

NE CASC

Northeast Climate Adaptation Science Center

Mapping Salt Marsh Response to Sea Level Rise and Evaluating 'Runneling' as an Adaptation Technique to Inform Wildlife Habitat Management in New England

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States:

Maine

Massachusetts

Rhode Island

Connecticut

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New York

Status:

In Progress

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Overview

Loss of saltmarsh habitat is one of the biggest threats to coastal sustainability in the Northeast. Salt marsh has been identified as an essential fish and wildlife habitat, and loss of saltmarsh corresponds with precipitous declines in marsh-dependent wildlife. For example, the global population of Saltmarsh Sparrow is predicted to collapse within the next 50 years after experiencing a 9% annual decline across the northeastern U.S. Resource managers require tools to help restore salt marsh habitat for wildlife by adapting marshes to climate change-driven sea level rise. However, adaptation approaches need to be tested and evaluated before widespread application.

Researchers are testing a rapidly emerging sea level rise adaptation-technique called "runneling", and developing science-based tools to target marshes most important for wildlife. Runnels are micro-channels created to help restore tidal drainage in drowning marshes. Stored water that is unable to drain from marshes kills marsh vegetation, exposing sediments to waves, increasing erosion, and furthering marsh loss. However, no data are available describing runnel construction or outcomes for [runneling](#) tools are available to identify marshes and high priority habitat best suited for restoration using runnels.

In this study, researchers will address this need by expanding runnel evaluation in marshes to include information on wildlife, identifying marshes that meet criteria suitable for use of runnels as an adaptation approach, and piloting a tool to identify priority wildlife habitat using remotely-sensed data. This project helps land and resource managers determine how to best plan, implement, and evaluate runnelling as an emerging method to adapt salt marsh habitats to rising sea levels and increasing coastal storm impacts. The maps, tools, and data resulting from this work will help managers better protect salt marsh and wildlife in the face of climate change-driven sea level rise.

Publications

🔗 [Besterman, A. F., Jakuba, R. W., Ferguson, W., Brennan, D., Costa, J. E., & Deegan, L. A. \(2022\). *Buying Time with Runnels: a Climate Adaptation Tool for Salt Marshes. Estuaries And Coasts.* <http://doi.org/10.1007/s12237-021-01028-8>](https://doi.org/10.1007/s12237-021-01028-8)

Presentations

L. Hoffart; "Establishing baseline conditions for rapidly degrading marshes across a southern New England watershed."; Virtual; Coastal and Estuarine Research Federation 26th Biennial Conference; November 9, 2021

H.L. Sullivan; "The impact of runnelling as a hydrologic adaptation strategy on salt marsh carbon decomposition."; Virtual; Coastal and Estuarine Research Federation 26th Biennial Conference; November 8, 2021.

Besterman, A.F.; "'Runnelling' toward climate adaptation: Can interior drowning be reversed?"; Virtual; Coastal and Estuarine Research Federation 26th Biennial Conference; November 8, 2021.

Besterman, A.F.; "Buying time — Salt marsh adaptive management to sea level rise using runnels."; Society of Wetland Scientists Webinar; October 21, 2021.

R.W. Jakuba; SNEP Coastal Resilience Webinar: "Wetlands and Seagrasses: Nature's Superheroes in the Fight for Coastal Resilience in Southeast New England"; Virtual; July 15, 2021

Besterman, A.F., Brennan, D. Buying Time with Runnels: A Climate Adaptation Tool for Salt Marshes. NE CASC Webinar Series. September 15, 2022.

Besterman, A.F. Tidal Restoration May Save Drowning Marshes: Early Evidence from a Large-Scale Experiment. Department of Ecology, Evolution, and Organismal Biology Seminar, Iowa State University. March 2023.

Besterman, A.F. Tidal Restoration May Save Drowning Marshes: Early Evidence from a Large-Scale Experiment. Horn Point Lab Seminar, University of Maryland Center for Environmental Sciences. April 2023.

Sullivan, H.L., Besterman, A.F., Jakuba, R., Deegan, L.A., Bowen, J.L. The impact of runneling as a hydrologic adaptation strategy on salt marsh carbon decomposition. National Estuarine Research Reserve System (NERRS) Annual Meeting, Seattle, WA. October 2022.

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