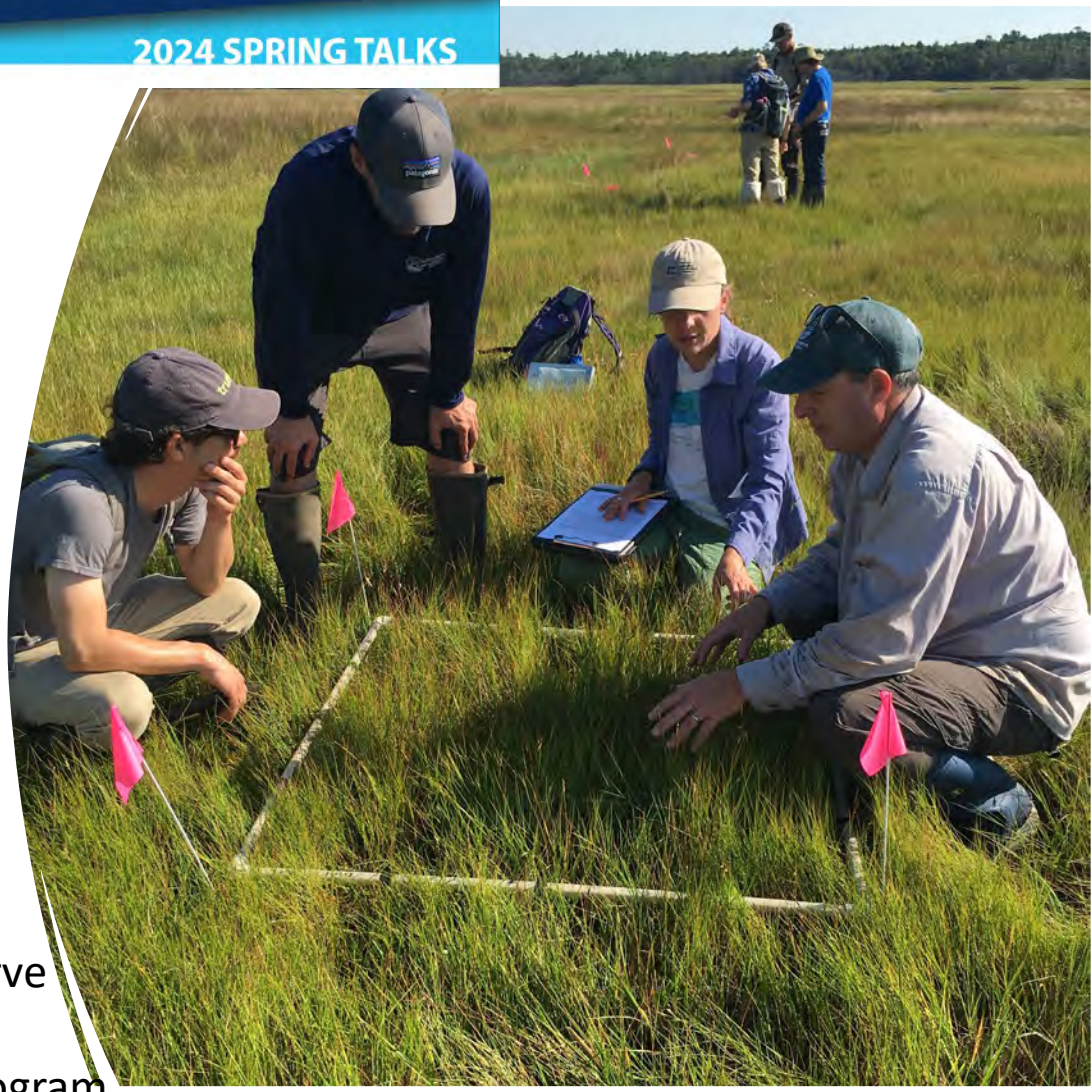
Senator George J. Mitchell
Center for Sustainability Solutions

THE UNIVERSITY OF MAINE

2024 SPRING TALKS

Marshes for Maine's Future

January 29, 2024



Christine Feurt Ph D
Director Coastal Training Program
Wells National Estuarine Research Reserve
Research Associate
School of Marine and Environmental Program
University of New England
cfeurt@wellsnerr.org

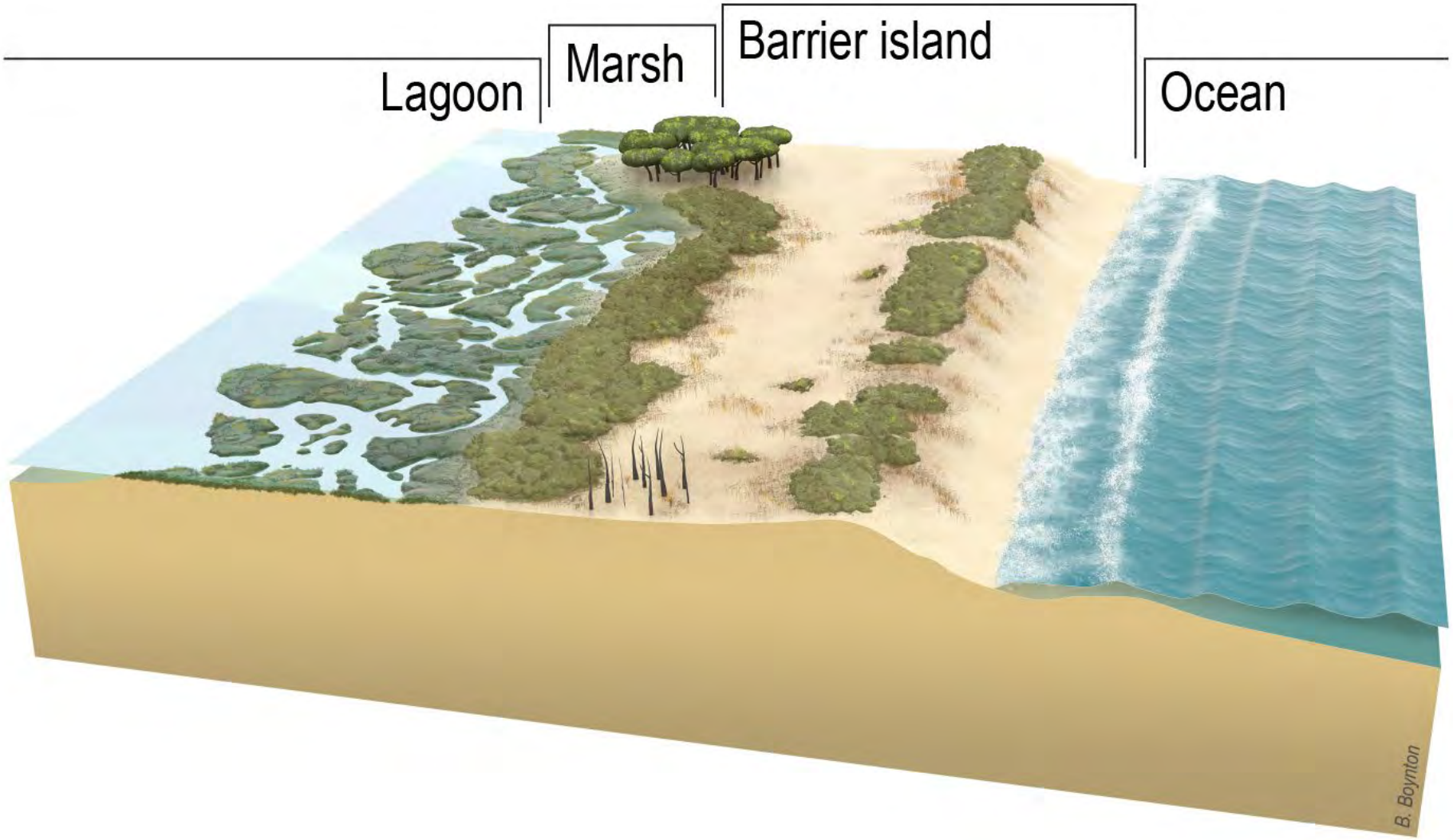

wellsreserve
Wells National Estuarine
Research Reserve

UNE

UNIVERSITY OF
NEW ENGLAND

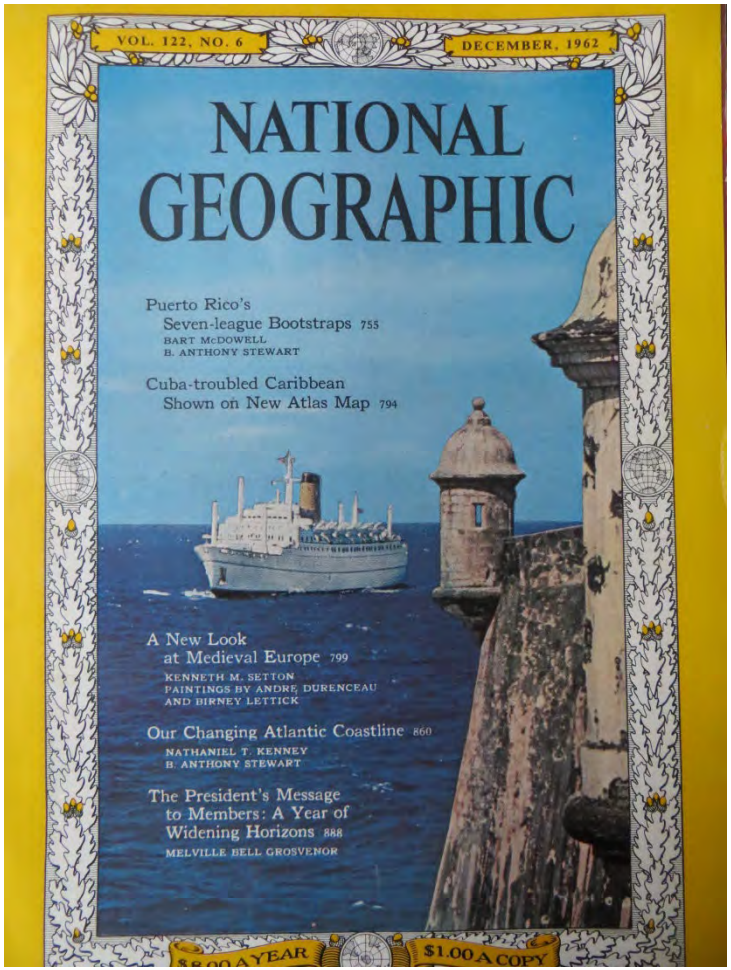
INNOVATION FOR A HEALTHIER PLANET

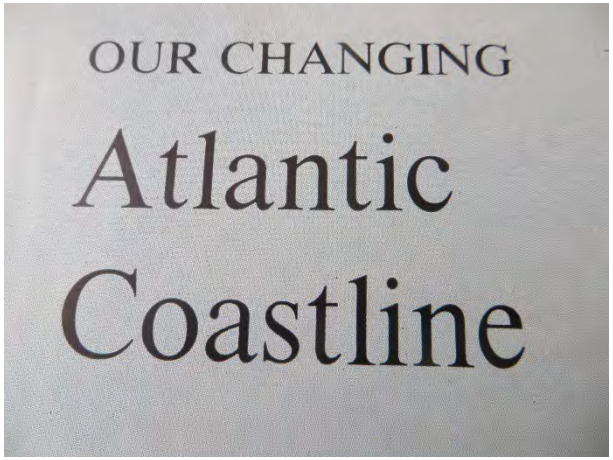

Princess Anne
WORCESTER
SOMERSET
Snow Hill
Pocomoke City
Crisfield
Virginia
Chincoteague
ACCOMACK
Eastern
NORTHAMPTON



USGS 2018

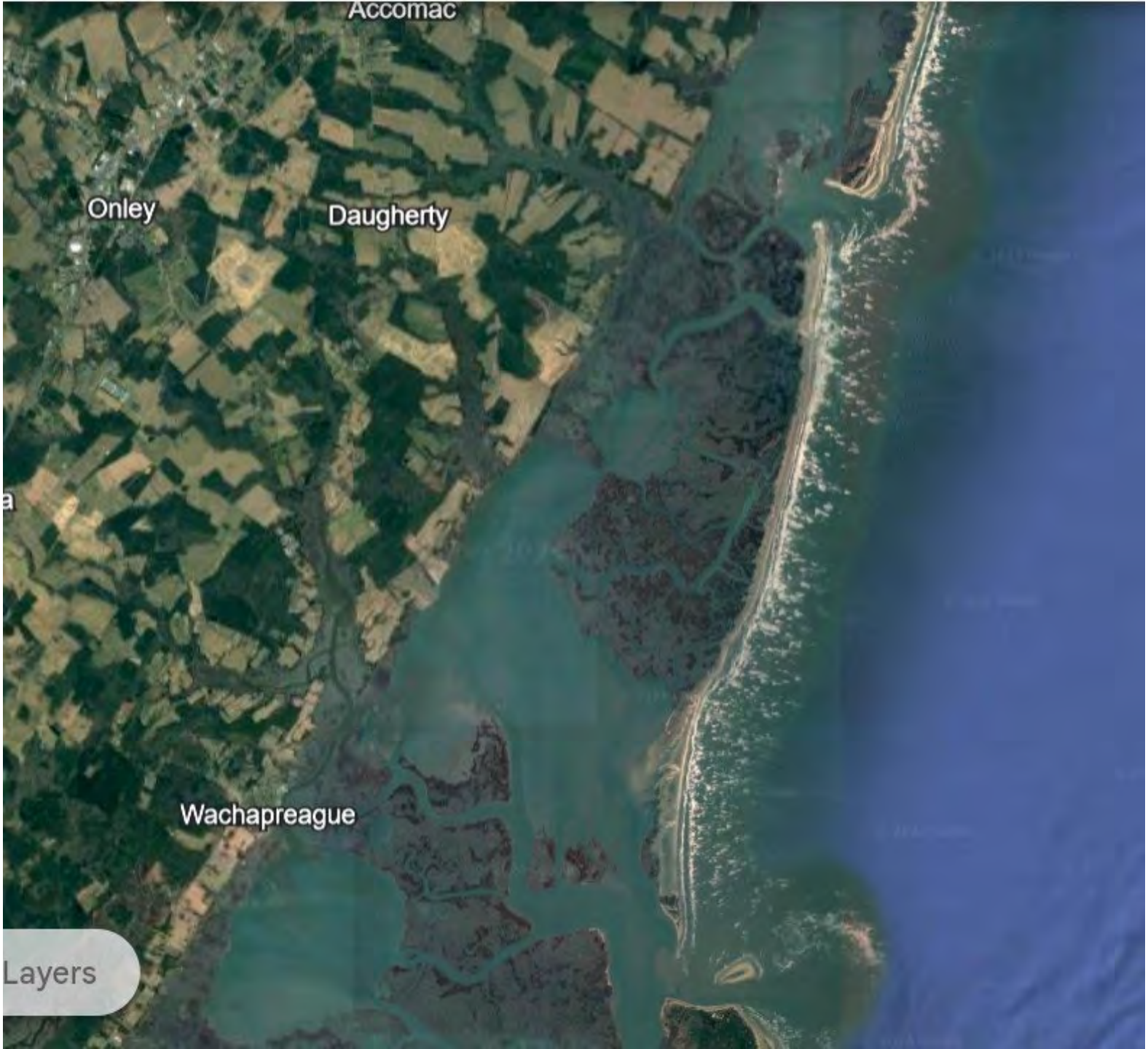
https://www.usgs.gov/media/images/illustration-describes-barrier-island-ocean-lagoon

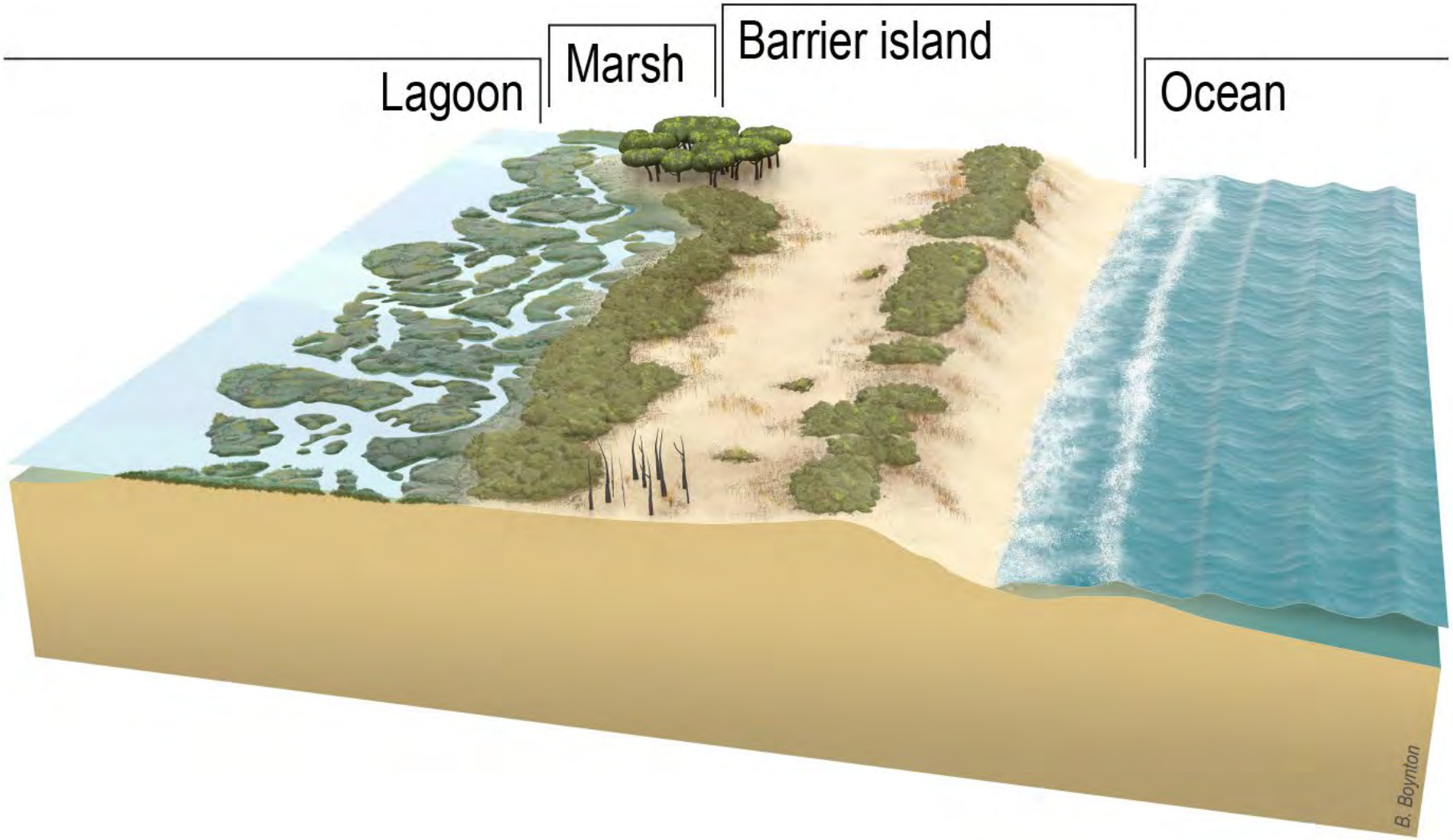




The Ash Wednesday Storm
March 6, 1962

Chincoteague Bay
Field Station


Accomac
Onley
Daugherty
Wachapreague
Layers



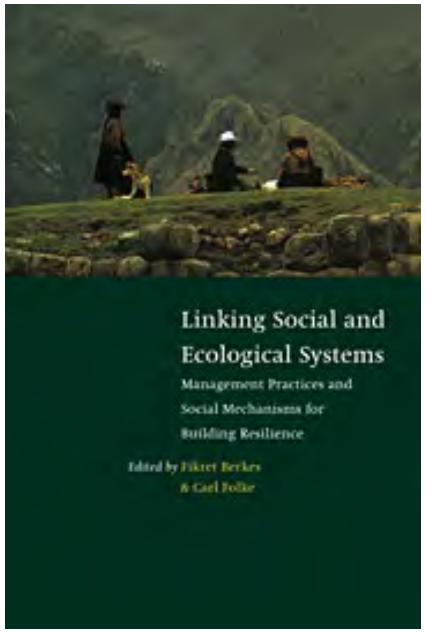
USGS 2018

https://www.usgs.gov/media/images/illustration-describes-barrier-island-ocean-lagoon

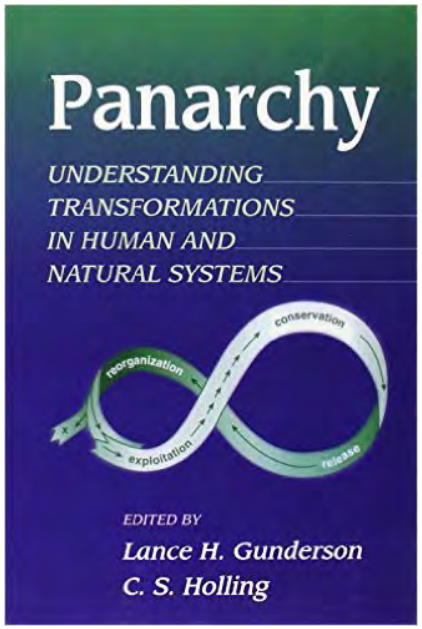
https://www.bayjournal.com/news/climate_change/last-cedar-island-house-slips-into-sea/article_5cd1fcb8-6cec-5dd4-8bb7-0f6a44d2a80a.html

Evolving Perspectives in Ecosystem Resilience

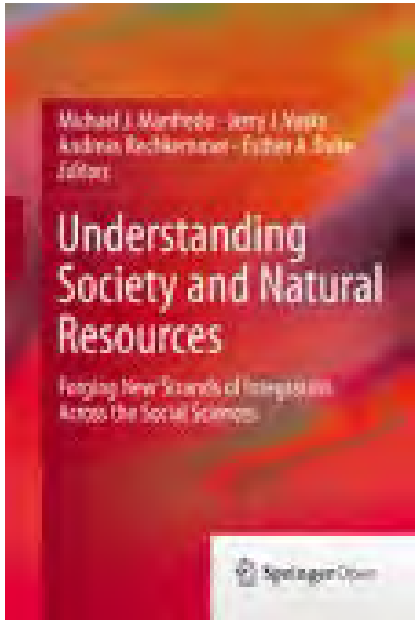
1995



1998

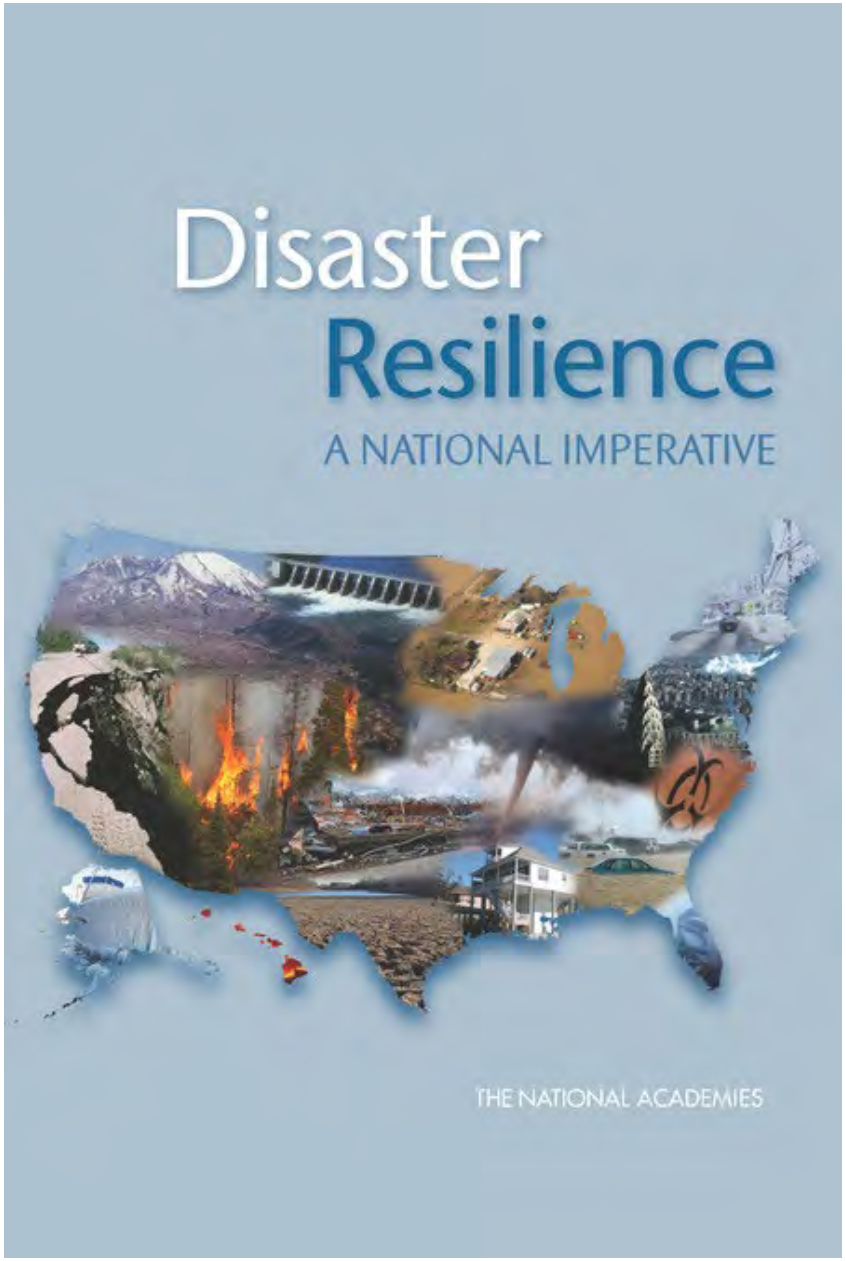


2002



2014

The 45 year legacy of Canadian ecologist “Buzz” Holling
*Holling, C.S. (1973). "Resilience and stability of ecological systems". Annual Review of Ecology and Systematics. **4**: 1–23.*



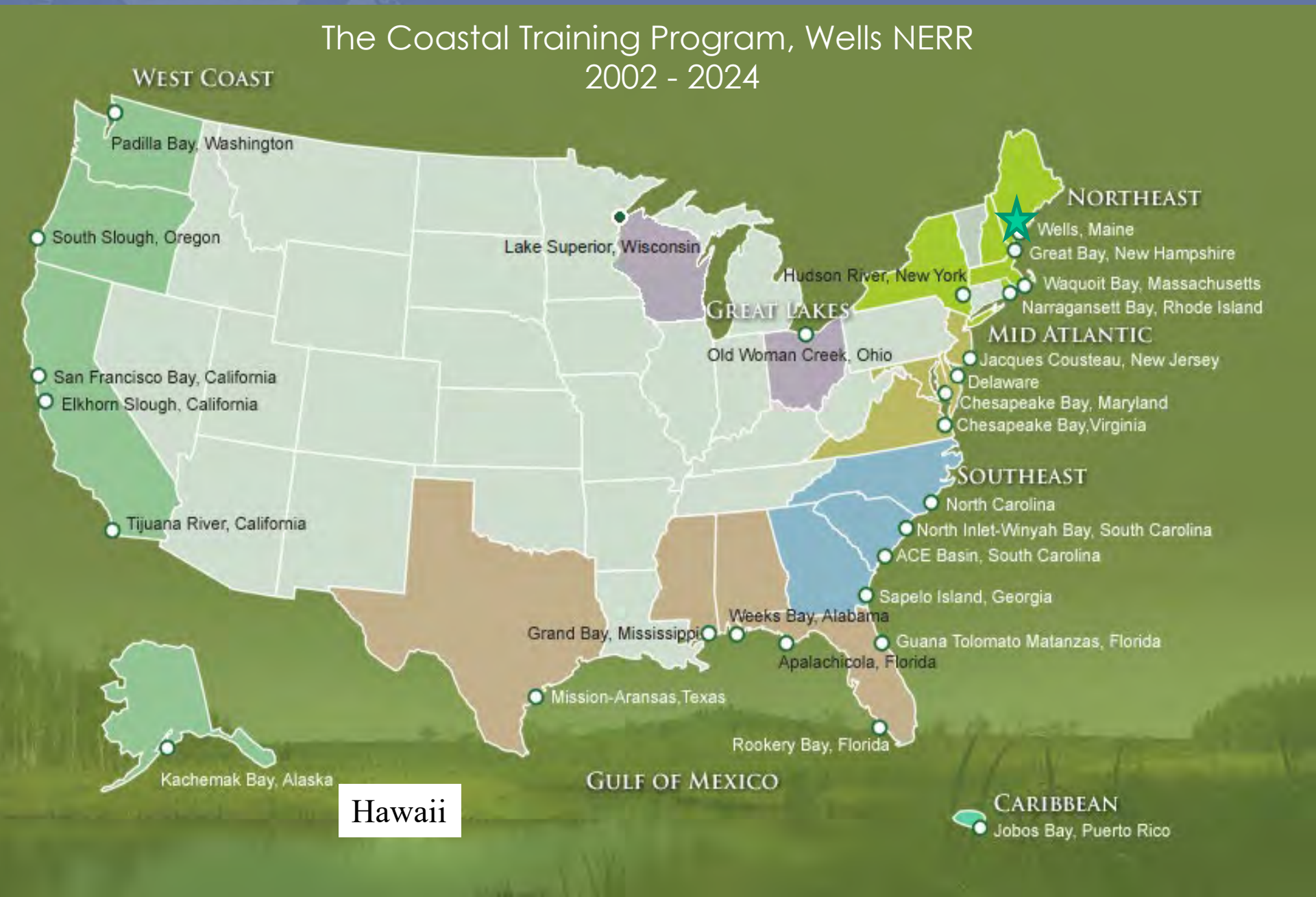
Social Resilience

Resilience is the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events.

https://www.nap.edu/catalog/13457/disaster-resilience-a-national-imperative

Resilient estuaries and coastal watersheds—
Where human and natural communities thrive

The National Estuarine Research Reserve System

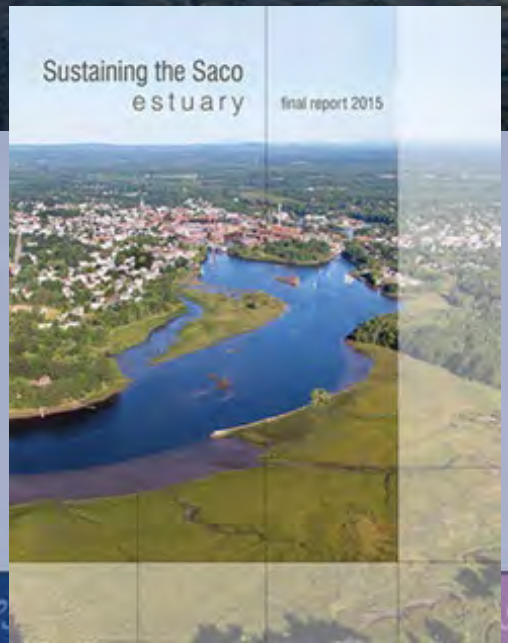


Collaborative Learning

"A framework and set of techniques intended for multiparty decision situations… A means of designing and implementing a series of events to promote creative thought, constructive debate and the effective implementation of proposals that the stakeholders generate."

Working Through Environmental Conflict
The Collaborative Learning Approach
By Steven E. Daniels and Gregg B. Walker (2001)

Sustaining Quality of Place and Ecosystem Health in the Saco River Estuary 2009 - 2014



wellsreserve
Wells National Estuarine Research Reserve

MAINE EPSCoR

NSF

i'm meSSi!
maine's sustainability solutions initiative

UNE
UNIVERSITY OF NEW ENGLAND
College of Arts and Sciences

Tidal Marshes reflect ‘textbook’ ecological gradient from saline to fresh

Dr Pamela Morgan and students


Saco River Corridor Commission
Biddeford-Saco Chamber of Commerce and Industry
Town of Saco: Planning Board, Conservation Commission
Saco Valley Land Trust
Saco River Salmon Club
Biddeford Saco Water
Coastal Waters Commission
Biddeford Pool Land Trust
Town of Biddeford: Planning Board, Open Space Committee, Conservation Commission, Shellfish Conservation Committee
State of Maine: DEP, DMR, DIFW
Wells National Estuarine Research Reserve
Rachel Carson National Wildlife Refuge
Friends of Wood Island Lighthouse
SACO
Saco School District
Saco Spirit
Rumery's Boat Yard
BIDDEFORD
Heart of Biddeford
Biddeford School District
Blandings Park Wildlife Sanctuary
Marston's Marina
A Stewardship Network Sustains the Saco Estuary
60 Fish Species
The Saco River estuary has the highest number of fish species --including adult and larval fish caught in the river and bay -- recorded in any Maine estuary.
About the Stewardship Network
Many people care for the Saco Estuary. Together they form a Stewardship Network protecting water, wildlife and habitats. Residents, visitors and businesses benefit from the efforts of the Stewardship Network. The surprisingly diverse collection of plants, birds and fish discovered by UNE and Wells Reserve researchers is a consequence of the cumulative actions taken by these people to sustain the Saco Estuary and the values most important to the people who live work and play in the region.
133 Bird Species
Nearly half of all bird species in Maine have been observed using the Saco River estuary. Many of the species are not commonly associated with estuaries.
360 Acres of Tidal Marsh
Three types of tidal marshes --salt, brackish, and freshwater-- occur here. These marshes improve water quality and provide habitat for many kinds of wildlife.
10 Rare Plants
A surprising diversity of plants live in these marshes, including ten species that are rare in Maine and/or nationally.
Saco Bay Tackle
Camp Ellis
University of New England
This research is part of Maine's Sustainability Solutions Initiative, a program of the Senator George J. Mitchell Center, which is supported by National Science Foundation award EPS-0904155 to Maine EPSCoR at the University of Maine.
MollyMaps 2014

Salt Marsh Impacts of Relict Agricultural Features to Surface Water Hydrology and Secondary Succession

University of New Hampshire
Coastal Habitat Restoration Team

David Burdick, Director, Jackson Estuarine Laboratory, School of Marine Science and Ocean Engineering, University of New Hampshire david.burdick@unh.edu

Susan Adamowicz, LMRD Biologist, Parker River NWR, Rachel Carson NWR, USFWS

Geoff Wilson, Principal, Northeast Wetland Restoration and Bear Creek Wildlife Sanctuary

University of New Hampshire
School of Marine Science and Ocean Engineering

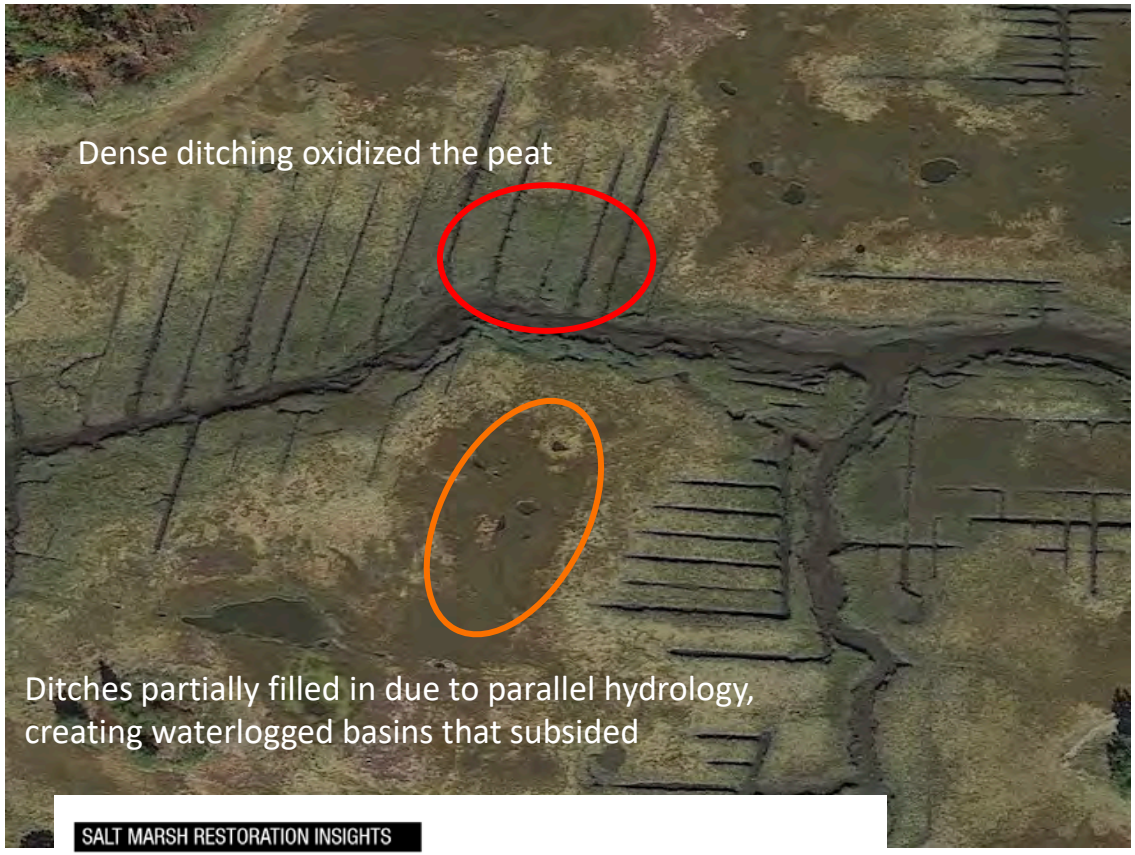
BEARCREEK
WILDLIFE SANCTUARY

U.S. FISH & WILDLIFE SERVICE

SMARTeams
Saltmarsh Sparrow Initiative

In New England, farmers abandoned their infrastructure but continued to cut salt hay

Project in Maine with the Kennebec Estuary Land Trust



So, by the time photography emerged, most of the farming was merely cutting the salt hay

SMARTeams
Saltmarsh Sparrow Initiative

SALT MARSH RESTORATION INSIGHTS

Farmers in the Marsh: Lessons from History and Case Studies for the Future

Susan C. Adamowicz[1], Geoffrey Wilson[2], David M. Burdick[3], Wenley Ferguson[4], and Russell Hopping[5]

Wetland Science and Practice July 2020

Climate Ready Coast - Southern Maine

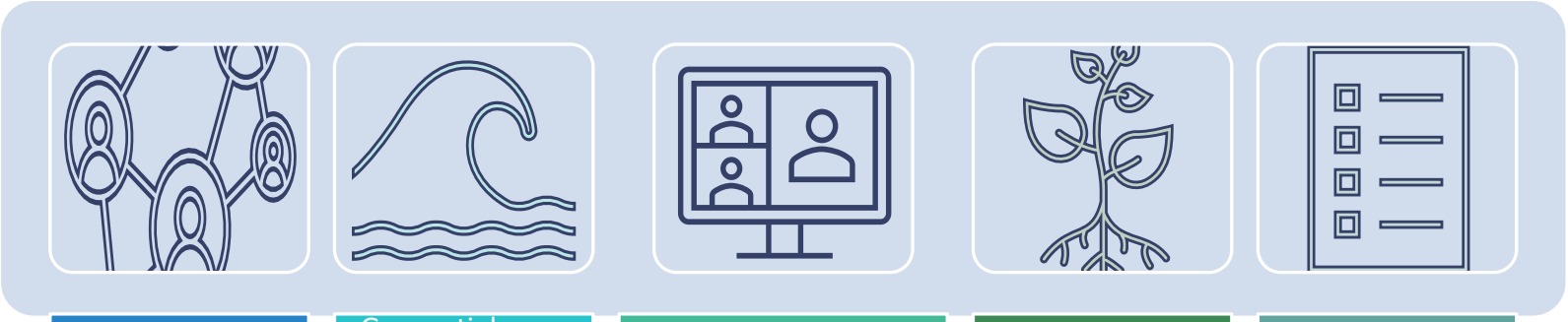
Climate Ready Coast - Southern Maine

A Regional Coastal Resilience Plan for Southern Maine

November 2023

https://storymaps.arcgis.com/stories/4b1a578fa6f84e8b83593c17d9c824aa

Project Tasks



Assessment of Resilience Needs and Socio-Economic Conditions

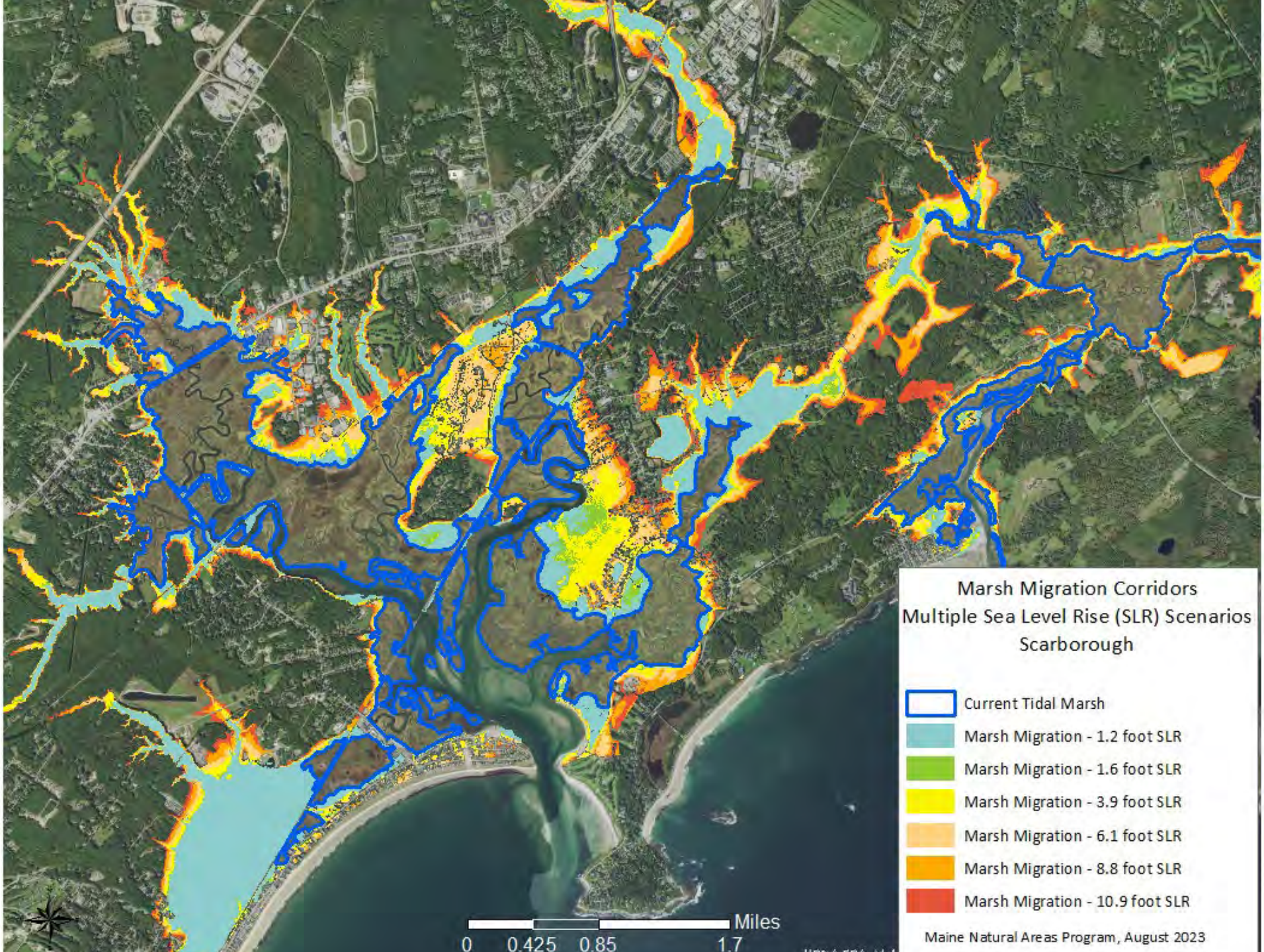
Geospatial Vulnerability Assessment

- Coastal hazards
- Infrastructure
- Social vulnerability
- Natural resources

Stakeholder Engagement

Identify & Prioritize Resilience Projects

Regional Coastal Resilience Plan


Marsh Migration Corridors
Multiple Sea Level Rise (SLR) Scenarios
Scarborough
Current Tidal Marsh
Marsh Migration - 1.2 foot SLR
Marsh Migration - 1.6 foot SLR
Marsh Migration - 3.9 foot SLR
Marsh Migration - 6.1 foot SLR
Marsh Migration - 8.8 foot SLR
Marsh Migration - 10.9 foot SLR
Maine Natural Areas Program, August 2023
Miles
0
0.425
0.85
1.7

Marshes for Maine's Future

Estuaries and Coasts (2024) 47:1–17
https://doi.org/10.1007/s12237-023-01275-x

MANAGEMENT APPLICATIONS

Check for updates

Using Geospatial Analysis to Guide Marsh Restoration in Chesapeake Bay and Beyond

Neil K. Ganju[1] · Katherine V. Ackerman[1] · Zafer Defne[1]

Received: 18 July 2023 / Revised: 25 August 2023 / Accepted: 1 September 2023 / Published online: 13 September 2023

Coastal Wetland Synthesis geonarrative:
https://geonarrative.usgs.gov/uscoastalwetlandsynthesis/

This project introduces marsh managers to two USGS geospatial products that link landscape integrity with coastal hazards.

- The restoration decision matrix based on the UVVR and elevation capital
- The marsh life span calculator

https://www.usgs.gov/centers/whcmsc/science/coastal-change-likelihood

Organizations Participating in the *Marshes for Maine's Future* Project

1. Casco Bay Estuary Partnership*
2. Downeast Salmon Federation*
3. Ducks Unlimited
4. Maine Coast Heritage Trust*
5. Maine Geological Survey
6. Maine Natural Areas Program
7. Maine Sea Grant
8. National Oceanic and Atmospheric Administration (NOAA)
9. Southern Maine Planning and Development Commission (SMPDC)
10. The Nature Conservancy (Maine)*
11. US Fish and Wildlife Service (USFWS)*
    - Atlantic Coast Joint Venture
    - Gulf of Maine Coastal Program
    - Rachel Carson National Wildlife Refuge
12. US Geological Survey, Woods Hole Coastal and Marine Science Center
13. Viewshed Consulting*
14. Wells National Estuarine Research Reserve*

*Included in *Marshes for Maine's Future* session at Maine Sustainability and Water Conference

This project was developed by marsh conservation and management decision makers working in Maine who use geospatial products in their work to:

1. Identify and prioritize potential marsh conservation areas
2. Evaluate restoration strategies
3. Develop projects using nature-based solutions
4. Manage wetland habitats for biodiversity conservation

Marshes for Maine's Future
Engaging *the Kaleidoscope Of Expertise*

Adapt
Regulations,
Ordinances &
Enforcement

Land
Conservation

Migration
Pathways

Planning &
Land Use
Management

Restoration

Nature-based
Approaches

Engineering
Public Works

Science: Marsh
Research &
Monitoring

Community/

Businesss/ NGO
Marsh
Stewardship

Education &
Community
Outreach

Do you know
Someone who will
be celebrating
New Year's Eve
December 31, 2099?