

Living Shorelines

The Future of Coastal Management



Helping Nature Heal
ECOLOGICAL LANDSCAPING

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What is a Living Shoreline?

- Vegetated area from the high water line to the first man-made infrastructure
- Spectrum of soft management options to address coastal issues
- Plants, biomass, site specific techniques
- Can be used in combination with or as an alternative to hard structures

Rees' Story



Why should we be worried about the health of our coasts?

- Value; economic, social, ecological
- Risk mitigation and resilience
- Climate change



The evolution of Living Shoreline techniques at HNH

- First Living Shoreline installed in 2002
- Working along the South Shore of Nova Scotia
- Partnering with the Ecology Action Centre since 2011 on the Northumberland Strait, w DAL, SMU & various others
- HB Nicholls Award at the 2014 Coastal Zone Canada Conference
- Partnering with NSERC on an Industrial Postgraduate Scholarship that supports one of our core team members in conducting proprietary research on the Living Shoreline techniques as part of a Masters thesis

13 year old LS site in Feltzen South, NS

Oceans Gala Dinner

JUNE 18, 2014 | WORLD TRADE AND CONVENTION CENTRE | HALIFAX, NOVA SCOTIA



The H. B. Nicholls Award for Significant Achievement in Coastal Zone Management

The H. B. Nicholls Award for Significant Achievement in Coastal Zone Management is presented biennially at each Coastal Zone Canada conference. This award is presented by the Coastal Zone Canada Association (CZCA) in recognition of an outstanding Canadian individual or group of individuals who have made substantial contributions to the advancement of coastal zone management in Canada. The Award is named in honour of Brian Nicholls (retired), formerly Head of the Marine Assessment and Liaison Division, Department of Fisheries and Oceans, Bedford Institute of Oceanography, Dartmouth, Nova Scotia. The Award was established in recognition of Brian's long and distinguished career with the Department of Fisheries and Oceans at the Bedford Institute of Oceanography, and his dedication to advancing the field of coastal zone management in Canada. Brian is a co-founder of the CZCA and was the first Chair of the CZCA Board from 1994-1996.

Le Prix H.B. Nicholls est le plus grand honneur décerné par l'Association, et est décerné en reconnaissance de réalisations exceptionnelles dans le domaine de la gestion des zones côtières.

First awarded at CZC 2000 in Saint John, NB, the 2014 awardee will join a group of remarkable individuals who have received the Award to date: H. Brian Nicholls himself in 2000; Larry Hildebrand in 2002; Art Hanson in 2004; Peter Harrison in 2006; Sabine Jessen in 2008; the Atlantic Coastal Zone Information Steering Committee (ACZISC) in 2010; and Jean-Claude Bédard in 2012.

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Transforming coastlines through the use of biomass



Strategic Use of Biomass



We can solve your coastal challenges

- Decreasing real estate values
- Property loss, literally, the land is sloughing off
- Risk to infrastructure, roads, power lines, homes & other investments
- Increasing coastal management costs
- Loss of recreation opportunities
- Decreasing quality/quantity of resources
- Loss of Safe access to the shore and Sea
- Deteriorating aesthetic appeal

Traditional Hard Structures



- Beneficial in high energy areas
- Already existing in many locations
- Historical value

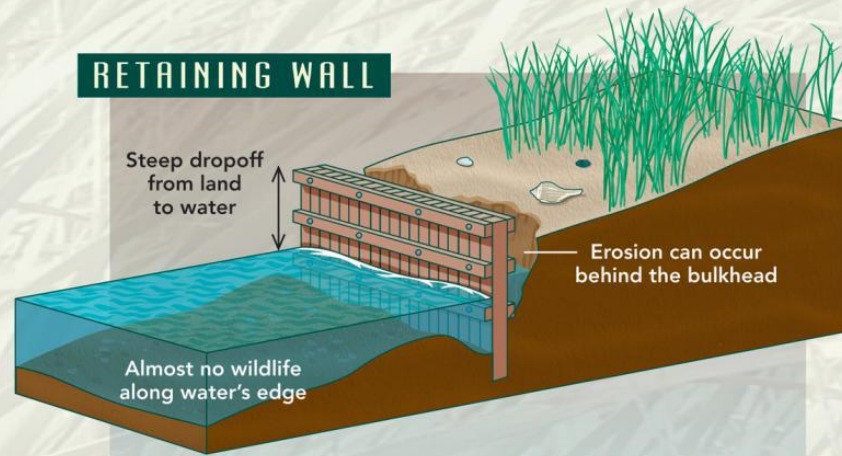
How do you tell that a structure is failing?

- Sink holes behind infrastructure
- Loss of beach in front of infrastructure
- Rocks/pieces of infrastructure being washed out
- Limiting coastal access, Humans and critters can't reach the water, &/or the land for laying eggs, shelter etc
- Decreased water quality, sediment is in the water column

Why don't hard structures work in the long term?

- Disrupt natural coastal processes
- Deflect energy causing erosion elsewhere (Luo et al., 2015)
- Susceptible to undercutting (Luo et al., 2015)
- Cause habitat fragmentation
- Cannot adapt to the effects of climate change

RETAINING WALL



'Hard' infrastructure like retaining walls abruptly severs the ecological connection between the coast and water.

LIVING SHORELINE



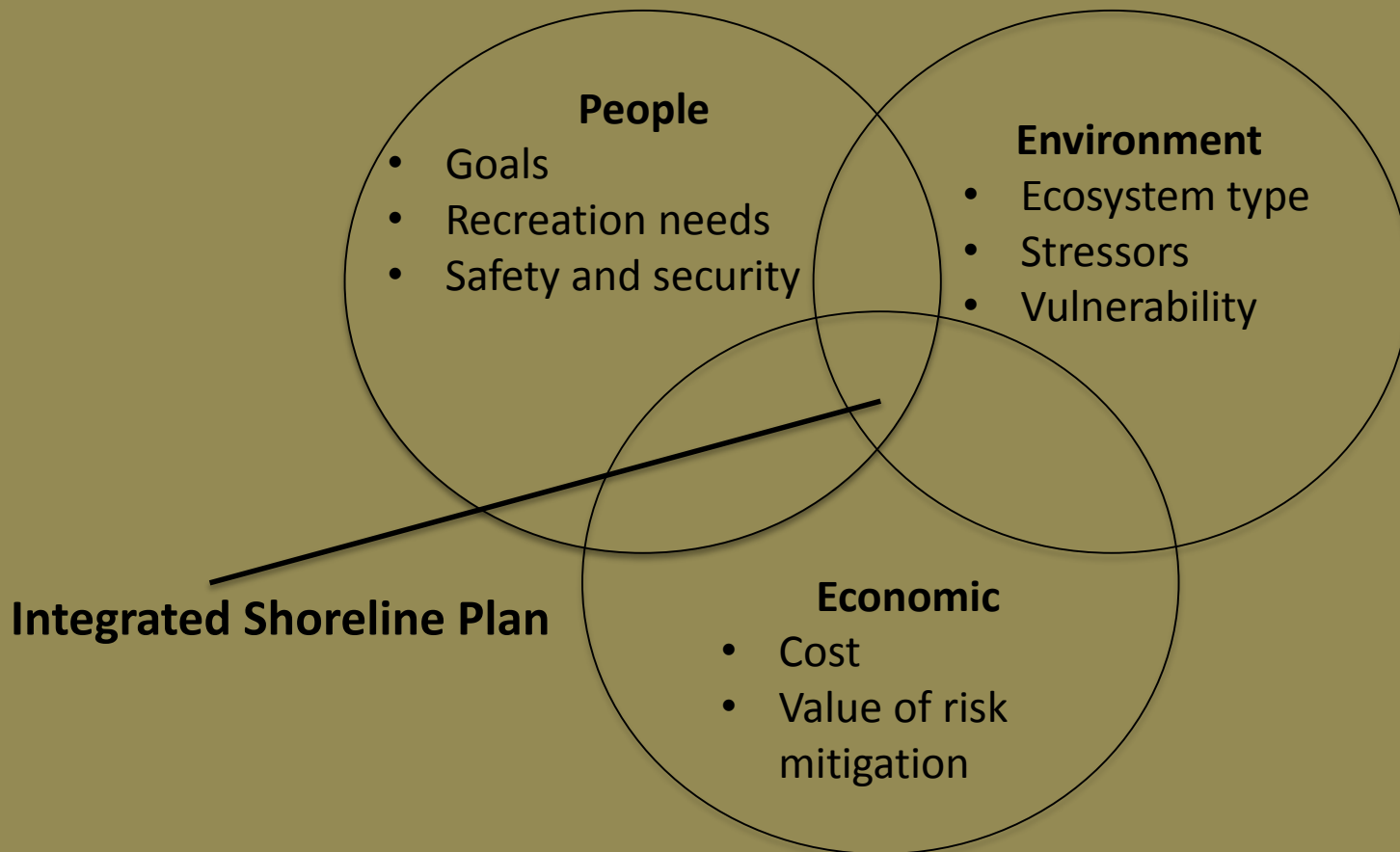
Not only do Living Shorelines defend land against destructive waves, but they also provide crucial habitat for fish and wildlife.

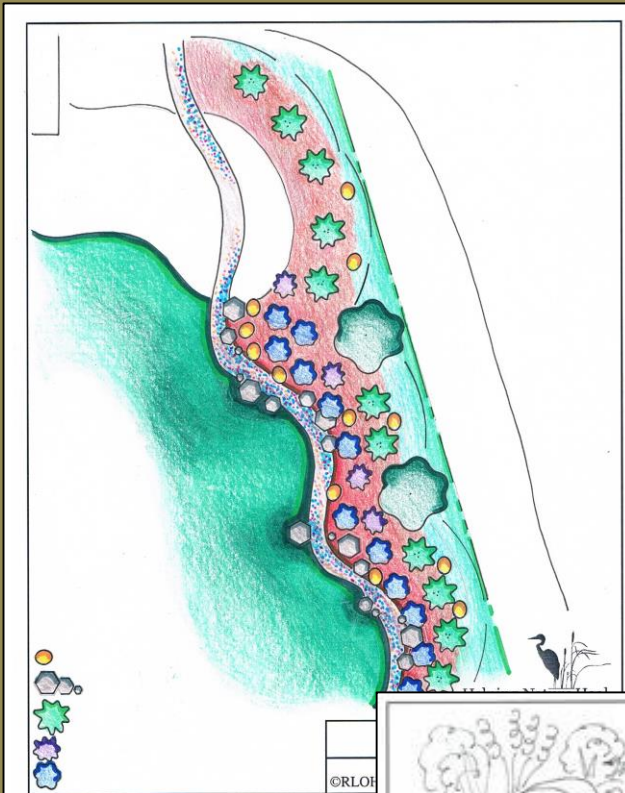
Designing solutions that work

- Optimizing functionality
- Increasing resiliency
- Improving access
- Maintaining ecological integrity
- Addressing one or many erosion factors
- Visually appealing

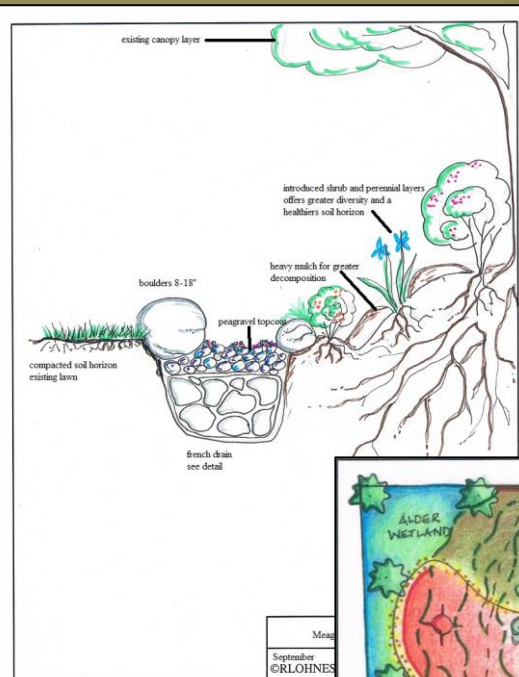
Requires an Integrated Planning Model

- Integrating the needs of people with those of the ecosystem they are living in

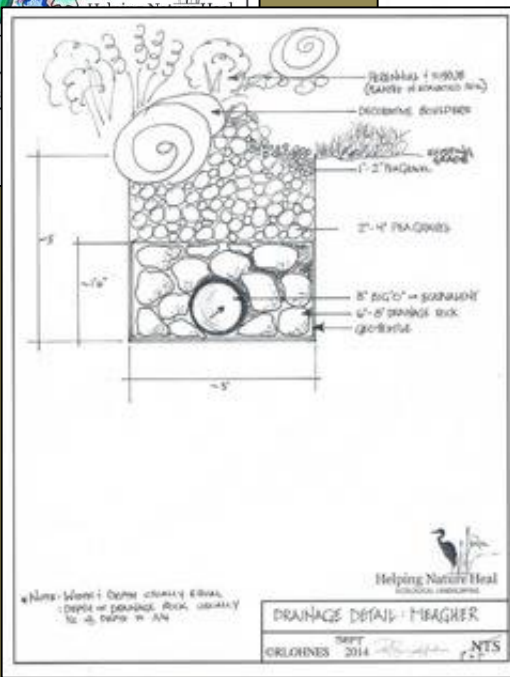




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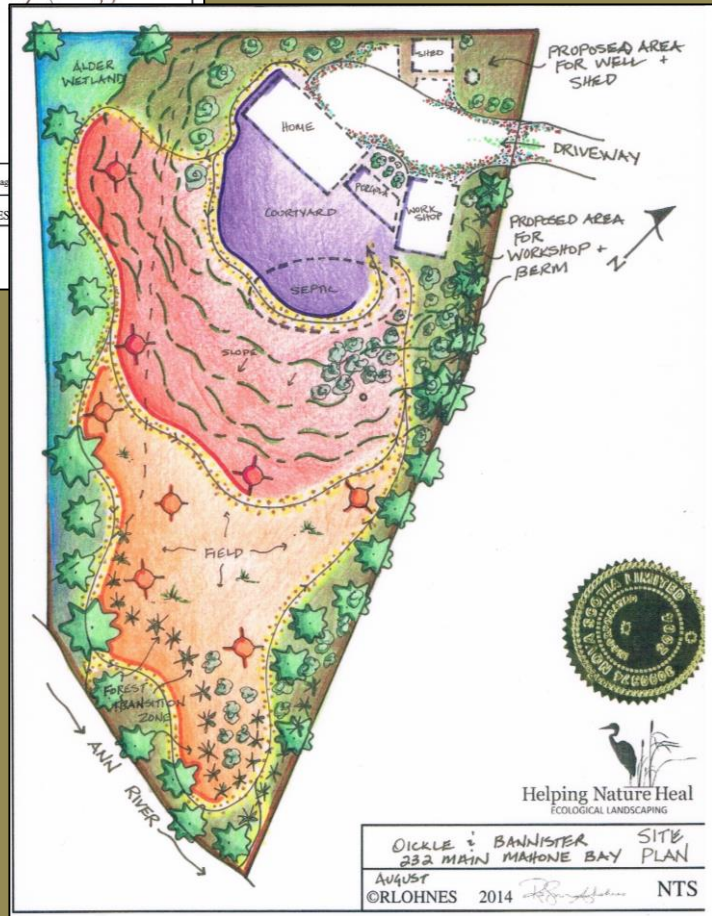
Moist
September
©RLOHNES



*Note: Width + Depth actually equal.
Depth of drainage rock, usually 12 to 18\"/>

DRAINAGE DETAIL - BRAGHER

DEPT
©RLOHNES 2014 NTS



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OICKLE + BANNISTER
232 MAIN MAHONE BAY
AUGUST
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NTS

Significant Natural Living Shoreline Ecosystems

- Can be restored or protected using Living Shoreline techniques
- Salt marshes, beaches and dunes, sand bars, barachois ponds, the intertidal zone, and coastal barrens should have special planning considerations for the significant protection and ecosystem services they provide (Stewart et al., 2003; Graham, 2010 (b))
- Areas of high erodibility dunes, beaches, bluffs, soft bed rock (shale, sandstone, gypsum etc.) should also have additional set backs or other restrictions (Stewart et al., 2003)

What happens when traditional methods fail?

- Queensland Beach example



Risk mitigation using 'From the Land to the Water' planning

- Reduce compaction and improve upland habitat
- Address overland flow and associated sediment runoff (Marques et al., 2007; Zhang et al., 2014)
- Bank and toe stabilization
- Enhance intertidal habitat
- Improve water quality



Integrating Living Shorelines and Traditional Hard Structures

- Planting into the cracks to stabilize sediment



- Softening the ends of hard infrastructure, making them more absorbent



- Buffer zones to stabilize soil behind infrastructure



Regulatory Integration

- Make consideration of soft management approaches mandatory during the permitting process for installation of rock walls and other hard structures
- Buffer zones mandated to the longest reach possible
- Stop placing hard structures in the areas of active erosion zone
- Understand where the active erosion zone is

Integration of hard and soft management approaches results in:

- Reduced risk to infrastructure
- Increased sediment stability
- Increased resilience during climatic events
- Increased biodiversity
- Increased habitat connectivity
- Increased public awareness of coastal processes
- Visually appealing infrastructure

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