Northeast Coast: Facing the Rising Tide

Building Climate Resilience for Fish and Communities through Land and Water Conservation Projects

Value of Coastal Wetlands

Estuaries are located where saltwater from the oceans and freshwater from the rivers intermingle to form brackish water. Their overlapping habitats of marshes, seagrasses, and oyster reefs serve as nurseries for fish and invertebrates, providing the rich food sources they need to grow while offering some protection from predators. Nearly 50% of all commercially important fish and shellfish in the US depend on estuaries and nearshore coastal waters for key parts of their life history. The habitats that these species depend on for food, shelter, and spawning are drowning.

Rising Seas, Storms, and Warming Waters

Sea levels and water temperatures in the Mid-Atlantic and New England are increasing at an alarming pace. Between 1950 and 2009, sea levels rose 3 to 4 times faster than the global average along a "hotspot" of about 621 miles from Cape Hatteras to Cape Cod. A NOAA sea level rise study in 2017 found that East Coast cities like Boston, Massachusetts, and Annapolis, Maryland, could see ocean levels rise by as much as 11.5 feet higher than today by the end of the century. The average sea-surface temperature on the Northeast Shelf has increased by about 2.3°F since 1854, with about half of this change occurring in the last few decades.

The loss of coastal wetlands from rising sea levels and storms will reduce estuarine-dependent fish and invertebrates, and reduce the natural protections to coastal communities. More than 50% coastal wetlands could be lost due to the combined effects of sea level rise and coastal development, such as the construction of seawalls, by the end of the century. This rise in sea level is due to a combination of water volume expanding as the oceans warm, melting of glaciers and ice sheets, changes to Atlantic Ocean circulation, and land subsidence.

The benefits from coastal habitats are at risk. As sea levels rise, coastal salt marshes retreat landward, but when their retreat path is blocked by bulkheads, seawalls, and roadways, we lose wetlands in what is known as "the coastal squeeze." Squeezed between hardened infrastructure and the rising bay, these marshes will eventually drown. A recent study found that nearly 90% of coastal, high-marsh wetlands in the Chesapeake Bay would be lost by 2100 under a 3-foot sea level rise scenario. Seagrass beds may meet a similar fate. As water levels rise, sunlight will not penetrate as deeply into the water column, and these rooted plants will be effectively shaded out.

Peter Miller

Barnegat Bay, the largest body of water in New Jersey, is a unique estuary ecosystem with different habitats including barrier islands, eelgrass beds, salt marshes, tidal flats, and maritime forests. Many species of shellfish and finfish depend on the Barnegat Bay and its complex food web during their life cycles. Eelgrass beds serve as an important nursery grounds, provide habitat and hiding places for important species such as flounders, crabs, and clams and small baitfish such as silversides and mumichog. Summer flounder, or fluke, hunt small shrimp and fish through seagrass beds and marsh channels all summer, getting bigger and bigger, before heading offshore in the fall. A recently completed model suggests a nearly complete loss of seagrass beds by 2100 under 2.5 feet of sea level rise, threatening the future of this prized catch sought by both sport and commercial fishermen.

Healthy Estuarine Habitats Also Benefit Communities

By conserving and restoring coastal habitats we improve coastal community resiliency to sea level rise, storm surge, and flooding, as well as storing carbon and providing critical habitat for our nation's fisheries. Coastal wetlands and seagrass beds also help to protect our future with their ability to absorb and trap atmospheric carbon to help mitigate climate change. Coastal habitats currently store up to 25.1 billion metric tons of carbon and are able to store three time more carbon per unit area than terrestrial habitats.

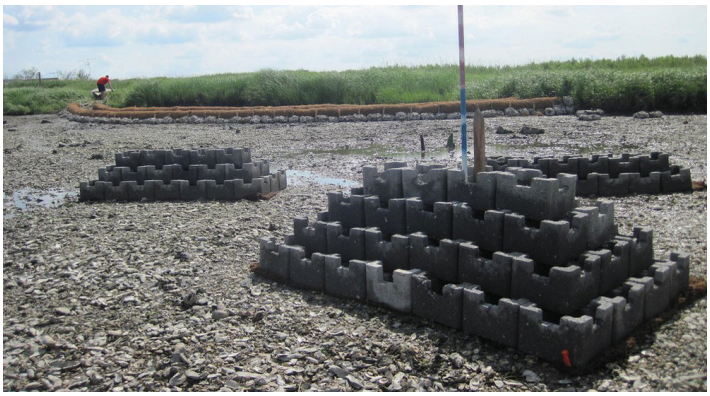
Natural infrastructure such as living shorelines and oyster reefs can protect our communities from floods, storm surge, and other extreme weather events.

The majority of the flood losses from Hurricane Sandy were along the heavily urbanized coastlines of New York and New Jersey in areas with few remaining wetlands. Communities that were protected by marshes had less flooding and storm surge damage than those built right along the water's edge, even if they had bulkheads.

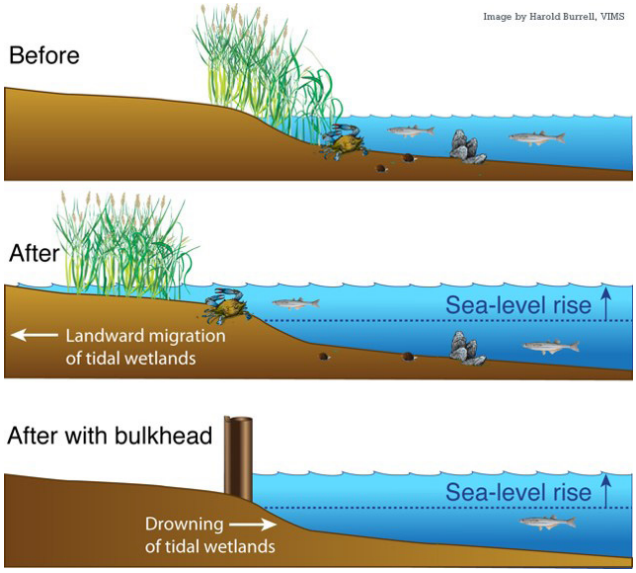
By the Numbers

Coastal wetlands saved more than **$625 million** in avoided flood damages from Superstorm Sandy across the northeastern United States.

Nature-based coastal infrastructure like marshes, seagrass beds, and oyster reefs, can significantly reduce storm surges and flood damage by an estimated **$23.2 billion** per year.



Sea Level Rise Fact: *Living breakwaters such as oyster farms clean coastal waters, provide nurseries for young fish, and help to reduce wave energy in dangerous storms, while living shorelines allow wetlands to retreat inland from rising seas.*



LAND AND WATER CONSERVATION SOLUTIONS

Plan for the effects of rising water levels by making sure that our wetlands have room to migrate and are not subject to coastal squeeze.

Protect the habitats we have now by utilizing nature-based infrastructure approaches where feasible in place of traditional hard structures. Instead of using bulkheads and walls to protect communities, replace them with living shorelines and oyster reefs.

Use nature-based infrastructure approaches to restore lost habitat. Sediment from dredging projects can be used to help elevate a salt marsh to keep pace with sea level rise. Eroding marsh edges could benefit from living shoreline treatments and could be protected with a seagrass bed or oyster reef to further reduce wave energy and lessen erosion.

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