Vita

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Universities Attended:

University of New Brunswick (2020)
Bachelors of Science

University of New Brunswick (2025)
Masters of Science

Conferences Presentations:

Rideout, T., Stewart, C., and Stephenson, M. May 2022. Prey selection for fatty acid signature analysis [Conference presentation]. Canadian Statistics Student Conference.

Rideout, T., Stewart, C., and Stephenson, M. June 2024. Prey selection for fatty acid signature analysis using the Akaike information criterion [Conference presentation]. Statistical Society of Canada Annual Meeting (St. John's, NL).

Prey Selection for Fatty Acid Signature Analysis Using the Akaike Information Criterion

UNIVERSITY OF NEW BRUNSWICK

THESIS DEFENCE AND EXAMINATION

in Partial Fulfillment

of the Requirement for the Degree of
Master of Science

by

Tyler D. Rideout

in the Department of Mathematics & Statistics

U.N.B., Saint John, N.B.

Friday, February 28th, 2025
9:30 a.m.

via MS TEAMs

Examining Committee

Dr. Connie Stewart	co-Supervisor
Dr. Matthew Stephenson	co-Supervisor
Dr. Maggie Brown	Internal Examiner
Dr. Kim Davies	External Examiner
Dr. Viqar Husain	Chair of Oral Examination

Abstract

The estimation of the diet compositions of marine predators using fatty acid signature analysis allows for valuable insights into the trophic structures of marine ecosystems through non-lethal means by comparing the fatty acid signatures of predators with a library of their potential prey. These prey libraries consist of the fatty acid signatures of individual prey grouped most often by species, and in order to obtain unique diet estimates the number of groups in the library must be less than the number of dietary fatty acids in the analysis. We propose a novel application of the Akaike information criterion to identify the correct subset of species in a predator's diet from a wider set of potential prey. The estimation of true zeroes through the removal of unconsumed species from the prey library may result in reduced variability and greater accuracy in the estimation of truly nonzero proportions. The performance of this method as a means of variable selection and its impact on diet estimates are explored through simulation studies and the analysis of real-life data from grey seals and their prey.