

STEWARDSHIP



Randall's Island
Park Alliance

Randall's Island
**WATERFRONT
STEWARDSHIP**



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TABLE OF CONTENTS

Randall's Island Park Alliance 4

Site History 6

Wetlands 10

Plants & Animals 18

Stewardship 34

Glossary 36

The Randall's Island Park Alliance

The Randall's Island Park Alliance (RIPA) was formed in 1992 to act as stewards of Randall's Island Park, in partnership with the New York City Department of Parks & Recreation and the local community. Based on the Management, Restoration and Development Plan created in 1999, RIPA has worked to transform the Park into an accessible and comprehensive resource for sports and recreation, while preserving the Island's parkland and natural areas.

The first phase of environmental restoration at Randall's Island began with a salt marsh and a freshwater wetland, in and near the Little Hell Gate **Inlet** on the west side of the Island. Further restorations include the installation of a one acre salt marsh along the Bronx Kill and a second growth forest near the Little Hell Gate **Inlet**. Upcoming waterfront restoration projects include creation of a living shoreline at the Park's northwestern edge.



This booklet will help you learn about the waterfront at Randall's Island. You will learn about the environmental benefits of the waterfront, site history, wetland creation, and plants and animals that inhabit the wetlands. At the end, you will learn how to promote environmental **stewardship** and become a Randall's Island Waterfront Steward!



Randall's Island Park Waterfront



History & Development Of Randall's Island

Randall's Island used to be three separate islands: **Randall's Island**, **Wards Island** and **Sunken Meadow**. You can see in the photo that they were separated by Little Hell Gate, a narrow channel that flowed between them.



For hundreds of years, the Islands were used not as a public park, but as a place for foraging and farms which later were developed into public facilities serving the people of Manhattan – including a boys' home, a hospital, and a home for Civil War veterans.



1930s

MANHATTAN

QUEENS

In the 1930s President Franklin Delano Roosevelt opened the Triborough Bridge and the Islands were designated as park areas for NYC residents to use for recreation.



1930s-1980s

MANHATTAN

QUEENS

After the Triborough Bridge was built, the Little Hell Gate Channel and the Bronx Kill, along with their adjacent wetlands, were filled by debris from construction projects in Manhattan. This joined Randall's Island, Wards Island, and Sunken Meadow into a single island.



1990s-Today

MANHATTAN

QUEENS

In 1992, RIPA was formed to work with the City of New York to develop sports and recreational facilities, maintain the Park and **restore** its natural environment, including the Randall's Island wetlands.

You can contribute to the history of Randall's Island by becoming a Waterfront Steward — read on to learn more!

Wetlands Restoration

HOW DID WE GET THERE?

As you learned on the previous pages, Randall's Island used to be three separate islands surrounded by rivers and wetlands. The Randall's Island wetlands that you see

today are actually located where the Little Hell Gate Channel and the Bronx Kill and their wetlands used to be before they were filled. That's why they are called **restored** wetlands.

Watch the changes in the photos as the wetlands are restored!

LITTLE HELL GATE SALT MARSH

Prior to 2007



Site before

2007-2008



Clearing site

2007-2008



During site excavation

FRESHWATER WETLAND

Prior to 2007



Site before

2007-2008



Clearing site

2007-2008



Removing garbage
& debris

When beginning the design process, the restoration team looked at the areas to be **restored**. They knew that they had to remove a lot of fill and debris in order to **restore** the wetlands. Because the features of the two sites were very different, they determined that two different types of wetlands would need to be created—a salt marsh and a freshwater wetland.

Mitigation Site

To “mitigate” means to make less harmful. **Mitigation** sites are restoration projects where a wetland is destroyed in one location but another wetland is **restored** somewhere else to off-set the impact. The Bronx Kill was a **mitigation** site.

2007-2008



Placing clean sand for plants

2007-2008



During site excavation

Spring 2008



During planting

Spring 2008



During planting

August 2008



First summer after planting

August 2008



First summer after planting

August 2009



Second summer after planting

August 2009



Second summer after planting

What are wetlands and why are they valuable?

A wetland is an area between land and water where the soil is often **saturated** with water. To be a wetland, two other things besides water have to be present: specific kinds of plants and specific kinds of soils that support those plants. Wetlands are a valuable resource because they clean our water, provide **habitat** for animals, and offer learning opportunities for people!



Wetland plants improve water quality by removing **pollution** like **sediments** and chemicals. They clean the waters at and around Randall's Island. There are two types of wetlands at the Park—salt marsh and freshwater wetland. The hydrology of the two wetlands is not the same, so they help improve water quality in different ways. The salt marsh filters the river water that flows through it as the **tide** goes up and down. The freshwater wetland filters **stormwater runoff** that flows off the roads and sports fields. Runoff and **pollution** first flow through the wetlands and are cleaned before reaching the rivers – and finally the Atlantic Ocean.

Randall's Island's wetlands provide wildlife **habitat**. They are feeding and nesting sites for birds, fish, crustaceans, and insects.

The **restored** freshwater wetlands provide important **habitat** for different **species**, including diverse insects such as butterflies, dragonflies and damselflies. Many birds use the site, such as red-winged blackbirds, marsh wrens, common yellow throats, swamp sparrows and green herons. We even have mammals, like the muskrats, and reptiles, like the gentle northern brown snake.



The **restored** salt marshes attract wading birds, shorebirds, and waterfowl. The marshes provide food sources for the great and snowy egrets and black-crowned and yellow-crowned night herons that nest on nearby South Brother Island. They also provide **habitat** for blue crabs, fiddler crabs and ribbed mussels, as well as finfish and shellfish.



The Randall's Island wetlands provide learning opportunities for people to study and enjoy our natural environment—just as you are doing now!

Salt Marsh

A salt marsh is a type of wetland found next to salty or **brackish** water bodies. Salt marshes are among the most productive ecological systems on earth, with very rapid rates of **photosynthesis**.

Salt marshes are usually tidal, which means that the water comes in and flows out of the wetland twice a day. The **tide** flows into and out of the Randall's Island salt marsh from the Harlem River, which feeds into the New York Harbor, which in turn connects to the Atlantic Ocean.

You will not find many types of plants growing in salt marshes because they have to be able to live in the salty water. Most of the plants here are tall marsh grasses. Shrubs and grasses planted on the slopes alongside the marsh to provide different kinds of wildlife **habitat**.



ACTIVITY 1

Exploring the Salt Marsh Hydrology at Randall's Island

Look out at the marsh. Notice how some areas are higher in **elevation** than others. At low **tide**, the water will only be in the tidal pool and channels. At high **tide**, the water will rise to cover the low marsh plants.

Below are two pictures that show a slice of the entire marsh from the boardwalk down to the tidal pool. On Picture A, color in where the water will be at low **tide**. On Picture B, color in where the water will be at high **tide**.

PICTURE A :
LOW TIDE



PICTURE B :
HIGH TIDE



Where is the water level right now as you look out at the marsh?
Is it low **tide** or high **tide** or somewhere in between?

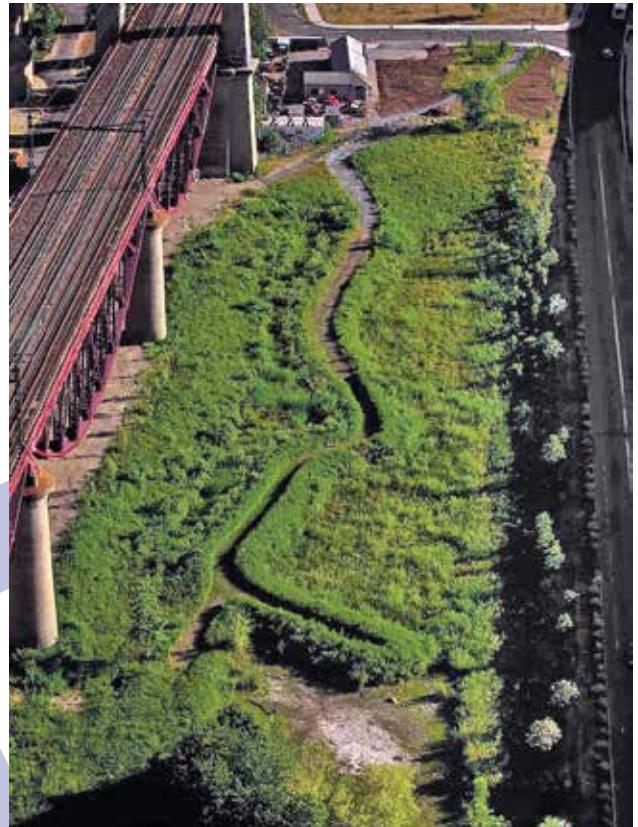
Freshwater Wetland

Water for freshwater wetlands comes from rain, **stormwater runoff** and/or **groundwater**.

The freshwater wetland at Randall's Island gets water from all three of these sources. However, its main source of water comes from drains that lead from roads and sports fields just south of the site, and bring water from those areas.

Many different types of plants can grow in freshwater wetlands. One type of freshwater wetland is an **emergent** wetland, where water is shallow and many plants are small and low to the ground. The freshwater wetland at Randall's Island is an **emergent** wetland.

As the wetland changes over time, trees may grow, making the area a forested wetland, which is sometimes referred to as a swamp.

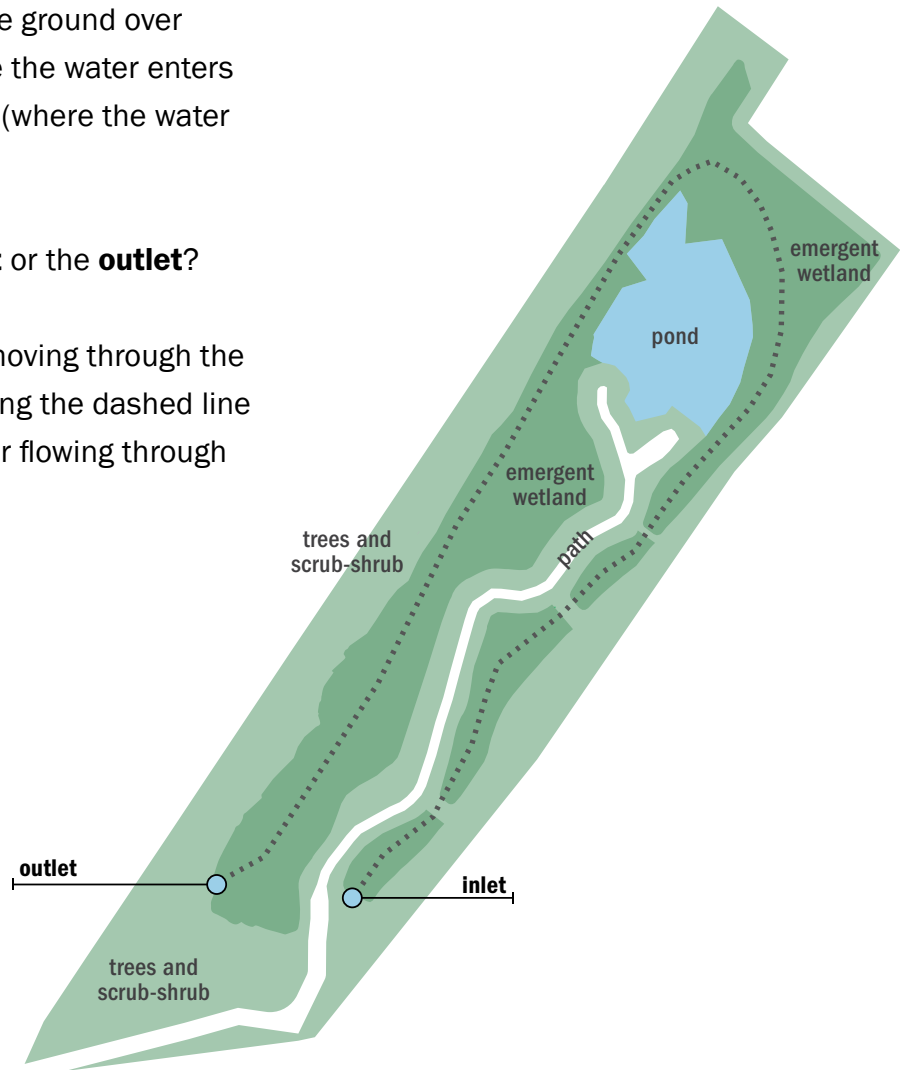


ACTIVITY 2

Exploring the Freshwater Wetland Hydrology at Randall's Island

Look at the **elevation** of the ground over the site, at the **inlet** (where the water enters the site), and at the **outlet** (where the water leaves the site).

- Which is higher, the **inlet** or the **outlet**?
- Which way is the water moving through the wetland? Add arrows along the dashed line to show the path of water flowing through the wetland.



The Bronx Kill Salt Marsh

The Bronx Kill once comprised a vast salt marsh. During the 20th century much of it was filled in. RIPA has **restored** a small but vibrant one-acre marsh at its northeastern edge. The site provides a natural buffer for boat wakes and storm surges entering the Kill from the East River. Salt marsh grasses filter **pollution** from the Bronx Kill and East River, improving water quality. During spring and summer, the marsh hosts foraging shorebirds, many of which nest on North and South Brother Island, just north of the Park. During spring and fall, migratory songbirds and butterflies feed among the upland plants. In the late summer, young bluefish can be seen feeding on smaller fish coming from the marsh. The Bronx Kill is where the Hudson River and Long Island Sound estuaries connect.

ESTUARIES

Estuaries are the transition between river and maritime environments. They have **brackish** water. The flow of water from the sea and river provides estuaries with high levels of nutrients making them one of the world's most productive **habitats**. With both salt and freshwater, estuaries also can host a wide range of organisms from both the ocean and from lakes and rivers.



WHATS IN A NAME:

The word “kill” comes from the Dutch word *kille* meaning riverbed or channel. When the Dutch first settled the region they gave many locations the name. When the English took over control they kept the names but dropped the “e.” Do you know of any other “kills”?

ACTIVITY 3

Using the image answer the following questions.

1. Using the structure of the bridge as a guide, mark where you think the Bronx Kill's shore once was.
2. Mark where you think small creatures, hoping for protection from predators, might be found.
3. Mark where you think a wading bird might be found waiting for its prey.
4. Mark one area that you think might be a source of **pollution** in the marsh.

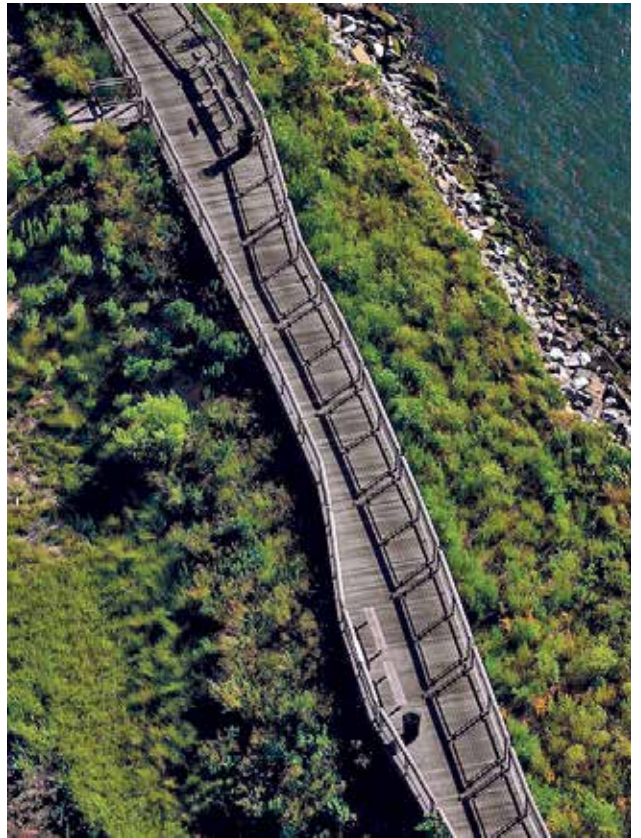


ACTIVITY 4

Observation

Let's learn about the plants and animals at the Randall's Island wetlands!

In order to learn about the plants and animals at the Randall's Island wetlands, you will need to practice your observation skills. Observe the photos on the next page of a mallard duck and a yellow-crowned night heron, **species** that live at the Randall's Island wetlands.



Take a moment to practice your observation skills with these two birds.



Record your observations about the type of bird and its color, shape, and body parts. What is it doing? How else can you describe it?



Record your observations about this second bird: its type, color, shape, and body parts. What is it doing?

How are the two birds similar? In what ways are they different? How might each bird's unique physical characteristics be useful in its habitat?

THE RANDALL'S ISLAND FIELD GUIDE

Following are some of the main plants and animals found on Randall's Island.
Test your knowledge: Can you answer the questions at the end?



Asters (Asteraceae)



The largest family of flowering plants. Asters bloom in late summer or fall with bright white, pink, purple, or blue flowers, usually around a yellow center. Three aster **species** were planted within the restoration site: New York aster, New England aster, and smooth blue aster.

Black Crowned Night Heron (*Nycticorax nycticorax*)



A common visitor to our wetlands, which nests in colonies with other herons. They can be seen foraging along rocky shorelines and from low-hanging trees over the water. They feed on many organisms such as fish, mussels, insects, reptiles, and even rodents.

Blue Crab (*Callinectes sapidus*)



A bottom-dwelling crab which inhabits coastal waters along the Atlantic and Gulf coasts. The back legs of the crab are broad and flat like paddles, allowing it to swim quickly. Blue crabs eat crustaceans, fish, and plants.

Canada Goose (*Branta canadensis*)



A grey bird with a black head, white cheeks and a long black neck. The Canada goose finds a mate at two years old and they stay together for life. Geese eat grasses, sedges, grain, and berries. They are a danger to young plants in the salt marsh because they grab hold of them with their bills and pull them out by jerking their heads.

Fiddler Crab (*Uca*)



A small crustacean, easily found looking for food in large numbers along creek banks when the **tide** is out. They live in burrows, which they dig up to two feet deep, and feed on tiny organisms living in the marsh mud. Male crabs have one claw which is much larger than the other one, and which they may slowly wave to attract a female or to defend their burrow from other males.

Grass Shrimp (*Palaemonetes pugio*)



Transparent creatures that reach about 2 inches in length. Their lifespan is about a year. These small creatures are important in the food chain. Grass shrimp feed on microscopic algae while small fish prey on the shrimp.

Great Egret (*Ardea alba*)



A large, long-legged and long-necked white heron, seen in tidal areas and salt marshes. It can stand still for a long time, then quickly skewer its fish and crab prey with its long, sharp beak. Great egrets build nests made of a platform of sticks in shrubs or trees near the water.

Mallard Duck (*Anas platyrhynchos*)



A common East Coast duck that spends much of the winter in salt marshes. The male mallard has a shiny green head and neck and a white collar. Females have speckled brown feathers. Mallards feed by picking insects from the water surface and plucking bugs and grasses from the bottom.

Marsh Elder (*Iva frutescens*)



A shrub that grows in clusters on the upland side of salt marshes throughout the East Coast. The leaves on the plant are narrow. Most marsh elders are about as tall as a person but some grow to twice that height. They provide nesting areas for small birds such as the marsh wren.

Monarch Butterfly (*Danaus plexippus*)



A butterfly often found in meadows, fields, marshes, and roadsides. Adults are bright orange with black markings and a black body. Wings have white spots on the edge. Female monarchs lay their eggs under milkweed leaves and the larvae eat the plant.

Mummichog (*Fundulus heteroclitus*)



A fish that lives in the salt marsh year-round. This finger-length brown fish travels in schools of hundreds of fish. At low **tide**, mummichogs are confined to the remaining wet areas, but at high **tide** they rise with the water and look for food among the cordgrass and other plants. During the winter, mummichogs escape the cold by burrowing into the mud.

Muskrat (*Ondatra zibethicus*)



A small mammal which lives in wetlands and waterways. Muskrats prefer heavy vegetation and muddy shores to make their homes. Their dens have many openings, some even underwater. During winter, muskrats build up grass mounds to create breathing holes through the ice.

Oysters (*Crassostrea virginica*)



Bivalves, with two shells (each shell is called a “valve”). Oysters form reefs together along the rocky parts of the shoreline, which provide **habitat** for many other underwater animals. They filter water while feeding on plankton. They take in food and water and release clean water. A single adult oyster can filter 50 gallons of water a day.

Pickerelweed (*Pontederia cordata*)



An **aquatic** plant that prefers calm shallow waters and typically grows to be two to four feet tall. It has waxy, dark green leaves that are almost heart shaped. Its long purple-blue flower blooms in summer. Its seeds are eaten by water birds, and fish hide under its large leaves.

Salt Marshmallow (*Hibiscus moscheutos*)



A plant found where the marsh meets dry land. Salt marshmallow plants can grow up to four feet tall, and the stems and leaves are covered in hairs. The leaves are toothed. The flowers are pink with a dark center, and can be as big as seven inches.

Smooth Cordgrass (*Spartina alterniflora*)



A perennial grass, meaning a grass that regrows on its own every year. It can be found all over the East Coast, including the tidal salt marsh at Randall's Island. Smooth cordgrass makes dense clumps, grows up to six feet tall and has tough roots, which hold onto the wetland soil, keeping it from being washed away. Stands of smooth cordgrass also provide **habitat** for fish and crustaceans.

Spotted Skimmer (*Libellula pulchella*)



A dragonfly often found in or near freshwater wetlands. Like all dragonflies, spotted skimmers have two life stages. Young spotted skimmers, called naiads, are wingless insects that live among the debris at the bottom of freshwater ponds. The adult has dark spots on its wings and is an agile flier that feeds on mosquitoes, flies and butterflies.

Staghorn Sumac (*Rhus typhina*) and Winged Sumac (*Rhus copallinum*)



Large shrubs with green-yellow flowers, red, hairy fruits, and many leaflets along each leaf. Sumac turns bright shades of yellow, orange and red in the fall. Many birds eat the fruit of sumacs, and cottontail rabbits eat the bark.

Switchgrass (*Panicum virgatum*)



A perennial grass that can have roots as deep as it is tall. Its root system also helps to add more organic matter to soils and provide better drainage. In the fall the grass produces lots of small seeds which are eaten by many resident and migratory birds. The dense stands that the grass forms also provide great cover for larger animals such as our resident muskrats.

Virginia Rose (*Rosa virginiana*)



A **native** rose whose bright pink flowers bloom during the summer. Once the flowers have been pollinated by insects, they turn to fruit which is a valuable food source for many birds. The rose plants form dense thorny thickets which many **species** of birds and mammals use for protection and cover.

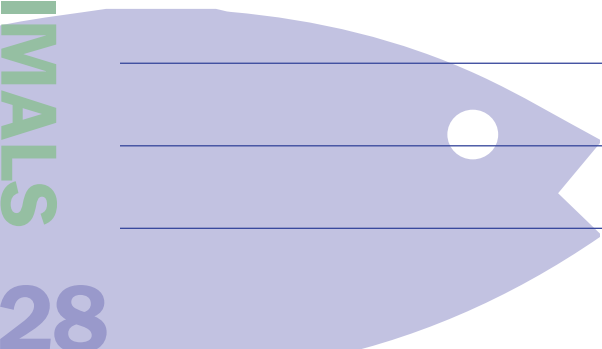
ACTIVITY 5

Using clues from your field guide, can you answer these questions?

1. Which animal are you most likely to see perching on low branches over the water?

2. What animal forms reefs where many other creatures can find protection?

3. List two plants that provide food and cover for animals:



ACTIVITY 6

Take notes on your observations at Randall's Island.

1. PLANTS: What **species** did you find?

2. ANIMALS: What **species** did you find? Also include any clues such as tracks, nests, etc.

ACTIVITY 7

Choose one plant or animal you found in Activity 6 and draw it.
Pay close attention to details.



ACTIVITY 8

Describe the plant or animal you chose to observe in Activity 7.
What made it look special and seem different from the others?

**PLANT or
ANIMAL NAME**

LOCATION

COLORS

MARKINGS

HABITAT TYPE

NEIGHBORS

**OTHER PHYSICAL
CHARACTERISTICS**

**APPROXIMATE
SIZE AND SHAPE**

BEHAVIOR NOTES

IDENTIFICATION

ACTIVITY 9

Word Search

The paragraphs below describe how the Randall's Island Wetlands were **restored** and the kinds of plants and animals you can expect to find in the wetlands now. After reading about the wetlands, see if you can find the **BLUE** words in the word search. The words are hidden diagonally, across and down – nothing is backwards!

SALT MARSH

The **SALT MARSH** was built by excavating the old **FILL** and placing clean **SAND** at lower levels, or **ELEVATIONS**, that would allow the **TIDE** to flow in and out of the site. A tidal **CHANNEL** was also built, which allows the **tide** to flow into the marsh and provides additional **habitat** for **FISH** and other wildlife, like **CRABS**. Birds like **EGRETS**, ducks, and **HERONS** will also visit the marsh to **NEST** and search for food. The marsh was then planted with a **GRASS** called **SPARTINA** and the upland areas next to the boardwalk were planted with different kinds of plants, including a flower called New York **ASTER** and a shrub called **BAYBERRY**.

FRESHWATER WETLANDS

Fill was also excavated from the **FRESHWATER** wetlands site, a berm (higher area) was built through the center, and the **SOIL** was shaped so that water would follow a new **FLOW PATH** into and out of the site. The new flow path created more **WETLAND** areas and increased the amount of time the water flows through the wetlands, so that it stays there long enough for the plants and soil to **FILTER** the water and remove **pollution**. The **PLANTS** at the freshwater wetlands include grasses, rushes, flowering plants like goldenrod, and trees like **WILLOW** and pin **OAK**. The freshwater wetlands provide **HABITATS** for many different types of animals, including insects like **BUTTERFLIES**, dragonflies and **CRICKETS**, as well as **BIRDS** like **ROBINS** and **DUCKS**.

F	L	O	W	P	A	T	H	A	B	I	T	A	T	S
I	R	O	B	I	N	S	Q	W	A	E	I	F	E	P
L	P	E	I	T	L	R	T	Y	Y	U	D	I	I	A
T	L	O	S	O	I	L	P	A	B	L	L	S	S	R
E	A	D	D	H	F	S	O	G	E	F	H	H	J	T
R	N	E	S	T	W	K	L	W	R	Z	X	C	D	I
V	T	B	N	A	N	A	M	E	R	H	E	R	O	N
Q	S	W	F	I	L	L	T	E	Y	R	I	I	Y	A
C	U	E	G	R	E	T	S	E	I	B	P	C	S	S
H	A	S	D	F	U	G	M	H	R	O	A	K	J	T
A	C	R	A	B	S	K	T	A	Z	T	C	E	C	E
N	V	G	R	A	S	S	B	I	R	U	D	T	Q	R
N	K	W	E	R	T	Y	A	U	D	S	I	S	O	P
E	L	E	V	A	T	I	O	N	S	E	H	A	U	D
L	A	F	W	E	T	L	A	N	D	B	S	X	I	X

How do you become a waterfront steward?

Waterfront **stewardship** means taking care of environments like the Randall's Island wetlands, which are sensitive natural resources. If the wetlands are protected, animals that live there can be healthy, plants can work to filter **pollution** and help keep our water clean, and we can continue to visit and learn from our environment.



To be a good Randall's Island Waterfront Steward:



- Observe the wetlands from the boardwalk and pathways to prevent injury to you & to protect the wetlands.
- Be careful not to step on any of the plants in the wetlands.
- Be sure not to litter or leave any of your trash behind.
- Pick up any garbage that you see in and around the waterfront and place it in trash cans.
- Quietly observe the wetlands. Loud noises and too much activity may disturb wildlife that uses the wetlands for nesting, feeding, and rest.
- Teach your family and friends how to be Waterfront Stewards!

GLOSSARY

Aquatic growing or living or often found in water

Brackish describes water that is more salty than fresh water but less salty than sea water; it usually occurs where fresh water and sea water mix

Elevation the measure of the height or vertical distance of the ground surface

Emergent a type of freshwater wetland with vegetation growing out of shallow water.

Estuary transition zone where freshwater from inland and salt water from the ocean mix together. Estuaries have tides but also provide greater protection from the waves and storms than in the open ocean.

Groundwater water located beneath the ground surface that occupies spaces between soil particles

Habitat environment or area where plant and animal **species** live

Hydrology study of the movement, flow patterns, and quantity of water

Inlet location where water enters an area

Invasive non-native; invasive plants or animals often multiply, spread quickly, and push native species out of an ecosystem

Mitigation To make less harmful

Native describes something that is naturally found in a specific place

Outlet location where water exits an area

Photosynthesis the process by which light from the sun helps plants to make food from water and from carbon dioxide in the air

Pollution chemicals and waste that cause harm to the environment by destroying **habitat** or contaminating soil, water or the food chain; most **pollution** comes from human activities

Restore to bring back a former condition; specifically, in a natural area, to return **native** soils, plants, and water flow by removing **invasive** plants, manmade **pollution** and structures

Saturated full of water; thoroughly wet

Scrub-shrub a **habitat** type found between wetland and upland (drier) areas; usually shrubs, grasses, and flowering plants grow in these areas

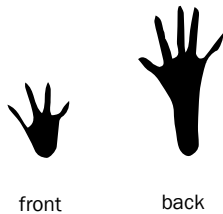
Sediment particles of soil; **sediment** makes water murky

Species a group or class of animal or plant with common traits

Stewardship careful and responsible management

Stormwater Runoff rainwater, dew or snow that falls on hard surfaces like roads, sidewalks, and parking lots and does not soak into the ground but instead flows directly into the sewer system

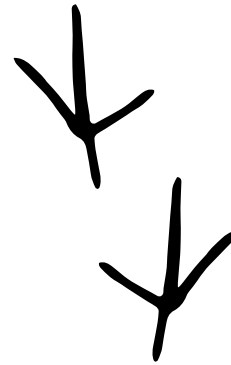
Tide the rise and fall of sea water, caused by rotation of the Earth and by the Moon and the Sun orbiting around it; most areas experience two daily **tide** cycles, with two high **tides** and two low **tides** in a 24-hour period



MUSKRAT



DUCK



HERON

The Beaufort Scale

The Beaufort Scale was created by Sir Francis Beaufort to determine wind speed in the field without special tools. Numbers on the scale represent different ranges of wind speed based on the observable effects on land and water.

The Beaufort Scale			
BEAUFORT #	WIND	SPEED (MPH)	EFFECT
0	calm	>1	smoke rises vertically
1	light air	1-3	smoke drifts slightly
2	light breeze	4-7	leaves rustle; wind vane moves
3	gentle breeze	8-12	leaves-constant motion; light flag extended
4	moderate breeze	13-18	raises dust and papers; small branches stir
5	fresh breeze	19-24	small trees sway
6	strong breeze	25-31	large branches move; use of umbrella difficult
7	moderate gale	32-38	whole trees in motion
8	fresh gale	39-46	twigs broken off trees; difficult to drive a car
9	strong gale	47-54	slight structure damage occurs
10	whole gale	55-63	trees uprooted; severe structural damage
11	storm	64-73	widespread damage
12	hurricane	above 75	devastation

Look around you now. What number would you give the current wind speed?

1

2

3

4

5

6

7



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 The Arsenal, Central Park
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Randall's Island
 Park Alliance

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