and nesting habitat preferences. Estimated population trends for these species may indicate changes in habitat condition and help inform management decisions.

| Focal Species                  | Foraging Habitat | Nesting Habitat     |
|--------------------------------|------------------|---------------------|
| Scarlet Tanager (SCTA)         | Canopy           | Outer tree branches |
| Eastern Wood-pewee (EAWP)      | Midstory         | Tree limbs          |
| Black-and-white Warbler (BAWW) | Tree bark        | Ground              |
| Hooded Warbler (HOWA)          | Foliage          | Shrub               |
| Worm-eating Warbler (WEWA)     | Understory       | Ground              |
| Ovenbird (OVEN)                | Ground           | Ground              |
| Eastern Towhee (EATO)          | Ground           | Among leaf litter   |

### Species Highlight

During the breeding season, Black-and-white Warblers (*Mniotilta varia*) reside in deciduous and mixed forests and defend their territories vigorously. Although they are ground nesters, these wood warblers probe the bark along tree trunks and high into the canopy for insect prey. Though considered habitat generalists on wintering grounds, Black-and-white Warblers are sensitive to forest fragmentation in their breeding range. The Breeding Bird Survey reports a slight decline in the U.S. over the past 50 years.

Photograph © Tringa Photography

