



Western Washington University
Western CEDAR

Salish Sea Ecosystem Conference

2018 Salish Sea Ecosystem Conference
(Seattle, Wash.)

Apr 4th, 3:30 PM - 3:45 PM

Soft shore protection: lessons learned from 20 years of project design and implementation

Jim Johannessen

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Soft Shore Protection: Lessons Learned from 20 Years of Project Design and Implementation

Jim Johannessen

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Bellingham, WA

coastalgeo.com

Driftwood Beach

Blakely Island, 1998 project

1992

**NET SHORE-DRIFT OF SAN JUAN,
AND PARTS OF JEFFERSON,
ISLAND AND SNOHOMISH
COUNTIES, WASHINGTON**

MARCH, 1992



Jim Johannessen

Prepared for
Shorelands and Coastal Zone Management Program
WASHINGTON DEPARTMENT OF ECOLOGY
Olympia, WA 98504-7600

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1995

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**Coastal Erosion Management Studies in
Puget Sound Washington:
Executive Summary**

Coastal Erosion Management Studies, Volume 1



January 1995
94-74



printed on recycled paper

JOHANNESSEN
JOHANNESSEN

2007

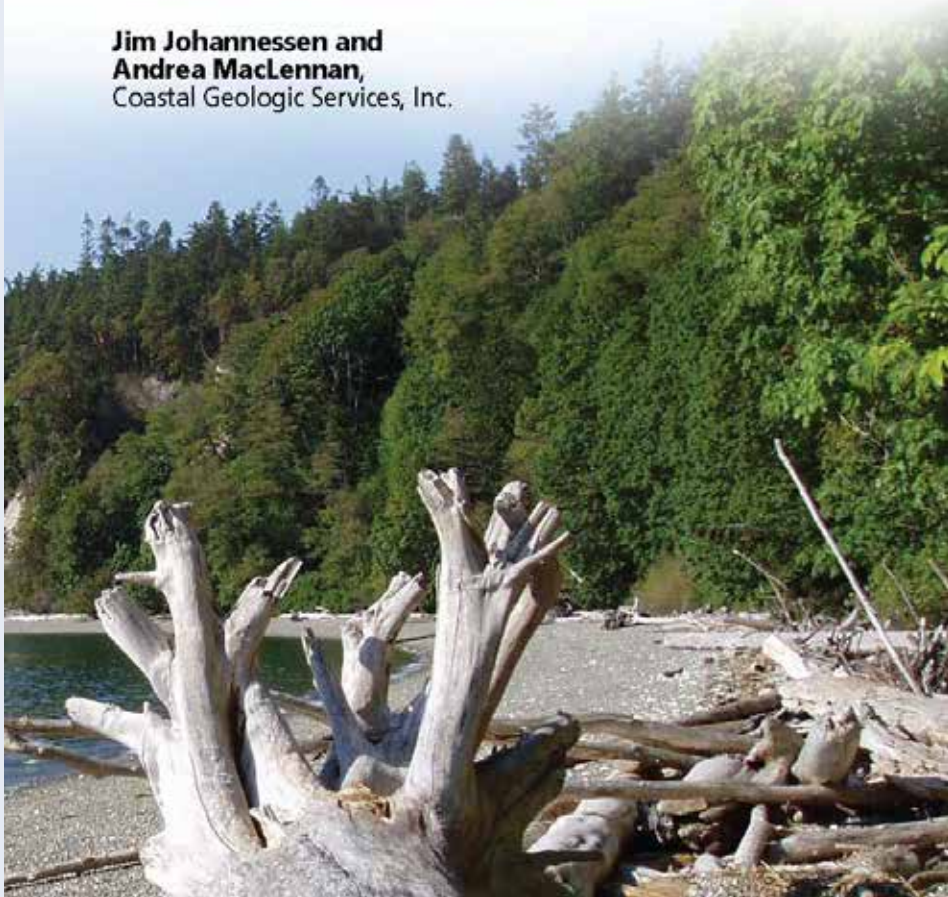
Technical Report 2007-04

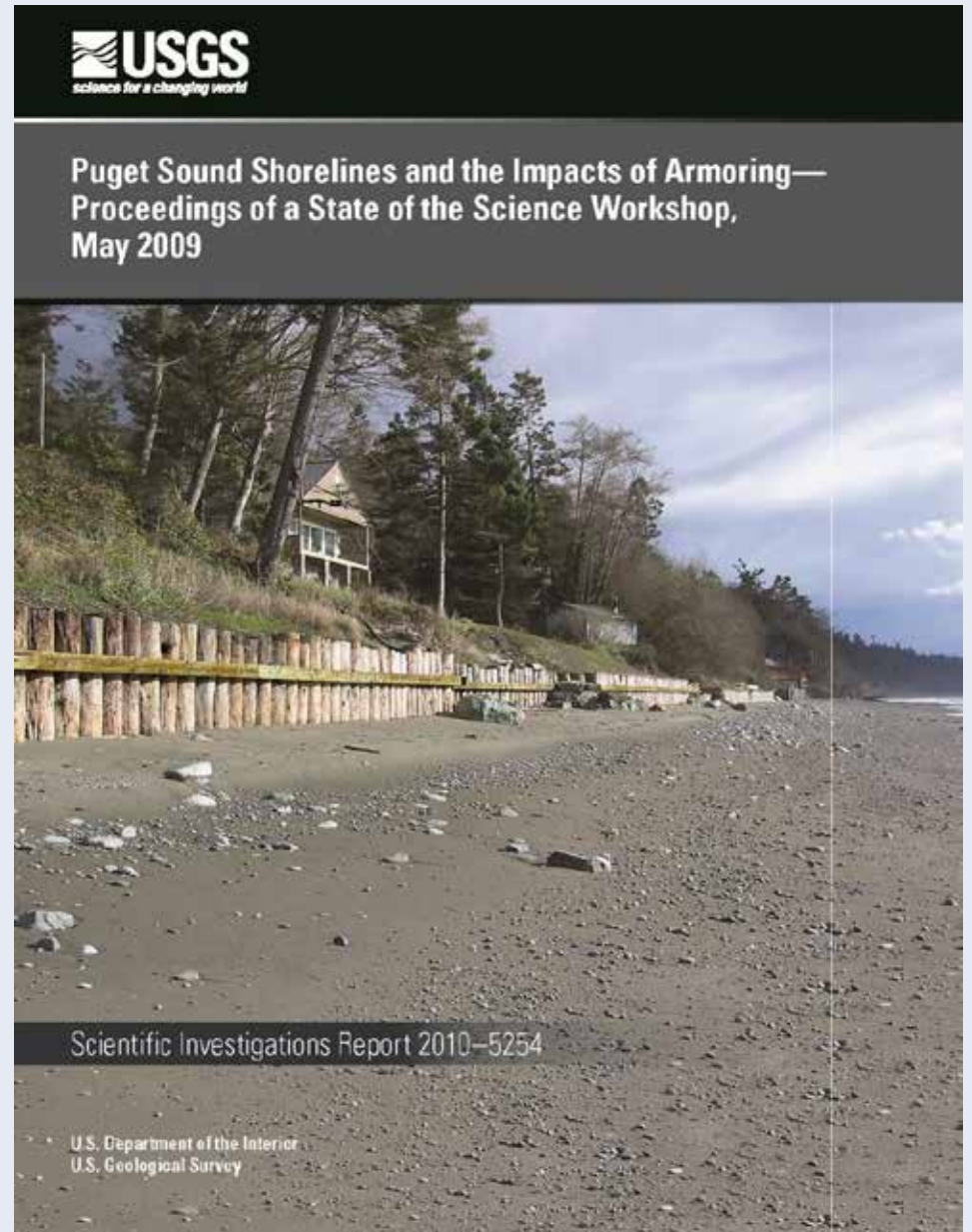
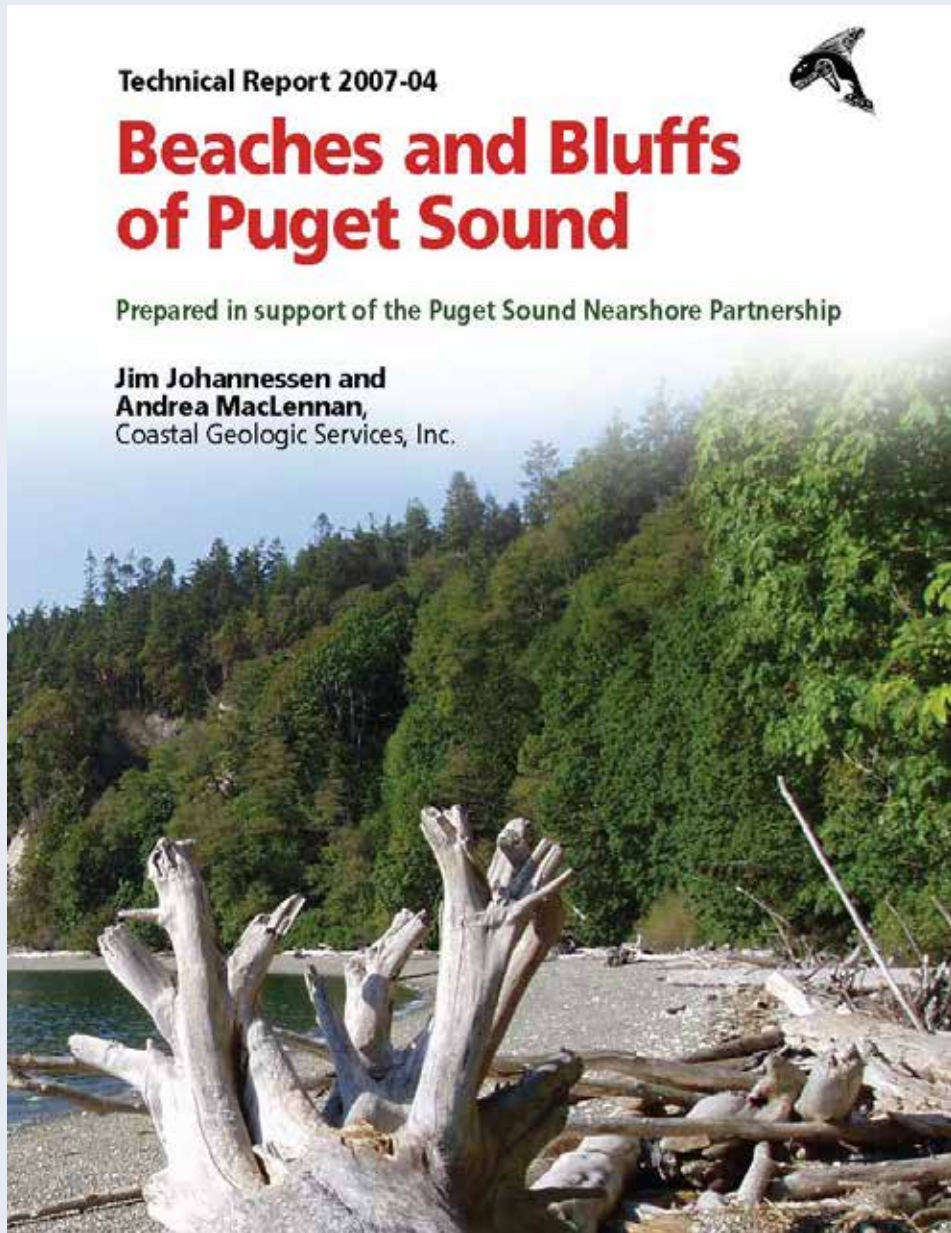


Beaches and Bluffs of Puget Sound

Prepared in support of the Puget Sound Nearshore Partnership

**Jim Johannessen and
Andrea MacLennan,**
Coastal Geologic Services, Inc.





Technical Report 2011-01

Historical Change and Impairment of Puget Sound Shorelines

Atlas and Interpretation of Puget Sound Nearshore Ecosystem Restoration Project Change Analysis



Simenstad, C.¹, Ramirez, M.¹, Burke, J.², Logsdon, M.³, Shipman, H.⁴, Tanner, C.⁵, Toft, J.⁶, Craig, B.⁷, Davis, C.⁸, Fung, J.⁹, Bloch, P.¹⁰, Fresh, K.¹¹, Campbell, S.¹², Myers, D.¹³, Iverson, E.¹⁴, Bailey, A.¹⁵, Schlenger, P.¹⁶, Kiblinger, C.¹⁷, Myre, P.¹⁸, Gertzel, W.L.¹⁹, and MacLennan, A.²⁰

PUGET SOUND NEARSHORE ECOSYSTEM RESTORATION PROJECT

Puget Sound Nearshore Ecosystem Restoration Project
U.S. Army Corps of Engineers, Seattle District
Seattle, Washington
and
Washington Department of Fish and Wildlife
Olympia, Washington

September 2011



¹School of Aquatic and Fishery Sciences, University of Washington; ²National Park Service, School of Oceanography, University of Washington; ³Washington Department of Ecology, U.S. Fish and Wildlife Service; ⁴The Nature Conservancy, SoundGIS; ⁵Washington Department of Transportation; ⁶NOAA Northwest Fisheries Science Center; ⁷U.S. Army Corps of Engineers, Seattle District; ⁸People for Puget Sound; ⁹Anchor Environmental O&A; ¹⁰Data Date & Mapping; ¹¹Cveg Applied Geology; and ¹²Coastal Geologic Services

Technical Report 2011-01

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Technical Report 2011-02



Strategic Needs Assessment: Analysis of Nearshore Ecosystem Process Degradation in Puget Sound

Prepared in support of the Puget Sound Nearshore Ecosystem Restoration Project

Paul Schlenger¹, Andrea MacLennan², Erin Iverson¹, Kurt Fresh³, Curtis Tanner⁴, Betsy Lyons⁵, Steve Todd⁶, Randy Carman⁷, Doug Myers⁸, Scott Campbell⁹, and Ali Wick¹.

¹Anchor QEA; ²Coastal Geologic Services; ³NOAA Northwest Fisheries Science Center; ⁴U.S. Fish and Wildlife Service; ⁵The Nature Conservancy of Washington; ⁶Point-No Point Treaty Council and the Salmon and Steelhead Habitat Inventory and Assessment Program; ⁷Washington Department of Fish and Wildlife; ⁸People for Puget Sound; and ⁹Seattle District, U.S. Army Corps of Engineers.

Targeted Outreach to Reduce Impacts from Shore Armor
in the Port Susan Marine Stewardship Area

Program Assessment Summary Report

Prepared for:
Northwest Straits Foundation
1155 N. State St. Suite 422
Bellingham, WA 98225
www.nwstraits.org

Prepared by: Tracie Johannessen, M. Ed.

EEOutcomes
Program Design, Assessment & Evaluation
tracie.johannessen@gmail.com www.eeoutcomes.com
(360) 319-6839

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Projects

Shoreline Landowner Program

Shoreline Armor Reduction Program

Shoreline Landowner Program

Feeder Bluff Mapping of Puget Sound



Prepared for: The Washington State Department of Ecology and
Washington Department of Fish and Wildlife



Prepared by: A. MacLennan¹, J. W. Johannessen¹, S. A. Williams¹, W. Gerstel², J. F. Waggoner¹,
and A. Bailey³

¹Coastal Geologic Services, Inc., ²Qwg Applied Geology, and ³Sound GIS



June 21, 2013

Feeder Bluff Mapping of Puget Sound



Prepared for: The Washington State Department of Ecology and Washington Department of Fish and Wildlife

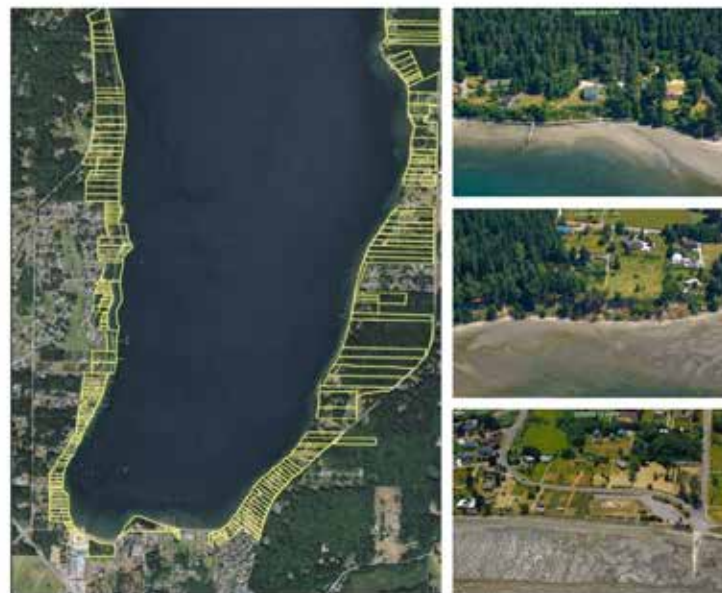


Prepared by: A. MacLennan¹, J. W. Johannessen¹, S. A. Williams¹, W. Gerstel², J. F. Waggoner¹, and A. Bailey³

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June 21, 2013



Puget Sound Shoreline Parcel Segmentation Report

Prepared for: WA Department of Fish and Wildlife and WA State Department of Natural Resources

Prepared by: Coastal Geologic Services, Inc.

Prepared as part of the project: Social Marketing to Reduce Shoreline Armoring



Feeder Bluff Mapping of Puget Sound



Prepared for: The Washington State Department of Ecology and Washington Department of Fish and Wildlife

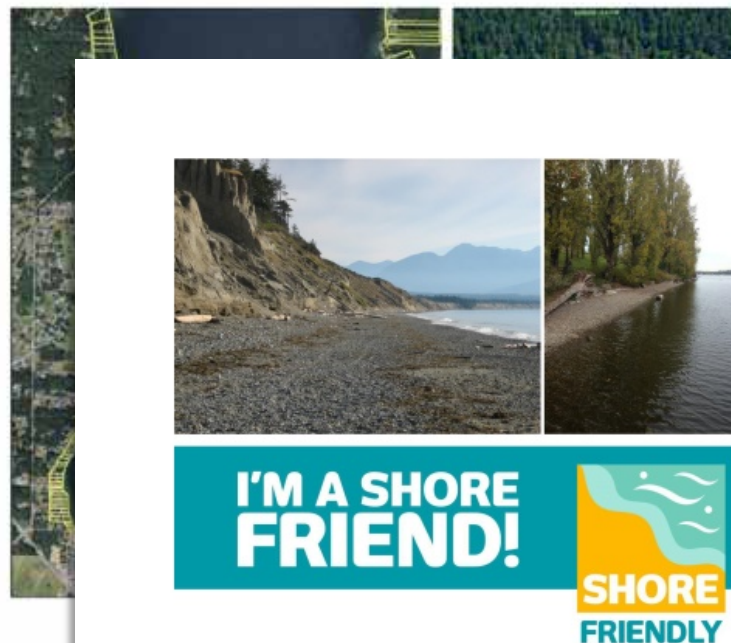


Prepared by: A. MacLennan¹, J. W. Johannessen¹, S. A. Williams¹, W. Gerstel², J. F. Waggoner¹, and A. Bailey³

¹Coastal Geologic Services, Inc., ²Qwg Applied Geology, and ³Sound GIS



June 21, 2013



Puget

Shore Friendly Final Report

Prepared for: WA Department of Fish and Wildlife and WA State Department of Natural Resources

Prepared by: Colehour + Cohen, Applied Research Northwest, Social Marketing Services, Futurewise and Coastal Geologic Services

Prepared as part of the project: Social Marketing Strategy to Reduce Puget Sound Shoreline Armoring

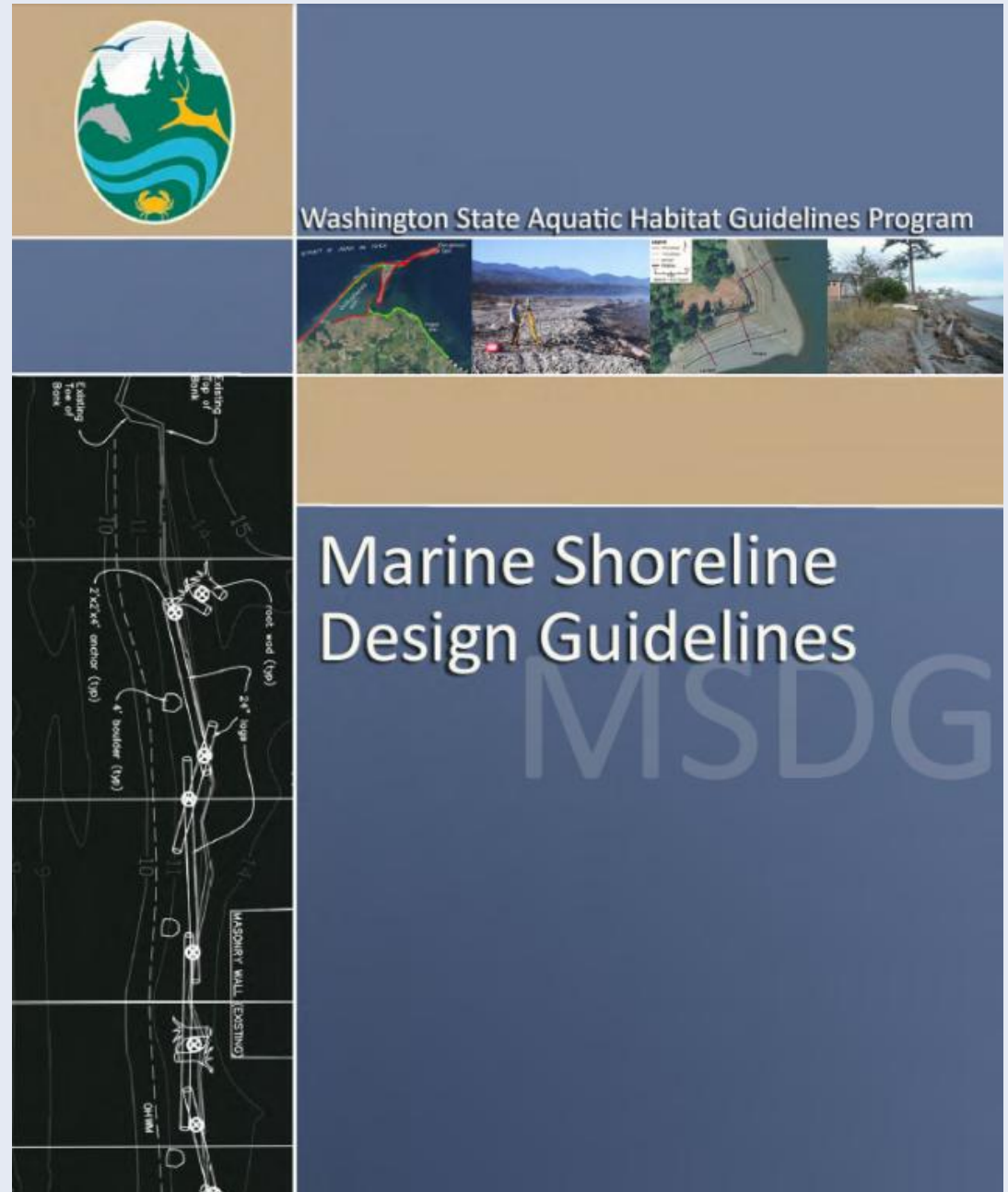


Note: Shore Friendly came out of this report

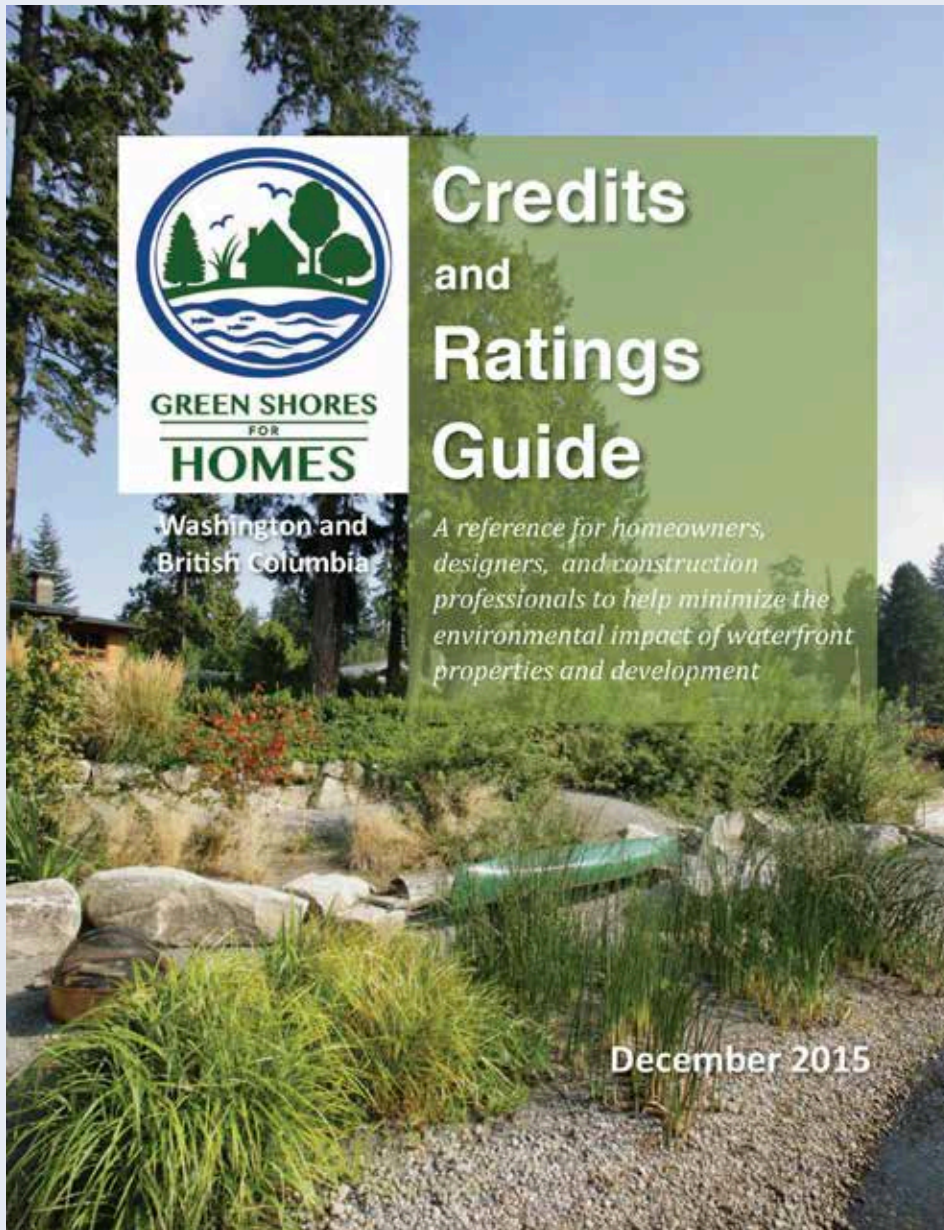
Marine Shoreline Design Guidelines

by Coastal Geologic Services, for the Washington Dept. of Fish and Wildlife; EPA funding, 2014

- w Coastal geomorphology
- w Site assessment methods
- w Coastal process assessment methods
- w Technique guidance
- w Case studies and monitoring results
- w 419 pages of good stuff!



2015



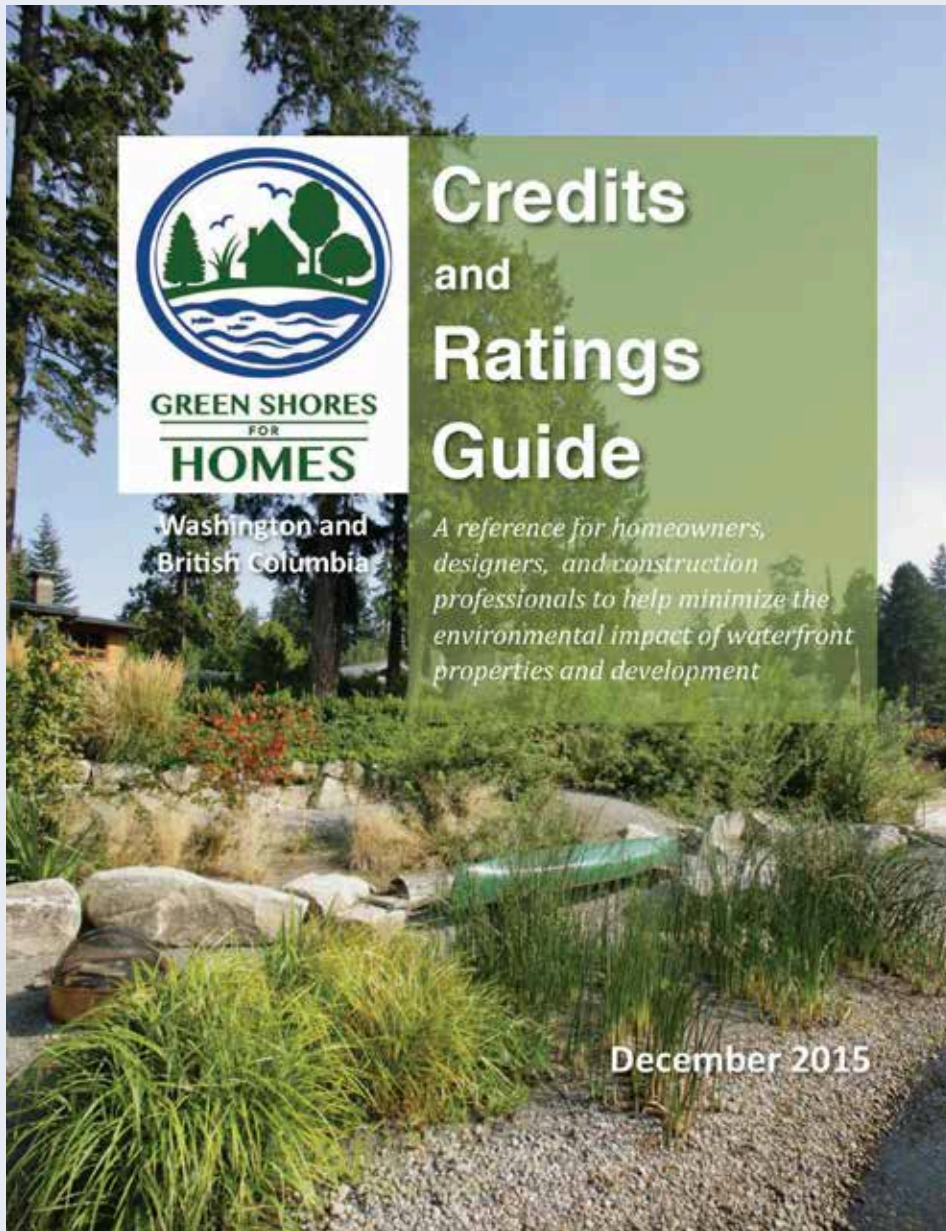
Credits and Ratings Guide

Washington and
British Columbia

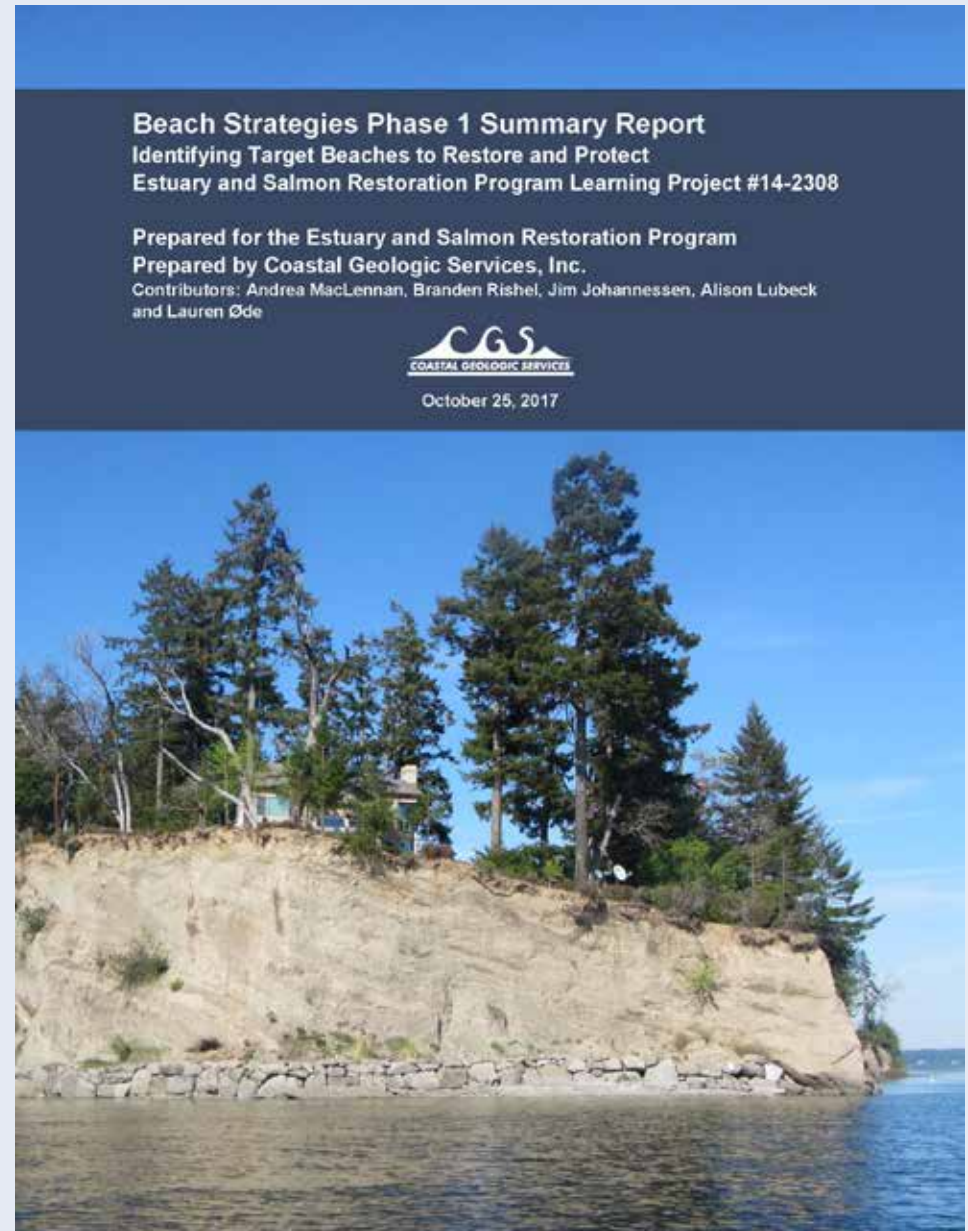
*A reference for homeowners,
designers, and construction
professionals to help minimize the
environmental impact of waterfront
properties and development*

December 2015

2015



2017



...call it by different names:

Soft Shore Protection

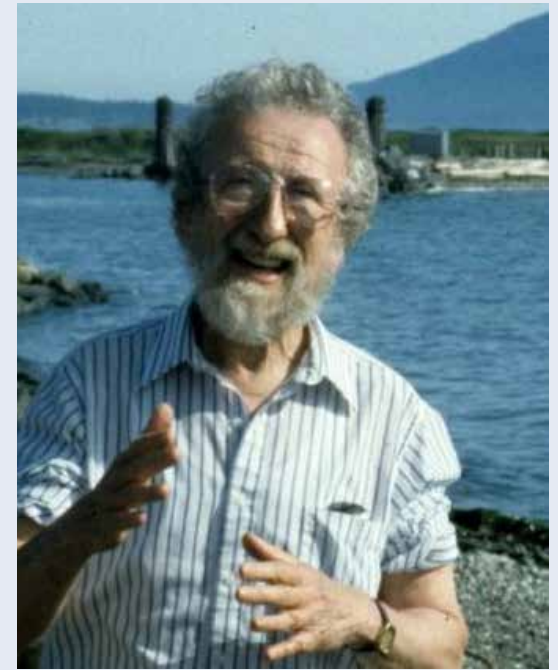
Living Shorelines

Nature Based Solutions

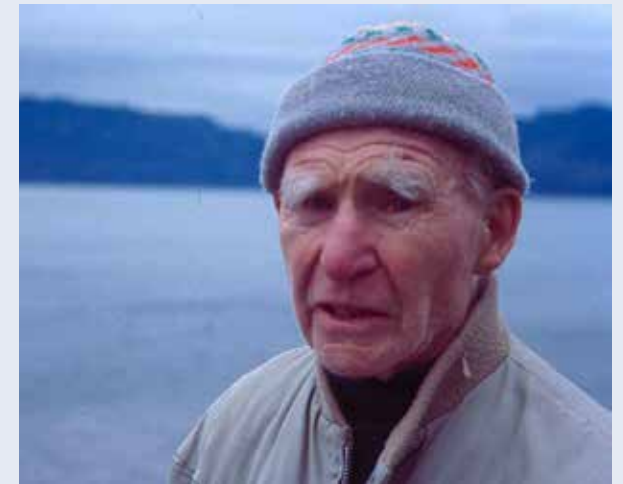
Design with Nature

Green Shores

Dr. Maury Schwartz



Wolf Bauer, PE



Design techniques for habitat improvements (MSDG)

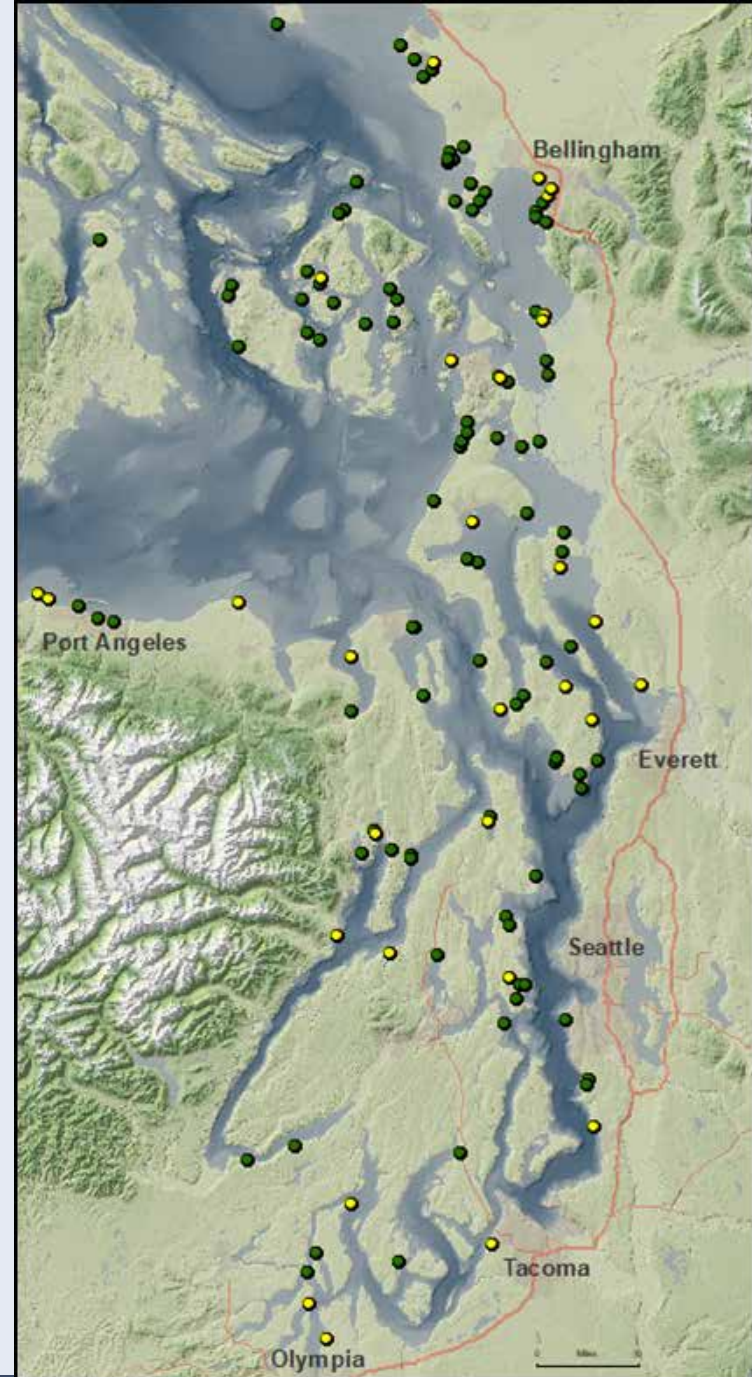
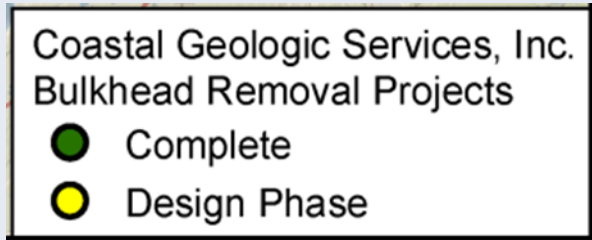
Process-based:

- Remove or avoid shore armor along sediment sources (feeder bluffs) to maintain littoral drift inputs
- Remove structures on beach to restore alongshore and cross-shore connectivity

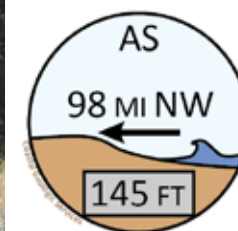
Site-specific:

- Uncover beach *and* re-create appropriate substrate with beach nourishment to restore forage fish spawning habitat
 - Surf smelt and sand lance
 - Primary food source for returning adult salmon
- Restore vegetation in backshore habitats
 - Terrestrial insects for birds, other wildlife
- Allow room for drift log and wrack deposition; install large wood if appropriate
 - Greater habitat complexity, moist and cool micro-habitats
 - Increased organic matter and organisms

Projects that follow all designed by Coastal Geologic Services



SLR ready



- Shoretype
- Fetch
- Removed Hard Armor

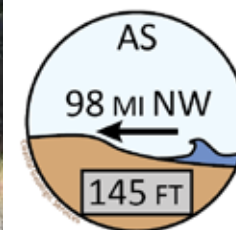
After



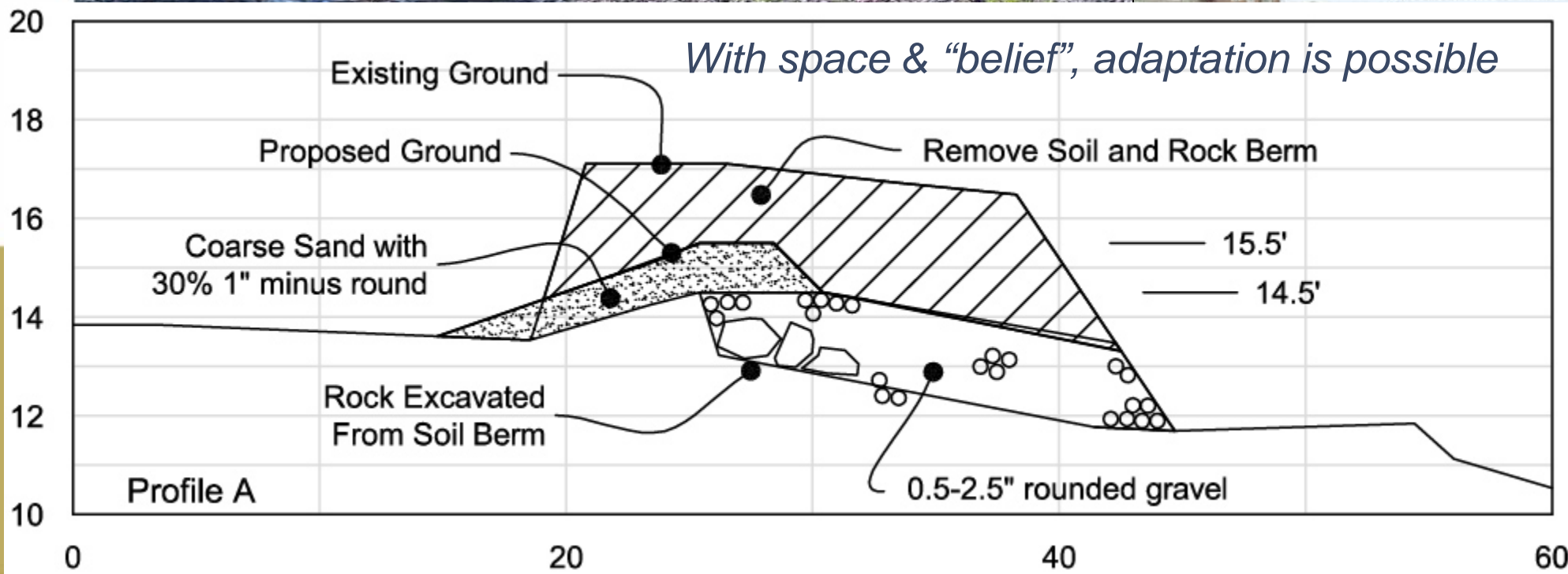
Before

Landowners on Orcas Island installed a gravel beach with logs and native vegetation in place of a rock berm. This new beach enhances storm protection, improves beach access, and provides habitat for fish and wildlife.

SLR ready



- Shoretype
- Fetch
- Removed Hard Armor



Driftwood Beach, Blakely Island 2016

San Juan Co.



Driftwood Beach, Blakely Island



Driftwood Beach, Blakely Island: 1998, Pre-Project



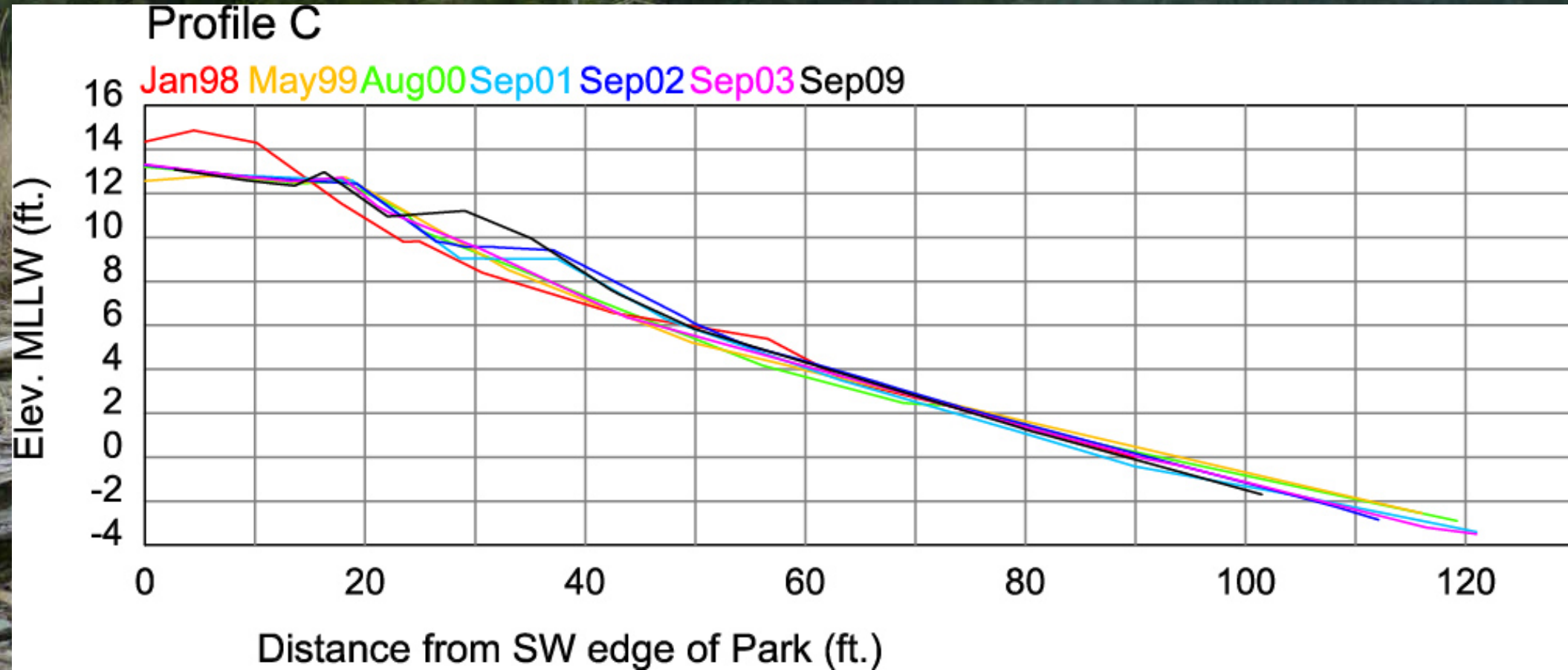
Driftwood Beach, Blakely Island 1998



Driftwood Beach, Blakely Island 2016

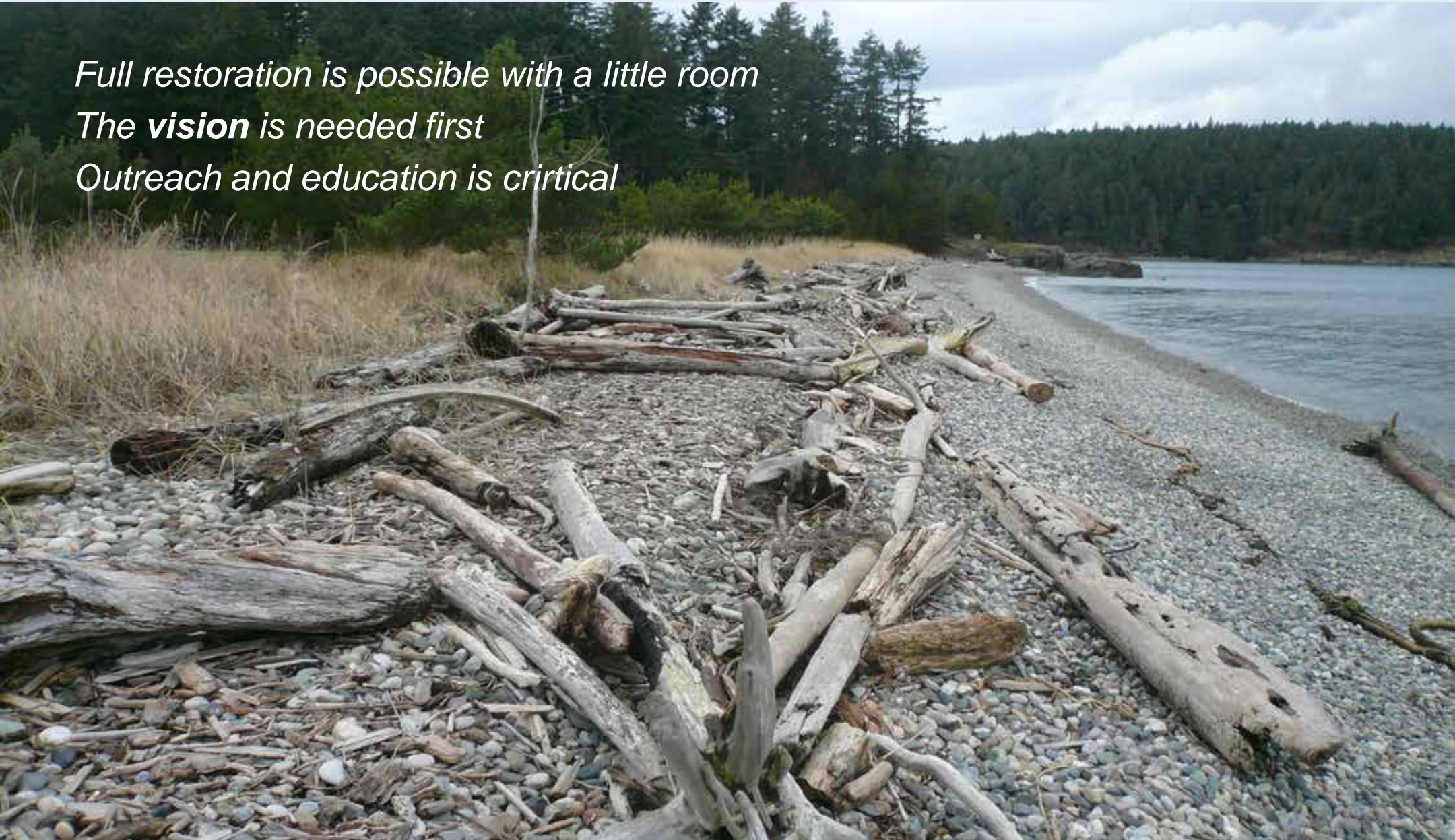


Driftwood Beach, Blakely Island 2016



Driftwood Beach, Blakely Island 2016

*Full restoration is possible with a little room
The **vision** is needed first
Outreach and education is critical*



Analysis Tools: Ala Spit Co. Park, N. Whidbey Island



Problem:
Erosion,
potential spit
breach, lagoon
estuary change,
public safety



Ala Spit Co. Park, N. Whidbey Island

Geomorphic/Shore Change

Littoral transport analysis

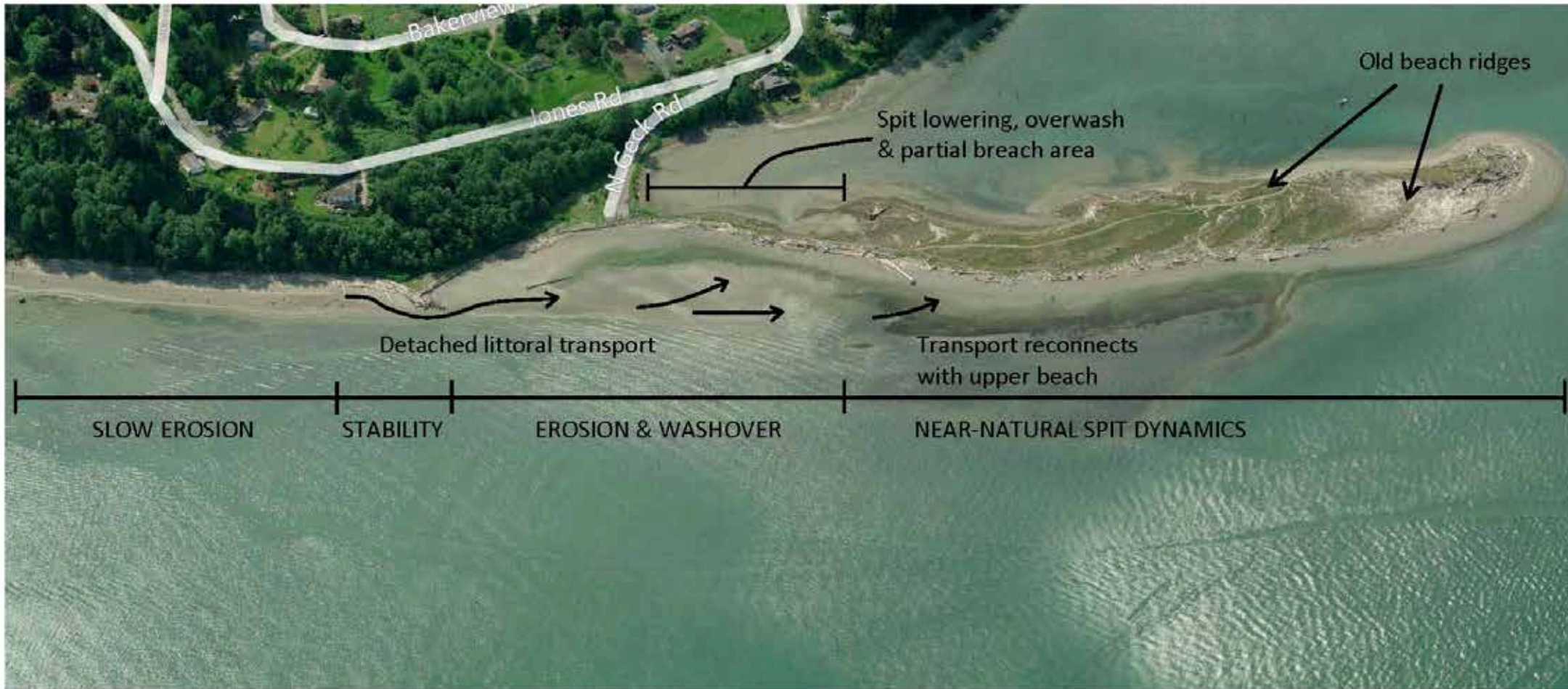
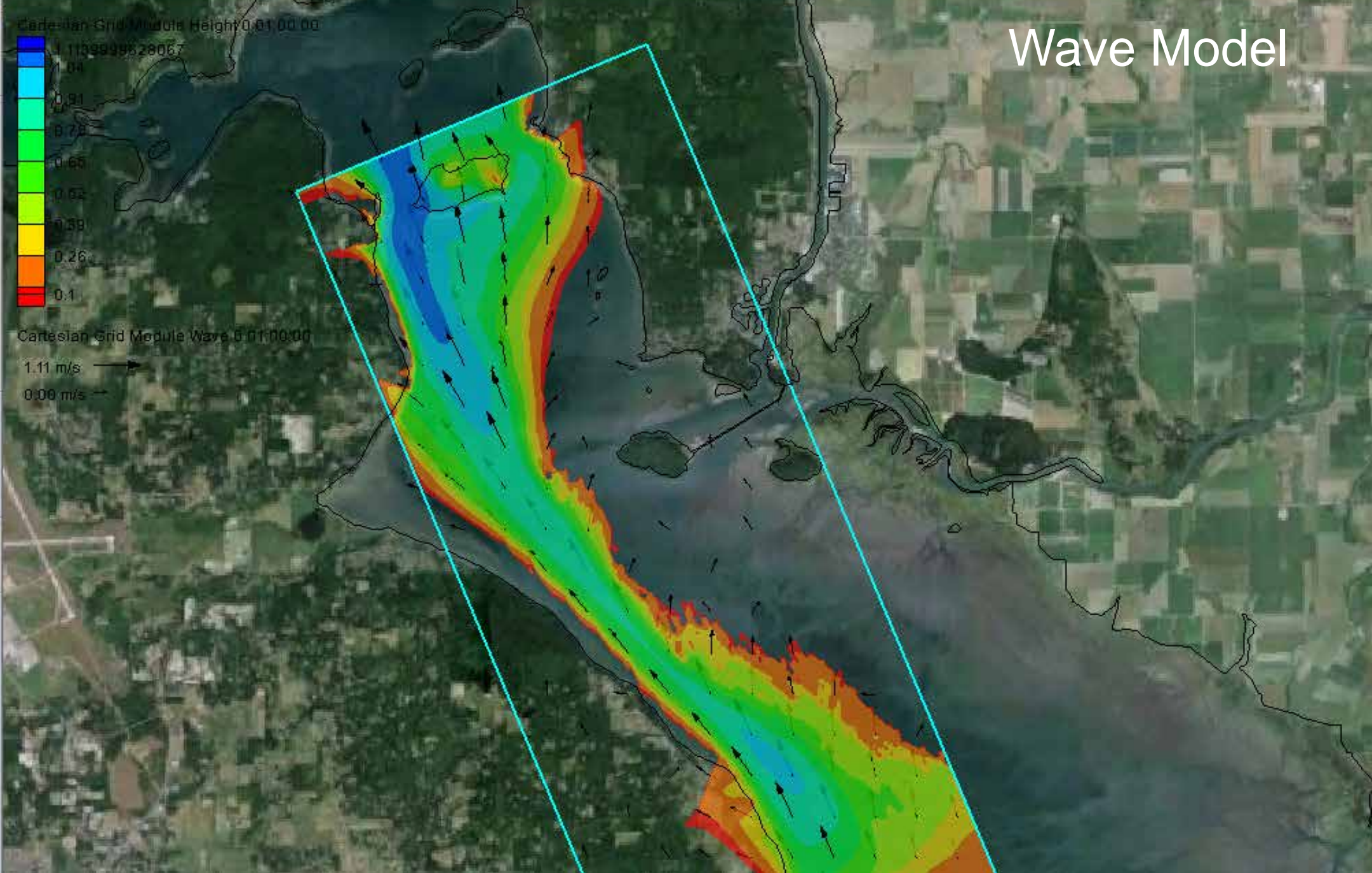
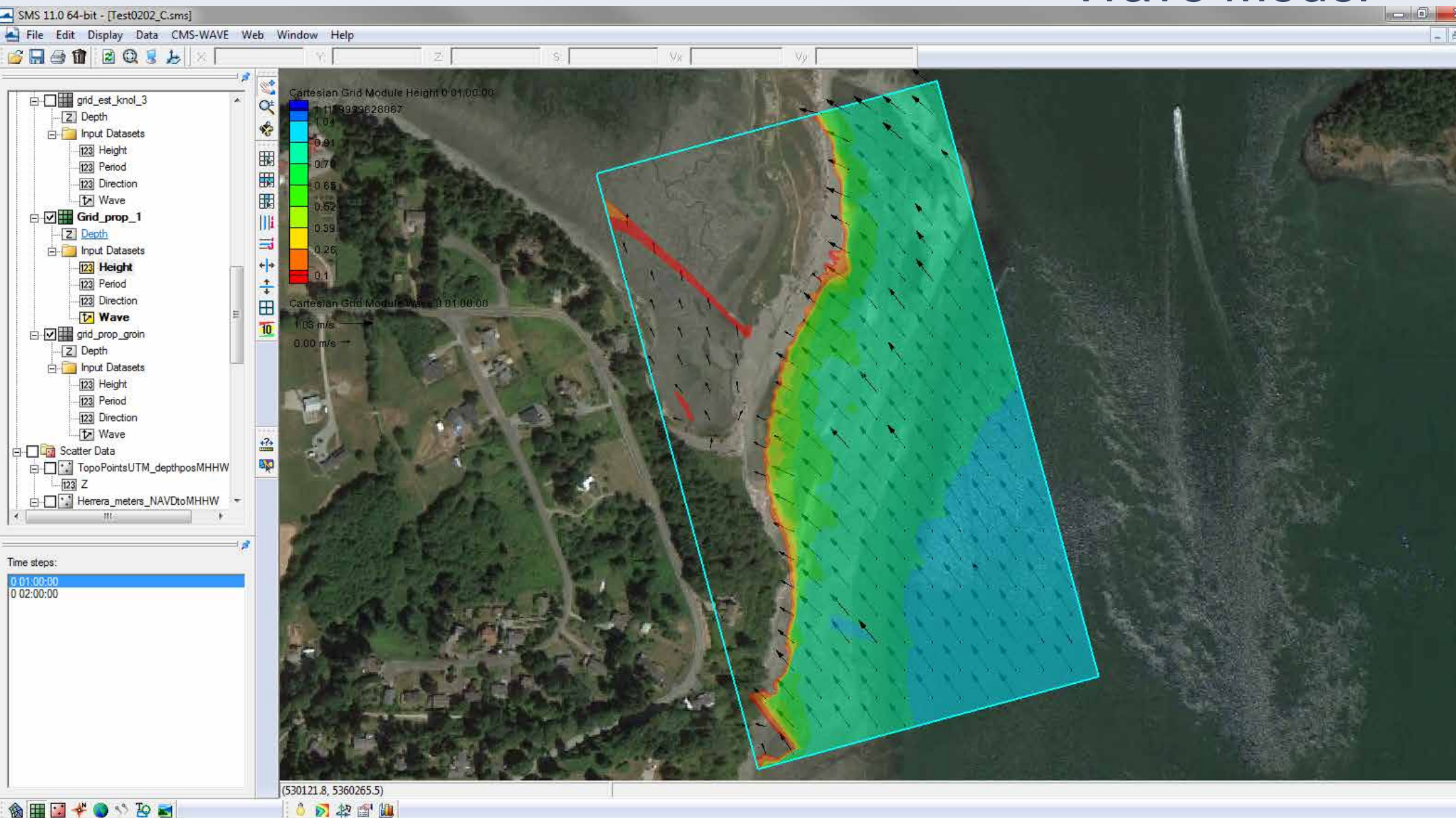


Figure 8. Ala Spit coastal geomorphic model annotated oblique aerial photograph (Bing aerials website accessed 2013).

Wave Model



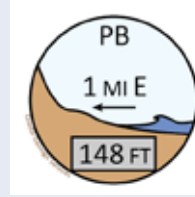
Wave Model



Bulkhead Removal

Private Site, West Sound, Orcas Island - 2015

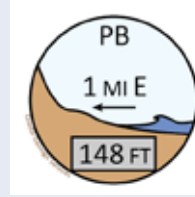
- 20 ft high marine bank
- Willing landowners, late 2015 removal



Bulkhead Removal

Private Site, West Sound, Orcas Island - 2015

- 20 ft high marine bank
- Willing landowners, late 2015 removal



*Some owners, managers are ready to plan for SLR,
Trading some upland area for a long-term beach*



Waypoint Park, Whatcom Waterway, Bellingham - Before



Waypoint Park, Whatcom Waterway, Bellingham - 2017



Waypoint Park, Whatcom Waterway, Bellingham - 2018



- w **Process based restoration** is the priority; Pacific salmon habitat and prey item restoration are key drivers for Puget Sound projects
- w Regional **guidance documents** define best practices
- w **Every site is different:** standard engineering evaluation methods can clash with irregular shores and terrain, and natural materials
- w **Design requires** broad understating of coastal processes and other disciplines
- w **Scale matters:** we need to make *SSP accessible* for small sites, larger sites deserve more coastal processes and engineering analysis
- w **Complimentary techniques often needed:** gravel & sand nourishment, large wood, vegetation, armor removal, regrading
- w **Permit** process consumes many resources
- w **More monitoring *and* synthesis** will inform future work