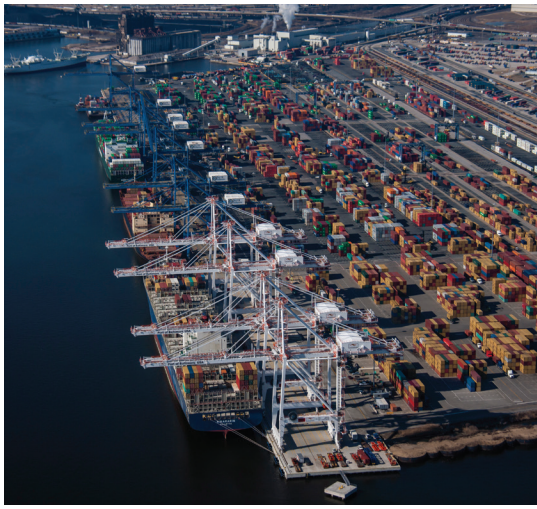
Select U.S. Ports Prepare For Panama Canal Expansion



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Port Everglades photo: Len Kaufman

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Prepared for and Funded by the NAIOP Research Foundation

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NAIOP, the Commercial Real Estate Development Association, is the leading organization for developers, owners, investors and related professionals in office, industrial, retail and mixed-use real estate. NAIOP comprises 15,000 members in North America. NAIOP advances responsible commercial real estate development and advocates for effective public policy. For more information, visit www.naiop.org.

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The data collection measures included in this report should be regarded as guidelines rather than as absolute standards. The data may differ according to the geographic area in question, and results may vary accordingly. Local and regional market performance is a key factor. Further study and evaluation are recommended before any investment decisions are made.

This project is intended to provide information and insight to industry practitioners and does not constitute advice or recommendations. NAIOP disclaims any liability for action taken as a result of this project and its findings.

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Introduction

The construction of the Panama Canal at the beginning of the last century changed patterns of international trade by opening new routes between countries that traditionally had not traded because of their remoteness. The canal was built for military purposes but, with the passing of time, became a facilitator of trade that shortened times and distances between production and consumption markets.[1] The current lock system has been in place for almost 100 years. Yet the size of oceangoing vessels has expanded considerably.

Hence, the Panama Canal is currently in the process of a major expansion effort. After the new set of locks is opened at the end of 2015, significantly larger ships will be able to traverse the canal. The new locks will allow the passage of Post-Panamax ships that carry up to 12,600 TEUs, instead of the maximum 4,800 TEUs that can be transported in Panamax vessels.[2] With the expansion, the canal will allow ship owners to take advantage of economies of scale, reducing fuel and other operational costs associated with the crossing in more efficient Post-Panamax vessels. Ship owners will benefit from the connectivity offered by the confluence of 30 liner services moving cargo between markets of highest density (for example, routes from Asia to the U.S., South America to the U.S. and the East Coast to the West Coast of the U.S.) and 33 feeder services that serve the regional trade of Latin America and the Caribbean.[3]

This report is a compilation of information about nine U.S. ports. Each case study includes information about the port location, operating status, cargo types and volume, terminals and cranes, foreign trade zones, transportation and access, employment, and current and future improvement projects.

The Panama Canal expansion is expected to have very dramatic effects on many of these ports, especially those on the East Coast and in the South. The ports will need to have waterside infrastructure in place to handle the larger Post-Panamax ships that will navigate the expanded canal. They also will need to have landside infrastructure in place to handle the increased volume of container traffic.

The report focuses on nine container ports on the nation's East and South coasts: the East Coast ports of New York and New Jersey and Baltimore; the Southeast ports of Virginia, Charleston and Savannah; the Florida ports of Miami, Jacksonville and Everglades; and the Gulf port of Houston. Each of these ports is in a different stage of readiness to accept Post-Panamax ships. Some already are prepared to accommodate them. Some are in the process of expanding their waterside and landside facilities in order to accommodate them. Others are not yet implementing these types of expansion efforts or, if they have begun to do so, have not yet made significant progress. It is not clear when, if ever, these ports will be ready. The case studies that follow describe each port.

Conclusions

We have examined each of the nine ports from a variety of perspectives to understand its degree of readiness to accept Post-Panamax vessels after the new set of locks begins operation in 2015. Many of the ports face a variety of challenges, primarily centering on navigational depth and the number of berths that can accommodate the larger ships. Additional challenges concern the capacity of the port's landside operations to efficiently handle the large volume of containers on the Post-Panamax vessels.

Each of the ports has a variety of projects planned or underway that will increase its landside and/or waterside capacity. As competitors, each maintains that it can handle Post-Panamax vessels. Whether the carriers agree will determine which ports succeed and which will become secondary players as ship sizes continue to grow.

Ship Categories

The maritime industry uses a variety of categories to describe container ships. This report uses the following three categories to describe ships of different sizes and capacities:

- **Panamax** vessels are those that fit through the existing locks of the Panama Canal. The maximum length of these vessels is 965 feet, the maximum draft is 42 feet and they can carry a maximum of 4,800 TEUs.
- **Post-Panamax** vessels are those that will fit through the expanded locks of the Panama Canal. The maximum length of these vessels is 1,200 feet, the maximum draft is 50 feet and they can carry a maximum of 12,600 TEUs.[1]
- **Super Post-Panamax** vessels are ships such as the Maersk Triple E that can carry up to 18,000 TEUs and are too big to traverse even the expanded Panama Canal.

[1] "U.S. Port and Inland Waterway Modernization: Preparing for Post Panamax Vessels," Institute of Water Resources, U.S. Army Corp of Engineers, June 2012.

Endnotes

[1] IAME Conference 2014, Norfolk, Virginia, July 15-18, 2014.

[2] "U.S. Port and Inland Waterway Modernization: Preparing for Post-Panamax Vessels," Institute of Water Resources, U.S. Army Corp of Engineers, June 2012.

[3] IAME Conference 2014.

"[The] Panama Canal widening discussion is good for the port to put focus on the need for infrastructure."

– Steven Cernak, chief executive and port director, Port Everglades[1]

Port Everglades

Despite its name, Port Everglades is not found in the Everglades ecosystem. Located in South Florida on the Atlantic Ocean, the port is set in the Fort Lauderdale metro area, near Hollywood and Dania Beach, with Miami just 23 miles to the south. It is owned and operated by the Broward County Port Everglades Department, a self-supporting enterprise fund of the county government. Known for servicing the Americas, Port Everglades is preparing itself to benefit from the expansion of the Panama Canal by purchasing and installing Post-Panamax cranes as well as by deepening its channel. The port's geographic location makes it a convenient destination for ships heading east through the Panama Canal or west through the Suez Canal. It also has the shortest entrance channel of any U.S. East Coast port, which enables shippers to save time and fuel costs.[2]

More than 5.2 million tons of containerized cargo move through Port Everglades annually, making it the 12th leading container port in the U.S. More than 30 shipping lines serve the port. Aggressive expansion of port facilities, other improvements and new construction are expected to ensure that the port will continue to meet the increasing demands of cargo terminal operators.[3]

Location, Size and Terminals

Situated between the Fort Lauderdale-Hollywood International Airport and a barrier island that is home to John U. Lloyd Beach State Park, the port covers 1,742 acres of land and features 10 cargo and 11 passenger terminals.

Operating Status

Operating revenue and operating income for Port Everglades have been growing as a result of the increasing volumes of total TEUs handled since 2010. Increased container traffic can be attributed to the fact that existing customers are shipping more TEUs. In 2011, the port ranked seventh in the U.S. for the total number of container ship calls.[4] The port experienced a dramatic drop in almost all types of activities during the Great Recession, including container cargo, dry bulk cargo, liquid bulk cargo and cruise ship calls.

Figure 1

Operating Status

Year	Operating Revenue (in thousands of dollars)	Operating Expenses (in thousands of dollars)	Operating Income (in thousands of dollars)
2013 (Estimate)*	$151,507	$103,479	$53,256
2012	142,931	98,551	44,380
2011	139,177	99,545	39,632
2010	124,654	96,821	27,833
2009	109,669	73,236	16,183
2008	117,441	73,093	24,325
2007	112,500	72,111	20,204
2006	106,286	89,469	16,820
2005	104,535	87,664	19,871
2004	111,037	73,966	37,070
2003	87,880	70,143	17,467
Average Growth Rate (2003 to 2012)	6%	5%	20%

*2013 estimates are based on 2003 to 2012 growth rate.
Source: Port Everglades website; dataset compiled by authors

Cargo

Port Everglades currently handles container, liquid bulk, and dry bulk cargo as well as cruise passengers. It receives more than 12.5 million gallons of petroleum products every day. There are 13 petroleum terminals operated by private companies on private property within the port's jurisdiction.[5] In 2012, the port handled 973,191 tons of dry bulk cargo, including imports and exports of cement, aggregates, tallow and gypsum. (These products, which are used in construction, are very demand driven.) That same year, the port handled 120,812 tons of break bulk products, mainly steel, lumber and wood.[6]

Figure 2

Cargo Summary

Year	Container Volume (in TEUs)	Container Ship Calls	Total Tonnage (in thousands of tons)
2013 (Estimate)*	938,932	1,821	22,070
2012	923,600	1,867	21,748
2011	880,999	1,861	21,645
2010	793,227	1,830	21,212
2009	796,160	1,980	21,108
2008	985,095	2,197	23,624
2007	948,680	2,270	19,240
2006	864,030	2,185	20,521
Average Growth Rate (2006 to 2012)	1.66%	-2.46%	1.48%

*2013 estimates are based on 2003 to 2012 growth rate.

Source: Port Everglades website; dataset compiled by authors

Facilities: Cargo Terminals

Port Everglades is divided into three sections: Northport, Midport and Southport. The Northport section is home to terminals 1, 2 and 4. These dual-purpose terminals handle both cargo and cruise operations. The Midport section contains four dual-purpose terminals, 19, 26, 27 and 29.[7] The Southport section handles all container traffic moving through the port.

The port's major cargo terminal operators are Dole Fresh Fruit International Ltd., Florida International Terminal LLC, Mediterranean Shipping Company and Portus. They serve shipping lines such as Dole Ocean Cargo Express, CMA CGM Group, Maersk Line, Hapag-Lloyd and MSC Shipping Co. USA.

Facilities: Cranes

Port Everglades cargo terminals feature a variety of cranes. Of the port's nine container cranes, seven can handle cargo from Post-Panamax ships. Five new Post-Panamax container cranes will be added over the next 20 years; two of those cranes will be in place within five years. They will be able to reach across 22 containers and stack as many as seven containers high.

Figure 3

Cranes

Type	Number	Tons/Description
Southport		
Current		
Gantry Cranes	7	57 tons max; Post-Panamax, low profile, shuttle boom, General Electric electronics
Planned		
Gantry Cranes	5	
Midport		
Current		
Paceco Gantry	2	58 long tons max; 150 feet/minute hoist speed
Gottwald Mobile Harbor	1	100 long tons max

Source: Port Everglades website

Facilities: Cruise Terminals

In addition to the dual-purpose terminals described above, Port Everglades also has five passenger-only terminals, all in the Midport area. Nine cruise lines serve Port Everglades, the third-largest cruise port in the U.S., after the Port of Miami and Port Canaveral. The largest of these lines, in terms of the total capacity of passengers each can accommodate with its current fleet, are Royal Caribbean International (22,154 passengers), Celebrity Cruises (16,676), Holland America Line (14,665), Princess Cruises (13,196) and Carnival Cruise Lines (2,974). Royal Caribbean, for example, has six cruise ships that call the port home; between them, these ships can accommodate 22,154 passengers.[8]

Foreign Trade Zone

Port Everglades' Foreign Trade Zone (FTZ) No. 25 is the first and largest FTZ in the state of Florida.[9] Business activities in the foreign trade zone include assembly, display, manipulation, processing, repackaging, repair, salvage, storage and manufacturing. Other unique features include 22.7 acres activated by U.S. Customs and Border Protection, 388,600 square feet of warehouse space with around-the-clock access and a computerized inventory control system. There are 14 additional FTZ sites throughout Broward County in proximity to the port.[10]

Figure 4

Cruise Ship Terminals Passengers Served

Year	Number of Passengers
2012	3,757,320
2011	3,952,843
2010	3,674,226
Average Growth Rate (2010 to 2012)	1.32%

Source: Port Everglades website

Figure 5

Foreign Trade Zone Summary

(FTZ No. 25)

Year	Value of Merchandise Received (in millions of dollars)	Value of Merchandise Forwarded (in millions of dollars)
2013	$4,605	$4,653
2012	$4,393	$4,365
2011	$3,736	$3,696
Average Growth Rate (2011 to 2012)	-4.62%	-0.36%

Sources: Port Everglades website; dataset compiled by authors

Transportation and Access

Port Everglades is easily accessed by all modes of transportation, including motor carriers, airlines and railroads. It offers direct access to multimodal inland links through the interstate and state highway systems. A Florida East Coast (FEC) Railway hub is located within two miles of the port. A near-dock, rail-served intermodal container transfer facility (ICTF) was completed in mid 2014. The ICTF, coupled with the rail hub, enables cargo to move in and out of the port faster and more efficiently. Finally, the port's location directly across Route 1 from Fort Lauderdale-Hollywood International Airport provides significant advantages for moving freight by air.[11]

Employment

Port Everglades is an economic powerhouse for Broward County. The port generates an annual economic impact of nearly $26 billion statewide, according to an economic impact study conducted by Martin Associates. Through direct, induced, indirect and related user taxes, the port contributes more than $733,554 million in local and state tax revenue.[12]

Current and Future Port Projects

Port Everglades has a current channel depth of 42 feet. The port is planning to deepen the channel to 50 feet in order to accommodate Post-Panamax vessels. It also plans to deepen and widen the navigational channel around the outer entrance from 45 feet deep and 500 feet wide to 50 feet deep and 800 feet wide. Finally, it plans to deepen the inner entrance and main turning basin channel from 42 to 50 feet.

Figure 7 summarizes key improvements planned and underway at the port.

Figure 6

Employment, 2013

	Cargo	Cruise	Total
Direct	6,359	5,074	11,433
Induced	5,232	2,828	8,060
Indirect	4,503	3,534	8,036
Related Use	175,180	N/A	175,180
Total	191,274	11,435	202,709

Source: Port Everglades website

Figure 7

Current and Planned Improvements

Project	Completion Date (Estimated)	Estimated Investment (in millions of dollars)	Description
Intermodal Container and Transfer Facility	Mid 2014	$72	Public-private partnership with the Florida East Coast Railway LLC (FEC). Construction of a 42.5-acre near-dock intermodal container transfer facility (ICTF) to efficiently move international cargo containers between ships and rail while also serving as a state-of-the-industry domestic intermodal hub.
Southport Turning Notch Extension and Mangrove Uplands Enhancement	2017	$122	Extension of the Southport Turning Notch berthing area to enhance mangrove uplands. New 2,400-ft.-long wharf area will front on the existing 42-ft.-deep Turning Notch. Berth extension will create five new cargo berths at Southport. New mangrove habitat will furnish a 16.5-acre conservation area.
Channel Deepening and Widening	December 2017	$320	Deepen the outer entrance channel from its existing 45-ft. depth to 57 ft. while increasing its width from 500 ft. to 800 ft. Deepen Inner Entrance Channel and Main Turning Basin from 42 ft. to 50 ft.
New Post-Panamax Container Cranes	2019 to 2034		Add five new Post-Panamax container cranes over the next 20 years; two of those cranes will be in place within five years.
Foreign Trade Zone Relocation	N/A		Relocate facilities of FTZ No. 25, operated by Port Everglades, from the east side of McIntosh Road to the west side of McIntosh Road, placing the warehouse facility closer to the ICTF.

Source: Port Everglades website

Outlook

Port Everglades is South Florida's most diverse port, with large cargo operations and a very active cruise ship business. The port's wide variety of planned improvements should make it a top Post-Panamax vessel destination in the future. However, in late 2015, when the Panama Canal expansion is expected to open, the port will not have the necessary depths and widths to accommodate Post-Panamax ships. Channel deepening and widening is currently taking place and is expected to be completed in December 2017, which will enable the port to accommodate the larger vessels at that time.

Other significant changes that will improve the port's Post-Panamax competitiveness include the purchase of larger gantry cranes and relocation of FTZ No. 25. In addition, the Florida Department of Transportation is building the Eller Drive Overpass, which will carry vehicles entering the port over new rail tracks that will expand to six working tracks for the ICTF. The intermodal facility is expected to eliminate an estimated 180,000 truck trips per year by 2029. Located near large population centers in South Florida and at the same time easily accessible from Florida's agricultural areas, this port should experience substantial growth with the expansion of the Panama Canal.

Endnotes

[1] Interview with the Journal of Commerce at the 2014 Trans-Pacific Meeting.

[2] "Port Everglades Facilities Guide & Directory," www.bluetoad.com/publication/?i=203256, retrieved May 20, 2014.

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[4] "Vessel Calls Snapshot, 2011," U.S. Department of Transportation Maritime Administration, released March 2013, revised November 2013, www.marad.dot.gov/documents/Vessel_Calls_at_US_Ports_Snapshot.pdf, retrieved May 20, 2014.

[5] Port Everglades website, www.porteverglades.net/cargo/petroleum/, retrieved May 20, 2014.

[6] Port Everglades website, www.porteverglades.net/cargo/bulk-and-break-bulk-cargos/, retrieved May 20, 2014.

[7] Port Everglades website, www.porteverglades.net/cruising/facilities-and-terminals/, retrieved May 20, 2014.

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[9] Port Everglades website, www.porteverglades.net/development/ftz-overview/, retrieved May 20, 2014.

[10] Ibid.

[11] Port Everglades website, www.porteverglades.net/cargo/, retrieved May 20, 2014.

[12] Port Everglades website, www.porteverglades.net/our-community-role/economic-impact/, retrieved May 20, 2014.

"We are one of the most efficient ports on the East Coast. [T]he opportunity for growth far exceeds the competitive barriers."

– Joseph M. Greco Sr., director, intermodal/trade development, Maryland Port Administration[1]

Port of Baltimore

The Port of Baltimore, owned by the Maryland Port Administration, is located at the top of the Chesapeake Bay, with terminals in Baltimore, Maryland. As the 10th largest port in the U.S., it handled a total of $53.96 million of goods in 2012.[2] In 2010, the port dealt with more than 40 million tons of cargo, with a particular focus on break bulk niche cargo.[3] It has six public and 23 private terminals. It is also the closest East Coast seaport to the Midwest. It generates about 40,000 jobs annually. Given its number of terminals, capacity and location, the port is well positioned to increase its volume and value in the future. The harbor is 50 feet deep, with one berth that is also 50 feet deep, allowing it to already receive Post-Panamax cargo ships via the Suez Canal.[4] With these deep waters, the port is working to position itself for the future.

Location, Size and Terminals

The Port of Baltimore is located close to the Port of Virginia's Hampton Roads terminals, which are at the mouth of the Chesapeake Bay. However, its location farther north along the Chesapeake Bay at the beginning of the Patapsco River provides it with the unique position of being the closest East Coast seaport to the Midwest and that region's many manufacturing centers. Thus the majority of its cargo goes to and comes from the Midwest. In 2012, the Port of Baltimore ranked 11th in the U.S. in terms of tonnage bound for foreign countries at $53.85 billion.[5] It currently handles the largest amount of cars and light trucks being imported to and exported from the U.S.

Located on 45 miles of shoreline and 3,405 waterfront acres, the port operates six public and 23 private terminals that can handle a variety of cargo.[6] The public terminals are the Seagirt Marine Terminal, Dundalk Marine Terminal, South Locust Point Marine Terminal, North Locust Point Marine Terminal, Hawkins Point and the Masonville/Fairfield Terminal area.[7] The six main private terminals are the Curtis Bay Coal and Ore Pier, the Consolidation Coal Pier, the Chesapeake Terminal, the Atlantic Terminal, Rukert Terminals Corp. and Canton Marine Terminal.[8]

Operating Status

While the Port of Baltimore is the 10th busiest port in the U.S. in terms of tonnage, it faces stiff competition from other nearby East Coast ports. It has begun to focus on its differentiators, which are its ability to efficiently ship bulk (such as coal) and general cargo. Focusing on these two areas has allowed the value in goods that pass through the port to increase while the volume of goods has decreased. This means that there is still opportunity for growth for the port.

Figure 1 shows the past four years of operating revenue and expenses. These numbers show a port that is recovering from the 2007 recession and is modest about its growth opportunities for 2015. Its expenses are higher because of capital projects to which it has already committed, such as dredging projects and reconstruction of terminals.

Cargo

The Port of Baltimore handles a variety of cargo at its many public and private terminals. It handles autos, containers, break bulk, waste and hazardous materials (hazmat) cargo, among other general cargo. Bulk cargo such as coal, salt and sugar tend to be handled by the private terminals. In 2013, there was a 22.6 percent decrease in bulk cargo tons because a nearby coal plant closed.

Figure 1

Operating Status

Year	Operating Revenue (in thousands of dollars)	Operating Expenses (in thousands of dollars)	Operating Income (in thousands of dollars)
2015 (Forecast)	$43,709	$51,301	$(7,592)
2014 (Unaudited)	47,643	50,394	(2,751)
2013	48,448	44,476	3,972
2012	55,892	44,094	11,798
2011	49,065	46,876	2,189
Average Annual Growth Rate (2011 to 2015)	-9.82%	8.496%	

Source: Maryland Department of Transportation[9, 10]; authors' estimates

Figure 2

Cargo Summary

Year	Container Volume (in thousands of TEUs)	General Cargo Total Volume (in thousands of tons)
2013	6,369	9,569
2012	6,297	9,594
2011	5,873	8,882
2010	5,648	8,150
2009	5,248	7,326
2008	5,814	8,962
Average Annual Growth Rate (2008 to 2013)	6.87%	4.88%

Source: Maryland Port Administration[11]; authors' estimate

The type of cargo that the port handles is outlined in Figures 3a and 3b. According to the Maryland Port Administration's 2013 Foreign Commerce Report,[12] the port currently ranks ninth among U.S. ports in terms of foreign cargo dollar value. In 2012, it ranked first in value of international cargo with $54 billion; it was the largest automobile port on the East Coast and the largest roll-on/roll-off port on the East Coast.[13]

Figure 3a

Top Commodities by Value

(in millions of dollars)

Export Commodity	Export Value	Import Commodity	Import Value
Automobiles/light trucks	$7,437	Automobiles/light trucks	$10,983
Coal	1,460	Construction machinery	1,388
Tractors	1,388	Radioactive elements	1,194
Radar apparatus	811	Tractors	713
Combines/harvesters	556	Tin	645
Civilian aircrafts, engines and parts	531	Nickel	594
Construction equipment	528	Ferroalloys	581
Aircraft, spacecraft and launch vehicles	328	Aluminum plates and sheets	416
Tanks	313	Off-highway trucks	385
Off-highway trucks	291	Furniture	385

Source: Maryland Port Administration[14]

Figure 3b

Top Commodities by Tonnage

Export Commodity	Export Tons	Import Commodity	Import Tons
Coal	15,056,118	Salt	911,529
Waste paper	837,029	Automobiles/light trucks	738,786
Automobiles/light trucks	785,914	Sugar	621,134
Iron ore	492,762	Automobiles	648,476
Ferrous scrap	404,691	Wood pulp	601,877
Tractors	158,989	Alumina	590,574
Lumber	128,465	Gypsum	493,930
Logs	93,938	Iron/steel slag	366,761
Construction equipment	79,000	Fertilizers	323,584
Flat rolled stainless steel	60,230	Petroleum bitumen/coke	300,175

Source: Maryland Port Administration[15]

Facilities: Cargo Terminals

The Port of Baltimore has six public terminals and six main private terminals. The Maryland Port Administration maintains the public terminals, while the private terminals are fully operated by private firms. (Seagirt Marine Terminal became a public-private partnership with Ports America in 2010.)

Facilities: Passenger Terminals

The Port of Baltimore's Cruise Maryland Terminal handles a busy schedule of cruises from Carnival Cruise Lines, Royal Caribbean International and Crystal

Figure 4

Facilities: Terminals

Terminal	Total Acreage	Type of Cargo	Berths
Dundalk	570	Containers, break bulk, wood pulp, Ro/Ro, autos, projects cargo, farm and construction equipment	Four with 36-ft. draft, seven with 42-ft. draft, two with 50-ft. draft
Masonville/Fairfield	Total terminal area is 150 acres; 61 acres for auto terminal	Fairfield area includes four specialized terminals for handling and processing autos, light trucks and similar Ro/Ro cargo	Pier 4: 832 ft., depth 49 ft. Pier 5 and wet basin: 1,393 ft., depth 23 ft.
Seagirt	284	Containers	Berths 1-3: 3,127 ft., depth 45 ft., capable of handling up to 9,200 TEU vessels Berth 4: 1,225 ft., depth 50 ft., capable of handling up to 14,000 TEU vessels
South Locust Point	79	Forest products	Three with 36-ft. draft
Cruise Maryland	18.7	Cruise passengers	1,139 ft., depth 35 ft.
North Locust Point	90	Wood pulp, lumber, latex, steel, paper and containers	Five finger piers with 34-ft. depths; three are 1,200 ft., one is 1,235 ft. and one is 635 ft.
Intermodal Container Transfer Facility (ICTF)	84	International and domestic containers	N/A

Source: Maryland Port Administration[16]

Cruises.[17] The port began receiving cruise lines after the Sept. 11, 2001, terrorist attacks on New York City. In 2006, the Cruise Maryland Terminal opened with indoor seating capacity for 1,000 passengers. In 2013, this terminal reached its capacity (since most cruises begin and/or end on the weekend), with two cruise ships disembarking each week.[18] At capacity, the terminal can handle 100 cruises a year with 241,000 passengers.[19]

To ensure that the port experiences continuing passenger cruise growth, it is seeking not only to reach capacity, but also to expand passenger cruise operations by bringing additional cruises to South Locust Point.[20]

Facilities: Cranes

The Port of Baltimore has a total of 38 cranes. The Masonville/Fairfield Terminal area does not have any cranes, as it is used almost exclusively for automobiles and light trucks. Seagirt Marine Terminal has been updated to prepare for the Panama Canal expansion with taller and wider cranes. It is one of two East Coast ports that is currently ready to handle the larger ships. (The Port of Virginia is the second.)

Figure 5

Type and Number of Cranes

Type	Number	Description
Seagirt Marine Terminal		
Sumitomo Post-Panamax Crane	7	Outreach 144 ft.
Rubber-tired Gantry Crane	12	Outreach 78 ft.
Super Post-Panamax Crane	4	Outreach 50 ft.
Dundalk Marine Terminal		
Heavy Lift Mobile Crane	2	
Container Crane	9	Outreach 126 ft.
North Locust Point Marine Terminal		
Container Crane	1	45 long tons
Gantry Mounted Whirly Crane	2	75 tons
South Locust Point Marine Terminal		
Revolving Gantry Crane	1	100 short tons
Intermodal Container Transfer Facility		
Rubber-tired Gantry Crane	2	Straddles train tracks

Source: Maryland Port Administration[21]

Foreign Trade Zones

While the state of Maryland has four foreign trade zones (FTZs), most Port of Baltimore cargo traffic occurs in Baltimore City Zone No. 74. Within this zone are 19 general purpose sites that provide 1,706 acres of storage.[22] In 2009, according to the Maryland Port Administration, this FTZ "handled more than 18,000 different commodities from 24 different countries of origin."[23] This FTZ is designated as an Alternative Site Framework that allows for "greater flexibility to FTZs by using simpler and less time-consuming procedures."[24] Near the Port of Baltimore but outside the city limits are Prince George's County FTZ No. 63, with 76 acres on two sites, and Washington County FTZ No. 255, with seven sites and 1,800 acres.

Transportation and Access

The Port of Baltimore is accessed through railways, motor carriers and airlines. It is five minutes away from Interstate Highway 95, a main East Coast thoroughfare. It also connects to multiple highways that head west.

Figure 6

Port of Baltimore Transportation and Access

Terminal	Rail Access	Highway Access
Dundalk	Norfolk Southern provides direct rail access to all berths and sheds Two rail storage yards total 9,300 ft. of track Two 2,000-ft. storage tracks and five unloading tracks, ranging from 1,500 to 1,800 ft.	2.5 miles from I-95, 1.5 miles from I-695, easy access to other major interstates
Masonville/Fairfield	CSX spur adjacent	
Intermodal Container Transfer Facility	CSX provides direct service	Less than one mile and two traffic signals from I-95
North Locust Point	Direct connection to terminal by CSX; direct rail access to all berths	2.25 miles to I-95, with connections to other major interstates
South Locust Point	Direct connection to terminal by CSX	
Seagirt	Direct connection to the adjacent ICTF by CSX	Within minutes of many major transportation arteries, including I-70

Source: Maryland Port Administration[25]

Employment

According to a 2011 economic impact study, the Port of Baltimore generates more than 40,000 jobs.[26] Direct jobs accounted for 14,627 positions such as terminal operators, steamship agents and freight forwarders. Induced jobs numbered 14,474, including jobs with local grocery stores, restaurants and other nearby services. Indirect jobs numbered 10,936, including jobs supported by the business purchases of the employers who create the direct jobs. The same study says that "port activity supports 205,012 jobs within the state that are related to the Port of Baltimore."[27] In total, "port activity generated $3 billion in personal wage and salary income for Maryland residents."[28]

Current and Future Port Projects

According to a report on its FY2015 proposed budget, the Maryland Port Administration spent $89.5 million on major capital projects in FY2014.[29] These include dredge projects, reconstructing six berths at Dundalk Marine Terminal to enable them to handle deeper and wider ships, a chrome ore residue project and an expansion project. The dredge projects include ongoing and new sites for dredged materials as well as dredging the terminal waters to deepen their capacity. This will allow the port to deepen its berths to 50 feet in preparation for the Panama Canal expansion.[30]

The expansion project focuses on expanding rail access, improving the width and direction of the Seagirt Marine Terminal and filling in a basin for storage.[31] The port is also negotiating with the current owners to purchase the coastal area called Sparrows Point. If purchased, it would provide land upon which to place dredged materials and another terminal.[32]

Outlook

The Port of Baltimore has a bright outlook. Port officials said that while competition is steep, "the opportunity for growth far exceeds the competitive barriers."[33] The port has expanded its harbors, a berth and cranes, making it the second East Coast port to be fully prepared for the Panama Canal expansion. Couple this with the fact that the port is one of two federally funded East Coast port projects to prepare for the Panama Canal expansion and it is clear that the port is well positioned for growth and increases in market share. Port officials are also looking to diversify their market share in multiple vertical markets, such as agricultural commodities. They also have made increasing their inland access through intermodal activities a top priority.

The port is adaptable to different kinds of cargo, carriers and business models, as demonstrated by its public-private partnership with Port America. This suggests that the Maryland Port Administration is strategic in not only how it understands the current and future maritime trade landscape but how it can best position its business outreach and infrastructure building. After Sept. 11, the port began taking a huge share of the Port of New York and New Jersey's cruise business. It then grew this business into a stable and ongoing revenue stream with a large and tourist-friendly cruise port terminal. This suggests that the port is agile and opportunistic in responding to unexpected changes in actions that are not directly related to maritime business but have a direct impact upon it. This will become particularly useful if weather becomes increasingly dramatic and sea levels rise.

While the Port of Baltimore faces stiff competition from other nearby ports, such as the ports of Virginia and Philadelphia, it has remained competitive. Port executives feel that their efficiency gives them a competitive edge, stating "we are the most efficient on the East Coast."[34] Its expansion projects will allow it to become even more efficient and to handle the increase in Asian trading partners that it hopes to attract, as well as to continue to serve the variety of vendors and ships that currently call on it daily.

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"We are the fastest growing port in the country."

– Byron Miller, vice president, marketing and sales support, Port of Charleston[1]

Port of Charleston

The Port of Charleston has the deepest water in the southeastern U.S. and handles more than $65.1 billion in imports and exports annually.[2] According to the South Carolina State Ports Authority (SCSPA), it provides "260,800 jobs across the state in the maritime, transportation, distribution and manufacturing industries while providing an overall economic impact of $45 billion each year."[3] The port "directly handles over 19.1 million tons of cargo annually."[4] It "is one of the busiest container ports along the Southeast and Gulf coasts and is recognized as one of the nation's most efficient and productive ports. The Charleston Customs district ranks as the nation's eighth largest in dollar value of international shipments."[5]

Owned and operated by the SCSPA, the port has been positioning itself for growth by "heavily investing in its new and existing terminals with a 10-year, $1.3 billion capital plan. A new terminal that will boost total container capacity in the port by 50 percent is set to open in 2018."[6]

Location, Size and Terminals

Located in the South Atlantic state of South Carolina, the Port of Charleston is made up of five public terminals: Columbus Street Terminal, North Charleston Terminal, Union Pier Terminal, Veterans Terminal and Wando Welch Terminal. It has connections to rail, highway, and air transport routes that go across the U.S. The port's deep water enables its terminals to handle a variety of cargo, including bulk, break bulk and container cargo.

Operating Status

The Port of Charleston was deeply affected by the Great Recession and has yet to fully recover its 2007 operating revenue and income. In part, this is because of a 2012 investment in infrastructure and capital projects that reflects an interest in long-term recovery and that will position the port well for post-Panama Canal expansion.

Figure 1

Operating Status

Year	Operating Revenue (in thousands of dollars)	Operating Expenses (in thousands of dollars)	Operating Income (in thousands of dollars)
2013	$140,388	$124,061	$16,327
2012	130,948	123,674	7,274
2011	124,649	108,006	16,643
2010	111,744	103,372	8,372
2009	136,201	110,517	25,684
2008	165,092	110,399	54,693
2007	153,442	103,566	49,876
Average Growth Rate (2007 to 2012)	-9%	20%	-67%

Source: PriceWaterhouseCoopers LLP (2011, 2012, 2013) [7-9]

Figure 2

Cargo Summary

Year	Container Volume (in thousands of TEUs)	Outbound Tonnage	Inbound Tonnage	Total Tonnage
FY 2014 (estimate)	1,685			
FY 2013 (estimate)	1,560			
FY 2012	1,432	23,412	40,233	63,645
FY 2011	1,384			
FY 2010	1,278			
FY 2009	1,368			
FY 2008	1,695			
FY 2007	1,884	6,290	18,070	24,360
Average Growth Rate (2007 to 2012)	-24%	272%	123%	161%

Source: Wilbur Smith Associates, Inc.;[4] PriceWaterhouseCoopers LLP (2011, 2012, 2013)[7-9]

Cargo

During the Great Recession, the Port of Charleston diversified the types of cargo coming in and leaving its terminals. The total volume in TEUs has only begun to meet pre-2008 levels. However, total tonnage has more than doubled since 2007. The break bulk pier tonnage has doubled during this time, to 1.62 million tons in 2013. Given the port's proximity to regional forestry resources, many of the Southeast's forestry products — lumber, paper and pulp — go through the port on their way to other parts of the U.S. and the world.

Facilities: Cargo Terminals

The Port of Charleston has five public marine terminals, four of which are operated by the South Carolina State Ports Authority (SCSPA). The North Charleston Terminal is jointly operated by the SCSPA and Ceres Marine. At low tide, the port has a deepest point of 47 feet.

Figure 3

Top 10 Exports and Imports, 2012

Rank	Exports	Imports
1	Paper and paperboard, including waste	Furniture
2	Wood pulp	Auto parts
3	Auto parts	Sheets, towels, blankets
4	Logs and lumber	Fabrics, including raw cotton
5	Fabrics, including raw cotton	Auto and truck tires and tubes
6	General cargo, misc.	General cargo, misc.
7	Synthetic resins	Menswear
8	Mixed metal scrap	Apparel, misc.
9	Unclassifiable chemicals	Women's and infant wear
10	Poultry, chiefly fresh and frozen	Paper and paperboard, including waste

Source: South Carolina State Ports Authority[10]

Figure 4

Facilities: Terminals

Terminal	Total Acreage	Size (in sq. ft.)	Number of Warehouses	Type of Cargo	Number of Cranes	Channel Depth (in feet)	Berth Length (in linear feet)
Columbus Street	155	259,149	2	Roll-on/roll-off, break bulk, project cargo	3	45	3,500
North Charleston	201	N/A	N/A	Container	6	45	2,500
Union Pier	N/A	500,000	N/A	Break bulk		35	2,470
Veterans	110	96,993	2	Bulk, break bulk, roll-on/ roll-off, project cargo	0	35	4,452
Wando Welch	689	187,680	1	Container	11	45	3,800

Source: South Carolina State Ports Authority[11-15]

Facilities: Passenger Terminals

Union Pier Terminal is a one-berth, one-ship terminal visited by ships from more than 11 different cruise companies annually, bringing an estimated $37 million in economic impact to the Charleston area.[16] These cruise ships represent about 3 percent of all ships that call on Charleston annually. Union Pier is near parking and shopping for tourists and farther away from the heavy cargo terminals with which it shares waterways. In 2012, total passenger volume reached 189,445, up from 47,298 in 2009.[17]

Facilities: Cranes

The Port of Charleston has 20 shipside cranes designed to move different types of cargo. Wando Welch, the largest terminal, focuses on ship-to-shore cranes that move TEUs. It has nearby rail connections to CSX Transportation and Norfolk Southern Corp. railways. Intermodal rail volume increased 50 percent between 2011 and 2013. North Charleston Terminal has six cranes with 41 moves per hour per crane. Truck turn time at both terminals averages approximately 23 minutes. Columbus Street Terminal has three TEU cranes. It also has on-dock connections to CSX and Norfolk Southern railways and switching services available for Palmetto Railways.

The port also features a mobile floating crane owned and operated by Charleston Heavy Lift that can move among all of the terminals and can lift cargo from ship to ship, from ship to truck, from ship to rail and from ship to storage yard. Charleston Heavy Lift is a joint venture between J.E. Oswalt and Sons Inc. and Stevens Towing Co. Inc.

Vessels Accommodated

According to the SCSPA, "a total of 1,839, 1,745 and 1,695 vessels (excluding barges) docked [at the Port of Charleston] during the years ending June 30, 2013,

Figure 5

Type and Number of Cranes

Type	Number	Outreach
Columbus Street Terminal		
Paceco/Espana Post-Panamax	2	145 ft.
Paceco/Hyundai	2	196 ft. 10 in.
IHI	1	121 ft.
North Charleston Terminal		
IHI Post-Panamax	4	145 ft.
ZPMC Post-Panamax	2	196 ft. 9 in.
Wando Welch Terminal		
IHI Post-Panamax	1	145 ft.
Paceco/Hyundai Super Post-Panamax	4	190 ft.
HHI/GE	2	196 ft. 9 in.
ZPMC Post-Panamax	2	196 ft. 9 in.
Morris Post-Panamax	3	146 ft.
IHI	1	121 ft.

Source: South Carolina Ports Authority[11, 12, 15]

2012 and 2011, respectively."[18] "The Port Authority provided services to 18 out of the top 20 largest container ship lines based on U.S. containerized import and export cargo volumes."[19] Following the 45-foot harbor deepening project completed in 2012, the port handled 1.68 million TEUs in 2014. The port regularly handles vessels carrying more than 9,000 TEUs and drafting up to 48 feet. At least six vessels enter the harbor each day. Pier container volume increased 8 percent in fiscal year 2014.

Foreign Trade Zones

The South Carolina State Ports Authority was named fDi magazine's "Global Foreign Zones of the Future" in 2010 and 2011. There are currently three foreign trade zones in South Carolina, with 32 strategically located sites throughout the state. Foreign trade zones link directly from the Wando Welch and North Charleston terminals. Although shippers in 24 states use Charleston to access foreign customers and suppliers, 45 percent of SCSPA "tonnage and about a third of containers are related to South Carolina firms. North Europe and Asia are the SCSPA's top markets, combining for 54 percent of total volume, but more than 150 nations are served directly from SCSPA docks."[20]

Transportation and Access

The Port of Charleston is accessed by railways, motor carriers and airlines.[21] According to the SCSPA, "CSX and Norfolk Southern both operate large, well-equipped rail yards in Charleston served by double-stack intermodal trains. RapidRail dray program provides cost-competitive, efficient and seamless connection between the marine terminals and rail yards. Charleston offers best-in-class high and wide rail clearances for oversize/over-dimensional moves."[22] Motor carrier access includes direct interstate highway access to five major highway arteries. More than 150 trucking firms operate in Charleston.

In addition, the South Carolina Inland Port extends the Port of Charleston's reach by 212 miles. Located between Charlotte and Atlanta, the facility is within 500 miles of 94 million consumers.

Employment

According to a 2008 economic impact study, the SCSPA impacts an estimated 260,800 jobs in South Carolina.[23] The vast majority of the impacts arise from port users who ship goods through the port authority, "with the balance, 24,700 (9 percent) jobs, directly and indirectly attributable to port operations. In terms of jobs, such users employ an estimated 236,100 people (91 percent of total jobs)."[24] The port employs 6,800 people. Indirect and induced multiplier effects add an additional 17,900 jobs.

Current and Future Port Projects

According to the SCSPA, "the South Carolina State Ports Authority is currently building the only permitted new container terminal on the U.S. East and Gulf Coasts."[25] Located on more than 250 acres of the old Charleston Navy Base, this terminal will boost capacity at the Port of Charleston by 50 percent and will focus on container cargo. Construction is currently underway. The new terminal is planned to open by 2019.

Additional new storage facilities were completed in 2013. At Wando Welch Terminal, a 25-acre refrigerated container yard was completed that centralized all temperature-controlled cargo and increased capacity by 10 percent. At Columbus Street Terminal, a 100,000-square-foot warehouse was built. Finally, the previously mentioned South Carolina Inland Port was completed, extending the port's reach by 212 miles and providing 40,000 lifts annually. That number is expected to grow to 100,000 lifts annually when the inland port is at full capacity.

According to the SCSPA, "the inland port, providing overnight double-stack rail service, will improve the efficiency of international freight movements between the Port, the upstate manufacturing region and neighboring states, thus promoting economic development in South Carolina. By utilizing the rail line, importers and exporters can maximize tonnage moved per gallon of fuel, which will provide both environmental benefits and costs savings."[26]

The Charleston Harbor Deepening Project, which is currently undergoing a feasibility study, is being contemplated in direct relation to the expansion of the Panama Canal. While the port can currently receive eight weekly calls from ships too large for the current Panama Canal, it anticipates that growth from the Panama Canal expansion project will call for a deepening of its port. It has secured funds both locally and federally to execute this project. Multiple studies by the U.S. Army Corps of Engineers and others have determined that this is the "best value for scarce public dollars." The SCSPA estimates that the project will be completed by 2019.[27]

Many private investment projects are currently occurring near the port. The SCSPA estimates that more than "20 million square feet of prime Class A industrial distribution centers"[28] will be developed in the "Port of Charleston market in the next few years. Speculative buildings in the 200,000 [to] 1.5 million-square-foot range are scheduled for a number of key developments within an hour's drive of the port facilities, luring large-scale import and export operations to the immediate port area."[29] The total footprint of these projects will be "more than 2,600 acres. Private sector developers are driving this trend. Some of the most prominent companies in the industrial development business are aggressively pursuing and closing projects within a range that will deliver 4+ truck turns per day."[30]

Outlook

While it is already being called on by Post-Panamax ships, the Port of Charleston is further positioning itself to become a larger U.S. port player by building a new terminal that will allow an estimated 50 percent increase in capacity. The recently completed inland port further expands its reach. Port officials have set ambitious goals of doubling the port's volume in seven years.[31]

The port's deep waters and increasingly diversified cargo portfolio create many opportunities. Port officials plan to further deepen harbors and channels to more than 50 feet by 2018. They are also looking to increase the amount and types of manufacturing and agricultural goods the port handles.

Given the economic growth occurring throughout the Southeast, the Port of Charleston will increase in importance as local industry grows. As port officials said, "we are the fastest growing port in the country."[32] With this growth will come some growing pains. Making sure a trained labor force is available to operate port machinery and maintaining the efficiency for which the port has become known will be ongoing challenges. With a political landscape that values the economic contribution that the SCSPA makes to South Carolina's economy, the port must work to scale its growth while keeping itself nationally and internationally competitive.

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"We're on the front end of this no matter what transpires."

– Roger Guenther, executive director, Port of Houston Authority[1]

"The current challenge is to stay one step ahead of the market's need for build-out of our container facilities."

– Ricky Kunz, vice president of trade development and marketing, Port of Houston Authority[1]

Port of Houston

The Port of Houston has been ranked No. 1 in the U.S. for foreign waterborne freight for 17 consecutive years, U.S. imports for 21 consecutive years and U.S. export tonnage for four consecutive years. It has been ranked second in total tonnage for 21 consecutive years.[2] With a track record like this, it is no wonder that Colliers International has named Houston "Most Irreplaceable Port."[3] The port is known as one of the economic engines for the state of Texas, creating more than 1 million port-related jobs throughout the state and generating millions of dollars in state and local tax revenue.[4]

Location, Size and Terminals

Centrally located in the southern U.S., the Port of Houston offers great distribution to both the East and West coasts. Customers and terminal operators enjoy efficient distribution by railroad, multiple highways and air freight. The 25-mile-long port is located just east of downtown Houston. There are only 52 miles of ship channel between the port and the Gulf of Mexico. Due to its location, diversity of terminals and overall size, the port has been able to increase its trade volumes of imports and exports through container, dry bulk and liquid bulk cargo.

Operating Status

The Texas Comptroller Leadership Circle Program was launched in 2009 to encourage high levels of financial transparency of local governments in the state. In both 2012 and 2013, the Port of Houston applied for and was granted Gold Leadership Circle awards, scoring 20 out of 20, underscoring the port's viability. The port's operating financial report shows the substantial amount of income generated by the port.

The port's 2012 operating revenue and cargo tonnage were the highest ever recorded. In 2013, the port set a new record with a $7.23 million increase in operating revenue. This trend is expected to continue since the market forecast for total TEUs, based on previous years of growth, is expected to increase by 2.8 percent. The actual number of TEUs imported and exported in 2013 was 1,950,071, compared with 1,934,845 in 2012. Total tonnage handled increased by 3 percent from 2011 to 2012; general cargo also increased, by 18 percent (excluding containers). Total tonnage for 2012 was 35,825,450.

Cargo

Total tonnage for the port decreased significantly from 2008 to 2009 because of the Great Recession. Since 2009, however, total tonnage has steadily increased. Container traffic does not show the same trend; instead, it has increased steadily since 2006. The upward trend is continuing. In its comparative statistics for January and February 2013 and 2014, the port shows that total exported tonnage is up by 4.6 percent, an increase of 182,484 tons. Import tonnage has decreased slightly, by 1.0 percent or 30,065 tons. At the same time, the total number of TEUs imported and exported has increased by 31.4 percent, the equivalent of 72,539 more TEUs.[5] The port's cargo consists of raw materials such as grain and petroleum products as well as containerized cargo.

Facilities: Cargo Terminals

The Port of Houston is able to handle these volumes of cargo because of its sufficient land space, berth lengths, port depth and intermodal efficiency. The port has six general cargo terminals, as summarized in Figure 3, plus two container terminals, the Barbours Cut Container Terminal and the Bayport Container Terminal. Although the port's current listed depth is 45 feet, this is not consistent throughout the port. The Bulk Material Handling Plant and Public Elevator No. 2 have 40-foot depths at mean low tide, Jacintoport Terminal is 38 feet deep at mean low tide, and the Turning Basin and Woodhouse are 36 feet deep.

Figure 1

Operating Status

Year	Operating Revenue (in thousands of dollars)	Operating Expenses (in thousands of dollars)	Operating Income (in thousands of dollars)
2013 (Estimate)	$237,329	$162,078	$83,057
2012	223,214	156,977	66,237
2011	198,452	149,929	48,523
2010	184,824	146,695	38,129
2009	198,452	151,000	6,000
2008	197,993	186,493	11,500
2007	190,858	172,567	18,291
2006	168,090	139,110	28,980
2005	155,264	128,664	26,600
2004	136,569	121,299	15,270
2003	120,902	114,010	6,892
Average Growth Rate (2003 to 2012)	6.32%	3.25%	25.39%

Source: Port of Houston website; data set compiled by authors

Figure 2

Container Volume

Year	Container Volume	Container Ship Calls	Outbound Tonnage	Total Tonnage
2013 (Estimate)	1,991,455		1,016,217	35,825,450
2012	1,934,845	8,395		35,059,363
2011	1,866,439			33,549,358
2010	1,812,268			31,328,281
2009	1,809,866			28,814,376
2008	1,794,312			35,244,262
2007	1,753,210			
2006	1,581,163			
Average Growth Rate (2006 to 2012)	3%			

Source: Port of Houston website; data set compiled by authors

Figure 3

Facilities: Cargo Terminals

	Channel Depth (in feet)	Quay Length (in linear feet)	Berth Length (in linear feet)	Size (in acres)
Bulk Materials Handling Plant	40		1,310	
Care Terminal	36		1,100	32
Jacintoport Terminal	38	1,836		125
Public Elevator No. 2	40		600	
Turning Basin Terminal	38		806	20
Woodhouse Terminal	39		1,800	10
Barbours Cut Container Terminal	40	2,000		235
Bayport Container Terminal	40	3,300		193

Source: Port of Houston website

Figure 4

General Cargo Terminal Operators

Terminal	Operator
Bulk Materials Handling Plant	Kinder Morgan
Care Terminal	Coastal Cargo of Texas
Jacintoport Terminal	Jacintoport International
Public Elevator No. 2	Louis Dreyfus
Turning Basin Terminal	Port of Houston
Woodhouse	GP Terminals

Source: Port of Houston website; data set compiled by authors

Figure 5

Type and Number of Cranes

Type	Number	Tons/Description
Turning Basin Terminal		
Container Crane	1	40.6 metric tons
Mobile Truck Crane	2	300 tons
Barbours Cut		
Impsa Post-Panamax Gantry Crane	2	N/A
Morris Post-Panamax Gantry Crane	2	N/A
Paceco Gantry Crane	5	N/A
Kone Gantry Crane	22	N/A
Bardella Gantry Crane	8	N/A
Noel Gantry Crane	6	N/A
Bayport Container Terminal		
ZPMC Post-Panamax Gantry Crane	6	N/A
ZPMC Super Post-Panamax Gantry Crane	3	N/A
Kone Gantry Crane	27	N/A

Source: Port of Houston website

Facilities: Cranes

The Port of Houston has 84 cranes available at the Turning Basin Terminal, Barbours Cut and the Bayport Container Terminal. Barbours Cut and Bayport are the only terminals with Post-Panamax ship-to-shore cranes. Barbours Cut has 36 rubber-tired gantry cranes, including 22 Kone brand, eight Bardella brand and six Noel brand, while Bayport has 27 Kone brand rubber-tired cranes. These cranes are used in loading and unloading containers off of and onto trucks and rail cars. They straddle the trailer of the truck or rail car to accomplish this and can be driven throughout the terminal. Ship-to-shore cranes generally are on tracks and only move laterally along the quay. Other cranes are available, but are privately owned and require special arrangements with the owners.

Facilities: Passenger Terminals

The Port of Houston has a 96,000-square-foot state-of-the-art cruise terminal at Bayport. The Bayport Cruise Terminal serves two cruise lines, Princess Cruises and Norwegian Cruise Line. The Norwegian Jewel, a 2,374-passenger ship, began cruising from the port in October 2014, as did the Emerald Princess, which has a passenger capacity of 3,082. The port of Houston competes with the Port of Galveston for cruise business, and recently won a bidding war to attract these two ships.

Vessels Accommodated

The Port of Houston's versatility enables it to accommodate a wide range of ship sizes and styles. The Bulk Materials Handling Plant, which is operated by Kinder Morgan under a long-term lease, handles dry bulk exports and imports. Its vessel loading system has the ability to load 1,800 short tons per hour. Dry bulk carriers up to 750 feet in length are standard at this terminal; longer vessels can be accommodated with approval from the Houston Pilots. The industry names for ships of this length are "Handy Size" (maximum 672 feet long, 10,000–30,000 DWT) and "Aframax" (maximum 803 feet long, 80,000–119,999 DWT).

The Care Terminal handles heavy-lift (odd-shaped) cargo; because of the technical demands of loading and unloading heavy-lift cargo, accommodations vary depending on the specific cargo. Bagged cargo is handled at the Jacintoport Terminal, which uses the "Spiralveyor" handling system. According to the port, this system has the ability to load ships "at a very high rate of speed."

Public Elevator No. 2, located within the Woodhouse Terminal, is noteworthy as an efficient elevator for exporting large amounts of grain. Ships up to 750 feet in length (Handy Size or Aframax) are the maximum listed; longer ships can be accommodated with approval. Vessels can be loaded at an average speed of 70,000 bushels per hour, with a maximum speed of 120,000 bushels per hour.

The Turning Basin is a 37-wharf complex designed to handle break bulk (dry and liquid), containerized, and heavy-lift cargo. Vessels at this terminal vary dramatically. Ro/Ro vessels, ships that handle equipment on wheels that can be rolled on and off the ship, are accommodated at the Woodhouse Terminal.

Foreign Trade Zones

Foreign trade zones are an important part of the Port of Houston. The port has 700 acres dedicated to foreign trade zones. In its 2012 report to Congress, the U.S. Foreign-Trade Zones Board ranked Houston's FTZ No. 84, which the port operates, as No. 2 in the U.S. for merchandise received.[7] Total foreign trade through the port in 2012 was 21.7 million tons. The leading countries for container import trading by tonnage that year included:

- China, 1,190,187 tons.
- Brazil, 919,193 tons.
- India, 875,570 tons.
- Russia, 855,577 tons.
- Germany, 632,971 tons.

The leading container export leaders included:

- Brazil, 893,148 tons.
- Chile, 612,567 tons.
- China, 609,528 tons.
- Belgium, 589,009 tons.
- India, 567,523 tons.

(Tonnage moved does not always translate into the largest trading partner by dollar amount.)

The port contains 14 foreign trade subzones:

- 84E, Gulf Coast Maritime.
- 84F, Valero Refining.
- 84H, Shaffer Inc.
- 84I, Tuboscope Vetco International.
- 84J, Shell Oil Co.
- 84K, Dril-Quip.
- 84L, Tadiran Microwave Networks.
- 84M, Hydril USA Manufacturing LLC.
- 84N, Pasadena Refining System Inc.
- 84O, Exxon Mobil Corp.
- 84P, Houston Refining LP.
- 84Q, Equistar Chemicals.
- 84R, Michelin North America Inc.
- 84T, Toshiba International Corp.

In 2012, the foreign trade zone imported 9.7 million tons of cargo with a total value of $26.2 billion. Export tonnage and value were slightly higher; 12 million tons were forwarded, with a value of $27.3 billion.

Transportation and Access

The Port of Houston is easily accessed by all modes of transportation, including railroads, motor carriers and airlines. According to World Class Logistics Consulting Inc., 14 major freeways and 3,200 freeway lane miles are available to move cargo through Houston. Over 7 million people can be reached within a day's drive time; over 28 million can be reached for next-day delivery. Motor carriers can reach anywhere in the U.S. within three or four days. Four intermodal rail terminals nearby are served by BNSF Railway Co., Union Pacific Railroad and The Kansas City Southern Railway Co.[8]

Employment

A 2012 economic impact study conducted by Martin Associates Inc. concluded that the Port of Houston generated $178.5 billion in economic impact activities that year. It also generated $1.1 billion in direct, indirect and induced taxes ($549.4 million in state taxes and $524.4 million in local tax receipts). The port's employment impact is equally impressive, as shown in Figure 6.[9]

Current and Future Port Projects

In 2012, the Port of Houston spent $200 million on capital investment projects; its budget for 2014 was $325 million. The bulk of the 2014 budget, $283 million, was spent on developing the Bayport and Barbours Cut container terminals, including modernization of Barbours Cut, railroad improvements at Barbours Cut and channel development at both terminals.[10] The port also currently has on order a total of $60 million in Super Post-Panamax gantry cranes.[11]

Figure 6

Employment

	Cargo	Cruise	Total
Direct	19,767	200	19,967
Induced	25,468		
Indirect	13,548		
Related Users	592,501		
Total Jobs	651,284		

Source: "The Local and Regional Economic Impacts of the Port of Houston, 2011"

An additional $26 million will be spent on projects that involve concrete work, wharf rehabilitation and additional improvements to bulk and general cargo terminals in the Turning Basin area. The remaining funds will be spent on small projects such as building maintenance. A variety of improvement projects ranging in cost from $500,000 to $5 million are in the procurement stages. These projects will include items such as Americans with Disabilities Act (ADA) improvements, security cameras, parking lot repairs and oyster mitigation.

Outlook

The Port of Houston has positioned itself as a financially sound port that can handle diverse cargo needs. Because of its 1) waterside features, including berth lengths, port depth, terminal facilities with advanced technology (such as heavy lifting equipment for break bulk shipping and high-speed loading equipment for dry bulk shipping) and port investment in wharfs, cranes, and channel development, as well as 2) landside features, including 14 developed foreign trade subzones, 14 major freeways and four intermodal railroads, the port is ready to accommodate the increase in traffic expected after the expansion of the Panama Canal.

However, with expected increases in the volume of container shipping, implicit challenges exist in the broader Houston Ship Channel. Maritime traffic congestion may occur due to unexpected accidents. Negative impacts on the normal flow of traffic in the 52-mile key waterway that links the port to the open sea could generate huge economic losses. With 11 percent of the nation's refining capacity coming from the Houston Ship Channel, any increase in the number of accidents and closures of the channel could shake the competitiveness of the port.

Endnotes

[1] International Association of Maritime Economists Conference, Plenary Session 1, Panama Canal Expansion Response, Norfolk, July 16, 2014, and author interview with Roger Guenther, executive director of the Port of Houston Authority and Ricky Kunz, vice president of trade development and marketing, July 24, 2014.

[2] Port of Houston website, www.portofhouston.com/about-us/overview, retrieved May 20, 2014.

[3] "North American Port Analysis," K.C. Conway, Colliers International, April 2013, www.colliers.com/-/media/Files/MarketResearch/UnitedStates/MARKETS/2013Q1/Colliers_NA_Port_20131H_FINAL.pdf?campaign=Port-1H2013, retrieved April 14, 2014.

[4] Port of Houston website.

[5] "Port of Houston Comparative Statistics," February 2014, www.portofhouston.com/static/gen/business-development/Origination/1-February_14_PHA_Comparative_Stats.pdf, retrieved April 14, 2014.

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[7] "74th Annual Report of the Foreign-Trade Zones Board to the Congress of the United States," August 2013, http://enforcement.trade.gov/ftzpage/annualreport/ar-2012.pdf, retrieved May 20, 2014.

[8] "Port of Houston Gateway Fact Sheet, Executive Summary," WCL Consulting, www.portofhouston.com/static/gen/business-development/Origination/WCL_POH_Gateway_Fact_Sheet_2012.pdf, retrieved May 20, 2014.

[9] "The Local and Regional Economic Impacts of the Port of Houston, 2011," Martin Associates Inc., May 22, 2012, /www.portofhouston.com/static/gen/about-us/Misc/PHA-EconomicImpact-2012.pdf, retrieved May 20, 2014.

[10] Port of Houston website, http://www.portofhouston.com/business-development/capital-improvement-projects/, retrieved May 20, 2014.

[11] "North American Port Analysis," K.C. Conway, Colliers International, December 2013, www.colliers.com/-/media/Files/MarketResearch/UnitedStates/Colliers_NA_Port_20132H_FINAL?campaign=port-2H, retrieved April 23, 2014.

"We are spreading our eggs over multiple baskets and are optimistic about growth."

– Nancy Rubin, senior director, communications, Jacksonville Port Authority[1]

Port of Jacksonville

The Port of Jacksonville ranks as the No. 1 vehicle export port in the U.S. and the top container port in the state of Florida. In 2013, its three cargo terminals handled a total of 8.2 million tons of cargo, including more than 926,000 TEUs — a new container record — and more than 630,000 vehicles.[2]

Location, Size and Terminals

The Port of Jacksonville is located along the St. Johns River in Jacksonville, Florida, and operated by the Jacksonville Port Authority (Jaxport). It includes three cargo terminals — the Blount Island Marine Terminal, the Dames Point Marine Terminal and the Talleyrand Marine Terminal — and one passenger terminal, the Jaxport Cruise Terminal, which began operating in 2004. The port covers roughly 1,500 acres of land.

Operating Status

The Port of Jacksonville generated just shy of $52 million in operating revenue in 2012, the port's 12th consecutive year of operating revenue growth. The port's operating expenses stayed relatively flat or declined over the past four years, as shown in Figure 1. The number of container ship calls also increased, from 1,765 in 2009 to 2,083 in 2012. This upward trend is due to the constant expansion and development of the port.

Cargo

The Port of Jacksonville's expansion and development also translate into growth in the number of TEUs the port receives, which set a record in 2012 of almost 924,000. (It was estimated to set a new record in 2013 of about 927,000, a number that was expected to reach 950,000 in 2014.) Over the past decade, TEUs and total cargo tonnage grew by 23,000 and 50,000, respectively. In 2013, the port processed 8.2 billion tons of cargo in both TEU and bulk goods.

Facilities: Cargo Terminals

In 2006, Jaxport began planning to increase the depth of the St. Johns River from 38 to 40 feet along all four of the Port of Jacksonville's terminals. That effort began in 2009 and is now complete. During the past few years, Jaxport has been attempting to determine a new optimal depth for the river, one that will be deep enough to enable the port to accept larger, Post-Panamax vessels but that will not compromise budgets. The Port Authority currently believes that this optimal depth is 47 feet, a depth that would continue to be sufficient through 2035.

Blount Island Marine Terminal is the largest of the port's four terminals, with over 6,600 linear feet of berth space. Talleyrand Marine Terminal has 4,780 linear feet of berth space while Dames Point Marine Terminal consists of two berths, each of which is 1,200 linear feet.

Figure 1

Operating Status

Year	Operating Revenue (in thousands of dollars)	Operating Expenses (in thousands of dollars)	Operating Income (in thousands of dollars)	Container Volume (in TEUs)	Container Ship Calls
2013 (Estimate)	$53,100	$52,000	$1,100	927,000	N/A
2012	51,825	54,069	-2,244	923,660	2,083
2011	50,871	55,116	-4,245	900,433	2,030
2010	50,636	56,438	-5,802	826,580	1,947
2009	47,344	54,804	-7,460	755,000	1,765
2008	42,363	47,099	-4,736	697,999	1,827
2007	39,905	40,927	-1,568	710,073	N/A
2006	38,492	43,839	-5,347	768,239	N/A
2005	34,098	39,600	-5,502	777,318	N/A
2004	31,014	37,981	-6,967	727,660	N/A
2003	30,293	32,207	-1,914	692,422	N/A
Average Growth Rate (2003 to 2013)	4.29%	3.8%	N/A	2.5%	N/A

Source: "Jaxport/Jacksonville Port Authority Annual Report, 2003 to 2013"; data set compiled by authors

Figure 2

Cargo Terminals

Terminal	Type	Channel Depth	Planned Depth	Berth Length (in linear feet)	Size (in acres)
Blount Island	Cargo	40	47	6,600	754
Talleyrand	Cargo	40	47	4,780	173
Dames Point	Cargo	40	47	Two, 1,200 each	585

Source: Jacksonville Port Authority website

Blount Island handles 80 percent of all cargo at the port. It is situated on 754 acres on the western part of the island and is nine nautical miles from the Atlantic Ocean. The cargo it handles each day includes container, roll-on/roll-off (Ro/Ro), break bulk and general cargo. It operates one 112-ton whirly crane and eight container cranes. The terminal includes 240,000 square feet of transit shed space (where cargo waits to be transported) and a 90,000-square-foot container station.

Talleyrand sits on 173 acres and is located about 21 nautical miles from the Atlantic Ocean. It handles container, break bulk, liquid bulk, automobiles and some other general cargo. It operates two 50-LT (long traveling) capacity rubber-tired gantry cranes on 4,800 linear feet of total track as well as four container cranes. Talleyrand Director Doug Menefee works directly with Talleyrand Terminal Railroad Inc., which allows the on-dock rail system to directly switch to Norfolk Southern Corp. and CSX Transportation rail lines. Talleyrand also provides 160,000 square feet of warehouse space, which can accommodate 2.2 million cubic feet of cold storage space, and a 553,000-square-foot transit shed for all other cargo.

Figure 3

Lines Served

Blount Island	Talleyrand	Dames Point
832nd Transportation Battalion	Crowley Liner Services	Martin Marietta Aggregates
AMPORTS	Global Stevedoring Inc.	Rinker Materials – CEMEX
APM Terminals	Hamburg Süd North America	TraPac/MOL
APS East Coast Inc.	ICS Logistics	
Ceres Marine Terminal	JAXPORT Refrigerated Services	
Coastal Maritime Stevedoring LLC	Laser International/Pioneer	
Hoegh Auto Liners	Mediterranean Shipping Co. (MSC)	
International Transport Logistics Inc.	Southeast Toyota Distributors	
Ports America	SSA/Cooper LLC	
Sea Star Line LLC	Talleyrand Terminal Rail Road	
Terminal Investment Corp. (TICO)	Westway Trading Inc.	
Trailer Bridge Inc.		
Wallenius-Wilhelmson		
WWL Vehicle Services		

Source: Jacksonville Port Authority website

Figure 4

Cranes

Terminal	Type of Cranes
Blount Island	Eight container cranes (two 40–ton, one 45–ton and five 50–ton cranes) One 112–ton gantry whirly crane
Talleyrand	Four container cranes (one 40–ton, two 45–ton and one 50–ton crane) Two 50–ton rubber-tired gantry cranes One 100–ton multipurpose whirly crane One 40–ton container stacker
Dames Point	Six container cranes (four 40–ton and two 50–ton cranes) Six 40–ton rubber-tired gantry cranes

Source: Jacksonville Port Authority website

The port's third and newest cargo terminal, Dames Point, operates on a total of 585 acres. The TraPac-owned terminal occupies 158 acres and was built in 2009. It is located 10 nautical miles from the Atlantic Ocean and serves container, bulk and cruise cargo. Dames Point processes the least amount of cargo of any terminal at the port. It focuses mostly on goods traveling to and from Asian ports, specifically cargo to and from Tokyo-based ports. The equipment used to accommodate this cargo consists of six container cranes and six rubber-tired gantry cranes.

Facilities: Cranes

The Port of Jacksonville's cargo terminals feature 18 container cranes as well as eight rubber-tired gantry cranes.

Facilities: Passenger Terminals

The Jaxport Cruise Terminal opened in 2004; 85,000 passengers embarked from the terminal that year. Since then, it has grown by an average of about 10,000 passengers per year. In 2008, however, the cruise terminal hit an all-time low, accommodating just 76,000 passengers, as a result of preparations for the 2,056-passenger Carnival Fascination, which was a large success when the port reopened the following year. In 2012, a record number of passengers, 195,397, embarked from the port, a 3 percent increase from 2011. The terminal is 63,000 square feet; the cruise berth is 1,289 feet long and 40 feet deep. The cruise terminal has created many jobs and strengthened the port's economic impact.

Figure 5

Current and Planned Improvements

Project	Completion Date (Estimated)	Estimated Investment (in millions of dollars)	Description
Dames Point Intermodal Container Transfer Facility	2014	$ 30.0	Planned to open in December 2014.
			More efficient way to transfer containers between vessels and trains.
			Will reduce trucking traffic.
Mile Point Improvement	2015	$ 36.5	Improve flow in St. Johns River at Mile Point.
			Restoration of Great Marsh Island.
			Pre-construction, design and engineering are underway.
Blount Island Repair Project	2016	$ 30.0	Revive berths 30-35.
			Estimated to take over three years to finish.
			Will replace all worn equipment and rails, supporting infrastructure and work platforms.
Talleyrand Marine Terminal Wharf Rehab Project	2017	$ 9.0	Phase I is in the works and Phase II is in planning.
			Replacing old sheet pile wall with new and extending the docks' life with work underneath.
Harbor Deepening Project (planning stages)	2019	$684.0	Plan to deepen harbor from 40 to 47 feet.
			Will accommodate much larger ships and increase revenues.
Hanjin Container Terminal	2020	$300.0	Construction of a new 90-acre state-of-the-art container terminal.

Source: Jacksonville Port Authority website

Foreign Trade Zone

The Port of Jacksonville lies within Foreign Trade Zone No. 64, which was ranked third-best in the world in 2010, according to fDi magazine. The zone was ranked according to its economic potential, number of facilities and space, cost effectiveness and efficiency, transportation incentives and overall foreign direct investment strategy.[3] The port is a non-operating foreign trade zone grantee and therefore does not report total value for zone users.

Transportation and Access

Over 60 million customers are located within a 24-hour drive of all three Port of Jacksonville cargo terminals. The port works with over 100 trucking firms. With the terminals just minutes away from Interstate 95, I-10 and I-75, trucks can take full advantage of the interstate highway system. Truck times at each terminal average 23 minutes for two moves. Each day, more than 36 trains use the Jacksonville-based CSX Transportation rail system, the Norfolk Southern Corp. system and the Florida East Coast Railway. CSX provides access to 22,000 miles of railway that reach north into 23 states and Canada. Norfolk Southern has just shy of an additional 21,000 miles of railway, which also connects to the District of Columbia. Together, these railroads provide access to a total of 43,000 miles of railway in the U.S. and Canada.

Employment

The Port of Jacksonville currently supports nearly 65,000 jobs that are directly and indirectly related to port activity, with an annual economic impact of $19 billion. About 23,000 of the jobs are port-dependent positions, jobs that directly rely on the port. Another 43,000 positions are related to cargo activity at the port; these jobs are found within the region's retail, manufacturing, wholesale and distribution industries.[4]

Current and Future Port Projects

Continuous improvements are an important element of port operations. The U.S. Army Corps of Engineers is in the process of conducting a comprehensive, year-long economic, engineering and environmental study of expanding the depth of the Port of Jacksonville harbor from 40 to 47 feet. Many of the projects described in Figure 5 involve keeping the port safe and appealing to shipping companies. Others, including the harbor deepening project, the development of the new Hanjin Container Terminal and the construction of the new Dames Point Intermodal Container Transfer Facility, will help the port remain competitive by enabling it to accommodate more and larger ships and by increasing the efficiency of container transfer operations.

Outlook

The projects presented in Figure 5 are planned to begin in the near future or have already started. These projects are the major reason the Port of Jacksonville will be ready to accommodate Post-Panamax ships in the near future. With access to three rail lines and a variety of rail yards and intermodal terminals in close proximity, the port will have a competitive advantage over most other East Coast ports regarding access to southeastern markets. The long-term prospects for this port to develop further are quite good.

Endnotes

[1] Author interview with Nancy Rubin, senior director, communications, Jacksonville Port Authority, July 11, 2014.

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[3] "Jacksonville Foreign Trade Zone Ranked Third in the World." Mark Szakonyi, Jacksonville Business Journal, June 28, 2010, www.bizjournals.com/jacksonville/stories/2010/06/28/daily4.html, retrieved May 20, 2014.

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"It's a game changer, but I also think that not every port inside the U.S. needs to go to 50 feet."

– Bill Johnson, CEO and port director, Port of Miami[1]

Port of Miami

Located in southeast Florida, the Port of Miami (also known as PortMiami) resides on Dodge Island, a 520-acre island in central Biscayne Bay just east of the city of Miami. The port is adjoined with two other nearby islands, Lummus and Sam's. It has a channel depth of 42 feet, which is currently being dredged to about 50 to 52 feet, with a completion date scheduled for mid-2015.[2]

Location, Size and Terminals

The Port of Miami features 128 cargo berths (berths 60–188; see Figure 3) and three major terminal operators, Seaboard Marine, South Florida Container Terminal and Port of Miami Terminal Operating Company.[3] The port also has seven cruise terminals, which take up 64 berths. According to Cruise Market Watch, Miami was the busiest cruise port in the world in 2013.[4]

Operating Status

Performance for the years 2009–2012 has been moderate. Operating revenue for 2012 decreased by $5.6 million from 2011. The decline can be attributed to a decrease in revenues from cruise-related activity, cargo activity, crane user fees, parking, rentals and ground transportation.[5] According to the Port of Miami's financial report for 2012, "the economic upturn contributed to an increase of approximately 0.2 percent, when measured in TEUs. This increase, as well as tariff adjustments, caused the port's cargo related revenue to increase by 11 percent from fiscal year 2011."[6] Tourism has almost made a full recovery, compared to the number of tourists traveling to the city of Miami before the recession.[7] This part of the market is essential to the port because of its positioning in the cruise industry. However, the increase in tourism did not translate to more cruise passengers in 2012, when the port saw slightly fewer cruise passengers than it did in 2011.

By streamlining processes and moving cargo more efficiently, the port has reduced operating expenses year after year since 2009. This, coupled with the completion of major projects, specifically the tunnel project in mid–2014 and the rail restoration project, will enable the port to continue moving more cargo efficiently. This, in turn, will allow the port's operating revenue to increase while at the same time lowering operating expenses. However, the forecast is still moderate until the deep dredge project is complete. At that time, larger ships carrying more cargo will be able to call on the port, which will increase throughput.

Cargo

According to the Port of Miami's website, over half of its cargo business is derived from trade with Latin America and the Caribbean.[8] Principal inbound and outbound cargo for the port include fruits and vegetables, apparel and textiles, non-refrigerated food products, paper, electronic equipment, stone, clay, cement tiles, construction/industrial equipment, trucks, buses and automobiles. Accordingly, the main operations of the port include roll-on/roll-off (Ro/Ro), container, break bulk (odd-shaped) cargo and vehicle exports.

Figure 1

Operating Status

Year	Operating Revenue (in thousands of dollars)	Operating Expenses (in thousands of dollars)	Operating Income (in thousands of dollars)
2013 (Estimate)*	$105,878	$59,027	$48,118
2012	103,577	59,550	44,027
2011	109,146	65,836	43,310
2010	104,084	66,335	37,749
2009	100,057	68,998	31,058
2008	94,697	61,578	33,118
2007	84,568	64,020	20,547
2006	82,114	77,342	4,772
2005	80,360	53,180	27,180
2004	78,624	49,011	29,613
2003	83,153	65,044	18,108
Average Growth Rate (2003 to 2012)	2.22%	-0.88%	9.29%

*Estimates are based on authors' calculations, using the average growth rate.
Source: Port of Miami website; dataset compiled by authors

The port operates a state-of-the-art fumigation system able to quarantine 70 containers daily. This is an important procedure for the port, because a large portion of its imported cargo is perishable goods. However, the port is not limited to the short voyage from South America for its fruits and vegetables. Longer voyages carrying this cargo use refrigerated containers. The port can accommodate up to 1,000 refrigerated containers at a time.

Facilities: Cargo Terminals

The Port of Miami has a unique terminal layout because of its location on Dodge Island. Berths and terminals are contiguous along the edge of the island. For this reason, berth number ranges are stated rather than individual terminal names. Berths 00 to 59 and 189 to 194 are cruise terminals; berths 60 to 71 and 83 to 188 handle Ro/Ro cargo; berths 99 to 182 are cargo terminals, including container terminals; and berths 195 to 219 handle miscellaneous cargo.

Figure 2

Cargo Summary

Year	Container Volume (in thousands of TEUs)	Outbound Tonnage (in thousands of tons)	Inbound Tonnage (in thousands of tons)	Total Tonnage (in thousands of tons)
2014 (Estimate)*	892	4,089	3,819	7,908
2013	901	4,000	3,961	7,980
2012	909	4,222	3,886	8,108
2011	907	4,376	3,846	8,282
2010	847	3,865	3,524	7,389
2009	807	3,500	3,331	6,831
2008	828	3,655	3,775	7,430
2007	885	3,462	4,373	7,835
2006	977	3,352	5,302	8,654
Average Growth Rate (2006 to 2013)	-1.01%	2.23%	-3.58%	-1.01%

*Estimates are based on authors' calculation, using the average growth rate.
Source: Port of Miami website; dataset compiled by authors

Figure 3

Facilities: Terminals

Terminal	Existing Channel Depth (in feet)	Existing Berth Length (in linear feet)
Berths 00–59	36	7,126
Berths 60–62	35	299
Berths 63–68	35	699
Berths 69–71	35	285
Berths 72–98	35	3,345
Berths 99–140	42	4,951
Berths 141–149	42	1,150
Berths 150–182	28	3,919
Berths 183–188	30	651
Berths 189–194	30	850
Berths 195–208	30	1,443
Berths 209–212	N/A	310
Berths 214–219	28	739

Source: Port of Miami website; dataset compiled by authors

Currently the port is working to have the main channels dredged to about 50 to 52 feet. Cargo and container terminals are perfectly situated at the furthest southeast side of Dodge Island. This allows the larger ships with the deepest drafts to load and unload cargo without having to traverse the narrower and more shallow segments of the port. There are still 5,101 feet of available berth space that can be used for development between bays 69 and 98.

Facilities: Cranes

In August 1999, the Port of Miami established Port of Miami Crane Management Inc. (PMCM), a nonprofit corporation, to handle the maintenance of port cranes. The port owns 13 ship-to-shore container handling gantry (quay) cranes. PMCM owns some of the largest cranes in the world. According to PMCM, "these Super Post-Panamax cranes [11-12 in Figure 5] that were delivered in January 2005 are among the largest quay cranes in operation in the world as they were designed to work a 22 container wide vessel at Port of Miami cargo terminal;" and "they were designed to have the capacity to work on any container vessel existing and on the engineers' drawing boards."[9] The port has made a significant financial commitment to being prepared for the expansion of the Panama Canal through its purchase and installation of these Super Post-Panamax cranes. All necessary cranes have been ordered and installation is complete.

Figure 4

Cargo Lines Served

American President Lines Ltd. (APL)	Mitsui Osaka Shosen Kaisha Lines (MOL)
China Shipping Container Lines	Nipon Yusen Kabushiki Kaisha (NYK Line)
CMA CGM Group	Orient Overseas Container Line (OOCL)
Compania Sud Americana de Vapores CCSAV	Seaboard Marine
Ecuadorian Line	United Arab Shipping Company (UASC)
EvergreenMarine	US Lines
Hanjin Shipping	Wilhelmsen
Hapag-Lloyd America	Yang Ming
Hyundai Merchant Marine	Zim Integrated Shipping Services
Maersk Line	

Source: Port of Miami website

Figure 5

Type and Number of Cranes

Type	Number	Tons/Description
Cranes 4–6		
Kocks 50LT	3	70 tons max under cargo beam; ABB DCS600 retrofitted drives with AC410 Advant Controller with CMS 7
Cranes 7–10		
ZPMC 50LT Cranes	4	50 long tons; all have been converted from diesel-generated power to electrical power that works on 13.2 KV from underground electrical pits
Cranes 11–12		
ZPMC 65LT	2	75 long tons max under cargo beam; Super Post-Panamax cranes; ABB DCS600 Multidrive System, AC410 Advant Controller with CMS 7; Flender gearboxes, Bubenzer brakes, ZPMC 20/40/45/2-20 65LT Twin-Lift Spreaders and run on 13.2 KVAC shore power
Cranes 13–16		
ZPMC 65LT	4	100 long tons max under cargo beam; Super Post-Panamax crane; ABB ACS800 Multidrive System, AC800M Controller with CMS 7; ZPMC gearboxes, Bubenzer brakes, ZPMC 20/40/45/2-20 65LT Twin-Lift Separating Spreaders and run on 13.2 KVAC shore power

Sources: Port of Miami website; dataset compiled by authors

Facilities: Passenger Terminals

Known as the "Cruise Capital of the World," the port moves millions of passengers each year and relies heavily on these passengers to return year after year. Currently, 30 cruise ships and 13 different cruise lines operate from the port, headed to the Bahamas, the Caribbean and Mexico. According to the port website, 2013 was the busiest year for cruise traffic in the port's history, with 4,030,356 multiday passengers and 48,173 single-day passengers.[10] Coupled with the increase in cruise passengers is an increase in the number of cruise lines sailing out of Miami. According to the port director, "the 2013 cruise season was one of Port of Miami's best with the addition of two new cruise brands — Regent Seven Seas Cruises and Disney Cruise Line — and the arrival of three new build ships [new ships] including the Carnival Breeze, Celebrity Reflection and the Oceania Riviera."[11]

Passenger traffic is forecasted to increase to just shy of 5 million for 2014.[12] Another promising sign for 2014 is the arrival of MSC Cruises' MSC Divina and Norwegian Cruise Line's newest ship, Norwegian Getaway. Cruise lines served are AIDA Cruises, Azamara Cruises, Carnival Cruise Lines, Celebrity Cruises, Costa Cruises, Crystal Cruises, Disney Cruise Line, MSC Cruises (USA), Norwegian Cruise Line, Oceania Cruises, Regent Seven Seas Cruises, Resorts World Bimini and Royal Caribbean International.

Foreign Trade Zone

The Port of Miami's Foreign Trade Zone No. 281 is considered a "General Purpose Trade Zone" established under the Alternative Site Framework (ASF). According to Miller & Company P.C., "one of the benefits of the ASF is that companies may be added in just thirty (30) days. This ASF option does not require a Grantee to locate other zone status property to remove or transfer to the proposed new site as with a traditional boundary modification."[13] This makes FTZ No. 281 more competitive. Existing customers and new customers can obtain a FTZ site in a relatively short amount of time compared to other sites without ASF status. The FTZ offers all forms of transportation necessary for multimodal distribution; located within it are Miami International Airport, Opa-locka Airport, railroad service and major highway access.[14]

Transportation and Access

The Port of Miami is significantly improving its ability to more efficiently move cargo in and out of the port by building a tunnel that will connect the port to Interstate 395 via Watson Island. Currently, according to the PortMiami Tunnel Project, "nearly 16,000 vehicles travel to and from the Port of Miami through downtown streets each weekday. Truck traffic makes up 28 percent (or 4,480) of this number."[15] Improvements to the existing railroad tracks (the Intermodal/Freight Rail Restoration Project) will, according to the port, "…re-connect the port with the national rail systems (CSX and Norfolk Southern) and expedite the movement of goods throughout Florida and into the continental U.S. New rail service to Port of Miami, with expanded connections throughout North America, augment the port's efforts to become a major global logistics hub allowing containerized cargo to reach 70 percent of the American population in 1–4 days."[16]

Employment

The Port of Miami supports 207,000 jobs, both directly and indirectly. This number is expected to increase by 33,000 new jobs due to projected increases in cargo throughput. The port's economic impact includes $27 billion in annual tax revenue to local and state governments. This is projected to increase to $34 billion annually with the increase in cargo throughput.[17]

Figure 6

Cruise Ship Terminals Passengers Served

Year	Number of Passengers (in thousands)
2013	4,078
2012	3,774
2011	4,018
2010	4,145
Average Growth Rate (2011 to 2012)	-12.1%
Average Growth Rate (2010 to 2011)	-3.1%

Sources: Port of Miami website; dataset compiled by authors

Current and Future Port Projects

The Port of Miami has been very aggressively preparing for the expanded Panama Canal. With the tunnel project complete, dredging is the only project left to be completed. The tunnel project was a decade in the making and will greatly reduce the amount of traffic created at the port. This, coupled with the rail restorations, will allow the port to efficiently move larger amounts of cargo faster. Deep channels are required for the larger Post-Panamax ships; the port has already started dredging in preparation.

Figure 7

Improvement Projects

Project	Completion Date (Estimated)	Estimated Investment (in millions of dollars)	Description
Tunnel Project	Completed	$915.0	The new port tunnel will improve access to and from the Port of Miami, serving as a dedicated road directly linking port facilities with the National Highway System. In addition to providing quicker access for port-bound trucks and automobiles, the port tunnel is designed to reduce traffic congestion on downtown Miami streets.
Deep Dredge	Mid-2015	$150.0	The port's deep dredge project will deepen the port's existing channel from its current 42–ft. depth to +/- 50–52 ft. in preparation for Post-Panamax ships.
Intermodal/ Freight Rail Restoration		$ 49.3	Previously decommissioned tracks will be restored to link the port and the Hialeah Rail Yard, providing direct cargo access to the national rail system. The on-dock intermodal rail service will provide shippers the convenience of port-to-door service.
New Super Post-Panamax Cranes	Summer 2013	$ 42.0	Four Super Post-Panamax cranes with the capacity to handle the new generation of large container cargo vessels have been installed.
Bulkhead Strengthening	Winter 2013	$ 65.0	Bulkheads and seawall along Wharves I–VII have been improved through a comprehensive strengthening program. This program included a variety of improvements to each wharf, including new bollards, fenders and water stations. Wharves originally designed for channel water depths ranging from 42–46 ft. have been deepened for improved wharf access, allowing improved cargo movement and stacking efficiencies needed for projected increases in containerized trade.

Source: Port of Miami website; dataset compiled by authors

Outlook

Similar improvements are being made at Port Everglades and the Port of Miami. The intermodal rail restoration and roadway tunnel projects link port facilities with Florida's interstate highways and other major arteries. Those landside improvements facilitate the growth of the maritime supply chain and reduce possible traffic congestion. The Port of Miami's unique terminal layout, which allows the larger ships with the deepest drafts to load and unload cargo without having to traverse the more narrow and shallow parts of the port, gives it a competitive advantage. Given the stable growth of the cruise business and cargo transport, the port is expected to remain a major economic force in the area.

However, it is critical to ensure that landside improvements, such as intermodal system, and waterside improvements, like dredging and deepening the Main Ship Channel, will deliver on time to accommodate Super Post-Panamax ships. Any delay in delivering the planned improvements or lack of budget to maintain the progress of the current investment will threaten the competitiveness of the port.

Endnotes

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"The biggest challenge faced by the port is reaching maximum efficiency in port operations by the time the larger container vessels arrive."

– Richard Larrabee, director of port commerce, Port Authority of New York and New Jersey[1]

Port of New York and New Jersey

Formed in April 1921, the Port Authority of New York and New Jersey became "the first bi-state agency ever created under a clause of the constitution permitting compacts between states with congressional consent."[2] The Port Authority manages and owns bridges, roads, airports, tunnels, commuter rail lines, the World Trade Center and port terminals. It differs greatly from other port authorities, whose primary responsibility is marine cargo and port activities. An approximate 25-mile radius from the Statue of Liberty, known as the "Port District," represents the geographic area in which the agency typically functions. A self-supporting entity, the Port Authority does not receive tax revenue. Instead, its revenue is derived from fees charged for bridge tolls, user fees at airports and bus terminals, rail transit system fares, rent, consumer services and retail stores.[3]

Location, Size and Terminals

Located on the Northeast coast of the U.S., the Port of New York and New Jersey is a perfect shipping origin/destination for imports and exports to and from Europe and Canada. The port has 10 terminals. Six terminals handle container cargo, three are reserved for cruise ships and one handles bulk and break bulk cargo.

Operating Status

Director of Port Commence Richard Larabee provided an update regarding the expected growth in TEUs after the Panama Canal expansion: "The average volume growth for the Port of New York and New Jersey has been approximately 4 percent since 2000. The port should see the same average growth after the canal's opening, with the cargo being transported on fewer but larger vessels. The biggest challenge faced by the port is reaching maximum efficiency in port operations by the time the larger container vessels arrive. Port stakeholders and the Port Authority have begun to address this issue with the creation of the Port Performance Task Force. The task force issued a report on June 24, 2014, with recommendations to improve all aspects of port productivity. The next step is implementation of those recommendations."[4]

Cargo

Total TEUs have increased year after year following the end of the Great Recession, with the exception of 2013. Hurricane Sandy made landfall in October 2012, causing significant infrastructure damage across New York and, especially, New Jersey. It is surprising that the total number of TEUs in 2013 was not affected more adversely, considering the amount of damage caused by the storm.

Figure 1

Operating Status

Year	Operating Revenue (in thousands of dollars)	Operating Expenses (in thousands of dollars)	Operating Income (in thousands of dollars)
2014 (Forecast)*	$243,778	$174,476	$69,302
2013	262,526	176,459	86,067
2012	249,609	190,043	59,566
2011	236,461	185,053	51,408
2010	223,095	163,424	59,671
2009	205,861	127,240	78,621
2008	201,269	143,523	57,746
2007	236,002	112,607	123,395
2006	170,617	109,371	61,246
Average Growth Rate (2006 to 2013)**	5.53%	6.16%	4.34%

*Updated by the Port Commerce Department

**Based on authors' calculation

Source: Port of New York and New Jersey website (2006 to 2013); data set compiled by authors

Facilities: Cargo Terminals

The Port of New York and New Jersey can handle almost any type of cargo at one of its six terminals. Primary cargo at the New York Container Terminal consists of containers, general cargo and break bulk cargo. The APM, Maher and Port Newark terminals load and unload containers only. The Global Marine Terminal handles containers, roll-on/roll-off (Ro/Ro) and heavy lift cargo. Equally versatile is the Red Hook Terminal, which primarily handles containers, Ro/Ro and break bulk cargo. One of the biggest advantages the port has is the existing depth of up to 50 feet at three of its terminals.

Figure 2

Cargo Summary

Year	Container Volume (in thousands of TEUs)	Outbound Tonnage (in thousands of tons)	Inbound Tonnage (in thousands of tons)	Total Tonnage (in thousands of tons)
2013	5,467	19,446	52,009	71,454
2012	5,530	23,194	57,608	80,802
2011	5,504	24,455	61,897	86,352
2010	5,292	20,333	61,058	81,391
2009	4,562	19,277	58,626	77,903
2008	5,265	21,520	67,387	88,906
2007	5,299	18,070	69,161	87,231
2006	5,142	14,868	71,294	86,163
Average Growth Rate (2006 to 2012)	1.04% 1.20%*	6.56% 4.95%*	-3.00% -4.24%*	-0.91% -2.38%*

* Updated by the Port Commerce Department via author interview

Source: Port of New York and New Jersey website; data set compiled by authors

Facilities: Cranes

Unlike many other ports, every terminal at the Port of New York and New Jersey has the capacity to handle containerized freight. The port has 32 Post-Panamax cranes spread across its six terminals. The APM and Maher container terminals have Super Post-Panamax cranes already installed; these cranes have the ability to serve the largest vessels afloat, with a reach of 22 containers across. According to Richard Larrabee, "each container terminal within the port will have different capacities regarding maximum vessel size; however, the majority of the port's terminals should be able to handle, at a minimum, 12,000 TEU vessels."[5]

Facilities: Passenger Terminals

There are three major passenger ship cruise terminals in the Port of New York and New Jersey district. The Manhattan Cruise Terminal (MCT) is owned by the city of New York and operated by Ports America. MCT provides three deep-water and two shallower 1,000-foot-long berths suitable for servicing the world's largest cruise vessels on the Hudson River, only a few blocks west of Times Square in the heart of Manhattan. The terminal occupies the west side of 12th Avenue between 46th and 54th streets on Piers 88 and 90. A $200 million renovation of Piers 88 and 90 was recently completed.

Figure 3

Facilities: Cargo Terminals

Terminal	Existing Channel Depth at Mean Low Water (in feet)	Existing Ship Berth (in linear feet)
New York Container Terminal	37–45	3,012
APM Terminal	45–50	6,000
Maher Terminal	45–50	10,128
Port Newark Container Terminal	40–50	4,800
Global Marine Terminal	47	1,800
Red Hook Container Terminal	42	2,080 container/ 3,140 break bulk

Source: Port of New York and New Jersey website, author interview

The Brooklyn Cruise Terminal (BCT) is located in the borough's Red Hook section. The 182,000-square-foot, full-service cruise terminal represents a $52 million investment in the city's booming cruise sector. Metro Cruise Services LLC (Metro) entered into a four-year agreement with the New York City Economic Development Corp. (NYCEDC) in 2013 to be the sole and exclusive operator of the BCT.[6]

The Cape Liberty Cruise Port, situated in Bayonne, New Jersey, on the former Military Ocean Terminal at Bayonne (MOTBY), is operated and managed by the Cape Liberty Cruise Port LLC. Royal Caribbean International is investing $50 million into the property to build a new terminal and two parking facilities in coordination with its debut of the new Quantum of the Seas cruise ship.[7]

Figure 4

Type and Number of Cranes

Type	Number	Tons/Description
New York Container Terminal		
IHI	3	40 long tons; height, 75 ft.; outreach, 115 ft.
Paceco	2	45 long tons; height, 120 ft.; outreach, 135 ft.
Liebherr Post-Panamax	4	50 long tons; height, 120 ft.; outreach, 164 ft.
APM Terminal		
ZPMC Super Post-Panamax	4	50 long tons; height, 131 ft.; outreach, 206 ft.
ZPMC Post- Panamax	6	50 long tons; height, 120 ft.; outreach, 140 ft.
Paceco-Mitsui Post-Panamax	2	50 long tons; height, 120 ft.; outreach, 140 ft.
Paceo	3	50 long tons; height, 85+ ft.; outreach, 110 ft.
Maher Terminal		
Fantuzzi Super Post-Panamax	5	65 long tons; height, 120 ft.; outreach, 200 ft.
ZPMC Super Post-Panamax	4	65 long tons; height, 120 ft.; outreach, 200 ft.
Liebherr Super Post-Panamax	2	65 long tons; height, 120 ft.; outreach, 200 ft.
Paceco Post-Panamax	6	50 long tons; height, 100 ft.; outreach, 135 ft.
Paceco Panamax	1	40 long tons; height, 100 ft.; outreach, 115 ft.
Port Newark Container Terminal		
Paceco	3	46 tons; height, 169 ft.; outreach, 118 ft.
ZPMC Post-Panamax	2	50 long tons with spreader, 60 long tons without; height, 219 ft.; outreach, 167 ft.
Fantuzzi Post-Panamax	4	50 long tons with spreader, 60 long tons without; height, 219 ft.; outreach, 167 ft.
Global Marine Terminal		
ZPMC Post-Panamax	2	65 long tons; height, 131 ft.; outreach, 185 ft.
ZPMC Post-Panamax	4	50 long tons; height, 110 ft.; outreach, 180 ft.
Red Hook Container Terminal		
Liebherr Post-Panamax	2	60 long tons; height, 100 ft.; outreach, 150 ft.
Star	1	50 long tons; height, 82 ft.; outreach, 133 ft.
Kone	1	60 long tons; height, 89 ft.; outreach, 133 ft.
Paceco	2	40 long tons; height, 80 ft.; outreach, 120 ft.
Liebherr (Port Newark Terminal)	2	Mobile Harbor Stick Cranes

Source: Port of New York and New Jersey website and author interview

Foreign Trade Zone

The Port Authority of New York and New Jersey is the grantee of Foreign Trade Zone No. 49. The FTZ's general purpose zone comprises a total of 4,536 acres, with 2,502 acres located within Port Newark, the Elizabeth-Port Authority Marine Terminal and the Port Jersey-Port Authority Marine Terminal, and 2,034 acres of privately owned and operated industrial parks located in Elizabeth, Kearny, Carteret, Perth Amboy, Port Reading, Edison, North Bergen, South Brunswick and Woodbridge, New Jersey.

According to the Port Authority, "in addition to the general purpose zone sites, FTZ No. 49 sponsors nine subzones in New Jersey that include Bristol-Myers Squibb Co. in New Brunswick; AZ Electronic Materials USA Corp. in Somerville and Somerset; Phillips 66 in Linden; Firmenich in Newark and Plainsboro; Merck & Co. in Rahway; Movado Group Inc. in Moonachie; Swatch Group in Secaucus; In Mocean Group LLC in North Brunswick; and LVMH Möet Hennessy-Louis Vuitton in Springfield."[8]

The total value of merchandise received and forwarded through FTZ No. 49's general purpose and subzone sites in 2012 was $30.3 billion. Everything from auto parts to orange juice moves through this FTZ.

Transportation and Access

The Port Authority of New York and New Jersey owns, operates or manages most of the infrastructure needed to move goods from cargo terminals to end users. Railroad service to terminals includes, according to the Port Authority, the "ExpressRail System, a comprehensive $600 million rail program at the Port of New York and New Jersey. The program has created dedicated rail facilities — and additional support track and rail yards — for each of the port's major container terminals."[9] These terminals include Elizabeth, Newark and Staten Island. Moving goods by roadway enables 100 million consumers to be reached within a day from the port.

In addition, three international airports and one airport specializing in short to medium domestic routes are located nearby and owned and operated by the Port Authority. John F. Kennedy International Airport is the busiest in the region, while Newark Liberty International Airport serves as a logistics center for overnight packages. Stewart International Airport, the newest of these airports, handles some of the largest aircraft in service, while La Guardia Airport is the region's short to medium route airport.

Figure 5

Employment (2012)

	Cargo	Cruise	Total
Direct	161,601	3,752	165,353
Related Use	129,112	1,599	130,711
Total	290,713	5,351	296,064

Source: Updated by the Port Commerce Department through author interview

Employment

Figure 5 shows the total number of jobs for the port/maritime industry, not for the Port Authority, including direct, indirect and induced jobs, according to the "Economic Impact Study of the New York-New Jersey Port Industry, 2012" conducted by A. Strauss-Wieder Inc. The study also states that 251,730 jobs were created in New Jersey, 45,730 in the state of New York and 34,830 in New York City, creating $7.2 billion in tax revenues.[10]

Current and Future Port Projects

Director of Port Commence Richard Larabee and his team described current and future capital expenditure plans: "The port's $1.6 billion dredging project to bring the port to 50 feet will be completed in the first quarter of 2015. The $1.3 billion Bayonne Bridge Navigational Clearance Program will result in a raising of the roadway to create an air draft clearance of 215 feet by 2016. These two projects will allow the port to handle the larger vessels anticipated to be coming through the expanded Panama Canal.

The 50-foot channel and berth deepening project and the Bayonne Bridge Navigational Clearance Program are the two high-profile projects for the port; however, the Greenville Yards Rail Facility, which will serve the Global Container Terminal, is also a project that will have a major impact on the port. Rail expansion at PNCT [Port Newark Container Terminal] and NYCT [New York Container Terminal] are also progressing at this time."[11]

Figure 6

Improvement

Project	Completion Date (Estimated)	Estimated Investment (in millions of dollars)	Description
Bayonne Bridge	By 2016	N/A	"'Raise the Roadway' of the Bayonne Bridge to 215 ft. The 64 ft. of additional air draft will accommodate larger, more efficient vessels."
Goethals Bridge	Late 2018	$ 1,500	"Design, build, finance and maintain a replacement bridge directly south of the existing one. The new bridge will feature three 12-ft.-wide travel lanes in each direction."
Harbor Deepening	Q1 to 2015	$ 1,600	Will allow the next generation of "larger, longer and wider ships to access the nautical corridor leading from the Ambrose Channel into the Upper Bay and Newark Bay."
Roads	2014 to 2018	$113,300	Create additional lanes "in some locations; widening and realigning certain critical thoroughfares; installing central barriers and retaining walls; replacing/renewing critical stretches of pavement; updating/synchronizing traffic signals; relocating signage and lighting to promote maximum visibility; regrading critical turns to allow freight vehicles to use them at higher speeds and with greater safety."
APM Terminals	Complete	N/A	"Added four new 22-row reach cranes"; added refrigerated container racks that tripled the terminals' processing capacity to 1,964 reefer containers at a time; expanded its terminal area from 266 to 350 acres; added two low-emission, rubber-tired gantry cranes, reducing emissions by 40 percent.
Maher Terminals	Complete	N/A	"Improved infrastructure, acquired equipment, and upgraded pivotal technology; features one of the world's largest straddle carrier fleets, speeding the flow of containers between ships and rail connections"; currently operating 11 Super Post-Panamax cranes with a reach of 22 across; two Super Post-Panamax Liebherr cranes with a reach of 25 across delivered in November 2014; four Super Post-Panamax cranes with a reach of 25 across will be delivered at the end of 2015.
New York Container Terminal	Complete	N/A	"Increased length of berth from 2,500 to 3,000 ft. and constructed an intermodal rail facility; linked to transcontinental rail routes by the terminal's own on-dock rail operation, ExpressRail Staten Island, which is capable of producing mile-long trains."
Port Newark Container Terminal	2015	N/A	"Building out ExpressRail Port Newark to double PNCT's intermodal capacity from 125,000 lifts per year to 250,000 by the end of 2014; converting 33 acres of its on-dock container terminal transfer facility to serve as a high-density container yard; adding three new cranes rated to support Super Post-Panamax vessels."
Global Terminal	2015	N/A	"Augmenting Port Jersey Boulevard to increase access to Global Terminal; on track to become the port's first terminal operator to deploy automated rail-mounted gantry cranes, maximizing efficiency on the Port Jersey Channel." Twenty rail-mounted gantry cranes were delivered in 2014 and some are already operational. In addition, the terminal will take delivery of two Super Post-Panamax cranes, which should be operational in 2015.

Source: Quotes from "The Port of New York and New Jersey: Setting the Pace for a Stronger Future."[12] Additional information from author interview with Richard Larrabee.[13]

Outlook

With current equipment such as 32 Post-Panamax cranes and 15 Super Post-Panamax cranes, in addition to the six Super Post-Panamax cranes currently on order for delivery in 2014 and 2015, and port-related services such as FTZ No. 49 with 15 sites and nine subzones over a total of 4,536 acres, the Port of New York and New Jersey is one of the most competitive container ports in the U.S. Given the importance of its geographic location and key role in inbound and outbound trade from Europe, Asia and Canada, we foresee a sustainable growth in container traffic after the Panama Canal expansion. The average volume growth for the port has been approximately 4 percent since 2000. Each container terminal within the port will have different capacities regarding maximum vessel size; however, the majority of the port's terminals should be able to handle, at a minimum, 12,000 TEU vessels.[13]

The port faces two big challenges. First, although the Bayonne Bridge is expected to be raised to 215 feet by 2016, it currently is too low for many large ships to pass beneath it. As reported by the Journal of Commerce on April 25, 2014, "Vessel operators are being warned by the Coast Guard to make sure their vessels can fit under the 151-foot vertical clearance of the Port of New York and New Jersey's Bayonne Bridge, which two ships have struck during the last four months."[14]

The second challenge comes from possible port congestion and delays due to labor shortages and computer equipment failures. Shortages of dockworkers and drayage drivers may cause intermittent port delays. With traffic volume spikes and shortages of longshore workers, chronic truck backups at the port are inevitable.

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"We see nothing but blue skies ahead."

– John F. Petrino, director of business, Georgia Ports Authority[1]

Port of Savannah

The Port of Savannah, one of Georgia's two deep-water seaports, is owned and operated by the Georgia Ports Authority (GPA). It is the largest single-operator facility in North America as well as the fastest-growing and the fourth-largest U.S. container port (in total volume, after the ports of New York and New Jersey, Los Angeles and Long Beach, California).[2] It also is the second-busiest U.S. container tonnage exporter, after the Port of Los Angeles.[3] It is currently handling Post-Panamax ships. Several recently approved projects will increase the port's capacity to handle larger ships by 2018.

Location, Size and Terminals

The Port of Savannah is located on the Savannah River, 18 miles from the Atlantic Ocean, and features two terminals, Garden City Terminal and Ocean Terminal, situated on 1,200 and 200 acres, respectively. Garden City Terminal is the fourth-busiest container port and the single largest container terminal in the U.S. It handles more than 8,000 truck transactions a day, more than any other U.S. port. Goods can be delivered from there to 44 percent of U.S. consumers within two to three days.[4]

Operating Status

The Port of Savannah continues to grow each year across numerous measures. The number of container ship calls declined from 2,169 in 2012 to 2,001 in 2013 as average vessel capacity increased by 6 percent. Both operating expenses and operating revenue have grown each year since 2009. More importantly, operating income grew from $59.26 million in 2009 to $78.30 million in 2013.[5]

Figure 1

Operating Status

Year	Operating Revenue (in thousands of dollars)	Operating Expenses (in thousands of dollars)	Operating Income (in thousands of dollars)	Container Volume (in millions of TEUs)	Container Ship Calls
2014 (Estimate)	$310,600	$227,600	$83,000	3.12	1,873
2013	292,583	214,285	78,298	2.95	2,001
2012	283,538	205,385	78,153	2.98	2,169
2011	266,514	194,604	71,910	2.90	2,155
2010	238,321	175,898	62,423	2.60	1,947
2009	227,796	168,535	59,261	2.40	1,825
Average Growth Rate (2009 to 2013)	8%	7%	11%	16.3%	18.2%

Source: Georgia Ports Authority; authors' estimates

Cargo

In 2014, the Port of Savannah was on track to handle 3.1 million TEUs (both imports and exports), a 6.3 percent increase from 2013.

Facilities: Cargo Terminals

The Port of Savannah has access to over 500 acres of open storage, 2.5 million square feet of warehouse space, 68,000 square feet of cold storage and an additional 120 acres for roll-on/roll-off (Ro/Ro) cargo such as tractors, vehicles and other bulk cargo. The 201-acre Ocean Terminal, a dedicated break bulk and Ro/Ro facility, handles a wide range of cargo, including wood and steel products, automobiles, farm equipment and other heavy project cargo.[6]

The 1,200-acre Garden City Terminal specializes in handling containers, with nine container berths and one liquid bulk berth. It also has two intermodal container transfer facilities (ICTFs).[7] Channels at both terminals currently are 42 feet deep. The port handles the deeper, larger Post-Panamax ships by waiting for high tide for them to enter and exit the port. The GPA plans to increase that depth to 47 feet at both terminals, which would enable these larger ships to enter and exit at any time.

Figure 2

Cargo Terminal Facilities

Type	Number	Total Size
Garden City Terminal		
Berths	9	9,693 continuous linear ft.
Warehouses	5	1,124,016 sq. ft.
Cold Storage	1	68,150 sq. ft.
Container Fields	9	506 acres
Ocean Terminal		
Berths	9	5,768 linear ft.
Transit Sheds/Warehouses	14	1,427,245 sq. ft.
Rail Sidings	14	11,100 feet
Open Storage	1	80 acres
Container Field	1	10 acres
Ro/Ro Facility	1	33 acres

Source: Georgia Ports Authority website

Facilities: Cranes

The Port of Savannah is the first U.S. port to begin making the transition to electrified rubber-tired gantry cranes, a process that is expected to result in fuel savings of up to 95 percent. (This equates to savings of over $10 million a year, after electricity costs are taken into consideration.)[8] Garden City Terminal currently is equipped with nine Post-Panamax cranes, which can reach across at least 16 containers, and 16 Super Post-Panamax cranes, which can reach across at least 22 containers.[9] Ocean Terminal is equipped with two gantry cranes, a barge crane and a container crane.[10]

During the next 10 years, the port plans to gain an additional eight Super Post-Panamax cranes and 53 rubber-tired gantry cranes. In 2014, the port's board of directors approved the purchase of four more Super Post-Panamax cranes, which are expected to arrive by January 2016. This will increase the port's maximum capacity from a current level of about 5.8 million TEUs to over 7.5 million TEUs per year.

Vessels Accommodated

The Port of Savannah has over 9,800 linear feet of berth space. The Savannah River is 500 feet wide and 42 feet deep at low tide, with about 7.5 feet of difference between high and low tides. At Ocean Terminal, bridge clearance sinks to 185 feet at high tide. The King's Island Turning Basin enables large ships to turn around. The largest vessel to traverse the port to date, a Post-Panamax ship, was 1,095 feet long and could carry up to 9,600 TEUs. In 2013, 1,837 vessels called on Garden City Terminal and 164 vessels went to Ocean Terminal.

Foreign Trade Zone

The Port of Savannah operates in Foreign Trade Zone No. 104. The Savannah Airport Commission (SAC) owned the trade zone from the time it was created in 1984 until 2013. In mid-2013, the SAC transferred control of the trade zone to World Trade Center Savannah, the international arm of the Savannah Economic Development Authority. Both parties agreed that this move would help attract additional foreign investment and enable area businesses to expand into foreign markets.[11]

Transportation and Access

The Port of Savannah's Garden City Terminal features two intermodal container transfer facilities (ICTFs). The 160-acre Mason ICTF is served by five working rail tracks totaling 14,000 feet and three storage rail tracks totaling 8,000 feet. The 18-acre Chatham ICTF has three working rail tracks totaling 6,300 feet and an 11,615-foot storage track. The ICTFs provide unrestricted daily double-stack service with two- and three-day delivery times for cargo going to major markets east of the Mississippi, the Gulf Coast and the Midwest, as well as overnight service to Atlanta; Charlotte, North Carolina; Jacksonville, Florida; and Charleston, South Carolina.

Both Garden City Terminal and Ocean Terminal are served by the Norfolk Southern Corp. and CSX Transportation railways. Both also feature immediate

Figure 3

Foreign Trade Zone No.104 Summary

Year	Imports (in millions of dollars)	Exports (in millions of dollars)
2010	$34,350	$24,271
2009	27,701	18,929
2008	36,150	22,838
2007	31,187	18,320
2006	25,968	13,703
2005	22,345	11,439
2004	16,528	9,670
2003	13,630	7,617
Average Growth Rate (2003 to 2010)	22%	31%

Source: Georgia Ports Authority website; World Port Source website; authors' estimates

Figure 4

Current and Future Projects

Project	Completion Date (Estimated)	Estimated Investment (in millions of dollars)	Description
Savannah Harbor Expansion Project	Early 2018	$702.0	Deepening the harbor will allow larger ships to enter the port and reduce the effects of low tide.
Jimmy Deloach Parkway Extension	May 2016	72.8	Will provide direct access to the port from I-95 and the State Route 307 overpass; also will expand the parkway to four lanes.
Additional Electrified Rubber-tired Gantry Cranes	Present to 2024	N/A	Will greatly reduce costs and emissions; expected to save more than 1.8 million gallons of diesel fuel annually; savings will be greater than the cost of the cranes.

Source: Georgia Ports Authority website

access (less than six miles) to two major interstate highways: I-95, which travels north-south, and I-16, which travels east-west. Ocean Terminal also has convenient access to I-516.[12]

Employment

In fiscal year 2011, Georgia's deep water ports (including both the Port of Savannah and the Port of Brunswick) supported over 350,000 full-time and part-time jobs across the state, just over 8 percent of Georgia's total employment, generating $67 billion in sales. Every dollar spent by the port industry and port users generates an estimated additional 70 cents for Georgia's economy.[13]

Current and Future Projects

Figure 4 summarizes key projects underway or planned at the Port of Savannah. Among the most critical of these for accommodating Post-Panamax ships is deepening the Savannah River channel to 47 feet. The Savannah Harbor Expansion Project (SHEP) received the last of all required federal and state regulatory approvals in July 2013 and full authorization to construct by way of the Water Resources Reform and Development Act (WRRDA), which President Obama signed into law on June 10, 2014. In October 2014, the U.S. Army Corps of Engineers, the Georgia Department of Transportation and the GPA signed a project partnership agreement allowing construction of the SHEP to begin.[14] After 14 years of study and review, the project will now move to construction and is expected to be completed in early 2018. It will improve navigation by doing the following:

- Deepening the inner harbor to 47 feet and the entrance channel to 49 feet.
- Extending the entrance channel by seven miles.
- Constructing three bend wideners and two meeting areas.
- Enlarging the King's Island Turning Basin at the Garden City Terminal.[15]

Outlook

Post-Panamax ships are already calling on the Port of Savannah. With the recent approval of the SHEP, the capacity of the port will be increased by 2018 to accommodate the needs of Post-Panamax ships.

Port of Savannah officials see "nothing but blue skies ahead."[16] They foresee continuing growth of current vertical markets, such as automobiles and container cargo, as well as growth in areas in which the port could capture greater market share, such as Ro/Ro and break bulk cargo. In the meantime, the Georgia Ports Authority is proceeding with plans to purchase new cranes that will add to its capacity and ability to accommodate large container ships at Garden City Terminal. On May 19, 2014, the GPA board approved $86.5 million to purchase four new ship-to-shore cranes and 20 new rubber-tired gantry cranes. The new cranes, scheduled to arrive in February 2016, will give the port a total of 20 Super Post-Panamax cranes, more than any other single, self-funded terminal in the U.S.[17]

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"Virginia is already big-ship ready. It's going to be very modest when it comes down to the gains a new Panama Canal will bring to Virginia."

– John Reinhart, CEO and executive director, the Virginia Port Authority[1]

Port of Virginia

The Port of Virginia is made up of six container and general cargo terminals that moved more than 2.2 million TEUs in calendar year 2013, making it the sixth-largest container port in the U.S. In addition to the state-owned general cargo terminals, the Port of Virginia harbor is also home to many privately owned facilities that handle primarily bulk cargo. All terminals in the Port of Virginia harbor collectively handled a total of 66.68 million metric tons of container, break bulk and bulk cargo in 2013, ranking it as the fourth-largest U.S. port based on total cargo. The port has deep channels (currently 50 feet and authorized to go to 55 feet) and berths that are already receiving Super Post-Panamax ships. It has high levels of automation and is one of the most technologically advanced ports on the East Coast. The port generates employment for more than 343,000 Virginians as well as $41.1 billion in revenue.[2]

With 9.8 percent growth in 2012 and 5.6 percent increase in 2013, the port is one of the fastest-growing East Coast container ports. Its relationships with international trading partners undergird this growth; its largest trading partner is China. With an existing terminal (APM Terminals Virginia) that currently handles 1.2 million TEUs and has the capacity to handle 2.3 million TEUs, as well as an aggressive plan to add a new terminal (the Craney Island Eastward Expansion) that will more than double its TEU capacity, the port is well positioned to handle more cargo and the bigger ships that will be seeking to call on the East Coast after the Panama Canal expansion.[3]

Location, Size and Terminals

The majority of the Port of Virginia is located in Hampton Roads in the southeastern part of Virginia. It is well situated in relation to growing population areas on the East Coast. The port handles cargo in several geographically separate areas. Hampton Roads, the area that includes Portsmouth, Newport News and Norfolk, Virginia, has four terminals: Norfolk International Terminals, APM Terminals Virginia, Portsmouth Marine Terminal and Newport News Marine Terminal. While APM Terminals Virginia is owned by APM Terminals, all four terminals are operated by the Virginia Port Authority (VPA).

The Port of Richmond, also managed by the VPA, is located on the James River in Richmond, Virginia, and provides easy access to Interstate 95, the East Coast's principal north-south transportation artery. The Virginia Inland Port, located just west of Washington, D.C., in Warren County, is connected to Port of Virginia marine terminals via five-day-a-week rail service, bringing cargo 220 miles closer to inland U.S. markets.

Operating Status

According to the VPA's 2013 Financial Report, the Port of Virginia (including the Port of Richmond) handled 2.17 million TEUs that year, representing "an increase of 9.98 percent from fiscal year 2012."[4] As shown in Figure 1, operating revenue has been steadily increasing, as have operating expenses. The VPA has run a deficit in operating income since 2009. Virginia International Terminals LLC, a not-for-

profit entity that is held by the VPA, operates the terminals on VPA's behalf.[5] This corporate structure allows the VPA to be competitive by providing flexibility in how it works with labor unions and individuals. However, several consulting firms have noted that there may be other ways for the VPA to increase its competitiveness and efficiency in this highly competitive field.[6]

Cargo

In 2013, marine terminals in the Port of Virginia harbor handled 66.68 million metric tons of cargo.[7] This includes containers, roll-on/roll-off (Ro/Ro), break bulk and bulk cargo. According to the VPA, the port "receives 94 percent of operating revenues from handling containerized cargo."[8] In 2013, it handled 13 percent of the TEU volume on the East Coast, placing it behind only the ports of New York and New Jersey and Savannah.[9]

China is the port's main trading partner for exports and imports. In terms of total volume, including container, break bulk and bulk cargo, the port is ranked fourth in the U.S. The port's container trade is balanced with exports and imports, representing roughly equal amounts based on TEUs.

Figure 1

Operating Status

Year	Operating Revenue (in thousands of dollars)	Operating Expenses (in thousands of dollars)	Operating Income (in thousands of dollars)
2013	$103,146	$120,632	$(17,486)
2012	101,261	116,438	(15,177)
2011	91,219	108,404	(17,185)
2010	51,958	72,347	(20,389)
2009	53,155	66,851	(13,696)
2008	77,419	65,200	$12,219
2007	72,346	61,084	$11,262
2006	59,327	54,612	$4,715
2005	43,917	45,035	(1,118)
2004	39,394	42,176	(2,782)
Average Growth Rate (2004 to 2013)	10%	11%	

*2013 estimates are based on 2003 to 2012 growth rate.
Source: Virginia Port Authority

Facilities: Cargo Terminals

The Port of Virginia's largest state-owned terminal is Norfolk International Terminal. It is able to handle more than 1.2 million TEUs annually.[10] It has direct truck and on-dock rail loading access.[11]

APM Terminals Virginia is one of the most technologically advanced terminals in the U.S.[12] According to the VPA, it is "a semi-automated operation, with a mix of manual and automated container handling equipment".[13] One of the largest privately owned container ports in the U.S., it is currently able to handle 1 million TEUs annually. A planned expansion will enable it to handle 2 million TEUs annually.[14] It has 115 acres dedicated to stacked containers, more than half of which is semi-automated. With eight Post-Panamax cranes, it is already serving the larger ships, a situation that will increase after the expansion of the Panama Canal.

Portsmouth Marine Terminal ceased operations in 2011. All of its customers transferred to APM Terminals Virginia. Forty-four acres at the terminal are now used for empty container storage. Portsmouth Marine Terminal has available space to handle a variety of cargo, including roll-on/roll-off, specialized break bulk and project cargo as well as bulk cargo.

Figure 2

Cargo Summary

Year	**Container Volume** (in thousands of TEUs)	**Container and Break Bulk Ship Calls**	**Outbound Tonnage Value** (in thousands of dollars)	**Inbound Tonnage Value** (in thousands of dollars)	**Total Tonnage Value** (in thousands of dollars)
2013	2,224	1865	$29,566	$37,380	$66,946
2012	2,106	1966	27,352	35,730	63,082
2011	1,918	1828	23,983	30,828	54,811
2010	1,895	1841	20,481	28,361	48,842
2009	1,745	1758	19,194	25,774	44,968
2008	2,083	1833	24,684	33,466	58,150
2007	2,128	2289	21,072	31,466	52,538
2006	2,046	2338	NA	NA	NA
2005	1,981	2178	NA	NA	NA
Average Growth Rate (2005 to 2013)	1.3%	-1.7%	5.0%	2.5%	3.5%

Source: Port of Virginia Key Performance Indicators 2014 to 2018

Figure 3

Top 10 Commodities, Container, Break Bulk and Bulk Cargo Combined

Exports		Imports	
Type	**Tonnage** (in thousands of tons)	**Type**	**Tonnage** (in thousands of tons)
Mineral fuel, oil, etc.	49,858.79	Machinery	755.23
Misc. grain, seed, fruit	1,888.46	Furniture, bedding	582.99
Wood	1,704.79	Salt, sulfur, earth, stone	514.44
Woodpulp, etc.	15,588.79	Mineral fuel, oil, etc.	512.99
Food waste, animal feed	1,242.56	Beverages	464.63
Cereals	955.18	Wood	424.33
Plastic	627.36	Vehicles, not railway	418.59
Paper, paperboard	605.66	Plastic	412.16
Iron and steel	504.75	Rubber	384.45
Machinery	444.08	Fertilizers	376.18

Source: 2013 Key Economic Indicators[15]

Newport News Marine Terminal focuses on more labor-intensive cargo, such as break bulk and roll-on/roll-off cargo. It features a new warehouse for break bulk storage, and has room for additional construction and storage facilities to be built in the future.[16]

The Port of Richmond is a privately operated terminal owned by the city of Richmond and leased by the VPA. It can handle container, break bulk and other forms of cargo. It serves as an off-road, off-rail connection between the coastal terminals and Richmond.[17]

Facilities: Cranes

The Port of Virginia has a total of 65 cranes (including the Port of Richmond's one crane). Because Portsmouth Marine Terminal is no longer operational, there are 56 operating cranes.

Facilities: Passenger Terminals

Norfolk's Half Moone Cruise and Celebration Center works with a variety of cruise lines, including Carnival Cruise Lines, Oceania Cruises, Regent Seven Seas Cruises, Phoenix Reisen, Pearl Seas Cruises, AIDA Cruises, Crystal Cruises and Silversea. In 2015, the Carnival Splendor will begin sailing from Norfolk. In addition to the Splendor calls, 20 stop-over cruises are scheduled to visit Norfolk in 2014 and 2015.[19]

Figure 4

Facilities: Terminals

Terminal	Total Acreage	Type of Cargo	Number of Cranes	Channel Depth (in feet)	Berth Length (in linear feet)
Newport News	140	Break bulk, Ro/Ro	1	41	3,480
Norfolk International	693	TEUs, break bulk, Ro/Ro	14	50	7,300
Portsmouth	219	Break bulk, Ro/Ro	9	45	4,515
APM Terminals Virginia	230	TEUs, break bulk, Ro/Ro	40	50	4,000
Port of Richmond	121	TEUs, break bulk	2	22	1,584

Figure 5

Type and Number of Cranes

Type	Number	Outreach
Newport News Marine Terminal		
Heavy-lift Crane	1	114.15 ft.
Norfolk International Terminal		
ZPMC Suez Class	14	176-208 ft.
Portsmouth Marine Terminal		
ZPMC	3	155.53-157.93 ft.
Kone	4	127.54-151.18 ft.
Deer Park	1	139.77 ft.
CEMCO	1	139.73 ft.
APM Terminals Virginia		
Super Post-Panamax	8	176 ft.
Semi-automated Rail-mounted Gantry Crane	30	176 ft.
Rubber-tired Gantry Crane with Electric Spreader Bars	2	176 ft.
Port of Richmond Terminal		
M-2250 Manitowoc	1	N/A

Source: "VIT Crane Specifications & Berth & Channel Conditions," www.portofvirginia.com/facilities/port-of-richmond.aspx[18]

Vessels Accommodated

A total of 1,865, 1,966 and 1,828 vessels called on the Port of Virginia in 2013, 2012 and 2011, respectively.[20, 21] This includes larger ships traversing the Suez Canal that cannot currently pass through the Panama Canal. Located just 2.5 hours from open seas, the port has 50-foot-deep waterways and berths that allow Super Post-Panamax ships to call. In addition, the port is federally authorized to dredge harbor channels to 55 feet. This, coupled with the current technology available at the port, positions it as the East Coast port with the largest capacity for Super Post-Panamax ships.

Foreign Trade Zone

The Port of Virginia's Foreign Trade Zone No. 20 is spread over more than 10,000 acres in nine counties, making it one of the largest in the U.S.[22] The port recently received approval to create Alternative Site Framework sites within FTZ No. 20, which will streamline the process for companies applying for FTZ status.[23] This suggests that the amount of businesses, jobs and volume of cargo at the FTZ will increase.

Transportation and Access

All Port of Virginia terminals have highway and rail access. The Norfolk International Terminal focuses on its direct rail connection, with 23,000 feet of on-dock working rail track where trains are loaded and unloaded. APM Terminals Virginia has direct road access via highways and automated service for trucks. It also has on-dock rail access with CSX Transportation and Norfolk Southern Corp.[24] The Newport News Marine Terminal has direct rail access with CSX break bulk rail service and highway access via three Virginia highways.[25] Portsmouth Marine Terminal currently has direct access to CSX and Norfolk Southern railways, roadway access via U.S. Route 58 to I-95, I-64 and I-664. The Virginia Inland Port (VIP) extends the capacity of the Port of Virginia via five-day-a-week service on the Norfolk Southern railway. The VIP is connected to I-66 and is located just five miles from I-81.

Employment

According to a 2008 study by the College of William and Mary's Mason School of Business, total Virginia economic activity generated by the Virginia Port Authority's port operations included $41.1 billion in revenue and 343,000 jobs.[26]

Current and Future Port Projects

The Port of Virginia's "VPA 2040 Master Plan" describes where the port is today and provides a vision for how it will position itself in the future. The master plan includes a capital investment plan that "determines the best use of the available capital that will allow the port to capture cargo growth."[27] It includes the maintenance of current terminals, the purchasing of new equipment such as cranes and the construction of a new terminal. As previously mentioned, this includes shorter-term projects to expand the capacity of Norfolk International Terminals and double the TEU capacity of APM Terminals Virginia to 2.3 million TEUs.[28]

Expansion of the port at the future Craney Island Marine Terminal accounts for 60 percent of the capital investment plan. This is a long-term project; its timeline calls for the first phase of the terminal to open in the 2025-2028 timeframe. The Craney terminal will eventually have a capacity of 5 million TEUs annually.[29, 30] Construction of the terminal is underway; the area upon which it is being built was dredged and diked in 2013. Plans for the terminal area include distribution centers, which are expected to create almost 26,000 new jobs for the area.

Outlook

Given the Port of Virginia's current competitiveness and aggressive plans for the future, the outlook for the port is good. Virginia Port Authority officials agree: "We have been steadily growing. We are looking 50, 60, 70 years ahead to make sure we are growing and preparing for the future."[31] In addition to creating plans that are funded by several different funding streams, the VPA is maintaining and improving the port's profile as one of the most important ports on the East Coast.

Because it is already receiving Post-Panamax ships, it is well prepared for the expansion of the Panama Canal. The VPA is well aware of the competition it faces from other East Coast ports and takes that into account when planning for its future: "VPA's planned projects are expected to increase its container handling capacity from 3.5 million TEUs to 9.65 million TEUs by 2039. The three other largest East Coast ports are planning similar large projects that would keep pace with and possibly exceed VPA's capacity."[32]

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Glossary: Port and Shipping Terms

Types of Cargo

Break Bulk: Loose, noncontainerized cargo stowed directly in a ship's hold.

Container, Containerized: Cargo transported in containers (see below).

Dry Bulk: Loose, mostly uniform cargo, such as agricultural products, coal, fertilizer and ores that are transported in bulk carriers.

Liquid Bulk: Liquid bulk cargo such as crude petroleum and petroleum products, chemicals, liquefied gasses (LNG and LPG), wine, molasses.

Roll-on/Roll-off (Ro/Ro): Wheeled cargo that can be loaded onto and off of a vessel via ramps, without cranes (see below).

Type of Cargo Carriers

Container: A truck trailer body that can be detached and loaded onto a vessel or a rail car or stacked in a container depot. Containers may be ventilated, insulated, refrigerated, flat rack, vehicle rack, open top, bulk liquid or equipped with interior devices. A container may be 20, 40, 45, 48 or 53 feet long; eight feet or eight feet six inches wide; and 8 feet six inches or nine feet six inches high.

Reefer: A refrigerated container or vessel designed to transport refrigerated or frozen cargo.

Ro/Ro: A vessel designed to carry wheeled cargo, such as automobiles, trucks, trailers and railroad cars, that can be driven onto and off of the vessel.

Type of Cranes

Gantry Crane: A crane fixed on a frame or structure spanning an intervening space, typically designed to traverse fixed structures such as cargo (container) storage areas or quays and which is used to hoist containers or other cargo into and out of a vessel and place them onto or lift them from another vessel, barge, truck, chassis or train.

Gottwald Mobile Harbor Crane: A mobile, universally applicable handling machine powered by electric drives. It can service ships up to and including Super Post-Panamax class vessels and easily handles all standard container sizes from 20 to 45 feet. These cranes are often the only handling machines on the quay for handling containers, bulk materials and general cargo.

Rubber-tired Gantry (RTG) or Rubber-tired Container Gantry Crane: A gantry crane on rubber tires, typically used for acceptance, delivery and container stacking at a container yard.

Piggy Packer: A mobile container-handling crane used to load and unload containers to and from rail cars.

Ship Types

Barge Carriers: Ships designed to carry barges; some are fitted to act as full container ships and can carry a varying number of barges and containers at the same time. This class currently includes two types of vessels, LASH (lighter aboard ship) and Sea-Bee.

Bulk Carriers: Vessels designed to carry bulk homogeneous cargo such as grain, fertilizers, ore and oil. Dry bulk includes loose, mostly uniform cargo such as agribulk products, coal, fertilizer and ores. Liquid bulk carriers are known as tankers (see below).

Combination Passenger and Cargo Vessels: Ships with the capacity to carry 13 or more passengers and any form of cargo (freight).

Freighters: Ships that carry any type of cargo.

Full Container Ships: Ships equipped with permanent container cells, with little or no space for other types of cargo.

General Cargo Carriers: Vessels designed to carry heterogeneous cargo. These include break bulk freighters, car carriers, cattle carriers, pallet carriers and timber carriers.

Partial Container Ships: Multipurpose container ships in which one or more but not all compartments are fitted with permanent container cells. Remaining compartments are used for other types of cargo.

Ro/Ro Vessels: Ships specially designed to carry wheeled containers or trailers using interior ramps. These include all forms of car and truck carriers.

Tankers: Ships fitted with tanks to carry liquid bulk cargo such as crude petroleum and petroleum products, chemicals, liquefied gasses (LNG and LPG), wine, molasses and similar products. These include liquid oil tankers, liquid chemical tankers and liquid gas carriers.

Types of Operation Measures

Cargo Tonnage: Ocean freight is frequently billed on the basis of weight or measurement tons. Weight tons can be expressed in terms of short tons of 2,000 pounds, long tons of 2,240 pounds, or metric tons of 1,000 kilograms (2,204.62 pounds). Measurement tons are usually expressed as cargo measurements of 40 cubic feet (1.12 cubic meters) or cubic meters (35.3 cubic feet).

Dead Weight Tonnage (DWT): The maximum weight of a vessel, including the vessel, cargo and ballast.

Twenty-foot Equivalent Unit (TEU): The container size standard of 20 feet. Two 20-foot containers (TEUs) equal one marine container. Container vessel capacity and port throughput capacity are frequently expressed in TEUs.

Forty-Foot Equivalent Units (FEU): The marine container size standard of 40 feet. Two 20–foot containers (TEUs) equal one FEU.

Miscellaneous Terms

Berth: A place in which a vessel is moored or secured; the place alongside a quay where a ship loads or discharges cargo.

Bonded Warehouse: A warehouse authorized by customs authorities for storage of goods on which payment of duties is deferred until the goods are removed.

Breadth: The width of a vessel at its widest part, measured from the outer side of the planking or plating on one side to the corresponding point on the opposite side.

Container Yard: A container handling and storage facility, either at a port or inland.

Customs Broker: A person or firm, licensed by a country's customs authority when required, engaged in entering and clearing goods through customs for a client (importer).

Customhouse: A government office where duties are paid, documents filed, and so forth, on foreign shipments.

Draft or Draught: The depth of a ship while in the water, measured as the vertical distance between the waterline and the lowest edge of the keel.

Dock or Quay: A structure attached to land to which a vessel is moored.

Dockage: The charge assessed against a vessel for berthing at a facility or for mooring to a vessel so berthed.

Dredging: Removal of sediment to deepen access channels, provide turning basins for ships and maintain adequate water depth along waterside facilities.

Foreign Trade Zone: A free port that is divorced from customs authority but under government control. Merchandise, except contraband, may be stored in the zone without being subject to import duty regulations.

Landlord port: An institutional structure in which the port authority or other relevant public agency retains ownership of the port land and responsibility for port planning and development, as well as the maintenance of basic port infrastructure and aids to navigation.

Terminal Operator: The company that operates cargo handling activities on a wharf. A terminal operator oversees unloading cargo from ship to dock, checking the quantity of cargo against the ship's manifest (list of goods), transferring cargo, checking documents authorizing a trucker to pick up cargo, overseeing the loading/unloading of railroad cars, etc.

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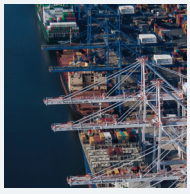
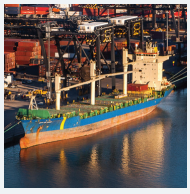
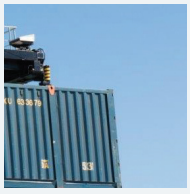


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