



Camilla Cerea/NAS

ACKNOWLEDGEMENTS

Audubon Maryland-DC is grateful to several funding organizations for making this project possible. Major funding includes generous grants from the WCS Climate Adaptation Fund, the National Fish & Wildlife Foundation's Chesapeake Bay's Stewardship Fund, and the France-Merrick Foundation. Support to establish the WCS Climate Adaptation Fund was provided by a grant to the Wildlife Conservation Society from the Doris Duke Charitable Foundation (DDCF). This material is based on work supported by the U.S. Environmental Protection Agency and the Chesapeake Bay Program's Innovative Nutrient and Sediment Reduction grants program, which support efforts with the Chesapeake Bay watershed to accelerate nutrient and sediment reductions with innovative, sustainable, and cost-effective approaches. Other grants were provided by the Bancroft Foundation, CSX, and Chesapeake Audubon Society. The Maryland Department of Natural Resources is contributing machinery and staff time.

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 Blackwater 2100 report, available at md.audubon.org/conservation/protecting-our-tidal-marshes



WETLAND RESTORATION AT FARM CREEK MARSH

CLIMATE RESILIENCE FOR A NEW ERA



A Blackwater 2100 project

David Curson

THE SINKING MARSHES OF DORCHESTER COUNTY, MARYLAND

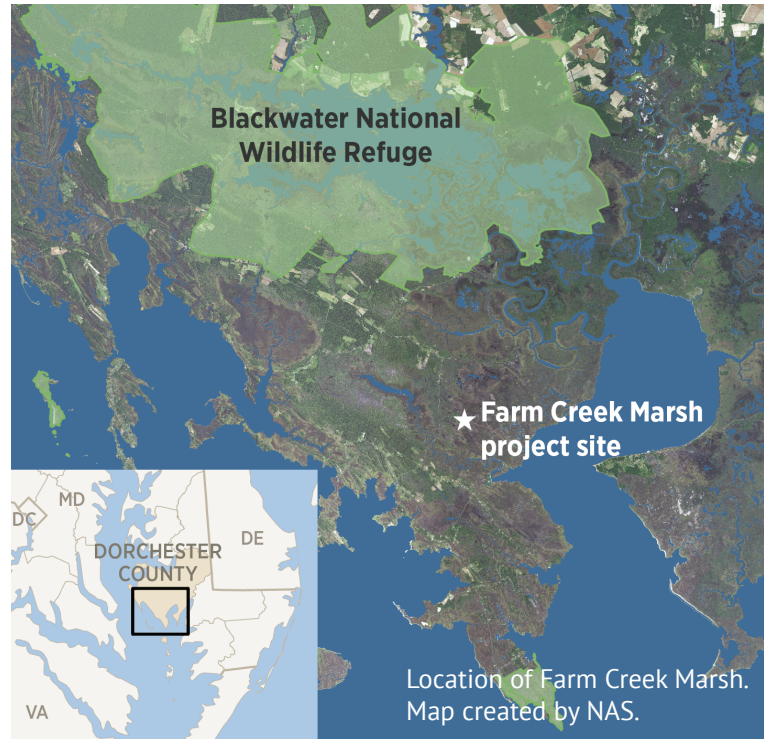
The tidal marshes within and surrounding Blackwater National Wildlife Refuge (NWR) are a national treasure. Lying at the heart of the Chesapeake, some 85,000 acres of marshes stretch across Dorchester County's seemingly timeless landscape, home to Bald Eagles, abundant fish and shellfish, and thousands of waterfowl.

Unfortunately, this landscape is changing rapidly. For thousands of years, the Chesapeake's marshes have built themselves upward on the peat remains of marsh grasses to compensate for the slow subsidence of the land, a result of geological forces caused by the last ice age. But now climate change is warming and expanding the Earth's oceans, accelerating the pace of sea level rise to a rate that exceeds the ability of marsh vegetation to lay down peat. As a result,

the marshes are submerging beneath rising waters. Scientists predict that, if nothing is done, nearly all of today's marshes in Dorchester County could be lost by the year 2100.

The migration of marshes inland as tidal influence reaches further upslope offers some hope that newly created marsh at the upland boundary may replace older marsh lost to erosion. In Dorchester County, hundreds of acres of dead pine trees testify to the recent conversion of forested upland to brackish tidal marsh. However, in many places this conversion is not producing vibrant meadows of marsh grasses but instead the dying trees are giving way to open water or large stands of invasive *Phragmites* reeds, and an opportunity for replacing eroded marsh is being lost.

MANAGING THE TRANSITION OF UPLANDS TO TIDAL MARSH



Can the transition of uplands to tidal marsh be managed effectively so that the newly created marsh is not lost in the process?

An ambitious project at Farm Creek Marsh, three miles from Blackwater NWR, plans to demonstrate one way that this can be done. Farm Creek Marsh is a 700-acre private sanctuary, owned by Chesapeake Audubon Society, that straddles the transition zone between pine forest and the vast tidal marshes encircling Fishing Bay.

Here, new marsh is forming as pine trees and forest understory vegetation die off due to saltwater intrusion from storm tides, and saltmarsh grasses replace them. But the health of this new marsh is deteriorating due to surface ponding of water, even though older marsh farther from the forest boundary is free-draining and healthy. Historical aerial images show that several acres of marsh grasses have eroded to open water in recent decades – this erosion is continuing today.

In 2015–2016, project partners conducted a hydrological study that revealed the reason for the flooding of the marsh surface. The recently transitioned marsh lies in a shallow basin that prevents water from draining to nearby tidal creeks. This basin may have been created by ground surface collapse as the pine trees died off decades ago. The study found that the inundation is due to both rainfall and occasional tidal storm surges and extends across 100 acres of marsh.

To remedy the excessive flooding, project partners are implementing an engineering solution. The deteriorating marsh will be connected to the tidal creek network by constructing a 500-foot (150m) extension to the nearest creek, using a low ground pressure excavator. The new creek will be built to mimic the form of nearby natural creeks. It will not only drain the ponded water but will also introduce tidal exchange and tidal marsh hydrology to the project site. By alleviating the waterlogged conditions, these changes should reinvigorate vegetation growth and improve the health and longevity of the marsh.

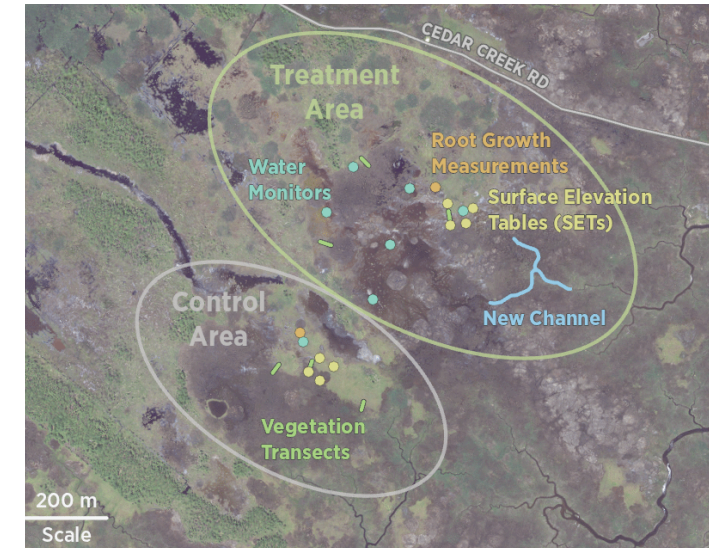


Hugh Simmons, President of Chesapeake Audubon Society, which owns Farm Creek Marsh. Credit: Camilla Cerea/NAS.

A NEW CLIMATE ADAPTATION STRATEGY FOR TIDAL MARSH

The enhancement of tidal hydrology at Farm Creek Marsh is one of a suite of novel techniques to help tidal marshes adapt to climate-driven sea level rise that scientists are piloting around the United States coastline. The extension of tidal creeks into recently transitioned marsh to alleviate inundation and erosion is a strategy that has not been employed before.

For this reason, an intensive program of environmental monitoring has been established to document how the marsh responds after the new channel is dug. A network of water monitors is measuring surface water levels before and after channel construction, and the project is also monitoring growth rates of marsh grasses, vegetation distribution, elevation of the marsh surface, and bird abundance. These variables are also being measured in an adjacent control area where inundated marsh will not be influenced by new drainage.



Location of new channel and environmental monitoring at Farm Creek Marsh. Map created by NAS.



Chris Nealen, USGS, measuring water quality. Credit: David Curson.

DIVERSE PARTNERSHIP

The project brings together a broad partnership to achieve its goals. Audubon's partners include the United States Geological Survey (USGS), Maryland Department of Natural Resources, The Conservation Fund, Sustainable Science LLC (a local wetland engineering firm), and Chesapeake Audubon Society (a membership chapter of Audubon), the property owner of Farm Creek Marsh.

SALTMARSH BIRDS – A UNIQUE BIRD COMMUNITY



Bird surveys conducted by Audubon show that Farm Creek Marsh supports several bird species found only in saltmarshes, including Clapper Rail, Seaside Sparrow, and Coastal Plain Swamp Sparrow. But another saltmarsh-dependent species, the Saltmarsh Sparrow is not present because of the waterlogged conditions. The Saltmarsh Sparrow is perhaps the bird species most at risk in North America from sea level rise and its population is declining at an alarming nine percent per year. Audubon hopes that Saltmarsh Sparrows may become established at Farm Creek Marsh after construction of the new tidal creek improves marsh health at the site.

Saltmarsh Sparrow. Credit: Frode Jacobsen.