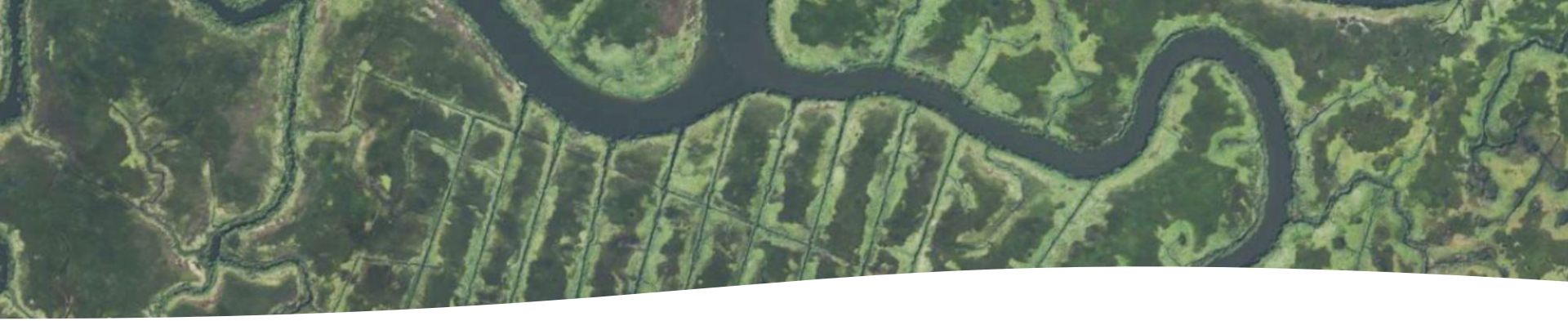


Coastal and Submerged Vegetation Workgroup

NROC Meeting - May 15, 2025

Sintra Reves-Sohn and Brian Yellen

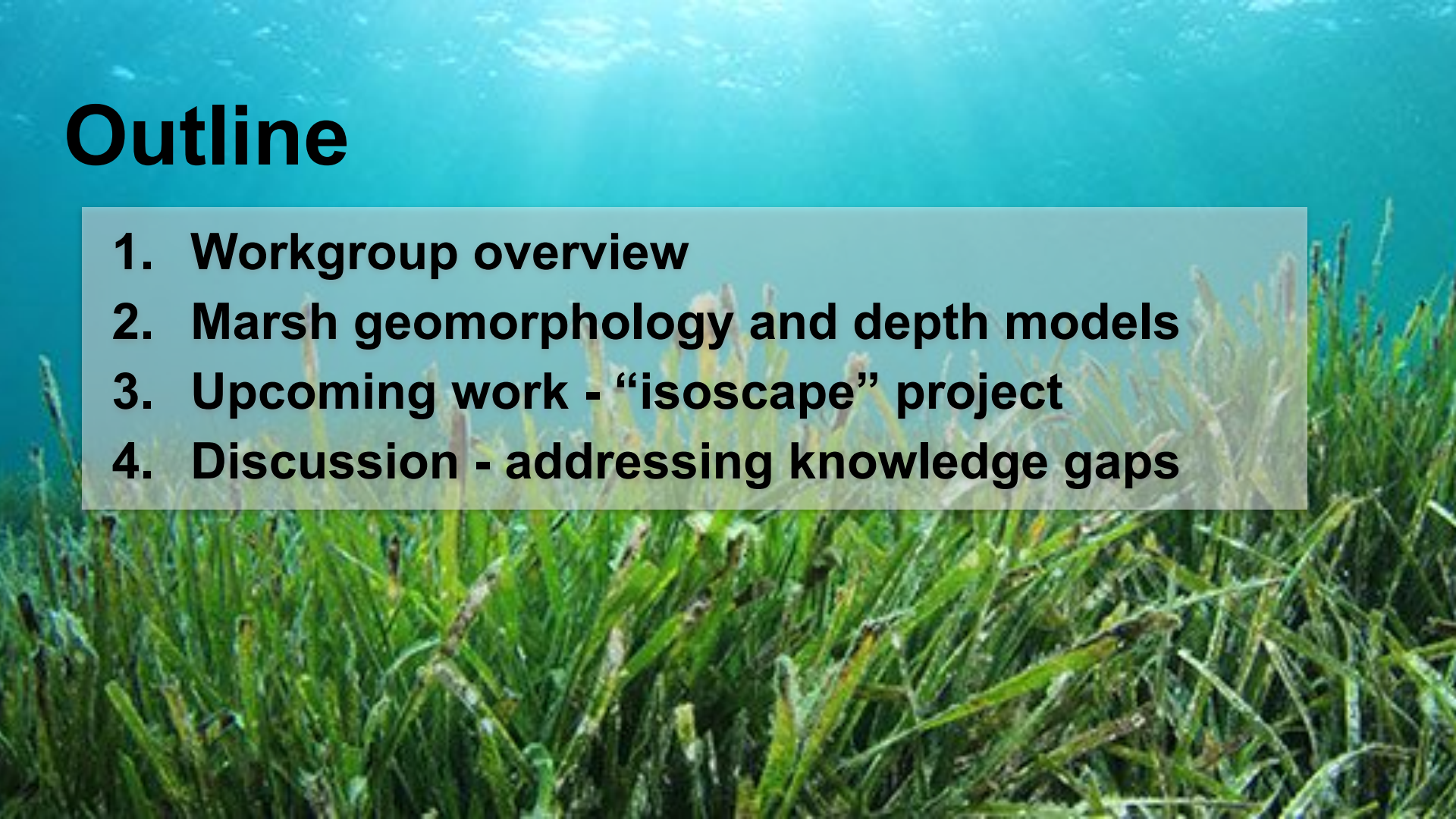
NROC
Northeast Regional Ocean Council

University of Massachusetts Amherst

MASSACHUSETTS GEOLOGICAL SURVEY

Outline

1. Workgroup overview
2. Marsh geomorphology and depth models
3. Upcoming work - “isoscape” project
4. Discussion - addressing knowledge gaps



1. Coastal Vegetation Workgroup

NROC Coastal Vegetation Workgroup

- **Coordination**: federal and state scientists, academic scientists, and managers
- **Mapping**: Identify critical knowledge gaps and management-relevant data products
- **Processes**: Advance knowledge of Northeast US coastal sediment biogeochemical processes

Overarching goal - scientists and managers collaborating to advance coastal management practices that incorporate carbon as part of holistic resilience decision making (in progress).

Past work - detailed maps of marsh and eelgrass sediment properties.

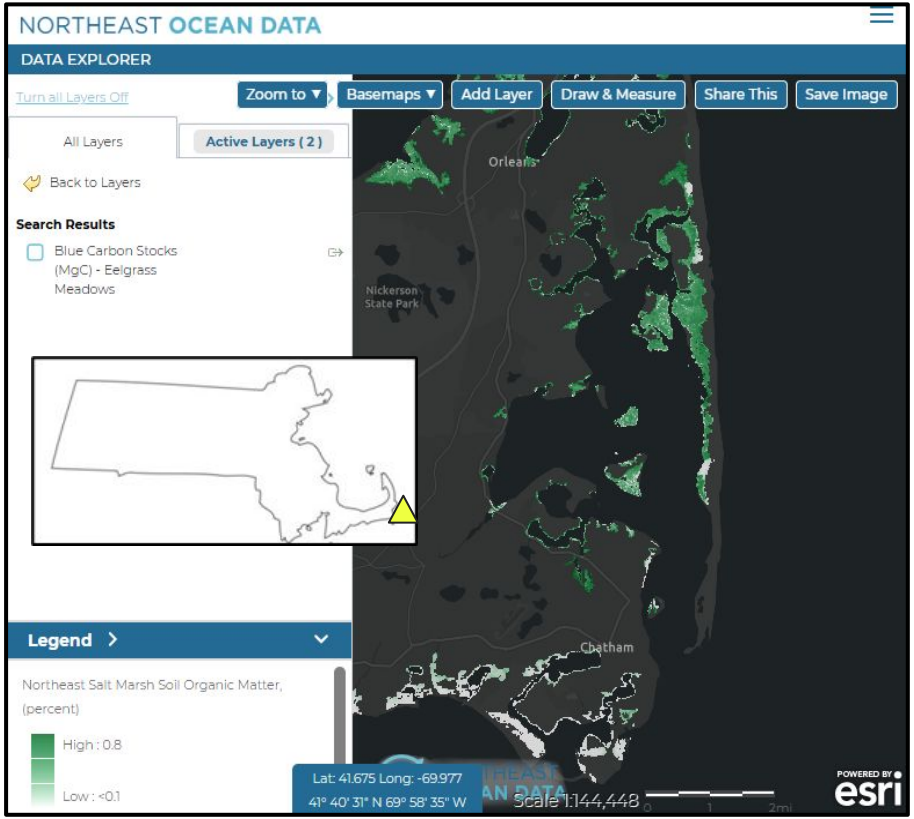
NROC Coastal Vegetation Workgroup

Next meeting - May 28 at 10 am (Virtual). All are welcome

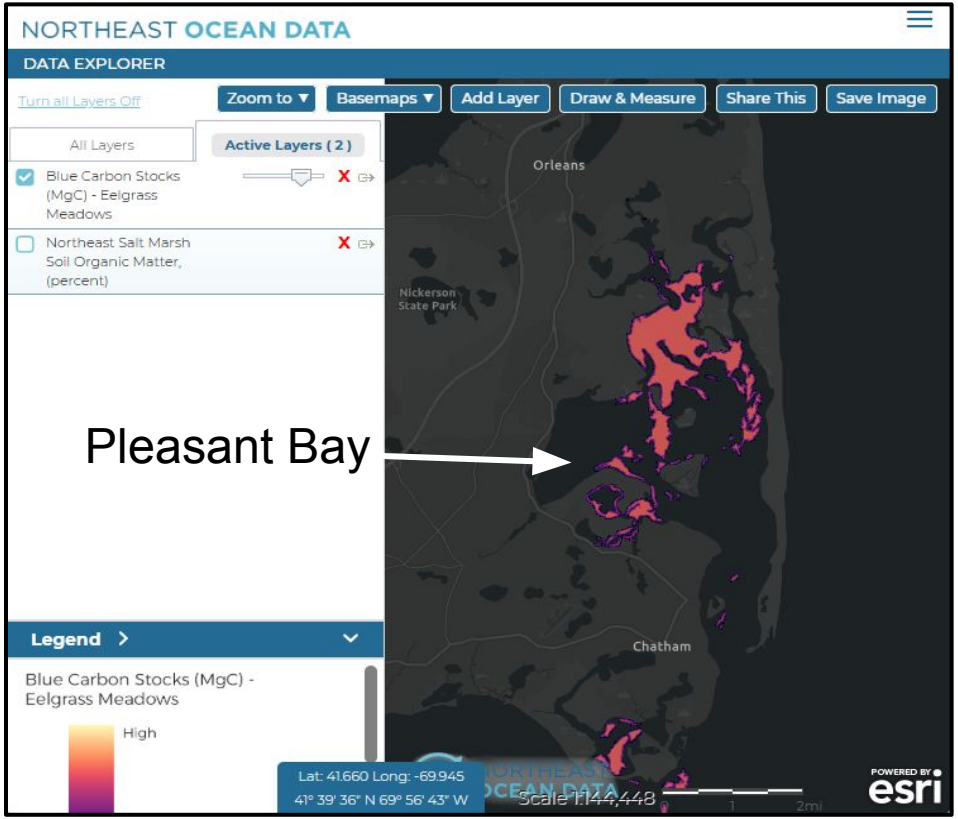
Alyssa Novak
Amy Trice
Angela Brewer
Beth Lawrence
Beverly Johnson
Brian Yellen
Chris Elphick
Claire Enterline
David Burdick
Dennis Deziel
Emily Shumchenia
Gail Chmura
Ivy Mlsna
Juliet Simpson
Kalle Matso
Kevin Kroeger
Kristen Puryear
Maggie Payne
Meagan Eagle
Megan Christian
Megan Tyrrell
Melisa Wong
Mike Bradley
Mike McHugh
Nick Napoli
Pam Morgan
Peter Edwards
Phil Colarusso
Rob Tunstead
Robert Vincent
Skye Wills
Steve Crooks
Steve Monteith
Susan Adamowicz
Sylvia Troost
Trevor Mattera
Zamir Libohova
Erin Rooney
Ekundayo Adeleke

Past work - marsh and eelgrass sediment properties

Salt marsh organic content



Eelgrass carbon stocks



Past work - publications

Region 1

The Blue Carbon Reservoirs from Maine to Long Island, NY

March 2023

www.epa.gov/region1

JGR Biogeosciences

RESEARCH ARTICLE

10.1029/2024JG008254

Key Points:

- Optical remote sensing captures ecogeomorphic drivers of soil organic carbon (SOC) spatial variability in salt marshes
- Remote sensing indices capture SOC variability with image acquired at high

Blue Carbon Mapping Using Temporally Optimized Satellite Remote Sensing Imagery: A Regional Study of Northeast US Salt Marshes

Wenxiu Teng[1], Qian Yu[1], Brian Yellen[1], Bonnie Turek[2], and Jonathan D. Woodruff[1]

[1]Department of Earth, Geographic, and Climate Sciences, University of Massachusetts Amherst, Amherst, MA, USA, [2]U.S. Fish and Wildlife Service, Gulf of Maine Coastal Program, Falmouth, ME, USA

JGR Earth Surface

RESEARCH ARTICLE

10.1029/2024JF007676

Key Points:

- Geomorphic position within a marsh plays a key role in soil development and carbon content, supporting carbon

Modeling Spatial Distributions of Salt Marsh Blue Carbon Using Morphometric Parameters From Lidar

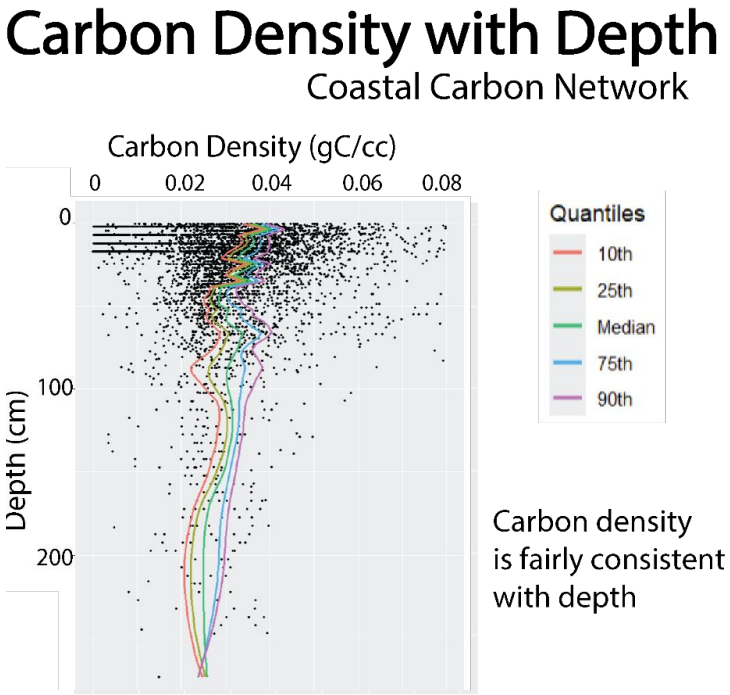
B. Turek[1,2], W. Teng[1], Q. Yu[1], B. Yellen[1], and J. Woodruff[1]

[1]Department of Earth, Geographic, and Climate Sciences, University of Massachusetts Amherst, Amherst, MA, USA, [2]U.S. Fish and Wildlife Service, Gulf of Maine Coastal Program, Falmouth, ME, USA

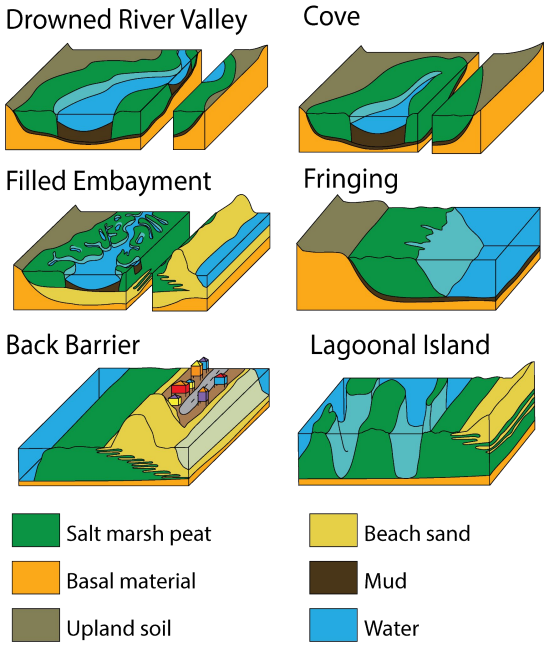
2. Recent work:
Geomorphic controls on marsh depth

Critical knowledge gap: depth of salt marshes in Northeast US

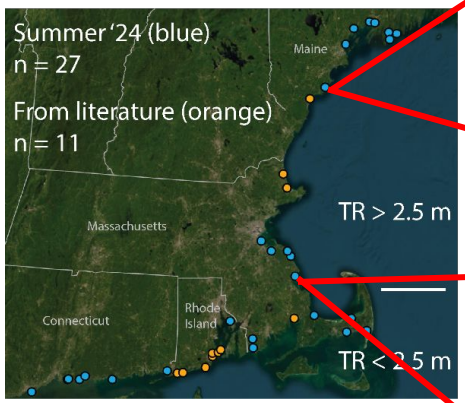
Meg, Dylan, and Sintra measuring peat thickness of a salt marsh on Cape Cod, MA



At last NROC presentation: geomorphic conceptual diagram, data collection, preliminary findings



Site locations



Example probe locations

Goose Rocks, Kennebunkport, ME
Filled Embayment and Back Barrier

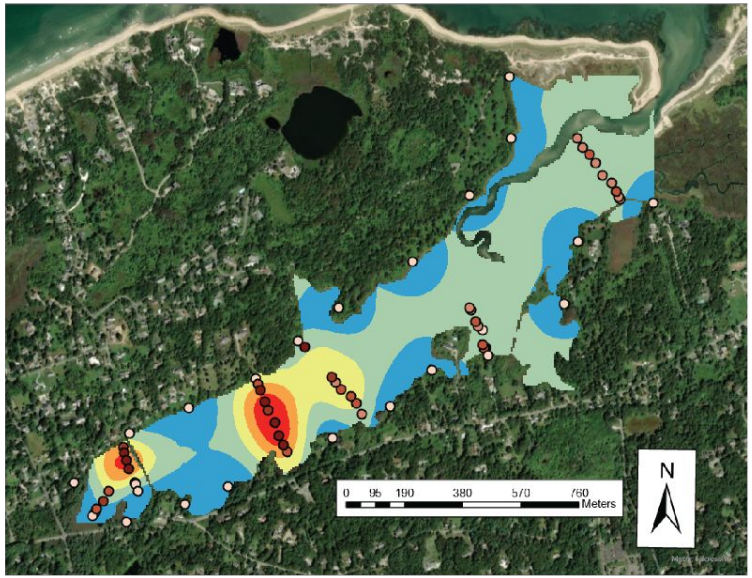
Bluefish River, Duxbury, MA
Drowned River Valley

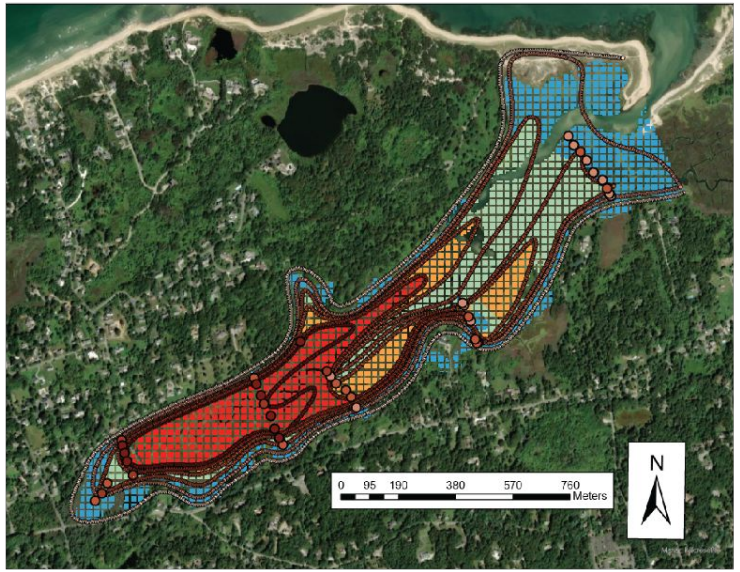
Depth to refusal (m)
0 - 1
1 - 2
2 - 3
3 - 4
4 - 4.9
4.9 +

Since last presentation: compared modeling strategies

Modeling depths: Interpolation vs. Contour

Example: Quivett Creek, Dennis, Cape Cod, MA





0 - 1.5 m

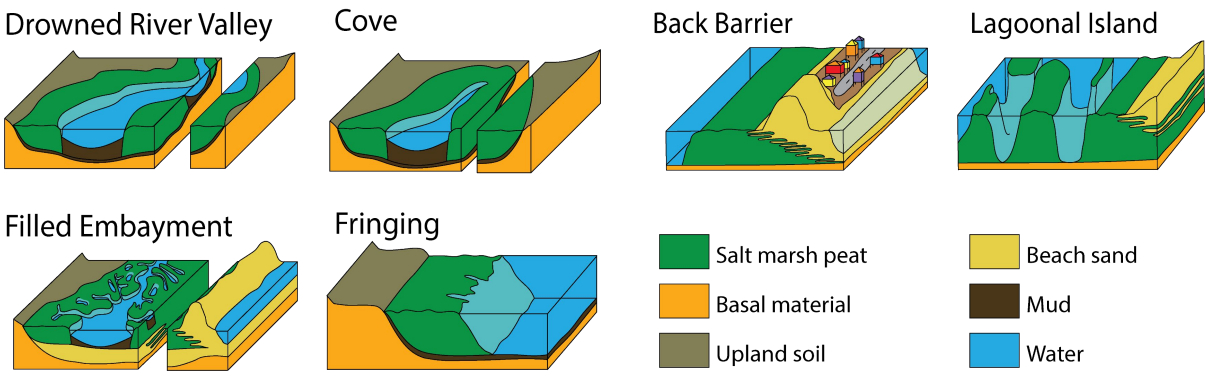
1.5 - 2.1 m

2.1 - 2.7 m

2.7 - 3.3 m

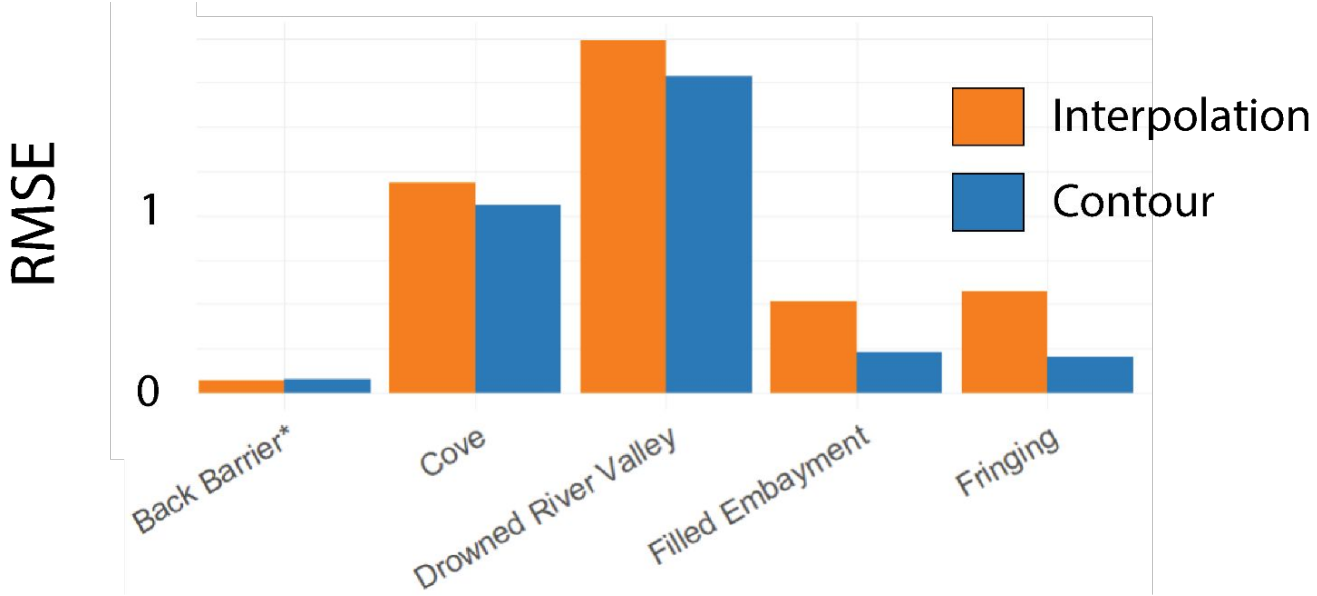
3.3 + m

Reminder:
Geomorphic Types

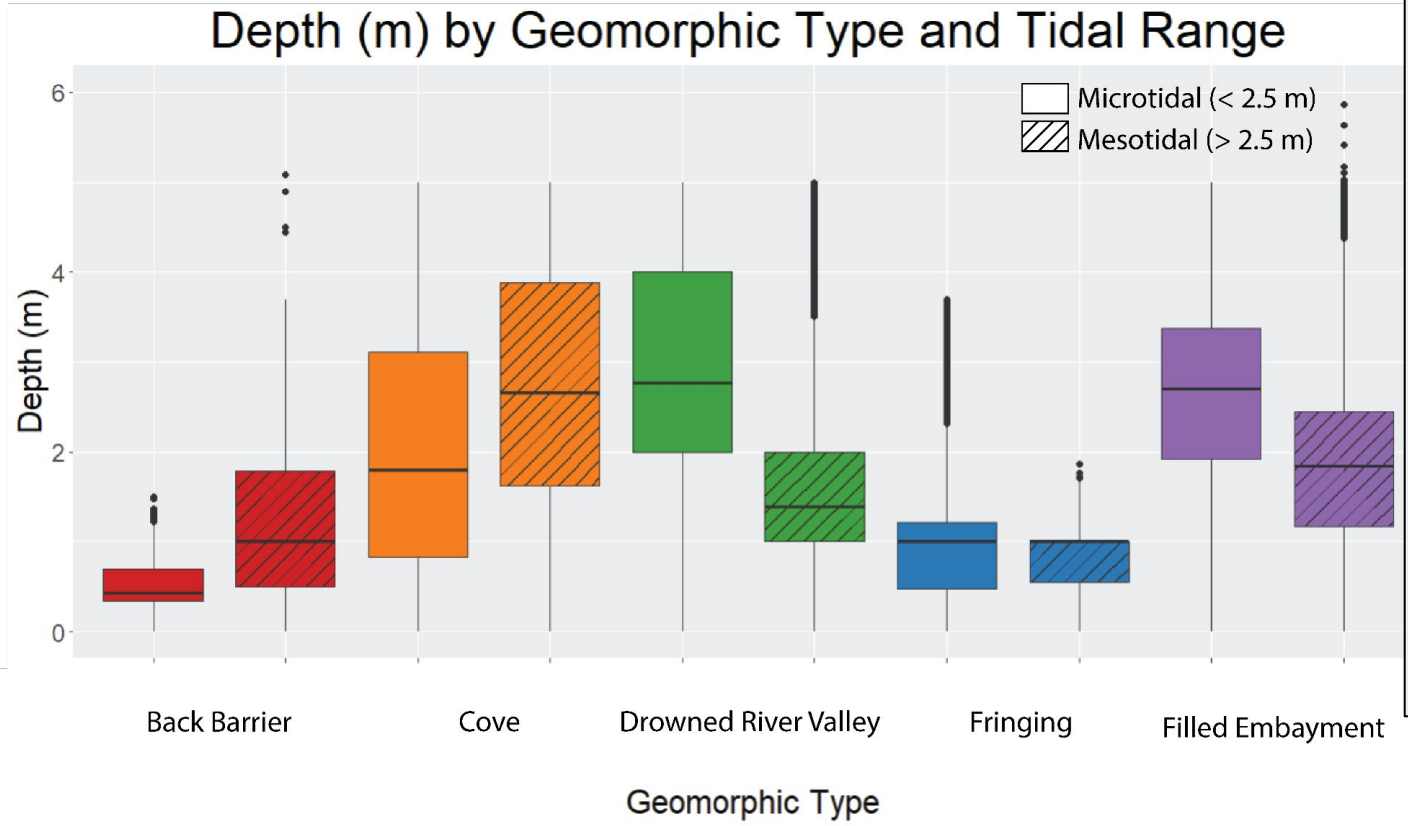


Root Mean Squared Error for Interpolation vs. Contour Models

*Back barrier was averaged, not contoured



Since last presentation: explored depth as function of geomorphic setting



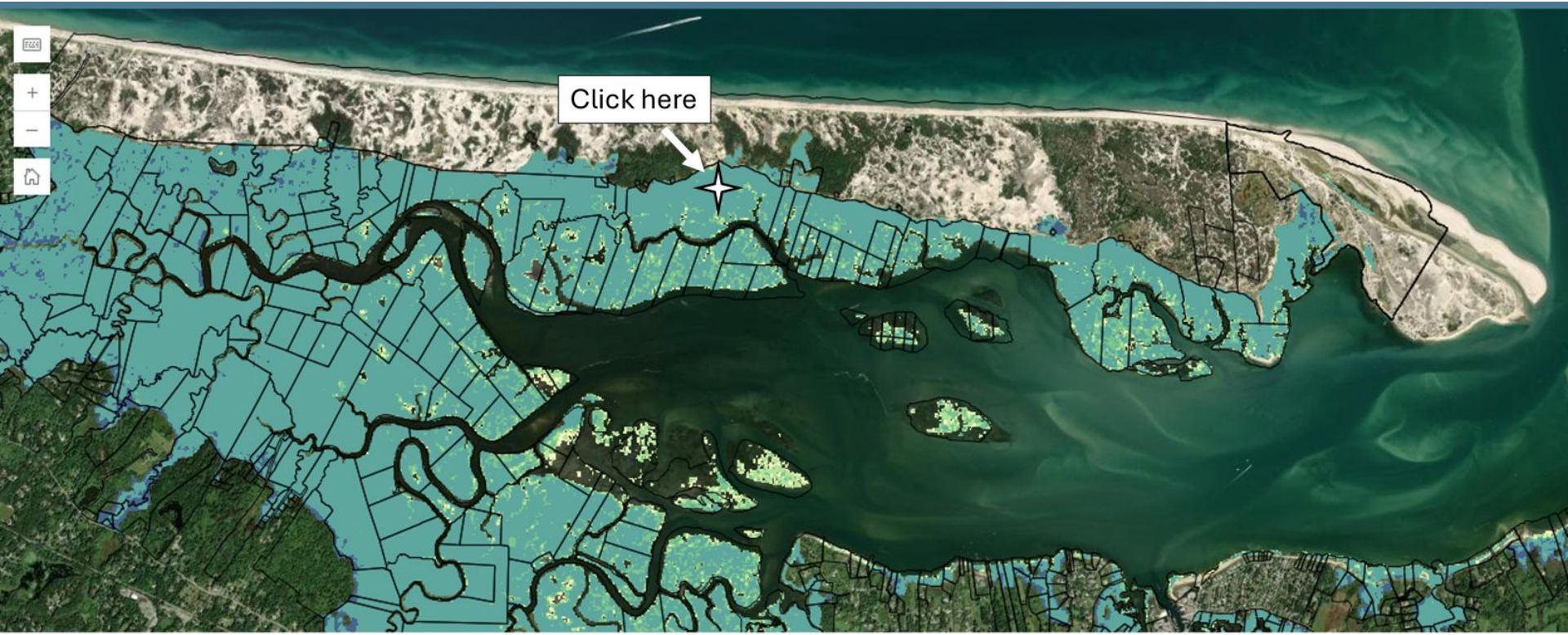
Average peat depth ~1.9 m (differences in geomorphic type)

Salt marsh degradation affects whole peat column

Completion of work in August ‘25

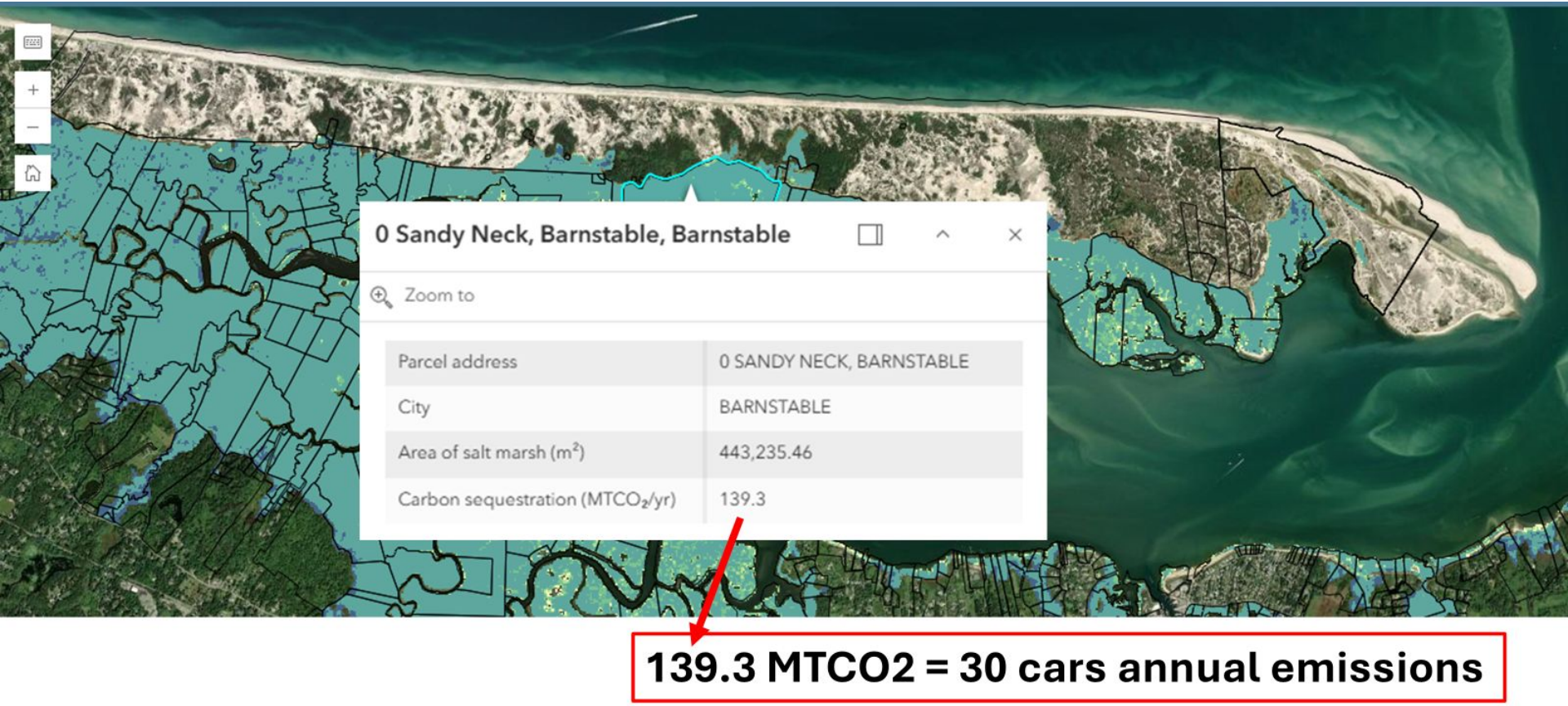
3. Upcoming work

Sequestration Viewer



Andy Atallah, UMass Amherst

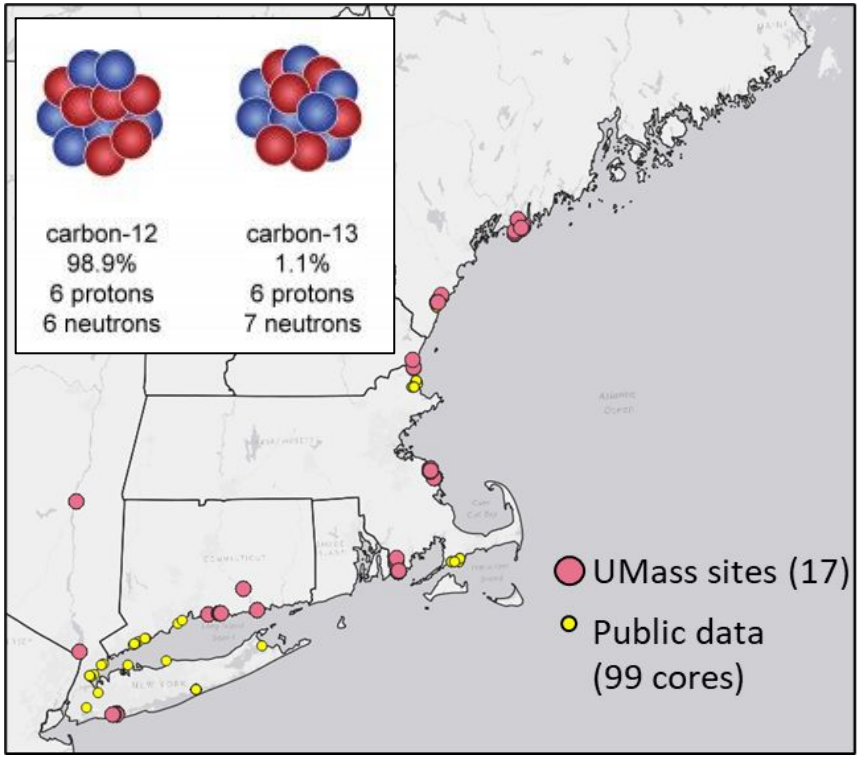
Sequestration Viewer



2025-2026 - Northeast US “Coastal Isoscape”

2025-2026 - Northeast US “Coastal Isoscape”

430 samples from 19 marshes



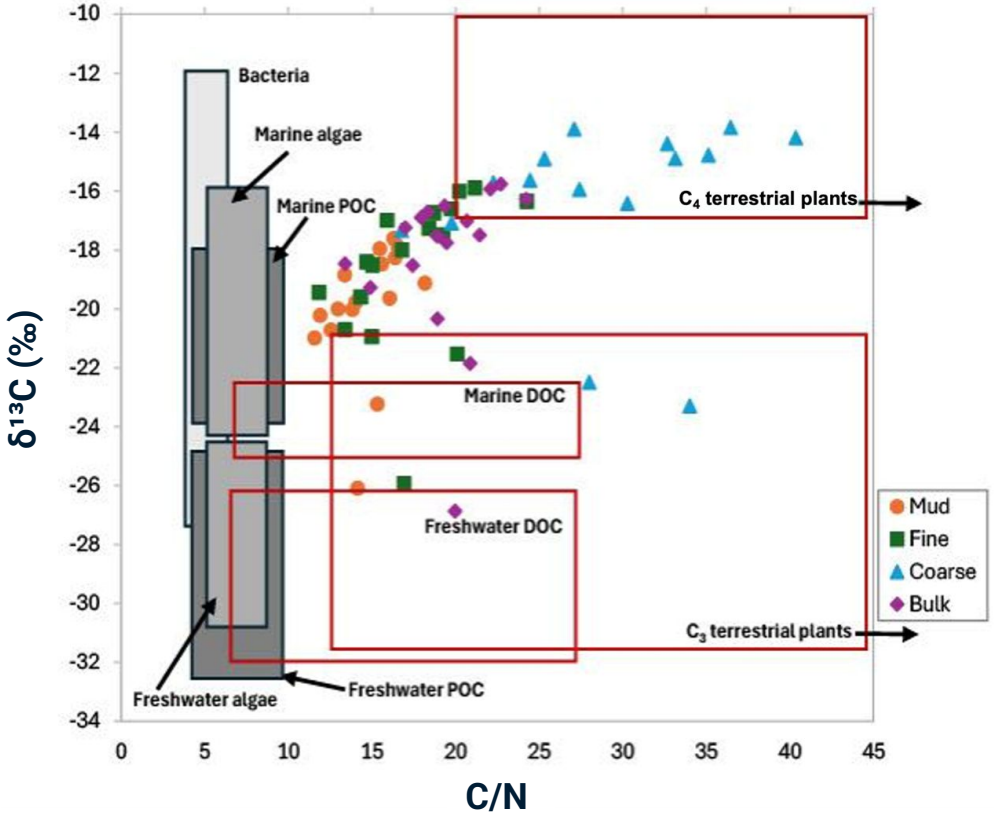
10 cm, 480 cc, BD ✔ LOI ✔

2025-2026 - Northeast US “Coastal Isoscape”

Sources of sediment (and carbon) to the Northeast coast

Organogenic

Minerogenic



4. Knowledge gap discussion

2025 and Beyond - Knowledge Gaps

- Conservation and restoration decisions
- Dredging, sediment disposal, thin layer placement
- Fluxes in gas and dissolved forms

Acknowledgements:

Funding - NROC

Collaborators (UMass): Andy Atallah, Melissa Rymaszewski

Thank you to workgroup members across the Northeast US

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Sintra Reves-Sohn, PhD Candidate, srevessohn@umass.edu

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