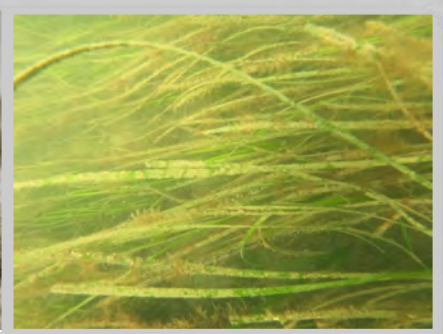
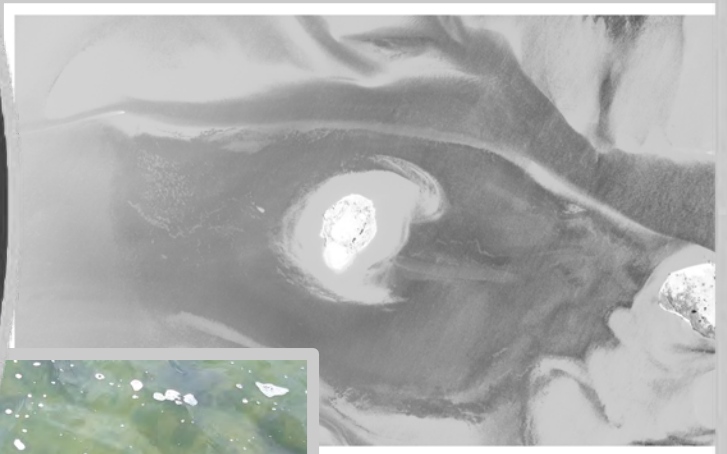
Dredged material can benefit SAV habitats

Emily Russ, Amy Yarnall, Matt Balazik, Safra Altman

BUDM for SAV Workshop

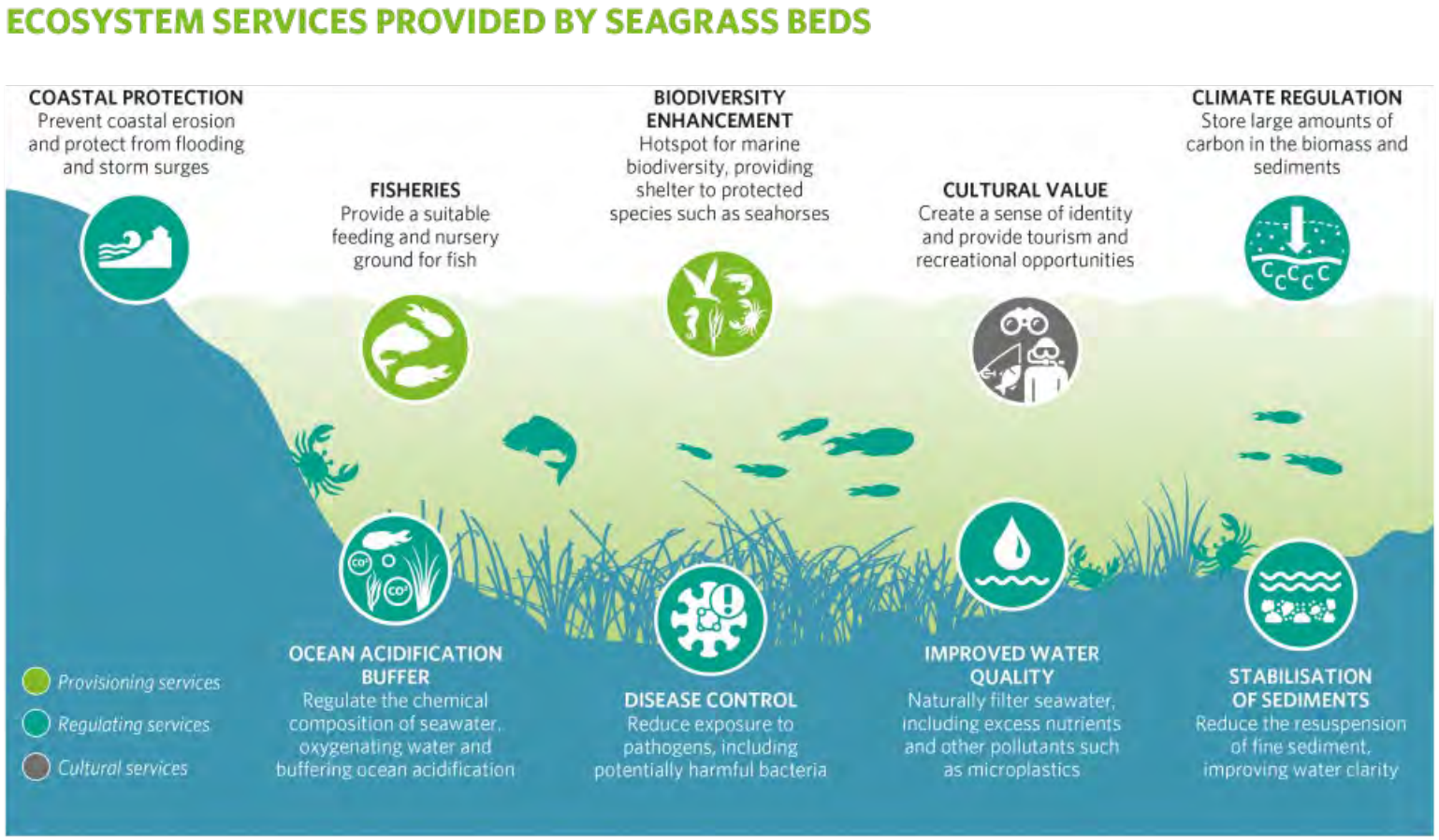
August 22, 2023

US Army Corps of Engineers

ERDC
ENGINEER RESEARCH & DEVELOPMENT CENTER

Submerged Aquatic Vegetation (SAV)

- SAV are submerged rooted and flowering plants
- SAV provide critical ecosystem services
  - Ecological
  - Chemical
  - Physical
  - Cultural

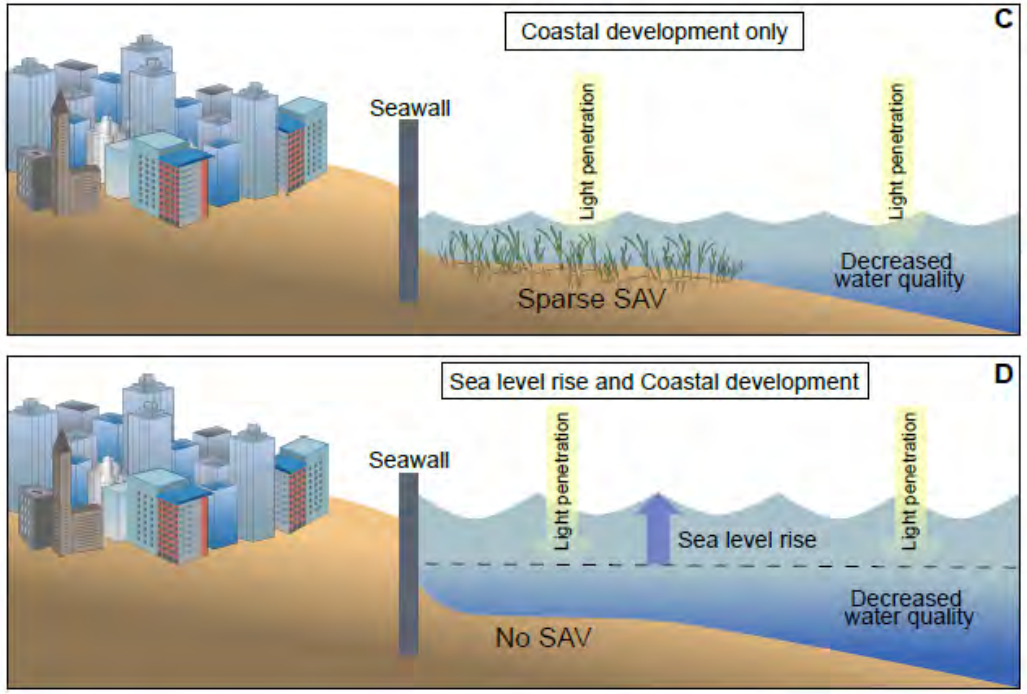


Modified from UNEP (2020) and Potouroglou, M., Westerveld, L. and Fylakis, G. (2020).

ZSL LET'S WORK FOR WILDLIFE | UNIVERSITY OF PORTSMOUTH | Environment Agency

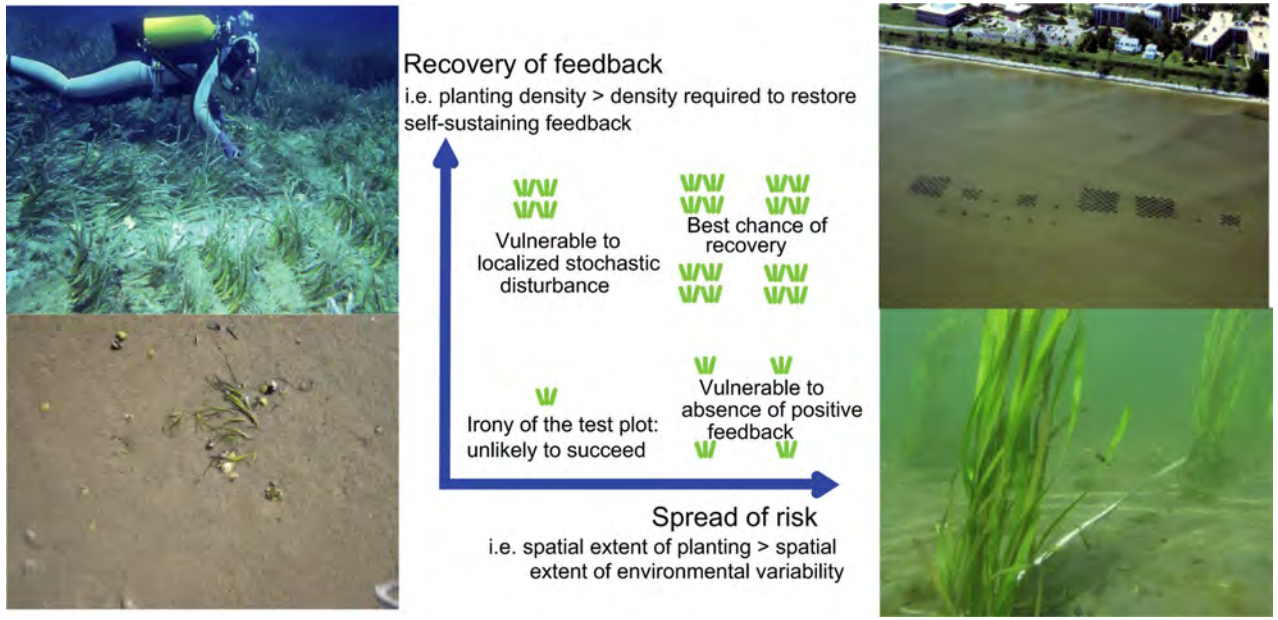
Threats to SAV

- 30% area loss globally (since 1800s)
- 7% lost annually due to multiple stressors, including:
  - Poor water clarity (agricultural, urban, and industrial run-off)
  - Coastal development
  - Climate change
  - Unregulated fisheries
  - Dredging*



SAV Restoration Efforts Show Limited Success

- Can use transplants (more common) or seed broadcasting
- Larger scale projects (1000-10000 seeds/plants) more successful



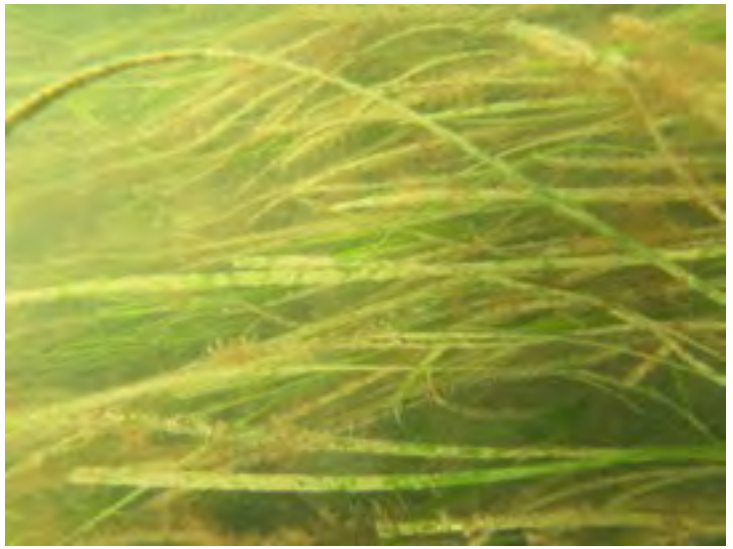
van Katwijk et al., 2015

- Ensure site is appropriate for SAV!

SAV vs. Dredging

- **Dredging impacts include:**
  - Physical removal (direct)
  - Burial (direct)
  - Elevated Turbidity (indirect)

- **Resource agencies focus on these short-term impacts to SAV**



https://www.saw.usace.army.mil/Missions/Navigation/Dredging/District-Plant-Dredging/Merritt/

*Notes on environmental impacts of dredging…

- **Most dredging-related SAV loss associated with direct removal**
- **Turbidity plumes not greater than background levels**
- **Better environmental management techniques:**
  - *In situ* monitoring
  - Particle tracking models to forecast turbidity
- **Few studies document impacts of dredging on SAV**

BUDM for SAV?

- Need innovative ideas to reach 70/30 goal
- Restoration/enhancement needed with conservation
- Losing SAV habitat to SLR (light limited)
- Create habitats that can support SAV (i.e., not light/depth limited)
- Need to demonstrate long-term benefits

Ideal Candidates for BUDM for SAV

- Shallow coastal/estuarine systems (i.e., plenty of light)
- Experiencing SLR but not heavy coastal development (shoreward expansion potential)
- Formerly vegetated areas that are now light limited
- TLP?
- Large-scale NNBF efforts?

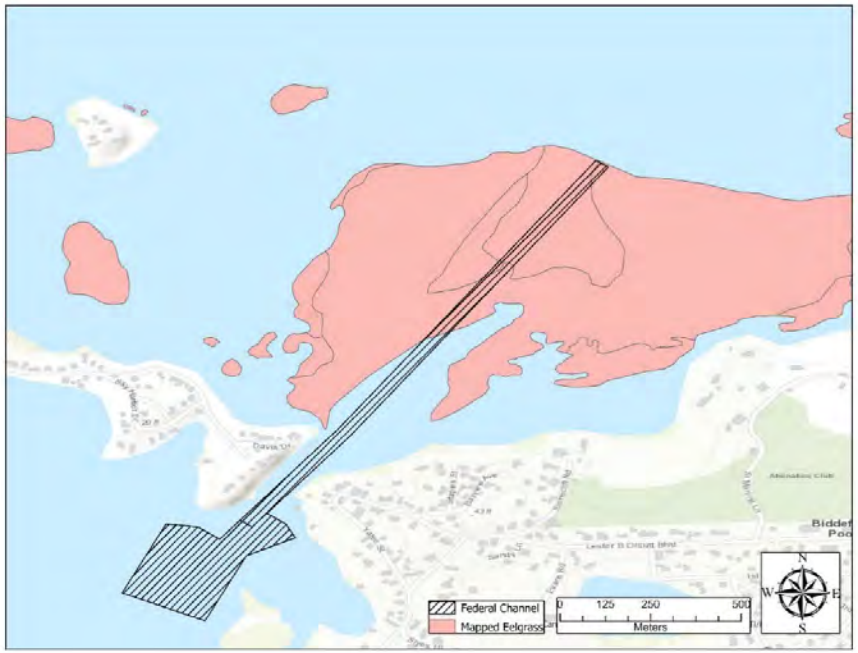
Bad Candidates for BUDM for SAV

- Heavy development
- Persistent water quality issues
- High wind, wave, current activity

Case Studies: Positive Long-Term Outcomes

- SAV is resilient – (Laguna Madre, TX; Wood Island, ME)

- Dredged material can create suitable habitat (Barnegat Bay, NJ)



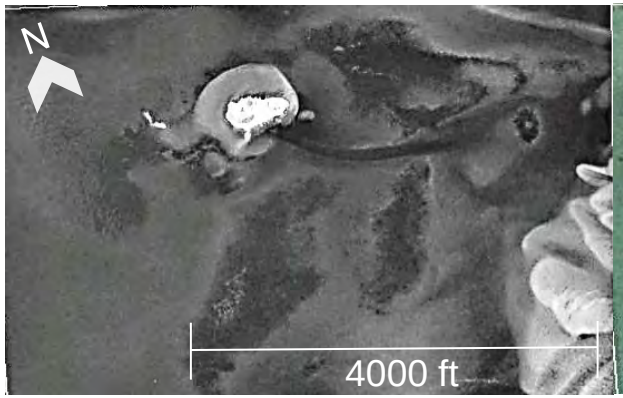
Altman et al., 2023

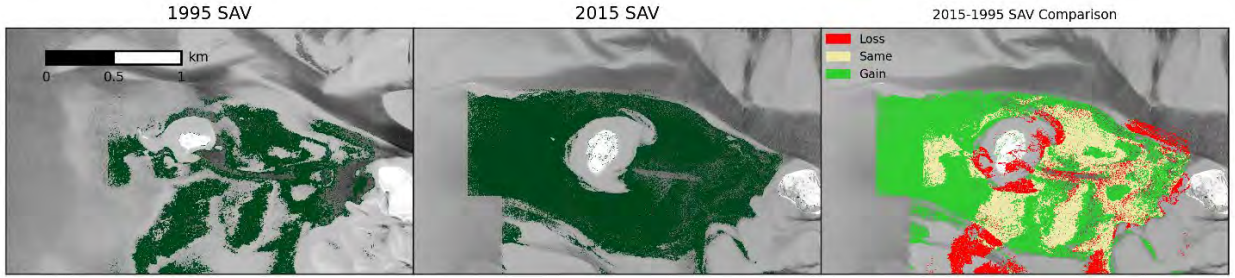
Barnegat Bay, NJ – Oyster Creek Channel

- **Oyster Creek Channel – Dredged ~2 years between 1981-2017**
- **Material placed at 2 open-water disposal areas that became islands**
  - 26A (East) – inactive since 2008, now a Heron Rookery
  - 26B (West)

Barnegat Bay, NJ – 26B SAV

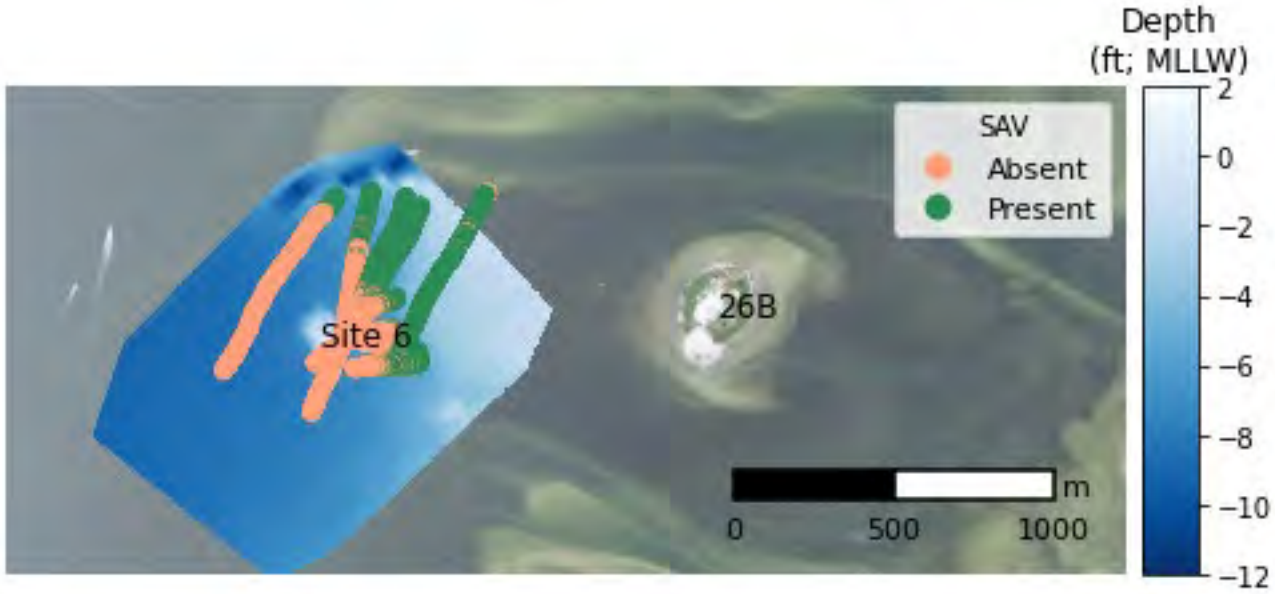
Imagery from GoogleEarth

March 1995	May 2008	September 2013	October 2017
			
Last placement: 1991 Next placement: 1996	Last placement: 2004 Next placement: 2009	Last placement: 2010 Next placement: 2015	Last placement: 2017*

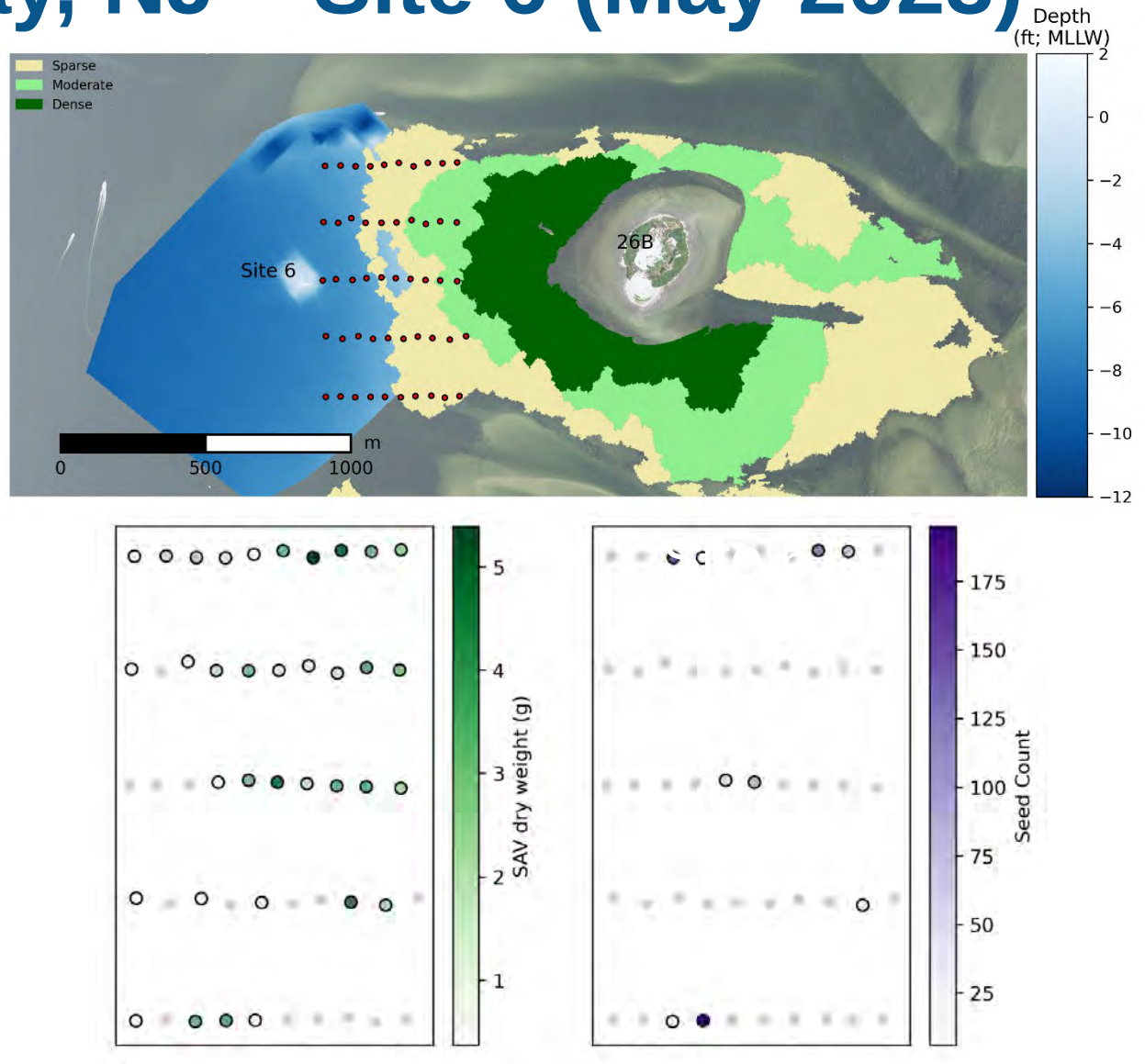


Barnegat Bay, NJ – Site 6

- **WRDA 1122 Pilot Project**
  - **Support navigation mission and use sediments beneficially**
- **~1 km west of 26B, deeper, no SAV (yet)**
- **Started placing sediment Fall 2020**



Barnegat Bay, NJ – Site 6 (May 2023)



Conclusions

- SAV provides essential ecosystem services
- SAV habitats vulnerable to multiple threats
- SAV resilient to short-term dredging impacts
- BUDM opportunities can provide long-term benefits to SAV habitats

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- Altman, Safra, Matthew Balazik, and Catherine Thomas. 2023. Eelgrass Functions, Services, and Considerations for Compensatory Mitigation. ERDC/EL TR-23-1. Vicksburg, MS: US Army Engineer Research and Development Center–Environmental Laboratory. https://dx.doi.org/10.21079/11681/46833.

- Katwijk, Marieke M. van, Anitra Thorhaug, Núria Marbà, Robert J. Orth, Carlos M. Duarte, Gary A. Kendrick, Inge H. J. Althuizen, et al. 2015. “Global Analysis of Seagrass Restoration: The Importance of Large-Scale Planting.” Special issue, British Ecological Society Special Feature: Demography Beyond the Population. Journal of Applied Ecology 53, no. 2 (April): 567–78. https://doi.org/10.1111/1365-2664.12562.

- Russ, Emily R., Amy H. Yarnall, and Safra Altman. 2023. Dredged Material Can Benefit Submerged Aquatic Vegetation (SAV) Habitats. ERDC/TN EWN-23-1. Vicksburg, MS: US Army Engineer Research and Development Center–Environmental Laboratory.