The Importance Of Plants for Living Shorelines

Jeremy Lundholm
TransCoastal Adaptations, SMU
CB Wetlands and Environmental Specialists

TransCoastal Adaptations
Centre for Nature-Based Solutions

Saint Mary's University

cbwes
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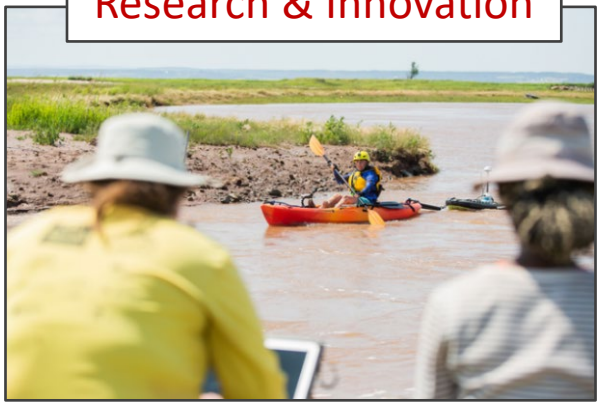
Mission:

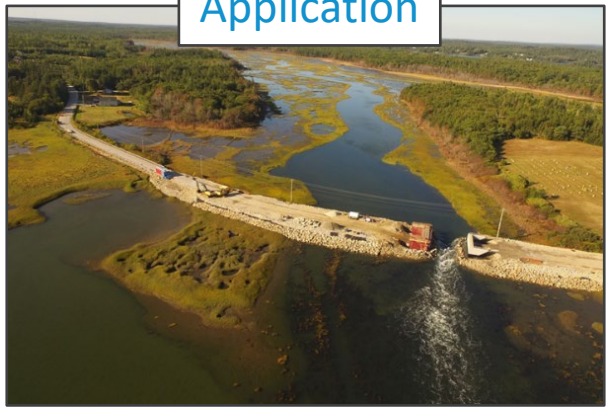
To help build climate resilient coastal communities and ecosystems by **protecting, enhancing**, and **restoring** natural processes through **innovative research, collaboration**; **implementing** nature-based adaptation solutions.
www.transcoastaladaptations.ca

Research & Innovation



Education & Outreach

Application



Current Collaborators:

Ecology Action Centre

DALHOUSIE UNIVERSITY

National Research Council Canada / Conseil national de recherches Canada

NOVA SCOTIA

CBCL LIMITED
Consulting Engineers

The Confederacy of Mainland Mi'kmaq

Clean

PRINCE EDWARD ISLAND WATERSHED ALLIANCE

COASTAL ACTION
ESTD · 1993

Government of Canada / Gouvernement du Canada
Canada

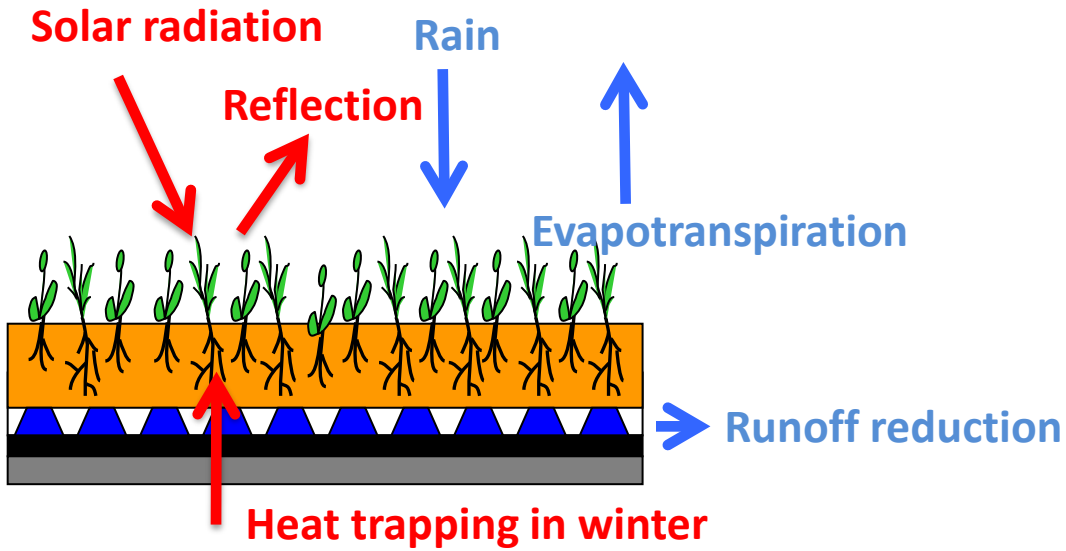
Thank you: Kelly Umlah, Leah Rudderham, Kayla Williams, Maka Ngulube, Allison MacNeil, Juliana Fernandes-Granzoti

Nature-Based Solutions and Plants

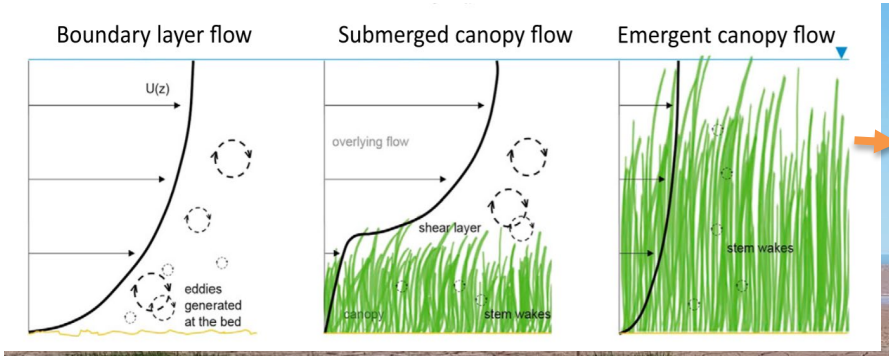
People take advantage of what plants do naturally as members of ecosystems
Physical structure and physiological functions of plants:

intercept and transform energy and material

Roof greening: plants use water, providing cooling through transpiration, reducing runoff
Plants trap snow in winter, increasing insulation, reducing energy loss



Influence of Vegetation on Wave Attenuation



80% decrease in first 10 m

Reductions to wave energy also increase sediment deposition

Plant height and density are key drivers...winter?

Inland Issues


Naturalized, unmown edge reduces energy of overland flow

Aboveground Effects

Shoots, Leaves and Stolons

1. Trap sediment
2. Reduce wave energy
3. Reduce rain-driven surface erosion


Salt Grass in front of rocked shoreline


Silverweed, with stolons

In winter:
dead thatch can
still protect surface

Belowground Effects

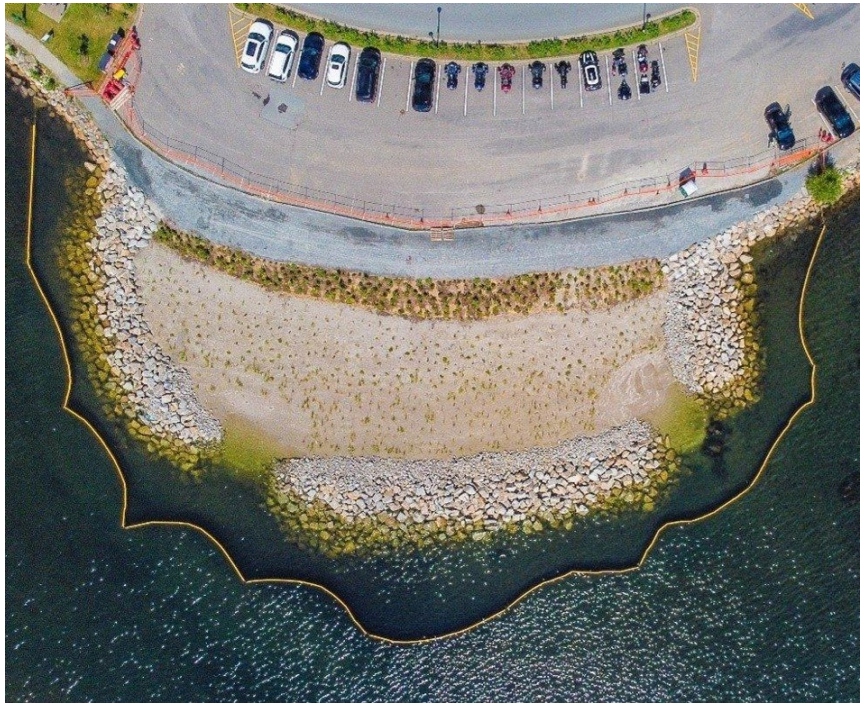
Roots and Rhizomes

1. Physically hold substrate together
2. Create habitat for benthos
3. Add organic matter to substrate

Mahone Bay Living Shoreline

Green Shores certification in progress
Plants stabilize surface, reduce erosion

1. Vegetated bank: shrubs stabilize upland edge
2. Tidal wetland: reduce wave energy
3. Rock sill: reduce wave energy, protect wetland



Salt Marsh Shrub: Marsh Elder (*Iva frutescens*)

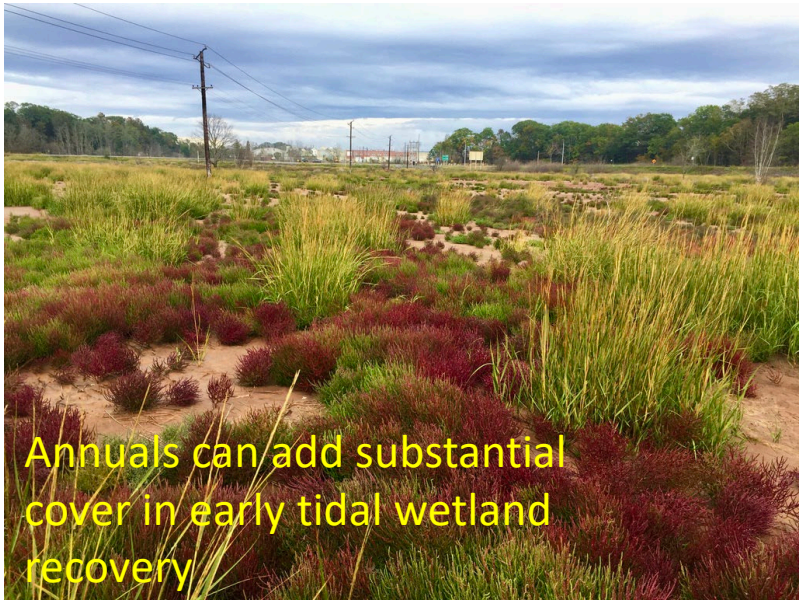
Only salt-tolerant shrub in Atlantic Canada
Could be protective, especially in winter
Maintains height when herbaceous vegetation has died back and fallen over

Marsh Elder: Experimental Planting

Mahone Bay living shoreline (Allison MacNeil)
Summer 2024
Testing different formats
(seedlings vs. rhizome offshoots)

Annuals

Typical in first stages of new wetland development
Ground cover, growth can be faster than perennials
May facilitate establishment and spread of perennials
Experimental tests: Shippagan NB and Mahone Bay NS living shorelines: 2025



Aesthetics

Oysterleaf

Sea Milkwort

Natural shoreline vegetation, Gulf of Finland


Thank You!
IRVING

Ecosystem Engineers

Organisms that change the environment experienced by other species

Beavers: transform streams into ponds
Forest trees: create shaded microclimate

Plants as Coastal Ecosystem Engineers

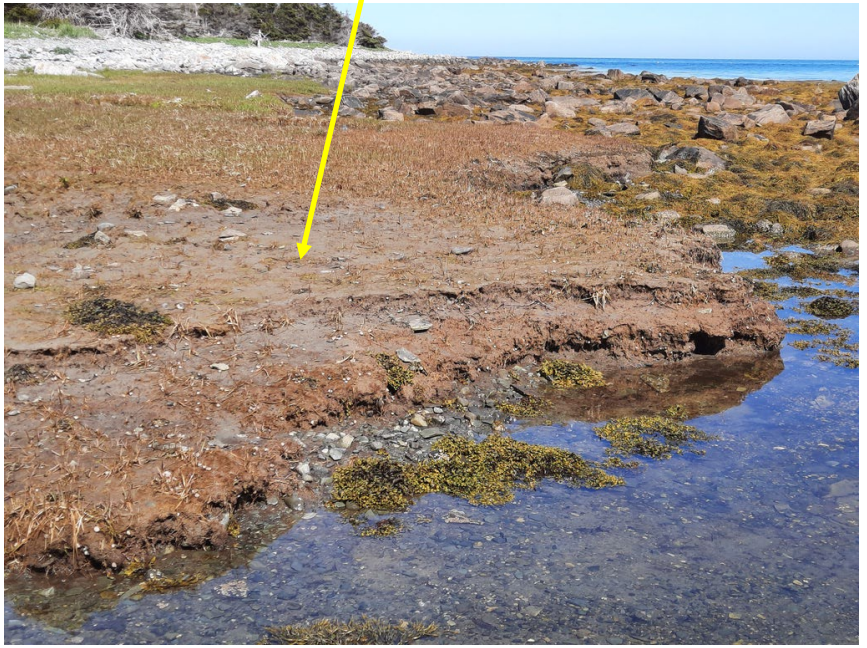
Transform entire ecosystems by:

1. Sediment trapping
2. Substrate stabilization
3. Adding organic matter to substrate

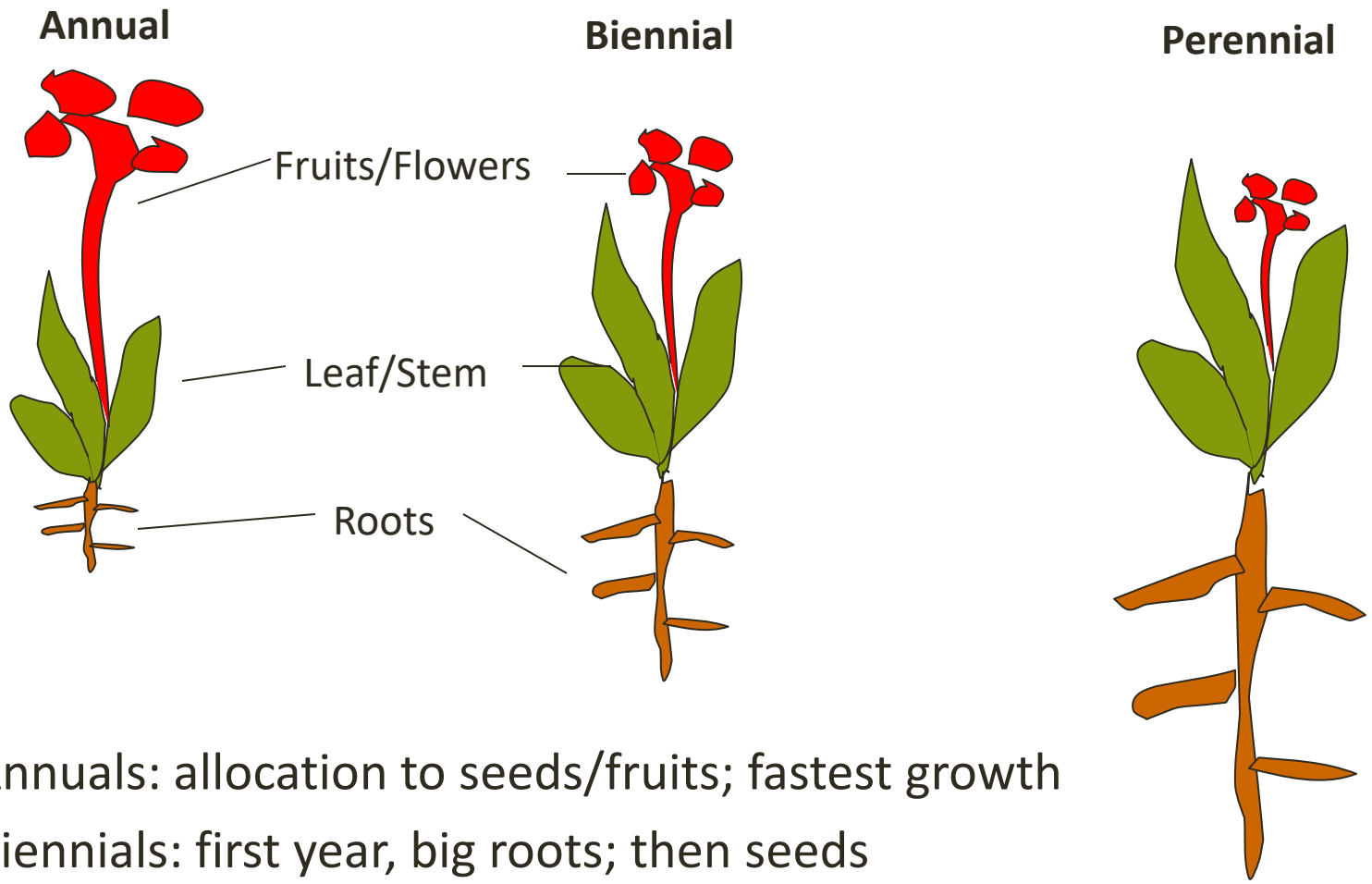
Limits to Ecosystem Engineering

Eroding brackish marsh

Drowning low salt marsh



Relative Allocation Patterns



- Annuals: allocation to seeds/fruits; fastest growth
- Biennials: first year, big roots; then seeds
- Perennials: greatest allocation to roots: slowest growth

Transition from annuals to perennials

Filters Constraining Plant Communities