

NEW YORK & NEW JERSEY HARBOR – HISTORY AND NAVIGATION



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US Army Corps
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EARLY HISTORY

New York Harbor is a part of a larger estuary that covers all of the Upper Bay and an extremely small portion of the Lower Bay. It is at the mouth of the Hudson River where it empties into NY/NJ Bight and the Atlantic Ocean.



Map of New York Harbor circa 1610



Giovanni da Verrazzano 1524



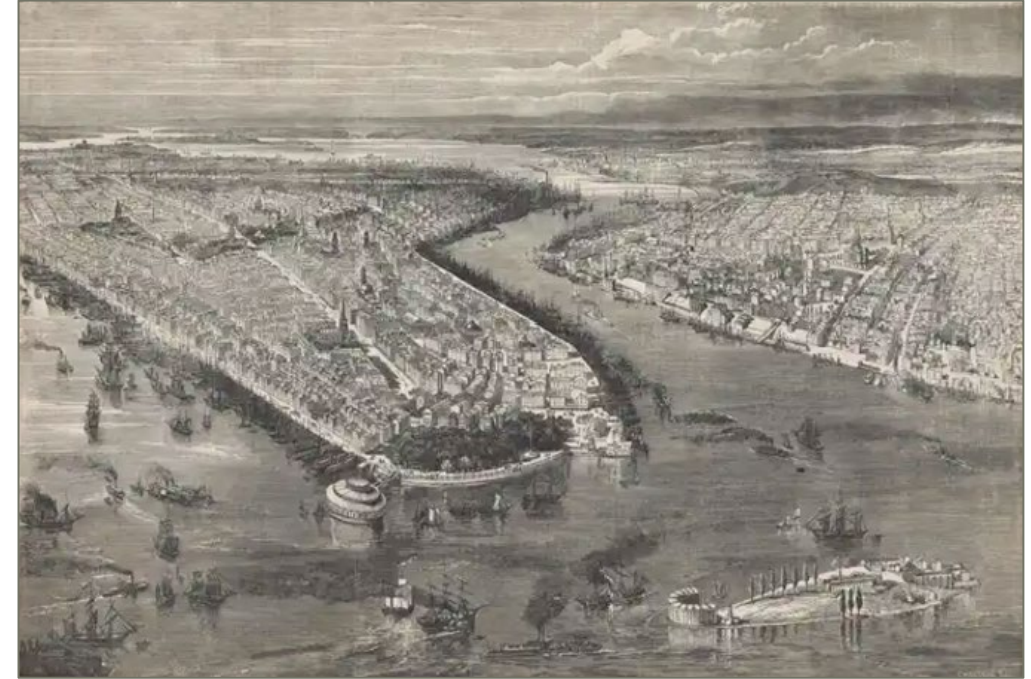
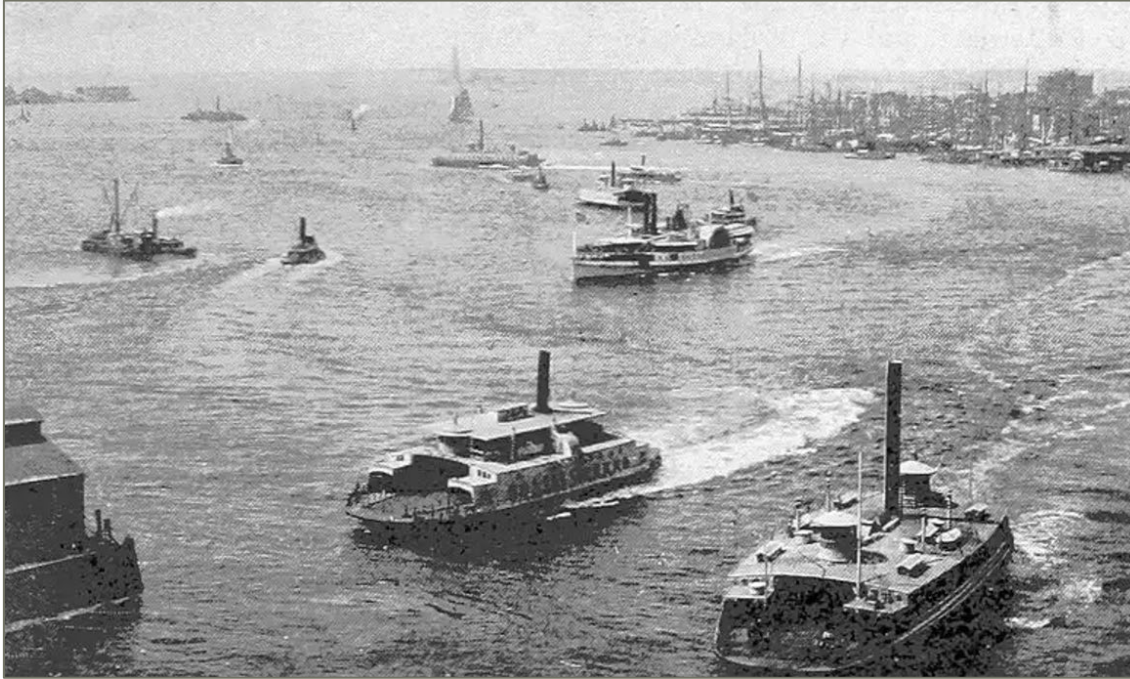
Henry Hudson's ship entering New York Harbor 1609



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New York & New Jersey Harbor - Its Navigation Importance

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New York Harbor, mid-19th century

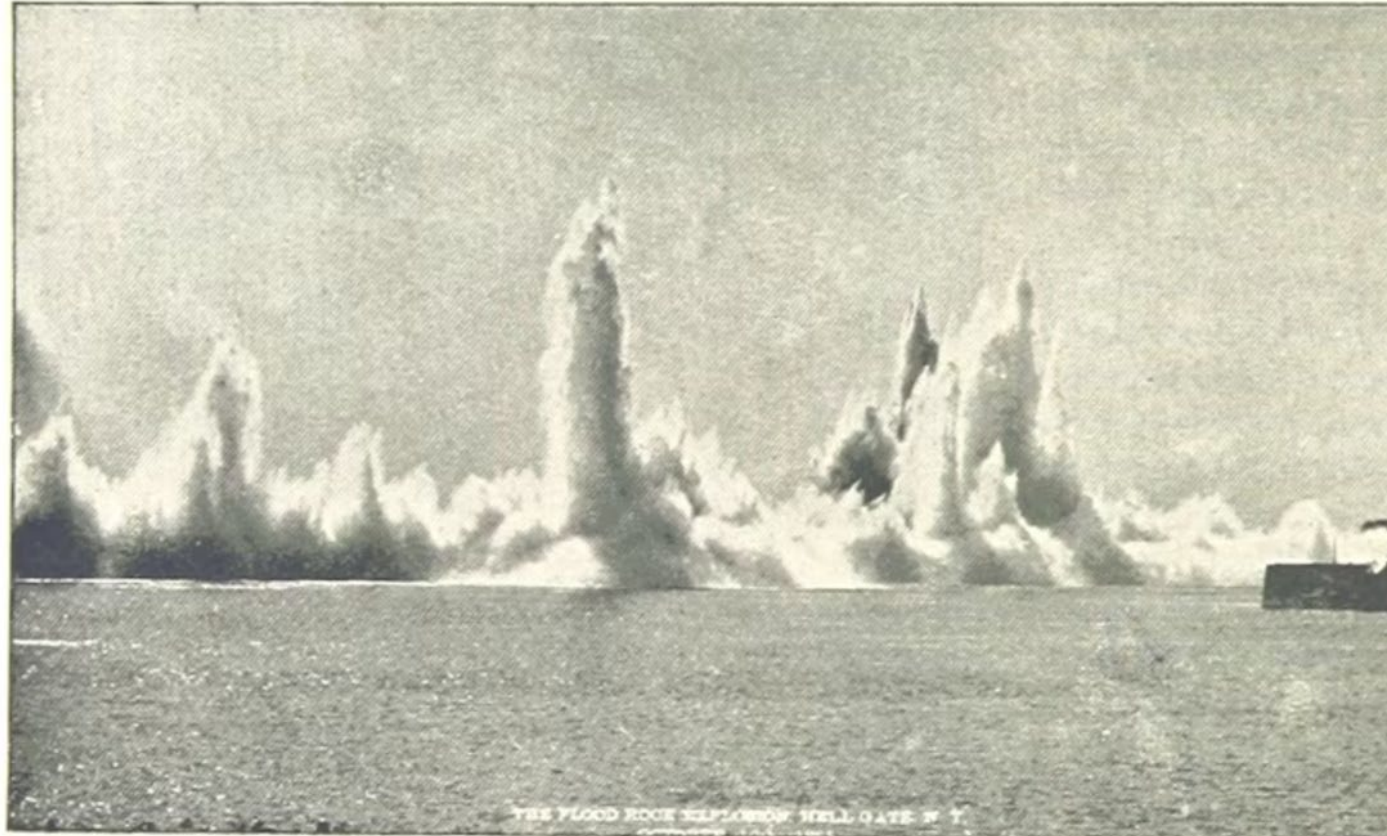
In 1835, Lieutenant Thomas Gedney discovered a deeper channel through the Narrows into New York Harbor. Previously, the passage was complex and shallow enough that loaded ships would wait outside the harbor until high tide, to avoid running into the huge sandbar.



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US Army Corps Involvement – Making Navigation Safer



Hell Gate, East River, 1885

In October 1885, the U.S. Army Corps of Engineers undertook one of the most ambitious and challenging engineering feats in American history—the removal of hazardous rocks from Hell Gate, a narrow and treacherous strait in the East River of New York.



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New York & New Jersey Harbor – Key to the Nation’s Economy



New York Harbor, circa 1895



New York Harbor, early 20th century

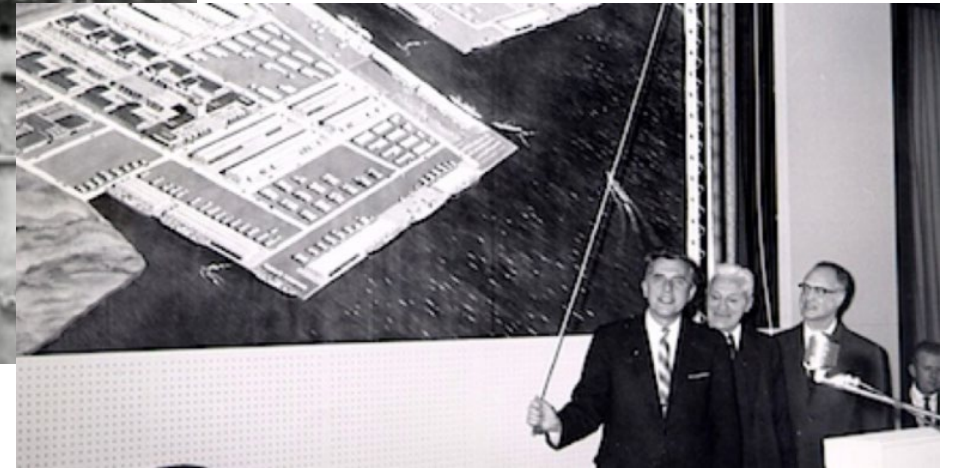
Nearly 61% of all U.S. exports passing through the harbor in 1874. The harbor saw major federal investment at the end of the century when Congress passed the Rivers and Harbors Act of 1899. Over \$1.2 million of initial funding was appropriated for the dredging of 40-foot-deep channels at Bay Ridge, Red Hook, and Sandy Hook.



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1921-PRESENT PORT AUTHORITY OF NEW YORK & NEW



With ever increasing commerce and a very crowded harbor, a compact was signed between the States of New York and New Jersey in 1921 creating the Port of New York Authority with a broad mandate to modernize the entire port.

In 1948, the Port Authority assumed the responsibility of operating Port Newark. The two World Wars and Great Depression had taken a toll on the port and it was greatly in need of repair



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The Coming of a Modern Container Port

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By 1951, Port Newark had become a modern terminal with 21 berths and a deepened 35-foot channel able to accommodate the largest ships at that time.

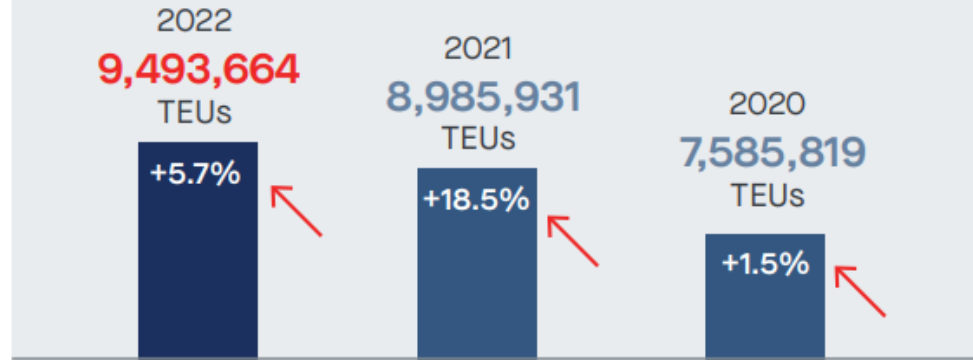
On April 26, 1956, a date that many in the shipping industry hail as the birth of the modern maritime era, the Ideal X – pioneered by the McLean Trucking Company – was rigged for an experiment to use standardized cargo containers that were stacked and then unloaded onto a compatible truck chassis.

On August 15, 1962, the Port Authority opened the World's first container port, Elizabeth-Port Authority Marine Terminal. The photo on the right shows it in 1958 just before construction started. Elizabeth became known as "America's Container Capital."



The Port of New York & New Jersey is the largest container port on the U.S. East Coast and second largest in the nation. Worldwide, it is the 23rd largest.

Record Cargo Volumes



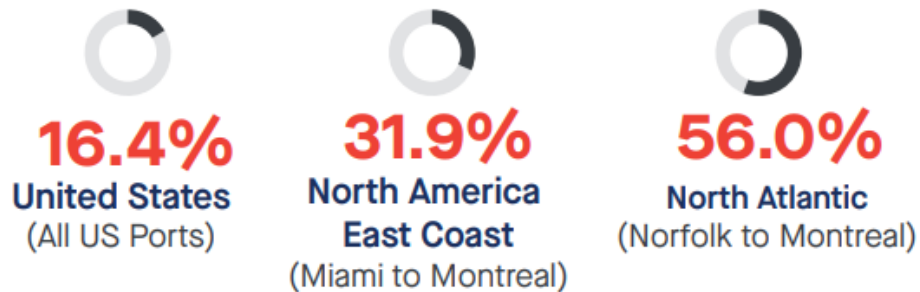
U.S. Port Volume Rankings

(2022, TEUs)

1	Port of Los Angeles	9,911,158
2	Port of New York & New Jersey	9,493,664
3	Port of Long Beach	9,133,657
4	Port of Savannah	5,892,131
5	Port Houston	3,974,901
6	Port of Virginia	3,703,230
7	Seattle Tacoma Seaport Alliance	3,384,018
8	South Carolina Ports	2,792,313
9	Port of Oakland	2,337,125
10	Port of Jacksonville (FY 2022)	1,298,132

Market Share

(2022, by TEU Volume)

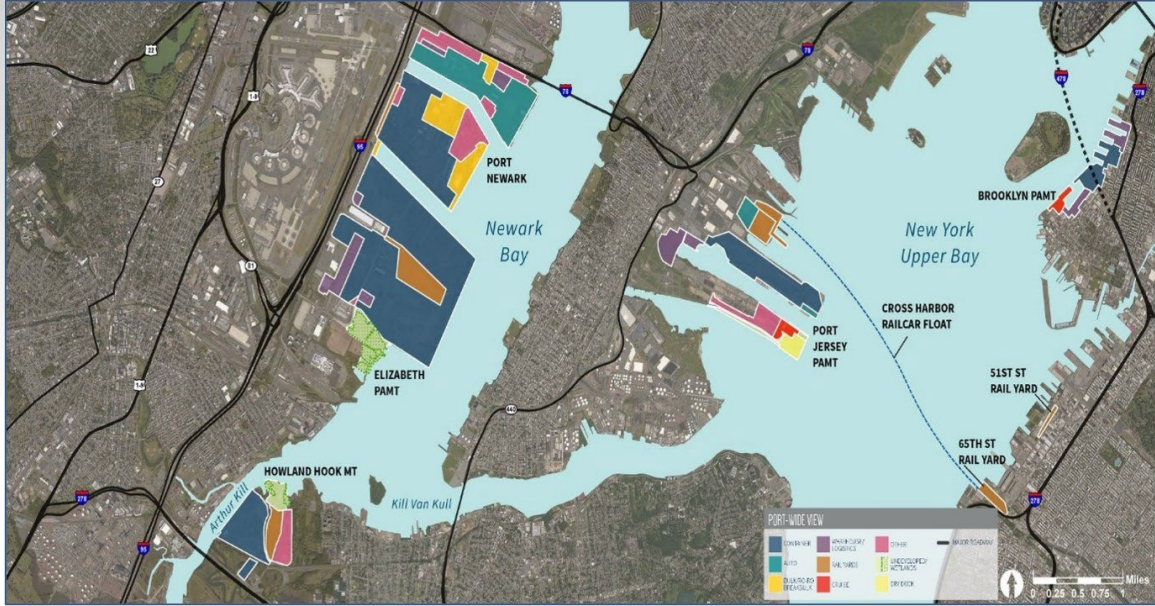


Approximately \$ 271 billion worth of goods in 2022 and located in the largest consumer marketplace in North America



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The Harbor Deepening Project – Dredging to 50-feet





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SUB-SURFACE - GEOLOGICALLY VARIED & CHALLENGING

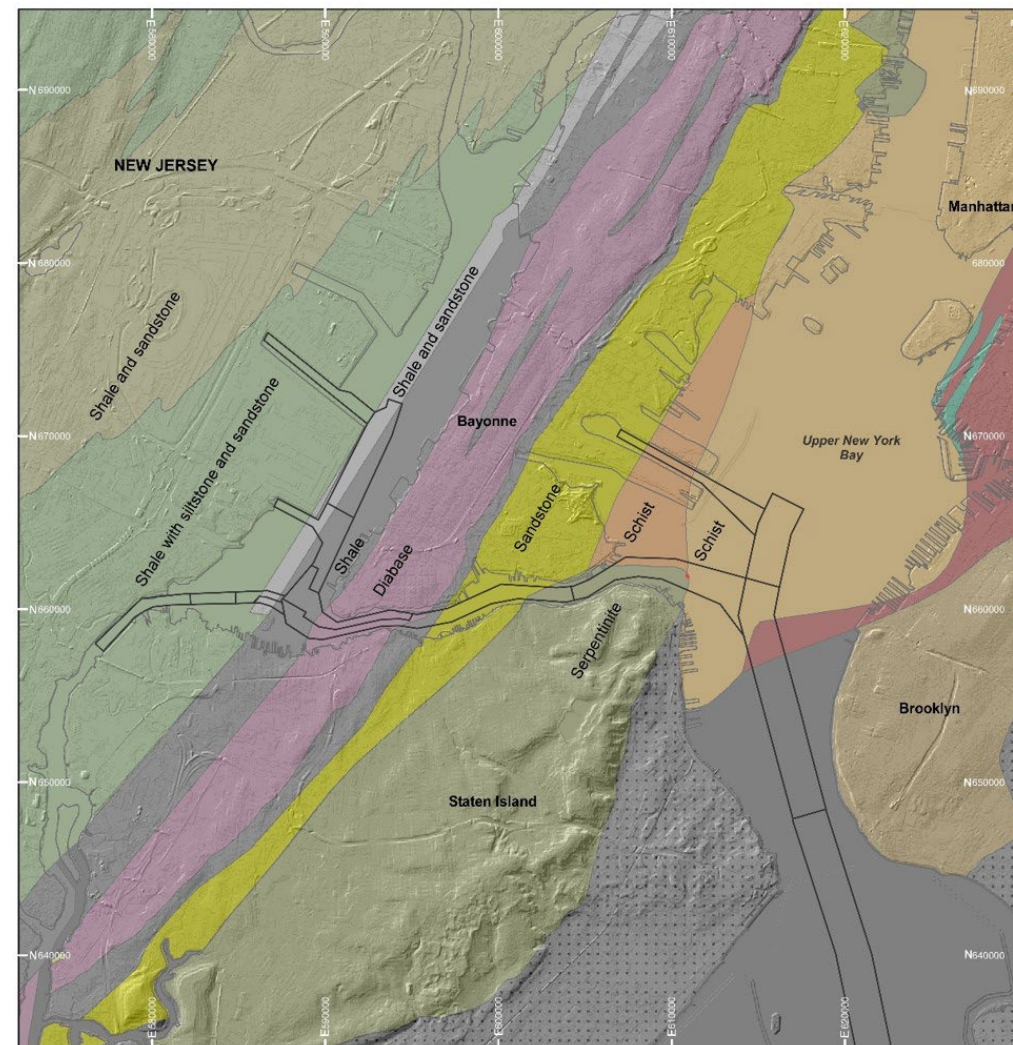
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- Glacial Till (the terminal moraine mixture of clays, sands, gravels, and boulders) and varved red-brown clay underlies the surface in portions of Port Jersey, Kill Van Kull, Newark Bay and Arthur Kill
- Underlying bedrock includes igneous, metamorphic and sedimentary strata
 - Harder bedrock, notably Diabase, Sandstone, and Pegmatite, required drilling & blasting pretreatment prior to mechanical dredging (excavator and/or clamshell dredges)
 - Softer bedrock, notably Serpentinite and Shale, was able to be fractured using cutterhead dredges (no pump out) then removed with mechanical dredges

What are the two general types of Holocene sediments encountered in the harbor when maintenance dredging and what other materials are encountered when deepening?

A: Maintenance dredging involves removal of accumulated silts and sands, but channel deepening of the main shipping channels also includes removal of Pleistocene glacial tills and clay and underlying bedrock which includes all three main types of rock: igneous (diabase), sedimentary (sandstone and shale), and metamorphic (serpentinite and Manhattan schist).





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WHAT AND HOW WE DREDGE?

Type of equipment is based on material



Clamshell - mud, sand, gravel, rocks, and debris



Drill Boats – placing charges for rock blasting



Cutter suction dredgers (CSDs) are classified as hydraulic dredgers – sand, clay, rock debris

Backhoe - sand, clays, gravel, cobbles and fractured and unfractured moderately strong rock



Hoppers - soft and loose soils, such as sand, silt and gravel





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BENEFICIAL USE OF DREDGED MATERIAL EXAMPLES



Brownfield Remediation



Bayonne Landfill: 4MCY



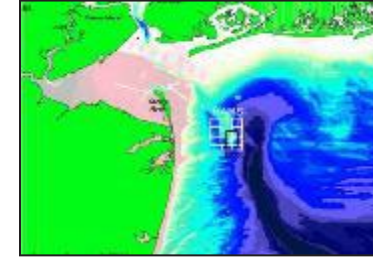
Lincoln Park: 339,000 CY

Beach Nourishment



Plumb Beach: 133,000 CY

Remediation



Capping HARS (+O&M): 56 MCY



Fish Reefs: 11 MCY rock



NY/NJ Harbor Deepening: 50 MCY



Capping NBCDF: 230,000 CY

Ecosystem Restoration: Jamaica Bay Marsh Islands



Elders East: 249,000 CY



Elders West: 302,000 CY



Yellow Bar: 375,000 CY



Black Wall: 155,000 CY



Rulers Bar: 92,000 CY



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LOOKING AHEAD TO THE FUTURE

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The ships keep getting bigger – Leading to the next Harbor Deepening Channel Improvements Project



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PROBLEM IDENTIFICATION

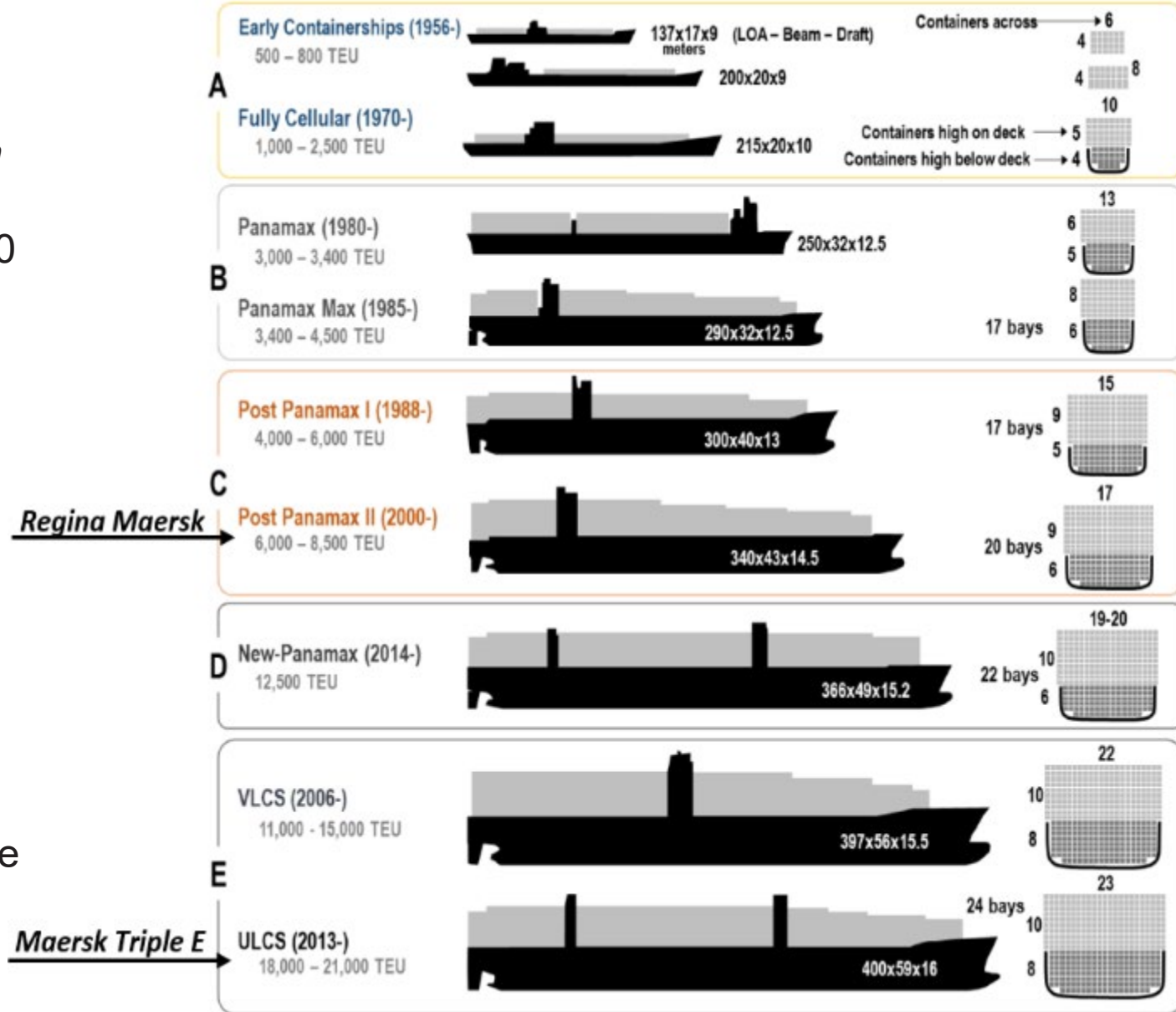


Navigation Constraints

The completed Harbor Deepening Project's channels were designed for the vessel the *Regina Maersk* (1,044 feet long, 140 feet wide, has a static draft of 46 feet, and a capacity to carry 6,400 twenty-foot equivalent units (TEUs)).

The fleet of container vessels regularly calling on the Port of New York and New Jersey now includes vessels that are depth constrained at the existing channel depth and experience maneuverability inefficiencies within the existing channel width.

The superseding of the channel dimensions has a significant adverse effect on the economics and design of the completed Harbor Deepening Project's channels and their usage. These inefficiencies are projected to continue in the future as vessel sizes increase to meet requirements for operational efficiencies and environmental compliance.





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PROJECT LOCATION



The project area is the existing -50-foot MLLW Harbor Deepening Project and immediately surrounding areas.





THE SELECTED PLAN



The Selected Plan is the National Economic Development Plan: deepening the pathways from sea to Elizabeth – Port Authority Marine Terminal and Port Jersey – Port Authority Marine Terminal from a maintained depth of -50’ MLLW to a maintained depth of -55’ MLLW.

The plan will allow for currently-calling vessels to increase their loads. The increase in cargo per vessel call yields economic benefits by allowing for more efficient use of containerships.

The Selected Plan

- includes placement of 33.2 million cubic yards of material; this includes beneficially using dredged material by placing it upland, at the Historic Area Remediation Site, or on a reef consistent with the current 2008 Dredged Material Management Plan
- includes intertidal and subtidal shallows habitat mitigation, cultural resources mitigation, and air quality mitigation

	Proposed Maintained Channel Level ^a [ft MLLW]	Proposed Authorized Channel Level ^b [ft MLLW]
Ambrose Channel	-58	-58
Anchorage Channel	-55	-55
Port Jersey Channel	-55	-57
Kill Van Kull	-55	-57
Newark Bay	-55	-57
South Elizabeth Channel	-55	-57
Port Elizabeth Channel	-55	-57

^aMaintained channel level includes the summer salt water draft, squat, salinity, wave motion, and safety clearance. The channels will be maintained at this depth.

^bThe authorized channel level includes additional safety clearance needed for hard bottom.

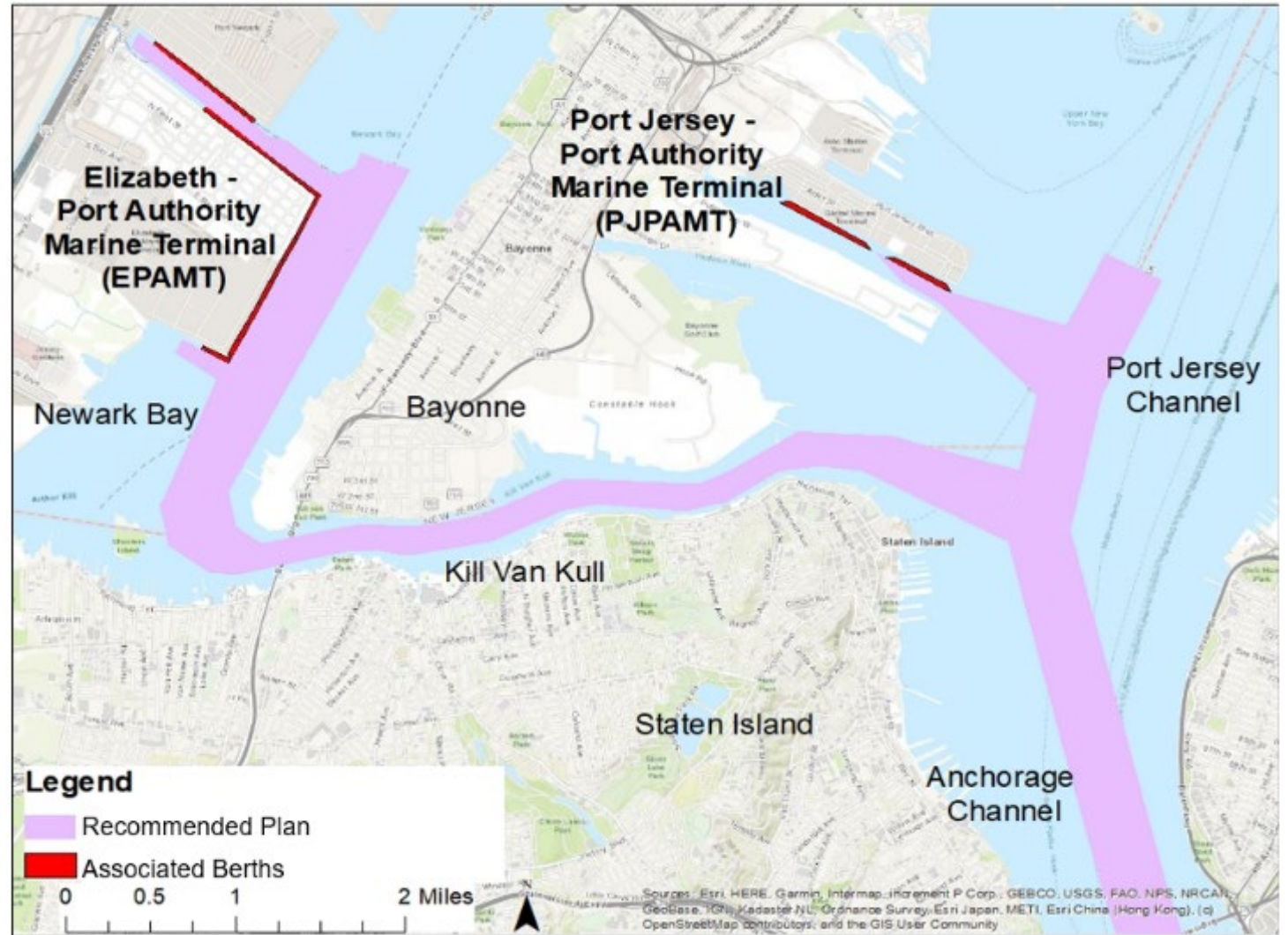


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PROJECT AREA



Deepening the pathways from sea to Elizabeth – Port Authority Marine Terminal and Port Jersey – Port Authority Marine Terminal to a maintained depth of -55 feet MLLW.





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DREDGING TODAY AND INTO THE FUTURE WITH BENEFICIAL REUSE

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The New York District is authorized to maintain 82 Federal Navigation Channels.

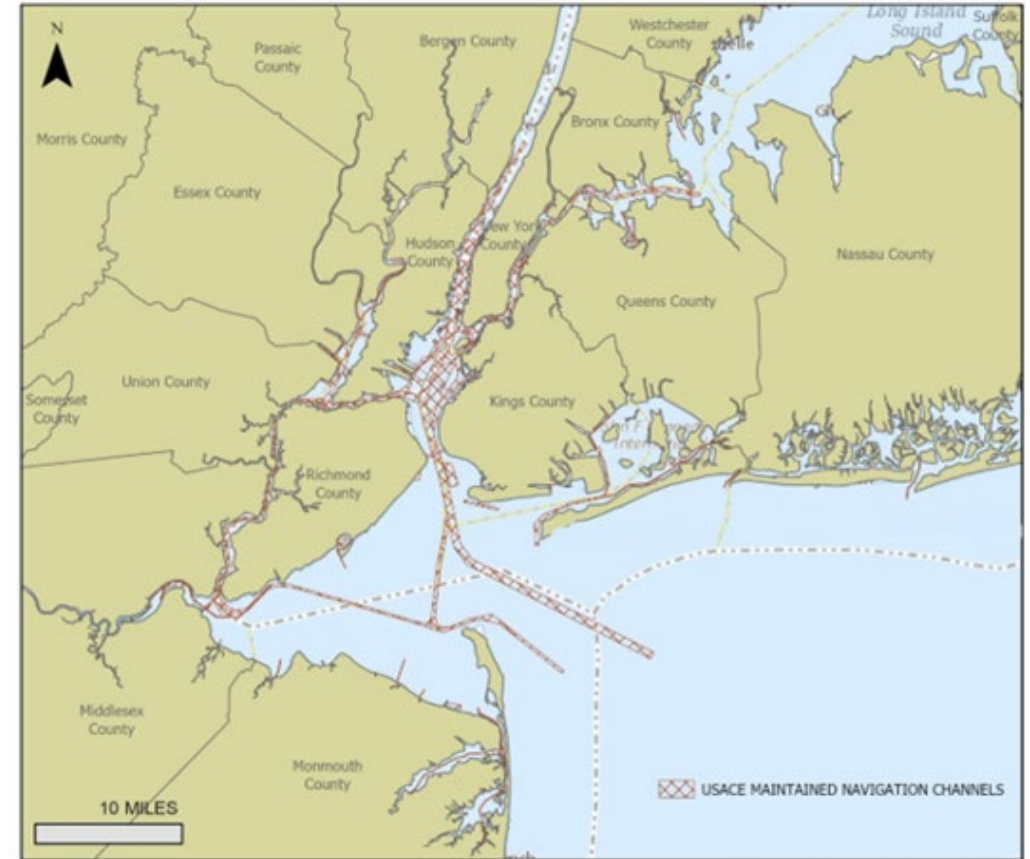
- 240 miles of Navigation Channels within Port of NY & NJ
- 187 miles of Re-nourishable Shoreline

During FY22-24, approximately 20.3 million cubic yards (MCY) of dredged material were beneficially used from maintenance projects.

- FY22 = ~7.4 MCY
- FY23 = ~6.0 MCY
- FY24 = ~6.9 MCY
- Future years – similar quantities

The new Harbor Deepening Channel Improvements Project will further deepen the main navigation channels from 50 to 55 feet and will generate over 33 MCY over the next 10 to 15 years

Placement Options – HARS, nearshore, shoreline, habitat creation, mines, capping....



Navigation channels maintained by USACE New York District.



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Actions Achieving the Vision of a World Class Harbor Estuary





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QUESTIONS?