Making Room for Wetlands: Application of Coastal Habitat Restoration for Climate Change Adaptation in Nova Scotia

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Cheverie Creek – NS’ first intentional salt marsh restoration project, Cheverie, NS
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Coastal habitats provide a range of climate change adaptation and ecosystem services.

**Storm water retention and filtration**

**Environmental services:**
- Migration corridors
- Habitat for species
- Primary productivity
- Carbon storage

**Land/Habitat Creation**
- Sediment accumulation & retention

**Erosion protection:**
- Wave energy dissipation

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*Coastal wetlands & Environmental Specilists*
The dominant driver of landscape change has been dyking of former salt marshes.
Removing the barriers – Restored 260 ha of tidal wetlands habitat since 2005

11 projects completed
- 7 culvert replacement
- 4 dyke breaching
- 259 ha (640 acres)

7 pending or in construction
- 5 dyke, 2 culvert
- 206 ha (509 acres)

Comprehensive pre & 5 year post-restoration monitoring
Given the right conditions, re-introduction of tidal flow stimulates rapid growth of vegetation & habitat recovery.
Based on a decade of experience, research and collaboration...

Pilot projects have been successful

Experience & science to support tidal wetland restoration:
- to mitigate unavoidable loss,
- recover some of what has been lost,
- an adaptation to CC & SLR

“Low hanging fruit”
Increased size & complexity
Passive → Active

Driven by:
- CC adaptation
- coastal resilience
- flood risk & safety concerns

Managed Realignment (MR)
Managed realignment (MR), managed retreat, or set back, involves the deliberate breaching of a coastal defense structure.

The two main functions of MR are:

- Restoration of tidal wetlands
- Reducing the extent of built coastal defense infrastructure

Options or designs for MR include:

- retreating to higher ground,
- constructing a set-back line of defense,
- shortening the overall defense length to be maintained,
- reducing wall or embankment heights or
- Widening/restoring a river flood plain

Making room for the natural movement of coastal habitats.
NSDA does not have the resources to raise or even maintain all of the 241 km of dyke & 260 aboiteaux in NS.

In many locations, it may not even be feasible to keep raising dykes from an engineering perspective.

Need to make some tough decisions about which ones to raise, the urgency with which this has to occur and where we need to strategically move the line of defense back.

Funded by: Fisheries and Oceans Canada’s Coastal Restoration Fund

Making Room for Movement: A Framework for Implementing Nature-based Adaptation Strategies in Nova Scotia’s Coastal Zone (Natural Resources Canada)

Project Partners:
Saint Mary’s University
CBWES Inc.
NS Dept. of Agriculture

In collaboration with:
Dalhousie University
CBCL Ltd.
Queens University
Local Marsh Bodies
First Nations
Ecology Action Centre
GOAL: restore ~75 ha (185 acres) of salt marsh habitat at 4 sites in the Bay of Fundy

Science (site selection & assessment; realignment & restoration design; monitoring)
Social (Marsh Body & First Nations; Archaeology/culture assessment; communications & education)

Multiple “Wins”
- **Reduce the overall amount of dyke** infrastructure
- Maintain or **enhance protection** of local public & private infrastructure
- Reduce level of vulnerability & **dyke maintenance costs** for NSDA
- **Restore** tidal wetland habitat

Construction completed at 1 site & in progress at another

Early planning stages at remaining two sites.
Belcher Street MR & Tidal Wetland Restoration Project, Cornwallis River, NS – completed June 2018

- Restored 6.5 ha
- Reduced overall dyke length
- Stabilized shoreline
- Increased level of protection
- Improved access Hay/Crop
Converse Dyke Realignment & Tidal Wetland Restoration Project. Status – under construction
Goal - Planning and executing a MR project takes time, patience, and a **framework**

**Initiation**
- Land acquisition, Project team, Goal setting

**Analysis**
- Historic, Hydrology, topography, At-risk infrastructure

**Design**
- Options, Marsh Body meeting(s), Cultural & historical; Model & validate

**Earthworks**
- Approval, tendering, New dykes/aboiteaux, Remove old dykes

**Monitor**
- Pre- & post-long term monitoring, Adaptive management

Develop & test a procedural framework to optimize restoration success including inclusion of First Nations, stakeholder consultation, archaeology, & assessment of current & future land-use
Goals 3 & 4: Capacity, science, innovation & collaboration

Comprehensive long-term **monitoring** programs & research

Increase scientific capacity, innovation **& training of HQP**

Establishing **new partnerships** & collaborations - archaeology, First Nations, ENGOs, academia

**Centre of Expertise**
Communicating the science & acceptance of nature-based approaches

– Alternative to traditional armour rock
– Build trust & provide tangible examples (pilot projects)
– "Soft" science (people are hard)

Trusting the “blade of grass”
Increasing willingness and funding opportunities for habitat restoration & CC Adaptation through MR at provincial and federal levels opening up some exciting opportunities.

However, significant **socio-economic and administrative barriers remain** & requires consideration of ethics, food security, historical/cultural significance of landscapes & long-term sustainability.

*Lots of fun still to be had!*