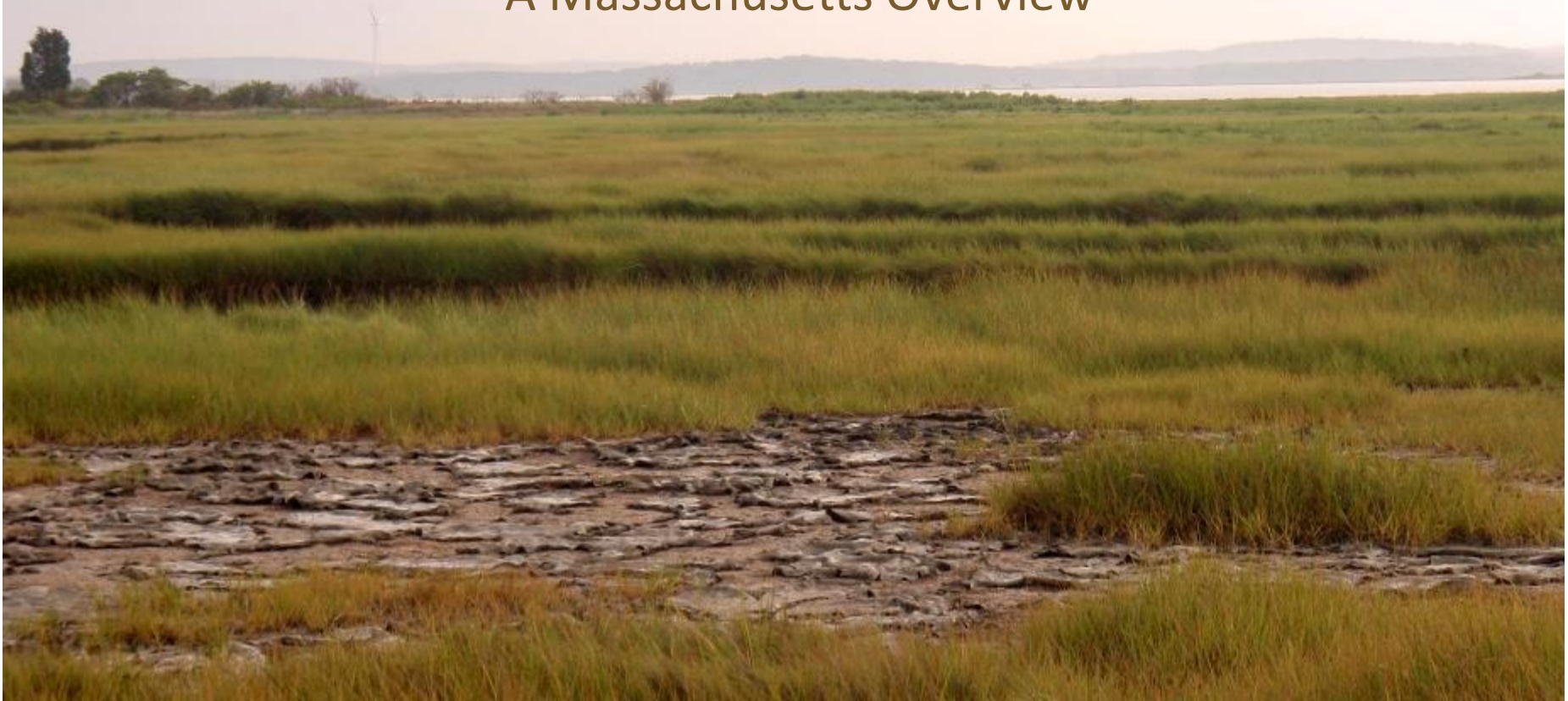


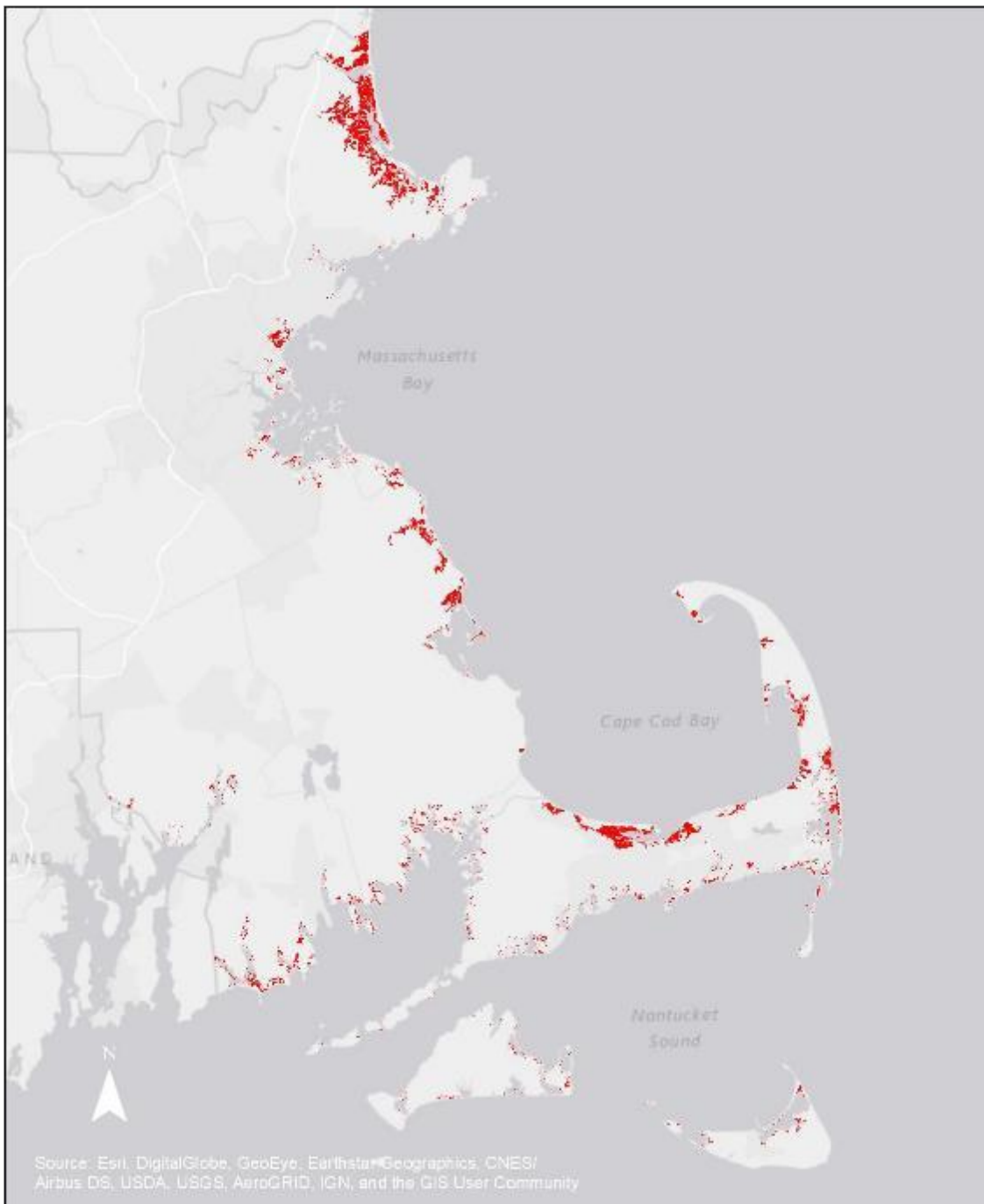
Marsh Impairment and Future Considerations

A Massachusetts Overview



Marc Carullo, Massachusetts Office of Coastal Zone Management
NERRS/NEERS Salt Marsh Special Symposium
Portsmouth, NH | April 26, 2018





Massachusetts salt marsh
extent and distribution.

(MassDEP Wetlands, 2005)



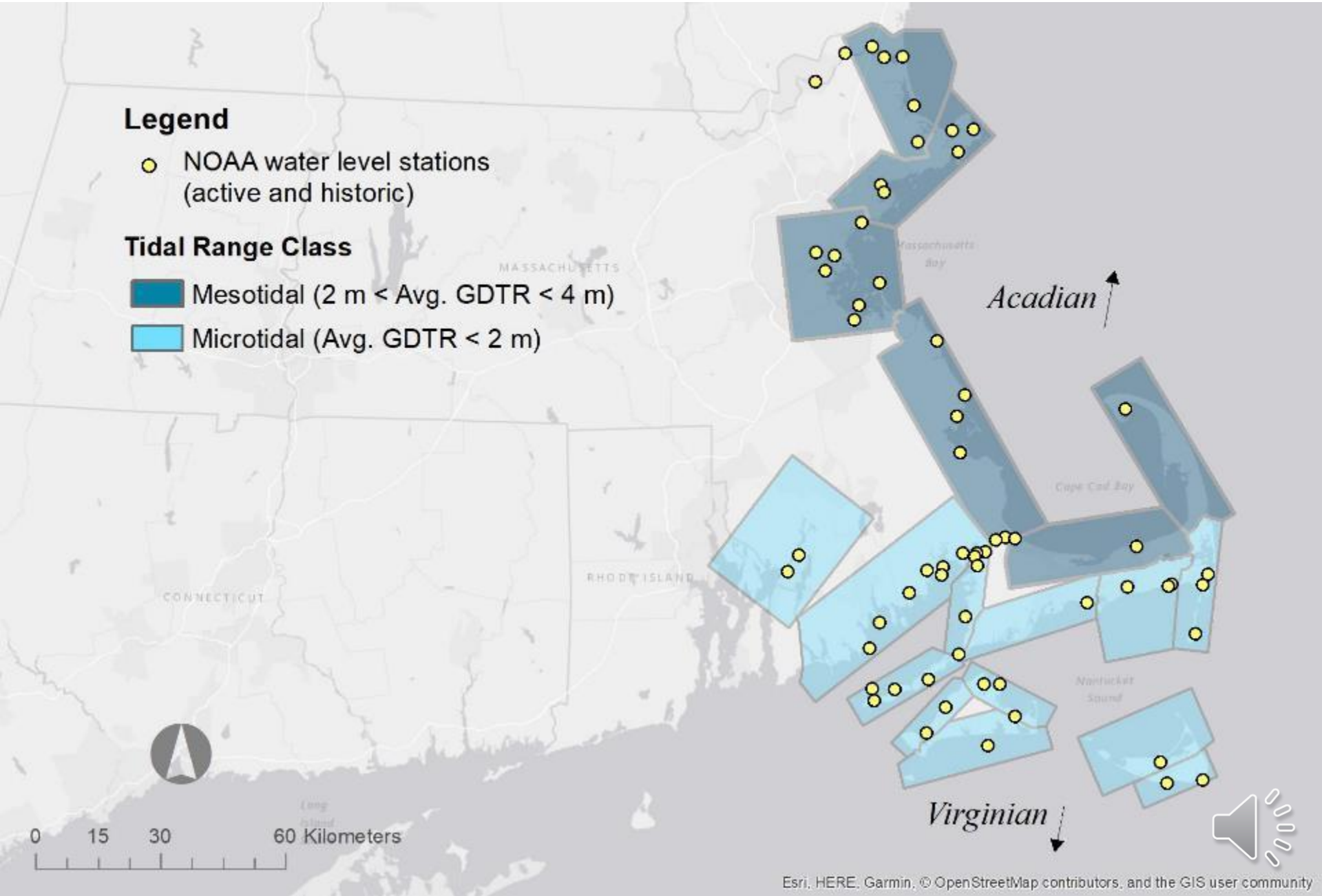
Tidal Range Classes

Legend

- NOAA water level stations (active and historic)

Tidal Range Class

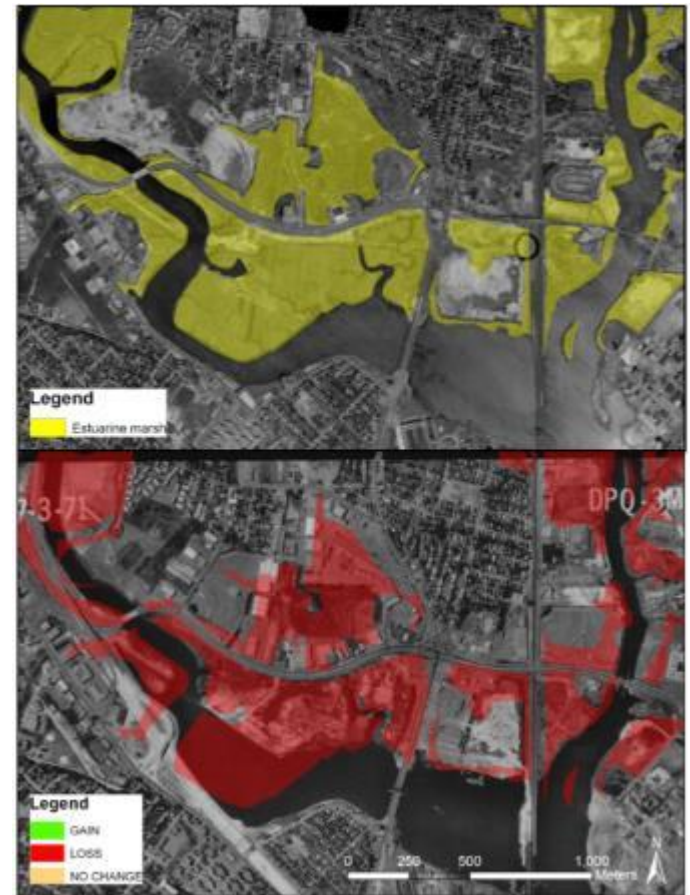
- Mesotidal ($2\text{ m} < \text{Avg. GDTR} < 4\text{ m}$)
- Microtidal ($\text{Avg. GDTR} < 2\text{ m}$)



**100 Years of Estuarine Marsh Trends
in Massachusetts (1893 to 1995):
Boston Harbor, Cape Cod, Nantucket,
Martha's Vineyard, and the Elizabeth Islands**



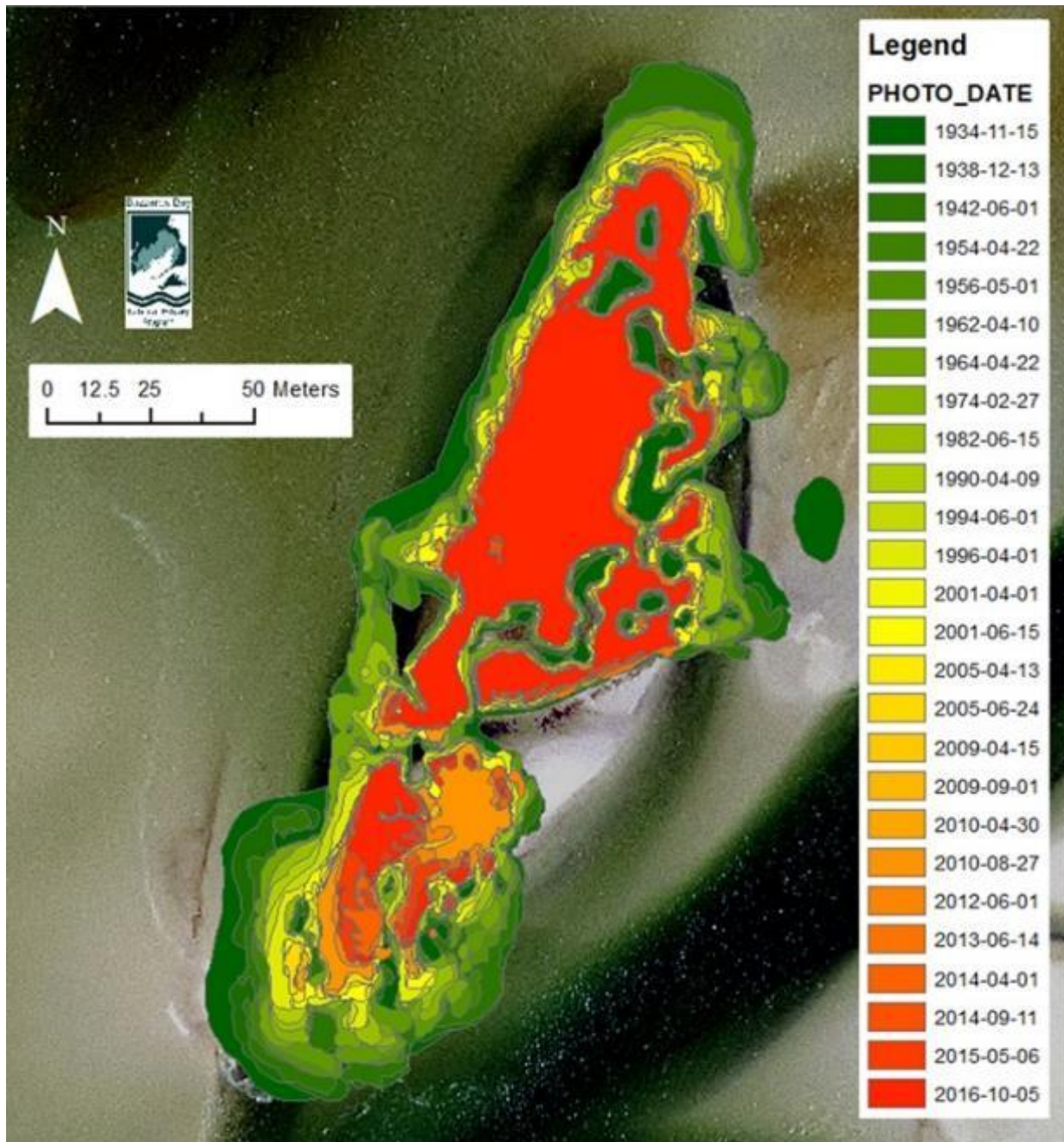
A Cooperative Report by the Massachusetts Office of Coastal Zone Management,
the U.S. Fish and Wildlife Service, and the University of Massachusetts



Mystic River, Somerville/Medford:
1952 aerial photograph with
mapped estuarine marsh [top] and
1971 aerial photograph showing
1952-1971 trends (loss) [bottom].

Carlisle et al. 2006





Loss in area of the salt marsh island Bailey Flat, Westport River, between 1934 and 2016.

(Costa and Weiner, 2017)

Image courtesy of J. Costa





Patterns of Change in Cape Cod Salt Marshes

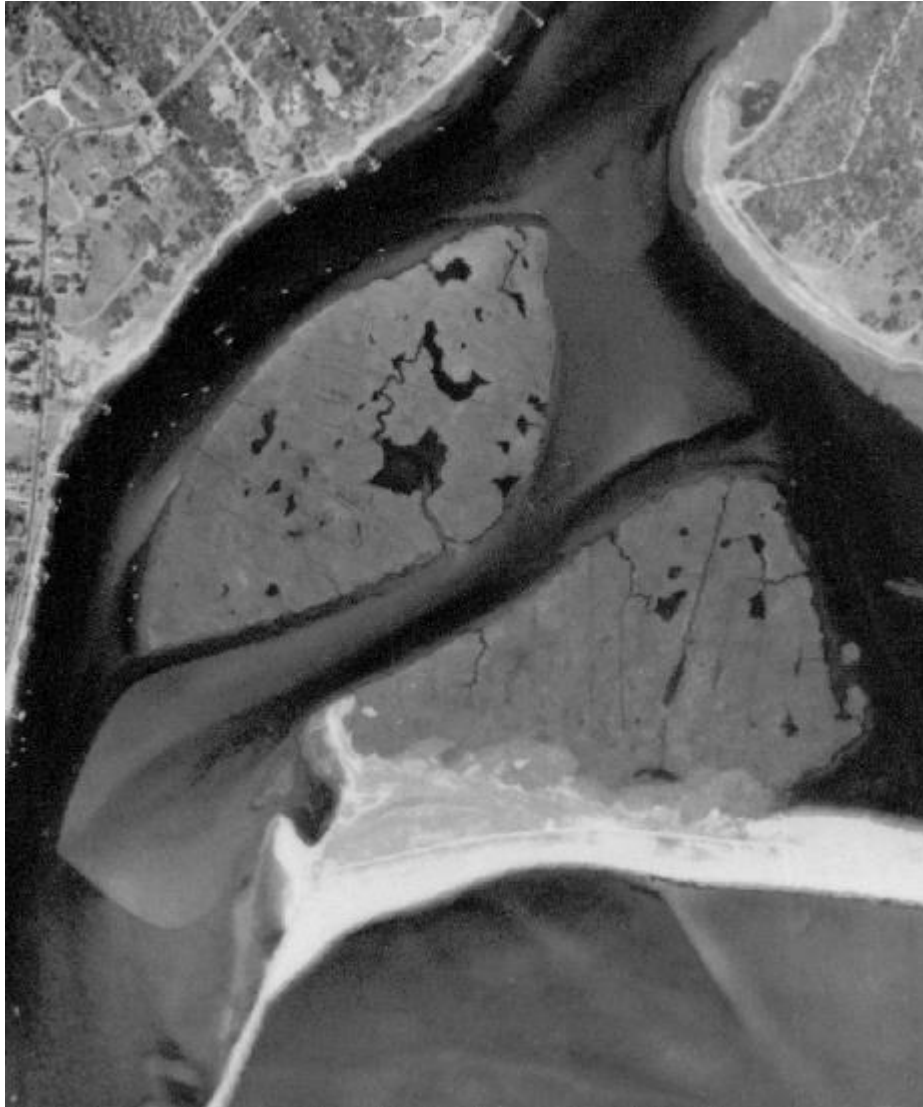




Aucoot Cove, Marion | Buzzards Bay



Marsh Loss: Stage Island, Dennis Cape Cod | Nantucket Sound



1952



2013

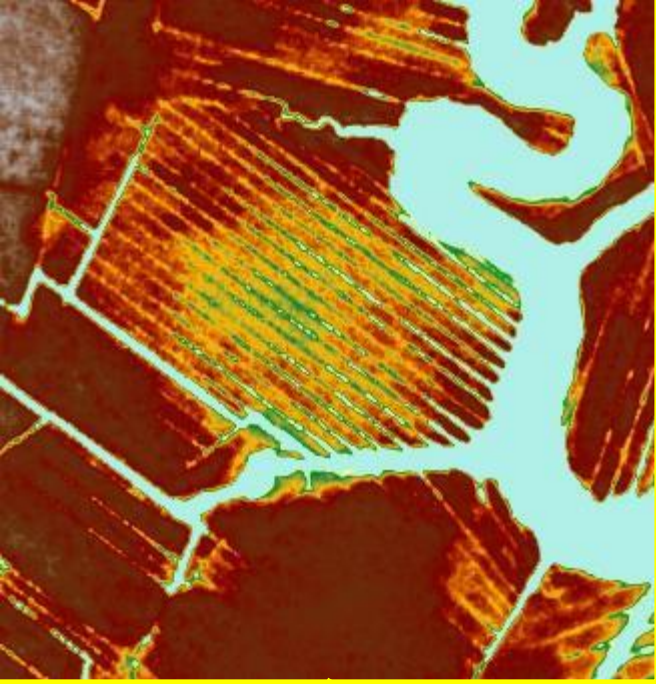


Marsh Loss: Cow Yard Lane, Dartmouth

Slocum River | Buzzards Bay



2016



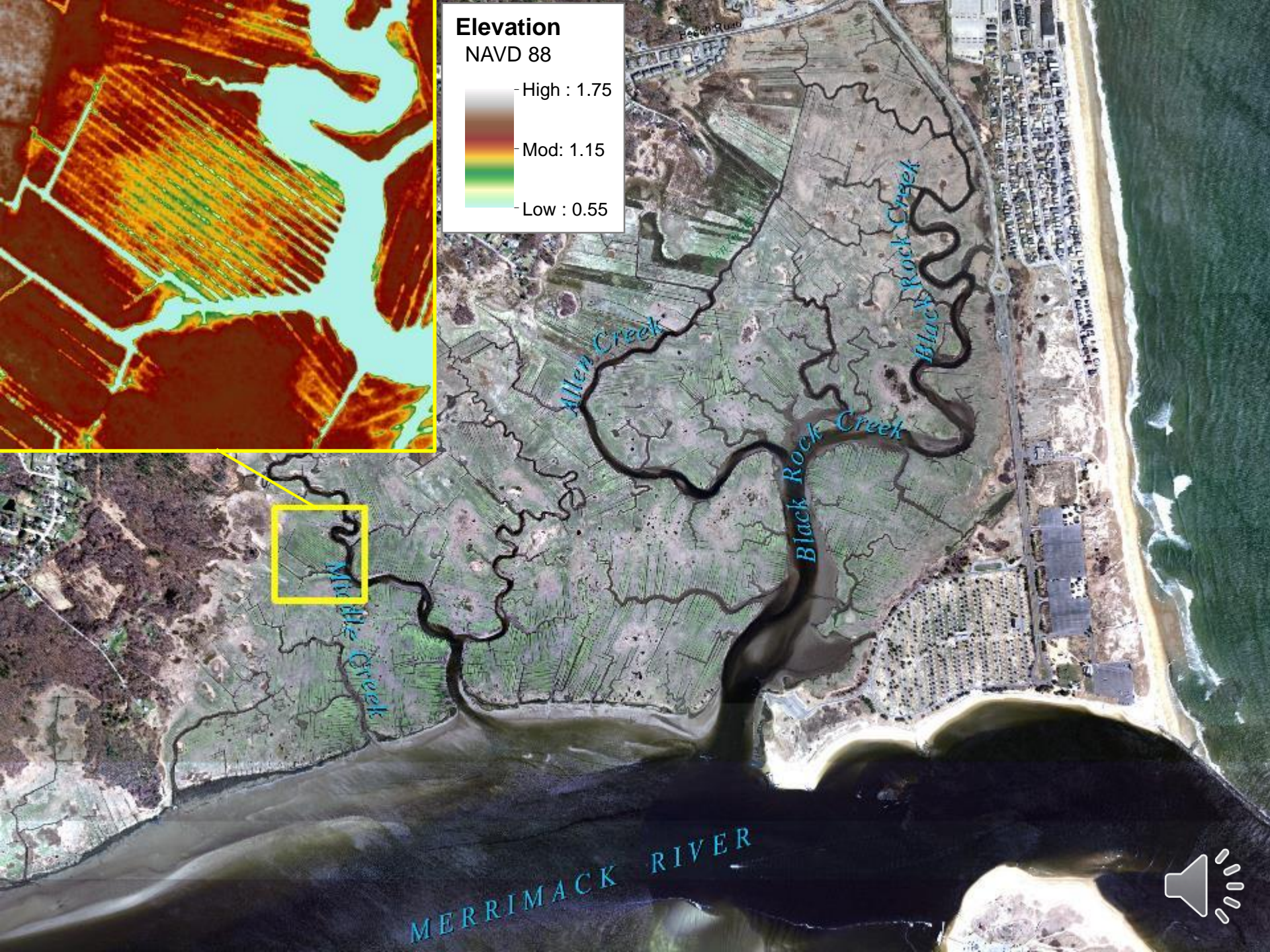
Elevation

NAVD 88

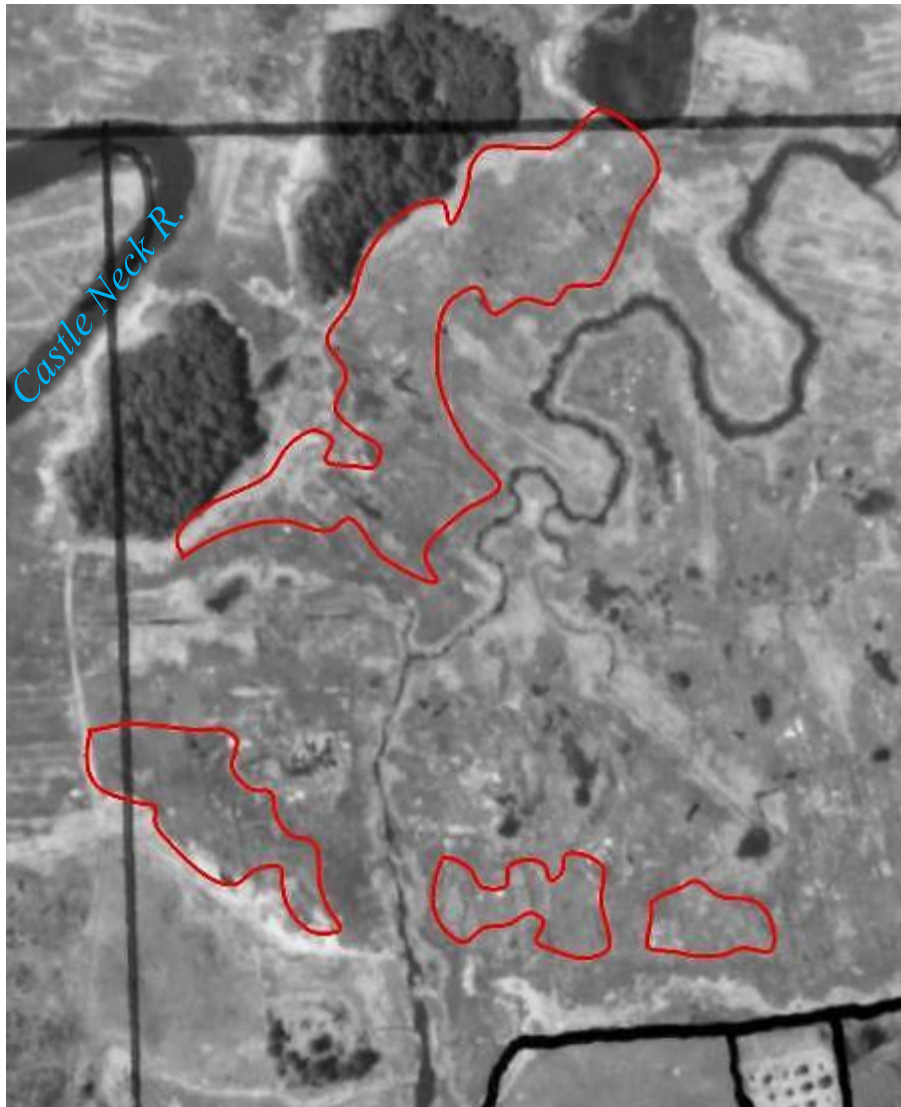
- High : 1.75

- Mod: 1.15

- Low : 0.55



“Rapid” Panne and Pool Formation: Essex Castle Neck River | Essex Bay



1952

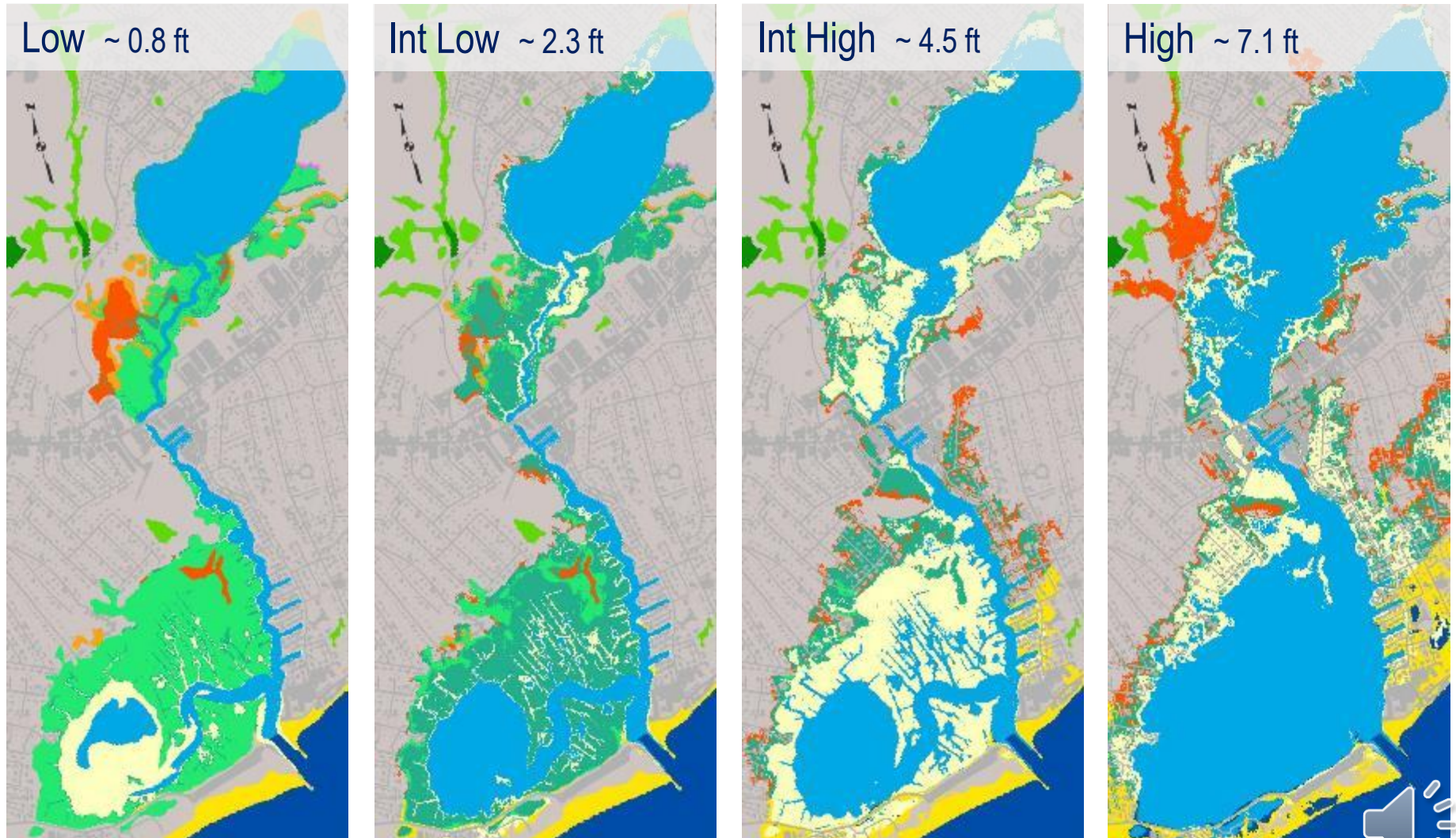


2013



Potential Wetland Distribution by 2100 Under Four SLR Scenarios

Parker's River, Yarmouth

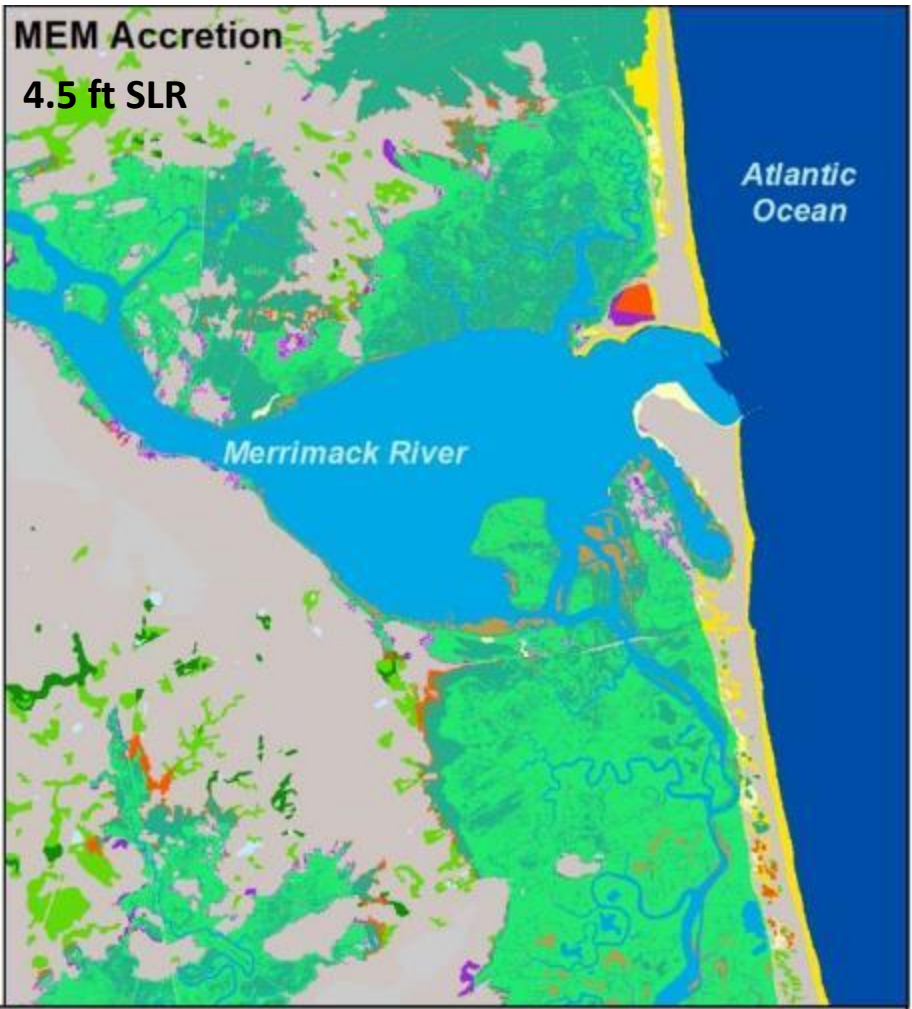


Source: CZM SLAMM

**Static Accretion
4.5 ft SLR**



**MEM Accretion
4.5 ft SLR**



SLAMM Wetland Categories



Statewide Condition Assessment

- A Volunteer's Handbook for Monitoring New England Salt Marshes
- NE Rapid Assessment Method (NERAM), w/ EPA
- Conservation Assessment and Prioritization System (CAPS), w/UMass and MassDEP



Map of mosquito ditches and CAPS ditch metric output



CZM Sentinel Site Monitoring



- Long-term vegetation and water level monitoring, other
- Tidal marsh habitat change mapping via satellite imagery
- UAS/drone research (UMass Amherst)





Next Steps

- Define, identify, and assess impaired and vulnerable marshes
- Provide decision-support for appropriate adaptation response
- Build marsh migration capacity through land conservation
- Develop a statewide strategy for building marsh resilience

