

Assisted Marsh Migration

A DOI Nature-Based Solutions Roadmap Fact Sheet



Assisted marsh migration is a coastal marsh conservation strategy that works with the inland movement of coastal marshes in response to rising sea levels¹. As sea level rise causes tidal inundation to move farther inland, marsh plants naturally move inland as well, seeking conditions that best match their ideal salinity and water exposure². Barriers such as seawalls, roads, canals, and homes can prevent marsh from migrating inland, resulting in loss of marsh habitat. Assisted marsh migration can consist of creating migration corridors, relocating infrastructure, removing invasive species, and transplanting plants³.

TECHNICAL APPROACH

Assisted marsh migration generally includes one or more of the following components:

- Removing upland obstacles such as infrastructure and invasive plant species. This also includes preventing future obstacles by preserving marsh migration corridors^{4,5}.
- Enhancing upland topography and hydrology to make it more suitable for coastal marsh, for example by removing dikes, reducing any steep gradients, and filling in existing ditches that lower the water table⁶⁻⁸. In some areas, shallow channels (runnels) may need to be added to prevent excessive inundation¹.
- Facilitating the movement of marsh plants by mowing marsh grasses and placing cuttings in migration areas⁹, transplanting endangered species¹⁰, and seeding to enhance genetic diversity¹¹.

BENEFITS

Climate Threat Reduction

- Reduced flooding
- Storm protection
- Sea level rise adaptation and resilience

Social and Economic

- Property and infrastructure protection
- Mental health and well-being
- Resilient fisheries
- Food security
- Jobs
- Cultural values

Ecological

- Improved water quality
- Increased primary productivity
- Enhanced biodiversity

CITATION

Warnell, K., Mason, S., Siegle, A., Merritt, M., & Olander, L. 2023. "Fact Sheet: Assisted Marsh Migration." *NBS Roadmap Project*. Durham, NC: Nicholas Institute for Energy, Environment & Sustainability, Duke University. www.nicholasinstitute.duke.edu/roadmap.

SITE SUITABILITY FACTORS

- ✓ Old agricultural fields or lawns
- ✓ Tidal inundation frequency of 0.5%-20% of high tides
- ✓ Slope less than 1%
- ✓ Salinity levels of 5-30 ppt
- ✗ Hazardous and contaminated sites
- ✗ Urbanized areas
- ✗ Dikes that won't be removed as part of the project
- ✗ Far from current marshes
- ✗ Lack of connectivity

EXAMPLE PROJECT

Blackwater National Wildlife Refuge on the Chesapeake Bay is testing several strategies to help its coastal marshes migrate inland with sea level rise, including acquiring additional land to preserve it as migration space, removing trees from areas likely to be inundated to promote growth of marsh vegetation, and controlling invasive *Phragmites* that may prevent native marsh vegetation from colonizing new areas.



Transition zone between marsh and forest at Blackwater National Wildlife Refuge. Photo credit: [Rav Paterra / USFWS](#). Public domain.

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KEY RESOURCES

Title and Link	Site Suitability	Design and Construction	Monitoring Guidance	Example Projects
Coastal Wetlands and Sea Level Rise: A Path to Climate Change Adaptation (MA Office of Coastal Zone Management)	✓	–	✓	✓
Marshes on the Move (NOAA & TNC)	✓	✓	–	–

LEARN MORE

Visit the DOI Nature-Based Solutions Roadmap for more information on assisted marsh migration, other nature-based solutions, and principles and considerations broadly relevant for nature-based solutions projects. The assisted marsh migration summary includes additional details on each section included in this fact sheet, plus information on operations and maintenance, common barriers, and more resources and example projects.

Explore the Roadmap



Full Roadmap Document



Assisted Marsh Migration Section

www.nicholasinstitute.duke.edu/roadmap