

Vita

Candidate's name: Miranda Ivy Crawford

Universities
Attended: University of New Brunswick (2019)
Bachelors of Science
Biology

University of New Brunswick (2024)
Masters of Science
Biology

Publications:

Alexander AC, M Morrison, T Laengle, J Allen, and C Sheedy, Tim MacDonald, Janice Villeneuve. In press. Pesticides Section 3, Synthesis of the Science on Stressors. Strategic Science Assessment for the Canada Water Agency. Environment and Climate Change Canada, Ottawa, ON.

Effects of Insecticides, Agriculture and Climate Change on Freshwater Benthic Macroinvertebrates in Prince Edward Island, Canada

UNIVERSITY OF NEW BRUNSWICK
THESIS DEFENCE AND EXAMINATION

in Partial Fulfillment

of the Requirement for the Degree of
Master of Science

by

Miranda I. Crawford

in the Department of Biology

U.N.B., Fredericton, N.B.

Friday, March 1st, 2024

2:30 p.m.

Bailey Hall, Room 27

Examining Committee

Dr. Alexa Alexander-Trusiak

Dr. Tillmann Benfey

Dr. Serban Danielescu

Dr. Shawn MacLellan

Supervisor

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Abstract

Global pesticide use has resulted in widespread environmental degradation, persistent contamination of water sources, and unintended impacts on non-target species. Mixtures of pesticides are commonly found, yet these chemicals are rarely studied in combination. Insecticides frequently found in areas of intensive agricultural land use are particularly concerning as these chemicals likely also impact aquatic macroinvertebrates. This thesis analyzed trends in factors that contribute to the persistence and presence of four commonly detected insecticides and their impact on benthic macroinvertebrates in 10 study watersheds over a greater than 10-year period (2007 to 2021) in Prince Edward Island, Canada by examining the variability and influence of chemical (insecticides, water quality), biological (benthic macroinvertebrate assemblages), and physical (habitat integrity, water discharge) components with regards to agricultural intensity. The results indicated that agriculturally impacted watersheds had multiple insecticide detections,

degraded habitats, increased nutrient concentrations, and benthic assemblages, indicative of highly impacted streams.