Opportunities for Protecting Salt Marsh Migration Corridors in New Hampshire: A summary of the *Pathways to Salt Marsh Resilience Project*

Final Report | May 2025

EXECUTIVE SUMMARY

Project Overview

Salt marshes in New Hampshire are threatened by sea level rise and coastal development. Without the space to migrate inland, marshes may drown and get squeezed out of existence.

There is an urgent need to focus on the places, ecological processes, and management actions that can help salt marshes expand inland and migrate into adjacent upland areas as seas rise, thus supporting the long-term persistence of this important habitat.

This report summarizes the results of the Great Bay National Estuarine Research Reserve's (GBNERR) *Pathways to Salt Marsh Resilience Project*, whose goal was to identify and promote projects in coastal New Hampshire that protect pathways for salt marsh migration.

Over the course of the 18-month project, we consulted with 58 individuals from 30 partner organizations through a series of workshops and small meetings and asked them:

1. What **spatial, field and practical considerations** can help us identify promising areas to invest in marsh migration projects?
2. Given the spatial information we compiled and your local knowledge, ***where* should we invest** in marsh migration projects?
3. **What *specific strategies* should be promoted** in each priority location?

The Pathways to Salt Marsh Resilience Project included six National Estuarine Research Reserves and was funded by a National Fish and Wildlife Foundation America the Beautiful Challenge Grant (Award #78114). See the National Estuarine Research Reserve Association's Wetland Protection Pathways project website for more information on the national project.

Ways to Promote Salt Marsh Migration

Project partners helped us identify the following types of projects that can help protect marsh migration corridors:

- **Land conservation** that protects the upland areas where marshes will expand into as seas rise.
- **Restoration projects** that address impairments in existing salt marshes to increase their long-term resilience and ability to migrate.
- **Facilitated or assisted migration** into upland areas adjacent to current salt marsh, such as re-grading, planting, invasive species management, breaching berms or stone walls, or tree limbing.
- **Regional analysis and research** about topics, such as the role of historic stone walls or railroad beds that may block marsh migration.
- **Multi-parcel marsh migration projects** that benefit multiple properties, such as adaptive management of vulnerable school yards or neighborhood easements.
- **Outreach and technical guidance** for public and private landowners about how to proactively manage a changing shoreline and make space for marsh migration.

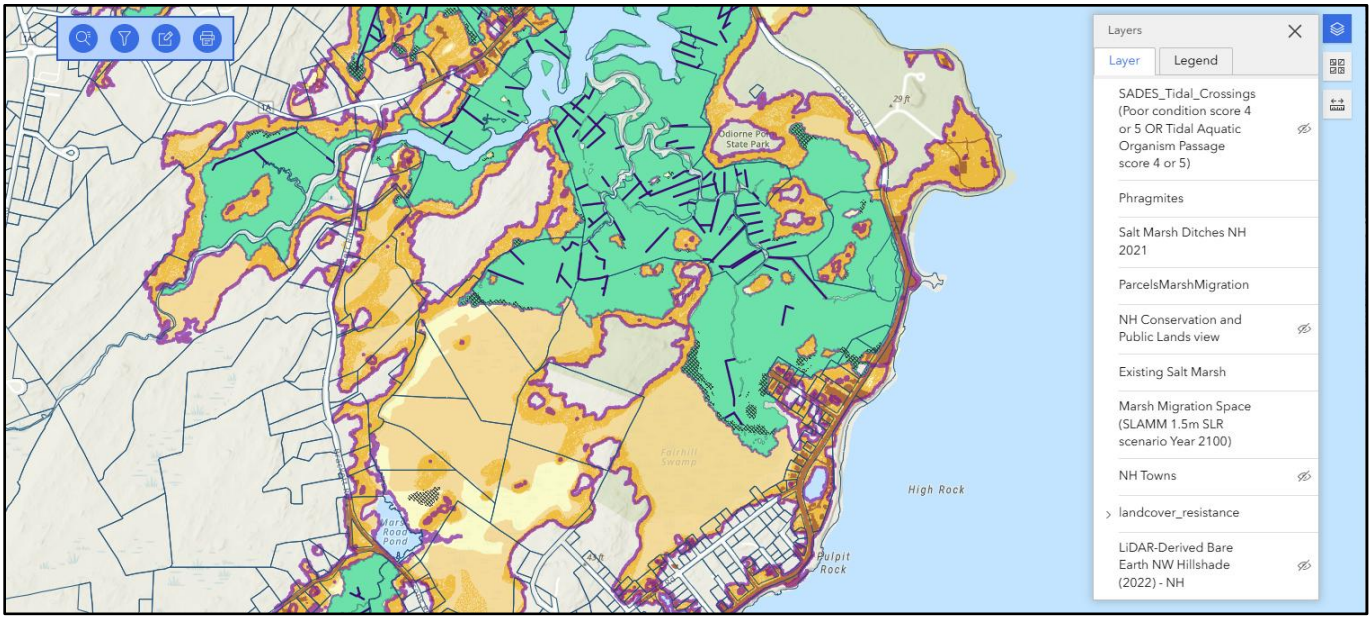
Partners brainstorming marsh migration ideas with large maps at the project kick-off workshop in October 2023.

Identifying Places for Marsh Migration

Building off of a University of NH literature review on marsh migration, we gathered partner input and determined that the following factors and resources are important to consider when deciding where to invest limited dollars to ensure that marshes have a pathway to migrate inland over time:

- ***Large migration space*:** Sea level rise projections, high resolution land elevation data, and spatial modeling were used to identify large, contiguous areas where marshes could expand as seas rise.
  - *Key resource:* Sea Level Affecting Marshes Model (SLAMM)
- ***High potential that the adjacent upland will transition to marsh:*** Generally, low-lying upland areas adjacent to marshes that have gentle slopes, fewer trees, and less development are expected to more easily transition to salt marsh.
  - *Key resource:* NH Fish & Game Landcover Resistance Spatial Analysis, which models how easily marshes could migrate into different areas, based on slope and land cover type
- ***Viable conservation opportunities:*** Land protection projects are often easier to fund and implement in areas with large, privately-owned parcels, close to other conservation lands, and, ideally, with potentially interested landowners.
- ***Healthy and connected marshes:*** Larger marshes that are in good condition (e.g., fewer invasives, less ditching, large high marsh zone), with good connectivity to other marshes and their migration space, are generally believed to be more likely to persist, adapt, and migrate.
  - *Key resource:* The NH Salt Marsh Plan
- ***Community and partner interest and momentum:*** Partners brought their knowledge of the areas and helped us identify places where there was community interest, current projects, and momentum that could help energize additional work to protect the migration corridors for salt marshes.
- ***Multiple ecological benefits:*** It could be easier to attract funding and justify investments in specific marsh migration pathway projects if they are perceived as valuable for many reasons, such as protecting unique plant or wildlife species, mitigating flooding, or offering aesthetic and recreational values.

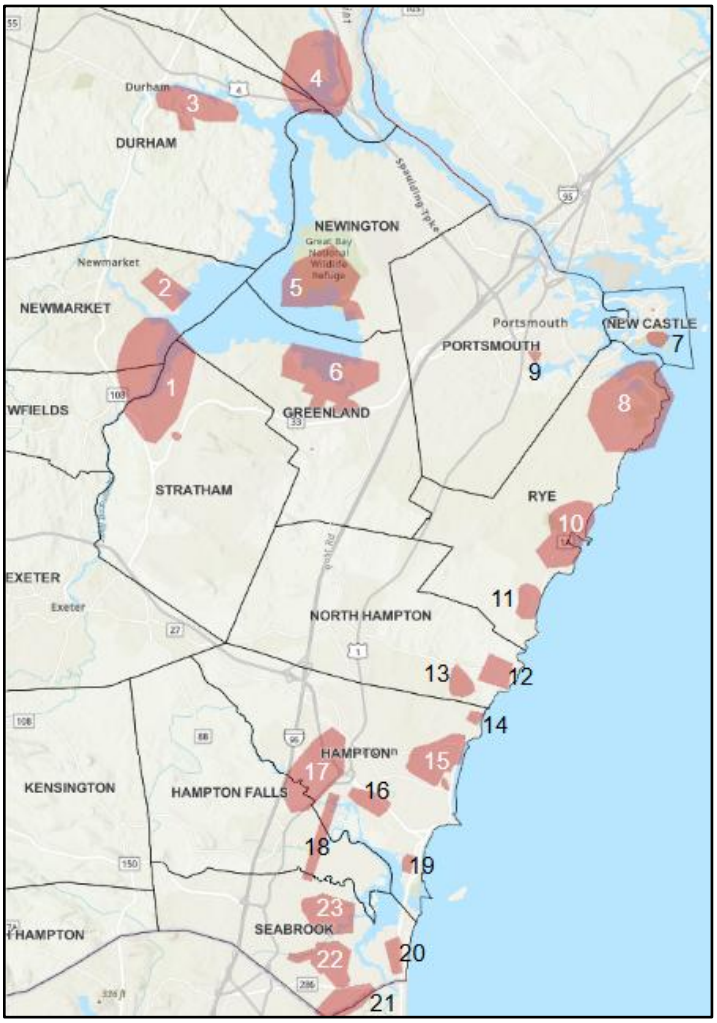
The NH Marsh Migration Mapping Tool was created for this project to pull together key spatial data, including layers cited here, to help identify promising locations for marsh migration projects.



Example screenshot of the NH Marsh Migration Mapping Tool created for this project, showing existing marsh (green) and the land cover resistance scores within the marsh migration space (yellow to orange).

Promising Areas for Marsh Migration

With the help of our online marsh migration mapping tool and a series of workshops and small meetings, we identified 23 promising areas in New Hampshire where we should invest in projects that will protect corridors for salt marshes to migrate inland as seas rise.



Promising areas for investing in salt marsh migration projects in coastal New Hampshire identified through this collaborative process. See Table 3 in the full report for details on these areas and suggested marsh migration project ideas.

Developing Site-Specific Strategies

After reviewing the 23 promising areas, we chose to scope out and explore site specific strategies for 12 projects where we felt we could advance work over the short-term; for example, by supporting a grant application, adding a new dimension to an on-going initiative, or jumpstarting action in a priority area.

For most of 12 project sites, we developed a summary product called a *Marsh Migration Opportunity Map - a* succinct project profile to support planning and implementation. These profiles offer an interpretation of maps and spatial data for the site and summarize local knowledge and ideas generated by partners. Appendix C includes all the Marsh Migration Opportunity Maps.

We found it important to consider the following attributes for each site to guide project planning:

- Amount and characteristics of **marsh migration space.**
- **Tidal restrictions** (e.g., undersized or dysfunctional culverts) that may need to be replaced to restore tidal flow and enable marsh migration.
- **Other barriers to migration**, such as berms or stone walls, that may need to be addressed to enable migration.
- **Invasive species,** such as *Phragmites*, which are known to thrive in the transition zone between fresh and brackish water and can impede establishment of native salt marsh plant marsh species.
- **Potential for in-marsh remediation**, such as ditch repair and managing megapools through runneling, to improve current condition and long-term resilience.
- **Potential for facilitated migration**, which could include changes in hydrological patterns to remove/deter *Phragmites* in transition zones, limbing or removing trees that are shading the marsh edge, or regrading adjacent slopes.
- **Implications for developed areas** in the migration space and considerations for protecting vulnerable neighborhoods and adjacent marsh habitats.

In addition to the mapping products, we also offered customized support to advance the 12 projects, including proposal writing assistance, convening partners to brainstorm strategies, and developing customized analyses. Although this project ends in 2025, GBNERR will continue to support priority projects and can offer technical assistance to organizations and communities that would like to explore ways to protect salt marsh migration corridors. To discuss a project concept or request a site-specific Marsh Migration Opportunity Map, you can reach out to Lynn Vaccaro at lynn.e.vaccaro@wildlife.nh.gov.

To learn more, visit: greatbay.org/science/habitat-science