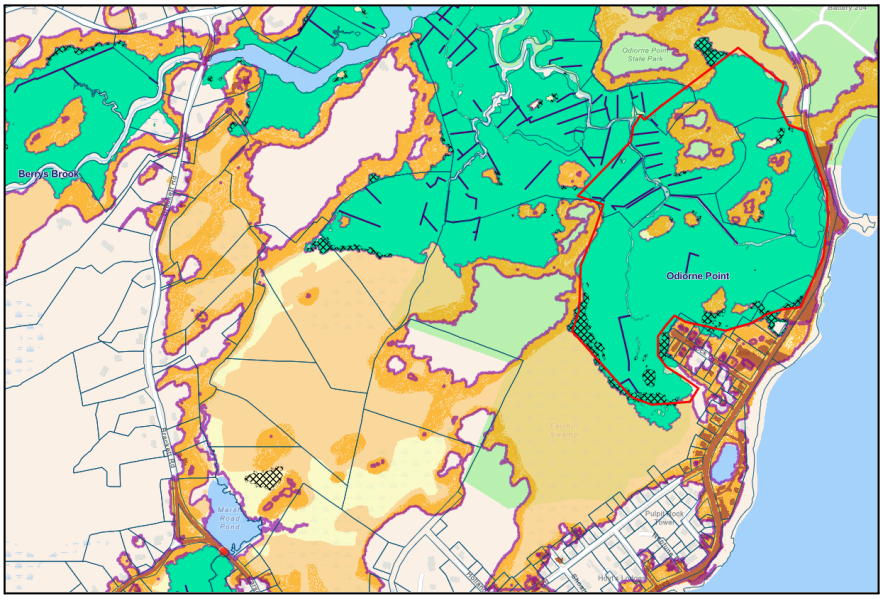
NH Marsh Migration Mapping Tool

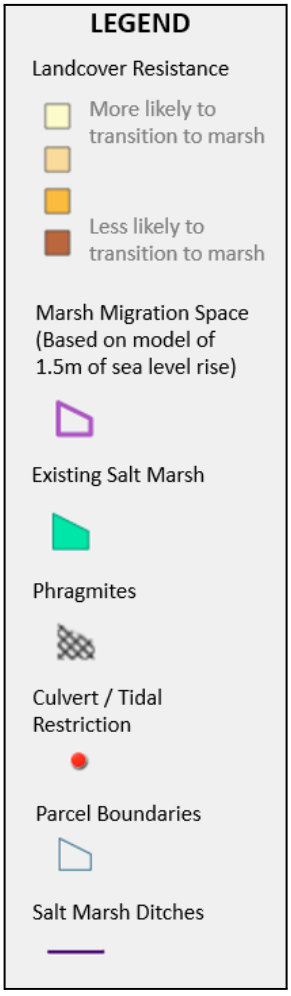
Link to the Mapping Tool: **Marsh Migration Mapping Tool**

Great Bay National Estuarine Research Reserve (GBNERR) and NH Department of Fish & Game created an online mapping tool to support the *Pathways to Salt Marsh Resilience Project*, an initiative focused on identifying and advancing efforts across coastal New Hampshire that will help protect the natural pathways salt marshes need to migrate as sea level rises. Originally developed as a tool for internal use, we are now sharing it with partners in case it can support their work.

The mapper includes the spatial data layers that were determined by our collaborative, science-based process to be the most important for identifying where to invest in salt marsh migration pathways projects. The table below provides a description of these data layers. Users can overlay the extent of marsh migration space by the year 2100 (determined through recent SLAMM modeling), along with existing salt marsh, the location of impaired tidal crossings, coastal parcels with metrics important to salt marsh migration, conservation areas, and high resolution topography (LiDAR), along with several other pertinent layers.

To address a data gap identified by the *Pathways Project,* NH Fish & Game conducted a new analysis of "landcover resistance" based on a previous study by The Nature Conservancy.[1] It combines detailed LiDAR elevation and NOAA C-CAP land cover data to provide relative scores for how easily salt marsh could migrate into a given area. Review of this data can prompt more detailed, on-the-ground field assessments of the migration space.





[1] Anderson, M.G. and Barnett, A. 2017. Resilient Coastal Sites for Conservation in the Northeast and Mid-Atlantic US. The Nature Conservancy, Eastern Conservation Science. http://www.nature.ly/TNCResilience

Summary of Spatial Data in the Marsh Migration Mapping Tool

Spatial Data Layer	Description	Source
Marsh Migration Space (1.5m SLR Year 2100)	This layer, shown as a purple outline, displays the predicted, long-term salt marsh migration space by showing the extent of estimated salt marsh that could be possible with 1.5 m of sea level rise by the year 2100. This was created using the Sea Level Affecting Marsh Model (SLAMM) and does not take into account development in the migration space. The *Landcover Resistance* layer provides information on the area within the migration space and is clipped to this *Marsh Migration Space* extent.	SLAMM (Sea Level Affecting Marshes Model) Results, NHFG 2022
Landcover Resistance	This spatial data layer provides a prediction of how easily marshes could migrate into a particular area as sea level rises. This data is based on a 2024 analysis completed by NH Fish & Game/GBNERR that combines an estimate of "land form resistance" using high resolution elevation data and "land cover resistance" using land cover data including vegetation type and impervious surface. ● **Lighter yellows** (lower scores) are generally low-lying, freshwater wetlands and/or open water, both of which are likely to allow for marsh migration. (Note that open water may be too deep to convert to salt marsh and site visits should be used to verify migration potential.) ● **Oranges** (medium scores) are areas of moderate slopes and/or vegetation that could be conducive to marsh migration, such as agricultural fields or low-lying forests. ● **Dark brown**s (higher scores) are areas of high elevation and/or are often developed (impervious) or steeply-sloped forested areas that would likely block marsh migration without intervention.	NHF&G, based on Anderson et al., 2017[2]
Existing Salt Marsh	This layer shows the existing salt marsh boundary in NH, divided into marsh units established as part of the NH Salt Marsh Plan. Includes detailed information from the NH Salt Marsh Plan for each marsh unit. Includes presence or absence of historical/archaeological resources for each marsh unit or adjacent migration space within 150 meters (Y=present, N=not present). Includes presence or absence of Species of Concern for each marsh unit or adjacent migration space within 150 meters (Animal, Plant, None).	NOAA Coastal Change Analysis Program (C-CAP). NH Salt Marsh Habitats 2013. NOAA-Office for Coastal Management, 2020
Salt Marsh Ditches	This layer shows the extent of ditches present. The ditches were created during historic agricultural practices and mosquito control activities, and have been shown to reduce the resilience of salt marsh habitat.	GBNERR, 2021

Spatial Data Layer	Description	Source
Tidal Crossings	This layer shows a subset of the SADES (Statewide Asset Database Exchange) tidal stream crossing dataset. A tidal crossing is a culvert or bridge associated with a roadway that conveys two-way tidal flow. An analysis done by NHDES and TNC prioritized these areas based on their condition and their ability to support aquatic organism passage (AOP). The subset of tidal crossings displayed are the most likely candidates for replacement (poor condition, low AOP), which could open upstream areas to potential salt marsh migration. For more information, see the DES webpage on tidal stream crossings.	The Nature Conservancy and NHDES Coastal Program, 2019
Phragmites	This layer shows the extent of the invasive plant species, *Phragmites australis*, based on aerial imagery collected in 2013. Phragmites, and other invasive plant species, can outcompete native salt marsh plants and are known to thrive in the transition zone between fresh and brackish water.	NOAA Coastal Change Analysis Program (C-CAP). NH Salt Marsh Habitats 2013. NOAA-Office for Coastal Management, 2020
NH Conservation Lands	This layer shows the boundaries of land that has been protected or conserved in NH.	NH GRANIT, 2023
NH Towns	This layer shows the town boundaries in NH.	NH GRANIT Conservation/Public Lands, 2023
Parcels in Marsh Migration Space	This layer displays parcels and includes information on the town, street address, parcel ID and size (in acres). Note: this layer has been clipped to show only parcels in the potential marsh migration area.	NH Department of Revenue Administration, 2023
LiDAR-Derived Bare Earth NH Hillshade (2022) - NH	This layer shows detailed elevation of the land surface with 1-meter resolution.	NH GRANIT, 2023

The Marsh Migration Mapping Tool may be useful to anyone seeking to identify promising areas for marsh migration in New Hampshire and we encourage you to explore its capabilities. If you have any questions about the tool, please visit the *Pathways Project* page or contact Lynn Vaccaro, Lynn.E.Vaccaro@wildlife.nh.gov.