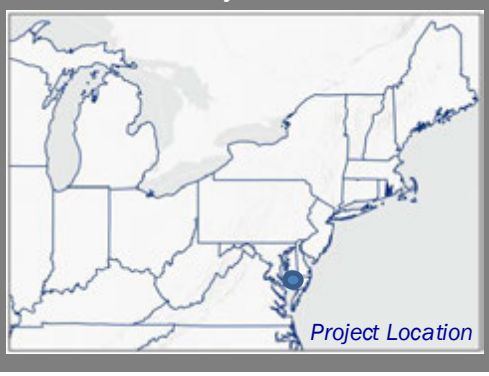
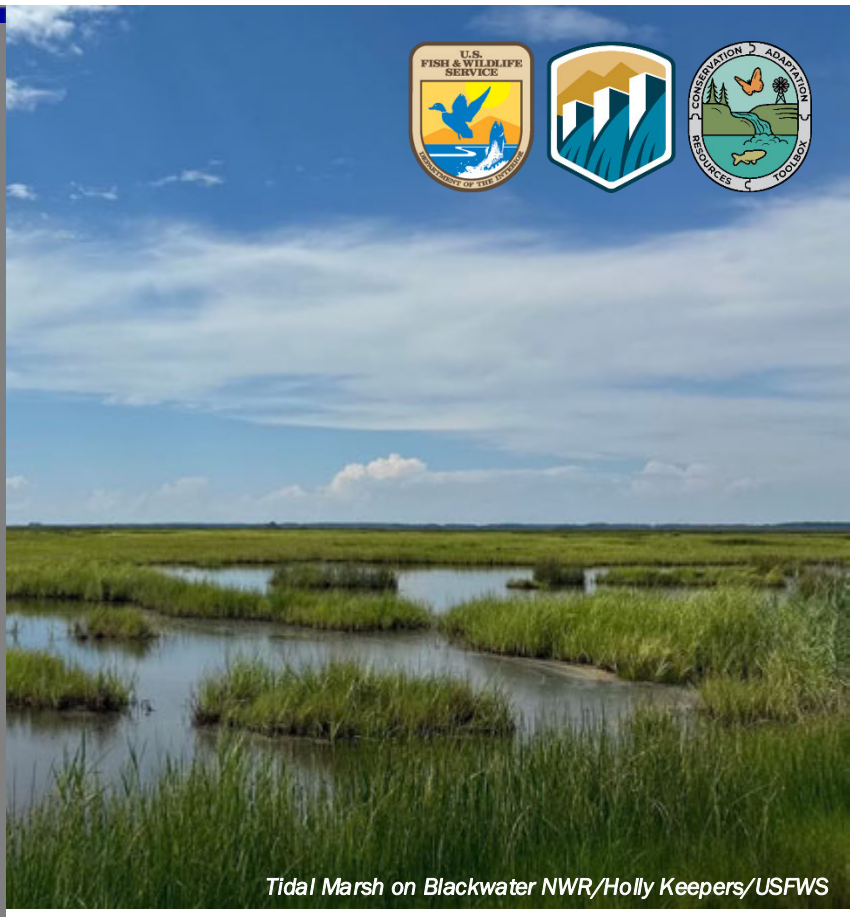
CLIMATE ADAPTATION

Marsh Migration and Thin-Layer Placement on Blackwater National Wildlife Refuge

Blackwater National Wildlife Refuge (NWR) is a tidal salt marsh in the Chesapeake Bay system. The marsh provides the local community with ecotourism, recreation, and storm protection. Over 5,000 acres of marsh have been lost to sea level rise, subsidence, erosion, and vegetation destruction from the invasive rodent, nutria (*Myocastor coypus*). In 2013, Blackwater NWR worked with multiple partners to develop Blackwater 2100, a predictive modeling plan to help the refuge assess current marsh needs, prioritize wetland restoration, and manage marsh migration. Sediment application using the nature-based technique of thin-layer placement and nutria eradication has increased the resiliency of remaining refuge wetlands and helped maintain wildlife habitats and ecosystem services.





KEY ISSUES ADDRESSED

Sea level rise and subsidence are submerging tidal marshes and driving the loss of valuable fish and wildlife habitat, as well as important ecosystem services. Invasive populations of phragmites (*Phragmites australis*) and nutria have decimated the native marsh vegetation. Climate change and increasingly frequent and severe weather events threaten human health and infrastructure and valuable fish and wildlife habitat. Past restoration aimed to restore the refuge to historic conditions; however, this did not account for the current scale of sea level rise.

PROJECT GOALS

- Use tidal marsh modeling and ecological transformations to build marshland structure and create new tidal marsh habitat
- Use Congress-provided funding to eradicate nutria on the entire peninsula in partnership with state and federal agencies and public and private landowners
- Ensure future planning considers changing coastal conditions to benefit both the people and wildlife of the Chesapeake Bay

VICTORY OVER NUTRIA

On September 16, 2022 Maryland was declared free from nutria. The last known nutria capture was in May 2015. Collaboration among federal and state agencies and over 700 landowners made the eradication of nutria possible.

Spreading Dredged Sediment/Dave Harp/Chesapeake Photos

PROJECT HIGHLIGHTS

Predictive Modeling: The project team used a forecasting tool, the Sea Level Affecting Marshes Model to study the effects of sea level rise on marsh habitats under predicted relative sea level rise scenarios. They also built a suitability model based on areas associated with native marsh species and land use factors. Coupling these two models identified the state of current resilient marsh areas, locations for future marsh establishment, and current marsh areas of high value to salt marsh birds.

Thin-Layer Placement: This was the first thin-layer project in the Chesapeake Bay. The refuge used dredge materials to add 26,000 cubic feet of sediment over 40 acres, raising elevation in some areas by 3-6 inches. The following year, refuge staff observed significant regrowth of native vegetation in the area and all previously sighted bird species had returned.

Collaborative Nutria Removal: Congress passed the Nutria Eradication and Control Act in 2003. With the help of public and private landowners, the project team has eliminated nutria from over 250,000 acres of wetlands on the peninsula. Wildlife surveys and tracking with detector dogs helped to find and remove the nutria.

Collaborators

- Audubon Mid-Atlantic
- The Conservation Fund
- Maryland Department of Natural Resources
- USDA APHIS Wildlife Services
- See online for full list of contributors

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Visit CART:

LESSONS LEARNED

The Blackwater 2100 plan required refuge staff to think proactively: which marshes are most vulnerable to sea level rise, and which are most resilient? Where will marshes be created on low-lying uplands due to marsh transgression? For example, the refuge has used this plan to help evaluate and prioritize potential land acquisition. Using a sea-level rise adaptation plan to help understand where marshes were most vulnerable and where they were forming on the landscape due to sea level rise was a paradigm shift for the refuge and has led to more effective restoration in previously unconsidered areas.

Despite management efforts, phragmites continues to outcompete native plants in many areas. The refuge has prioritized preventing the establishment of new phragmites populations over eradicating well-established stands.

A strong scientific foundation has been essential to this entire effort. High quality research by scientific partners has been critical in reducing uncertainty and guiding decision making. The refuge continues to work with the USGS, George Washington University, Virginia Institute of Marine Science and others to evaluate projects and improve their strategies.

NEXT STEPS

- Evaluate the consequences of accepting phragmites using the Resist-Accept-Direct decision-making tool: the refuge plans to study the effect of salt on the soil to deter establishment of phragmites populations
- Determine long-term outcomes of thin layer placement projects

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Ghost Forest on Blackwater NWR/David Curson/Audubon