

## Vita

Candidate's name: Lyle M. Vicaire

Universities  
Attended: University of New Brunswick (2014)  
Bachelors of Science

University of New Brunswick (2025)  
Masters of Science  
Biology

### Conference Presentations:

Barbeau, M.A., Vicaire, L., Stack Mills, A.M.E. (May 2022) Effect of population of origin on germination success of *Spartina alterniflora* collected from the Bay of Fundy and Northumberland Strait. Atlantic Canada Coastal and Estuarine Science Society (ACCESS) and Bay of Fundy Ecosystem Partnership (BoFEP) Joint Conference 2022, Truro, NS.

Vicaire, L.M., Beck, A.D., Barbeau, M.A. (June 2021) Seed viability, germination, and early survival of *Spartina alterniflora* from the Bay of Fundy and Northumberland Strait for salt marsh restoration. 9th World Conference on Ecological Restoration Virtual.

Vicaire, L.M., Barbeau, M.A. (May 2021) Seed viability, germination, and early survival of *Spartina alterniflora* from the Bay of Fundy and Northumberland Strait for salt marsh restoration. ACCESS (Atlantic Canada Coastal and Estuarine Science Society) 2021 Virtual Conference, Halifax, NS. (Second Place, Graduate Poster Award)

## Seed development, germination, and seedling performance of *Spartina alterniflora* from the upper Bay of Fundy and Northumberland Strait for salt marsh restoration

UNIVERSITY OF NEW BRUNSWICK  
THESIS DEFENCE AND EXAMINATION

in Partial Fulfillment  
of the Requirement for the Degree of  
Master of Science

by

**Lyle M. Vicaire**

in the Department of Biology

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

**Wednesday, November 5<sup>th</sup>, 2025  
1:00 p.m.**

Bailey Hall, Room B27

Examining Committee

Dr. Myriam Barbeau  
Dr. Les Cwynar  
Dr. Janet Blackadar  
Dr. Shawn MacLellan

Supervisor  
Internal Examiner  
External Examiner  
Chair of Oral Examination

## Abstract

Salt marshes provide many ecosystem benefits including enhancing coastal resilience, leading to increasing interest in their restoration. The engineering species of salt marshes along the North American east coast is the saltwater cordgrass *Spartina alterniflora*. The source of this grass used for restoration should be adapted to local conditions, and have high genetic diversity to resist abiotic and biotic stressors. My research goal was to develop a new (to New Brunswick) way of doing salt marsh restoration, by harvesting wild seeds and producing seedlings of *S. alterniflora*. From July–November 2020 and 2021, I monitored flowering and seed development at multiple salt marsh sites in Bay of Fundy and Northumberland Strait, and determined seed harvesting windows. In 2020, flowering, seed development and seed readiness occurred later than in 2021. Also, the two regions had a timing difference, with Bay of Fundy sites being ~1–2 weeks earlier than Northumberland Strait sites. Seeds collected at appropriate harvesting times from multiple

sites in each region in 2020 were cold stratified in two storage conditions (freshwater and high salinity water), and then germinated. I monitored seedling survival and growth in the greenhouse from February–June 2021, and their preparation for outplanting using two irrigation treatments (freshwater and saltwater); the latter to possibly harden the seedlings prior to outplanting. Seedlings from the Bay of Fundy were outplanted in a restoration site along the Memramcook River, and their performance monitored until November 2021. Plugs with initially  $\geq 3$  stems had 77% survival and increased in stem density and patch area (to 90 cm diameter) by the end of the growing season. Parental phenotype and prior greenhouse irrigation treatment did not affect the outplants by then. Overall, my results provide substantial evidence to support the use of *S. alterniflora* native seedlings for salt marsh restoration and creationwhole.