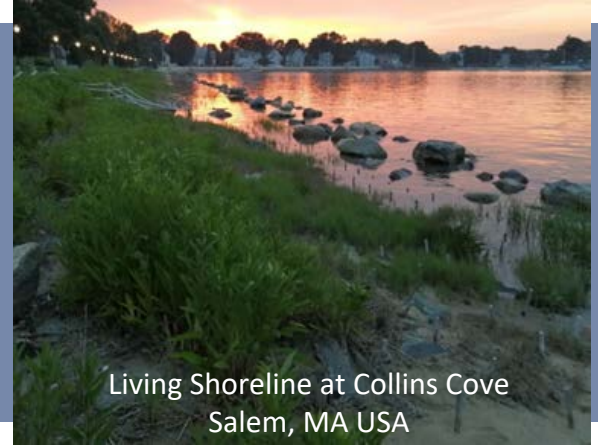


Biodiversity Study to Support Resilience of Coastal Marsh Ecosystems

Planting Event: Collins Cove, Salem, MA

BACKGROUND

Coastal salt marshes are crucial ecosystems, offering flood management, carbon sequestration, nutrient retention, and biodiversity. Threatened by rising sea levels, nutrient runoff, extreme weather, and urban development, salt marsh restoration is increasingly critical. However, practitioners often face limitations in accessing locally sourced plant materials, which can better withstand diverse conditions and support coastal resiliency.



Living Shoreline at Collins Cove
Salem, MA USA



Dr. Randall Hughes (Northeastern University) and Barbra Warren (Salem Sound Coastwatch) working with students and volunteers to stake planting locations

PLANTING PARTNERS

Ramboll Americas Engineering Solutions (Ramboll) and Northeastern University (NU), with support from the U.S. Army Corps of Engineers Engineering With Nature® (EWN) program, have partnered with Salem Sound CoastWatch, Mystic River Watershed Association (MyRWA), and The Nature Conservancy (TNC) to assess biodiversity and ecological function in MA wetlands. The project examines genetic diversity and restoration performance of cordgrass, comparing local ecotypes with commercial varieties.



Barbra Warren & Volunteers
Salem Sound Coastwatch

Sara Copp Franz & Dr. Molly McDermott
Ramboll US Consulting

Catherine Pedemonti
The Mystic River Watershed Association

Dr. Randall Hughes & Students
Northeastern University

Multiple Volunteers
The Nature Conservancy

Dr. Andrew McQueen
USACE ERDC



Planting Event: Collins Cove, Salem, MA

RESEARCH APPROACH

In 2022, Ramboll and NU gathered seeds and leaf tissue from three Massachusetts marshes (Belle Isle, Rumney, and Plum Island) to assess their genetic structure. The team utilized the seedlings for a planting experiment at Collins Cove, Salem, MA, planting local and commercial cordgrass stocks in spaced patches. Project partners planted approximately 1,700 plants at Collins Cove with the help of many volunteers. After planting, the project team collected baseline monitoring data on patch density, cover percentage, plant height, and the presence of flowers or seeds. Over a period of more than three years, the project will monitor plant performance in relation to genetic diversity and source composition.

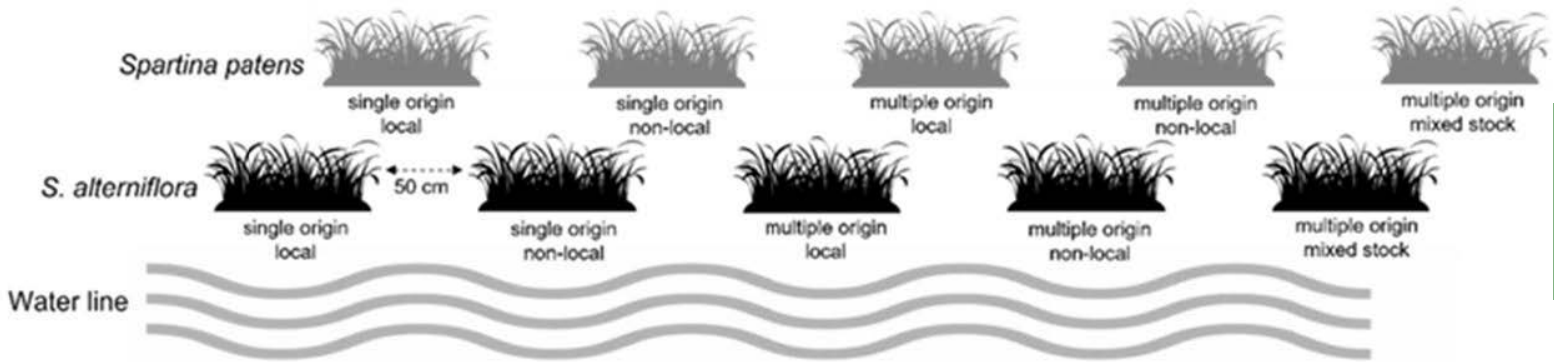


Figure 1. Diagram of living shoreline experimental plots.

PATH FORWARD

- Conduct comprehensive genetic analysis of both local and commercial stocks, led by NU
- Ensure continual monitoring of planted cordgrass for relevant phenotypic traits
- Thoroughly analyze all collected data for comprehensive insights
- Compile and finalize the research report; publish significant findings in scholarly manuscripts
- Schedule regular collaborative meetings for ongoing coordination
- Ensure timely sharing of data among all stakeholders
- Oversee continuous site management activities in collaboration with Salem Sound Coastwatch



Mandi Miller (Ramboll) and volunteers planting 1,700 plugs of *Spartina patens* and *Spartina alterniflora*