Updates on Living Shoreline Demonstration Treatments in Casco Bay

Project goal: Design, permit, install and monitor low-cost, transferable living shoreline approaches that reuse natural materials at selected representative sites

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P.A. Slovinsky, MGS

Funding from:
OFFICE FOR COASTAL MANAGEMENT
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Demonstration Site Selection Criteria

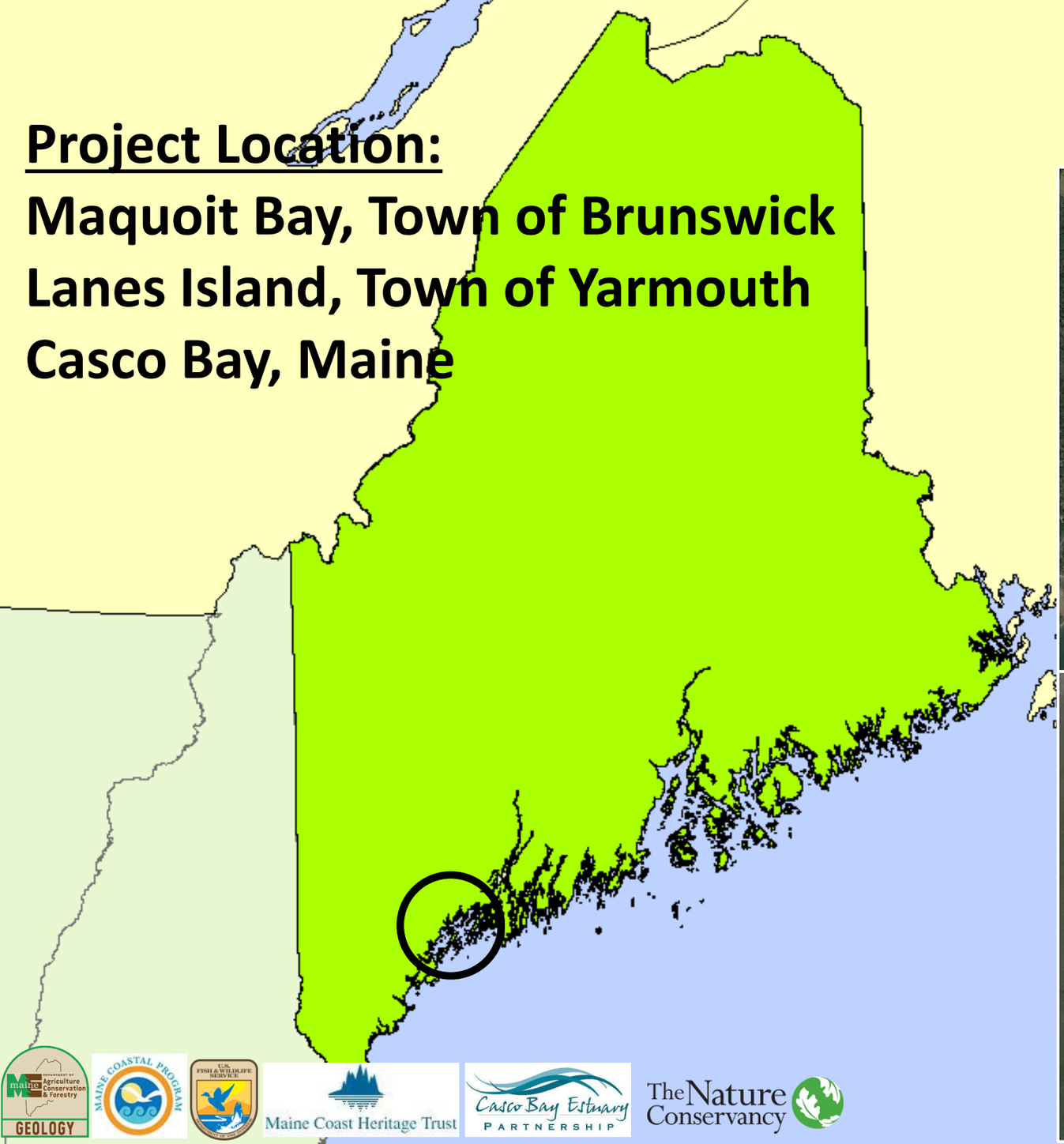
- Eroding bluff or marsh toe
- Representative geography/geology of larger region
- Ownership by a Project Partner
- Relatively easy <u>or</u> representative site access
- Relatively straight/consistent shore type of 150 feet or more
- Appropriate MGS Living Shoreline Suitability Score
- Educational/public viewing opportunities

Project Location:

Maquoit Bay, Town of Brunswick

Lanes Island, Town of Yarmouth

Casco Bay, Maine



GEOLOGY

Maine Coast Heritage Trust

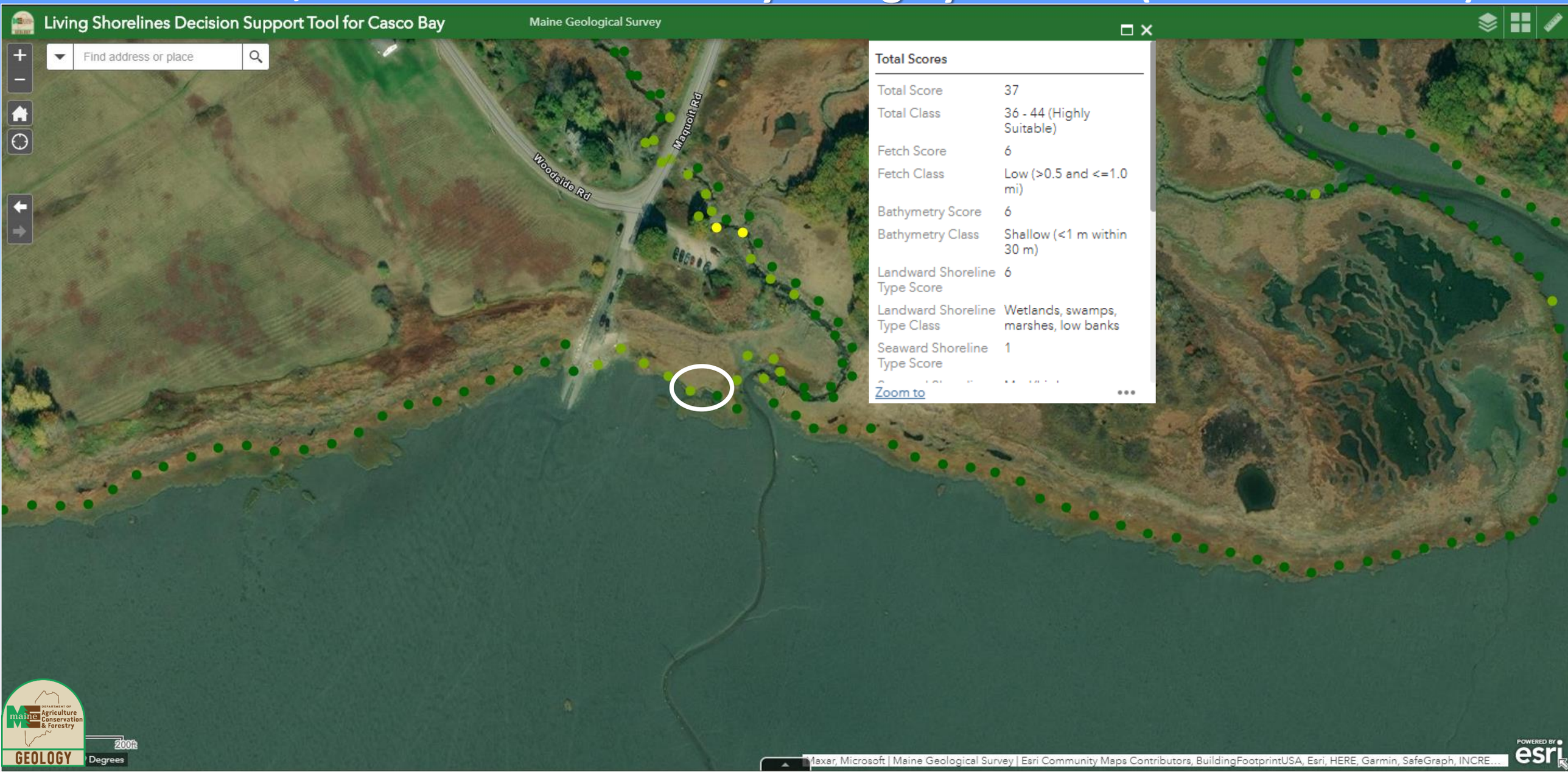
Casco Bay Estuary PARTNERSHIP

The Nature Conservancy

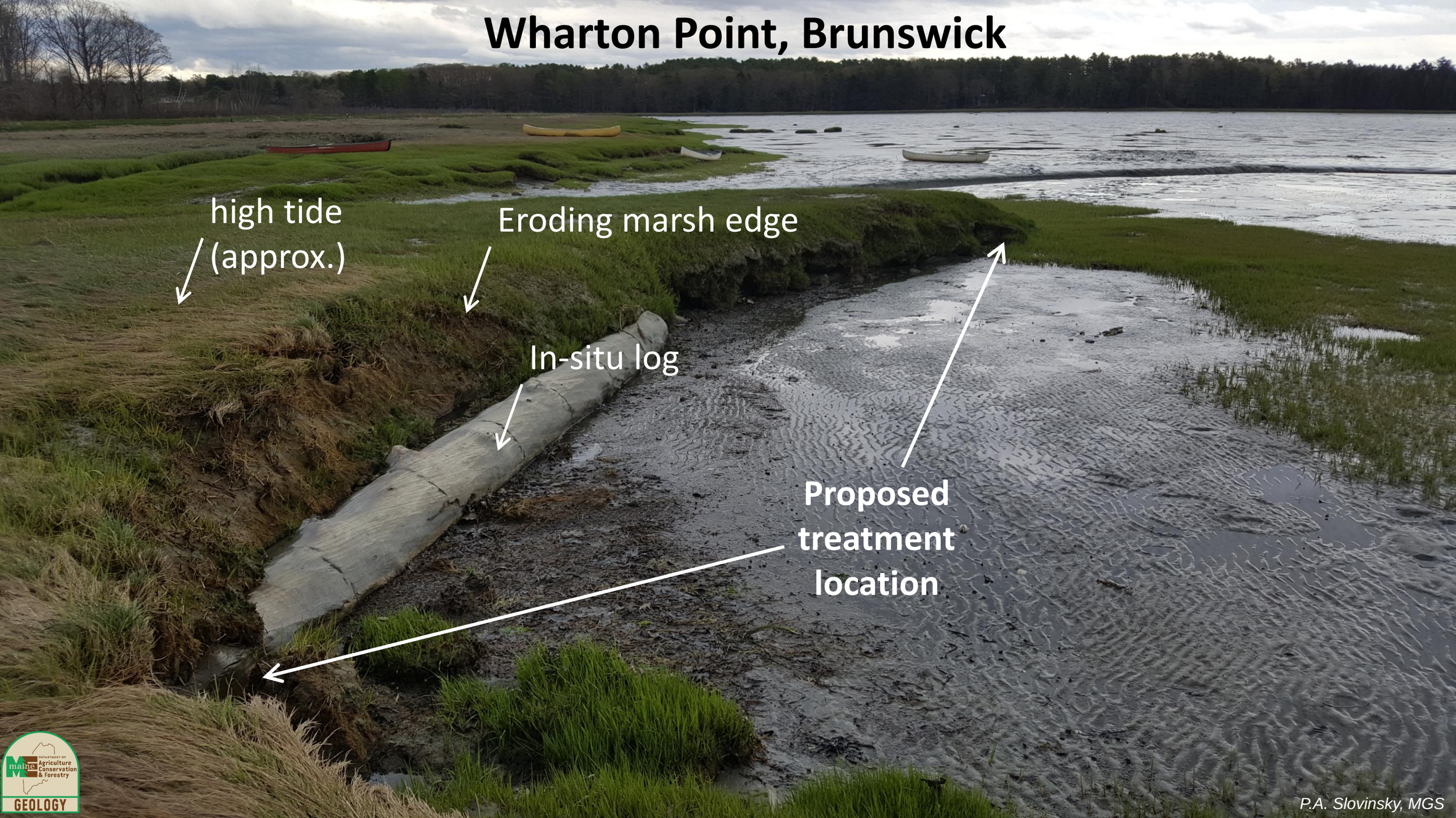
OFFICE FOR COASTAL MANAGEMENT
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

MGS Living Shoreline Suitability Tool

Wharton Point, Brunswick – Moderately to Highly Suitable (35 - 37 out of 44)



Wharton Point, Brunswick



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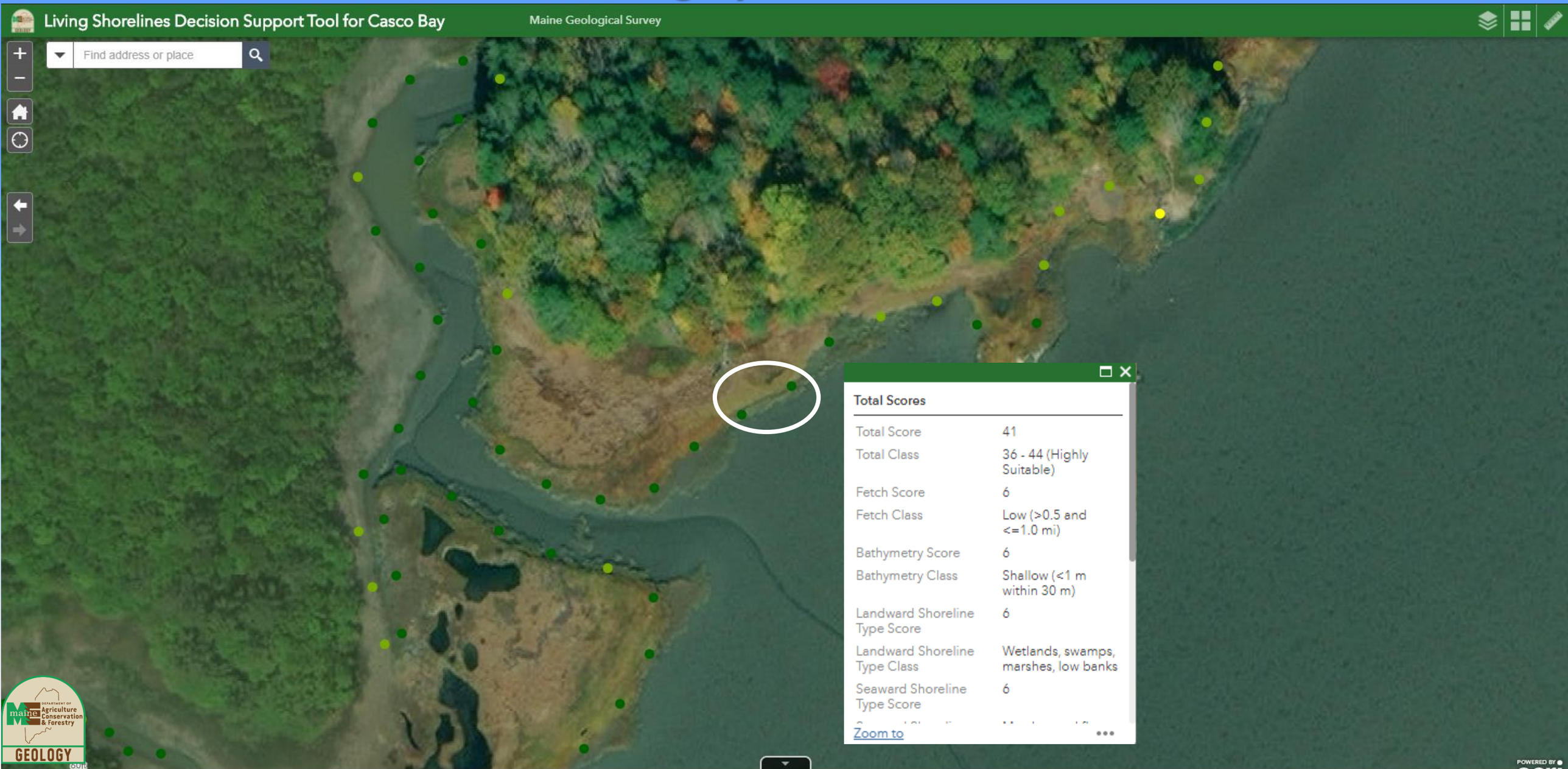
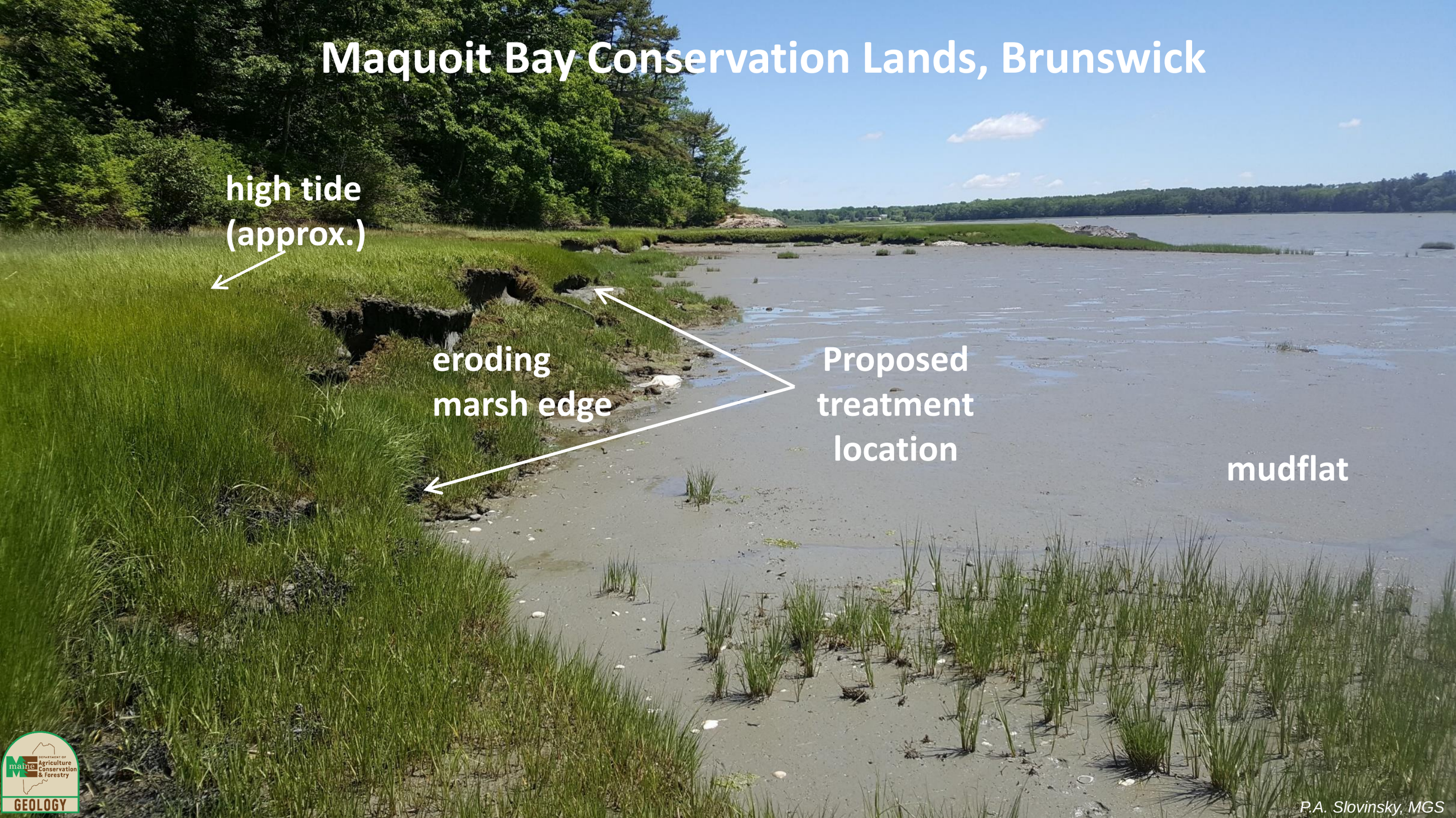
MGS Living Shoreline Suitability Tool

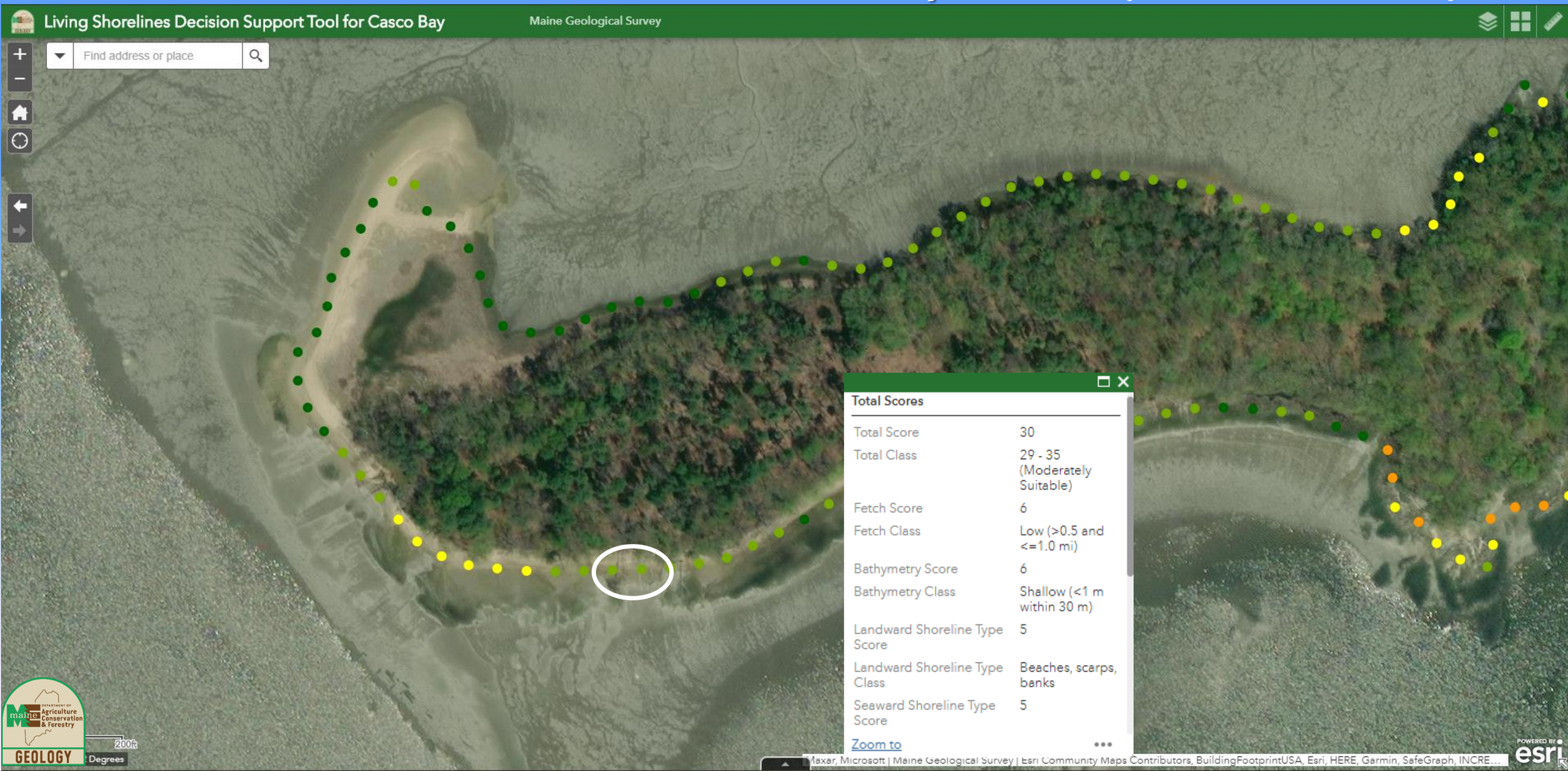
M. Bay Cons. Lands Brunswick – Highly Suitable (37 - 41 out of 44)

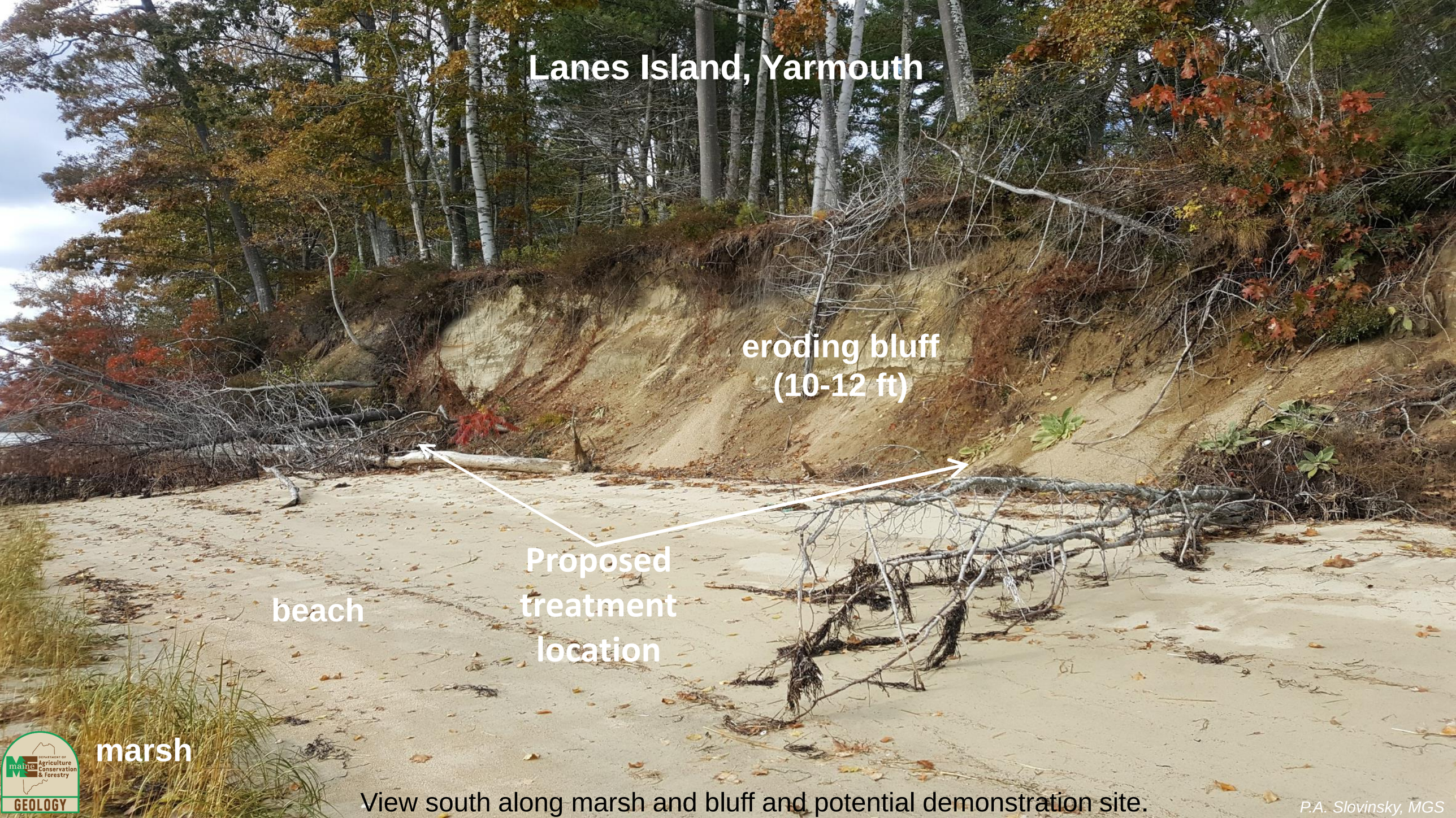



Maquoit Bay Conservation Lands, Brunswick
high tide
(approx.)
eroding
marsh edge
Proposed
treatment
location
mudflat
P.A. Slovinsky, MGS

MGS Living Shoreline Suitability Tool

Lanes Island, Yarmouth – Low end of Moderately Suitable (30 - 31 out of 44)





View south along marsh and bluff and potential demonstration site.

P.A. Slovinsky, MGS

Some encountered Project CHALLENGES, SOLUTIONS and initial LESSONS LEARNED

Challenge: address regulatory concerns about *degradable* plastics in the environment

Challenge: Account for the impacts of ice

Wharton Point

Maquoit Bay Conservation Lands

Solution? Develop and test *new* heavy-fiber weave biodegradable oyster shell bags

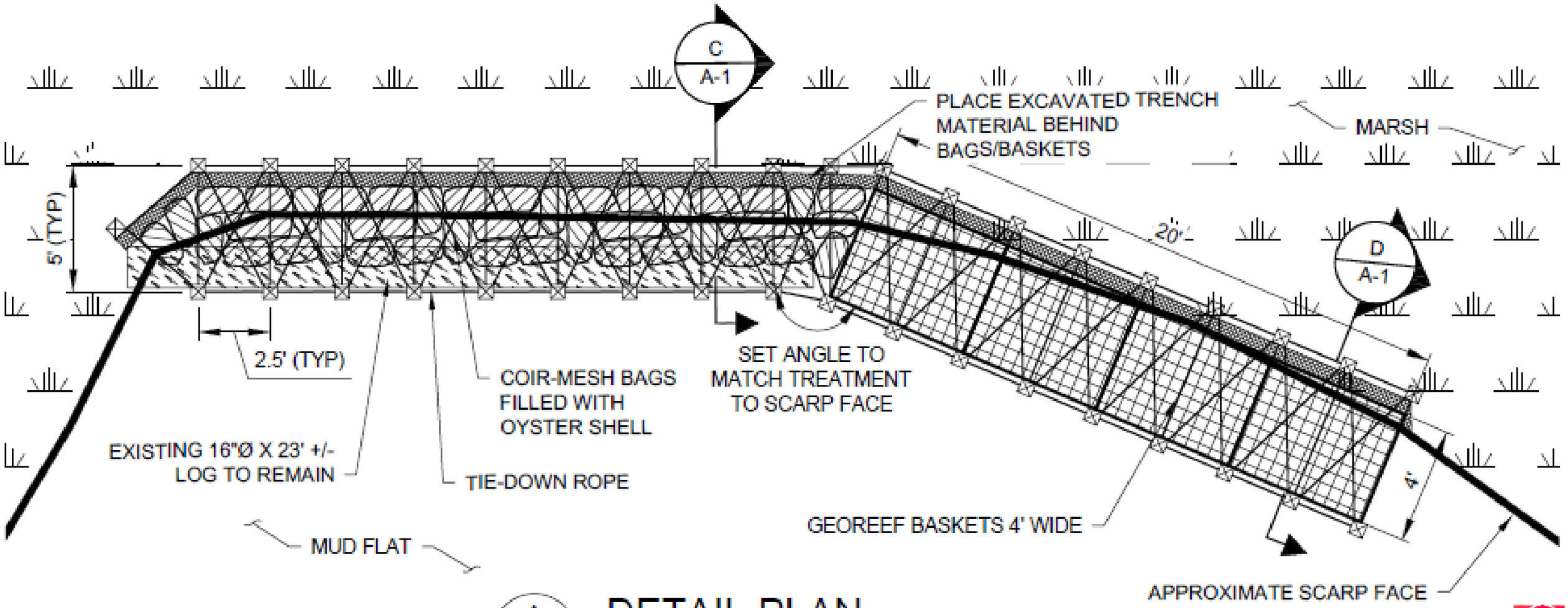
Solution? Test *new* UV and abrasion-resistant synthetic products

D. Bannon, GEI

Challenge: Bagging oyster shell with volunteers (during a pandemic)
Solution: bagging stations, sewing stations, and dedicated volunteers

Integrate synthetic and biodegradable materials and trees

Wharton Point



A / A-1 DETAIL PLAN

SCALE: 1"=5'-0"

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PORTLAND, ME 04101
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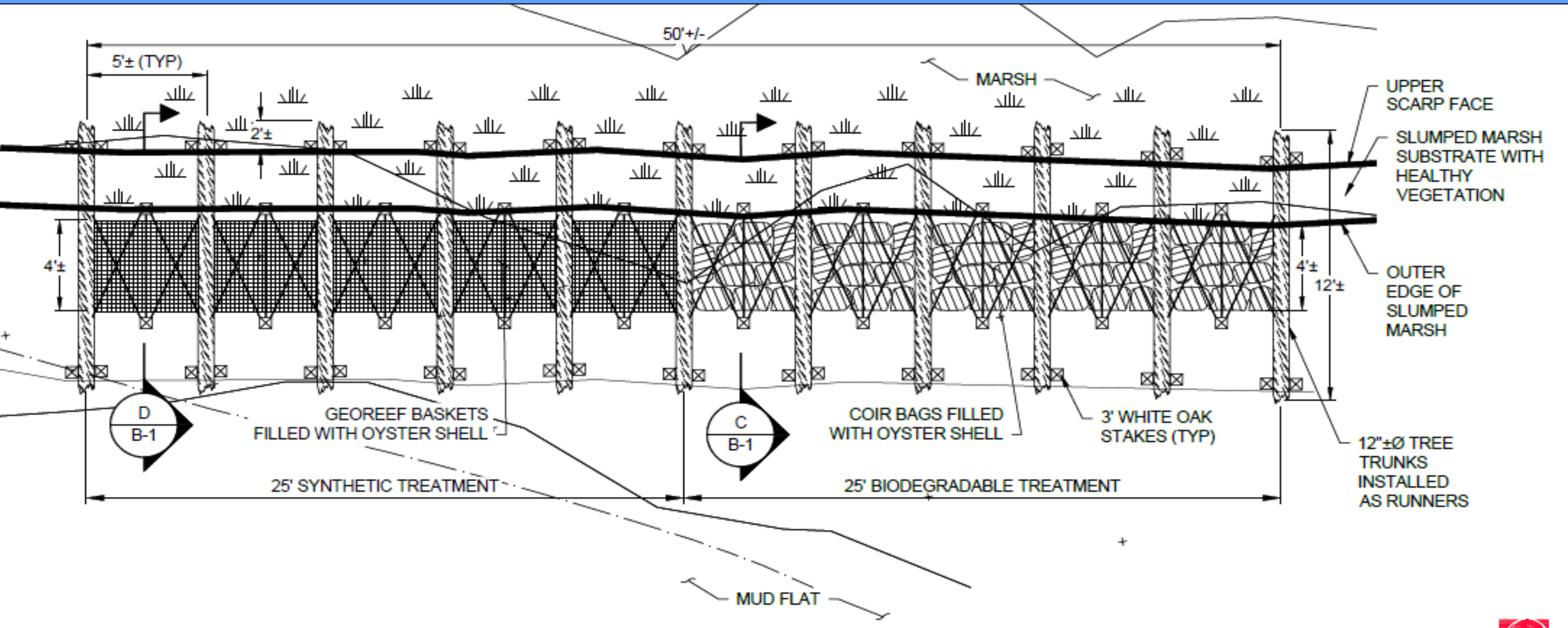
Solution: Integrate synthetic and biodegradable materials and trees

Maquoit Bay Conservation Lands



A
B-1

PLAN VIEW OF LIVING SHORELINE TREATMENT

SCALE: 1"=5'-0"

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Integrate *trees* into demonstration treatments to break up ice

Wharton Point

P. Slovinsky, MGS

Maquoit Bay Conservation Lands

D. Bannon, GEI

Challenge: “Dirty” oyster shell

D. Bannon, GEI

Solution: Develop an on-the-fly method to clean oyster shell

All images by P. Slovinsky, MGS

Challenge: delivering supplies while accounting for tides
Solution: Project partners, barges and airboats!

Images by S. Dickson and P. Slovinsky, MGS

Wharton Point

All images by P. Slovinsky, MGS

Maquoit Bay Conservation Lands

Images by S. Dickson and P. Slovinsky, MGS

Wharton Point

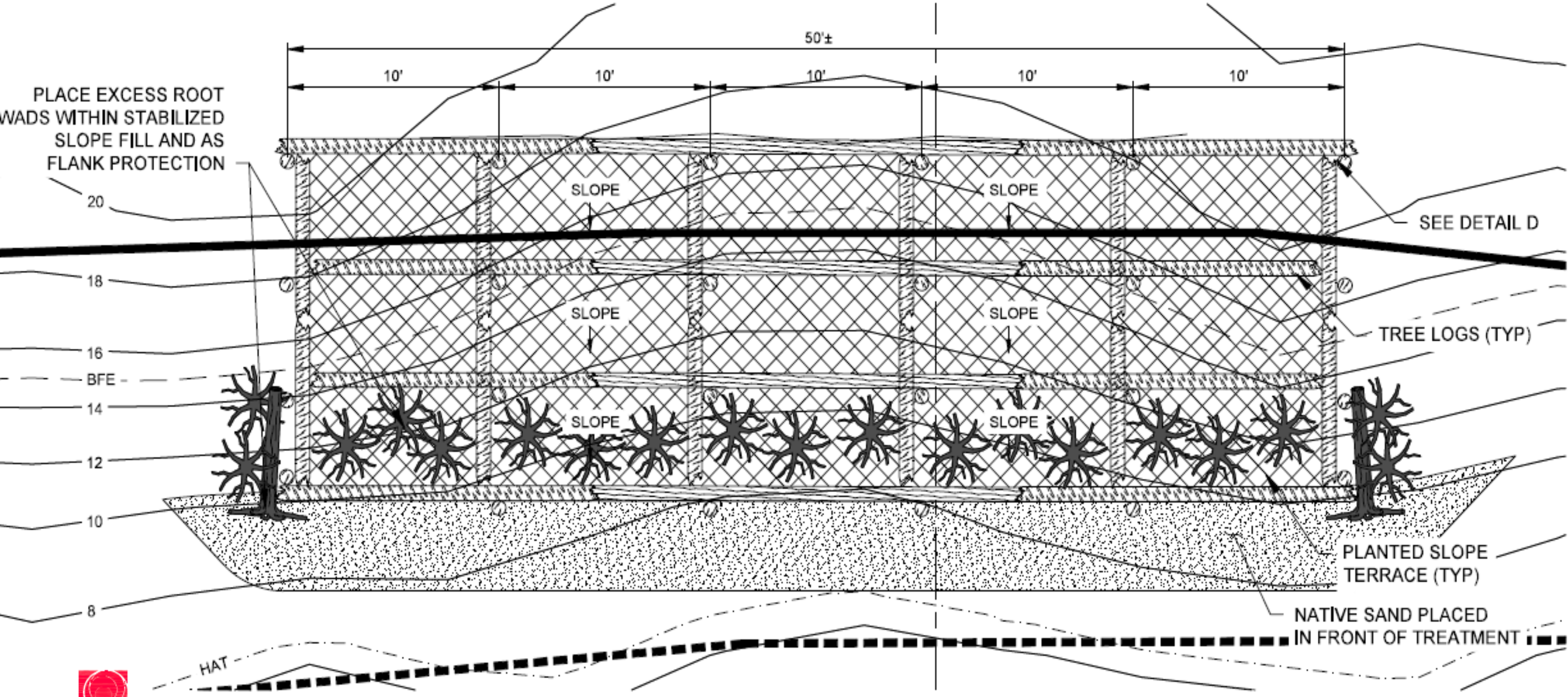
R. Harbison, GPCOG

Maquoit Bay Conservation Lands

Lanes Island, Yarmouth, ME

Challenge: Use a living shoreline to stabilize an unstable bluff <u>on an island</u> using trees = not an inexpensive proposition

Solution? regrade bluff and beneficially reuse trees



A
C-1

SLOPE STABILIZATION PLAN

SCALE: 1"=5'-0"

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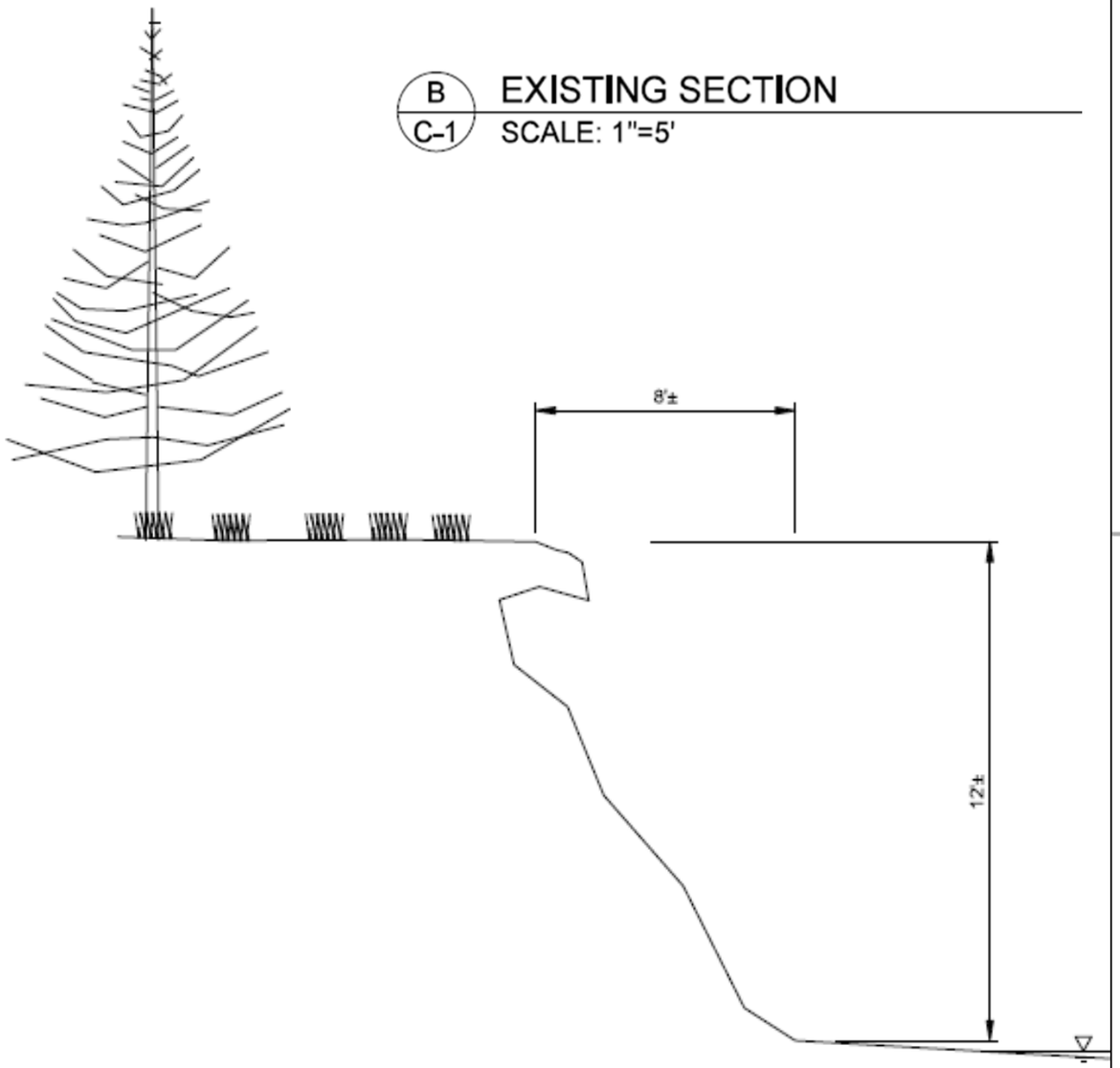
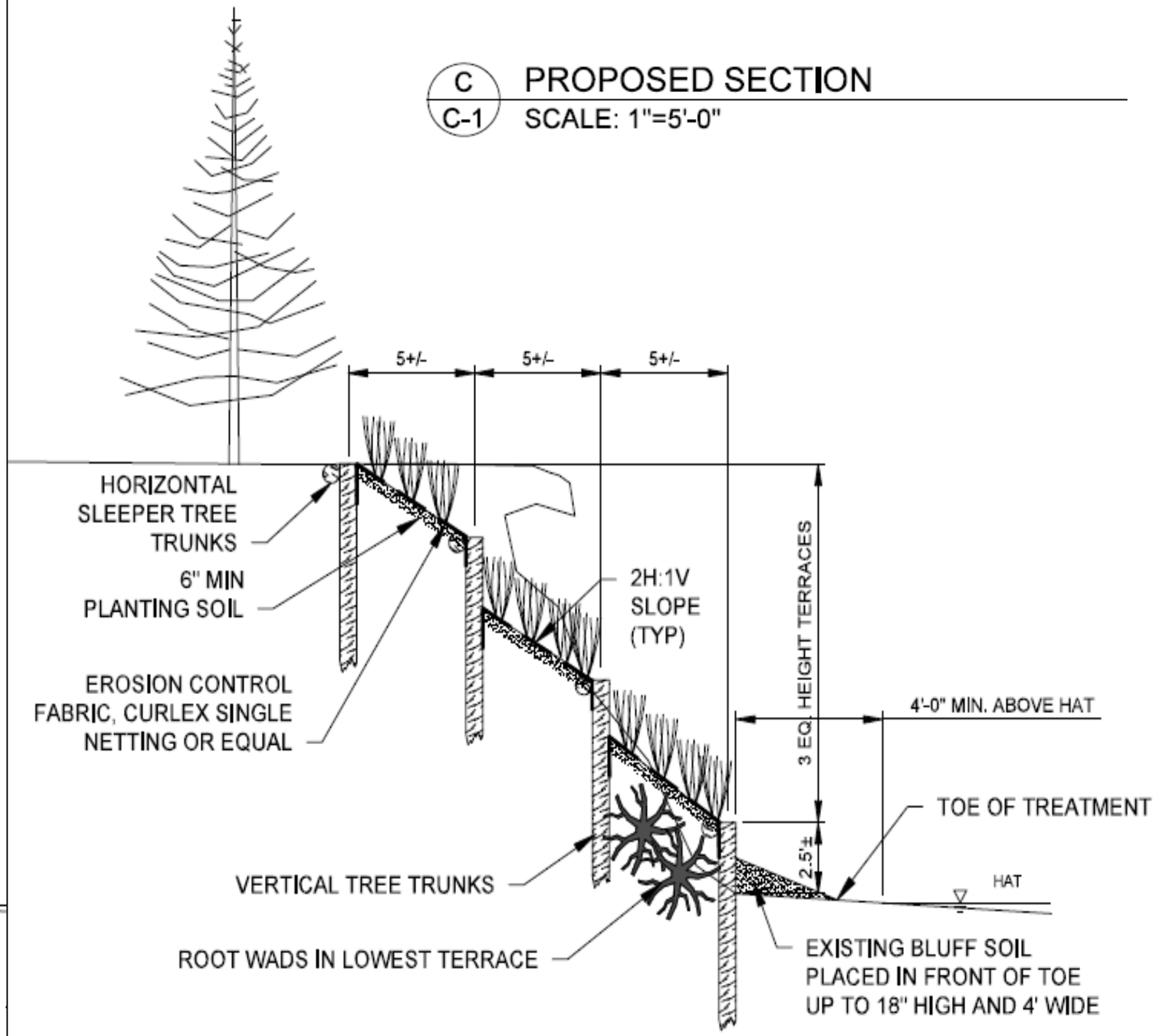
Solution? regrade bluff and beneficially reuse trees





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Lanes Island, Yarmouth, ME


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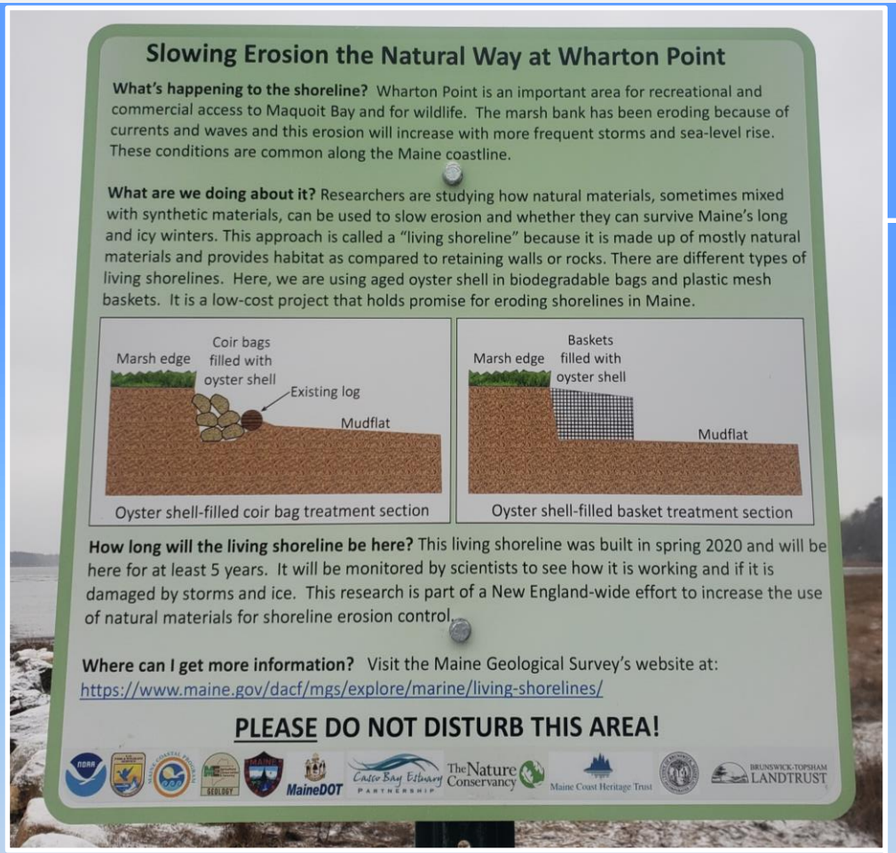
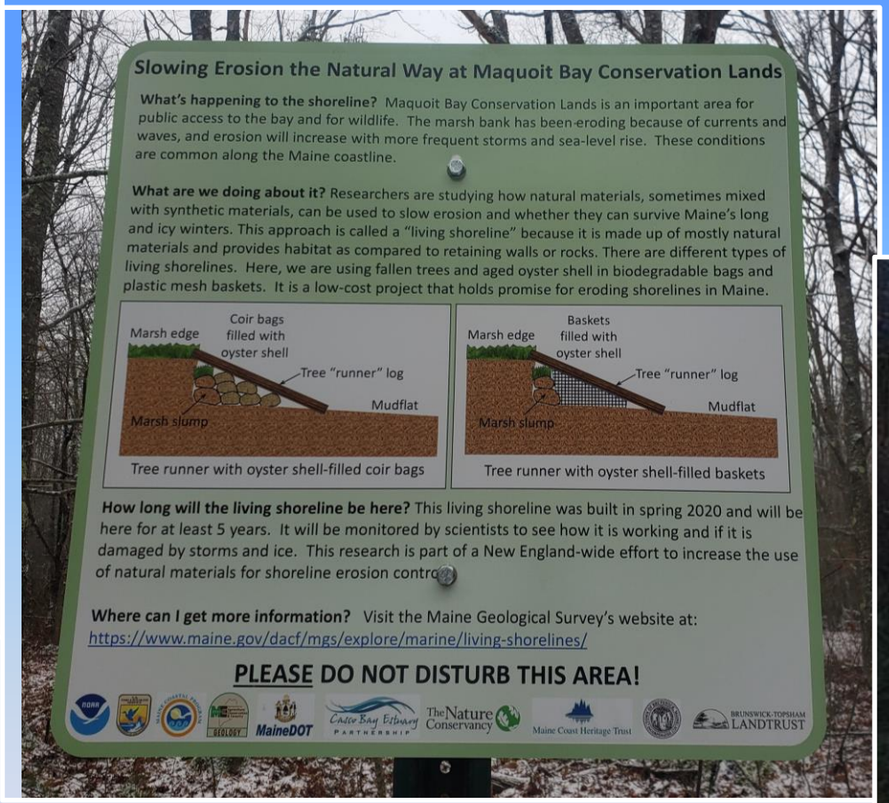
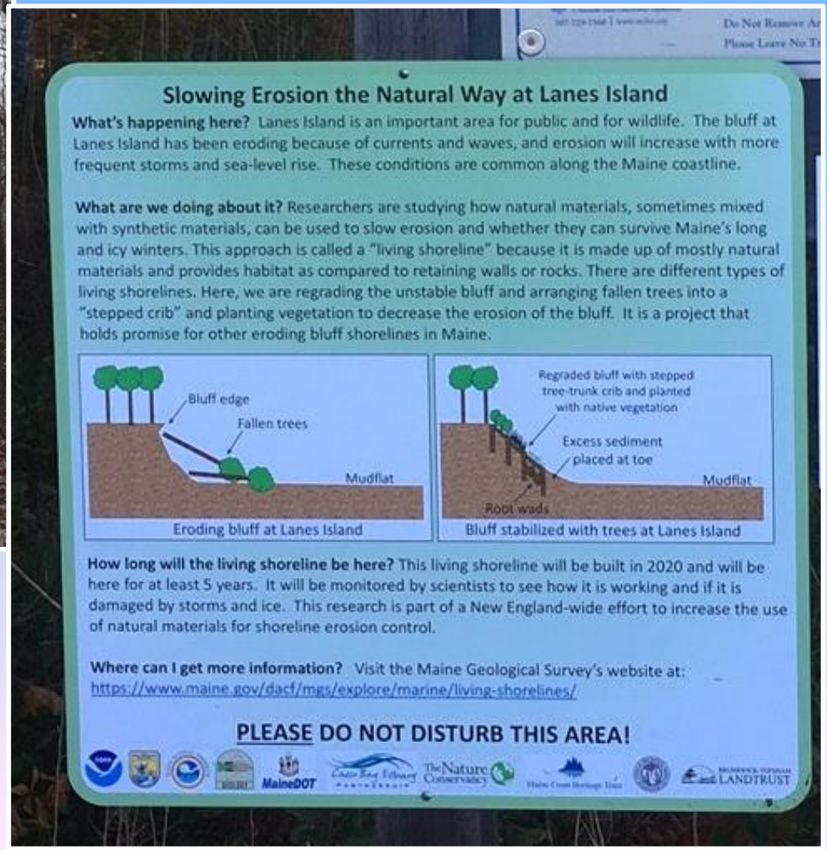
D. Bannon, GEI


J. Dallesander, SumCo

Informational Signage Placed at Each Site







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GEOLOGY

So how have the installations fared thus far?

R. Harbison, GPCOG

Wharton Point (since May 2020)

Minor settlement of GeoReef
Bags were re-staked and re-twined once
Wrack collects on bags

3 broken shell bags (poured out?)
Minor sedimentation/algae on bags
So far, *somewhat* storm-resistant

Maquoit Bay Conservation Lands (since May 2020)

Settlement of GeoReef

Little bag movement, no broken bags

Minor sedimentation in baskets

So far, pretty storm-resistant

some twisting and settling of logs

Bags were re-staked and re-twined once

Algae growth on bags

P.A. Slovinsky, 11-25-2020

Lanes Island, Yarmouth, ME Game Cam Images

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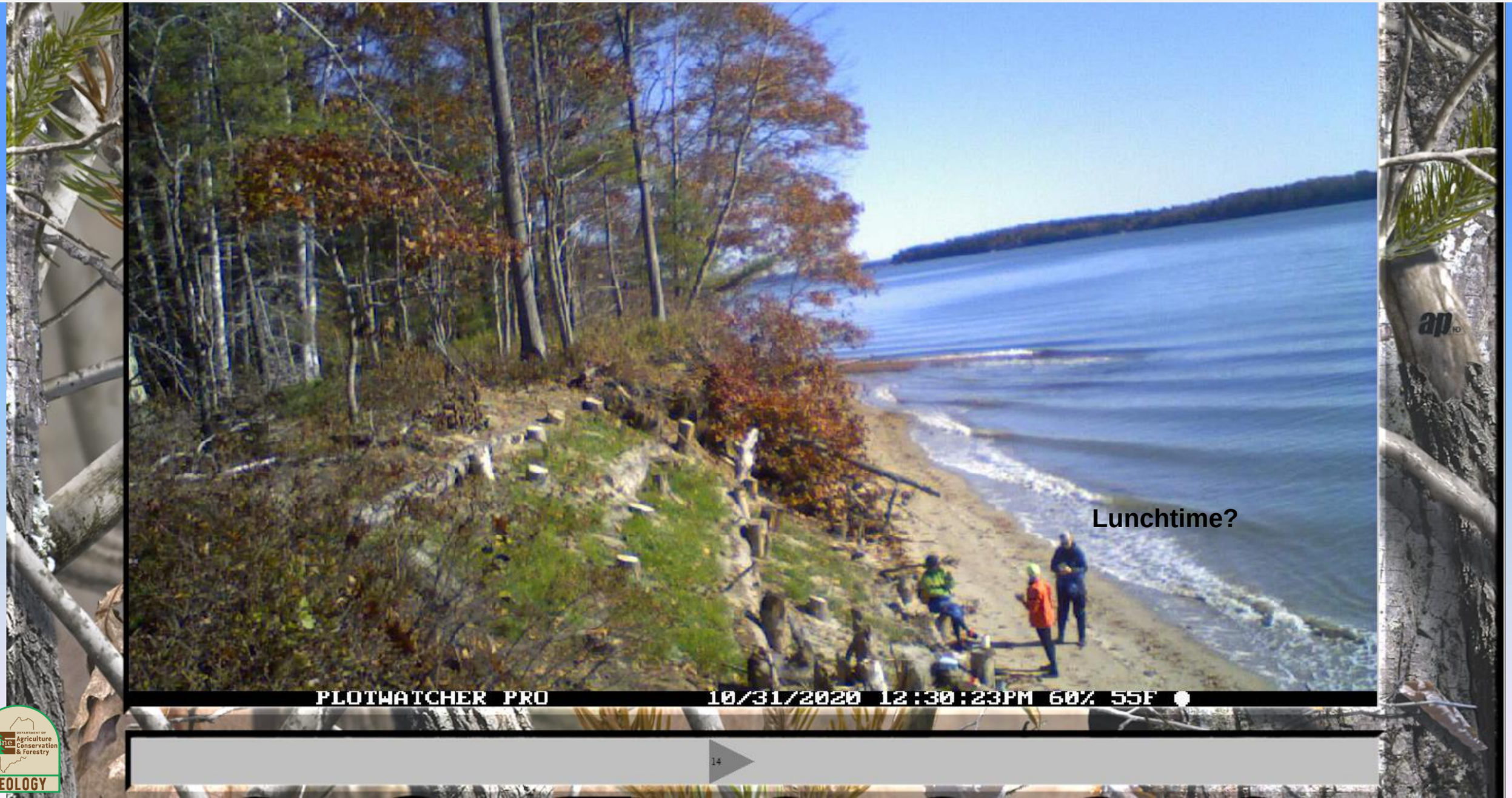
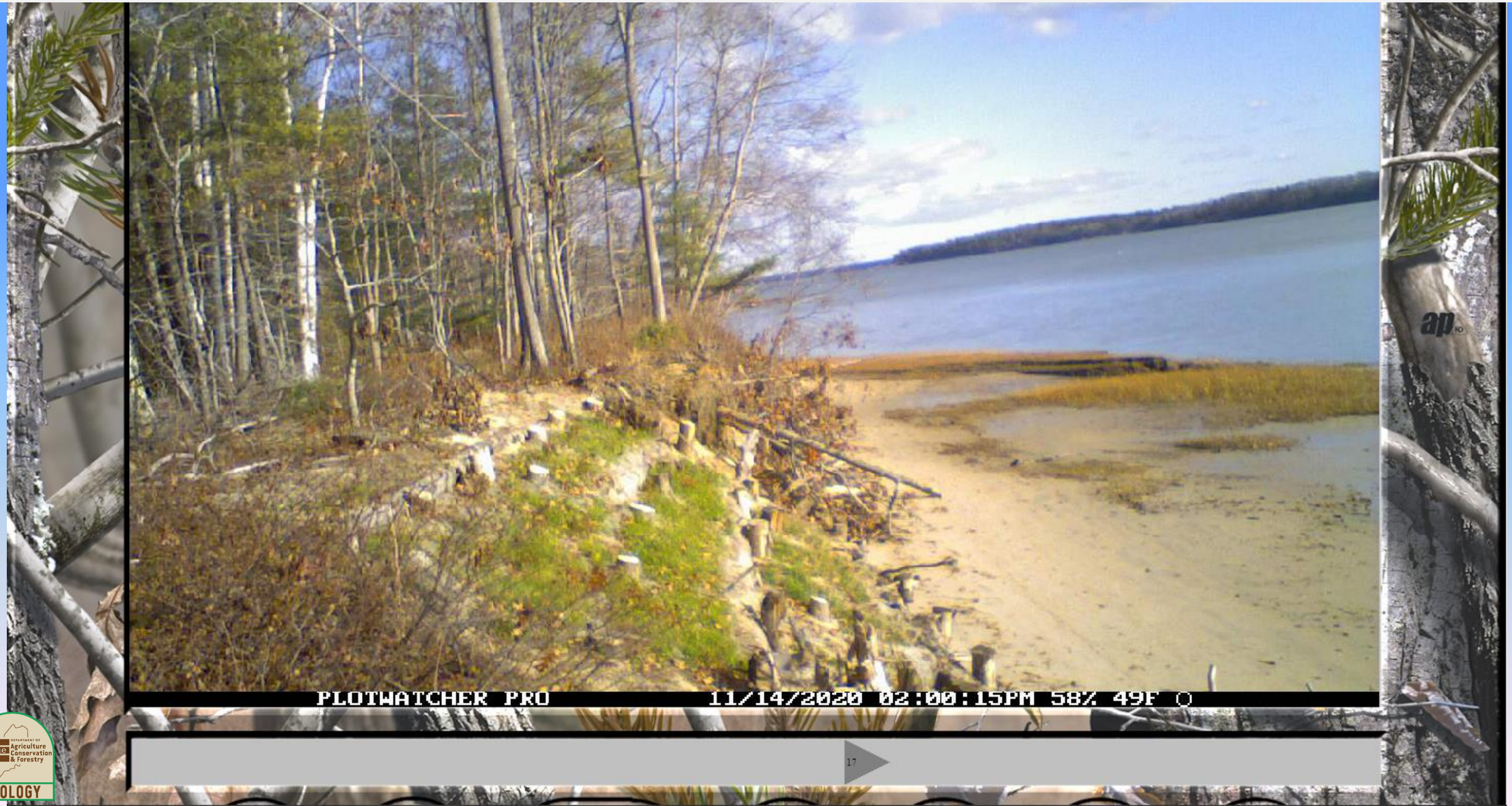
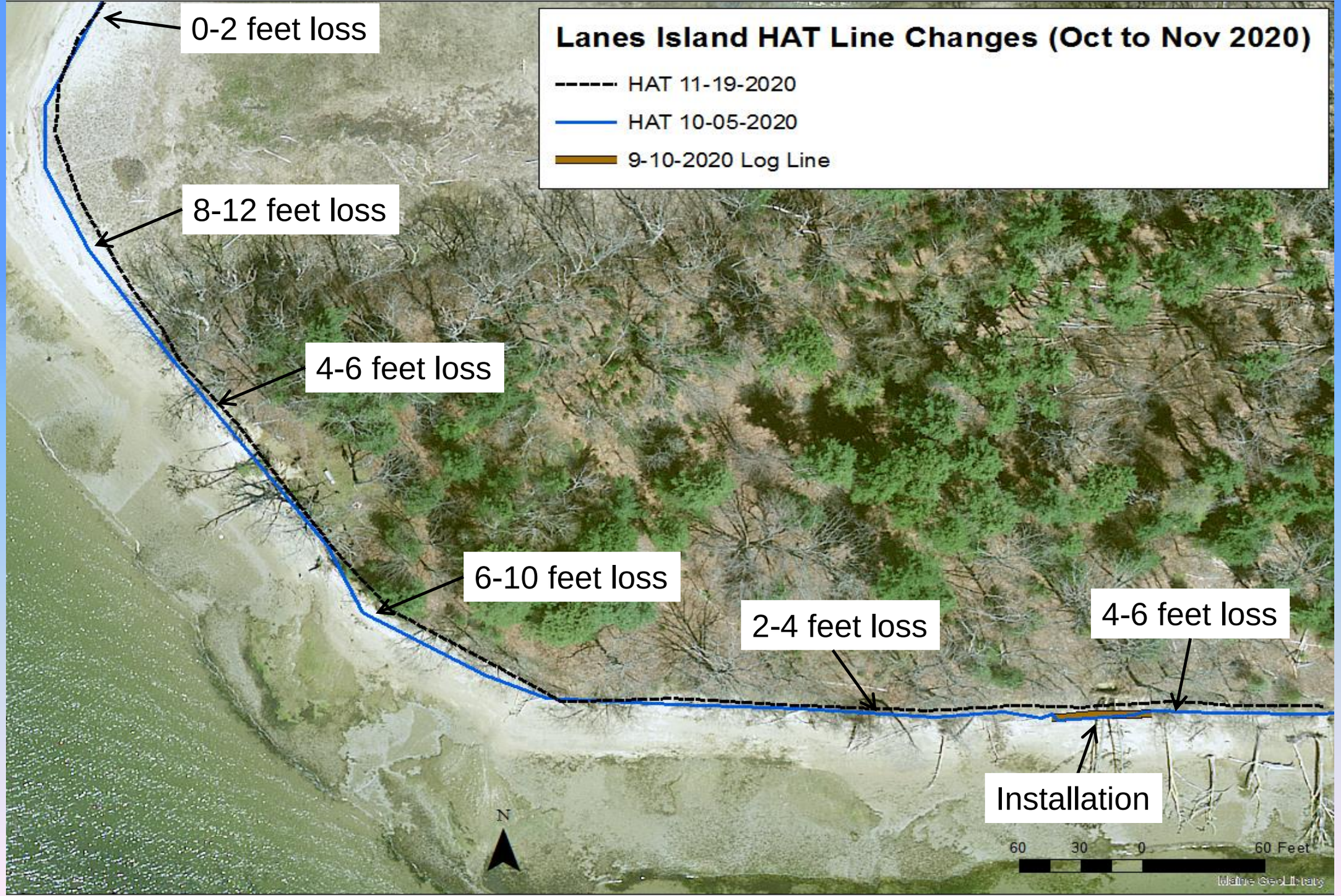


Lanes Island, Yarmouth, ME Game Cam Images



Lanes Island, Yarmouth, ME Game Cam Images

11/15-11/16 = 2 tidal cycles ≥12 feet MLLW + S to SE winds of 35-45 mph + waves
What did the 11/30-12/1 event do?


Lanes Island HAT Line Changes (Oct to Nov 2020)
HAT 11-19-2020
HAT 10-05-2020
9-10-2020 Log Line
0-2 feet loss
8-12 feet loss
4-6 feet loss
6-10 feet loss
2-4 feet loss
4-6 feet loss
Installation
N
60 30 0 60 Feet
Maine GeoLibrary

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Lanes Island (since Sept 2020)

- Erosion (~4-12 feet) of *bluff/dune in 11/15 storm (unclear about 11/30-12/1 event)*
- Extremely dynamic beach elevations along entire island
- Loss of sediment and plantings in first “step”; Lost game camera tree
- Change rate exceeded planned monitoring which precluded adaptive management
- Plan for moving forward – Do nothing? Maintain? Adapt? Remove?


P.A. Slovinsky, MGS, 11-19-2020


J. Arbuckle, MCHT, 11-28-2020


P.A. Slovinsky, MGS, 11-19-2020

DEPARTMENT OF Agriculture Conservation & Forestry
maine
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Some *Initial* Lessons Learned

- There are very few biodegradable options exist for living shoreline materials that might survive waves and winters in Maine. We may have found a resilient oyster shell bag along with a resilient synthetic basket design.

- Volunteer labor is appropriate and could be used for small, simple living shoreline installations that use shell bags and/or georeef-type materials. It would not be appropriate for large sites that require heavy machine work.

- Having an adaptable project team was key to being able to build the Brunswick sites and to find funding for and construct the Lanes Island site, especially during a pandemic.

- Messaging with stakeholders is key to avoid project challenges.

Some *Initial* Lessons Learned

- Construction and design of living shorelines needs to remain adaptable for difficult conditions (working around tides, access, storms, changing shoreline conditions) but should aim to match as-built plans as much as possible.

- A lack of historical shoreline change data at may have negatively influenced the siting of the treatment at Lanes Island.

- For demonstration treatments, access should be easy for construction and monitoring. Access at Lanes Island (deemed to be representative of "island construction") increased construction and monitoring difficulty and costs.

- Monitoring frequency was not geared towards dynamic and quick changes (at Lanes Island) and as such, adaptive management was difficult.

Some *Initial* Lessons Learned

- MGS living shoreline suitability rankings should be used for planning only and suitability determined through more in-depth, site specific information.

- Scale is important: small scale, 50-foot treatments may not be appropriate for determining efficacy of a treatment type along long shoreline lengths, especially dynamic ones.

- Extremely dynamic sites (even though they maintain natural living shorelines) may not be appropriate for certain types of living shoreline treatments (those that attempt to “stabilize” the shoreline).

- Regular maintenance should be expected with living shoreline installations.

Living Shoreline Demonstration Treatments in Casco Bay

State/Fed

Maine Department of Agriculture Conservation & Forestry GEOLOGY

Maine Coastal Program

Maine Dept. of Inland Fisheries and Wildlife

MaineDOT

U.S. Fish & Wildlife Service

NGO

The Nature Conservancy

Casco Bay Estuary Partnership

Maine Coast Heritage Trust

Municipal/NGO

Town of Brunswick, Maine Incorporated 1739

Brunswick-Topsham Landtrust

Contract:

GEI Consultants

SumCo Eco-Contracting

Special Thanks to:

Tensar

BMT Fibers Since 1922

Pipeline Specialists Team EJP Everett J. Prescott, Inc.

Higmo's Inc. Lumber • Music • Logging

Smith Boatyard

With participation from:

Department of Environmental Protection State of Maine

Maine Marine Resources

US Army Corps of Engineers

NOAA National Oceanic and Atmospheric Administration U.S. Department of Commerce

United States Environmental Protection Agency

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