

NSRC Progress Report 2021

Evaluating the Efficacy of Audubon’s Bird-friendly Maple: Can Managing Sugarbushes for Birds Provide Additional Benefits to Biodiversity, Ecosystem Services, and Forest Resilience?

PI Steven D. Faccio, Vermont Center for Ecostudies

Project abstract

Audubon Vermont’s Bird-Friendly Maple Project recommends forest management activities that promote sugarbush stands with a diversity of tree species and vertical habitat structure. Although these forests are more likely to support a diverse bird population, the efficacy of Audubon’s bird-friendly management guidelines to provide measurable benefits to bird populations is unknown. Additionally, the long-term sustainability of maple sap production is entirely contingent on healthy forests, but our knowledge is limited on how the complex drivers of increased maple sap production intensity, differing management strategies, and climate change will affect biodiversity, ecosystem services, and overall ecological health of sugarbushes.

By conducting field surveys of biodiversity and ecosystem service metrics across a gradient of sugarbush production and management intensities, NSRC researchers will pioneer this knowledge base and develop tools and policies that provide sustainable sugarbush management guidelines that are relevant across the Northern Forest landscape. This will result in updated guidance for sugarmakers and specific revisions to the bird-friendly maple management guidelines in order to achieve the desired benefit for bird populations.

Summary of progress in 2021

Field work was conducted during May thru August 2021. Study sites were established in May at seven cooperating sugarbushes across northern Vermont in the counties of Chittenden (1), Franklin (1), Lamoille (3), Orleans (1), and Orange (1) (see Fig. 1). Study sites ranged in size from 36 to 567 hectares. A total of 192 primary survey points, along with 576 subplots, were established. During June, birds were surveyed by three field staff using 50-m radius point counts at the 192 primary plots. Detailed vegetation metrics were collected by a team of 5-8 field staff at all 768 primary and subplots. Arthropods were surveyed using 16 x 16 cm² cardboard squares and vacuum sampling at the 576 subplots. Additionally, during May, native bee surveys were conducted at all study sites using “bee bowls” set-up along 50-m transects. A total of

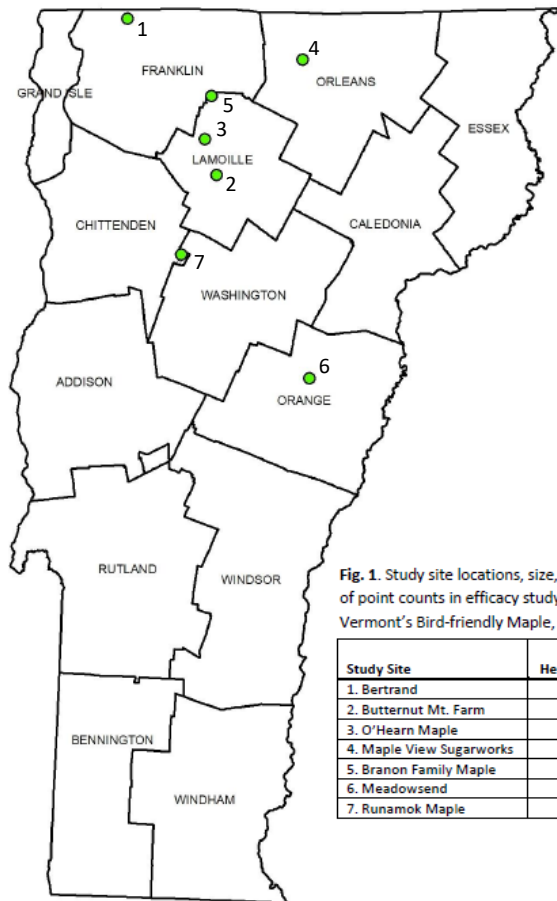


Fig. 1. Study site locations, size, and number of point counts in efficacy study of Audubon Vermont’s Bird-friendly Maple, 2021.

Study site locations, size, and number of point counts in efficacy study of Audubon Vermont’s Bird-friendly Maple, 2021

NSRC Progress Report 2021

25 transects were sampled, resulting in 285 native bees of 40 species collected. Prepared bee specimens will ultimately be donated to the Zadock Thompson Zoological Collection at UVM. Between September and December, two technicians processed arthropod samples collected during the vacuum surveys and completed all remaining data entry. Additionally, between October and the end of December, the PI and cooperator Liza Morse, began error-checking data, which is nearing completion.

The Fall 2021 issue of Vermont Center for Ecostudies Newsletter, Field Notes, featured an article summarizing the Bird-friendly Maple project (see page 10-11).

Problems or changes

We encountered no major problems, but we eliminated one taxon from our original survey Methodology. We originally planned to survey ant diversity, but cooperator Fischer decided to eliminate that taxon when UVM's ant specialist accepted a new position.

Plans for 2022

Plans for 2022 include conducting statistical and analytical modeling to determine the most biologically significant habitat covariates (vegetation and arthropod abundance) that explain variation in forest bird abundance and species richness/diversity across a gradient of sugarbush production and management intensities. We can then determine which of those habitat factors can be manipulated through silvicultural practices to achieve the structural conditions that result in the best habitat for forest birds. Audubon Vermont, one of our collaborators on this study, will then use these results to update management recommendations of their Bird-Friendly Maple Project. Along with our partners we will also produce a manuscript for peer-review. Additionally, the UVM team will continue field work on this project. Their work will not only investigate how the intensity of maple sugar production affects biodiversity, but it will also assess its impact on ecosystem services (such as carbon sequestration and storage) and resistance to invasive species and climate change, while investigating socio-economic outcomes of maple production at different scales.



Field biologist Bethany Smith measures the diameter of a large (31") sugar maple, which, along with thousands of other measurements, will provide insights into how to best manage working sugarbushes to benefit birds and other biodiversity