

Ph.D. Candidate

**Laura Katherine Boone**

Graduate Academic Unit

**Biology**

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**November 8, 2021**

**9:00 a.m.**

**Virtual Defence**  
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**Examining Board:**

Dr. Mark Sherrard (Biology)

Dr. Tillmann Benfey (Biology)

Dr. Wendy Monk (Forestry and Environmental Management)

Dr. Myriam Barbeau (Biology)      Supervisor

**External Examiner:** Dr. Christine Angelini

Department of Environmental Engineering Sciences

University of Florida

**The Oral Examination will be chaired by:**

Dr. Patricia Evans, Associate Dean of Graduate Studies

**BIOGRAPHY**

**Universities attended (with dates & degrees obtained):**

2011 – present

Ph.D. candidate, University of New Brunswick

2009

BSc, University of New Brunswick

**Publications:**

Virgin, S. D., Beck, A. D., **Boone, L. K.**, Dykstra, A. K., Ollerhead, J., Barbeau, M. A., and McLellan, N. R. (2020). A managed realignment in the upper Bay of Fundy: Community dynamics during salt marsh restoration over 8 years in a megatidal, ice-influenced environment. *Ecological Engineering*, 149: 105713.

**Boone, L.K.**, J Ollerhead, MA Barbeau, AD Beck, BG Sanderson and NR McLellan (2017) Chapter 21. Returning the tide to dikelands in a macrotidal and ice-influenced environment: challenges and lessons learned. *In Coastal Wetlands: Alteration and Remediation*. CW Finkl & C Makowski (ed) Coastal Research Library, Volume 21, Springer International Publishing, Cham, Switzerland, pp. 705-749. ISBN 978-3-319-56178-3

**Boone, L.K.** and Barbeau, M.A. (2015) Fort Beauséjour salt marsh restoration project – Emergent plants and invertebrates, and salt panne animals (2014 Report). Amherst, Nova Scotia. Ducks Unlimited Canada.

**Boone, L.K.** and Barbeau, M.A. (2014) Fort Beauséjour salt marsh restoration project – Emergent plants and invertebrates, and salt pool animals (2013 Report). Amherst, Nova Scotia. Ducks Unlimited Canada.

**Bursey, L.K.** and Barbeau, M.A. (2013) Fort Beauséjour salt marsh restoration project – plants and invertebrates on the emergent marsh, and animals in salt pools (2012 Report). Amherst, Nova Scotia. Ducks Unlimited Canada.

Alderson, C., **Bursey, L.K.** and Barbeau, M.A. (2012) Fort Beauséjour salt marsh restoration project – emergent plants and invertebrates, and panne animals (2011 Report). Amherst, Nova Scotia. Ducks Unlimited Canada.

**Bursey, L.K.** and M.A. Barbeau (2011) Fort Beauséjour salt marsh restoration project – baseline data: plants and invertebrates (2010 Report). Amherst, Nova Scotia. Ducks Unlimited Canada.

**Selected Presentations:**

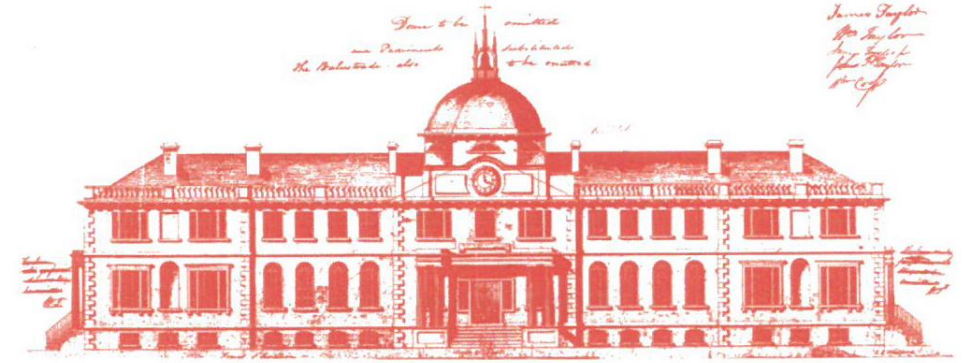
Norris G.A., M.A. Barbeau, S.D.S. Virgin, A.D. Beck, **L.K. Boone**, J. Ollerhead and N.R. McLellan (June 2021) Community dynamics during salt marsh restoration over 10 years in a megatidal, ice-influenced environment. 9th World Conference on Ecological Restoration (Society for Ecological Restoration) Virtual

Barbeau M.A., S.D.S. Virgin, A.D. Beck, G.S. Norris, **L.K. Boone**, J. Ollerhead and N. McLellan (November 2019) Salt marsh restoration in a mega-tidal and ice-influenced environment (Atlantic Canada). 2019 CERF (Coastal and Estuarine Research Federation) Biennial Conference, Mobile, Alabama, USA

# Ecology of salt marshes in Maritime Canada: geographic differences in species interactions and ecosystem restoration dynamics

## Abstract

Salt marshes, productive and important ecosystems, represent a large proportion of coastline in Maritime Canada (particularly in the Bay of Fundy and the southern Gulf of St. Lawrence), despite historic losses. However, knowledge about salt marshes elsewhere may not be fully applicable to their ecology and restoration in our north temperate region. A better understanding of the geographic variation allows for improved management of salt marshes, which confer substantial ecosystem services to surrounding areas. Recently, restoration of salt marsh ecosystem functioning has become popular amongst managers to reduce lifetime (implementation and maintenance) infrastructure costs. My research investigated two salt marsh related topics at north temperate latitudes, (i) the mutualist relationship between two notable salt marsh species near their northern range limit (Chapters 2 and 3) and (ii) recovery trajectory of salt marshes exposed to high tidal, wave and winter disturbance (Chapter 4). For the former, I assessed the strength of the relationship between *Spartina alterniflora* (saltwater cordgrass) and *Geukensia demissa* (ribbed mussels) in Maritime Canada using sampling and manipulative experiments. *Spartina alterniflora* and *G. demissa* co-exist in the Northumberland Strait; however, *G. demissa* has lower densities than in marshes in the mid and southeastern USA. The mutualistic relationship between these species was limited in Maritime Canada, but might be useful in possible future salt marsh restorations in the Northumberland Strait. For the latter, I examined a restoration assessment technique, bounds of expectation, for Bay of Fundy salt marshes, while quantifying their early successional dynamics. I provided guidance for acceptable expectations in an environment with high sediment dynamics. Overall, my research contributes to enhanced knowledge of salt marsh ecosystems in Maritime Canada, including its restoration potential, and supported several ongoing ecological and restoration salt marsh projects.



*Home of the School of Graduate Studies, Sir Howard Douglas Hall was designed by J.E. Woolford in 1825 and is the oldest university building in Canada still in use.*

*The University of New Brunswick recognizes that the university sits on traditional Wolastoqey territory. The river that runs right by our university – the St. John River – is also known as Wolastoq, along which live the Wolastoqiyik -- the people of the beautiful and bountiful river.*

## UNIVERSITY OF NEW BRUNSWICK SCHOOL OF GRADUATE STUDIES

ORAL EXAMINATION

**Laura Katherine Boone**

IN PARTIAL FULFILMENT  
OF THE REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY