

# Life in the Pile Fields



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# HUDSON RIVER PARK



## About Hudson River Park

Hudson River Park is a 550-acre park and Estuarine Sanctuary from Chambers Street to W 59 Street in Manhattan. It includes four miles of waterside esplanade, 16 reconstructed public piers to date, four dedicated boat houses for sailing, rowing and paddling, and numerous other places to play, learn and relax. The Park offers hands-on education and interactive scientific research with the purpose of communicating the ecological importance of the Park's 400-acre Estuarine Sanctuary. Through parkwide programs, visitors are invited to experience the River as a living laboratory for community engagement and stewardship.



## Pile Fields: A Vertical Community

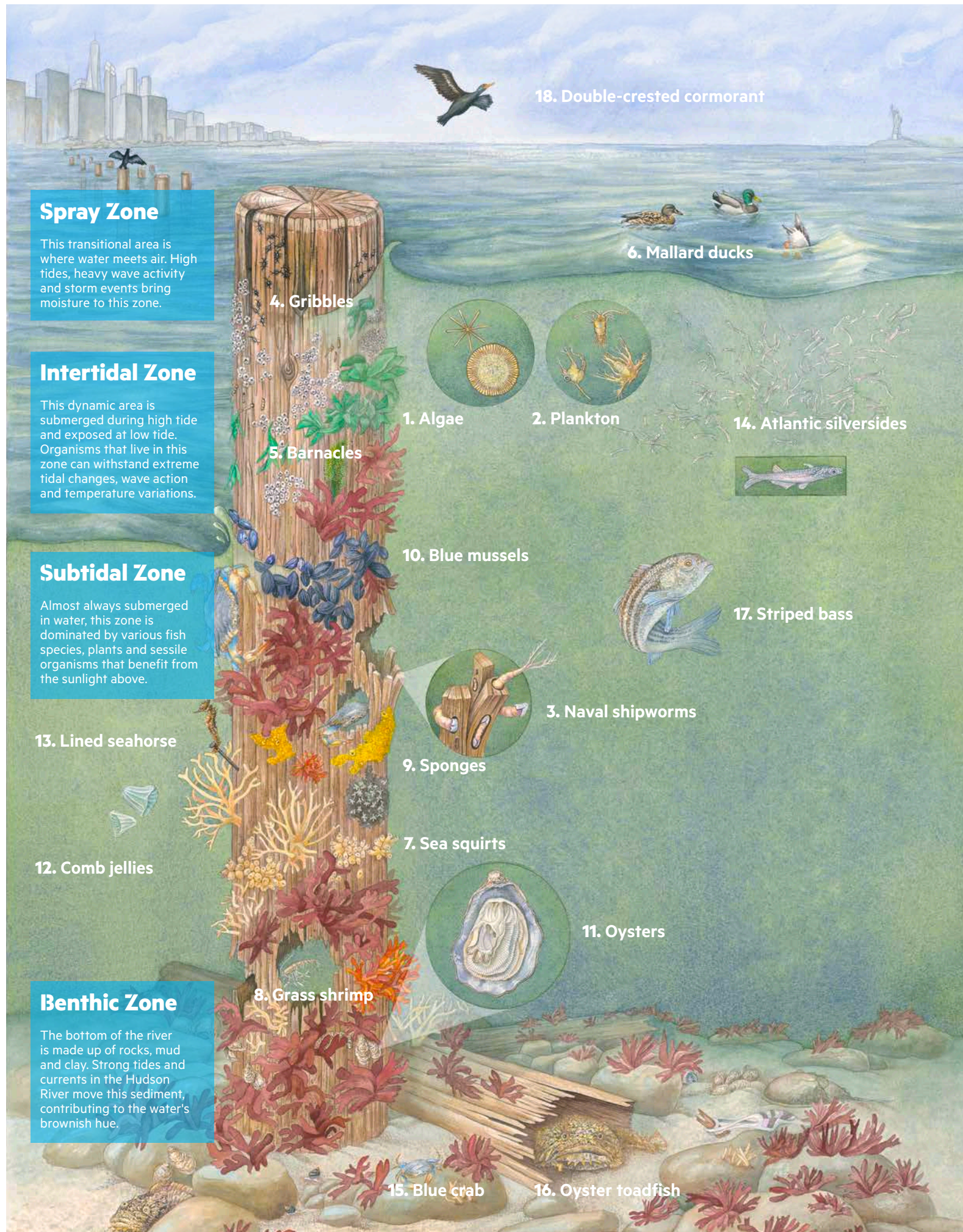
Nearly half of the entire Hudson River is a tidal estuary due to the daily flow of salty ocean water mixing with upstream fresh water sources. Estuaries, like the Park's sanctuary waters, are among the most productive ecosystems on earth. Park waters support a dynamic underwater world and provide essential habitat for more than 70 different species of fish.

Hudson River Park's pile fields are clusters of aging wooden fragments that remain from bygone piers. The Park's pile fields are some of the most notable elements of Hudson River Park's Estuarine Sanctuary because of the dynamic habitat that they create and the complex food web they support.





# Explore a Dynamic Underwater World



## Spray Zone

This transitional area is where water meets air. High tides, heavy wave activity and storm events bring moisture to this zone.

## Intertidal Zone

This dynamic area is submerged during high tide and exposed at low tide. Organisms that live in this zone can withstand extreme tidal changes, wave action and temperature variations.

## Subtidal Zone

Almost always submerged in water, this zone is dominated by various fish species, plants and sessile organisms that benefit from the sunlight above.

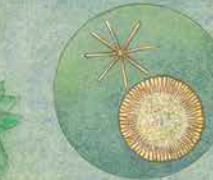
## Benthic Zone

The bottom of the river is made up of rocks, mud and clay. Strong tides and currents in the Hudson River move this sediment, contributing to the water's brownish hue.

18. Double-crested cormorant

6. Mallard ducks

4. Gribbles



1. Algae



2. Plankton

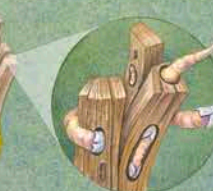
14. Atlantic silversides



5. Barnacles

10. Blue mussels

17. Striped bass



3. Naval shipworms

9. Sponges

7. Sea squirts



11. Oysters

8. Grass shrimp

15. Blue crab

16. Oyster toadfish

**1. Algae** such as sea lettuce, *Ulva lactuca*, and red algae, *Ceramium tenuicorne*, are marine plants that need sunlight to grow. They often use holdfasts (root-like anchors) to attach to piles and provide much needed food and shelter.

**2. Plankton** are often-microscopic plants and animals float with moving water. Plant plankton are phytoplankton and animal plankton are zooplankton. Plankton are the foundation of the Hudson River food web.

**3. Naval shipworms** *Teredo navalis*, are elongated mollusks that bore into submerged wood with a helmet-like shell leaving behind numerous habitat nooks throughout an aging pile.

**4. Gribbles** *Limnoria tripunctata*, are isopods, a class of crustaceans (shelled animals) with segmented bodies. Their stomachs contain a special enzyme that allows them to digest wood.

**5. Barnacles** *Amphibalanus improvisus*, undergo a complete metamorphosis when their free-floating larvae cement themselves to piles and grow shells. Their shell closes at low tide to avoid drying out, and instinctively reopens at high tide, allowing them to feed with their feathery legs.

**6. Mallard ducks** *Anas platyrhynchos*, are dabblers—they tip forward in the water to graze on plants beneath the surface. Females are mottled brown, a physical quality that provides ideal camouflage for guarding a nest.

**7. Sea squirts** *Molgula manhattensis*, are small tubular animals that resemble a grape. As larvae, they swim freely before transforming into a sessile (non-moving) adult. They have two siphons that they use to filter water.

**8. Grass shrimp** *Palaemonetes pugio*, have small translucent bodies that reveal their inner anatomy, notably showcasing a female's eggs during spawning season. A powerful flick of their muscular tail allows them to move quickly through the water.

**9. Sponges** such as red beard sponges, *Microciona prolifera*, grow on wooden piles, rocks, and other hard surfaces and create habitat for small animals. Boring sponges, *Cliona celata*, drill holes into mollusk shells to anchor themselves. This eventually kills the mollusk and allows the sponges to expand their colony.

**10. Blue mussels** *Mytilus edulis*, use byssal threads (strong thread-like anchors) to attach themselves onto surfaces including piles. These threads can detach to help mussels mobilize for food and protection.

**11. Oysters** *Crassostrea virginica*, were once abundant in New York Harbor, and now are a rare sight today due to centuries of overharvesting and water pollution. A single oyster can filter 50 gallons of water each day, removing pollutants and improving water quality.

**12. Comb jellies** *Mnemiopsis leidyi*, are translucent invertebrates with rows of combs (tiny hairs) which run up and down their bodies. These combs act like oars to propel the jellies vertically as they float with tides and currents.

**13. Lined seahorses** *Hippocampus erectus*, are weak swimmers due to their vertical orientation and small dorsal fin. For support against river currents, they use their curled tail to grasp onto piles.

**14. Atlantic silversides** *Menidia menidia*, swim in large schools for protection from predators. They use an extra sensory organ called a lateral line to coordinate and detect movements by feeling vibrations in the water.

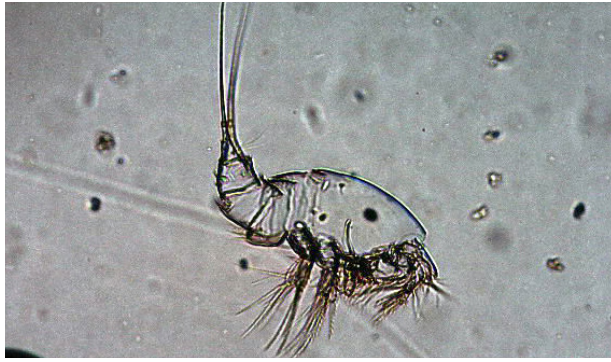
**15. Blue crabs** have the scientific name *Callinectes sapidus*, which translates to "beautiful, tasty swimmer" because they glide with two back legs shaped as paddles. They can also release and regrow their legs when threatened.

**16. Oyster toadfish** *Opsanus tau*, can survive in poor river conditions because of their tolerance to pollution. They croak loudly when agitated or trying to attract a mate.

**17. Striped bass** *Morone saxatilis*, begin their lives as eggs in the Hudson River's fresh water and spend their adult years in the Atlantic Ocean. As juveniles, they spend a few years in estuary waters, especially near and in the protective pile fields.

**18. Double-crested cormorants** *Phalacrocorax auritus*, can often be found in the pile fields with their wings spread out to dry. Unlike other water birds, they lack waterproof oil on their feathers allowing them to dive to impressive depths.





## Plankton

*Copepoda*

Plankton are responsible for providing food and oxygen to a variety of organisms, making them the foundation of the food web.



## Naval Shipworms

*Teredo navalis*

Naval shipworms and gribbles bore into wooden piles, creating crevices where other aquatic plants and animals take hold.



## Red Beard Sponge

*Microciona prolifera*

Red beard sponges and other aquatic species attach themselves to piles, offering food and shelter to mobile animals.



## Barnacles

*Amphibalanus improvisus*

Barnacles are crustaceans that permanently affix to piles, an ideal location to filter feed on detritus.



## Oysters

*Crassostrea virginica*

Oysters attach to piles in clusters, building habitat for other animals and decreasing wave energy during storms.



## Striped Bass

*Morone saxililis*

Juvenile striped bass live in the Park's pile fields where waves are gentle and small critters to eat are plentiful.



## Oyster Toadfish

*Opsanus tau*

Oyster toadfish blend into the piles at the river bottom where they ambush small crabs, shrimp, snails, mussels and fish.



## Blue Crab

*Callinectes sapidus*

Blue crabs are pile field predators that use their claws to tear food, which sometimes includes other blue crabs.



## Mallard Ducks

*Anas platyrhynchos*

Mallard ducks swim through the piles, skimming the water's surface for algae and invertebrates to eat.



## Double-Crested Cormorant

*Phalacrocorax auritus*

Double-crested cormorants can often be seen drying their feathers atop the piles and diving for fish in the river below.