WSP GOLDER

Knowledge Barriers & Data Gaps Hindering NBS Retrofitting

Workshop 2: Retrofitting Existing Infrastructure Using NbS,

Phil Osborne, WSP Golder

Fellow, Geomorphologist, Canada

19 May 2022

Nature Based Shoreline Solution (NBSS)

DEFINITION

Nature-based Solutions (NbS) defined by IUCN as "actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits

Nature Based Shoreline Solutions:

- Scalable, flexible, adaptable, resilient to climate change
- Local construction material and workmanship
- Cost effective & expected to be favored by local communities / permitting / regulatory

However, there are currently a number of potential gaps and barriers that hinder widespread retrofitting:

- Footprint requirements
- Technical barriers and gaps
- Socio-Political barriers and gaps

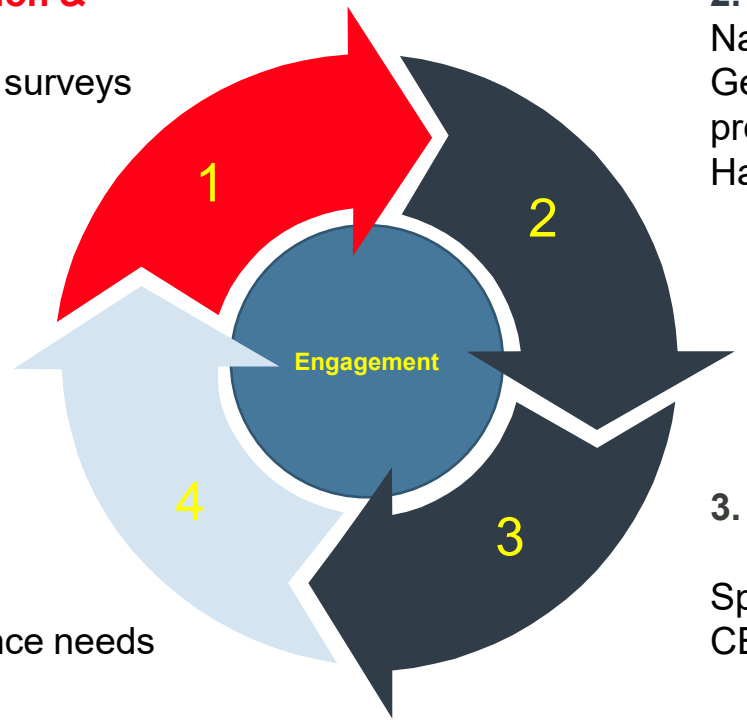
Nature Based Shoreline Solution Lifecycle Process

- **STAGES**

Planning

1. Site Characterization & Assessment
Physical and biological surveys
Definition of littoral cell

2. Options & Design
Natural analogues
Geomorphology/coastal processes Coastal engineering
Habitat design



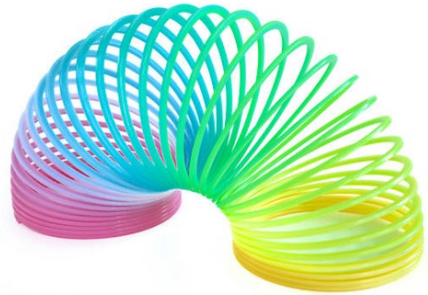
4. Monitoring
Topographic response
Habitat health
Adaptation & maintenance needs

3. Construction & Implementation
Specialized requirements
CEMP

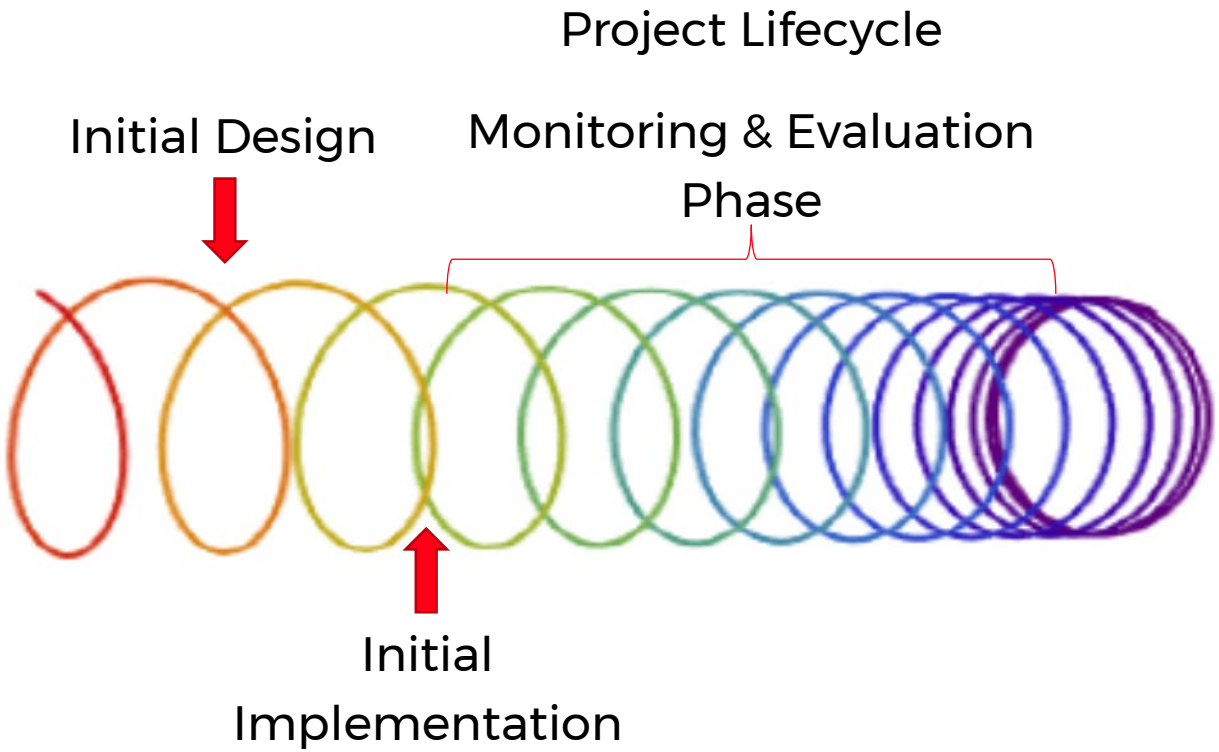
Implementation

Slinkies and Technical Challenges

A Canadian Perspective



- Sufficiency of scientific and technical knowledge
- Monitoring and Evaluation
- Targeted design guidance
- Balancing Objectives – NBS a Panacea?
- Need for Innovation



Technical Knowledge Barriers & GAPS

A Canadian Perspective

- Biophysical environmental and climatic context Is “Cold Regions Living Shorelines” an oxymoron?
- Multi disciplinary / transdisciplinary and **professional** elements
- Basic Design Requirements: water levels, waves, geotechnical, sedimentological, ecological regimes
- Parameters for Success: Natural shoreline arrangement, Footprint requirements, Littoral Cells

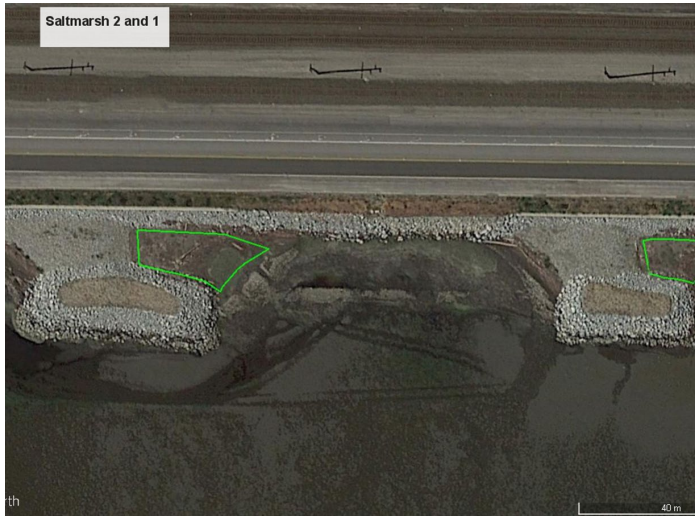
Socio - Political Challenges

A Canadian Perspective

- Perceptions, alignment, acceptance
- Time lags between implementation and benefit
- Consistent political support
- Policy and Governance Context of Multifunctional assets
- Financial constraints and metrics

Deltaport Causeway Habitat Improvements

BUILDING NEW HABITAT – PITFALLS AND PROGRESS



- Barrier beaches with breakwater segments provide control points to limit longshore transport → dynamic but stable beaches
- Sheltered pocket marshes
- What do you do in a whole new environment?
- Align with wave climate
- Woody debris and eelgrass wrack accumulation have hampered survival of marsh plantings
- Be aware of wrack and material that can float into the site; invasive plants; grazing (rabbits, geese)

Cates Park

- RESTORED BEACHES CREATE A SEDIMENT SUPPLY / ENHANCE HABITAT

- Erosion Issue: Impacts to park facilities & cultural material, Exposed to SW-SE waves, Vessel traffic, Sea level rise increases erosion
- Constraints: No excavation, Public use maintained
- Solution proposed: Restore beach, maintain & feed longshore, Designed 2013/Constructed 2014

- Longshore transport re-established by natural design
- Erosion of structure provides protection benefit to adjacent shores and habitat enhancement
- Recreational use of shore preserved by adoption of maintenance approach
- Demonstrates nourishment approaches not limited to bayed/calm environments

Thank you

Phil Osborne, WSP Golder – posborne@golder.com