

# Working Coasts



## Boom to Bust

Once so many clam boats filled Great South Bay that, it is said, a person could cross the Bay by walking from boat to boat. During the 1970s the quantity of hard clams for harvest seemed endless. Eventually, high consumer demand led to illegal clam harvesting, called poaching, often from uncertified underwater shellfish lands. To reduce the public's exposure to contaminated hard clams, clams living in uncertified areas were harvested and transplanted to certified (cleaner) lands. Over time these clams purged themselves of harmful pathogens making them safe to eat. High harvest rates and transplant efforts reduced hard clam spawning stocks; coupled with the Bay's degrading water quality, hard clam populations were decimated and the number of clammers dwindled.

Hard clams are bi-valve mollusks – slow growing, soft-bodied animals protected by two hinged shells called valves. They burrow into the Bay bottom leaving two tubes exposed above the sand or mud. One tube siphons nutrients and oxygen from the water while the other returns filtered water to the Bay. Scientists estimate that in the 1970s, when hard clams were most plentiful, they filtered all of Great South Bay's water in less than three days. By the 1990s, when hard clams were at their lowest population level, it took as much as 100 days for the remaining individuals to filter the same volume of Bay water.

Each spring the Town of Babylon's aquaculture program grows a million juvenile hard clams, called seed clams, in protective floating racks. By fall, when most are large enough to survive predation by crabs, oyster drills and other organisms, they are released into Great South Bay. Efforts to rebuild the hard clam population are sometimes disrupted by periodic algal blooms, most notably the brown tide. First noted in 1985, brown tide inhibits the hard clam's growth and diminishes reproduction. Other factors affecting hard clam retention in the Bay are being studied. Maintaining a healthy hard clam population could clean Bay waters and support recreational and commercial clamming.



In 1974, half of the hard clams consumed in the United States came from Great South Bay. 700,000 bushels with a dockside value of \$35 million (approximately \$174 million in 2013 dollars), were harvested. By 1998, less than 1,300 bushels were harvested from Babylon Town waters – 1% of the 1974 peak.



Littlenecks, cherrystones and chowders are local names for hard clams (*Mercenaria mercenaria*) of different ages and sizes. Little-necks are the youngest and smallest and chowders are the oldest and largest; cherrystones fall somewhere in the middle. Hard clams, also called northern quahogs (pronounced co-hogs), can live for up to 30 years.

# Natural Coasts



**Atlantic Menhaden**  
*Brevoortia tyrannus*



**Bluefish**  
*Pomatomus saltatrix*



**Striped Bass**  
*Morone saxatilis*



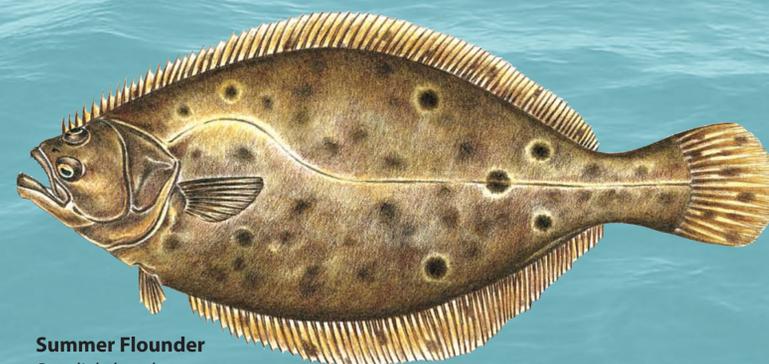
**Atlantic Silversides**  
*Menidia menidia*



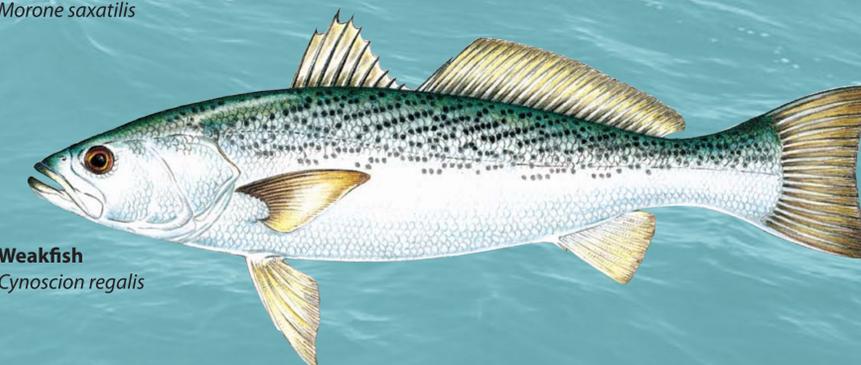
**Alewife**  
*Alosa pseudoharengus*



**Blueback Herring**  
*Alosa aestivalis*



**Summer Flounder**  
*Paralichthys dentatus*



**Weakfish**  
*Cynoscion regalis*

## Fish Highway

Fire Island Inlet forms a natural passageway for migrating Atlantic Ocean fish to enter Great South Bay. The Bay's sheltered waters, salt marshes and eel grass beds create an ideal habitat where fish can feed, spawn and grow. Great South Bay is a vital part of Long Island's South Shore Estuary, which stretches 70 miles from the western border of Nassau County to the middle of Suffolk County.

Twice a day tides push ocean water through the Inlet into the Bay where it mixes with freshwater from

the land to create brackish water. Together, salt marshes, submerged aquatic vegetation and brackish water creates the Estuary – one of the most biologically diverse and productive types of ecosystems on earth. Decaying organic matter found in the salt marshes combines with brackish water to form a nutritional “estuary soup” in which plankton, the smallest aquatic plants and animals, grow and thrive. Small forage fish such as bay anchovy and Atlantic herring feed on the plankton and in turn are hunted by larger predator fish.

In the spring and fall thousands of fish migrate back and forth between the Atlantic Ocean and Great South Bay through Fire Island Inlet. Huge schools of forage fish such as menhaden, alewives and silversides swim through the Inlet followed by thousands of predator fish like bluefish, weakfish and striped bass. This seasonal fish migration into and out of Great South Bay makes Fire Island Inlet one of the best fishing areas on Long Island's South Shore, attracting both commercial harvesters and recreational anglers.

# Natural Coasts



## Sharing the Beach

Sandy beaches along the barrier islands between the Atlantic Ocean and Long Island's South Shore Estuary are important nesting areas for Piping Plovers and Least Terns. Each spring these tiny birds nest in shallow, barely visible depressions in the sand, called scrapes. Eggs and chicks blend against the sand making them almost impossible to see.

Least Terns, the smallest of the North American tern species, weigh just over an ounce and seek protection by nesting together in colonies. Adults aggressively defend their eggs and young by swooping down on

intruders with sharp shrill cries. These birds feed by partially plunging into shallow waters to catch small fish. Migration takes place in late summer when they fly south toward Brazil and Peru. Piping Plovers are short plump birds that weigh about two ounces. Individual pairs nest alone or among Least Terns. Adults lure predators away from nests by pretending to be injured, a behavior called the broken wing display. Piping Plovers feed on worms, crustaceans and insects pulled from the sand. They spend winters along the coast from the Carolinas to Mexico.

Commercial hunting brought both species to near extinction in the late 1800s. Public outcry and the passage of the 1918 Migratory Bird Treaty Act resulted in their protection. Fenced off areas at the Town of Babylon's Atlantic Ocean beaches protect an important Least Tern and Piping Plover nesting area on Long Island. Today danger comes from uninformed people and predatory animals. To protect the birds from extinction people should respect restricted areas and keep pets off the beach.



Piping Plover (*Charadrius melodus*)



Least Tern (*Sternula antillarum*)

# Dynamic Coasts



## Shifting Sands

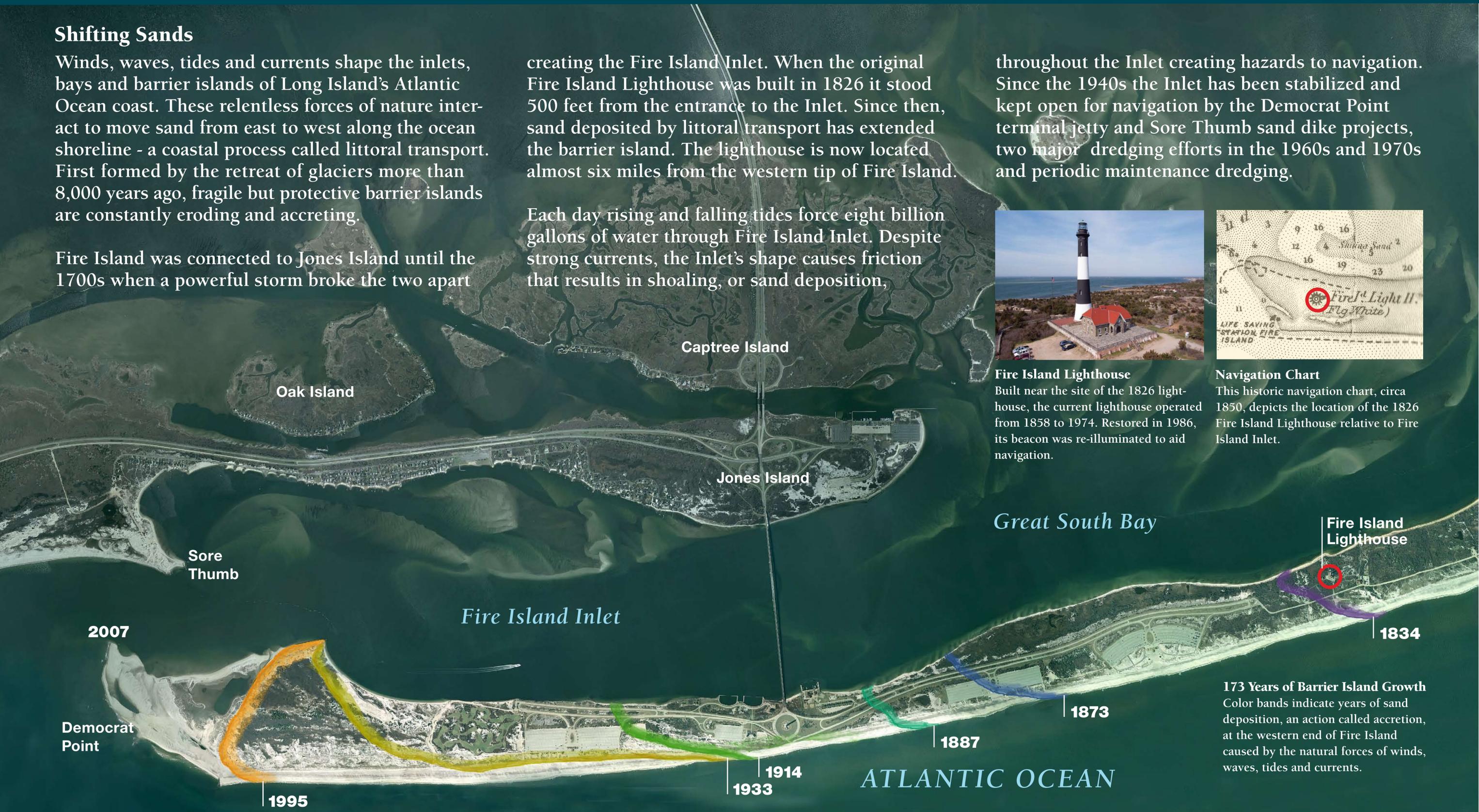
Winds, waves, tides and currents shape the inlets, bays and barrier islands of Long Island's Atlantic Ocean coast. These relentless forces of nature interact to move sand from east to west along the ocean shoreline - a coastal process called littoral transport. First formed by the retreat of glaciers more than 8,000 years ago, fragile but protective barrier islands are constantly eroding and accreting.

Fire Island was connected to Jones Island until the 1700s when a powerful storm broke the two apart

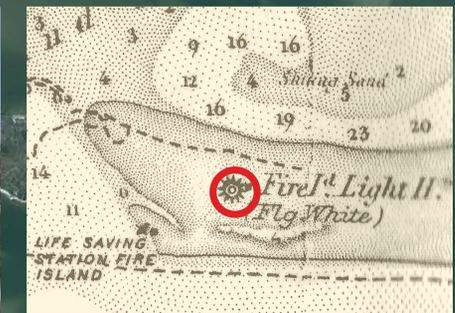
creating the Fire Island Inlet. When the original Fire Island Lighthouse was built in 1826 it stood 500 feet from the entrance to the Inlet. Since then, sand deposited by littoral transport has extended the barrier island. The lighthouse is now located almost six miles from the western tip of Fire Island.

Each day rising and falling tides force eight billion gallons of water through Fire Island Inlet. Despite strong currents, the Inlet's shape causes friction that results in shoaling, or sand deposition,

throughout the Inlet creating hazards to navigation. Since the 1940s the Inlet has been stabilized and kept open for navigation by the Democrat Point terminal jetty and Sore Thumb sand dike projects, two major dredging efforts in the 1960s and 1970s and periodic maintenance dredging.



**Fire Island Lighthouse**  
Built near the site of the 1826 lighthouse, the current lighthouse operated from 1858 to 1974. Restored in 1986, its beacon was re-illuminated to aid navigation.



**Navigation Chart**  
This historic navigation chart, circa 1850, depicts the location of the 1826 Fire Island Lighthouse relative to Fire Island Inlet.

**173 Years of Barrier Island Growth**  
Color bands indicate years of sand deposition, an action called accretion, at the western end of Fire Island caused by the natural forces of winds, waves, tides and currents.

# Natural Coasts



## Sharing the Beach

Autumn on Long Island's South Shore is marked by the arrival of thousands of geese and ducks from Canada. They migrate in V formations, called skeins, to conserve energy and increase their flying range. Attracted to shallow bays and extensive wetlands, these birds find abundant food and ample shelter throughout the winter. Their exposure to predation is diminished by congregating on the water in dense flocks, called rafts. In spring, they migrate back to northern nesting grounds where they breed and raise their young.

Geese mostly graze on plants while ducks eat both plants and small marine animals. Some ducks feed by diving completely under water; others by tipping their bottoms up, submerging their heads and upper bodies and "dabbling" with their bills. Most waterfowl have a special gland that secretes oil used for "waterproofing." While preening, the birds use their bills to rub oil on their feathers, legs and feet to remain dry. Their circulatory systems have evolved to keep them warm by minimizing heat loss, allowing them to swim in cold water and walk on ice.



**Bufflehead**  
(*Bucephala albeola*)

### Don't Feed the Geese and Ducks

Waterfowl fed human food are at risk. They stop foraging for plants and animals which leads to poor nutrition, disease and physical deformities. A plentiful supply of unnatural food also encourages the birds to stay in one place, disrupts normal migration and causes over-population.



**Atlantic Brant** (*Branta bernicla*)  
After migrating south from above the Arctic Circle, this goose will forage on tidal flats for its favorite food, eelgrass.



**Pintail** (*Anas acuta*)  
A strong and graceful flier, this slender dabbling duck feeds on the seeds of aquatic plants and animals.



**Common Goldeneye** (*Bucephala clangula*)  
Nicknamed the "whistler" for the loud sound its wings make in flight, this diving duck eats mostly small marine animals.



**Redhead Ducks** (*Aythya americana*)  
Known as a "raft duck," this diving duck rests on the water in daylight and feeds mostly at night on aquatic plants.



**Greater Scaup** (*Aythya marila*)  
Often seen in large rafts, this diving duck feeds on many small animals, especially young shellfish, as well as aquatic plants.



**Green-winged Teal** (*Anas crecca*)  
Among the fastest and most agile fliers of all ducks, this dabbling duck feeds mostly on aquatic plants