

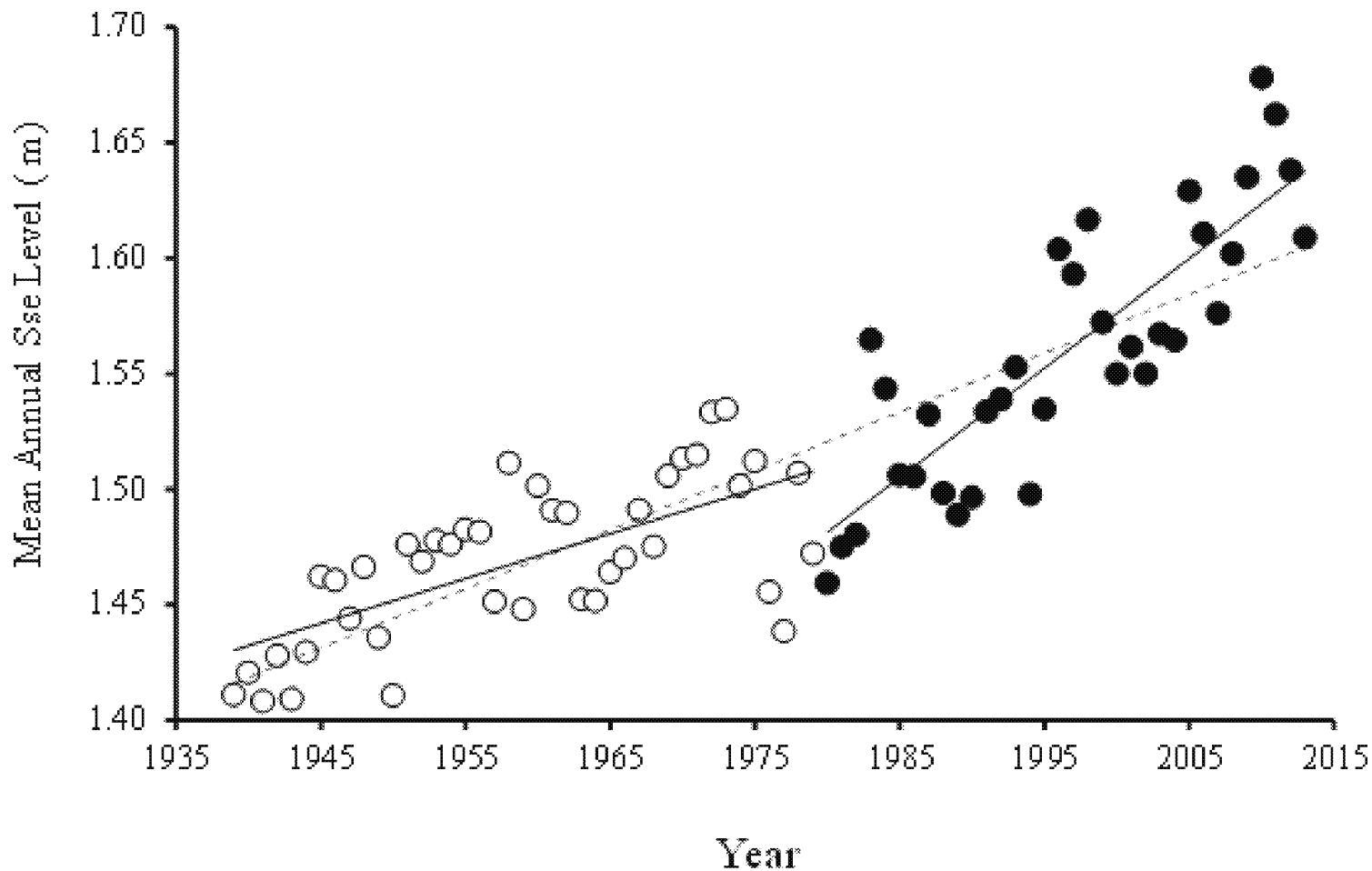
Coastal Resilience: Salt Marsh Sustainability in New England



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US EPA ORD Atlantic Ecology Division (AED)

New England State Commissioners' Visit to AED
June 19, 2018

Problem: Accelerated Sea Level Rise



Annual average sea level at New London, CT. Open circles indicate sea levels from 1939-1979 (2 mm/y) and filled circles indicate sea levels from 1980-2013 (4.7 mm/y).

Resulting in:

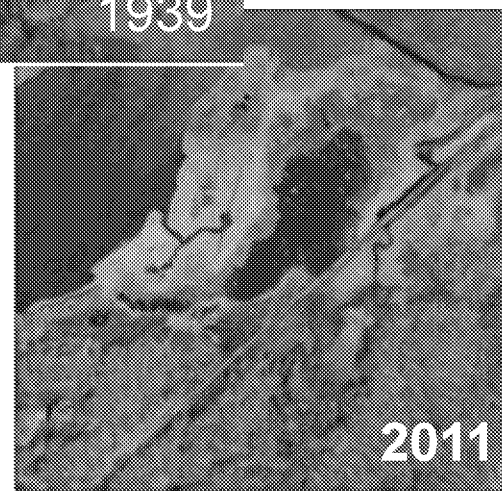
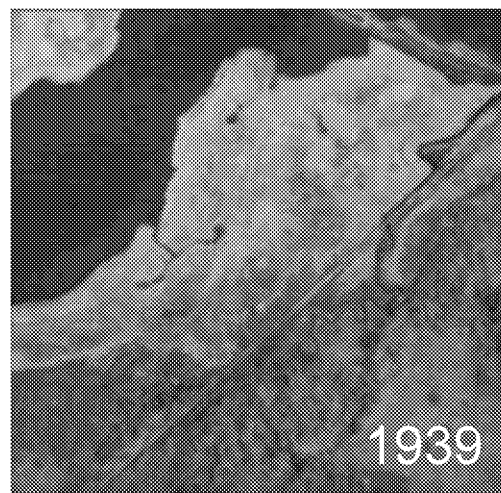
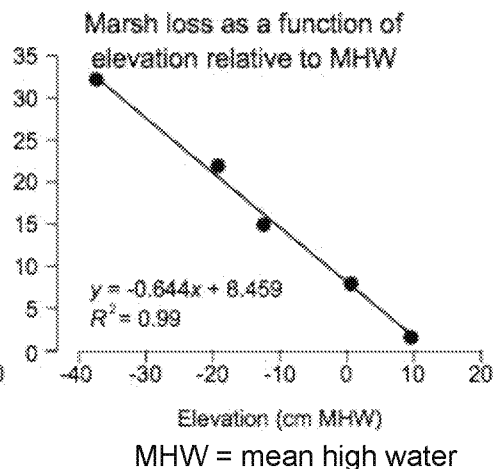
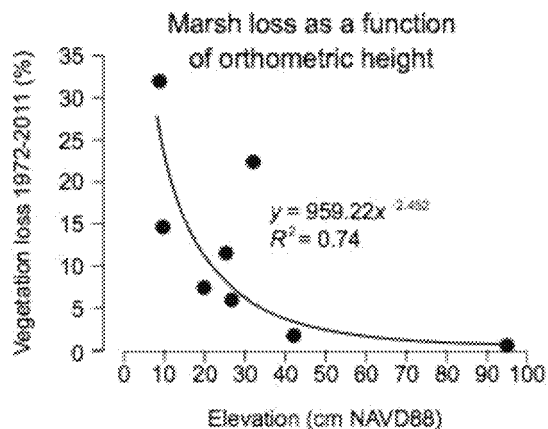
1. Increased flooding of coastal communities
2. Loss of habitat for fish, shellfish and wildlife

What are the vulnerabilities of coastal marshes from sea level rise, and how can this inform restoration strategies?



Key Observations

- Many marshes in Narragansett Bay lack “elevation capital”
- Tidal marsh vegetation changes are linked with marsh elevation



Workshops to Discuss Management Actions

EPA ORD-AED partnered with local, state and federal groups to **organize a workshop** in **2014** to discuss management actions for sustainability of New England coastal marshes.

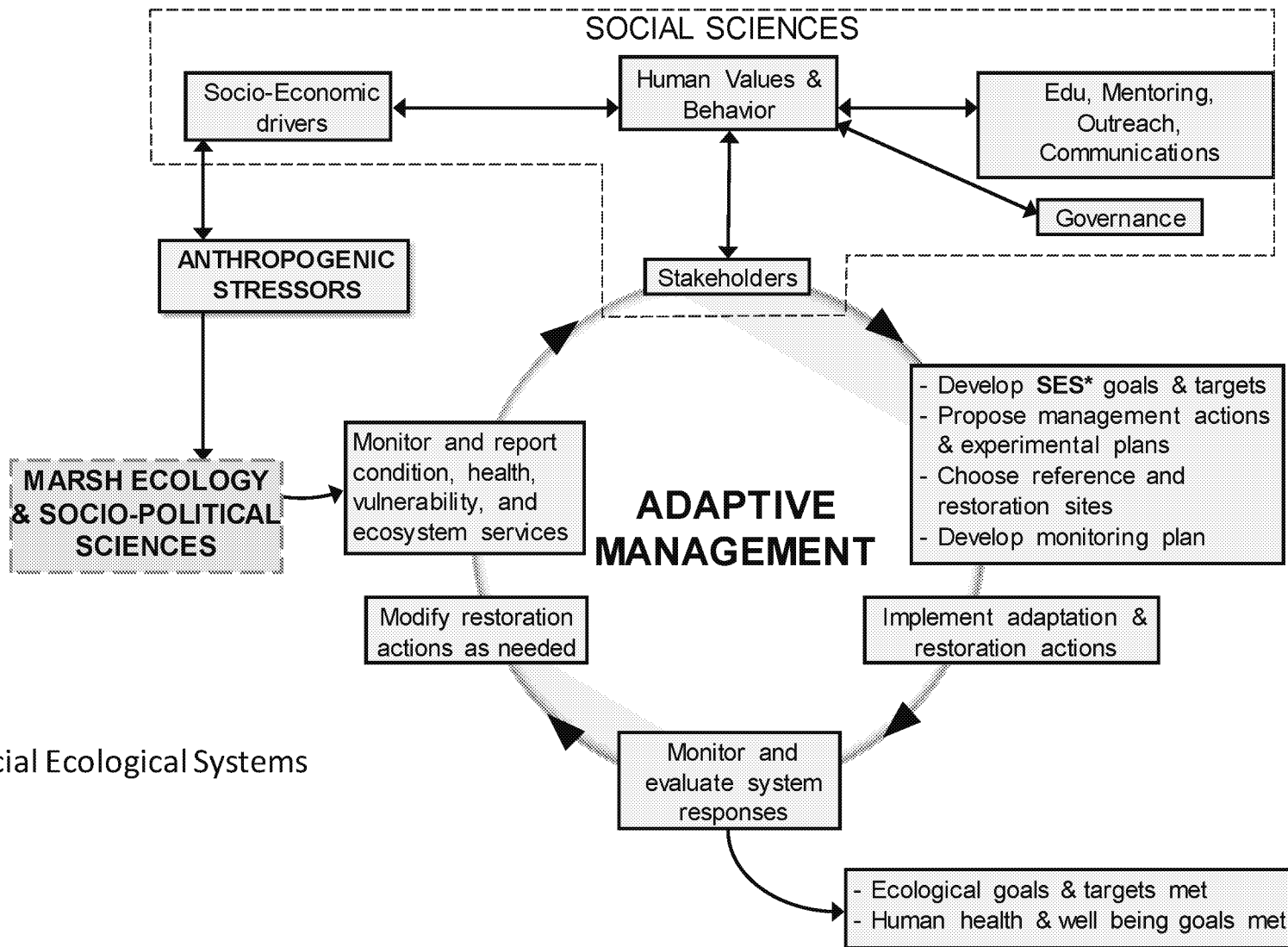
EPA ORD-AED **helped set the stage for a follow-up workshop** in **2018** to assess the progress made and challenges remaining to promote coastal marsh sustainability.

Hundreds of New England local, state and federal partners **attended both meetings**.



Link to special issue in Estuaries and Coasts summarizing the 2014 workshop and results (8 articles). <https://link.springer.com/article/10.1007/s12237-016-0166-1>

Coastal Marsh Adaptive Restoration Framework



*(SES) Social Ecological Systems

Restoration & Adaptation Actions

- Land conservation/Land use planning
- Removal of barriers to future migration
- Tidal restoration and hydrologic modifications
- Elevation enhancement with sediment
- Living shorelines



Case Study: Bride Brook, CT Restoration Project

Alewife Run restored and the subsiding marshes are recovering. Marsh restoration is ongoing.



Case Study: Ninigret Pond, RI Thin Layer Placement

- Back-barrier marsh adjacent to man-made breachway, state-owned public access point, beach and campground
- Salt marsh habitat exhibiting areas of prolonged flooding, vegetative die-off, subsidence and marsh edge erosion

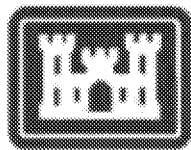


Photo credit & point-of-contact: Caitlin Chaffee, cchaffee@crmc.ri.gov

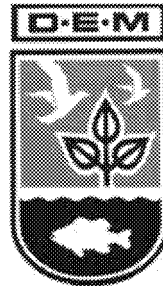
Governance: Permitting & Regulatory Compliance



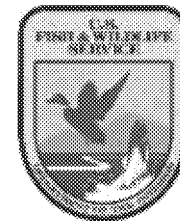
- NEPA Environmental Assessment/Section 106 (USFWS lead federal agency)
- USACE Section 404 Permit (includes sign-off by EPA, NOAA National Marine Fisheries Service)
- State Section 401 Water Quality Certification
- CRMC Assent



US Army Corps
of Engineers



Rhode Island
Department of
Environmental
Management



NOAA
FISHERIES



Approx. 68,000 cubic yards dredged material to restore ~20 acres of marsh

- Design, Engineering and Permitting: \$110,453
- Construction
 - Mobilization/Demobilization: \$334,400
 - Dredging, spreading & grading of material: \$543,900
 - Alternate dredging: \$530,812
- Planting: \$100,000
- TOTAL: \$1,619,565
(includes cost sharing with USACE,
beneficial use of dredged materials;
~\$81K per acre restored)

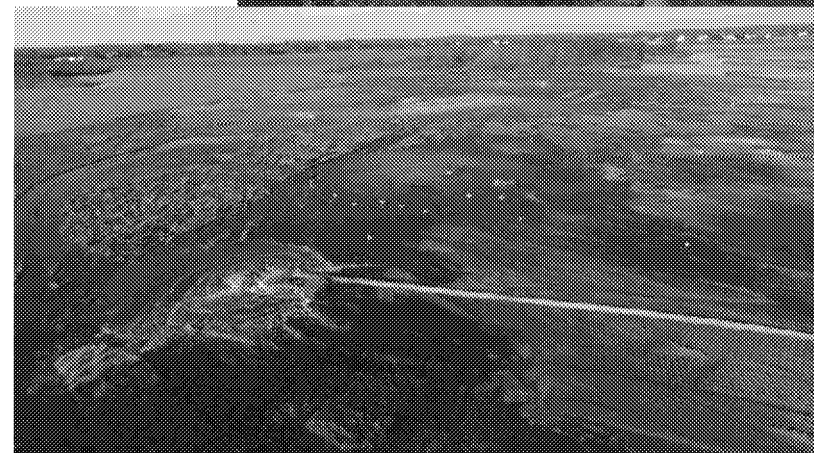
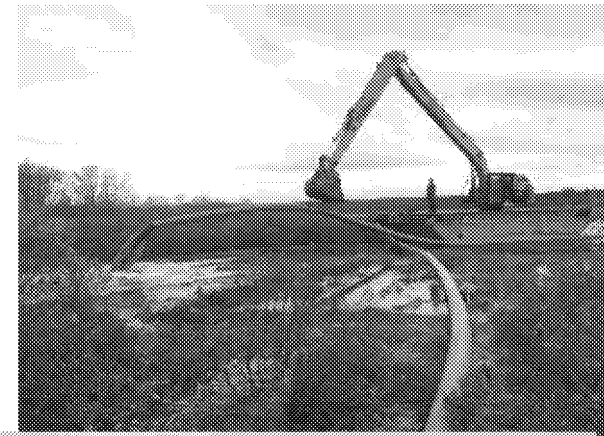


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Post Thin Layer Placement at Ninigret Pond, RI

Citizen Volunteers & Outreach Tours



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