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# Preserving an iconic beach for future generations

## Coney Island turns 100!

JoAnne Castagna, Ed.D.

When Rifat Salim came to the United States from Pakistan as a young girl with her mother and siblings to reunite with her father after years of being a part, one of the first places he suggested they visit is Coney Island, a famous beach and amusement park destination in Brooklyn, New York City that's visited by more than 5 million people annually.

She said, "Me and my brother and sisters were excited to go to the beach. We were wearing our ethnic clothes because we don't wear bikinis. When we got there, we ran towards the beach and put our feet in the cold water. I remember to this day the feeling of water and sand slipping away from my feet. It was a wonderful experience."

Coney Island was Salim's first impression of America and would continue to play a role in her life. After getting her citizenship, she became an engineer and now works for the U.S. Army Corps of Engineers, New York District, an agency that's helped to preserve this beach for future generations, including her own children.

The Army Corps does this not just because the beach is historic, but more importantly because it plays a role in protecting the community from coastal flooding and sea level rise.

Coney Island, is a peninsular neighborhood of around 115,277 residents and is located on the southwestern section of the New York City borough of Brooklyn. The area is about 4 miles long and a half a mile wide and includes Coney Island Proper with Brighton Beach and Manhattan Beach to its east and Sea Gate, a private gated community, to its west.

The waterways in and around the peninsula include the Atlantic Ocean and Lower New York Bay to the south and west and the Gravesend Bay and Coney Island Creek to the northwest.

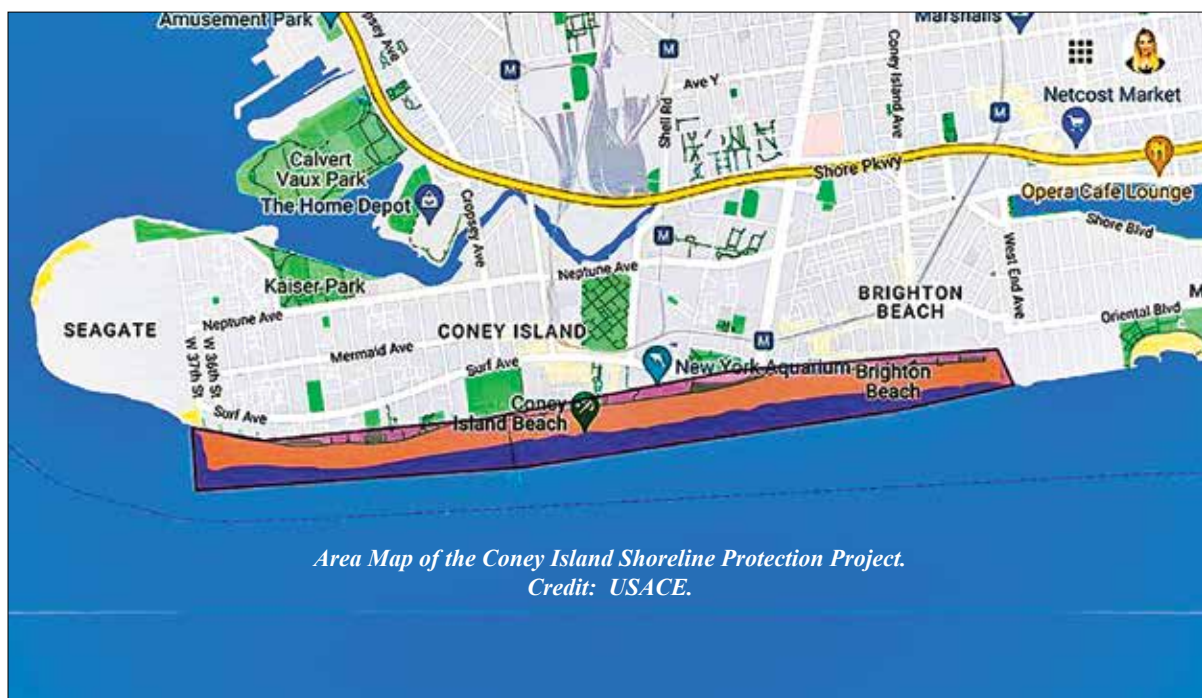
Coney Island Beach extends 2.7-miles along the south shore of the peninsula and has a boardwalk that extends from Coney Island Proper to Brighton Beach.

The beach turns 100-years-old this and year and for the past century, the Army Corps has played a significant role in preserving it in collaboration with partnering agencies. Following is a brief history of the famous destination and the work the Army Corps has performed and continues to do today.

In the late 19<sup>th</sup> Century, Coney Island was America's biggest and most visited seaside resort and amusement park destinations, boasting some of the largest and most luxurious hotels in the country, fancy fish houses and racetracks. It was so internationally famous that it was compared to the Eiffel Tower in Paris and the Pyramids of Egypt.



*Rifat Salim with her teenage daughter on the Coney Island boardwalk on the Fourth of July.  
Source: Rifat Salim.*



*Area Map of the Coney Island Shoreline Protection Project.  
Credit: USACE.*

The destination attracted millions of visitors annually to its several competing amusement parks that included Steeplechase Park that had mechanical horses that carried guests around the grounds, Luna Park, that was considered a genuine fantasyland with large towers and camel and elephant rides, and Dreamland. In addition to many independent amusements.

Some of the attractions were so large that immigrants arriving from Europe on ship could see them from the water during the years before the Statue of Liberty was built.

Coney Island was also a place that showcased innovations. For example, it was the first place that many people experienced light bulbs for the first time. In fact, Luna Park had 1,300,000 electric lights that enabled visitors to have fun for hours after dark.

The public's amazement of the park's lights even continues today. Salim said of her first visit there, "In the evening, it got so bright from all of the lights from the amusement park. It felt so festive."

Coney Island is also where modern American amusement was invented and was the first place to have rides, including having the very first roller coaster in the United States named the Switchback Railway.

In addition, Coney Island had the Wonder Wheel, a 150-foot-tall steel Ferris wheel, the Cyclone, a roller coaster with an 85-foot, 58-degree drop, and the 262-foot-high Parachute Jump. All of these attractions still exist today and are historic landmarks.

At this time, the beach at Coney Island was owned by adjacent landowners, but in 1923 it officially became a public beach and was expanded.

The New York City Department of Parks and Recreation increased the size of the beach by pumping sand onto the shore to build up the existing bathing area.

In addition, a boardwalk was constructed and named in honor of then Brooklyn borough president Edward Riegelmann. This was done by erecting concrete piles and pile caps out in the water and laying timber stringers and decking.

This new boardwalk, as well as new subway service in the 1920s helped to draw more visitors.

During this time, the park started to feature many side-shows and entrepreneurs, such as Nathan Handwerker, started selling hot dogs for a nickel, which would eventually turn into



*Aerial image of the Sea Gate portion of the Coney Island peninsula showing the completed T-groins in 2016.  
Credit: USACE.*

A large advertisement for CASHMAN DREDGING. The top half features the company logo in white on a dark green background. Below the logo is an aerial photograph of a large green and white dredging vessel with a red crane, positioned near a beach and a breakwater. The bottom half of the advertisement has a dark green background with white text. The text includes the company name, a tagline, and a website/phone number.

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the Nathan's Famous hot dog chain known today.

From the mid-20<sup>th</sup> Century to the 1970s, Coney Island experienced a slowdown in its popularity but work still continued on maintaining the beach.

During the 1940s - 1950s, the Parks Department constructed boulder jetties off the beach to extend wooden ones already there to slow down erosion of the shore.

Jetties are long, narrow structures that protect the shoreline of a body of water by acting as a barrier against erosion from currents, tides, and waves.

Sand erosion of the beach is a natural occurrence. Beaches naturally lose sand over time due to wave action and long-shore currents. When hurricanes and coastal storms occur, breaking waves and elevated water levels can change the width and elevation of beaches and accelerate erosion, which can make a beach community vulnerable



*Coney Island Beach before the U.S. Army Corps of Engineers, New York District replenished sand in the early 1990s. Credit: USACE.*



*Coney Island Beach after the U.S. Army Corps of Engineers, New York District replenished sand in the early 1990s.*

*Credit: USACE.*

to storm risks.

During this time, the Parks Department also altered the boardwalk to accommodate the New York Aquarium that was relocated from Battery Park in Manhattan.

The aquarium still exists today, and Salim takes her children there often. She said, "My kids love to visit and observe sea animals, such as sharks, stingrays, dolphins, whales, and various fish."

Salim isn't the only Army Corps employee that has a connection to Coney. Years ago, Steve Weinberg lived in Coney Island and worked for the aquarium before he became an engineer for the Army Corps.

He said, "In the 1980's I was responsible for feeding the aquarium's Osborne Laboratory tanks and cleaning them on the weekends and during the summer." He's has worked for the Army Corps for 35 years and today is the Chief of Civil Works Section, New York District, U.S. Army Corps of Engineers.

Weinberg added that they were expanding the aquarium while he worked there and during the construction that took place on the old Dreamland property, a lot of history was uncovered.

He said, "I've always loved the history of Coney and during the construction many interesting things were unearthed including old cups and bowls, a giant compressed gas tank that required calling the bomb squad, the foundation of one of the park's towers, and perhaps most mysteriously - a small boat found in the middle of the beach! Was it buried by rum runners? I eventually learned that most of the beach was artificial and constructed in the 1920s. Presumably the boat had sunk in the ocean and was buried when the city had built the beach."

Expansion of the beach continued in the 1960s, when the Parks Department extended the bathing area and boardwalk further east into the Brighton Beach area and constructed a public restroom. Several years later more public restrooms, new lifeguard stations, and a shade pavilion were established.

Brooklyn borough president Howard Golden began replacing the boardwalk's

decking in phases in the 1980's and this work continued over the next two decades.

In the early 1990s the Army Corps began working on the beach in collaboration with the Parks Department and the New York State Department of Environmental Conservation. They started the Coney Island Shoreline Protection Project to restore the beach that was eroding and was putting the coastal community at risk.

The Army Corps restored approximately 3-miles of the beach-front with dredged sand, increasing its height and width and created dunes.

Replenishing sand and creating dunes on a beach can help to reduce future coastal storm risks. A beach's size, shape and sand volume help determine how well the beach can reduce risk to a developed community during a storm. Sand and dunes act as a buffer between the waves and storm water levels and structures landward of the beach.

*Panoramic image of a portion of Coney Island Beach and amusement park. May 2023.  
Credit: JoAnne Castagna, Public Affairs.*



To slowdown future beach erosion, the Army Corps placed 600 tons of stone and approximately 35,000 yd<sup>3</sup> of sand adjacent to a groin located on the western portion of the Coney Island peninsula in Sea Gate.

Groins are shoreline structures that are perpendicular to the beach that are designed to retain sediment from moving along the shore and help maintain the wide



*After Hurricane Sandy in 2013, the U.S. Army Corps of Engineers, New York District placed roughly 580,000 yd<sup>3</sup> of sand on Coney Island Beach to replace sand lost during the hurricane and also to restore the Coney Island Project to its original design profile from when the coastal storm risk reduction project was originally constructed in the 1990s.  
Credit: Chris Gardner, Public Affairs.*

beaches by minimizing or slowing down erosion.

Placing stone and sand adjacent to the groin will help prevent storm induced waves from reflecting off the sides of the groin sideways along the shore, causing the shore to erode further.

In 2001, a stone revetment was constructed near this groin to further slowdown beach erosion. A stone revetment is a wall that protects against erosion caused by wave action, storm surge and currents.

From the mid-20<sup>th</sup> Century on, Coney Island went through some ups and downs, much like the rides it's famous for, that included World Wars, the Depression, and urban change.

Even so, Coney Island, has proven to be resilient and in the early part of the 21<sup>st</sup> Century was experiencing a

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revitalization that included constructing many new businesses and attractions including a new Luna Park on the grounds of the original amusement park and a new baseball stadium.

However, just as things were picking up for the historic park, it faced a new challenge in October 2012 – Hurricane Sandy, a storm like no other. Sandy’s intense winds created an unexpected storm surge that created 14-foot-high waves that pushed sand and water up and over the boardwalk, merging with water from Gravesend Bay and Coney Island Creek, inundating the entire peninsula from every direction.

Almost every establishment was flooded with water and sand including the amusement park, aquarium, the subway system, the Coney Island Hospital, as well as many houses and high-rise apartment buildings.

The most destructive storm to arrive in New York City in recent history, left 43 New Yorkers dead and many without power, heat and hot water for months.

Immediately after the storm, the Army Corps was on the ground responding, both through its own response authorities and providing disaster response assistance for the Federal Emergency Management Agency.

Sandy’s devastation also included extreme erosion of the shore putting the Coney Island community vulnerable to future storms. Coney Island Beach lost 600,000 yd<sup>3</sup> of sand.

The Army Corps received funding and authority to restore Coney Island with the Hurricane Sandy Disaster Relief Appropriations Act of 2013 or “Sandy Bill.”

The bill authorized the Army Corps to not only repair engineered beach projects by replacing the sand lost during Hurricane Sandy, but also to restore them to their original design profiles.



*The boardwalk being constructed along Coney Island Beach in 1922. Photographer: Edward E. Rutter. Source: Borough President Brooklyn Collection. NYC Municipal Archives.*



*After Hurricane Sandy, crowds return to Coney Island Boardwalk during the annual Coney Island Mermaid Parade in the Summer of 2013. Credit: Yann Feron.*

surge pushed sand and water up and over the beach’s boardwalk, but the impacts behind the constructed project were not as bad as they could have been. “The beach’s higher elevation avoided an estimated \$494 Million in damages to houses and structures,” said Ciorra.

In 2016, the Army Corps performed additional measures in Sea Gate, to further reduce erosion. This work included constructing four stone groins and placing 75,000 yd<sup>3</sup> of dredged sand around them, as well as placing stone near an existing groin.

In addition, an existing dike received additional stone armoring. A dike is an onshore structure that protects low-lying

Anthony Ciorra, Chief of coastal restoration & special projects branch with the New York District, U.S. Army Corps of Engineers said, “In 2013, approximately 580,000 cubic yards of sand was placed onto Coney Island Beach, to repair damages caused by Sandy and to restore the project to its authorized design condition.” Ciorra was the project manager for the Coney Island Shoreline Protection Project from 1995 to 2004.

After Sandy, the Army Corps examined its beach nourishment projects across the northeast United States, to identify what projects were more effective in reducing storm risk to the shore communities.

Ciorra said, “The analysis showed that the communities located near beaches that had previously received beach nourishment and dune construction sustained less damages and saved billions of dollars in avoided damages.”

Coney Island Beach was one of these beaches. The beach’s sand was elevated to protect against storm surge and erosion. Hurricane Sandy’s

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areas against flooding. They are usually built as a mound of fine material with a gentle seaward slope in order to reduce the wave run-up and the erodible effects of the waves.



*Historic 262-foot-high Parachute Jump along with Coney Island Beach or boardwalk.  
Credit: JoAnne Castagna, Public Affairs.*

On the north-side of the peninsula, sea walls, flood walls, and levees would be tied into a mechanical tide gate storm surge barrier to close off Coney Island Creek to prevent flooding. On the south-side of the peninsula, the boardwalk would be raised five feet by adding a concrete walkway to prevent flooding from storm surge.

This year, Coney Island Beach turns 100-years-old and with the Army Corps' work it's sure to continue to be an iconic destination for future generations and most importantly a safe place to live with the reality of more frequent stronger storms and sea level rise.

Ciorra said, "The most rewarding part of working on Coney Island for me was restoring an historic beach that benefits the local traditionally under-served communities in terms of providing coastal storm risk management measures to reduce the threat to life and property, as well as provides recreational opportunities."

Weinberg said, "Part of the honor of working for the Army Corps is how quietly and anonymously we do so much to preserve peoples' lives and property. My father, who lived in Coney Island was also proud of our work. He's watched the Army Corps work from his terrace and called me every day with progress reports. My hope is that the beach continues to help protect people, and that it remains a place where a teen brings their date for day of fun and where a mother takes her children body surfing."

Today, Salim is one of those mothers. She takes her children to Coney Island every summer. She said, "There's so much to enjoy – the beach, rides, and the aquarium. On the beach, the kids love to dig in the sand and pull-out mole crabs. In fact, because of our frequent visits to the beach and aquarium, my teenage daughter has developed a strong passion for marine biology and is ecstatic about the possibility of volunteering for the New York Aquarium this summer."

She added, "Something we never miss during the summers is Coney Island's annual fireworks show on Independence Day, the Fourth of July." For a first-generation American who was greeted to this country by Coney's waves washing up and over her feet, this seems appropriate.

Dr. JoAnne Castagna is a public affairs specialist and writer for the U.S. Army Corps of Engineers, New York District. She can be reached at [joanne.castagna@usace.army.mil](mailto:joanne.castagna@usace.army.mil).

#### CONEY ISLAND HISTORY SOURCES:

Coney Island. The History of New York City's Most Famous Amusement Park Resort, by Charles River Editors.  
Heart of Coney Island website. ○

Lastly, accumulated sand was removed from in front of several bulkheads or retaining walls along the water. A retaining wall helps to stabilize a shoreline.

After Hurricane Sandy, Coney Island bounced back, and the parks were able to reopen the following year, making that year's annual Mermaid Parade and Nathan's Hot Dog Eating Contest, extra meaningful for visitors.

However, the Army Corps' work has not ended. It wants to make sure that the area can better withstand the wrath of future Sandy-like storms and sea level rise, so it's created the New York and New Jersey Harbor and Tributaries Coastal Storm Risk Management Feasibility Study. The study provides a full range of coastal risk reduction measures for communities to contemplate and provide feedback on to the Army Corps.

The Coney Island Beach community has provided its feedback on the study that would affect every part of the peninsula.



*Panoramic picture of the original Luna Park in 1903.  
Source: Heart of Coney Island.*

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