

Songbirds in the Sugarwoods

Assessing Forest Structure and Bird Diversity in Vermont Sugarbushes



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ABSTRACT

Maple syrup production in Vermont has increased by 45% since 2012, with similar growth across the Northern Forest, a region that also provides some of the highest-quality breeding bird habitat in North America. Expansion of the maple industry may, therefore, have implications for forest and forest bird diversity since some sugarbush management practices favor maple at the expense of other tree species. To address this issue, Audubon Vermont, the Vermont Maple Sugar Maker's Association and Vermont Department of Forests, Parks, and Recreation formed the Bird-Friendly Maple Project in 2014 to promote sugarbush management practices that increase forest structural and species diversity, with an aim to improve forest health, bird habitat quality, and ecosystem service provisioning. However, there is a lack of research explicitly examining the effects of sugarbush management practices on forest birds. To address this gap, a team of researchers at the University of Vermont, Vermont Center for Ecostudies, and Audubon Vermont initiated a project to survey birds, arthropods (an important food source for breeding birds), and vegetation in sugarbushes across northern and central Vermont. Here, we present preliminary results from three years of data collection on forest structure and diversity and bird communities in 16 active sugarbushes. This work shows how bird communities in sugarbushes vary with vegetation structure and composition and arthropod biomass, and will provide guidance on updating BFM management recommendations. Future analysis will drive a better understanding of how sugaring operations and sugarbush management affects forest structure and diversity, illuminating potential compliments and tradeoffs with biodiversity goals.

METHODS

Bird Surveys

Point counts were established in a 200 m grid at each site. The number of points per site varied depending on the size and configuration of the forest stand. At each survey point, three 4-minute, fixed-radius (50 m) independent point counts (12-minutes total/point) were conducted during the month of June. Bird surveys began between 0430 and 0500 on days with suitable weather conditions (no rain, light winds), and ended by 0930.

Vegetation Surveys

Vegetation surveys occurred at bird point count locations. Data was collected on the following metrics using a modified James & Shugart (1970) approach:

Center plot:

- Overstory Trees & Snags
- Canopy Cover
- Large Sapling
- Small Saplings & Shrubs
- Litter Depth
- Ground Cover
- Regeneration (Woody spp)
- Downed Woody Material

Subplots:

- Overstory Trees & Snags
- Canopy Cover
- Herbaceous, woody vegetation, & DWD cover

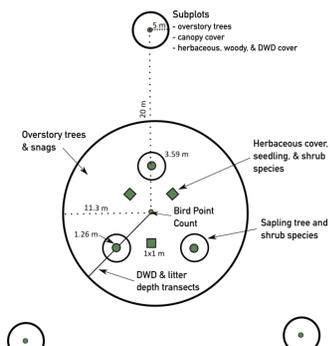


Figure 1. Layout of center sampling plot and subplots. The center plot was an 11.3 m radius plot (1/10th acre; 0.04 ha). The subplots were 5 m in radius located 20 m from the centroid of the center plot.

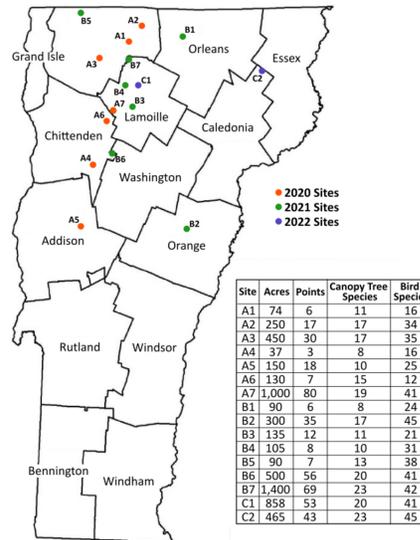


Figure 2. Map of study sites by year. The accompanying table shows acreage, the number of sample points, and the bird and canopy tree species richness of each site.

16 sugarbushes
37 canopy tree species
73 bird species



Check out the Bird-Friendly Maple guidelines

RESULTS

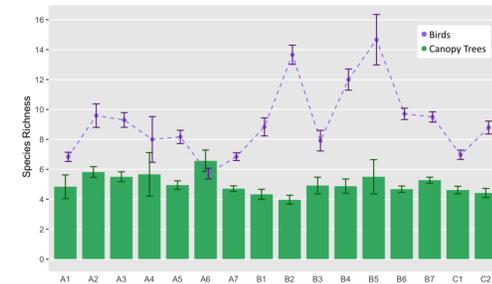
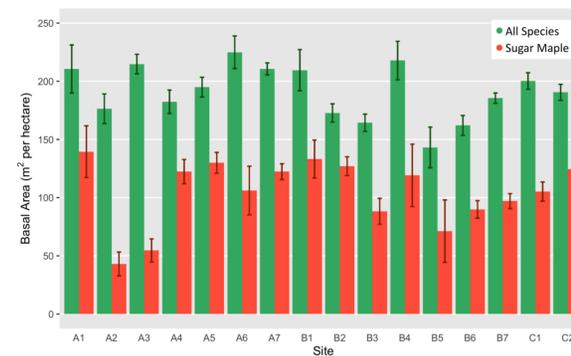


Figure 3. Mean species richness and standard error of birds and canopy trees by site.



Site	% Basal Area Sugar Maple
A1	66.2
A2	24.4
A3	25.4
A4	67.1
A5	66.7
A6	47.2
A7	58.1
B1	63.6
B2	73.6
B3	53.7
B4	54.7
B5	49.8
B6	55.4
B7	52.3
C1	52.5
C2	65.4

Figure 4. Mean basal area and standard error of all tree species and of sugar maple by site. The accompanying table indicates the average percent basal area of sugar maple by site.

NEXT STEPS

- Collect data on sugarbush management and operations metrics via sugarmaker survey
- Survey unmanaged reference sites for comparison with managed sugarbush stands

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