EAST RIVER MARSH

PRESERVING MARSH RESILIENCE FOR COASTAL COMMUNITIES

Photos: Carl Harvey/Menunkatuck Audubon Society

BACKGROUND

The East River Marsh encompasses 900 acres along the East River in Madison and Guilford, Connecticut. These tidal wetlands are a remnant of the great saltwater and brackish marshes that once extended nearly continuously along the Atlantic Coast from Maine to Georgia. With a mix of regularly flooded low marsh and intermittently inundated high marsh, the marsh provides a specialized habitat that supports salt marsh vegetation and animal life and nourishes the nearshore marine habitat along the Connecticut coast. The marsh also provides vital refueling and nesting opportunities for many thousands of migratory birds transiting the Atlantic Flyway, including the imperiled Saltmarsh Sparrow.

Saltmarsh Sparrow
Photo: Frank Lehman/Audubon Photography Awards

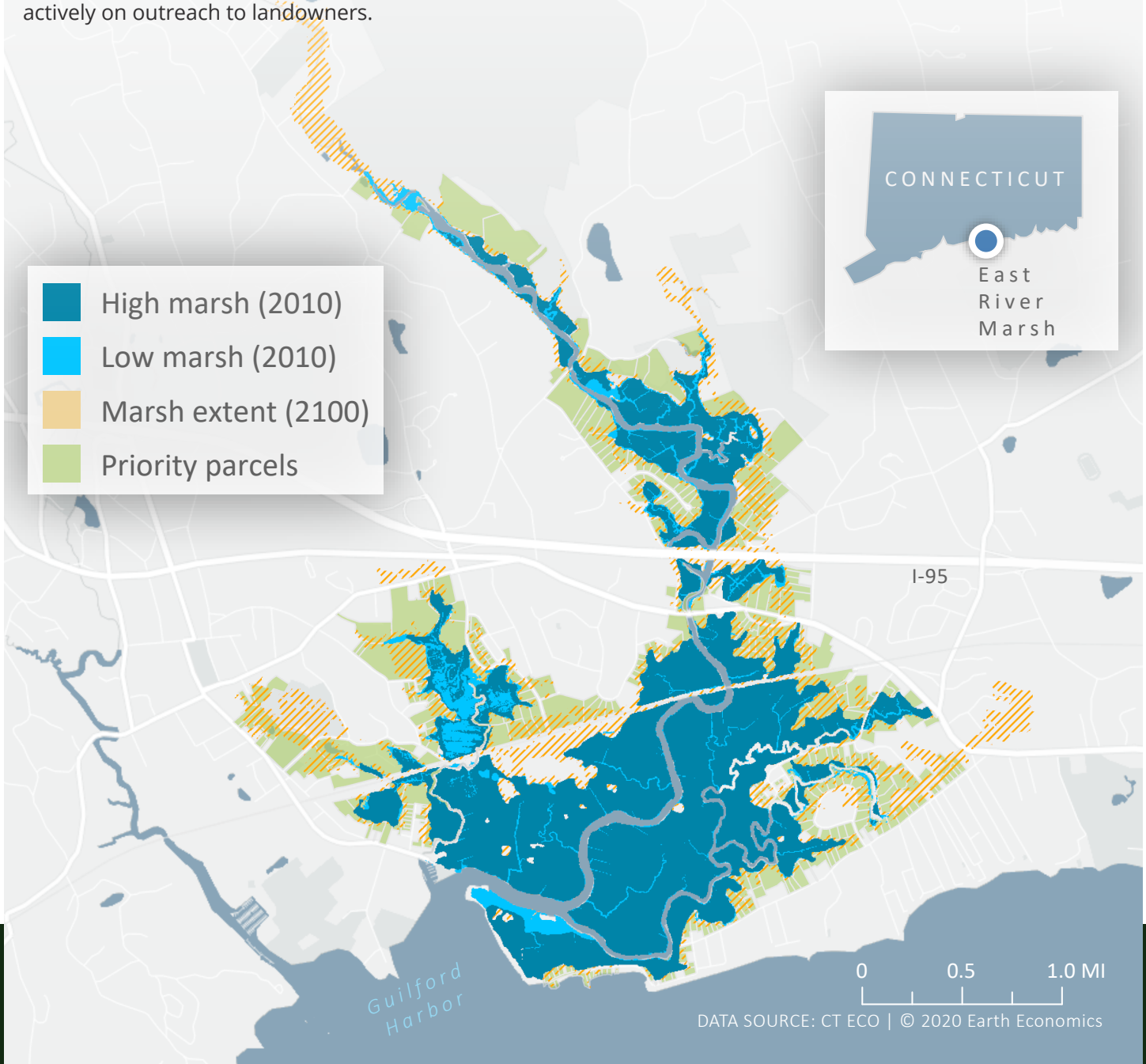
Audubon

EARTH ECONOMICS

MARSH **ON THE MOVE**

With models predicting 15-80 inches of sea-level rise over the next 80 years,[1] the East River Marsh will have to move in order to survive and continue providing suitable habitat for its many wildlife residents and visitors. The marsh will change in three ways. First, more and more marsh area will be repeatedly flooded each month, changing the habitat from high marsh to low, regularly flooded marsh. While high marsh today comprises more than 88 percent of the total marsh footprint, that number is likely to fall below 5 percent by 2100. Second, some of today's marsh may convert to mudflat/open water, reducing habitat benefits for salt marsh-dependent wildlife and aesthetic benefits. Finally, the marsh will expand into upland areas where barriers restricting its movement are absent. As higher tides reach upland areas, over 150 acres of new marsh may be created,[2] according to projections developed using the Sea Level Affecting Marshes Model (SLAMM).[3]

This geographic expansion will touch approximately 400 residential and commercial parcels currently surrounding the marsh. Through extensive spatial analysis of the area, Audubon has identified 68 privately owned parcels of land greater than 2 acres as priority conservation targets for this project. The relatively slow pace of marsh migration, though rapid by historical standards, provides an opportunity for Audubon, property owners, and the greater community to work together to protect undeveloped areas and minimize barriers to marsh migration while maximizing ecological and economic benefits that the new marsh area will provide to the community. The overarching goal of the East River Marsh Project, is to permanently protect — possibly through easement or fee acquisition — as many of the 68 identified land parcels as possible, allowing them to remain as marsh migration corridors. Audubon Connecticut and the Connecticut Department of Environmental Protection are working actively on outreach to landowners.



EAST RIVER MARSH **IS AN ECONOMIC TREASURE**

Beyond its many ecological roles, the East River Marsh also provides substantial economic value to communities along the Connecticut coast and beyond. Ecosystem services represent the economic benefits that people and communities receive from nature. In this case, low and high marsh may provide benefits worth at least $13,900 and $26,300 per acre per year, respectively (Table 1). Provided the marsh ecosystem remains healthy, these annual benefits will flow to the community for decades, or centuries, with little or no input or maintenance required. These resilient natural assets contrast with built, or grey, infrastructure such as seawalls and roads which must be regularly maintained and periodically replaced, at significant expense. The marsh's benefits fall into several categories, summarized below.

THE MANY BENEFITS OF **EAST RIVER MARSH**

RESILIENCE

Reduces the impact of flooding caused by storm surge or intense rainfall and helps with erosion control, thus protecting homes, business, and critical infrastructure.

ENVIRONMENT

Provides marsh, riparian, and estuary habitat that is vital for local wildlife, fish, and migrating birds.

Cleans the air and filters nutrients and pollutants from runoff, especially nitrogen.

Captures and stores carbon from the atmosphere to help mitigate climate change.

COMMUNITY

Provides local opportunities for birding, walking, boating, fishing, and hunting that brings residents together.

Provides aesthetic beauty in the community that improves the quality of life and increases property values.

Supports local jobs related to recreation and restoration, and provides the opportunity for environmental education.

EAST RIVER MARSH **IS A VALUABLE ASSET**

The annual benefit provided by the East River Marsh today is approximately $21.5 million per year.[4] Based on this annual value, the value of the marsh as an asset can also be estimated, comparable to the asset value of traditional infrastructure such as buildings or flood barriers. Using this approach, the marsh is expected to deliver $610 million in economic value to the region over the next 80 years. This estimate takes into account an 18 percent increase in the overall marsh boundary through the year 2100 due to sea-level rise.[5]

Clearly, the marsh is a significant asset to the community, providing critical services that build resilience and community well-being. These services will be especially important as the region experiences climate-related changes such as increased temperatures and more frequent, intense storms over the coming decades.

Table 1. Annual, per acre benefits from the East River Marsh.[6]

BENEFIT	LOW MARSH	HIGH MARSH
RESILIENCE		
FLOOD PROTECTION	$506	$506
STORM PROTECTION	$5,872	$14,680
ENVIRONMENT		
CARBON SEQUESTRATION	$2,203	$4,047
EXISTENCE VALUE[7]		$1,748
HABITAT VALUE	$1,232	$1,232
WATER QUALITY	$2,803	$2,803
COMMUNITY		
AESTHETIC VALUE	$952	$952
RECREATION	$382	$382
ANNUAL TOTAL	**$13,951**	**$26,350**

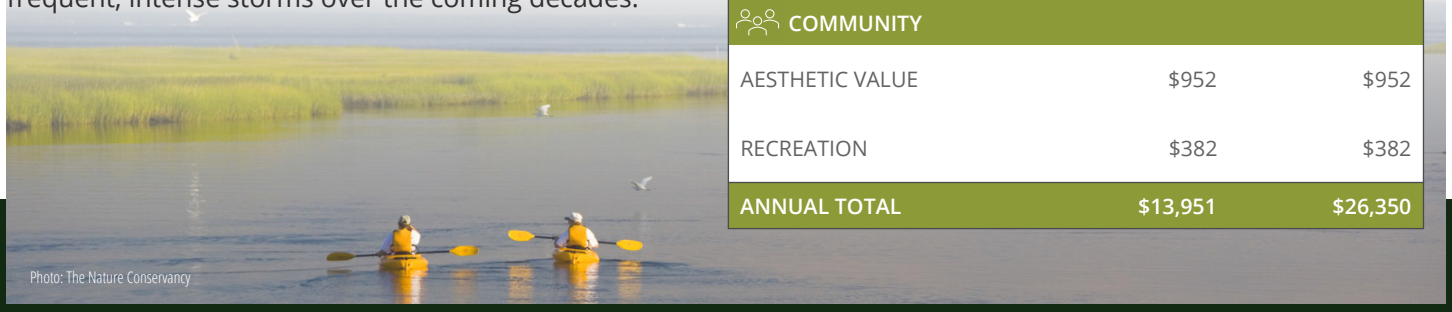


Photo: The Nature Conservancy

IMPORTANT VALUES **NOT ESTIMATED**

Lack of methods or data makes it difficult to estimate the economic value of some clearly important benefits of coastal wetlands such as the East River Marsh. The unmonetized benefits include:

- **Contiguous Natural Area:** The benefit of a large, contiguous ecosystem is often greater than the sum of its parts. For example, 100 acres of marsh may provide more resilience and wildlife benefits than 100 scattered acres of marsh, due to enhanced ecosystem connectivity and productivity. The supplemental economic benefit conveyed by the marsh's size is not estimated here.
- **Ecosystem Corridors:** Wild areas spaced along bird and wildlife migration routes provide feeding, nesting, and resting opportunities needed to maintain healthy populations. Few tools are available today to quantify and monetize the additional value conveyed by densely spaced ecosystems along migration corridors though it seems clear that the marsh acts as an important link in the chain of wetlands along the Atlantic Coast.
- **Nourishment of Long Island Sound:** Marshes play an important role in the health of the nearshore ecosystem by providing nutrients and controlling contaminant inflow, and providing a nursery for many marine creatures. While some of these benefits have been studied from a scientific approach, local complexity makes quantifying and valuing these benefits for an ecosystem like the marsh complex.

As ecological and economic methods and models advance, these values and others will further help leaders and residents make more informed choices about the community and its ecological resources. In the meantime, the values calculated here can be used to inform community decisions and analyses regarding how best to manage the migration of the marsh, while simultaneously enhancing the resilience of and community access to this unique resource.

ACKNOWLEDGEMENT

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ENDNOTES

1 *O'Donnell, J. 2019. Sea Level Rise in Connecticut. Available at: https://circa.uconn.edu/wp-content/uploads/sites/1618/2019/10/Sea-Level-Rise-Connecticut-Final-Report-Feb-2019.pdf*

2 *Based on 50% or greater likelihood of this outcome.*

3 *Warren Pinnacle Consulting, Inc. SLAMM: Sea Level Affecting Marshes Model. Waitsfield, VT. Available at: http://warrenpinnacle.com/prof/SLAMM/index.html*

4 *In 2018 dollars.*

5 *The asset value is calculated as the net present value of future benefits, based on a 3% discount rate over 80 years, to match sea level models that extend to the year 2100.*

6 *These values have been extrapolated from published, peer-reviewed economic and ecological models. In most cases, studies have been completed on specific projects and ecosystems by economists and ecologists. From this global body of work, the values used here have been derived from the studies that most closely match the local ecosystem, geography, and economic conditions found in coastal Connecticut.*

7 *Existence value is the value that people place on knowing certain ecosystems or species exist, even if they never plan to use or benefit from those ecosystems or species in any direct way.*

East River Marsh Complex
Photo: Carl Harvey/Menunkatuck Audubon Society