

Beneficial Use of Dredged Material – Thin Layer Placement (CR-26-76)

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Outline

- Beneficial Use of Dredged Material
- Understanding Thin Layer Placement
  - Marsh ecology
  - TLP as conservation tool
- North Carolina TLP Projects
  - Examples and outcomes
- East Coast TLP Applications
- Guidance & Key Takeaways



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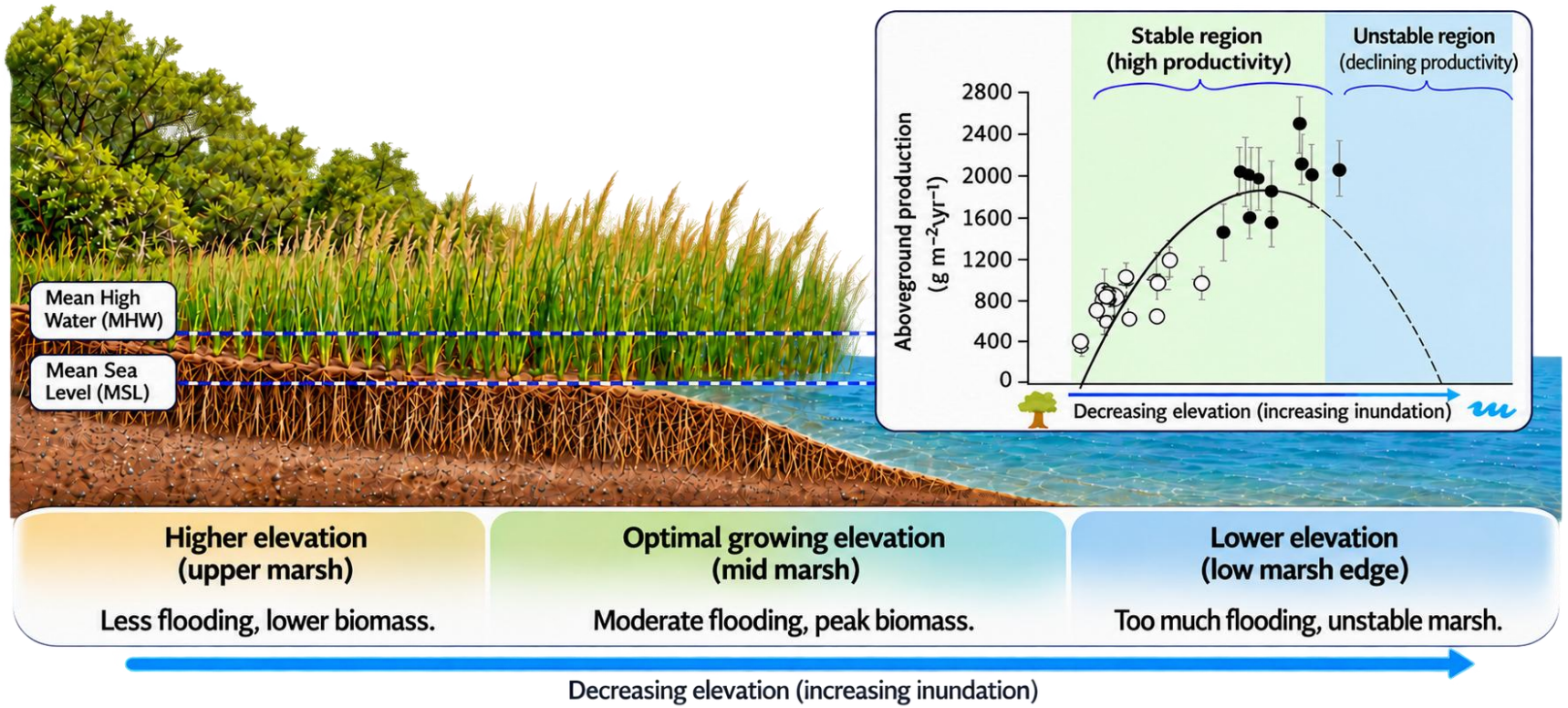
Beneficial Use of Dredge Material (BUDM)



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Optimal Marsh Conditions

Optimal marsh elevation occurs between Mean Sea Level and Mean High Water



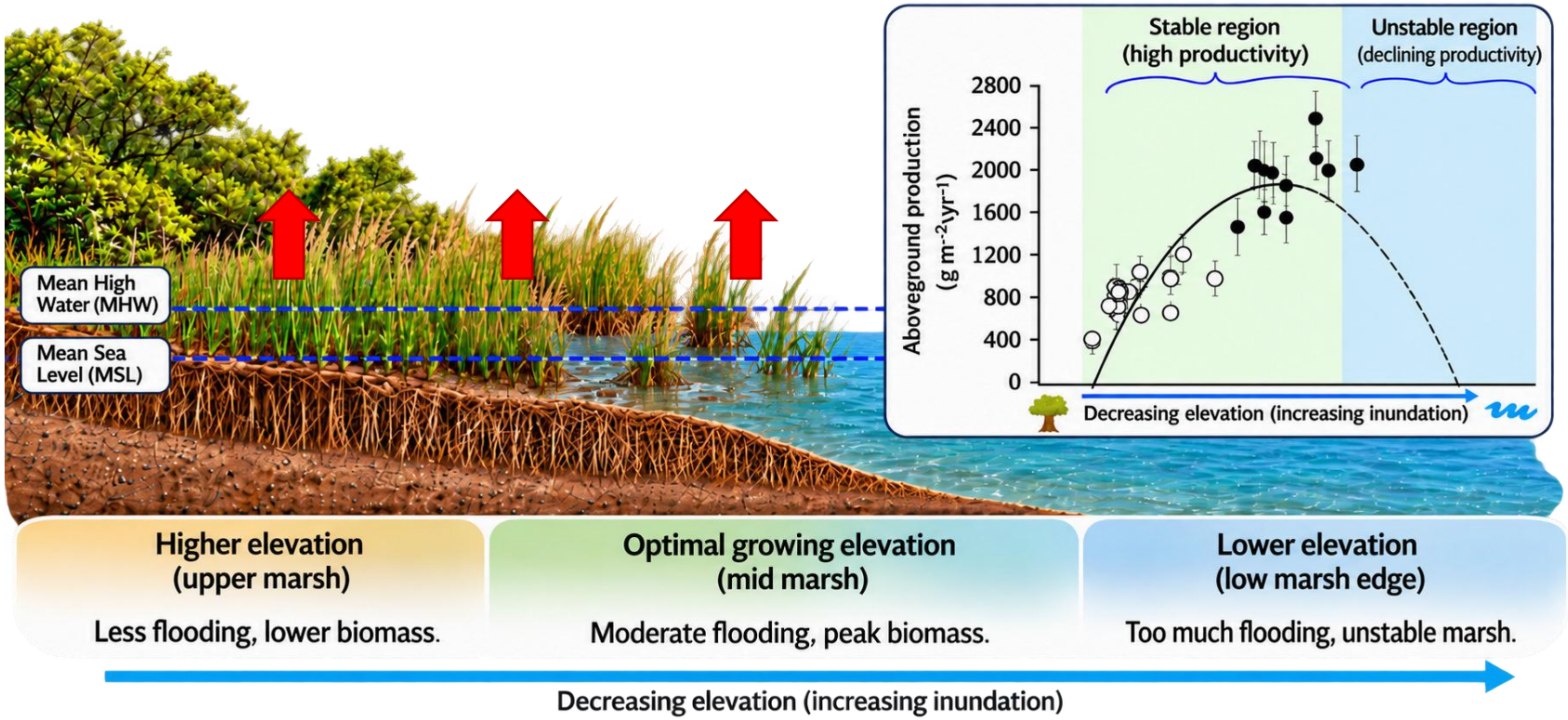


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Graphic generated by Matt Kenworthy with AI assistance. All scientific concepts were provided and reviewed by Kenworthy. Data graph adapted from Morris et al. 2002.

Degrading Marshes

Marshes that don't accumulate enough sediment to keep up with rising water levels are at risk of drowning.



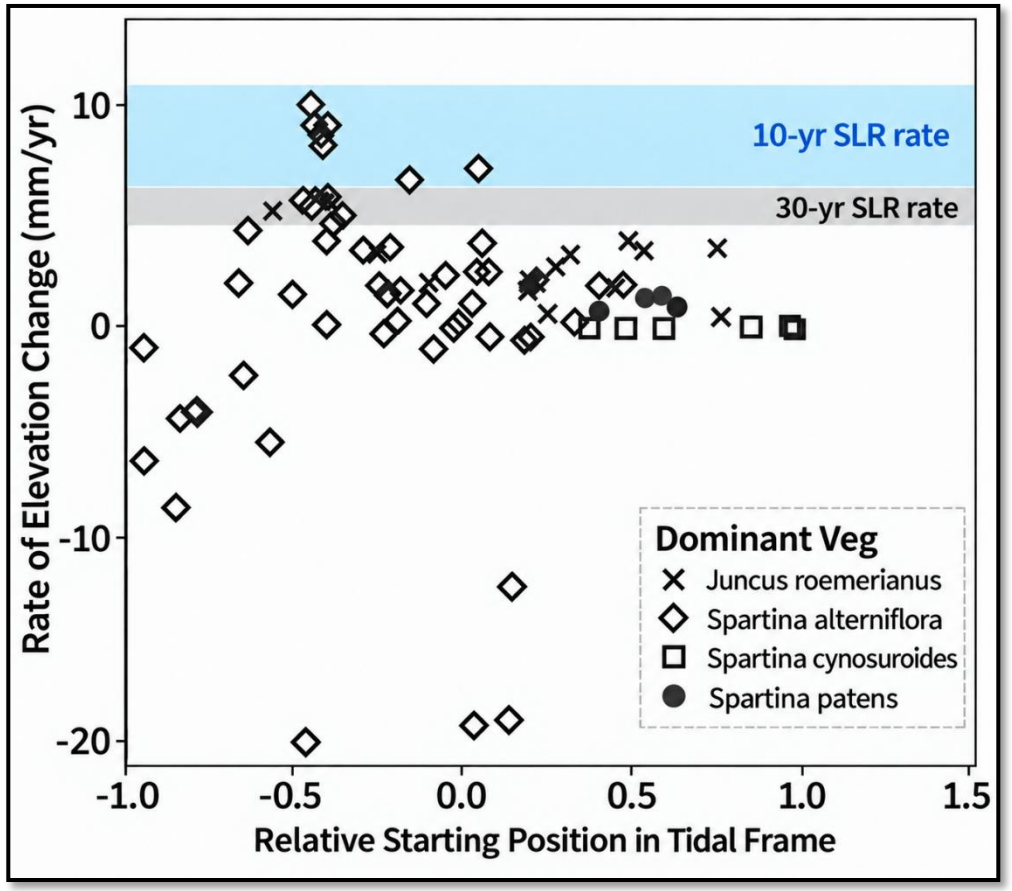


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NC Coastal Wetlands Are Drowning

- 84 tidal marsh monitoring sites evaluated across North Carolina.
- Most tidal marshes are not gaining elevation fast enough to keep pace with sea level rise.
- Greatest elevation gains occurred in marshes near mean sea level.
- Some shoreline marshes are losing elevation, largely due to erosion.



Graph adopted from NC SET Community of Practice 2024

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Thin Layer Placement

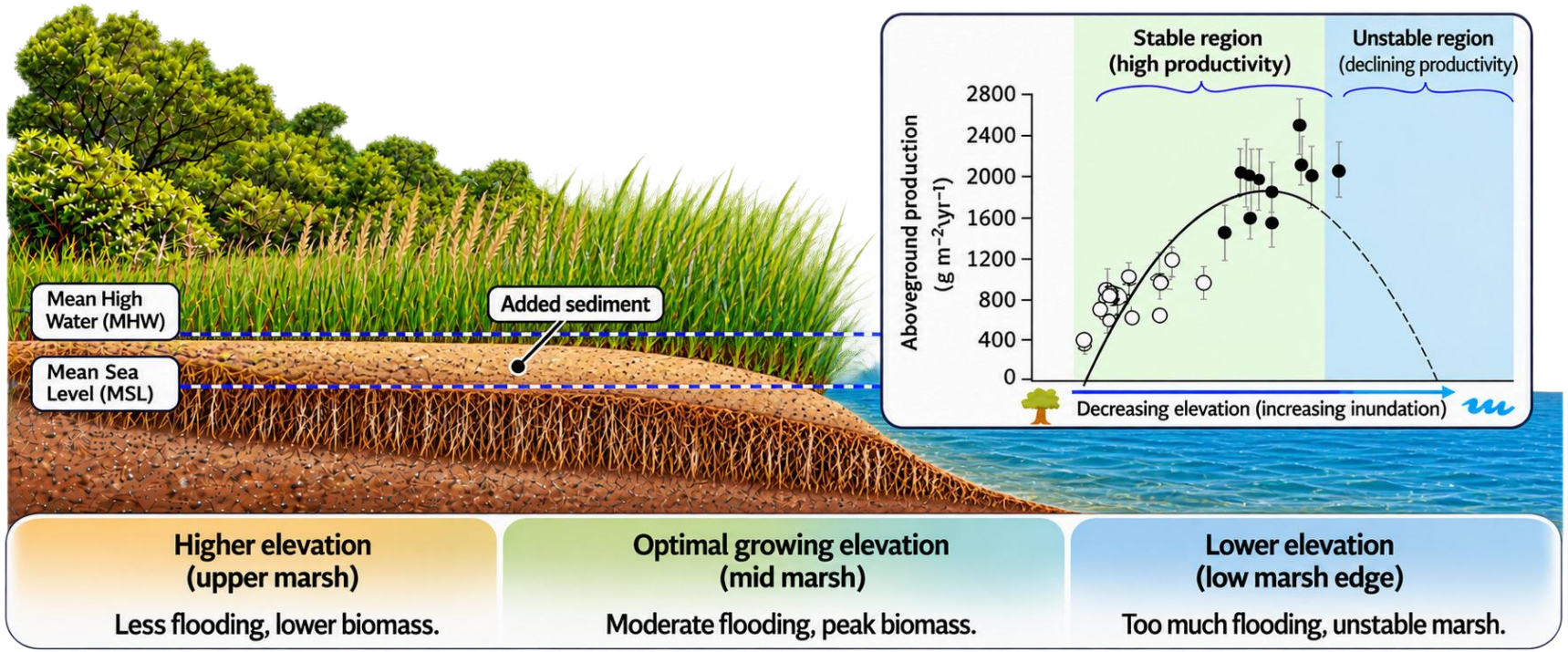




Photo credit: Delaware NREC

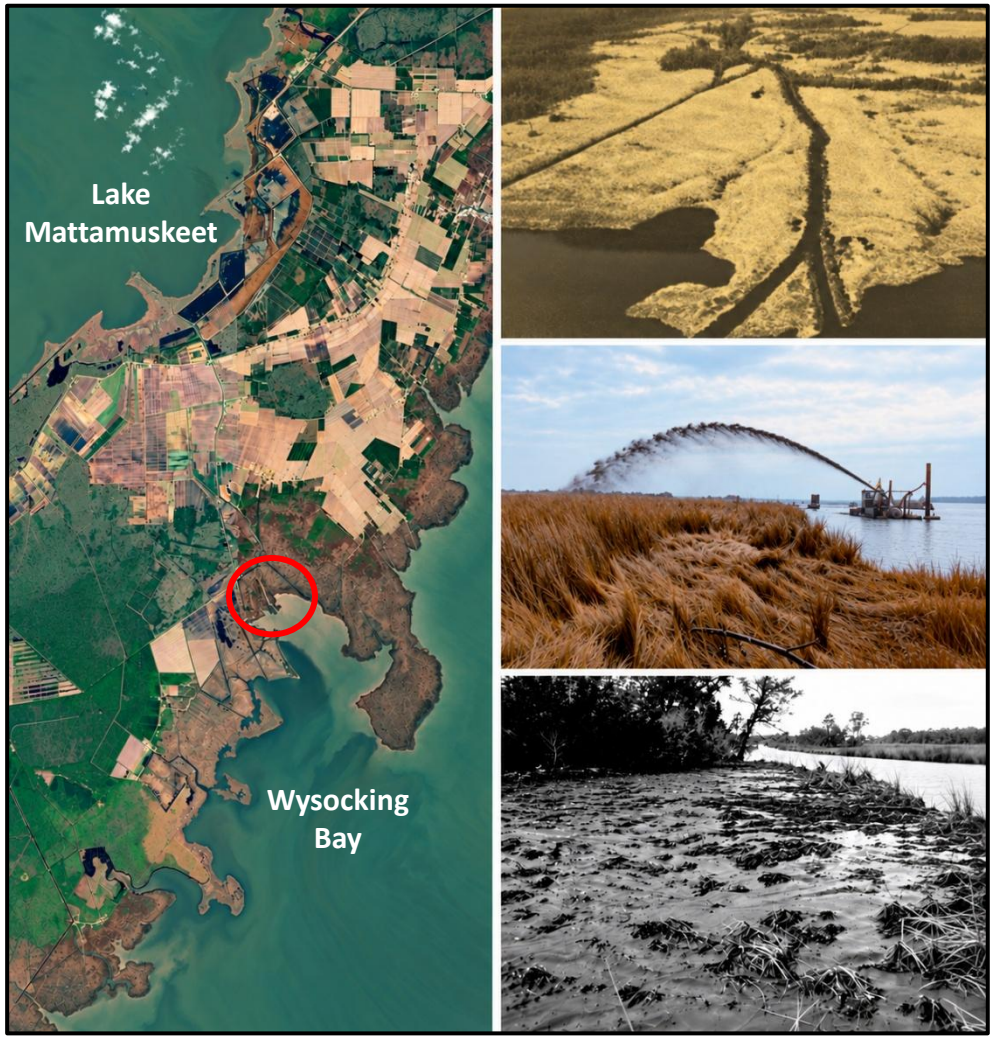


Photo credit: U.S. Army ERDC

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Gull Rock: Lake Landing Canal (1982) – Hyde County



Project Details

- Maintenance dredging (10–15k yds^3 sediment)
- 28 acres TLP area
- 2–4 inches average placement depth
- Monitored 9 years post application

Take Home Message

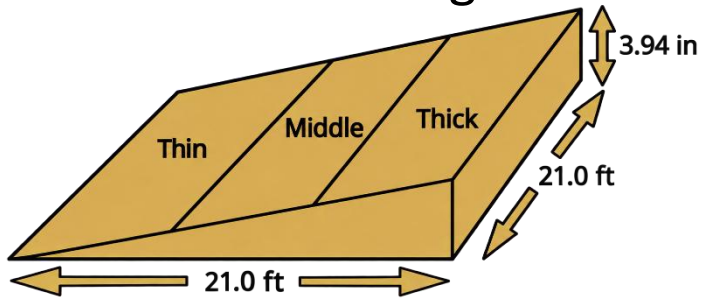
- Productive marsh persisted 9 years later
- Placement thickness mattered
- Biomass and density slightly lower at TLP sites
- Lack of baseline data limited ability to attribute changes directly to TLP

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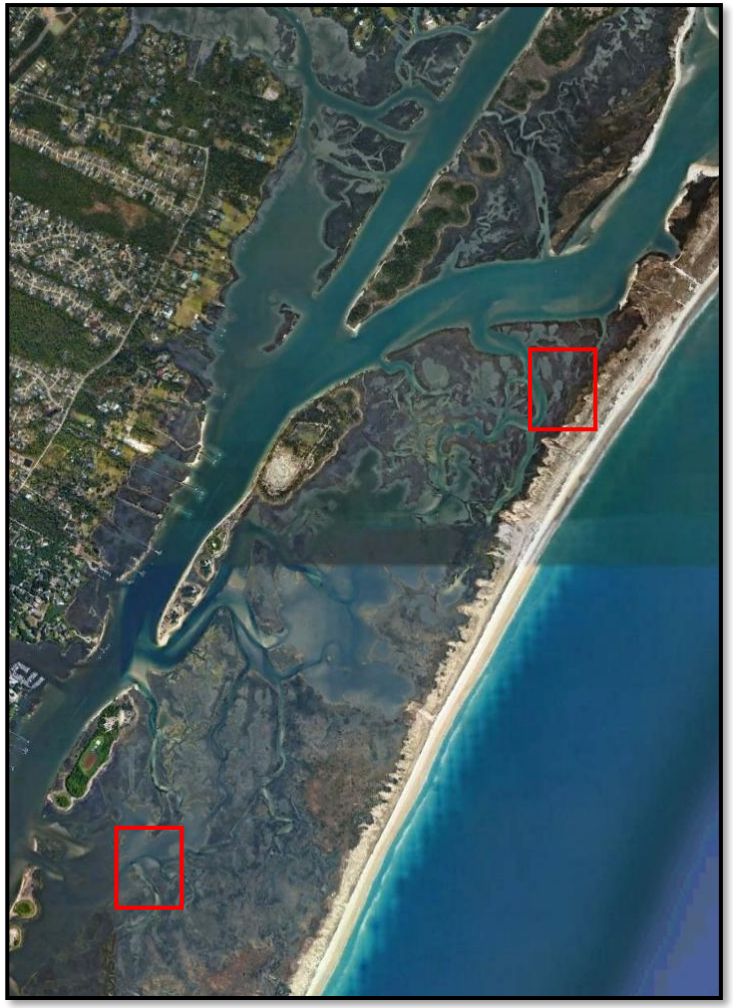
Masonboro Island (2000 & 2018) – New Hanover County

2000 Project Details (UNCW)

- Upland sediment source
- Degraded vs. non-degraded
- Variable sediment depth
- 2 years monitoring
  - Vegetation (density, height)
  - Soil chemistry
  - Benthic invertebrates
  - Benthic microalgae

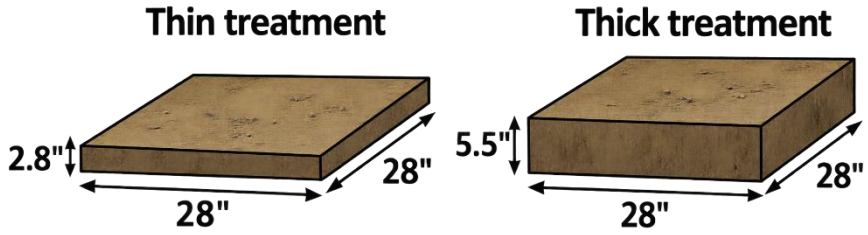


Source: Croft et al. 2006



2018 Project Details (NC NERR)

- Upland and dredged sediment
- Low vs. high marsh
- Two sediment depths
- 3 years monitoring
  - Vegetation (species, % cover)
  - Surface elevation
  - Crab abundance
  - Crab burrow density



Source: Raposa et al. 2023

Masonboro Island (2000 & 2018) – Outcomes

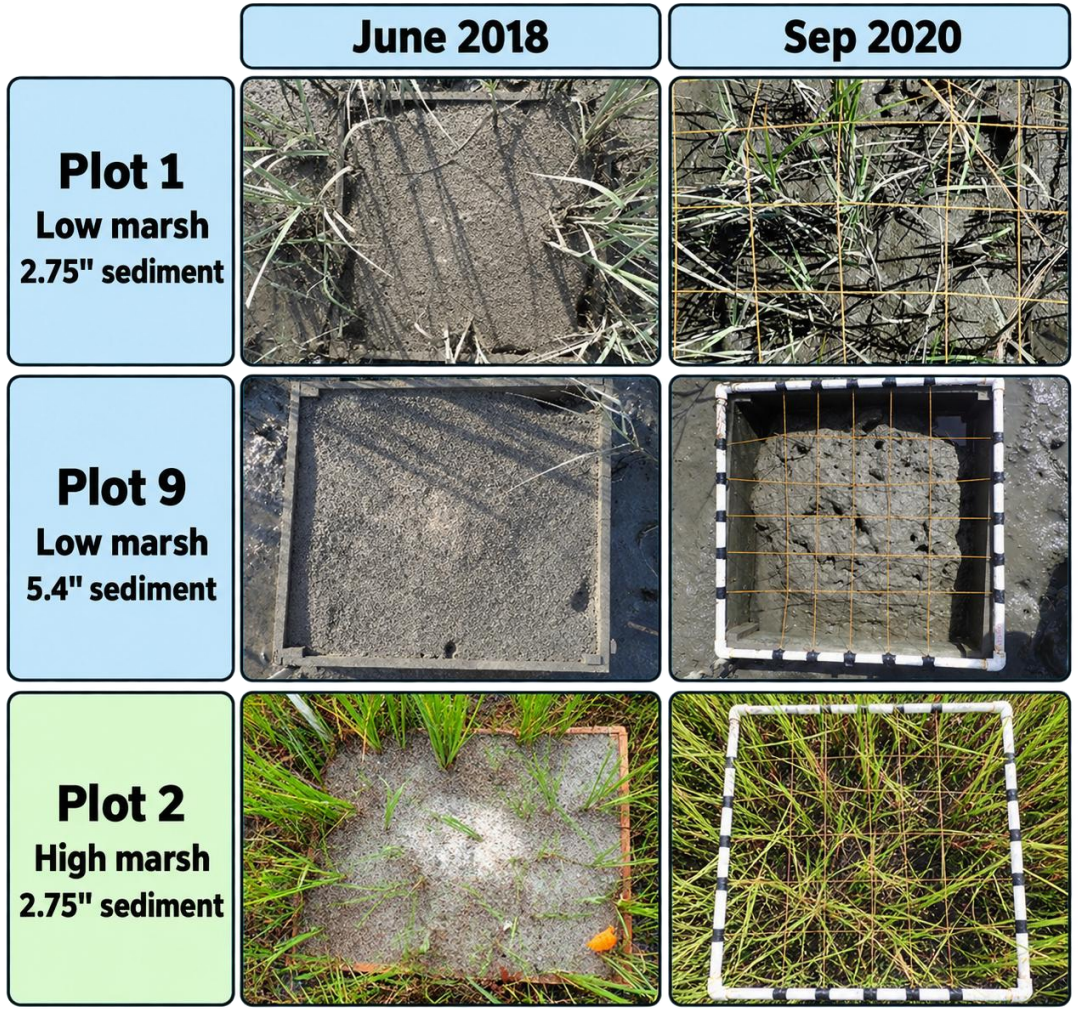


Photo credit: Brandon Puckett

2000 Study

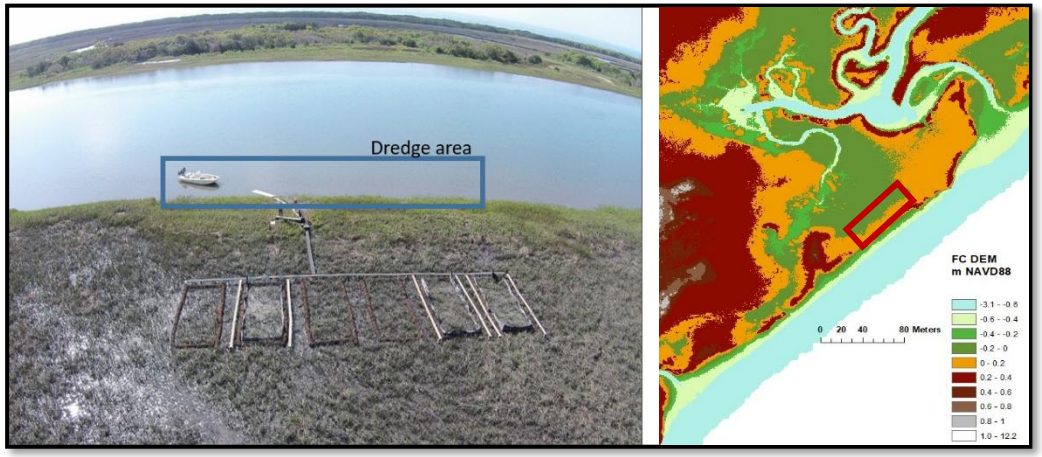
- TLP doubled stem density in deteriorated marsh
- Sediment additions improved soil conditions
- Minimal negative impacts in healthy marsh

2018 Study

- Vegetation recovered relatively quickly, but generally remained below reference conditions
- Thicker sediment additions generally slowed initial vegetation recovery
  - Differences between treatments disappeared after three years

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Camp Lejune (2017) – Onslow County



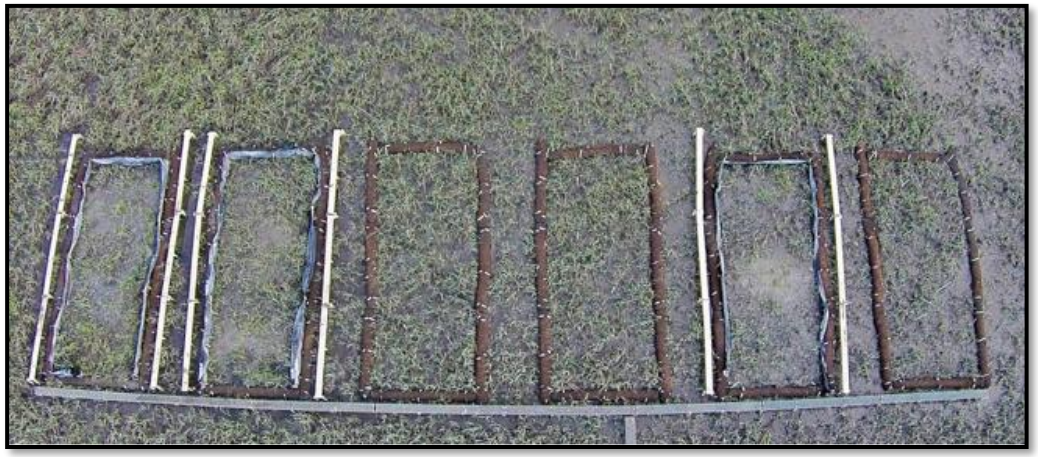


Photo credit: Jenny Davis; NOAA NCCOS

Project Details

- 10’x26’ experimental enclosures
  - 3 treatment, 3 control
- 2.5 inches average placement depth
- Monitored for 9 years post application

Take Home Message

- Elevation gains persisted through nine years
- TLP doubled vegetation biomass after one year
  - Benefits were temporary
- Rigorous initial marsh elevation data matters

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Piney Island (2024) – Carteret County

Project Details

- Pilot project to inform larger-scale restoration
- Dredged sediment from upland source
- 6 and 12 inch sediment depths
- 8’ x 8’ experimental plots
- Manual placement with coir log containment
- Monitoring
  - Vegetation recovery
  - Surface elevation
  - Sediment compaction



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TLP Applications Along the East Coast



Programmatic
High Regulatory Feasibility

- New Jersey
- Maryland
- New England
- Delaware
- Georgia
- North Carolina
- Virginia
- South Carolina

Multiple large pilot projects
Identified permitting pathway
Developing guidance manuals

Exploratory, Experimental
Low Regulatory Feasibility

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Graphic adopted from CHPP 2026

Deal Island (2024) – Maryland



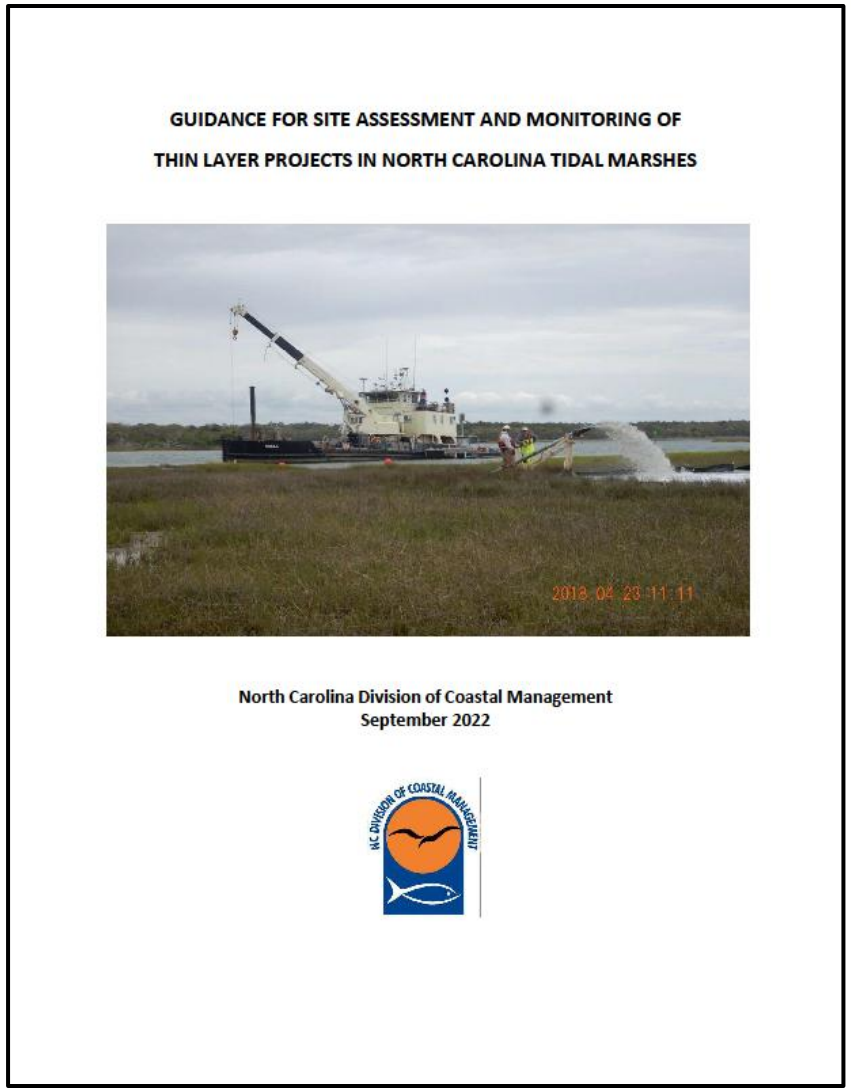
Photo credit: Jenny Davis; NOAA NCCOS

Project Details

- 72 acres
- ~167,000 yd^3
- Low pressure disposal
  - Fine-grained sediments
- Placement depths up to 18 inches
- Straw bale containment
- Hand planting of >700,000 plants
  - Intended to discourage invasives

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NCDCM TLP Project Guidance


GUIDANCE FOR SITE ASSESSMENT AND MONITORING OF
THIN LAYER PROJECTS IN NORTH CAROLINA TIDAL MARSHES

North Carolina Division of Coastal Management
September 2022

- Developed in response to growing interest in TLP as a coastal wetland restoration and conservation tool
- Collaborative effort with state and federal resource and regulatory agencies
- Framework to inform project design, interagency permitting reviews, and evaluation of project outcomes
  - Recommended site assessment and monitoring protocols

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Considerations



- TLP is not a statewide solution to coastal wetland loss, but may be an effective tool for conserving suitable, vulnerable wetlands
- Project outcomes are highly site-specific, and success depends on careful planning, implementation, and monitoring
- USACE's goal of 70% beneficial use by 2030 may create additional opportunities for TLP and coastal wetland conservation
- Other states provide valuable lessons on project design, regulatory approaches, and implementation challenges

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Questions?

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