

The roles of habitat, spruce budworm, and Btk in avian community structure

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The objective of this study is to determine whether spruce budworm-linked warbler species become more abundant as spruce budworm (SBW) density increases (numerical response), and if budworm-linked warblers become less abundant as prey density is reduced by the application of Btk (*Bacillus thuringiensis kurstaki*).

I hypothesize that the presence of SBW-linked warblers will change with (1) SBW density and (2) proximity to treatment areas.

Testable predictions:

- 1) If the presence of SBW-linked warblers will increase with SBW density, then the abundance of SBW-linked warblers should be higher in areas not sprayed with Btk.
- 2) If the presence of SBW-linked warblers is correlated to the closeness of sprayed and unsprayed areas, then sprayed sites should have higher densities of SBW-linked warblers.

Site Selection: 8 blocks – 4 sprayed, 4 unsprayed in Northern New Brunswick (Bathurst region). Surveys completed mid-May – early July.

Methods:

- 58 autonomous recording units (ARUs) (7 per block) – recording 5am to 10am each day, then analyzed in R using the MonitoR package
- Unlimited radius point count surveys at each block – at least one survey pre-spray, and one post spray – paired with each ARU station

Study Species: Bay-breasted Warbler (*Setophaga castanea*), Tennessee Warbler (*Leiothlypis peregrina*), and Cape May Warbler (*S. tigrina*)

To date, the data is not analyzed; however, there are notable trends in presence/absence of SBW-linked warblers. Cape May Warblers tend to vacate the sites after Btk application. While Bay-breasted Warblers remain in the area. Also, Tennessee Warblers were not recorded in either survey method. A second field season will be completed this upcoming summer. Then the data will be analyzed, followed by thesis writing. Expected graduation is May 2022.

This study will determine whether unsprayed areas act as a reservoir for SBW avian predators. These areas should host more abundant food (prey) resources and, therefore, host a greater abundance of SBW predators. Areas that were treated with Btk are expected to have the lowest abundance of Lepidopteran prey and avian predators. If this is true, and if the EIS relies on natural processes to terminate SBW that were not destroyed by insecticides, then the proximity of untreated areas (as potential predator reservoirs) to treated sites would need to be considered a vital component of the Early Intervention Strategy. Further, with the results of this research, forest managers and scientists will better understand SBW-linked warblers and their responses to Btk.

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Research Partners/Funding: Forest Protection Limited, Canadian Forest Service - Early Intervention Strategy, Healthy Forest Partnership

Citations: Venier et al., 2009, and Holmes et al., 2009