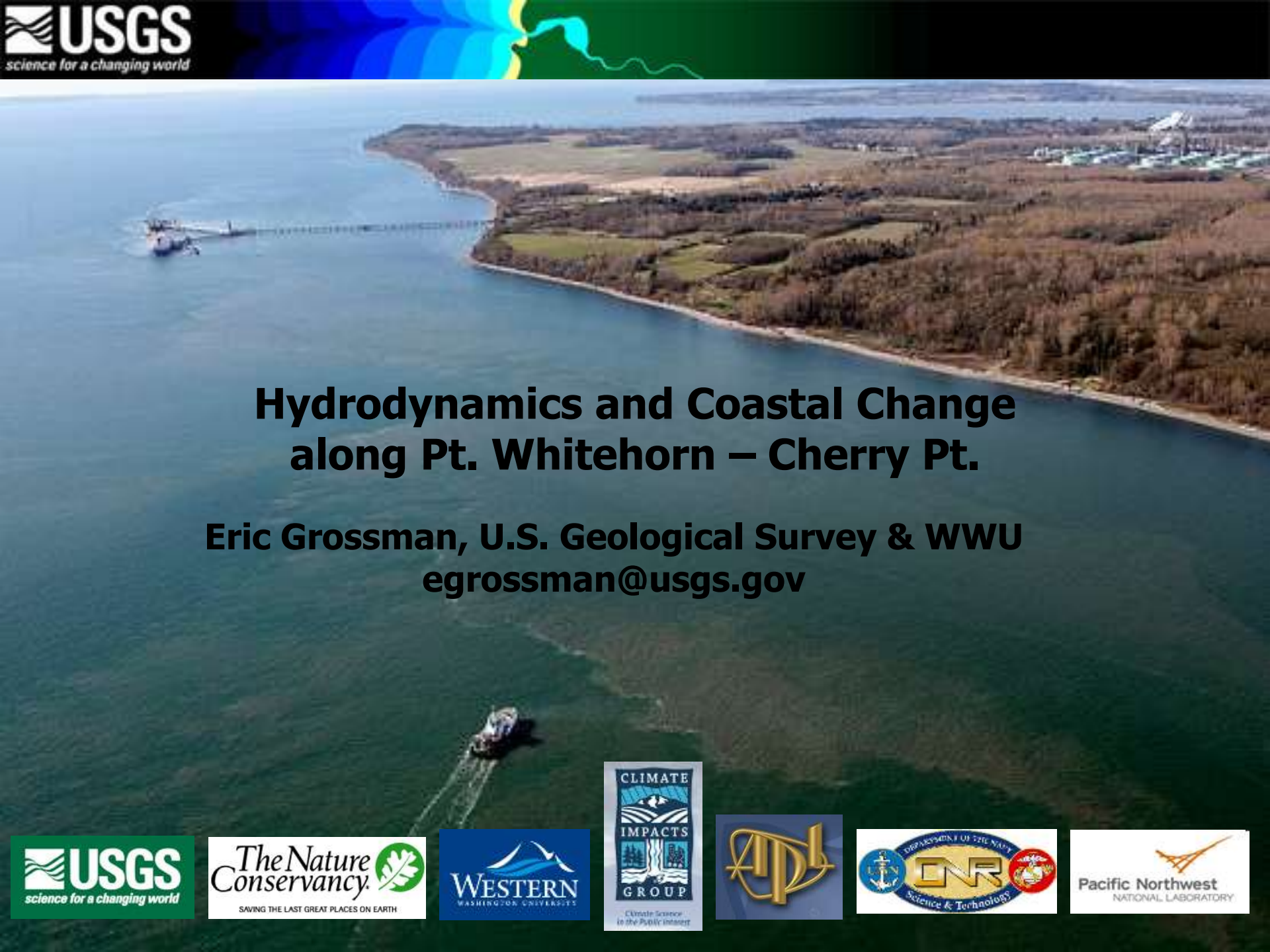

Hydrodynamics and Coastal Change along Pt. Whitehorn – Cherry Pt.

Eric Grossman, U.S. Geological Survey & WWU
egrossman@usgs.gov

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Goals:

1. Quantify Sediment transport and Physical Processes (erosion, sedimentation)

2. Assess Importance to Coastal Infrastructure and Ecosystems

3. Predict Coastal Response to Sea-Level Rise and Climate Change

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Supports:

WWU Thesis, Meghan Weaver (Scott Linneman, Eric Grossman)

USGS Coastal Habitats in Puget Sound Project (CHIPS)

WRIA1 Nearshore Habitat Restoration Prioritization

EPA Region 10 Scientific Investigation of Vulnerability of Coastal Infrastructure, Ecosystems and Communities

State Aquatic Reserve Program

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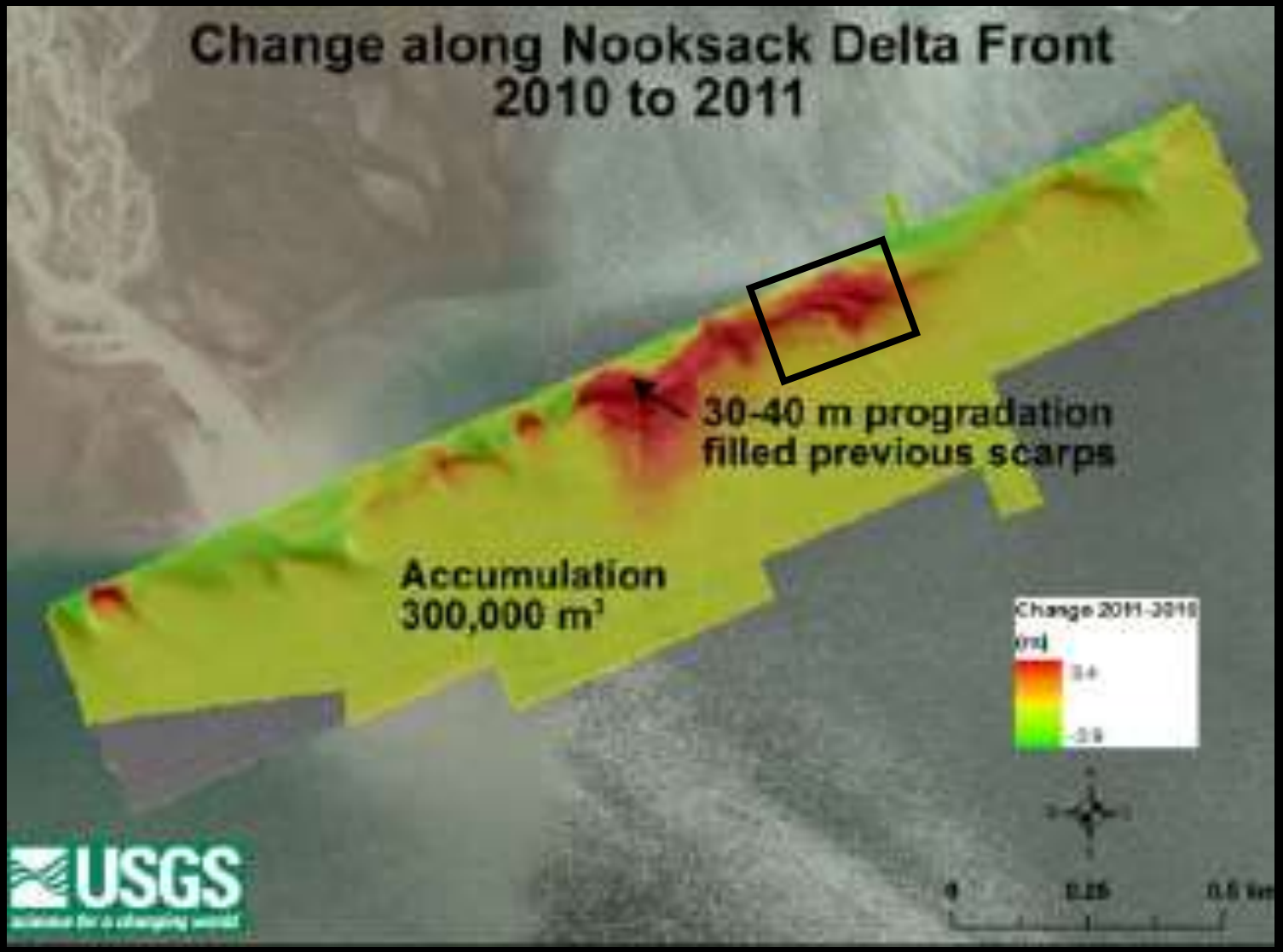
Coastal Habitats in Puget Sound Project (CHIPS)

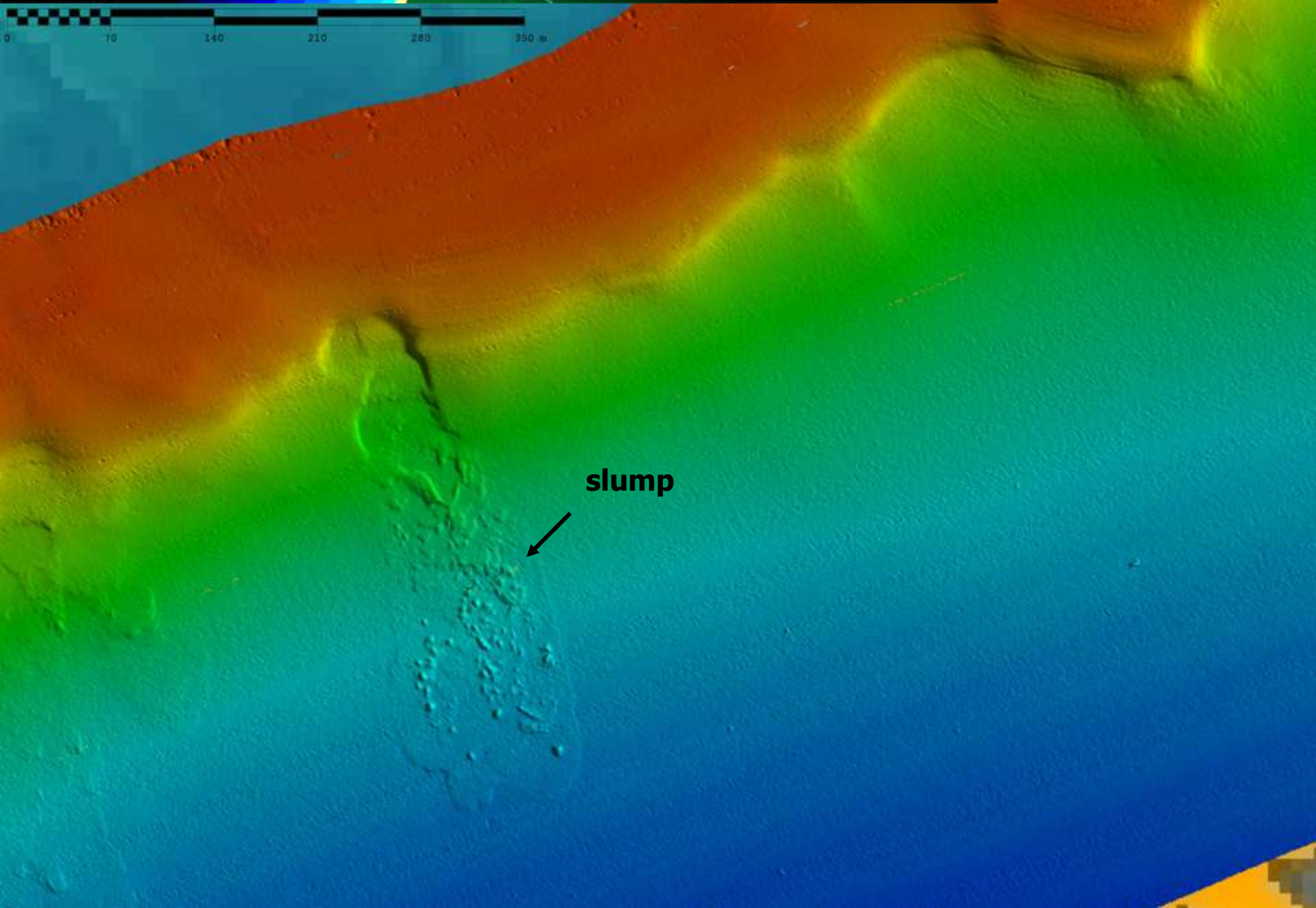
Nearshore Habitat Structure

Bellingham Bay

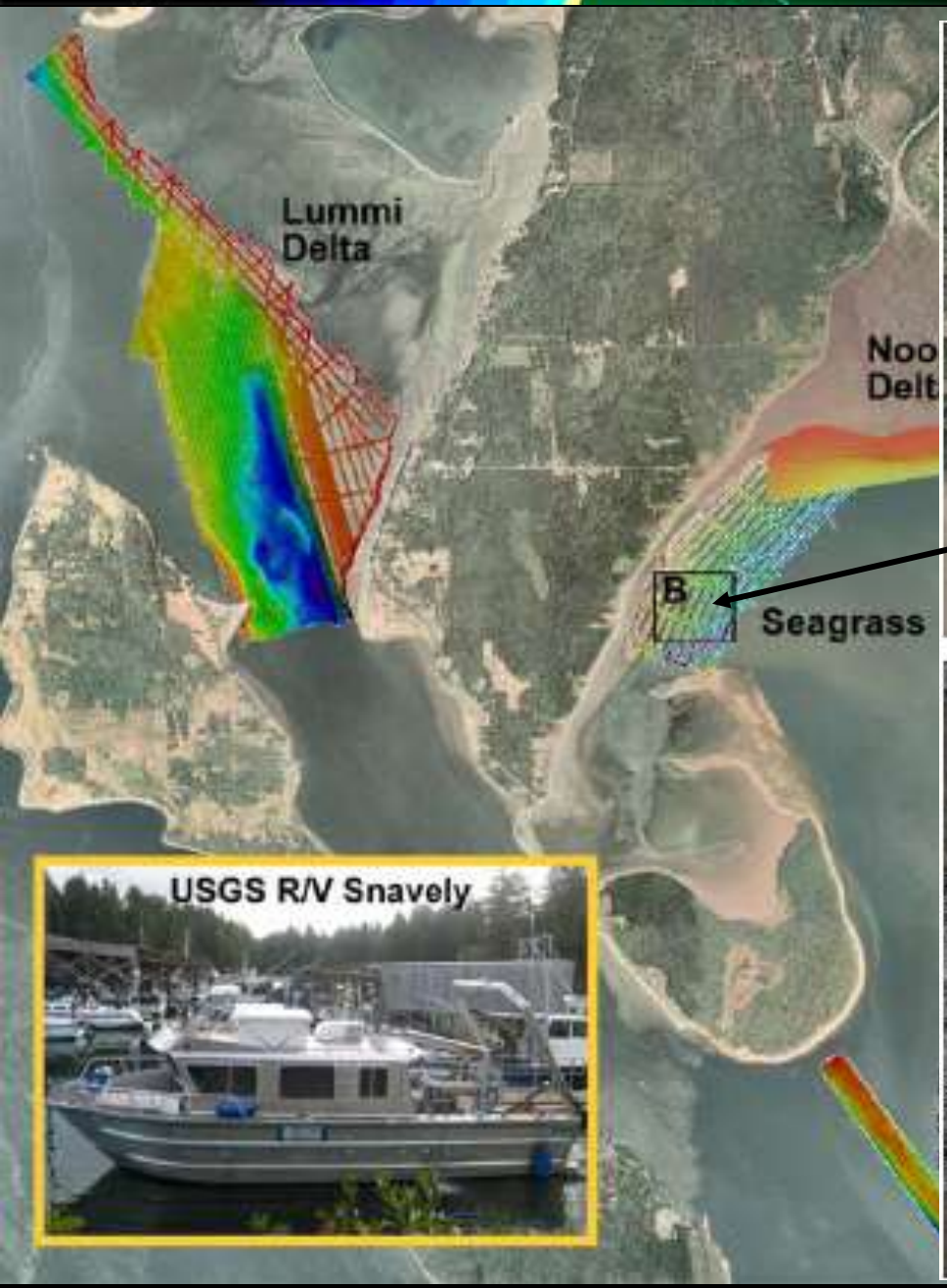
Coastal Habitats in Puget Sound Project (CHIPS)

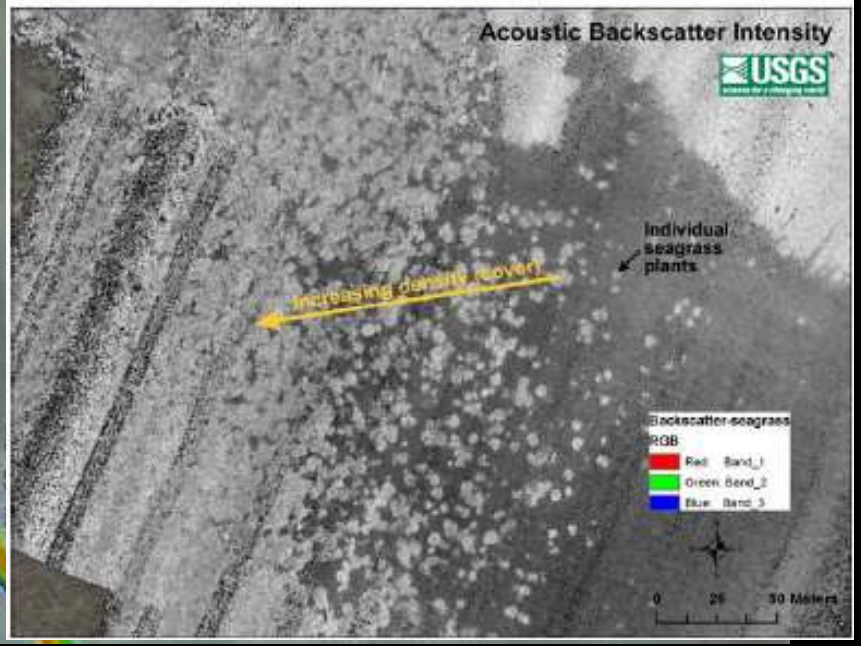


Coastal Habitats in Puget Sound Project (CHIPS)



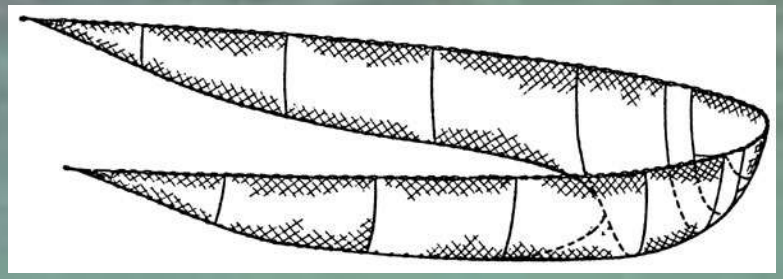
Coastal Habitats in Puget Sound Project (CHIPS)



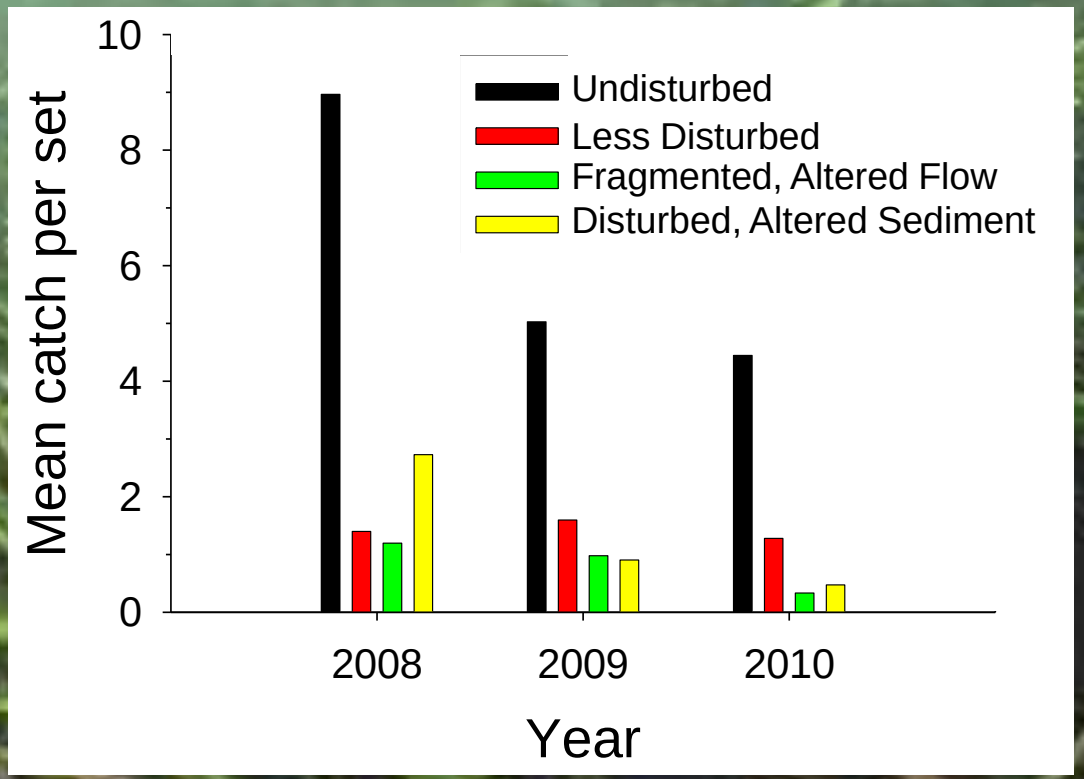


Coastal Habitats in Puget Sound Project (CHIPS)

Nearshore Use & Residency

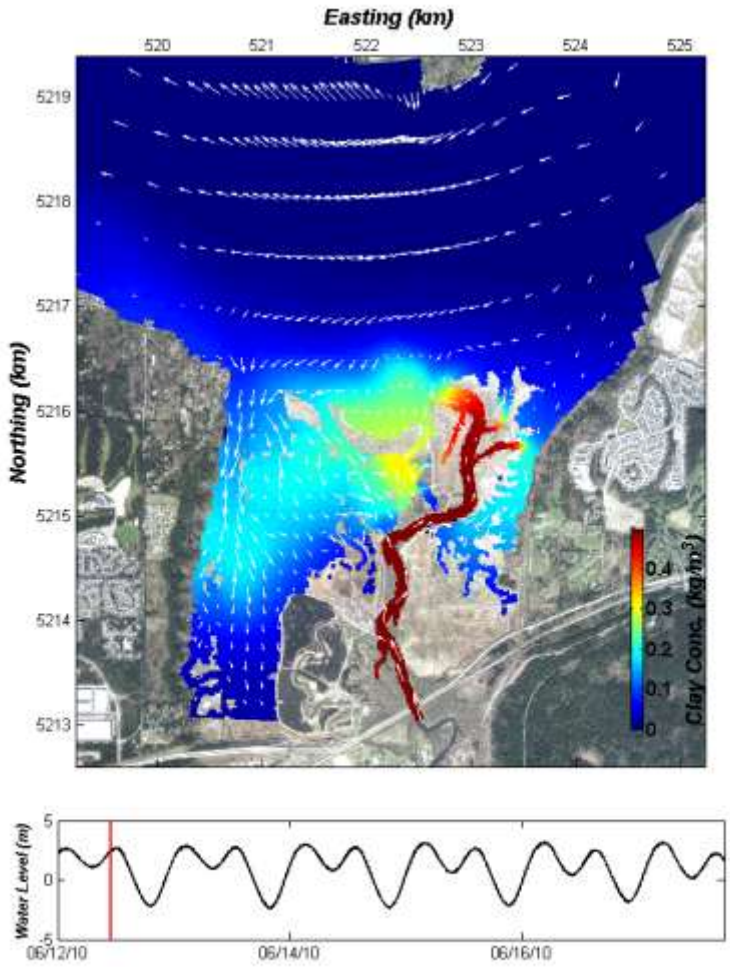


Herring Use of Eelgrass



Coastal Habitats in Puget Sound Project (CHIPS)

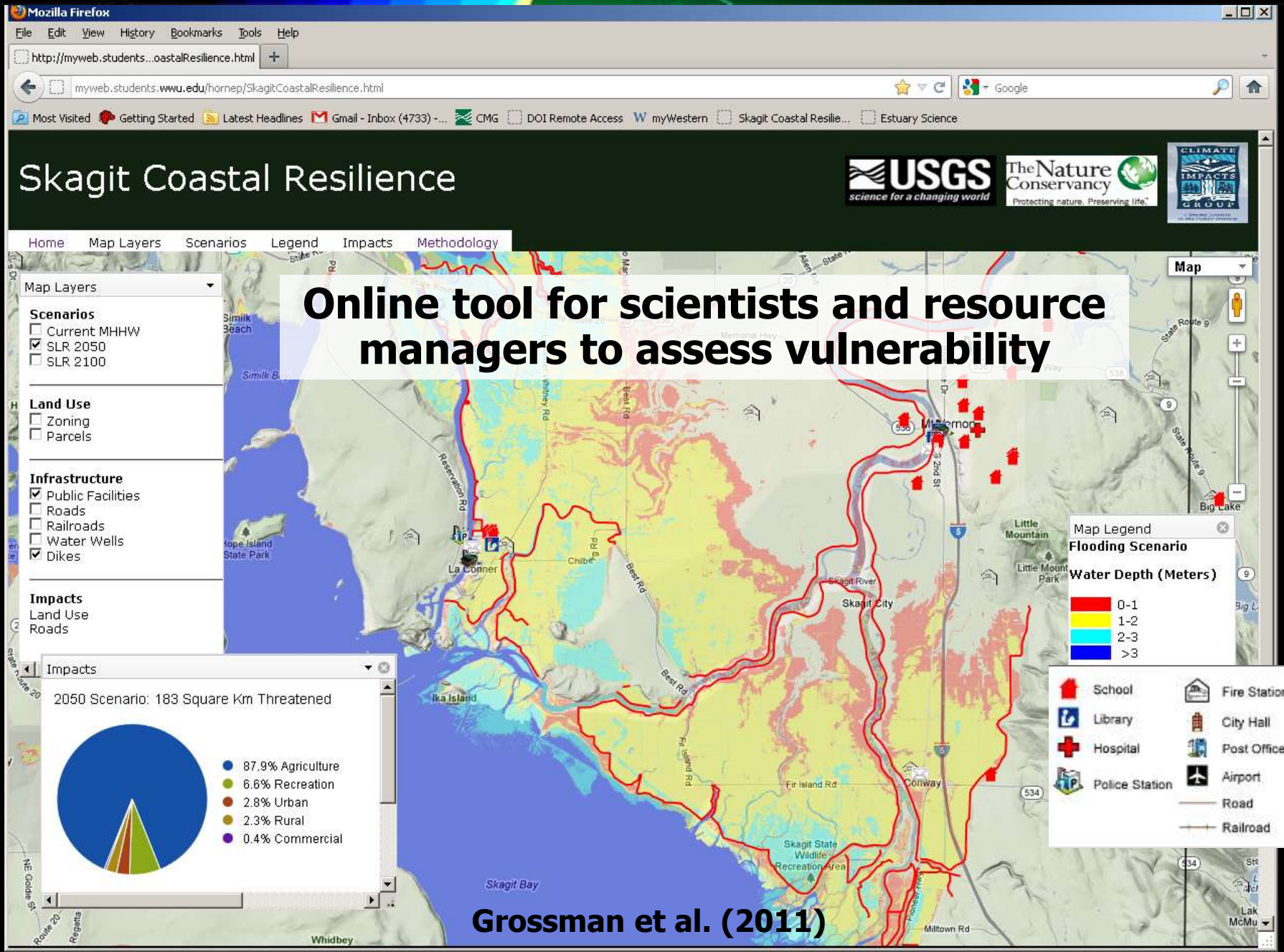
Tools and Models to Inform Adaptive Management



Nisqually Indian Tribe & USFWS
Nisqually National Wildlife Refuge Estuary Restoration

WA-DNR
Nisqually Reach Aquatic Reserve Management Plan

Coastal Vulnerability



Grossman et al. (2011)

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Vulnerable Shoreline, Infrastructure, Ecosystem, and Resources

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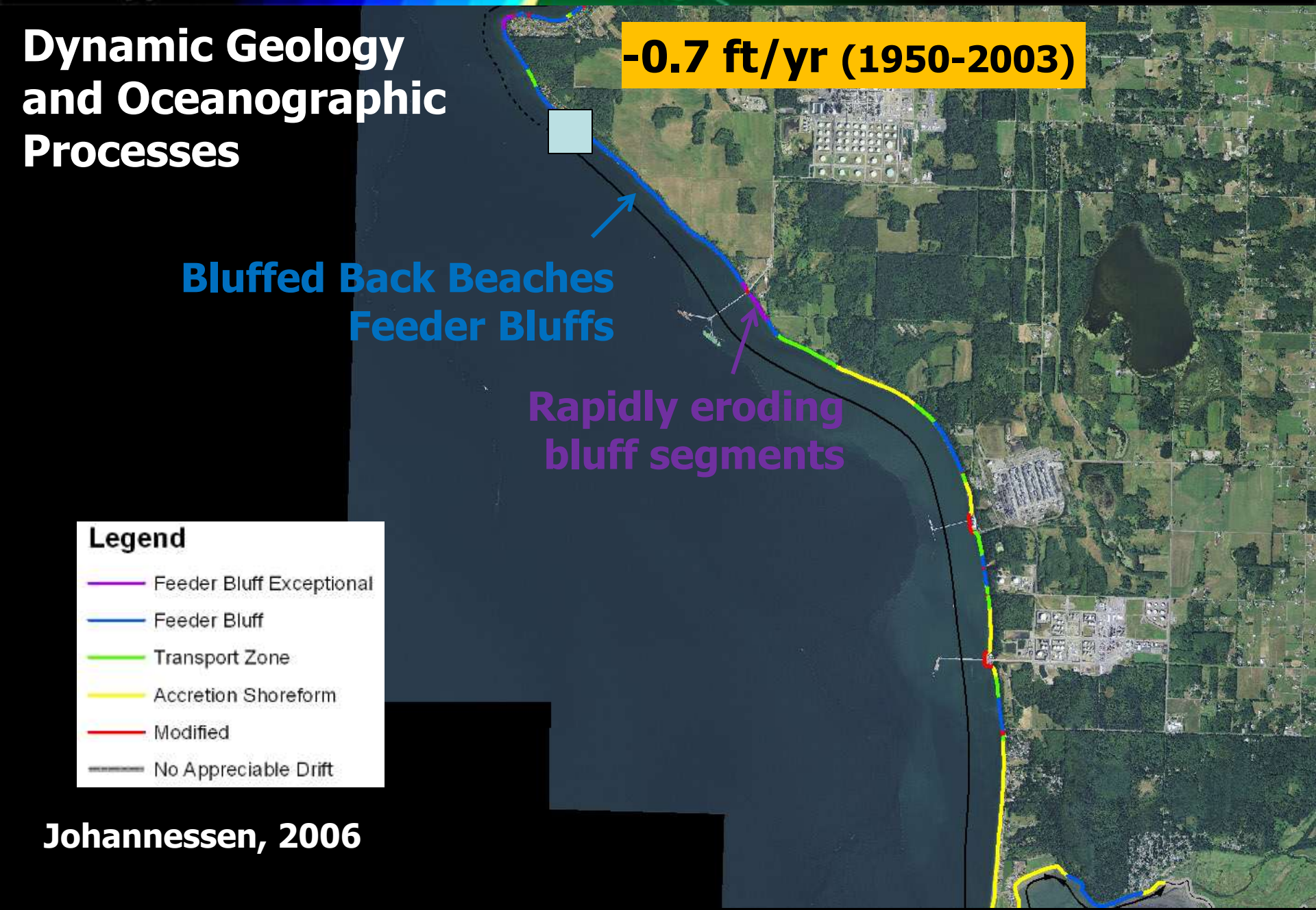
Dynamic Geology and Oceanographic Processes



Johannessen, 2006

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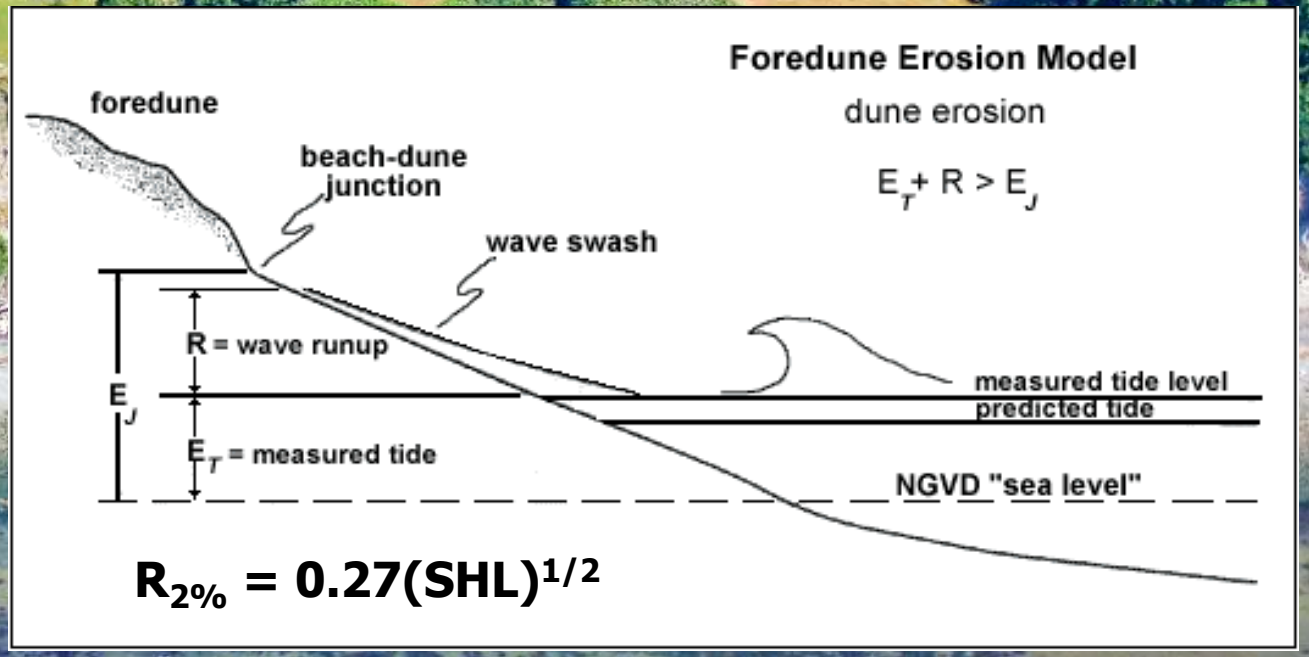

Dynamic Sediment Transport Processes

Complex Habitat

Eelgrass

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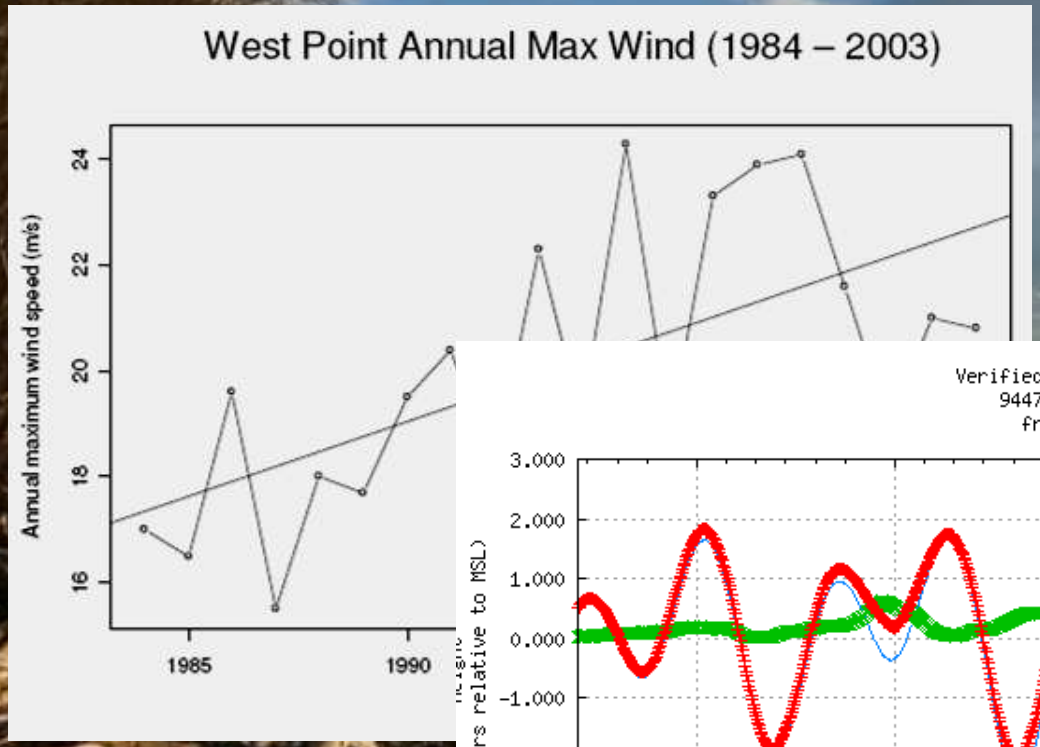
Physical Processes

Waves, Storm Surge
Sea-Level Rise
Groundwater Seepage
Sediment Supply/Source

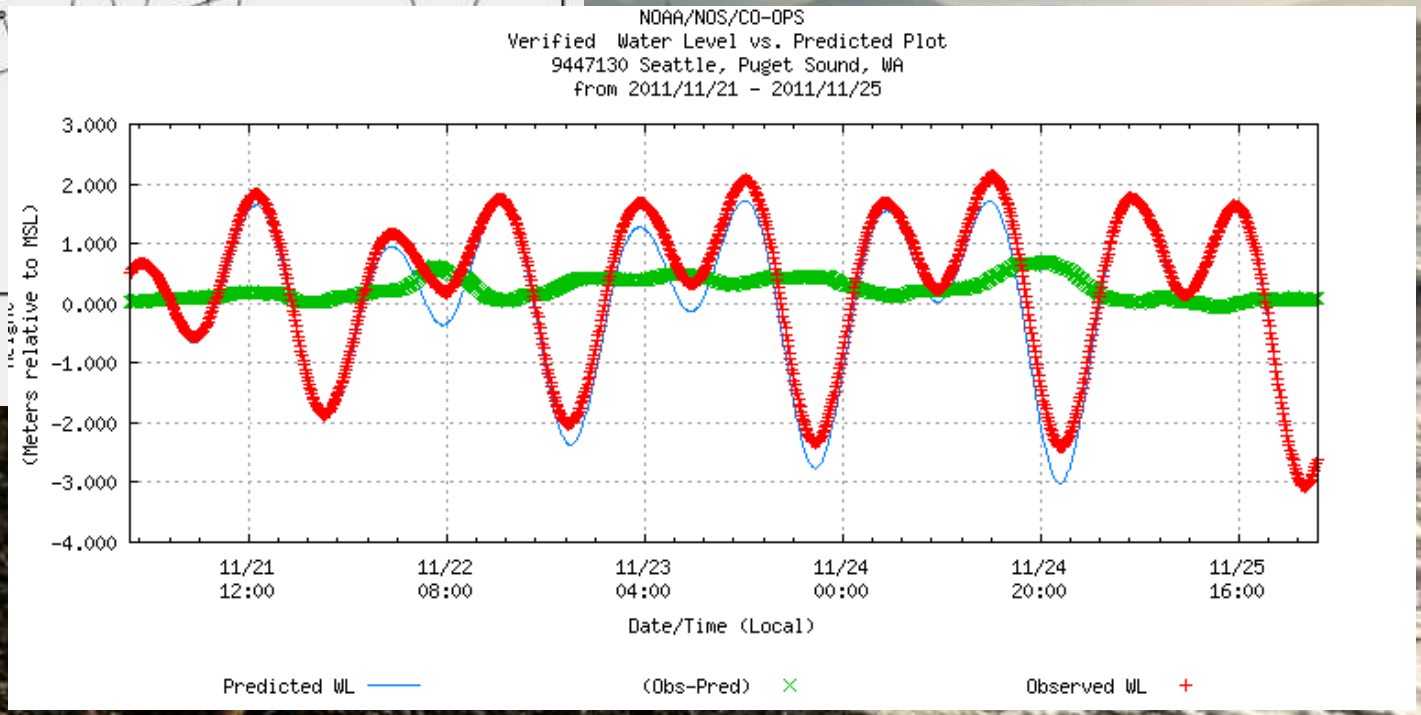
December 25, 2011

Cumulative Effects

Winds and waves

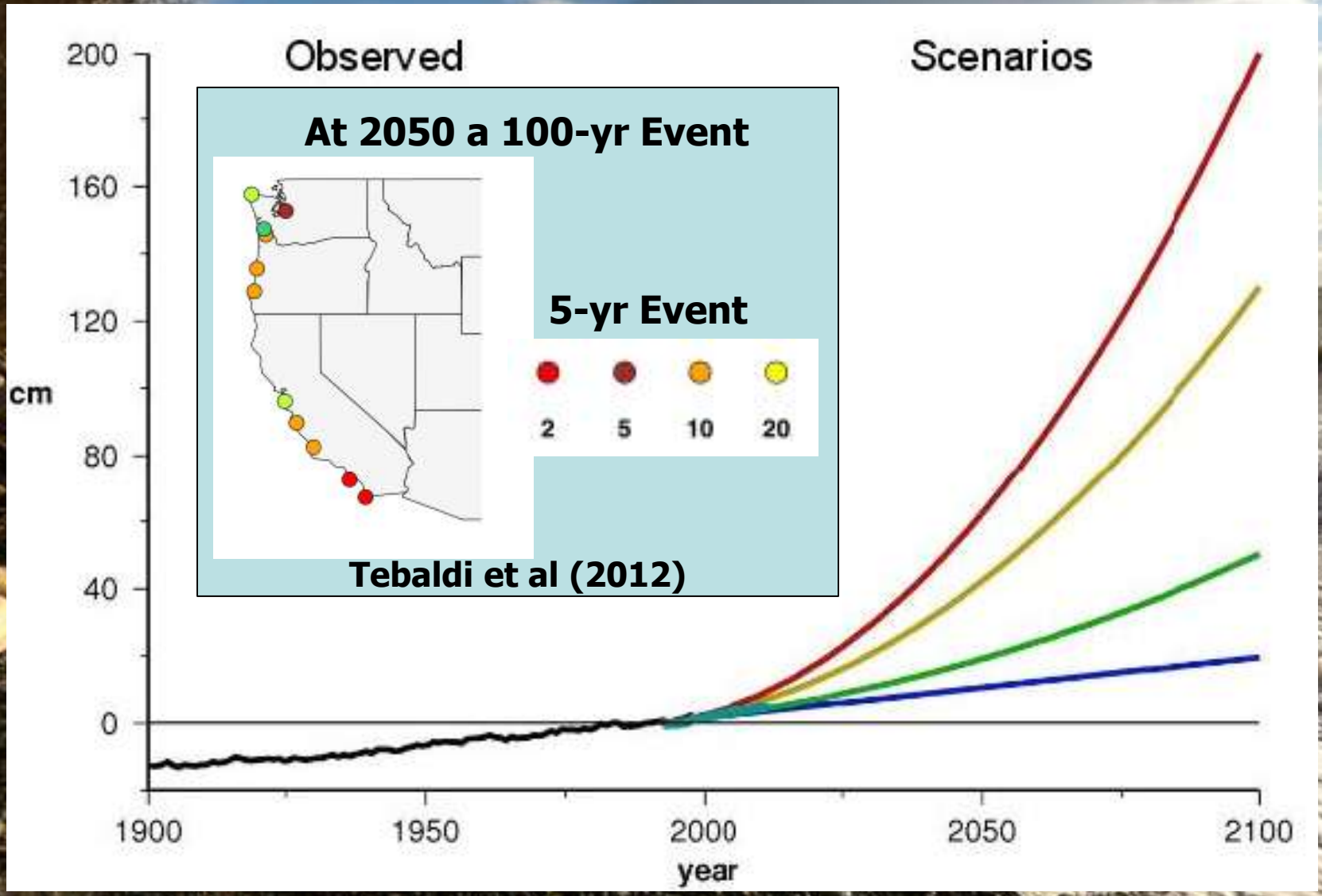


Inverse Barometer



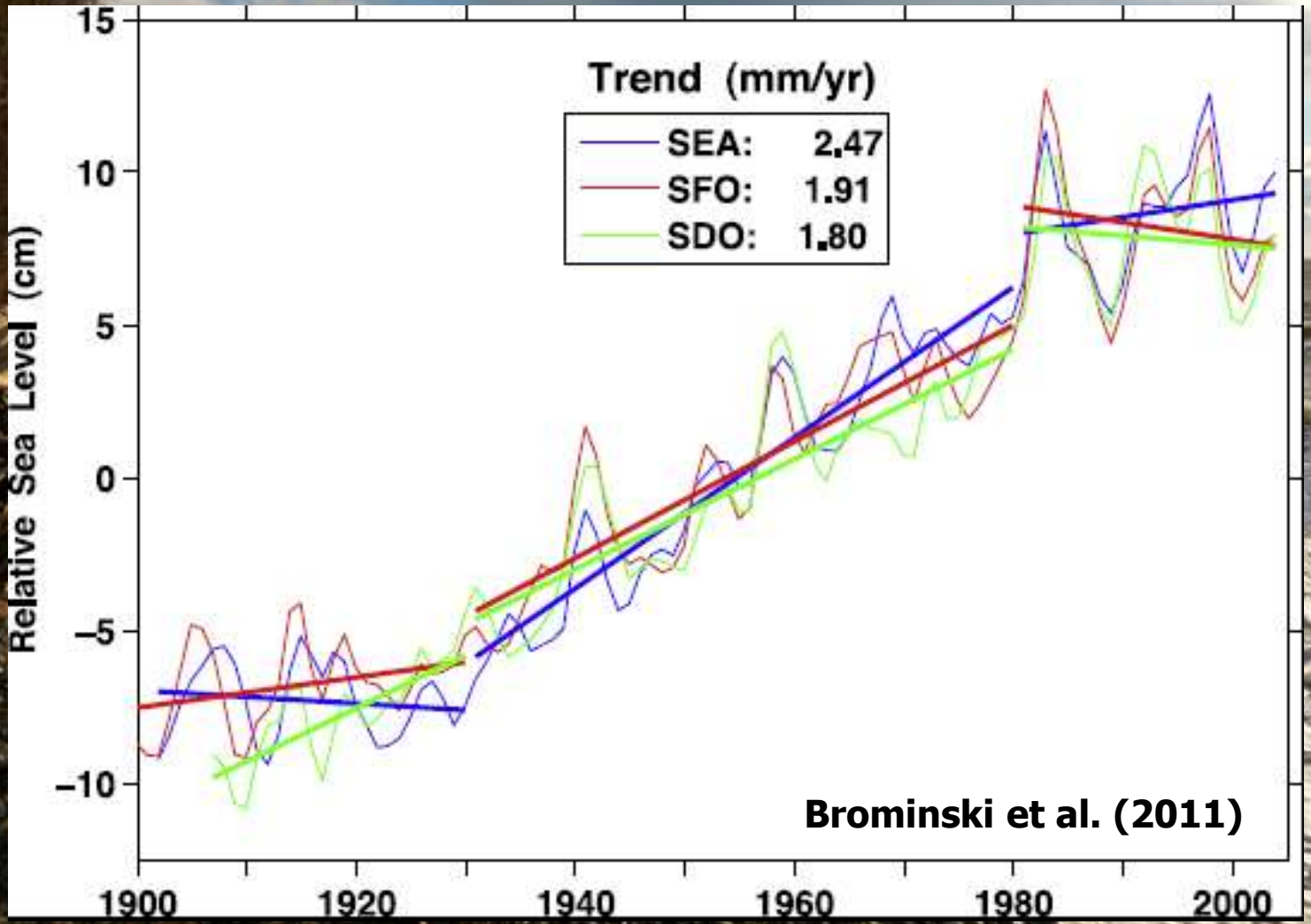
Grossman et al. (2012)

National Research Council
National Climate Assessment (2012)



Regional Sea Level Anomaly?

Imminent Acceleration of Sea-Level Rise with change in PDO? Wind stress?



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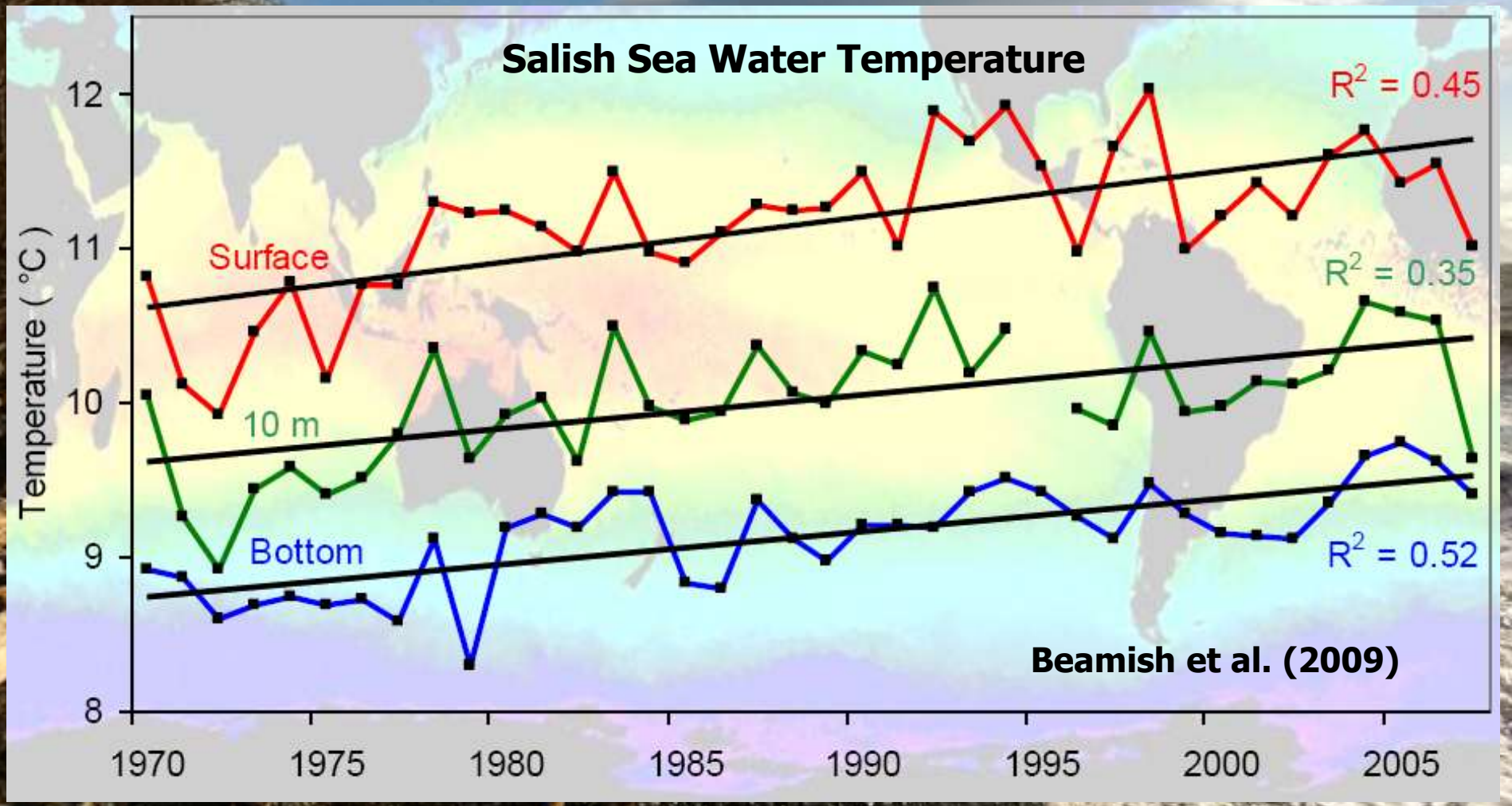
Regional Sea Level Anomaly?



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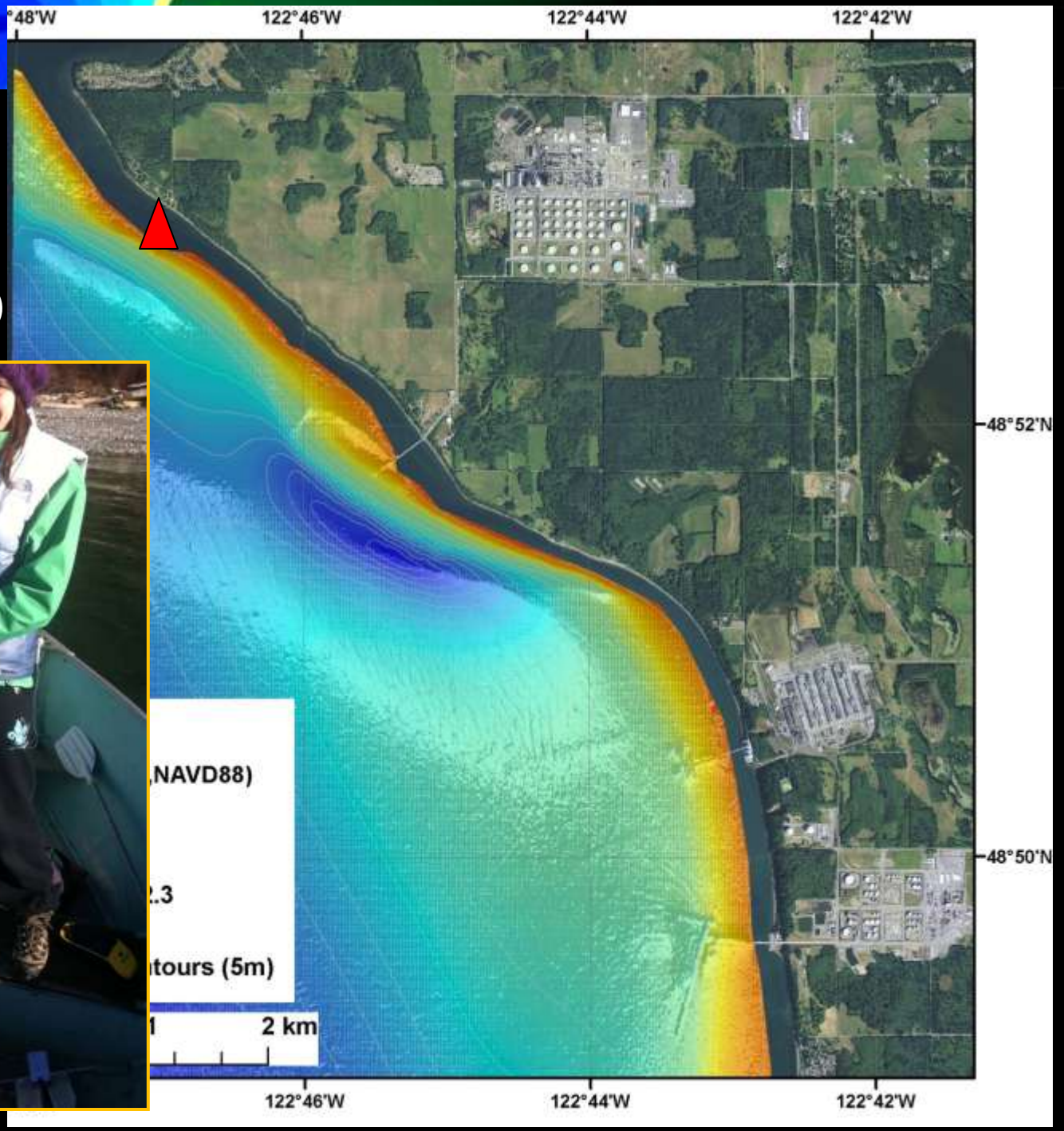
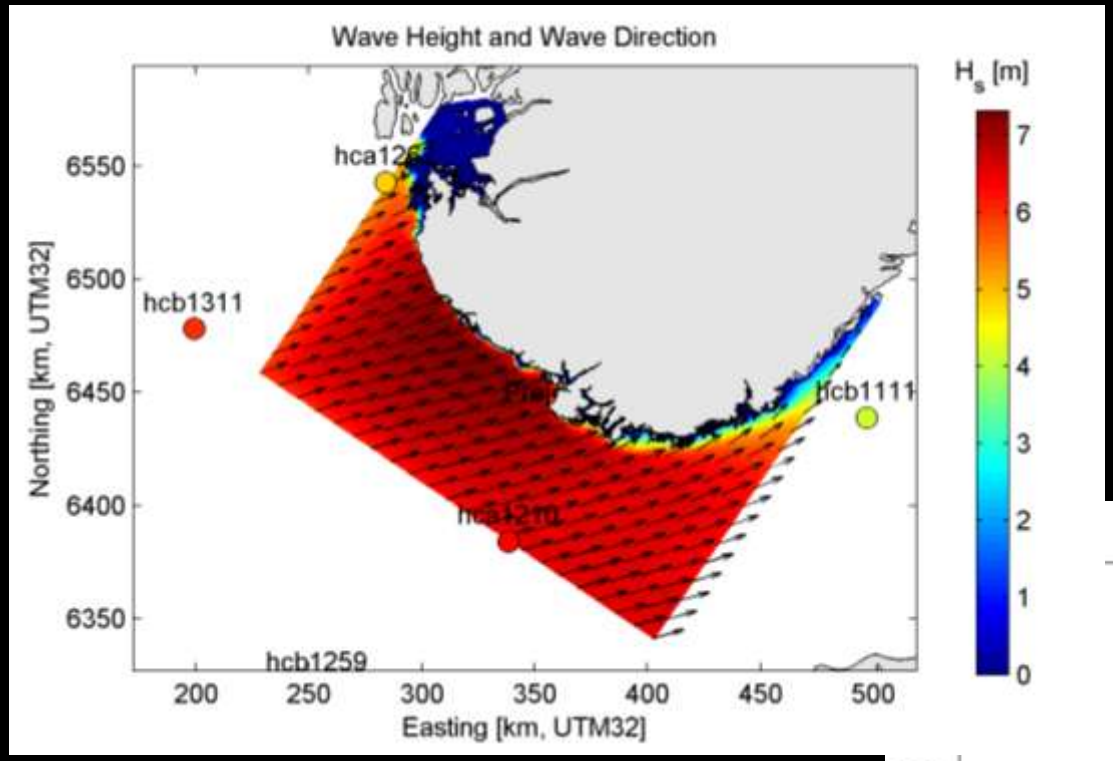
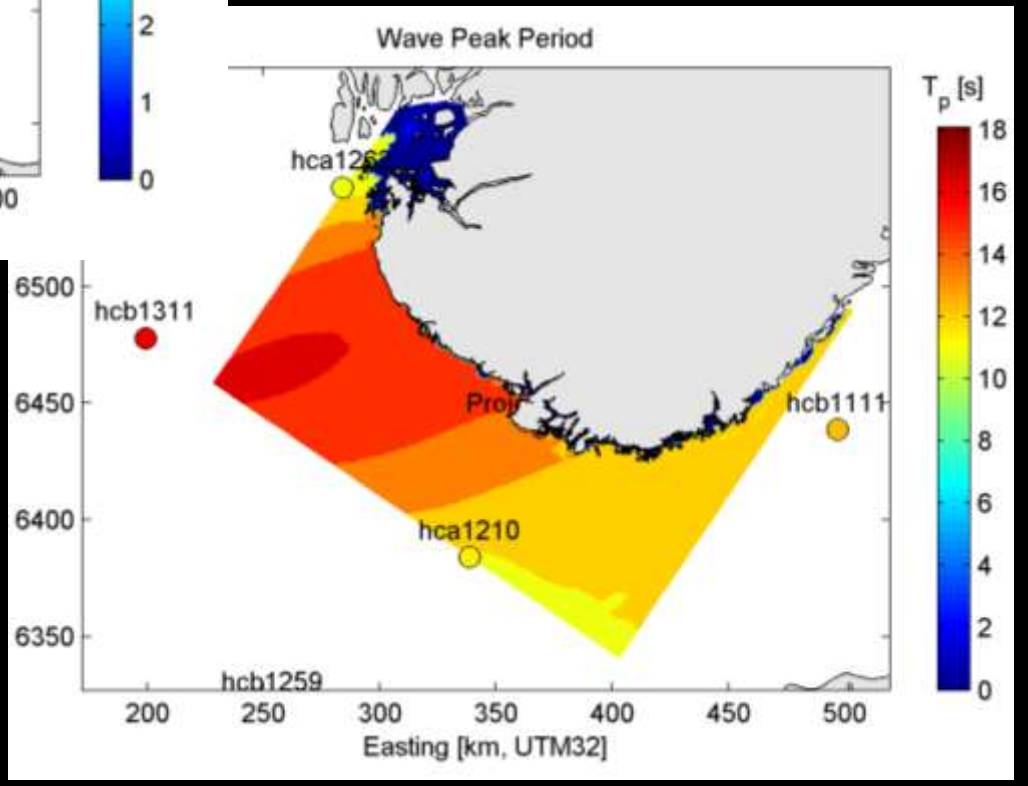
Wave Sensor
(Jan – April, 2012)
Tides @ 15 min
Waves @ 1hr (8 min)



Develop Wave/Circulation Model





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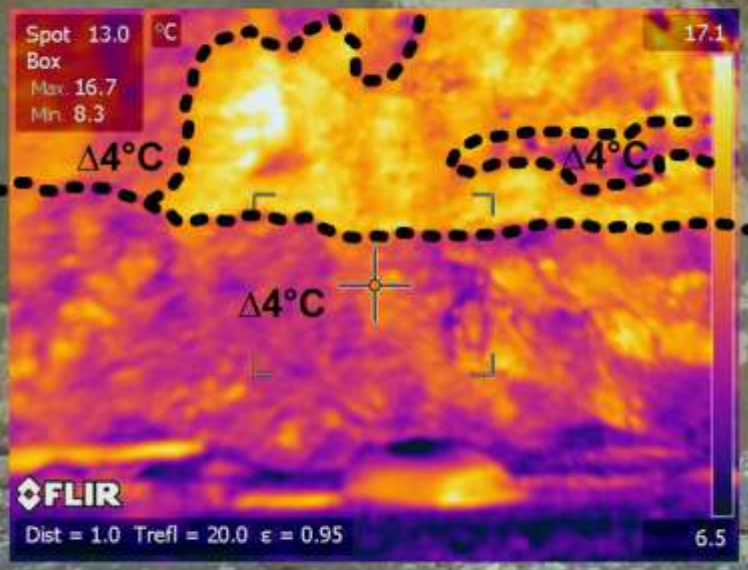
Groundwater Seeps & Bluff Erosion

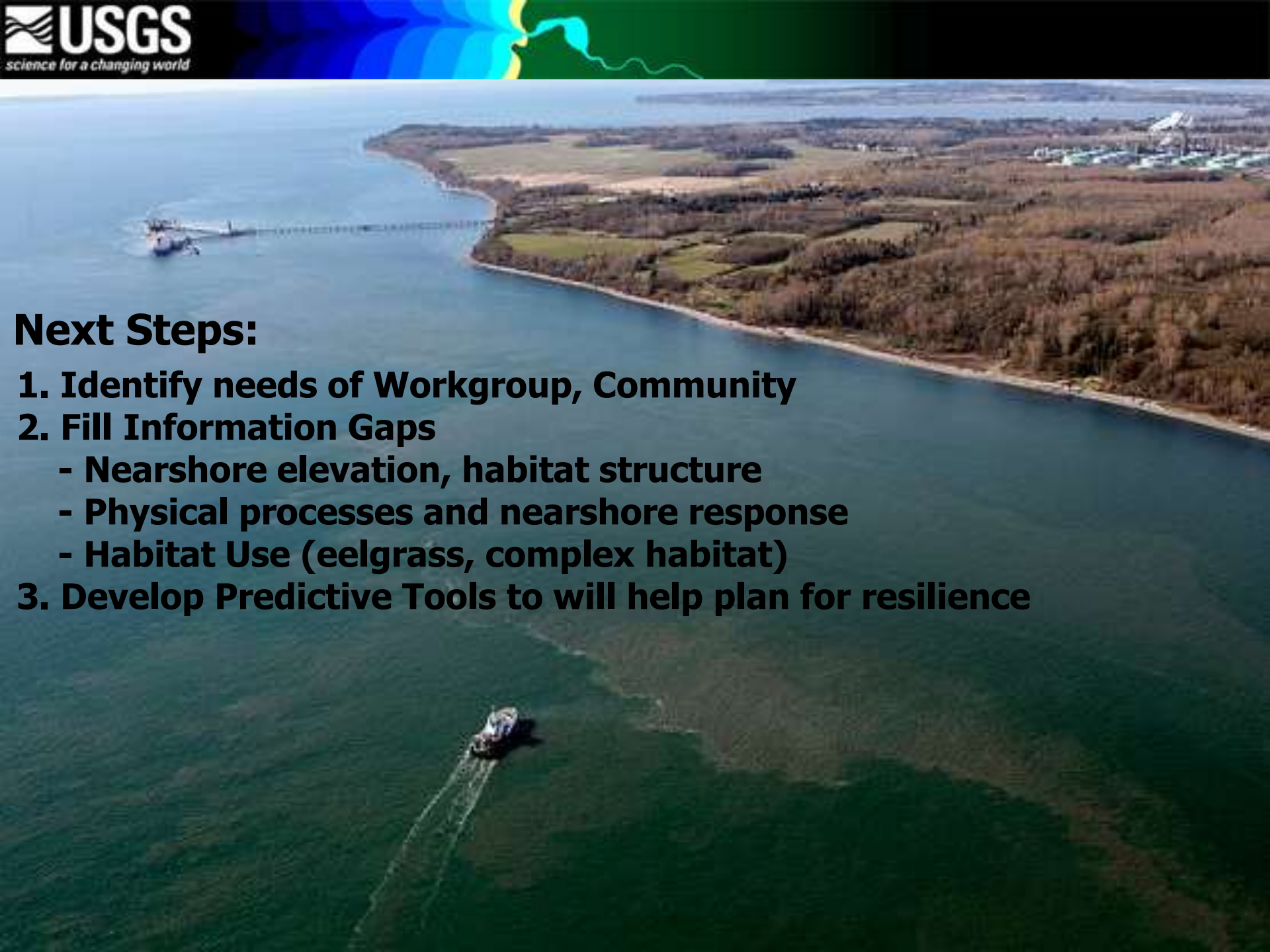
Groundwater Seeps & Bluff Erosion

1. Erosion, Sediment production processes
2. Temperature/salinity inputs alongshore



Purple areas are on average 4°C lower than gold

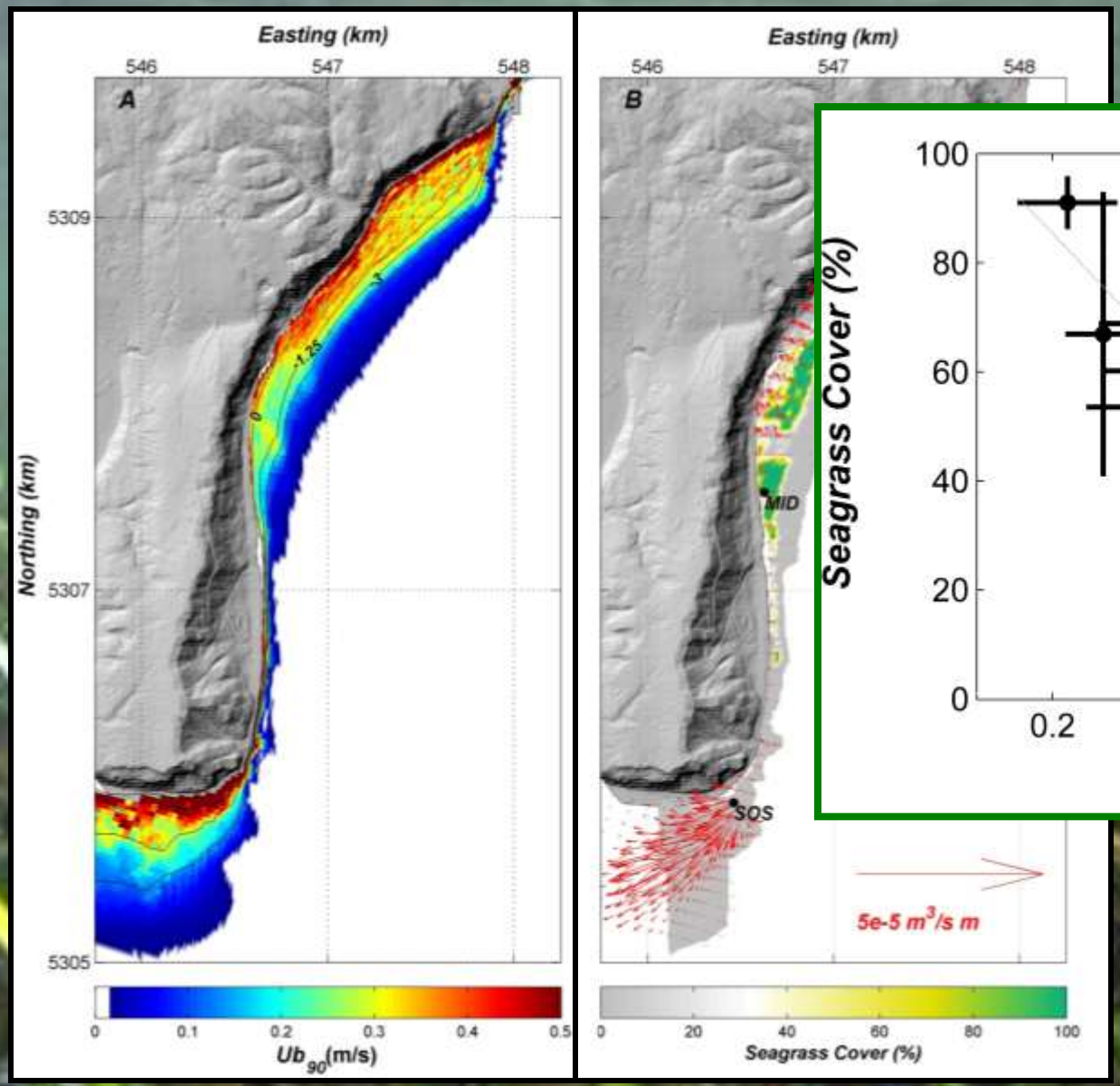
Grossman and Linneman (in prep.)

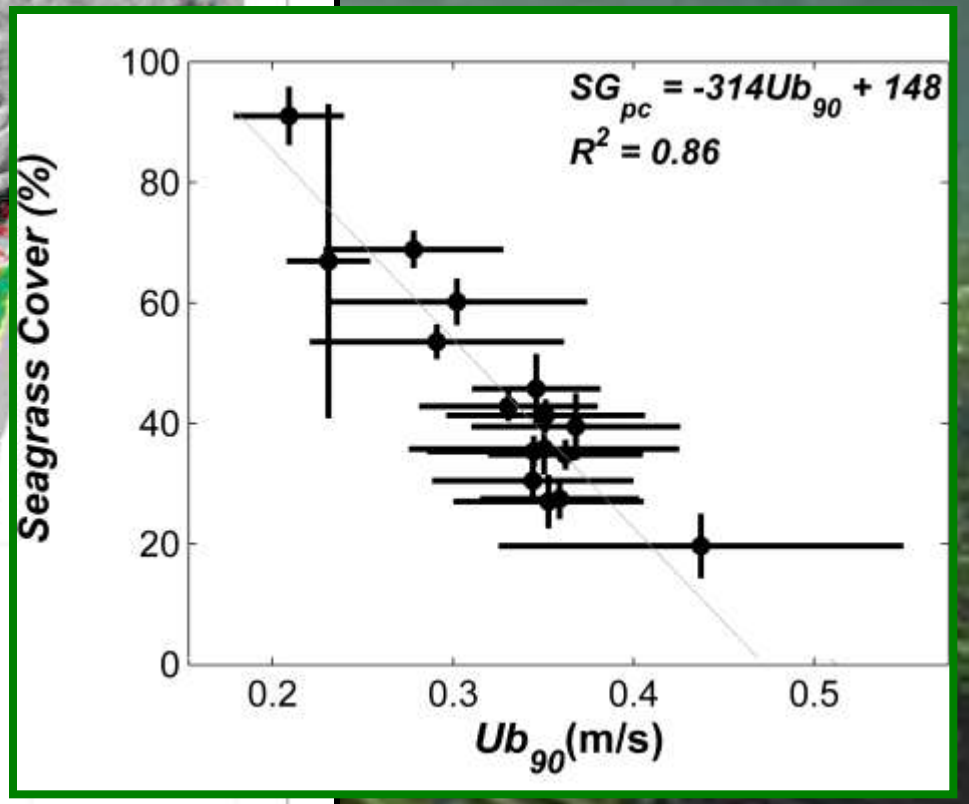


Next Steps:

1. Identify needs of Workgroup, Community
2. Fill Information Gaps
   - Nearshore elevation, habitat structure
   - Physical processes and nearshore response
   - Habitat Use (eelgrass, complex habitat)
3. Develop Predictive Tools to will help plan for resilience

Wave Energy Attenuation





Stevens and Lacy
(In Press)