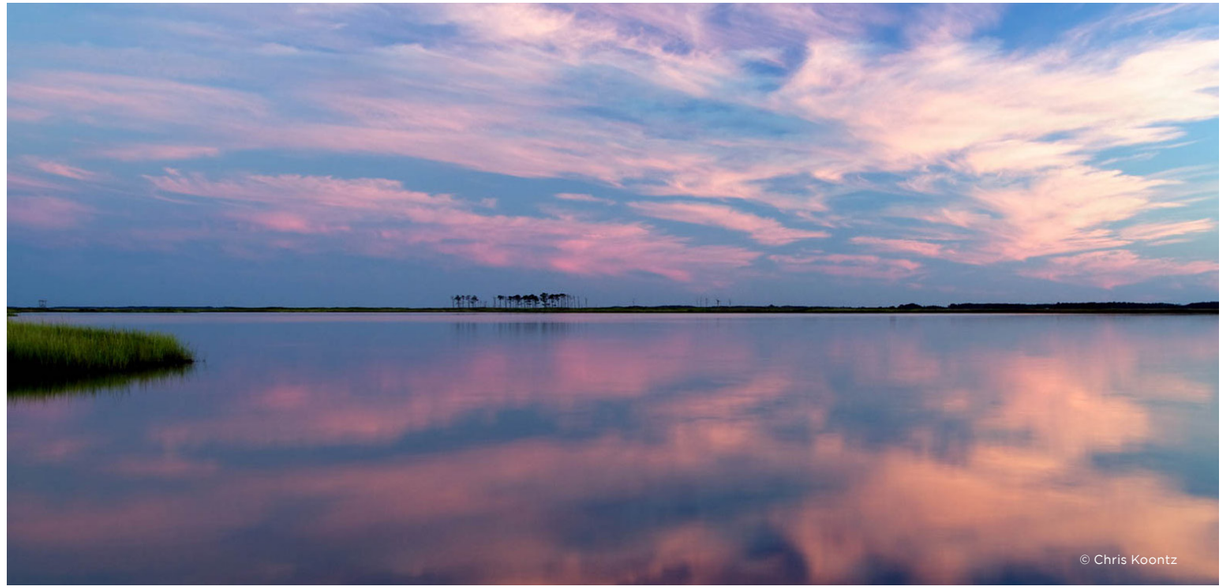

© Chris Koontz

Additional Blackwater Resiliency Projects

Other recent projects designed to model adaptive responses to climate effects on the Refuge or nearby include the following:

Marsh Tidal Exchange Enhancement – Design naturalized tidal drainage network for tidal marsh to improve native marsh grass health and productivity.

Marsh Migration Corridor Enhancement: Invasive plant control - Map presence of invasive common reed in forest and field areas and eradicate to maintain the ability for transition to native marsh grasses.

Nutria Eradication: Invasive animal control – Monitor for presence and eradicate non-native, invasive rodents responsible for past marsh loss to protect present and future native marsh areas.

Marsh Migration Corridor Enhancement: Forestry - Remove dead and dying trees in transitional forest area to improve adjacent marsh bird habitat and facilitate marsh transition upland.

Marsh Migration Corridor Enhancement: Crop replacement – Plant saturated soil adaptive switchgrass on formerly row-cropped agricultural land to provide native grass, commercial crop cover to facilitate transition to marsh.


© Albert McCullough

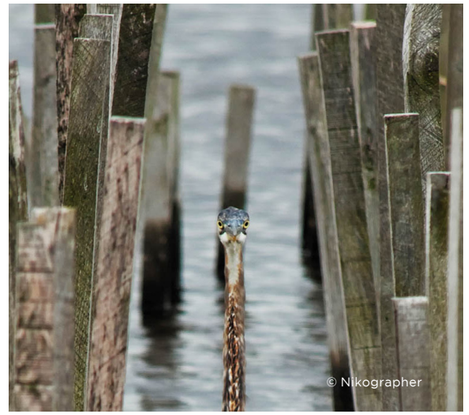

© Nikographer

Blackwater Climate Resiliency


© Erik Meyers

Adapting Blackwater's Marshes for the New Era

Today's visitor might experience the waving sea of marsh grass at Blackwater National Wildlife Refuge as part of a timeless landscape spanning past and future. Unfortunately, unseen factors are rapidly changing today's reality: Marsh loss is accelerating and sea levels are on the rise. Despite the presence of thousands of acres of salt marsh, rapidly accelerating sea levels threaten their persistence. Scientific models forecast much of the present-day Refuge to be converted to open water by the turn of the next century ***if*** nothing is done. Yet steps can be taken now to slow rates of marsh loss and decline and assure that salt marsh dependent birds – and humans – will be able to continue to enjoy this landscape for decades to come.


© Nikographer

Marshes on the Rise: Elevating Surface Levels at Shorters Wharf

An exciting new chapter in the management history of the Refuge is about to be written. During the fall of 2016, sediment will be carefully taken from the Blackwater River south of the bridge crossing for Maple Dam Road and spread thinly across a section of salt marsh that is showing telltale signs of decline due to rising water levels. The resulting increase in elevation is designed to boost plant productivity and prolong the expected life of the marsh ecosystem for several decades beyond what is currently forecast. Since the area chosen is also one with a high concentration of salt marsh birds, this project is good news for those species that depend on marsh habitat.

Blackwater's native marsh grasses maintain the marsh by their productivity, that is, the rate of growth in the root zone below the surface as well as the vegetation above. When grasses such as meadow cord grass "sit" too low in the tidal platform, they are inundated too frequently and for too long for the grasses to grow at the optimum rate. When decline of productivity sets in, the marshes start to show open patches that, over time, coalesce into more and more open water. This process makes the marsh more fragile to the effects of waves and coastal storms and less hospitable to salt-marsh dependent birds that have co-evolved with the marsh.

The extraction and surface application of materials will be completed this fall and winter. During the spring of 2017, the restored marsh area will be replanted with cord grass and other native vegetation. Careful monitoring will track the marsh over the next several years, and multiple research teams plan to study this early climate adaptation effort in real time. A limited scale restoration project immediately adjacent to the project site provides a striking example of marsh recovery in a similarly ponded area. This project is one of the largest of its kind yet undertaken and the first in the Chesapeake Bay region.

October, 2016

What's Happening to Blackwater's Marshes?

Over the past seven decades, Blackwater has lost nearly 5,000 acres of marsh to open water. The factors described in the Primer on Sea Level Rise contributed to the marsh loss, but nature is complex and other factors also affect the marshes. A South American rodent, the nutria, was introduced in the area during the mid-20th century. Nutria populations increased rapidly and were responsible for consuming large quantities of marsh plants, even the roots, which led to soil erosion an conversion of marsh areas to open water.

Scientific studies of Blackwater's marshes document that much of the loss comes from collapse of healthy tidal marsh areas from within. Native marsh grasses such as Spartina patens, or meadow cord grass, are naturally at their best within a relatively narrow tidal range. Too much inundation by the tides slows plant root growth and the decline in the marsh grasses health leads to less plant material to build the marsh for the next growing season. As plant health declines due to rising water levels, more gaps open among clumps of grass until entire segments of marsh become open water. Without the marsh grasses to anchor the soil, these marshes erode more and more with each tide and storm event.

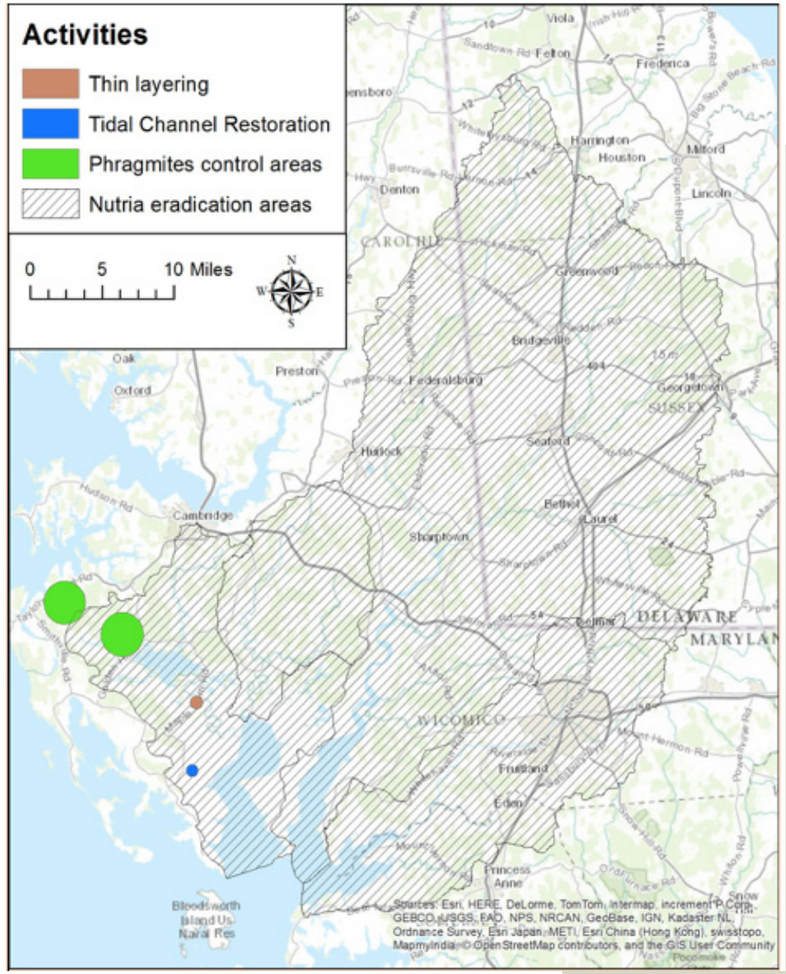
Despite the observed historic loss of Blackwater's marshes, aerial photographs taken during the same period shows some new marsh development in formerly upland areas as forest and field gave way to marsh vegetation with rising sea levels.

For more information, contact Project Partners:
Matt Whitbeck, US Fish and Wildlife Service – matt_whitbeck@fws.gov
Erik J. Meyers, The Conservation Fund – emeyers@conservationfund.org
David Curson, PhD, Audubon- Maryland-DC – dcurson@audubon.org

Acknowledgements

The Conservation Fund gratefully acknowledges the support of a generous grant from the National Fish and Wildlife Foundation and its Hurricane Sandy Coastal Resiliency Competitive Grant Program funded by the US Department of Interior for the marsh elevation project and other climate resiliency/ adaptation work at the Refuge and in adjacent areas. The Fund also wishes to acknowledge the support of the WCS Climate Adaptation Fund for other adaptation pilot projects and the Town Creek Foundation for its support of work assessing the impact of sea level rise and developing comprehensive strategies for adaptation for the marshes of southern Dorchester, Maryland.

Blackwater Resiliency Projects



Primer on Sea Level Rise

Blackwater National Wildlife Refuge is particularly vulnerable to rising sea levels due to its location, elevation, and geological history. The Refuge sits low on the horizon with long expanses only a foot or two above high tide and little elevation inland. Major Atlantic coastal storms regularly sweep through the Chesapeake region causing tidal surges, heavy wave impacts, and torrential rain.

Combined with the factors just mentioned, the loss of massive glaciers that once covered much of North America 10,000 years ago creates a giant see-saw effect, lifting land levels in the north and dropping them in the south, particularly here in the Chesapeake Bay region. Add one more piece to the puzzle: Higher levels of global atmospheric carbon (CO_2). More carbon and other "greenhouse gases" trap more of the Sun's solar energy which warms and expands the seas as well as the air. Combined, all these factors contribute to rising sea levels in the Chesapeake Bay. Over the past century, the average sea level in the Bay has risen over a foot.

There is more to come. Using respected world and local scientists to inform its work, Maryland convened a Climate Change Commission Scientific and Technical Working Group. Their conclusion was the most likely range of sea level rise in this century will be between 2.7 and 3.4 feet due to the rapidly increasing levels of atmospheric carbon. A subsequent update moved the likely range even higher.