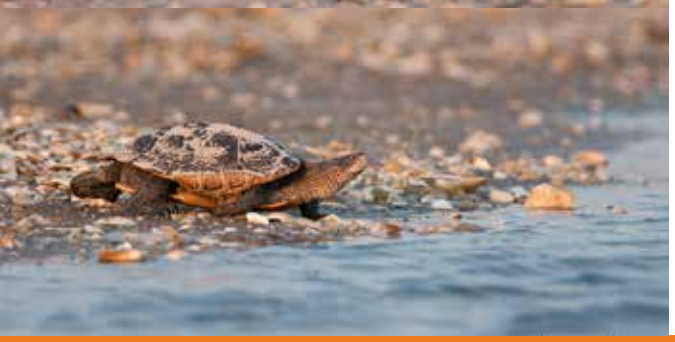
# What is an Estuary?

**Estuaries are transitional waters where rivers meet the sea, creating brackish conditions (a mix of fresh and salt water) that vary with tides, weather, and river flow. This dynamic mixing fuels some of the most productive ecosystems on Earth.**

Peconic Estuary Partnership

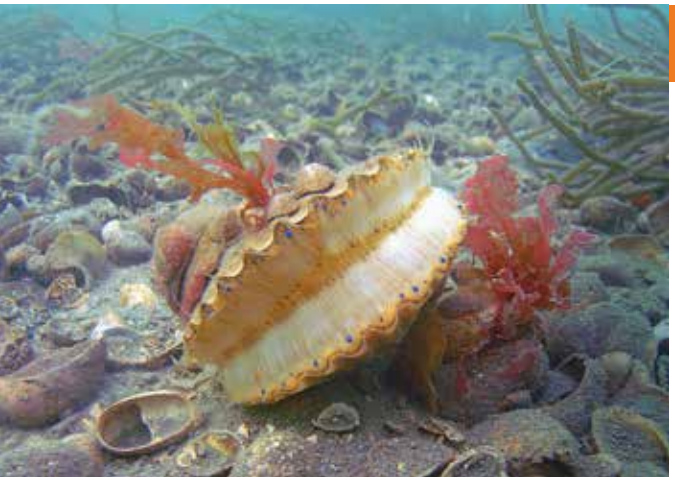


## Key Functions

- **Habitat & Nursery:** Estuaries and their marshes, seagrasses, and flats provide spawning, breeding, feeding, and refuge for fish, shellfish, birds, and mammals.
- **Natural Defenses:** Estuarine wetlands buffer communities by damping waves and storm surges, stabilizing shorelines, and absorbing floodwaters. During Hurricane Sandy, coastal wetlands prevented about $625 million in property damage across the northeastern U.S.
- **Water Quality:** Wetlands and seagrasses trap sediments and filter pollutants and excess nutrients before they reach the ocean.
- **Climate Benefits ("Blue Carbon"):** Tidal marshes and seagrass meadows capture and store carbon in plants and sediments for centuries, helping mitigate climate change.

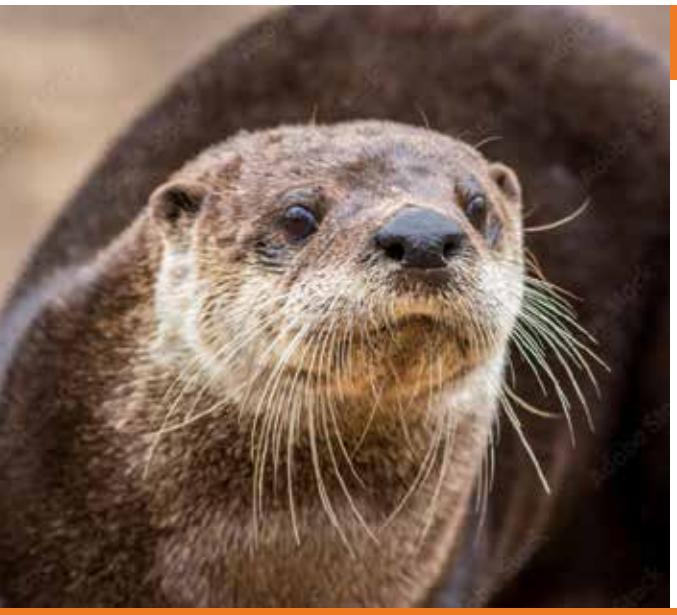
## Why Estuaries Matter to People

- **Fisheries and Food Security:** Seagrass meadows and marshes enhance fisheries production by boosting juvenile survival and habitat quality.
- **Economic Resilience:** Nature-based defenses reduce flood losses and can cost-effectively complement built infrastructure.
- **Cultural & Recreational Value:** Estuaries support boating, birding, and local traditions while sustaining coastal economies.



## Who Depends on Estuaries?

- **Peconic Bay Scallop** *(Argopecten irradians)*: Grows in seagrass beds that offer shelter and food; local restoration programs target eelgrass recovery and scallop spawning to rebuild the population.
- **Horseshoe Crab** *(Limulus polyphemus)*: Spawns on sandy, low-energy estuarine beaches; their eggs are a crucial food source for migrating shorebirds like the rufa red knot.
- **Piping Plover** *(Charadrius melodus)*: Nests and forages on coastal beaches and adjacent wetlands, relying on intact shoreline habitats.



## Who Depends on Estuaries?

- **Saltmarsh Sparrow** *(Ammospiza caudacuta)*: Breeds exclusively in Atlantic salt marshes; population declines are tied to marsh loss and sea-level rise.
- **River Otter** *(Lontra canadensis)*: Hunts fish and invertebrates in sheltered estuarine channels and marsh creeks (habitat quality depends on prey and water quality).
- **Alewife & other River Herring** *(Alosa spp.)*: Anadromous fish that migrate through estuaries between ocean and rivers; connectivity and estuarine habitat quality are vital to their life cycle.
- **American Eel** *(Anguilla rostrata)*: Catadromous fish born in the Sargasso Sea; juveniles (glass eels/elvers) move through estuaries into rivers before returning to the ocean to spawn.

## Major Threats

- **Pollution & Eutrophication:** Nutrient-rich runoff (nitrogen, phosphorus) drives algal blooms and hypoxia (low oxygen), causing fish kills, habitat degradation, and altered food webs.
- **Habitat Loss and Development:** Shoreline hardening, dredging, and infilling remove or fragment marshes, seagrasses, and spawning beaches (including key sites for horseshoe crabs).
- **Climate Change:** Sea-level rise, stronger storms, and warming waters erode habitats, flood nests (e.g., saltmarsh sparrows), and shift salinity and temperature regimes.
- **Overharvesting:** Unsustainable take (including historical pressure on river herring and horseshoe crabs) reduces populations and ripples through food webs.
- **Invasive Species:** Non-native plants and animals can outcompete natives and alter habitat structure, reducing biodiversity and nursery value.

## What You Can Do

- **Cut Nutrient Runoff:** Avoid fertilizers, keep vegetation buffers, and maintain septic systems to reduce eutrophication and hypoxia risk.
- **Dispose Safely:** Never pour chemicals down drains; participate in hazardous-waste collection.
- **Support Restoration:** Join marsh/shoreline cleanups, seagrass/marsh plantings, and living shoreline projects.
- **Back Smart Policy:** Advocate for stormwater controls, habitat conservation, fish passage (e.g., dam removals/culvert upgrades), and nature-based solutions.
- **Protect Wildlife:** Respect seasonal closures, keep distance from wildlife, stay on trails, and avoid trampling seagrass when boating in shallow water.
- **Learn More:** Scan the QR code for more information.

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