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2024 Port Performance Freight Statistics Program: Annual Report to Congress

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Quality Assurance Statement

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Preface

Pursuant to the requirements of Section 6018 of the *Fixing America's Surface Transportation Act* (FAST Act; P.L. 114-94; Dec. 4, 2015; 49 USC 6314), the Bureau of Transportation Statistics (BTS) has completed the 2024 annual report of the Port Performance Freight Statistics Program. The FAST Act requires BTS to report on the top 25 maritime ports as measured by 1) overall cargo tonnage, 2) dry bulk cargo tonnage, or 3) by twenty-foot equivalent unit (TEU) of containerized cargo. In 2016, the Working Group commissioned by the BTS Director recommended that U.S. Corps of Engineers (USACE) Waterborne Commerce Statistics be used to generate top 25 ports.[1] The program provides nationally consistent capacity and throughput performance measures for these ports.

As required, the annual report highlights summary statistics of the Nation's largest container, tonnage, and dry bulk ports and can be downloaded at https://www.bts.gov/ports/. Because ranking the top ports requires nationally consistent port data, port rankings are based on 2021 data—the most recent USACE data. For purposes other than ranking the ports, this report uses the latest data available through the time of this writing in late 2023.

[1] Port Performance Freight Statistics Working Group Recommendations (bts.gov)

1. Introduction

Measuring Port Performance

Reflecting the importance of ports to the Nation's multi-modal freight transportation system, Section 6018 of the *Fixing America's Surface Transportation* (FAST) Act requires the Bureau of Transportation Statistics (BTS) of the U.S. Department of Transportation (USDOT) to establish "a port performance statistics program to provide nationally consistent measures of performance of, at a minimum, the Nation's top 25 ports by tonnage; the Nation's top 25 ports by 20-foot equivalent unit; and the Nation's top 25 ports by dry bulk… [and] submit an annual report to Congress that includes statistics on capacity and throughput at the ports." The status of BTS as a principal Federal statistical agency requires these measures to be objective, the methods of measurement to be transparent and published statistics to meet reasonable quality standards.[2] FAST Act Section 6018 requires BTS to measure port throughput (defined in this report as the amount of cargo a port handles annually) and capacity (defined in this report as a port's maximum annual throughput, defined by tonnage, TEU, or other unit).

Port throughput statistics measure the volume of cargo or trade that ports handle, and the number of vessels that call at ports. Specifically, throughput metrics pertain to the weight, volume, and value of cargo handled, and the number and size of vessels that call:

- Cargo weight measured in short tons
- Containerized cargo volume measured in twenty-foot equivalent units (TEU)
- Cargo value measured in dollars
- Cargo vessel counts
- Vessel sizes measured in deadweight tons (DWT) for all vessels, and
- TEU capacity for container ships

This is the eighth edition of the Port Performance Freight Statistics Program Annual Report, which builds on the foundation of the 2016 Annual Report. In the inaugural edition, BTS published existing, nationally consistent measures of port capacity and throughput, and explained the criteria used to define ports and the measures used to define the top 25 ports in each category. The report included recommendations[3] of the advisory working group to the Port Performance Freight Statistics Program (2016 Working Group). These were delivered to the BTS Director prior to publication as specified in FAST Act Section 6018.

This 2024 Annual Report expands upon the first edition in several ways. The throughput and capacity statistics included in the 2016 edition have been

[2] Statistical Policy Directive No. 1: Fundamental Responsibilities of Federal Statistical Agencies and Recognized Statistical Units; *Federal Register* / Vol. 79, No. 231 / December 2, 2014. Page 71610.

[3] [Port Performance Freight Statistics Program Technical Documentation (bts.gov)]

updated with the most recently available annual data and, in many cases, have been supplemented with available monthly data.

This edition provides additional descriptions of global and national maritime trends to provide a more robust context for understanding port performance and the emerging issues and topics, including supply-chain challenges.

The Technical Documentation,[4] published separately, details the process used to identify the top 25 ports and calculate their capacity and throughput.

BTS plans to continue expanding and improving port throughput and capacity measures as resources permit. Additional discussion of BTS' potential future directions for the Port Performance Freight Statistics Program is included in the Looking Ahead section. Comments on this report are welcomed and should be sent to PortStatistics@dot.gov or to the Port Performance Freight Statistics Program, Bureau of Transportation Statistics, U.S. Department of Transportation, 1200 New Jersey Avenue SE, Washington, DC, 20590.

[4] Port Performance Freight Statistics Program Technical Documentation (bts.gov)

2. Top 25 Ports

Ports are commonly recognized as places where cargo is transferred between ships and trucks, trains, pipelines, or storage facilities. While ports are usually equated with the port authorities that govern them, ports can be difficult to define for statistical purposes due to closely related adjacent land uses (e.g., rail yards), variations in terminal ownership and governance, and proximity to other ports. Continuous waterfront may be divided into separate ports by administrative boundaries, such as the series of Mississippi River terminals in Louisiana between the ports of New Orleans and Baton Rouge. In contrast, the Port of New York and New Jersey and the Ports of Cincinnati-Northern Kentucky are treated as single entities, even though the former has a river and a state line dividing its facilities and the latter has terminals stretching 226 miles between the two states. Given the diversity of port ownership arrangements, operating methods, and cargoes handled, developing nationally consistent performance assessments for ports is a challenging task.

Ports are generally located within natural or human-made harbors. San Pedro Bay in California, for example, is a harbor where the Ports of Los Angeles and Long Beach are located with other public and private waterfront facilities. When cargo statistics are published at the harbor level, these data may include terminals that are not part of public port authorities and may thus show higher cargo volumes than what port authority statistics report.

There are many ways to define a "port," such as by legislative enactment of Federal, state, or municipal governments. To identify the nation's top 25 ports in a consistent manner, the meaning of 'port' itself must first be defined.

2.1 Port Definitions

Among possible definitions considered for use in these Annual Reports, Federal definitions offer a nationally consistent approach for determining what a "port" is, therefore providing a starting place from which to measure a port's throughput and capacity. The Federal Government defines ports in several ways, including:

- **U.S. Army Corps of Engineers Ports –** For statistical purposes, the U.S. Army Corps of Engineers (USACE) uses a port's boundaries as defined in the legislation associated with the port.
- **U.S. Customs and Border Protection Districts and Ports –** U.S. Customs and Border Protection (CBP) defines some ports as a single port and others as units comprising multiple ports. The U.S. Census Bureau relies on CBP definitions for reporting on trade.

This report follows the recommendations of the 2016 BTS Port Performance Working Group[5] to use the USACE statistical definitions of ports, which align with the Federal, state, and municipal legislative definitions associated with a given port. These legislative port definitions are relatively stable

[5] https://www.bts.gov/learn-about-bts-and-our-work/about-bts/port-performance-working-group

over time, although some ports have successfully petitioned USACE to alter their boundaries. The major advantage to using USACE's port definition is that USACE publishes nationally consistent cargo throughput data, including the data used to select the top 25 ports.

The USACE has also pursued methods of standardizing port limits for geographic analysis, these limits are termed Port Statistical Areas (PSA). A PSA is defined as a region with formally justified shared economic interests and collective reliance on infrastructure related to waterborne movements of commodities that is formally recognized by legislative enactments of state, county, or city governments. PSAs are excluded from the rankings, as the USACE does not categorize them as ports.

2.1.1 Port Governance

Ports are organized and governed in several ways, with implications for port definitions and data availability.

- **Port Authorities and Public Terminals –** A port authority (also sometimes called a harbor district) is a government entity that either owns or administers the land, facilities, and adjacent bodies of water where cargo is transferred between modes. Most ports are governed by port authorities or harbor districts, which are often part of local or state government. A port authority promotes overall port efficiency and development, maintains port facilities, and interacts with other government bodies. Additional activities include business development and management of infrastructure finances. While the structure, powers, and roles of port authorities vary, the American Association of Port Authorities (AAPA) states that they "share the common purpose of serving the public interest of a state, region or locality." Port authorities may act as:
- **Landlords –** These types of port authorities build and maintain terminal infrastructure and provide major capital equipment but are not engaged in operations. The Port of Los Angeles, Port of New York and New Jersey, and Port of Oakland are examples of landlord ports. In this capacity, port authorities may also offer concessions to tenants that make infrastructure improvements.
- **Operators –** These types of port authorities directly operate some or all the terminals in the jurisdiction. For example, the Houston Port Authority is an operating port.
- **Jurisdictional bodies –** These types of port authorities oversee private terminals, which are responsible for providing and operating their own infrastructure. For example, the Ports of Cincinnati-Northern Kentucky is a jurisdictional body.

A port authority's jurisdiction typically extends over land, where it may include granting concessions, approving construction, and making policy decisions; and over water, where jurisdiction is primarily focused on navigation improvements. A port may own and operate an extensive range of facilities over a large area, many of which may not be water related. Several port authorities (e.g., Oakland, Portland) also operate airports. The Port Authority of New York and New Jersey operates airports, tunnels, bridges, and transit systems as well as the seaport.

Certain states, such as South Carolina and Georgia, have statewide port authorities that administer some or all ports within their jurisdiction. Boards of appointed members typically lead these entities. These port authorities may also directly operate port facilities within the state. A state port authority may be a separate state department or located within that state's Department of Transportation.

Port authority jurisdictions may cross state boundaries. The Port Authority of New York and New Jersey and the Ports of Cincinnati-Northern Kentucky are examples of this.

Port authorities typically have jurisdiction over public terminals. Port authorities have jurisdiction over most U.S. container terminals, although some container terminals are owned or leased by private interests. Private bulk terminals are normally outside public port authority jurisdiction although they are still subject to U.S. Coast Guard and Federal regulation. Public port authorities may also own or administer bulk and Roll-on/Roll-off (Ro/Ro) terminals.

Public port authorities generally make selected data on their infrastructure and cargo operations available to the public. Data is usually presented on port authority websites, in annual reports, or in special reports or brochures. BTS uses data from these sources to supplement government and trade association sources and cross-checks the data to assure accuracy and consistency.

Private Port Terminals. Many dry bulk, liquid bulk, and Ro/Ro terminals are owned and operated by private firms and may or may not fall within public port authority jurisdictions. These terminals tend to be of three types:

- **Terminals owned by vessel or barge operators to serve their own operations.** The primary revenue source for these terminals is the transportation service being offered.
- **Terminals owned by cargo interests, such as grain terminals owned and operated by grain exporters or petroleum terminals operated by refinery owners.** The primary revenue source for these operations is the cargo and prior/ subsequent processing rather than the transportation or terminal services.
- **Terminals owned and operated by marine terminal operators.** These facilities derive their revenue from cargo handling services.

This report presents performance data at the port level, which in many cases include both public and private terminals. When possible, the profiles focus on the public terminals, as ports tend to make capacity and throughput data more readily available through public forums. The wide variety of port ownership, leasing, control, and operations arrangements leads to wide variation in collection, synthesis, and availability of capacity and throughput data. For example, private terminals may or may not publish data on their operations and infrastructure, while a refinery may report the total volume of petroleum processed, but not how much was received by vessel versus pipeline. Nationally consistent data are limited by private terminals that are not administrated by a port authority.

As the observations above suggest, this report provides a detailed picture as well as consistent capacity and throughput measures on public and private terminals governed by port authorities.

2.1.2 Cargo Types

In general, the geographic location and the cargo types handled determine the physical characteristics of a port and the relevance of various capacity and throughput metrics. Specifically, different cargo types require different vessels, terminal configurations, and handling equipment.

Waterborne cargo is classified into the following five major types:

1. Containerized
2. Dry bulk
3. Liquid bulk
4. Break-bulk
5. Roll-on/Roll-off

FAST Act Section 6018 (49 USC 6314) specified containerized and dry bulk cargoes as statistical categories; these are addressed in detail below. The other cargo types are discussed briefly. The total tonnage statistics included in this report and the port profiles[6] include all five cargo types.

A large port typically has multiple terminals that together can handle many cargo types; however, individual terminals are usually designed to move a single cargo type. The requirements of loading, unloading, and storing different cargo types leads to major differences in terminal design and overall port infrastructure.

2.1.3 Containerized Cargo

Containerized cargo includes most consumer goods imported into the U.S. and has been the chief focus of concerns over port performance. Cargo is containerized when it is placed in standard shipping containers that can be handled interchangeably on vessels, in terminals, and via inland transport modes. Standardized containers used in international maritime trade come in three lengths: 20 feet, 40 feet, and 45 feet. Standard containers are typically 8 feet wide and 8.5 feet high, regardless of length. Almost any commodity can be moved in standardized shipping containers if packed appropriately. Two-thirds of maritime cargo is shipped in traditional containers.[7]

[6] Each port listed is profiled separately in an interactive port profile, which are available online at [Port Performance Freight Statistics Program (bts.gov).](https://www.bts.gov)

[7] https://www.gao.gov/products/gao-22-104210

Container cargo volume and the capacity of container ships are usually measured in twenty-foot equivalent units (TEU), each nominally equal to one 20-foot container. Loaded and empty containers occupy the same space and are equal in terms of TEU. Forty-foot Equivalent Units (FEU, equal to two TEU) are used less frequently when describing throughput and capacity metrics, even though containers that measure 40 feet in length dominate international trade and account for approximately 90 percent of waterborne containers. There are also some 45-foot containers used in international trade (typically equal to 2.25 TEU although sometimes counted as 2.0 TEU). Conversion factors are used to shift between TEU and container counts, thereby allowing the comparison of total container volumes and other metrics. Container vessels range in capacity, from barges that can carry approximately 100 TEU to ships that are capable of carrying over 20,000 TEU.

2.1.4 Dry Bulk Cargo

Dry bulk cargo includes unpacked and homogenous commodities such as grain, iron ore, and coal. The size of a dry bulk terminal is determined by cargo volume, the number of commodity types, and vessel call frequency. Larger cargo volumes require more space, as do handling of multiple commodities that must be kept separated. Dry bulk terminals usually handle solely imports or exports and are designed accordingly, unlike container terminals that handle both imports and exports.

2.1.5 Other Cargo Types

Other cargo types are not specified in FAST Act Section 6018, although other cargo tonnage is included in the total tonnage data reported here. Other cargo types include liquid bulk cargoes, break-bulk cargoes, and Ro/Ro cargoes, which are defined as follows, per the PPFSP Glossary:

- **Liquid Bulk –** Cargo shipped in fluid form in tanker holds without packaging or containerization that is typically transferred with pump and piping or hoses. Major liquid bulk commodities include petroleum products, liquid natural gas, and liquid chemicals.
- **Break-bulk –** A category of cargo that is non-containerized and typically requires handling equipment to load and unload. Examples include bundled lumber or steel products moved by cranes, or project cargoes of many types. Break-bulk cargoes are sometimes also called general cargo, and roll-on/roll-off (Ro/Ro) cargoes are sometimes classified as break-bulk.
- **Roll On/Roll Off -** (1) Cargo that can be loaded onto a vessel with ramps, whether under its own power or pulled/pushed by another vehicle; (2) Any specialized vessel designed to carry Ro/Ro cargo, or a terminal that serves such vessels.

2.2 Port Components

The ports profiled in this report are complex entities, with both physical and institutional components that differ by function, cargo type, and geographic location, among other factors. The characteristics of these components and their interactions determine a port's overall capacity and annual throughput. Although publicly available measures do not exist for all components, those with nationally consistent measures are reflected in the port profiles.[8] Table 2-1 summarizes these key components and their connection to throughput and capacity measures.

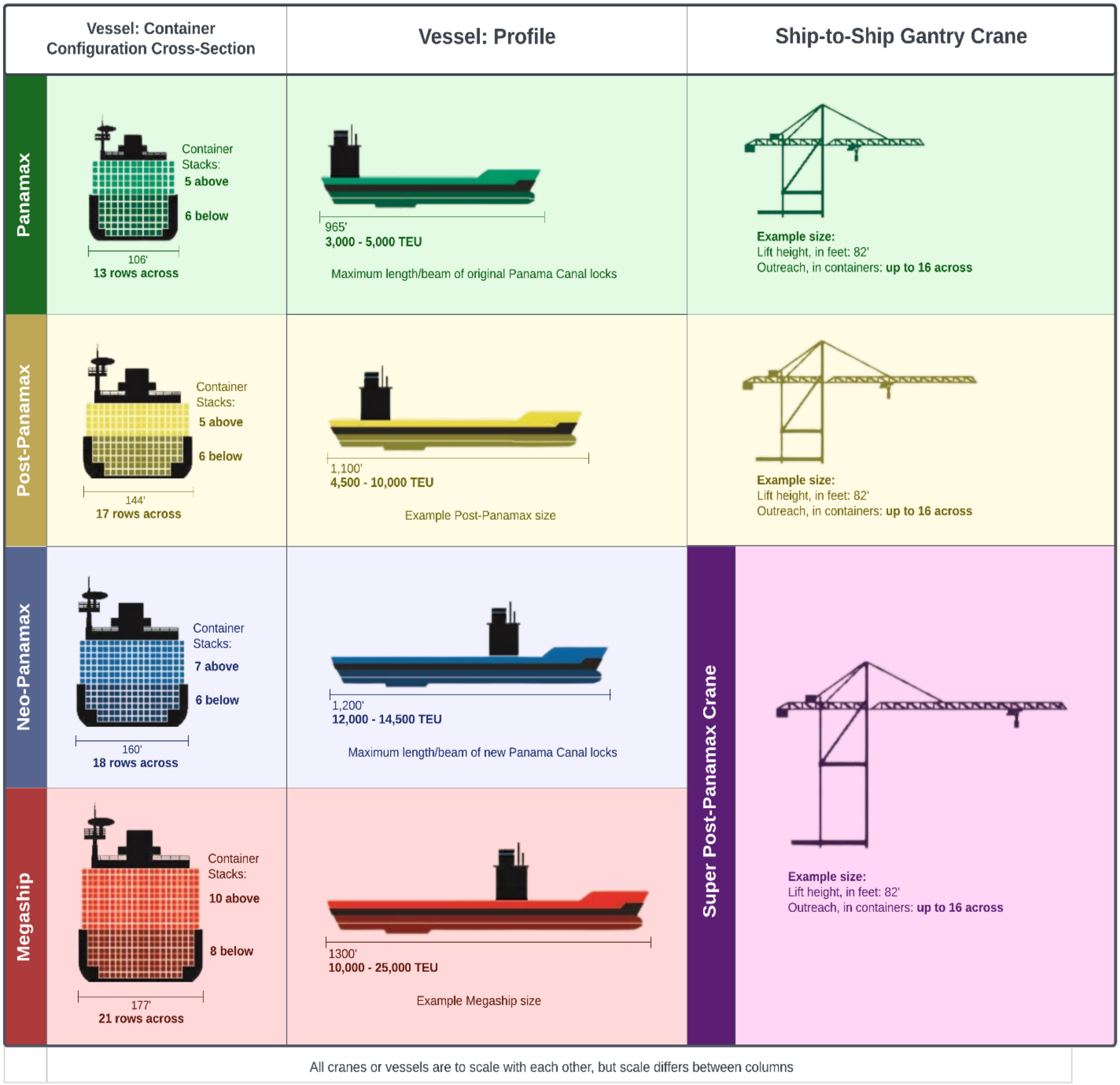
[8] Each port listed is profiled separately in an interactive port profile, which are available online at [Port Performance Freight Statistics Program (bts.gov).](https://www.bts.gov)

Table 2-1: Key Port Components & Their Impact on Port Infrastructure

Component	Description	Connection to Throughput and Capacity
Berth	A place to stop and secure a vessel for cargo transfer or other purposes. Berth locations are often determined by the availability of securement points on the wharf and may not have fixed sizes or boundaries.	The length of berths is significant for container and break-bulk terminals, where the full length of the vessel must be accessed. Berth length is less significant for bulk and Ro/Ro terminals, where unloading and loading operations use conveyors, ramps, or other means that do not involve the full vessel length. Insufficient berth availability can result in vessels waiting to be unloaded and loaded.
Waterside access	The waterways, channels, reaches, and anchorages that enable vessels to reach a port.	Limited waterside access can constrain the number and size of vessels that can call at a terminal.
Channel	A designated navigable waterway leading from open water to port terminals. Many channels have had sediment and other materials removed from the bottom of the channel (a process known as dredging) to accommodate larger vessels, and require periodic maintenance dredging to keep them navigable.	The shallowest point of a channel can be a limiting factor on the size of ships that can access a terminal. Channel access may also be limited by air draft restrictions imposed by bridges.
Terminal	A port facility where vessels are discharged or loaded. Terminals can be defined by their facilities, equipment, the type of cargo handled, physical barriers or boundaries, ownership or operating structure, and other characteristics. Terminals may be operated by a port authority, independent marine terminal operators, vessel operators, or private companies handling their own cargo.	Many ports contain numerous terminals, each with its own berths, equipment, and landside storage space, and which may be adjacent to each other or separated by many miles. Terminals vary widely in configuration and infrastructure, and the number and size are therefore not consistent indicators of port capacity. However, terminal design, size, and infrastructure availability have a significant impact on both throughput and capacity.
Loading and unloading equipment	The fixed or mobile terminal equipment needed to handle different vessel and cargo types.	Cargo and vessel types vary greatly. Most container vessels are loaded and unloaded with shore-side gantry cranes (“container cranes”). Smaller vessels and barges may be handled with on-board equipment (“ship’s gear”) or with mobile harbor cranes. Ro/Ro vessels and barges are loaded and unloaded via ramps. Bulk and break-bulk terminals use a combination of fixed and mobile equipment that typically allows for faster loading and unloading of a vessel, but operations may still be limited by landside infrastructure and operational efficiency.

Figure 2-1 illustrates how changes in vessel size impact port infrastructure. Larger vessels require greater berth lengths, larger loading and unloading equipment, and more cargo/ container storage space.

Figure 2-1: Container Vessel Size & Corresponding Port Infrastructure



2.3 Port Geography

Ports are classified as coastal, Great Lakes/St. Lawrence Seaway, or river ports. U.S. coastal ports include those on the East (Atlantic), West (Pacific), and Gulf coasts, as well as those in Alaska, Hawaii, and Puerto Rico. The Great Lakes and Seaway ports include public and private facilities in the eight Great Lakes states (Illinois, Michigan, Ohio, Indiana, Wisconsin, Pennsylvania, New York, and Minnesota). River ports primarily include those on the Mississippi, Columbia-Snake, and Ohio inland waterway systems.

- **Coastal ports –** typically handle larger ships than Great Lakes or river ports as they can meet the deeper draft requirements and greater cargo handling needs of vessels on major international trade routes. Coastal ports tend to have terminals in a compact geographic area. All container ports profiled in this report are coastal ports, due to economies of scale in container terminals and the lack of high-volume container services on U.S. inland waterways.
- **Great Lakes and Seaway ports** – serve ocean-going vessels during their primary season, but close during winter months. Lake terminals can resemble coastal and river facilities, with cargo type and vessel size the primary factors influencing terminal design.
- **River ports –** can be classified into three broad categories. The first group includes general purpose facilities that accommodate a wide range of commodities and vessels. The second group includes public facilities designed to handle a single commodity. The third group includes industrial terminals, which are typically privately owned and operated for a manufacturing, agricultural, refining, or mining facility. River and inland waterway ports are more likely than coastal ports to consist of privately owned and operated terminals, given historical patterns of development. River ports may also have terminals many miles from one another. These ports also typically handle smaller vessels than coastal ports, including barges.

2.4 Identification of the Top 25 Ports

The FAST Act requires the Port Performance Freight Statistics Program and the Annual Report to include the top 25 ports as measured by (1) overall cargo tonnage, (2) twenty-foot equivalent units (TEU) of container cargo, and (3) dry bulk cargo tonnage.

To identify the top 25 ports by overall tonnage, BTS utilized the total weight of cargo (domestic and international) entering and leaving the port in short tons as reported by USACE. For the identification of the top 25 ports by TEU, BTS includes foreign loaded, and all domestic containers as reported by USACE. Annual data used to determine the top 25 ports corresponds to 2021 reported data. While data was updated from the previous year's report, the approach to identifying the top 25 ports is unchanged from previous reports.

Tonnage statistics do not account for dry bulk, so BTS worked with USACE and the Maritime Administration (MARAD) to develop a method for identifying the top 25 dry bulk ports. The *Technical Documentation*[9] describes these approaches for defining dry bulk cargo in additional detail.[10]

Figure 2-2 through Figure 2-4, and Table 2-2 through Table 2-4 list the top 25 ports in overall cargo tonnage, total TEU, and dry bulk cargo tonnage, respectively. Maps follow each table to provide port locations.

Table 2-5 combines the top 25 ports for each category (total tonnage, TEU, and dry bulk tonnage) into a single list. As indicated in Table 2-5, many ports rank in the top 25 in more than one category. A total of 48 ports were identified within the three lists; 44 are located within the contiguous United States and four are located outside the contiguous United States, including two in Alaska (Port of Alaska in Anchorage and Port Valdez), one in Hawaii (Honolulu), and one in Puerto Rico (San Juan). Seven ports (Baltimore, Houston, Mobile, New Orleans, New York/New Jersey, Long Beach, and Virginia) are in the top 25 for all three cargo categories.

Due to statistical boundary and definitional changes, the 2021 data used to rank the ports may not

[9] Port Performance Freight Statistics Program Technical Documentation (bts.gov)

[10] Commodity Descriptions: The first two digits of the Waterborne Commerce Statistics Center (WCSC) publication codes correspond with the Lock Performance Monitoring System (LPMS) commodity codes. Both LPMS and WCSC codes were standardized to reflect the hierarchical structure of the Standard International Trade Classification (SITC) Revision 3 commodity codes. SITC, Rev.3 commodity codes conform to the Harmonized Commodity Description and Coding System (HS).Using SITC, Rev. 3 allows direct comparison (https://usace.contentdm.oclc.org/digital/collection/p16021coll2/id/2103).

be comparable to that of previous years. The USACE defines a port area as either 1) port limits defined by legislative enactments of state, county, or city governments or 2) the corporate limits of a municipality. Although this standard has not changed, the legislative enactments by governments can change from year to year. The U.S. Army Corps of Engineers provides several examples of changing geographic definitions of port boundaries.[11]

More detailed statistics on throughput and capacity are available at https://www.bts.gov/ports.

[11] https://transportation.org/water/wp-content/uploads/sites/8/2023/05/COWT-3a-Amy-Tujague-Shawn-Komlos-AASHTO1.pdf

Table 2-2: List of Top 25 Ports by Total Tonnage (Ranked by Short Tons)

1. Port Houston, TX	14. Port of Savannah, GA
2. South Louisiana, LA, Port of	15. Port Freeport, TX
3. Corpus Christi, TX	16. Port Arthur, TX
4. Port of New York and New Jersey, NY & NJ	17. Baltimore, MD
5. Port of Long Beach, CA	18. Duluth-Superior, MN and WI
6. Port of New Orleans, LA	19. Philadelphia Regional Port, PA
7. Beaumont, TX	20. Northern Indiana District, IN
8. Port of Greater Baton Rouge, LA	21. Tampa Port Authority, FL
9. Port of Virginia, VA	22. Port of Charleston, SC
10. Port of Los Angeles, CA	23. Texas City, TX
11. Plaquemines Port District, LA	24. Valdez, AK
12. Mobile, AL	25. Port of Portland, OR
13. Lake Charles Harbor District, LA	

Figure 2-2: Location of Top 25 Ports by Total Tonnage

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, based upon 2021 data (latest available) provided by U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center. Special tabulation as of November 2023.

Table 2-3: List of Top 25 Ports by Dry Bulk Tonnage (Ranked by Short Tons)

1. South Louisiana Port of, LA	14. Huntington-Tristate, KY, OH, WV
2. Port of New Orleans, LA	15. Kalama
3. Plaquemines Port District, LA	16. New Bourbon Port Authority, MO
4. Port of Virginia, VA	17. Portland
5. Port of Greater Baton Route, LA	18. Mid-America Port, IA, IL and MO
6. Duluth-Superior, MN and WI	19. Pittsburgh
7. Mobile, AL	20. Illinois Waterway Ports Terminals
8. Northern Indiana District, IN	21. Two Harbors
9. Port Houston, TX	22. Corpus Christi
10. Baltimore, MD	23. Seattle
11. Southern Indiana District, IN	24. Longview
12. Port of Kalama, WA	25. Tampa Port Authority
13. Port of Portland, OR	

Figure 2-3: Location of Top 25 Ports by Dry Bulk Tonnage

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, based upon 2021 data (latest available) provided by U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center. Special tabulation as of November 2023.

Table 2-4: List of Top 25 Container Ports by TEU (Ranked by TEU)

1. Port of Los Angeles, CA	14. Honolulu, O'ahu, HI
2. Port of Long Beach, CA	15. Baltimore, MD
3. Port of New York and New Jersey, NY & NJ	16. Port Everglades, FL
4. Port of Savannah, GA	17. Philadelphia Regional Port, PA
5. Port of Virginia, VA	18. Mobile, AL
6. Port Houston, TX	19. Port of Alaska in Anchorage, AK
7. Port of Charleston, SC	20. Port of New Orleans, LA
8. Port of Oakland, CA	21. Wilmington, NC
9. Tacoma, WA	22. Wilmington, DE
10. Port of Seattle, WA	23. Port of Palm Beach District, FL
11. Jacksonville, FL	24. South Jersey Port Corporation, NJ
12. PortMiami, FL	25. Boston, MA
13. San Juan, PR	

Figure 2-4: Location of Top 25 Container Ports by TEU

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, based upon 2021 data (latest available) provided by U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center. Special tabulation as of November 2023.

Table 2-5: Major Ports That Comprise the Top 25 Ports by Tonnage, Dry Bulk, and Container (Alphabetical Order)

Port Name		Tonnage Rank		Dry Bulk Rank		TEU Rank
Baltimore, MD	✓	17	✓	10	✓	15
Beaumont, TX	✓	7				
Boston, MA					✓	25
Cleveland-Cuyahoga Port, OH			✓	18		
Corpus Christi, TX	✓	3	✓	23		
Duluth-Superior, MN and WI	✓	18	✓	6		
Honolulu, O'ahu, HI					✓	14
Houston Port Authority, TX	✓	1	✓	9	✓	6
Jacksonville, FL					✓	11
Lake Charles Harbor District, LA	✓	13				
Mid-America Port, IA, IL and MO			✓	16		
Mobile, AL	✓	12	✓	7	✓	18
New Bourbon Port Authority, MO			✓	20		
New Orleans, LA	✓	6	✓	2	✓	20
New York, NY & NJ	✓	4	✓	21	✓	3
Northern Indiana District, IN	✓	20	✓	8		
Philadelphia Regional Port Authority, PA	✓	19			✓	17
Pittsburgh, PA Port of			✓	15		
Plaquemines Port District, LA	✓	11	✓	3		
Port Arthur, TX	✓	16				
Port Everglades, FL					✓	16
Port Freeport, TX	✓	15				
Port of Alaska, AK					✓	19
Port of Charleston, SC	✓	22			✓	7
Port of Greater Baton Rouge, LA	✓	8	✓	5		
Port of Kalama, WA			✓	12		
Port of Long Beach, CA	✓	5	✓	25	✓	2
Port of Longview, WA			✓	19		
Port of Los Angeles, CA	✓	10			✓	1
Port of Oakland, CA					✓	8
Port of Palm Beach District, FL					✓	23
Port of Portland, OR	✓	25	✓	13		
Port of Savannah, GA	✓	14			✓	4
Port of Seattle, WA			✓	17	✓	10
Port of Virginia, VA	✓	9	✓	4	✓	5
PortMiami, FL					✓	12
San Juan, PR					✓	13
South Jersey Port Corporation, NJ					✓	24
South Louisiana, LA, Port of	✓	2	✓	1		
Southern Indiana District, IN			✓	11		
Tacoma, WA					✓	9
Tampa Port Authority, FL	✓	21	✓	24		
Texas City, TX	✓	23				
Toledo-Lucas County Port, OH			✓	22		
Two Harbors, MN			✓	14		
Valdez, AK	✓	24				
Wilmington, DE					✓	22
Wilmington, NC					✓	21

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, based upon 2021 data (latest available) provided by U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center. Special tabulation as of January 2023.

3. Port Activities in 2022 & 2023

The United States is one of the world's largest trading nations, with $7 trillion in exports and imports of goods and services in 2022, the highest on record according to the US Census Bureau.[12] Of this total, goods alone exceeded $5.3 trillion (77.1 percent) in 2022, up from $4.6 trillion in 2021.

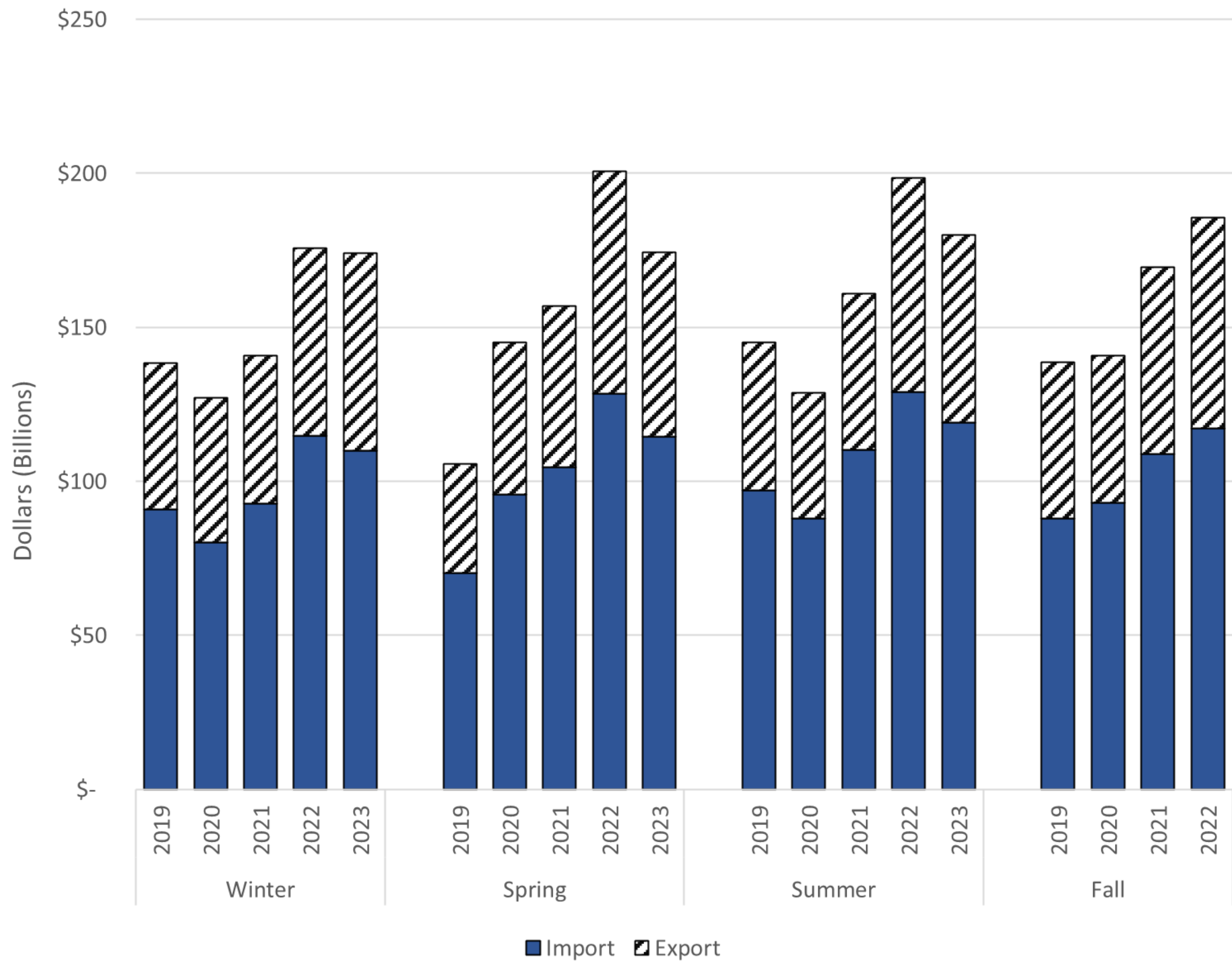
The Nation's ports handled 42.9 percent (over $2.28 trillion) of the U.S. international trade by value in 2022. While not reaching the heights of growth in the 2020-2021 period, total U.S. imports of goods grew by almost $424 billion or 14.9 percent while the export of goods grew by more than $324 billion or 18.4 percent between 2021 and 2022. Waterborne vessels are the leading transportation mode for U.S.-international trade in goods. As shown in Figure 3-1, vessels transported U.S.-international freight at record levels, with cargo value peaking at more than $206 billion in May 2022—up $106 billion (from the $100 billion low recorded in May 2020.[13] In 2023, cargo value declined slightly from mid-2022, reaching $183 billion in August 2023. The seasonal variations of imports and exports are shown in Figure 3-2.

[12] U.S. Census Bureau and the U.S. Bureau of Economic Analysis, based on the February 7, 2023, U.S. International Trade in Goods and Services, December and Annual 2022 report. Annual 2022 Press Highlights: https://www.census.gov/foreign-trade/statistics/highlights/AnnualPressHighlights.pdf

[13] U.S. Department of Transportation, Bureau of Transportation Statistics, based upon U.S. Department of Commerce, Census Bureau, *USA Trade Online*, available at USA Trade Online (census.gov) as of November 2023.

Figure 3-1: Monthly U.S. International Freight Value Transported by Vessel January 2019 to August 2022

Figure 3-2: Seasonal Variation in International Freight Value Transported by Vessel January 2019 to August 2023



SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, based upon U.S. Department of Commerce, Census Bureau, *USA Trade Online***,** available at [USA Trade Online (census.gov)](https://usatrade.census.gov) as of November 2023.

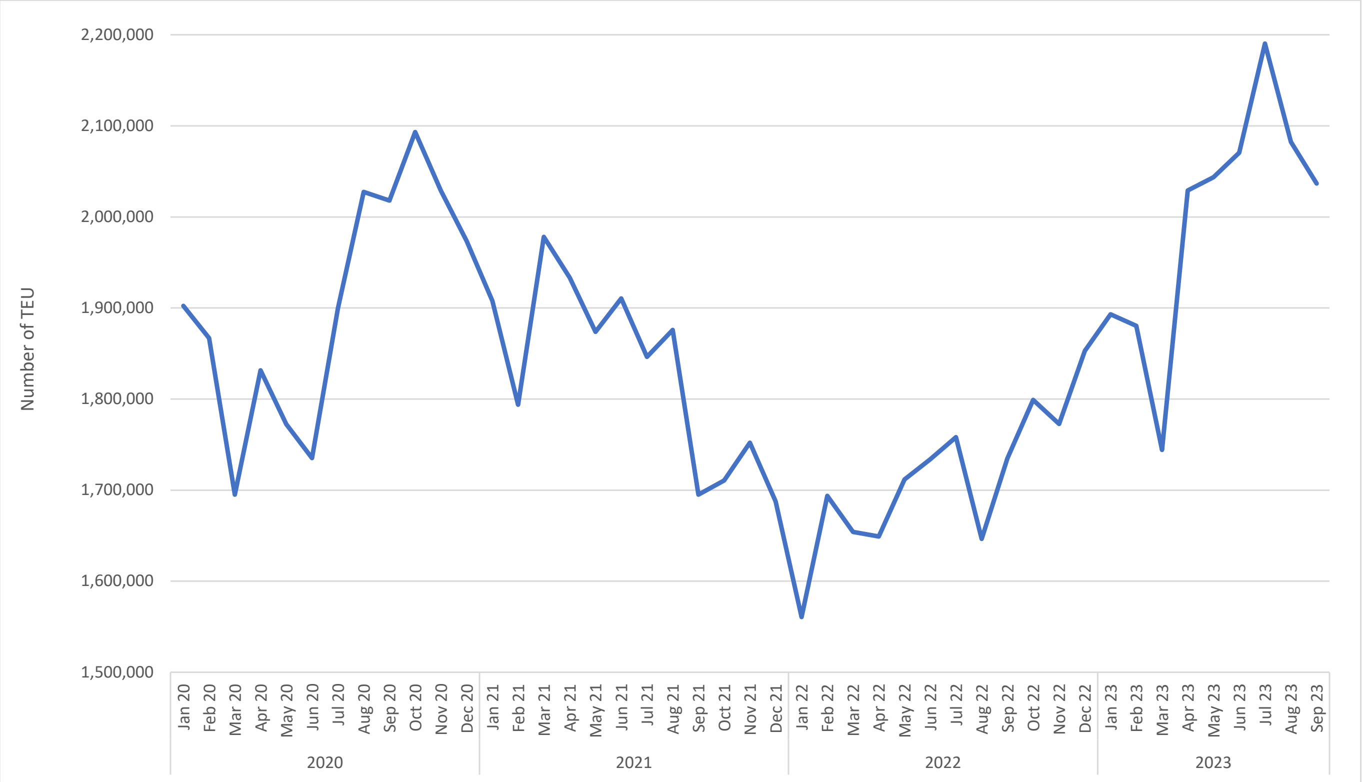
3.1 Supply Chain Challenges

While many of the port congestion challenges resulting from the COVID-19 pandemic and subsequent boom in trade have eased, supply chain issues continued.[14] Supply chain challenges related to throughput explored in this report were based on vessel capacity. TEU handled, number of container ships waiting to enter port, and the record low water on the Mississippi and Ohio Rivers.

Throughput measures reflect the amount of TEU handled by a port. The TEU capacity calling at U.S. ports represents all the available container slots of vessels that called at a port. TEU capacity is a summation of the container vessels' sizes, as measured in TEU. It does not necessarily equal the TEUs being unloaded or loaded at that particular port. TEU capacity can represent a supply chain challenge as it is a limiting factor of the number of TEUs a port can import or export via container ships, and thus a limiting factor of supply chain capacity. The TEU capacity data presented here is calculated as the average weekly capacity per month. As of September 2023, total TEU capacity calling at U.S. ports was higher than capacity in September of previous years. Annual capacity decreased from 21.9 million TEU in 2021 to 20.6 million TEU in 2022. As Figure 3-3 shows, monthly TEU capacity fell by an average of about 1.9 million TEU in 2020 to 1.71 million in 2022, a decrease of about 190,000 or 10.0 percent. TEU capacity for early-to-mid 2023 tends to be moving upward with average monthly capacity from January to September of 2 million TEU, an average of 314,316 TEU or 18.7% higher than 2022, and 128,437 TEU or 6.9% higher than 2021. Container shipping companies are a major driver of TEU capacity, as it is a direct reflection of their vessel call schedules. However, events outside the control of the shipping companies, such as port closures due to storms or channel closures, can also impact TEU capacity.

[14] Fact Sheet: President Biden Announces New Actions to Strengthen America's Supply Chains. November 27, 2023

Figure 3-3: Monthly TEU Capacity of Container Ships Calling at U.S. Ports January 2020 to September 2023

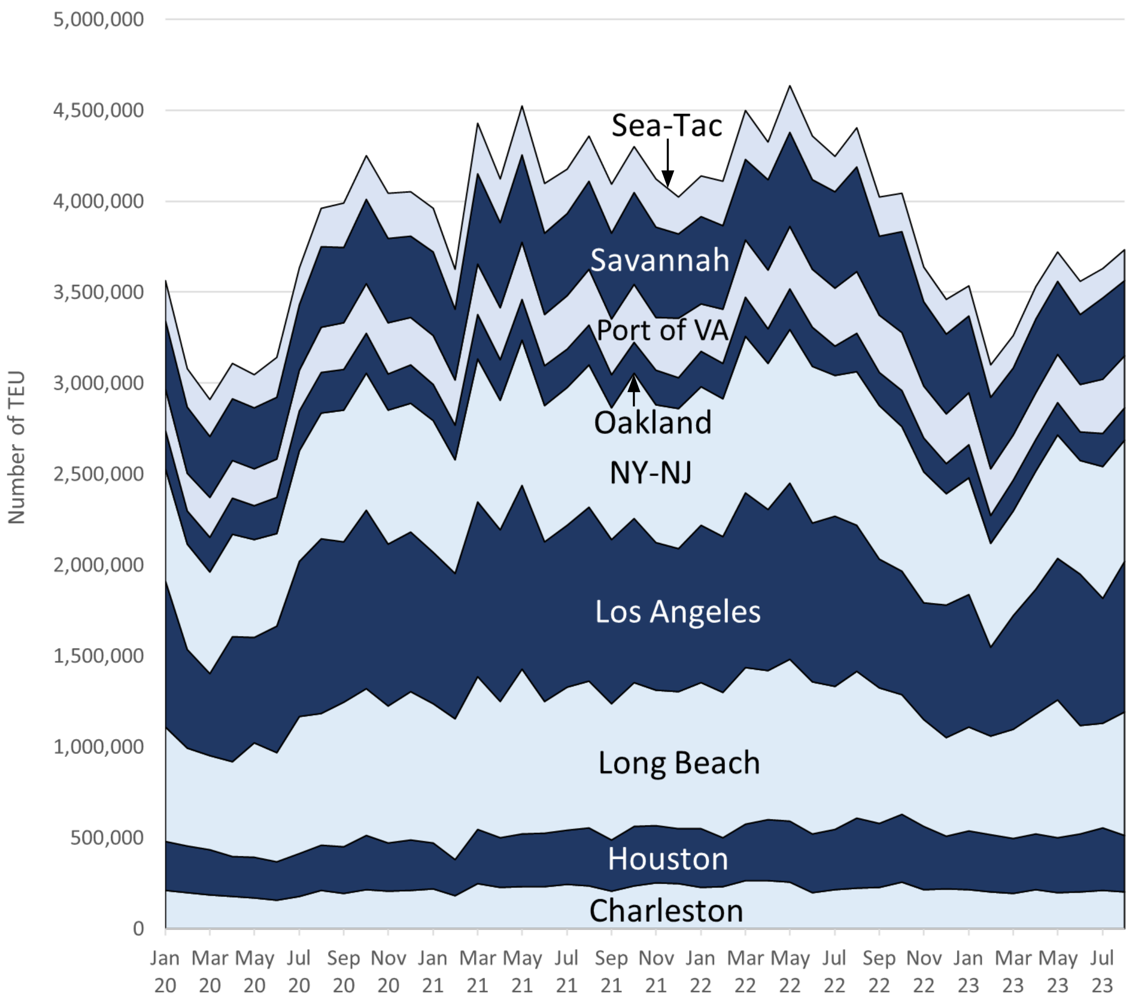


KEY: TEU = twenty-foot equivalent unit

SOURCE: U.S. Department of Transportation, Maritime Administration, Office of Policy & Plans analysis of data from U.S. Customs & Border Protection, Vessel Entrance and Clearance System, and Lloyd's Register of Ships (S&P Global), available at Latest Supply Chain Indicators (bts.gov) as of November 2023.

While TEU capacity has decreased, TEU throughput has increased. As shown in Figure 3-4, monthly TEU throughput at select U.S. container ports peaked at about 4.6 million TEU in May 2022, up 1.7 million TEU or 59.3 percent from the March 2020 low of about 2.9 million TEU. These nine ports were selected because they routinely and consistently provide data concerning TEU handle. The greatest increase in TEU handled has taken place at the Port of Virginia and Houston Port Authority which experienced a 26.4% and 14.5% increase, respectively, from January 2020 to August 2023. Other ports experienced an increase in TEU from early 2020 to early mid 2021 and 2022 before decreasing. This includes the Port of Long Beach and Port of Los Angeles which experienced a 45% and 26% surge, respectively, from January 2020 to May 2021 before dropping back to January 2020 levels by August 2023. Of the selected ports, the Port of Long Beach, Port of Los Angeles, and Port of New York & New Jersey handled the most TEU, with each handling more than 500,000 TEU monthly from 2020-2023 at their lowest points.

Figure 3-4: 20-Foot Equivalent Units (TEU) Handled by Selected U.S. Container Ports January 2020 to August 2023

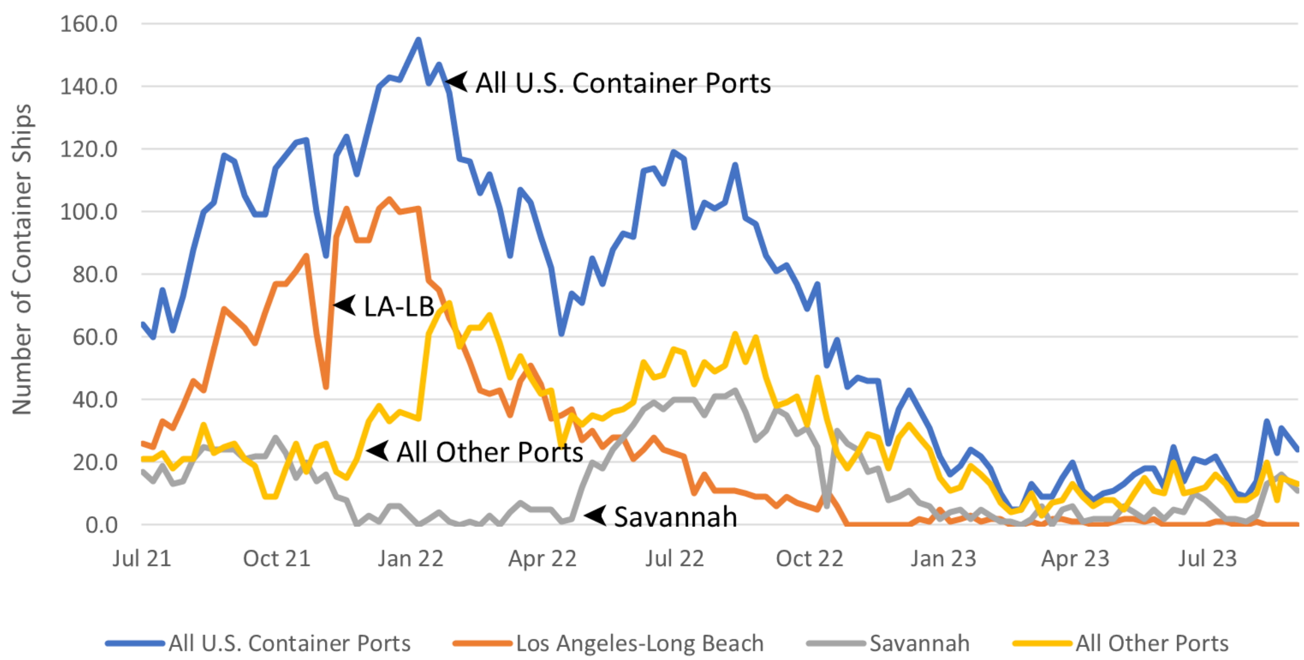


SOURCES: U.S. Department of Transportation, Bureau of Transportation Statistics analysis; based upon TEU volumes at the ports of Charleston, SC, http://scspa.com/; Houston, https://porthouston.com/; Long Beach, https://www.polb.com/; Los Angeles, https://www.portoflosangeles.org/; Northwest Seaport Alliance (Seattle / Tacoma), https://www.nwseaportalliance.com/; Oakland, https://www.oaklandseaport.com/; New York/New Jersey, https://www.panynj.gov/; Port of Virginia, http://www.portofvirginia.com/; and Savannah, https://gaports.com/; as of November 2023.

In 2023, container ships waiting to enter U.S. ports showed marked improvement over 2021 and 2022. In February 2022, a peak was reached of more than 150 weekly container ships waiting to dock, which was a continuation of the congestion seen during the COVID-19 pandemic caused by factors such as increased consumer demand.[15] The Ports of Los Angeles and Long Beach alone had more than one hundred vessels waiting at anchorages in San Pedro Bay, in some cases spending many more days at anchor than at dock. In contrast no ships were waiting to dock at these ports as of the most recently available data (Figure 3-5). Nationwide, container ships waiting to dock decreased to 12 in June 2023 before increasing to 31 in September 2023. Factors in the transient increase include ports receiving and commissioning new container crane equipment and United States Coast Guard (UCSG) ordered closures out of caution due to seasonal weather and storms. As of late November 2023, the number of waiting container ships was down to seven.

[15] Council on Foreign Relations, "What Happened to Supply Chains in 2021?", available at Council on Foreign Relations as of January 2024.

Figure 3-5: Weekly Number of Container Ships Awaiting to Dock at All U.S. Ports: July 2021 to September 2023



SOURCE: U.S. Department of Transportation, Maritime Administration, Office of Policy & Plans analysis of AIS data from S&P Global as of November 2023.

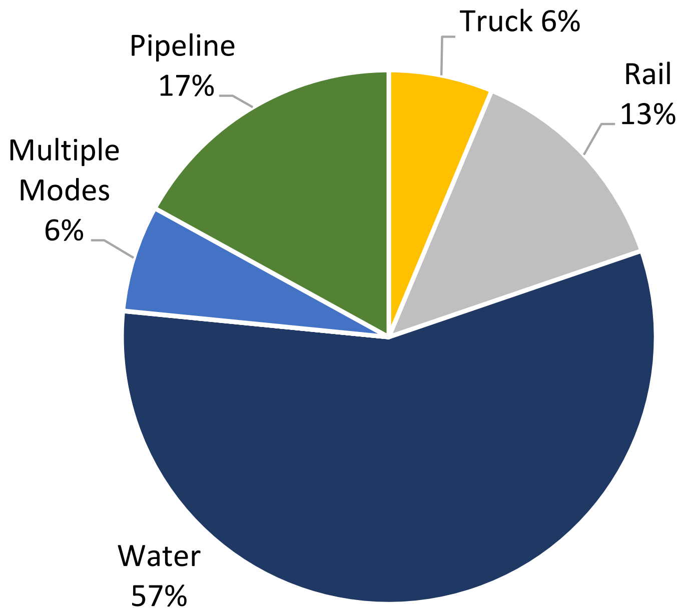
3.2 Record Low Water on the Mississippi and Ohio Rivers

Port capacity and throughput is affected by the state of the inland water system that is dominated by the Mississippi River. In 2022, the Mississippi River carried 57 percent of the 164.1 million tons that moved between the 12 states[16] touching the Upper Mississippi System and Louisiana, as shown in Figure 3-6. The percentage of freight tonnage carried by the River to Louisiana is much higher for some states than others: nearly 57 percent for Illinois, 8.6 percent for Missouri, and 10.7 percent for Kentucky.[17] In 2022 and 2023 to date, that flow of freight has been hampered by low water levels on the Lower Mississippi River. Barges must carry less cargo to reduce their drafts and barge tows must be reduced in number and length. At times, some parts of the waterway system were not navigable by barges.

[16] These include Minnesota, Wisconsin, Iowa, Illinois, and Missouri along the Mississippi north of its confluence with the Ohio River; Kansas and Nebraska along the navigable portion of the Missouri River; and Indiana, Ohio, Kentucky, West Virginia, and Pennsylvania along the Ohio River.

[17] U.S. Department of Transportation, Bureau of Transportation Statistics, Freight Analysis Framework (FAF, version 5.4), available at Freight Analysis Framework (bts.gov) as of November 2023.

Figure 3-6: Percent Tonnage by Mode between States on the Upper Mississippi River System and Louisiana, 2022



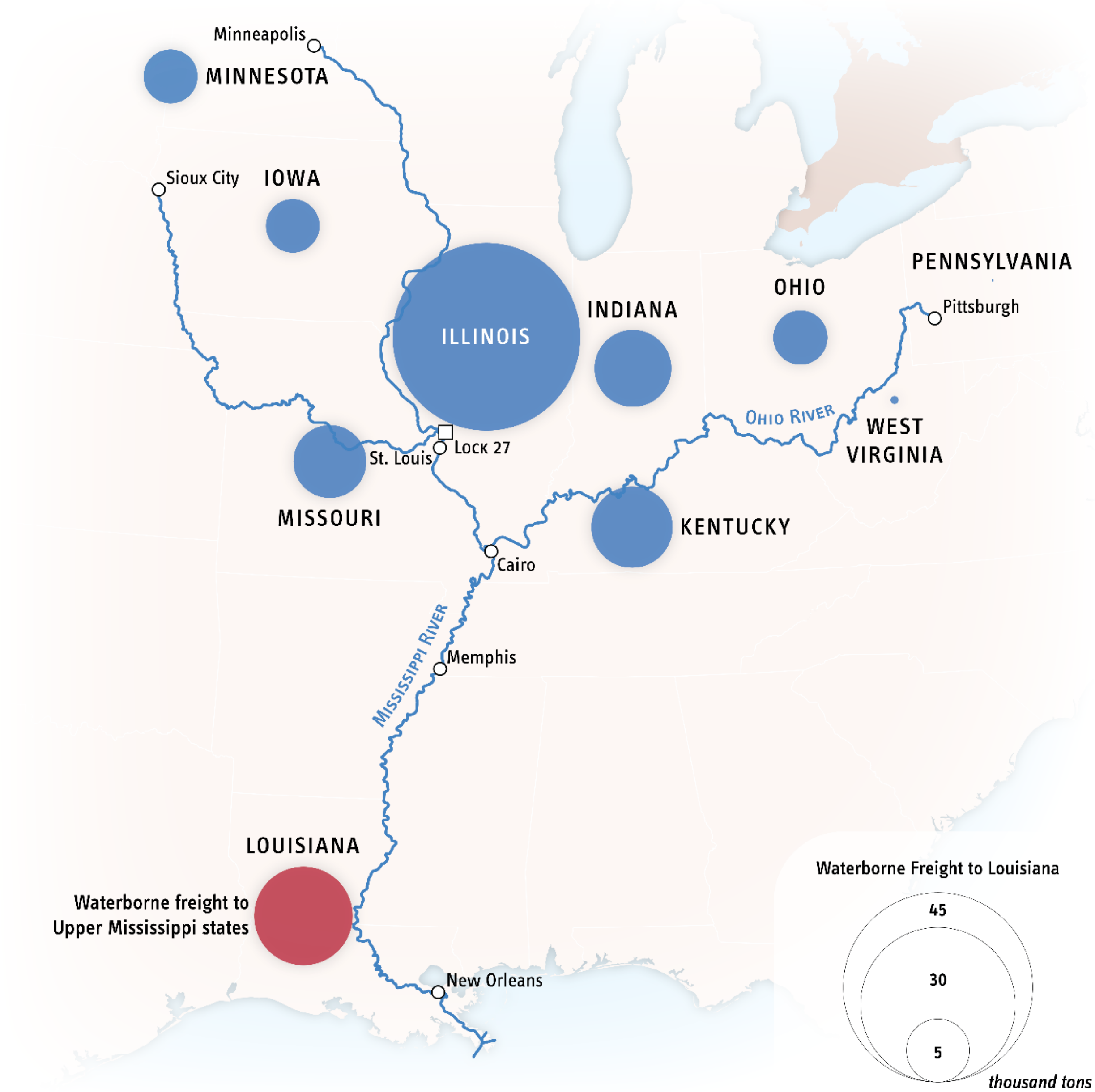
SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, Freight Analysis Framework (FAF, version 5.4), available at Freight Analysis Framework (bts.gov) as of November 2023.

Of the 12 states (excluding Kansas, Nebraska, and Wisconsin, which transported no tonnage), as shown in Figure 3-7, Illinois shipped the most waterborne freight to Louisiana in total (45 thousand tons) in 2022. Cereal grain accounted for 45 percent of the total tonnage from Illinois to Louisiana, and other agricultural products accounted for 28 percent. The river carried 97 percent of the cereal grain between Illinois and Louisiana, compared to 3 percent by rail, and it carried 83 percent of "other agricultural products"[18] between those two states, compared to 15 percent by rail and 2 percent by truck.[19]

[18] The category of "other agricultural products" excludes cereal grains, live animals and seafood, milled grain, and foodstuffs.

[19] U.S. Department of Transportation, Bureau of Transportation Statistics, Freight Analysis Framework (FAF, version 5.4), available at Freight Analysis Framework (bts. gov) as of November 2023.

Figure 3-7: Waterborne Tonnage from States on the Upper Mississippi River System to Louisiana, 2022



SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, Freight Analysis Framework (FAF, version 5.4), available at [Freight Analysis Framework (bts.gov)] as of November 2023.

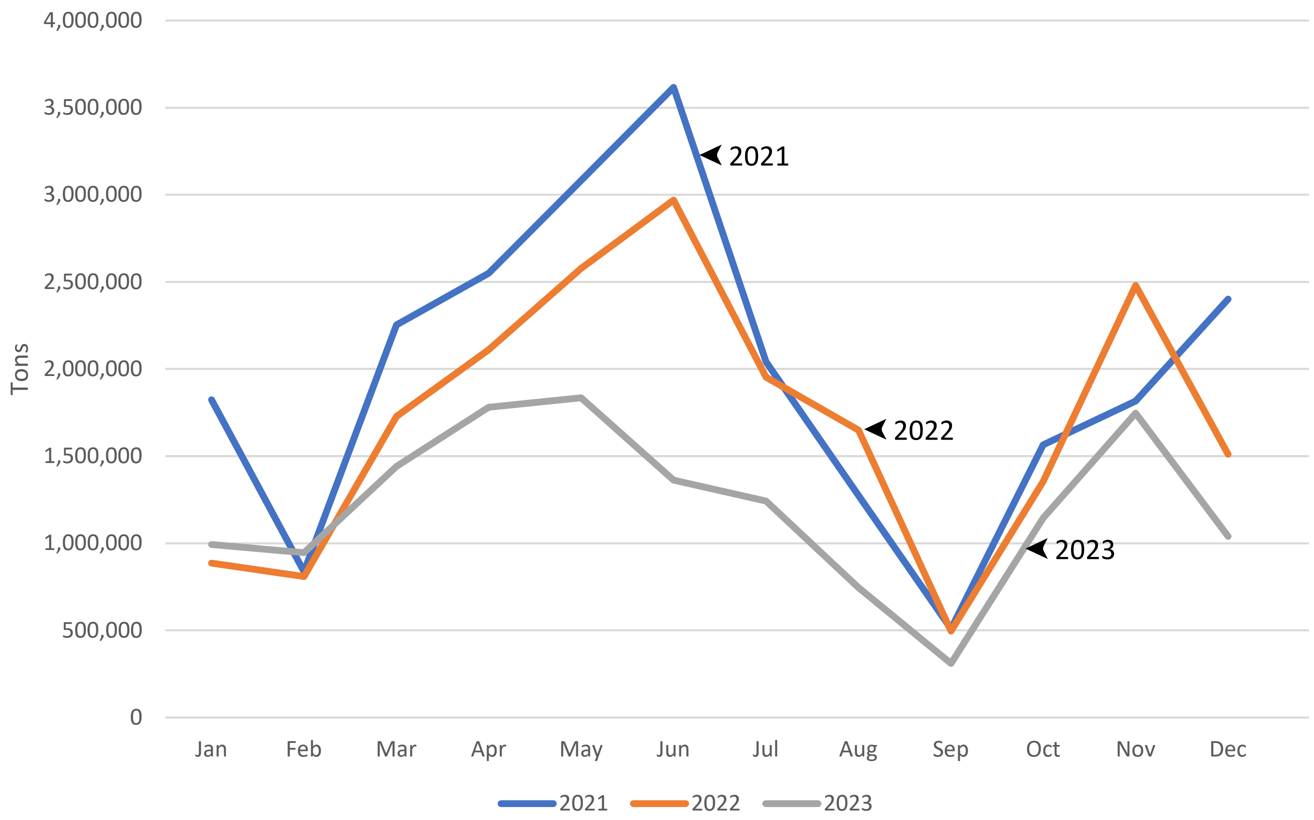
Many major barge commodities such as coal, chemicals, and petroleum move at similar volumes year-round. Grain and other farm products, however, are seasonal. In 2023, downbound (southbound) grain shipments from the Upper Mississippi through Lock 27[20] were even lower than the 2022 volumes, as shown in Figure 3-9.[21]

Unfortunately, the low water has again coincided with the peak shipping season for U.S. corn and soybeans, the nation's largest export crops. The October downbound grain and agriculture product shipments on the Lower Mississippi below Lock and Dam 27 were predominately soybeans and corn as shown in Figure 3-10, leaving those major export commodities most vulnerable to the Lower River disruption.

[20] Lock and Dam 27 are located on the Mississippi River near Granite City, IL.

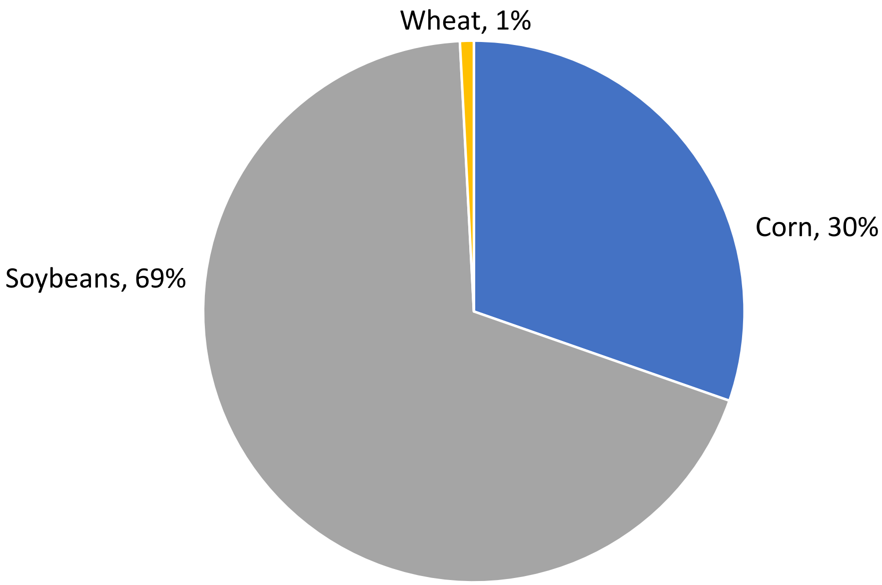
[21] U.S. Department of Transportation, Bureau of Transportation Statistics, analysis based upon *Downbound Grain Barge Rates* (12/05/23), available at Latest Supply Chain Indicators (bts.gov) as of December 2023.

Figure 3-8: Monthly Downbound Barge Grain Tonnage at Mississippi Lock 27 2021 to 2023



SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, analysis based upon U.S. Department of Agriculture, Agricultural Market Service, *Downbound Barge Grain Movements*, available at Downbound Barge Grain Movements (usda.gov) as of December 2023.

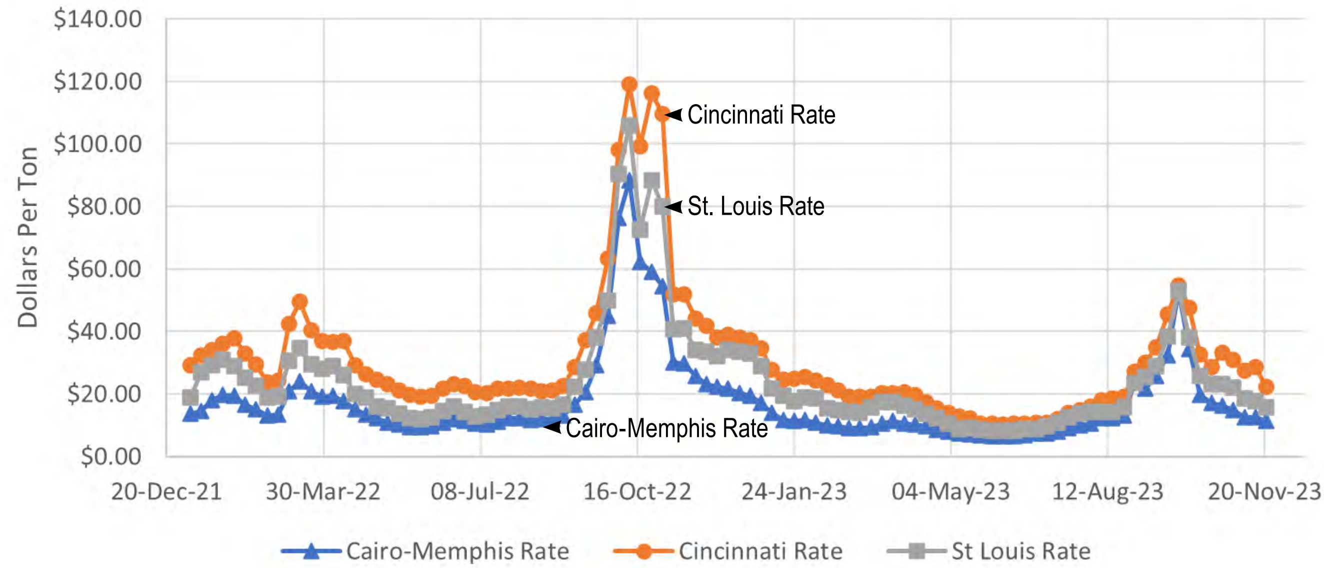
Figure 3-9: Downbound Grain & Agricultural Product Shares at Mississippi Lock 27 October 2023



SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, analysis based upon U.S. Department of Agriculture, Agricultural Market Service, *Downbound Barge Grain Movements*, available at Downbound Barge Grain Movements (usda.gov) as of November 2023.

The implications are apparent in barge shipping rates. By early September 2022, barge rates were at record highs. Downbound grain rates on the Mississippi in October 2022 rose to more than double the 2021 peak and remained very high in early November of that year, as shown in Figure 3-11. However, the winter of 2023 saw very low barge rates, which have only just ticked up in October 2023 and were far lower than October 2022 rates. Low rates can be reflective of low demand – with interruptions in service and inability to move the same tonnage as cost effectively, shippers may be moving to other modes.

Figure 3-10: Weekly Downbound Grain Barge Rates
January 2022 to November 2023



NOTE: Weekly barge rates for downbound freight originating from seven locations along the Mississippi River System, which includes the Mississippi River and its tributaries (e.g., Upper Mississippi River, Illinois River, Ohio River, etc.). Shown are St. Louis; Cincinnati, along the middle third of the Ohio River; and Cairo-Memphis from Cairo, IL, to Memphis, TN.

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, analysis based upon U.S. Department of Agriculture, Agricultural Market Service, *Downbound Grain Barge Rates* (12/05/23), available at Downbound Barge Grain Movements (usda.gov) as of November 2023.

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4. Port Capacity & Throughput Measures

4.1 Port Capacity Measures

Nationally consistent port capacity measures are measured by four elements (Table 4-1).

4.1.1 Air Draft & Channel Depths

Air draft restrictions may be eliminated as bridges are either raised or replaced. Several ports have constructed new bridges (such as the Long Beach International Gateway Bridge in California) or elevated existing bridges (such the Bayonne Bridge in the Port of New York and New Jersey) in recent years. Most recently, the Port of Corpus Christi has commenced a construction project to build a new cable-stayed bridge that will have 205 feet of clearance over the port's main shipping channel. This new bridge will replace the old through-type arch Corpus Christi Harbor Bridge, which has 138 feet of clearance.[22] This higher-clearance bridge will allow a higher number of ships to access the port, in addition to providing additional improvements to ground transportation, including a shared-use path. The bridge is expected to be completed in 2025.

Channel depths can limit the size of vessels able to call at a port. Coastal ports have deeper channels (42-foot average) than ports along the Great Lakes (28-foot average) or the inland waterway system (9-foot average). The Pacific coast ports with their natural harbors, such as the Ports of Long Beach and Los Angeles, have the deepest channels. The Mississippi River Ports of Cincinnati-Northern Kentucky, Huntington, Pittsburgh, and St. Louis have the shallowest channels. Even if a port's minimum channel depth allows for mega-ships, individual marine terminals within the port vicinity may not have the required depth to handle them.[23]

Additional information on the air draft and channel depths for individual ports and marine terminals can be found at https://www.bts.gov/ports.

[22] Port Corpus Christi, *Harbor Bridge Project*, available at Port of Corpus Christi (portofcc.com) as of October 2022.

[23] U.S. Department of Transportation, Bureau of Transportation Statistics, National Transportation Atlas Database (NTAD), *Navigable Waterway Lines* (May 2022), available at National Transportation Atlas Database (bts.gov) as of July 2022.

Table 4-1: Port Capacity Measures

Element/Metric	Description
Air draft restrictions (feet)	The distance between the mean low-level water line and the lowest point of a bridge or other structure over a shipping channel. The maps in the online Port Profiles present the limiting bridges located within the port vicinity. These restrictions may not affect all terminals in the port
Channel depth (feet)	The vertical distance from the water surface to the bottom of a channel. Channel depths may constrain port capacity, especially at coastal ports that serve the largest vessels
Number and type of container cranes	Number of dedicated container cranes for all the terminals capable of serving: 1) Panamax, 2) Post-Panamax, and 3) Super Post-Panamax vessels.
Presence of rail transfer facilities	On-dock rail transfer facilities are present at select ports. Nearby rail facilities are indicated in the overview for each online Port Profile.

4.1.2 Container Cranes

Container cranes are the critical link between the waterside and landside, including truck and rail connections and container yards used for short-term storage. Cranes move containers to and from the ship and shore. The number and size of cranes affect the number and size of container vessels that a terminal can service simultaneously. The top 25 container ports of 2021 operated a total of 539 ship-to-shore gantry cranes in 2023, up eleven from 528 in 2022 (as per 2023 Port Performance Freight Statistics Program Annual Report to Congress). As shown in Table 4-2, the number of cranes by port varies widely. Of ship-to-shore gantry cranes, 322 are classified as super post-Panamax, which are the most capable. This is an increase from 294 super post-Panamax cranes reported in last year's report. Many ports are replacing cranes with super post-Panamax cranes, decreasing the number of other types of cranes from 234 in 2022 to 217 in 2023. Other marine terminals at ports may use mobile harbor cranes, or container vessels may be equipped with ship gear to unload cargo or transport containers onto trailers.[24] Several port facilities plan to purchase cranes at new and existing container terminals, including the addition of reactivated terminals or the repurposing of other terminals. For example, the Georgia Ports Authority has approved a plan to renovate the Ocean Terminal at the Port of Savannah and repurpose operations from handling breakbulk to container cargo.[25]

Additional information on container cranes at individual ports and container terminals can be found at https://www.bts.gov/ports.

[24] U.S. Department of Transportation, Bureau of Transportation Statistics and Maritime Administration analysis, based upon individual port authority and marine terminal operator websites, including links to terminal-specific websites as of July 2022.

[25] Georgia Ports Authority, *GPA to renovate Ocean Terminal docks* (12/5/22), available at GPA to renovate Ocean Terminal docks (gaports.com) as of January 2023.

Table 4-2: Number of Container Cranes at the Top 25 Container Ports: 2021

State(s)	Port	Other	Super Post Panamax	Total
Alabama	Mobile, AL	0	4	4
Alaska	Port of Alaska in Anchorage, AK	3	0	3
California	Port of Long Beach, CA	14	61	75
	Port of Los Angeles, CA	33	34	67
	Port of Oakland, CA	13	13	26
Delaware	Wilmington, DE	2	0	2
Florida	Jacksonville, FL	16	6	22
	Port of Palm Beach District, FL	8	0	8
	PortMiami, FL	7	6	13
	Port Everglades, FL	9	6	15
Georgia	Port of Savannah, GA	4	30	34
Hawaii	Honolulu, O'ahu, HI	9	0	9
Louisiana	Port of New Orleans, LA	5	4	9
Maryland	Baltimore, MD	11	12	23
Massachusetts	Boston, MA	6	6	12
New Jersey	South Jersey Port Corporation, NJ	2	0	2
New York-New Jersey	Port of New York and New Jersey, NY & NJ	21	40	61
North Carolina	Wilmington, NC	7	0	7
Pennsylvania	Philadelphia Regional Port, PA	6	5	11
Puerto Rico	San Juan, PR	11	0	11
South Carolina	Port of Charleston, SC	3	24	27
Texas	Port Houston, TX	13	16	29
Virginia	Port of Virginia, VA	0	28	28
Washington	Port of Seattle, WA	6	10	16
	Tacoma, WA	8	17	25

NOTES: Based upon active marine terminals handling container ships at each container port. *A container crane* is defined as a ship-to-shore crane mounted on a "gantry;" a frame or structure spanning an intervening space, most often a workspace used to stack intermodal shipping containers on truck chassis and mounted on road or rail wheels. *Super post-Panamax* are a class of cranes that can fully unload intermodal shipping containers from the largest container ships approximately sixteen containers or greater in width. *Other cranes* include lesser cranes.

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics and Maritime Administration analysis, based upon individual port authority and marine terminal operator websites, including links to terminal-specific websites as of November 2023. Additionally, data was verified via interviews and correspondence with key port staff in November 2023.

4.1.3 Road & Rail Connections

Nearly all major U.S. ports have National Highway System (NHS) connectors,[26] the public roads that lead to major marine terminals, as well as on-dock or nearby intermodal container transfer facility (ICTF) rail connections. Ports are served by 322 NHS connectors that range in length from a few hundred yards to twenty-seven miles in the case of Port Mikiski – Kenai in Alaska.[27] These roadways can handle annual average daily traffic ranging from a few hundred vehicles to hundreds of thousands of vehicles.[28]

Of the top 25 container ports, 18 or 72 percent have on-dock rail, but all have nearby rail transfer facilities. However, 43 or 69.3 percent of container terminals have on-dock transfer facilities within the marine terminal boundaries to load containers directly onto rail cars. On-dock rail eliminates the need for drayage trucks to ferry shipping containers to and from the marine terminal and ICTFs, which in turn reduces port congestion and improves efficiency. Other container terminals are located near off-dock facilities. As shown in Table 4-3, the number of marine terminals handling container ships with on-dock rail by port varies widely.

Additional information on NHS connectors and rail connections for individual ports and marine terminals can be found at https://www.bts.gov/ports.

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[26] Highway intermodal connectors are roads that provide the "last-mile" connection between major rail, port, airport, and intermodal freight facilities on the National Highway System (NHS). For additional information, please visit Freight Intermodal Connectors Study (dot.gov).

[27] U.S. Department of Transportation (USDOT), Office of Planning, Environment, & Realty, available at https://www.fhwa.dot.gov/planning/national_highway_system/intermodal_connectors/ as of November 2023.

[28] U.S. Department of Transportation (USDOT), Bureau of Transportation Statistics (BTS), analysis of ***ADDT:*** USDOT, BTS, National Transportation Atlas Database (NTAD), available at National Transportation Atlas Database (bts.gov) as of November 2023. ***Intermodal Connectors:*** USDOT, Federal Highway Administration, Intermodal Connectors (Port Terminal), available at Intermodal Connectors (dot.gov) as of August 2022.

Table 4-3: Number of Terminals Handling Container Ships with On-Dock Rail in 2021's Top 25 Container Ports: 2023

State	Port	Number of container terminals	On-dock rail access
Alabama	Mobile, AL	1	1
Alaska	Port of Alaska in Anchorage, AK	1	0
California	Port of Long Beach, CA	6	5
	Port of Los Angeles, CA	8	8
	Port of Oakland, CA	5	0
Delaware	Wilmington, DE	1	0
Florida	Jacksonville, FL	3	3
	Port of Palm Beach District, FL	1	1
	PortMiami, FL	1	1
	Port Everglades, FL	2	0
Georgia	Port of Savannah, GA	2	2
Hawaii	Honolulu, O'ahu, HI	2	0
Louisiana	Port of New Orleans, LA	1	1
Maryland	Baltimore, MD	2	1
Massachusetts	Boston, MA	1	0
New Jersey	South Jersey Port Corporation, NJ	1	1
New York-New Jersey	Port of New York and New Jersey, NY & NJ	5	5
North Carolina	Wilmington, NC	1	1
Pennsylvania	Philadelphia Regional Port, PA	2	1
Puerto Rico	San Juan, PR	2	0
South Carolina	Port of Charleston, SC	4	2
Texas	Port Houston, TX	2	2
Virginia	Port of Virginia, VA	2	2
Washington	Port of Seattle, WA	2	2
	Tacoma, WA	4	4

NOTES: Based upon active marine terminals handling container ships at each port. A rail intermodal container transfer facility within marine terminal boundaries, or accessible without movement over public roads. The presence of an on-dock rail transfer facility allows terminal workers to load containers onto rail cars within the terminal, thereby avoiding the need to transport containers through the terminal gates on the chassis.

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics and Maritime Administration analysis, based upon individual port authority and marine terminal operator websites, including links to terminal-specific websites as of November 2023.

4.2 Port Throughput Measures

Nationally consistent port throughput measures are measured by six elements (Table 4-4).

4.2.1 Total Tonnage Handled by the Top 25 Tonnage Ports

The top 25 tonnage ports handled a total of 1.8 billion tons of cargo in 2021—about 72.8 percent of the tonnage handled by the top 100 ranked ports. The top 100 ports account for 94.8 percent of the total tonnage handled by U.S. ports.

The highest tonnage igures are associated with ports, such as the ports of Houston, South Louisiana, and Corpus Christi, which handle large quantities of both liquid bulk cargo (e.g., petroleum or chemicals) and dry bulk cargo (e.g., coal or grain). In 2021, Houston was the top tonnage port, handling 267 million short tons of cargo, as seen in Figure 4-1.[29]

4.2.2 Annual Dry Bulk Tonnage at the Top 25 Dry Bulk Ports

The top 25 dry bulk ports handled a total of 657 million tons of cargo, accounting for 65.1 percent of the dry bulk tons handled by all dry bulk ports nationwide. The top 100 ports account for 93.4 percent of total dry bulk tonnage handled by U.S. ports.

[29] U.S. Department of Transportation, Bureau of Transportation Statistics, based upon 2021 data (most recently available), U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center. Special tabulation as of November 2023.

The Port of South Louisiana handles nearly three times as much dry bulk tonnage as the second most (Port of New Orleans), as shown in Figure 4-2. The Port of South Louisiana handled 154 million short tons followed by 54 million short tons by the Port of New Orleans and 42 million short tons by the Plaquemines Port District (LA).[30]

4.2.3 Annual Number of Containers Handled by the Top 25 Container Ports

The top 25 container ports handled a total of 45.6 million TEU, accounting for 95.7 percent of the loaded TEU handled by the top 25 container ports. The container ports with the highest TEU volumes were coastal container ports (Figure 4-3), such as the ports of Los Angeles, Long Beach, and New York and New Jersey. The 2021 top container port was the port of Los Angeles, California which handled 7.0 million TEU.[31]

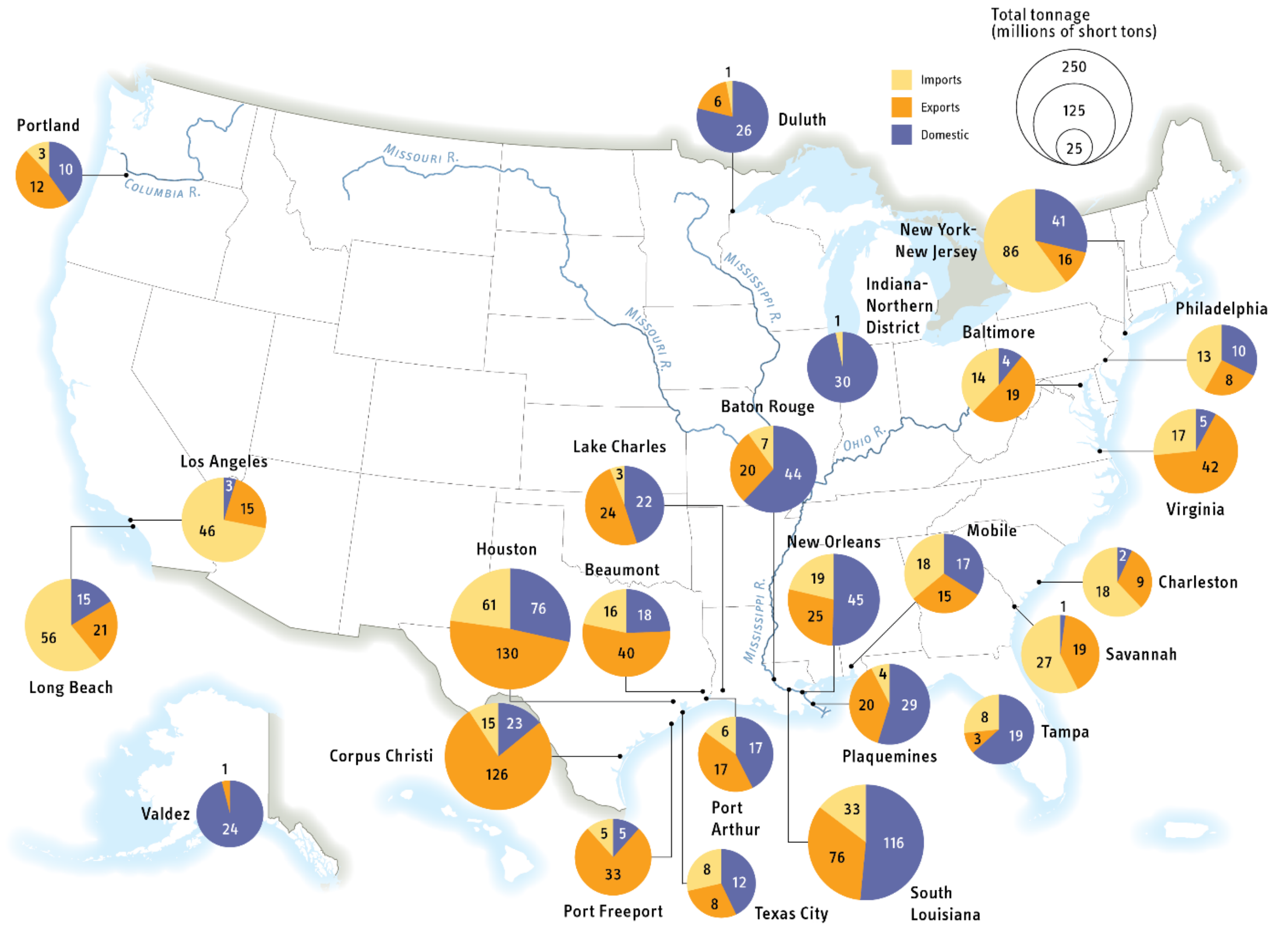
[30] U.S. Department of Transportation, Bureau of Transportation Statistics, based upon 2021 data (most recently available), U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center. Special tabulation as of November 2023.

[31] U.S. Department of Transportation, Bureau of Transportation Statistics, based upon 2021 data (most recently available) provided by U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center. Special tabulation as of November 2023.

Table 4-4: Port Throughput Measures

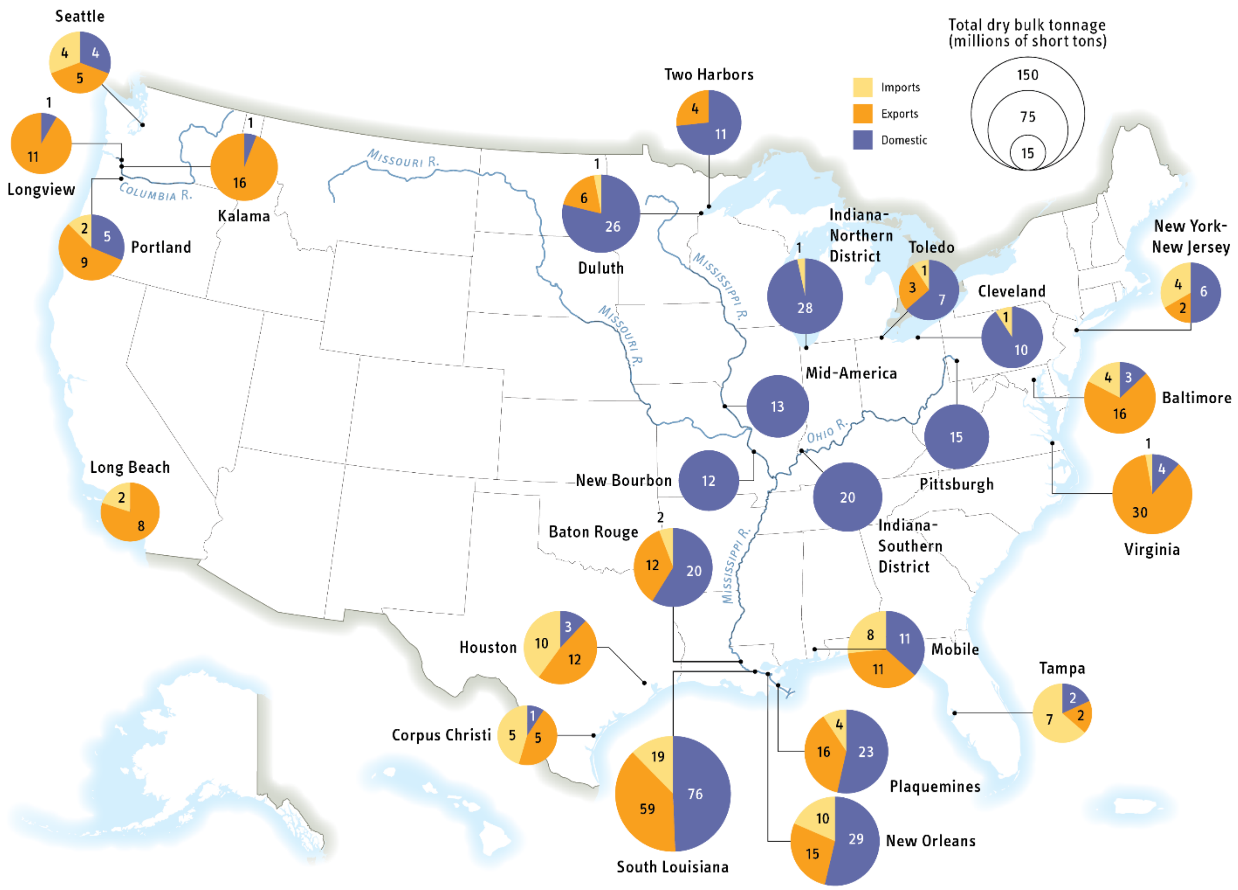
Element/Metric	Description
Annual total tonnage	Domestic, foreign, import, export, and total short tons, current year and percentage change from previous year
Annual dry bulk tonnage	Domestic, foreign, import, export, and total short tons, current year and percentage change from previous year
Annual container throughput	Inbound loaded, outbound loaded, empty, and total TEU, current year and percentage change from previous year
Average container vessel dwell time	Within port terminal boundaries limited to terminals servicing container vessels
Average Ro/Ro vessel dwell time	Within port terminal boundaries limited to terminals servicing Ro/Ro vessels
Average liquid bulk vessel (tanker) dwell time	Within port terminal boundaries limited to terminals servicing liquid bulk vessels

Figure 4-1: Top 25 Ports by Total Tonnage 2021



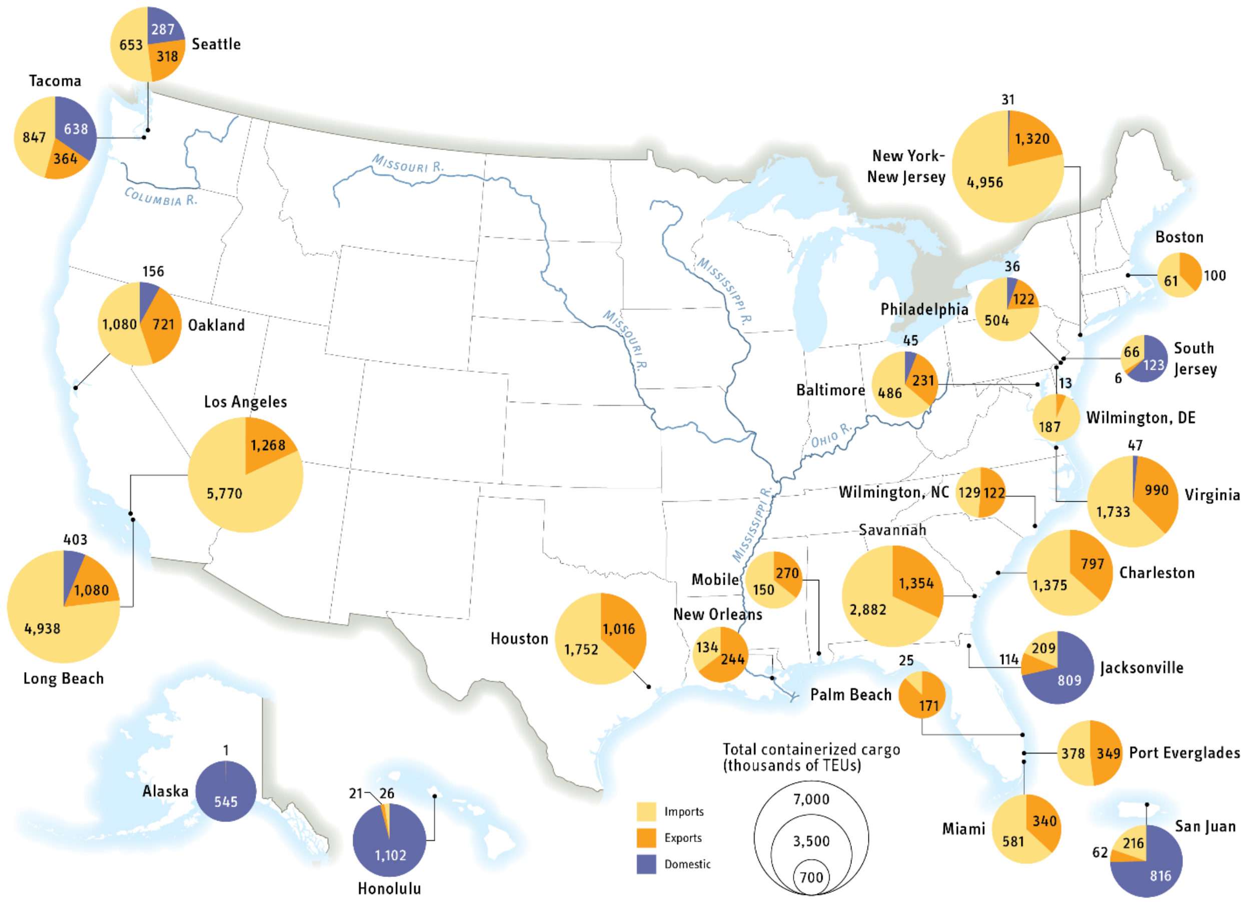
SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, based upon 2021 data (latest available) provided by U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center. Special tabulation as of November 2023.

Figure 4-2: Top 25 Ports by Dry Bulk Tonnage, 2021



SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, based upon 2021 data (latest available) provided by U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center. Special tabulation as of November 2023.

Figure 4-3: Top 25 Container Ports by TEU, 2021



SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, based upon 2021 data (latest available) provided by U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center. Special tabulation as of November 2023.

4.2.4 Vessel Dwell Times

The time vessels spend waiting in port is a major factor contributing to port performance. Vessel dwell times measure the time a vessel spends in port actively loading or unloading cargo, which in turn contributes to both port capacity and throughput performance. Port terminals focus on minimizing container vessel call duration to provide sufficient capacity to discharge and load container TEU's within the shortest period. Ocean carriers and terminal operators focus on minimizing dwell times due to the associated costs while in port. Longer dwell times lengthen schedules and raise costs that are ultimately reflected in shipping rates.

In collaboration with the U.S. Army Corps of Engineers, BTS uses the U.S. Coast Guard's (USCG) Automatic Identification System (AIS) data to calculate dwell times at berth for ship types, including container and liquid bulk (tanker) vessels. Additional information on the BTS' methodology can be found at https://www.bts.gov/PPFS-Tech-Docs.

4.2.5 Dwell Time of Container Vessels

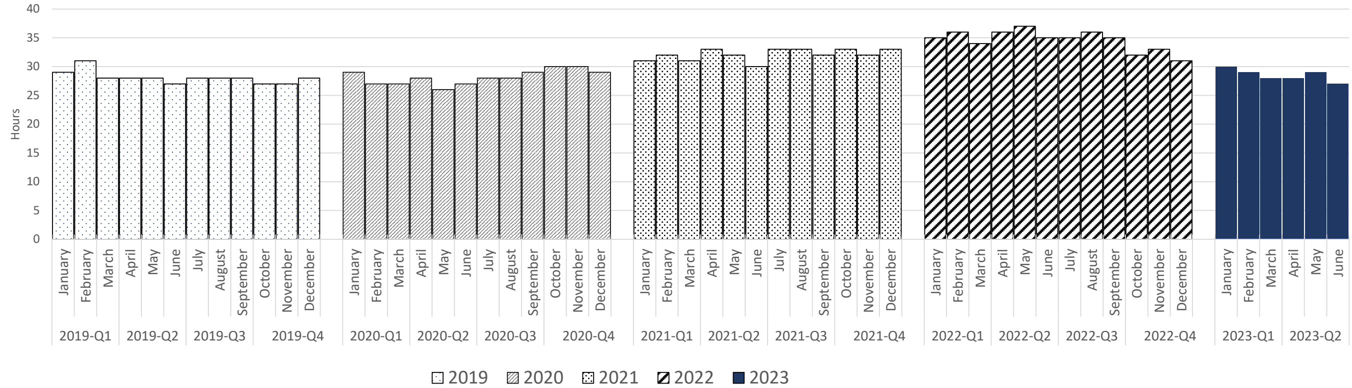
At the top 25 U.S. container ports, the average container vessel annual dwell time was estimated at 34.6 hours in 2022, up about 2.6 hours from 32.0 hours in 2021. Overall, as shown in the following Figure 4-4, dwell times for container vessels fluctuated monthly, though dwell times increased steadily since January 2021, peaked in the second quarter of 2022, and have been slowly decreasing through 2023. Container vessel dwell times were at an estimated low of 26 hours in May 2020, reaching an estimated peak of 37 hours in May 2022.[32] Average container vessel dwell times for individual ports are shown online in Port Profiles.

The distribution of the dwell times in Figure 4-4 and Figure 4-5 demonstrates the variability in dwell time, specifically the long "tail." Typically, consistent container vessel dwell times are ideal, but Figure 4-5 shows a long tail (e.g., dwell times greater than fifty-six hours). In terms of port performance, this long tail indicates irregular container vessel calls with less consistent and longer dwell times.

Furthermore, the comparison between the 2021 and 2022 distributions suggest that more vessels dwelled longer in 2022 than in 2021. For example, about 11 percent of the vessels dwelled between 40 and 56 hours (about 2 and a half days) in 2021, but this number increased to 14.5 percent in 2022. On the other hand, in 2022, 38.8 percent of vessels dwelled between 8 and 24 hours, a sharp decline from the 52.4 percent of vessels in 2020.

[32] U.S. Department of Transportation, Bureau of Transportation Statistics, calculated using AIS data from the U.S. Coast Guard's Nationwide Automatic Identification System (NAIS) archive, processed by U.S. Army Engineer Research and Development Center, Coastal and Hydraulics Laboratory, through the AIS Analysis Package (AISAP) software package, as of November 2023.

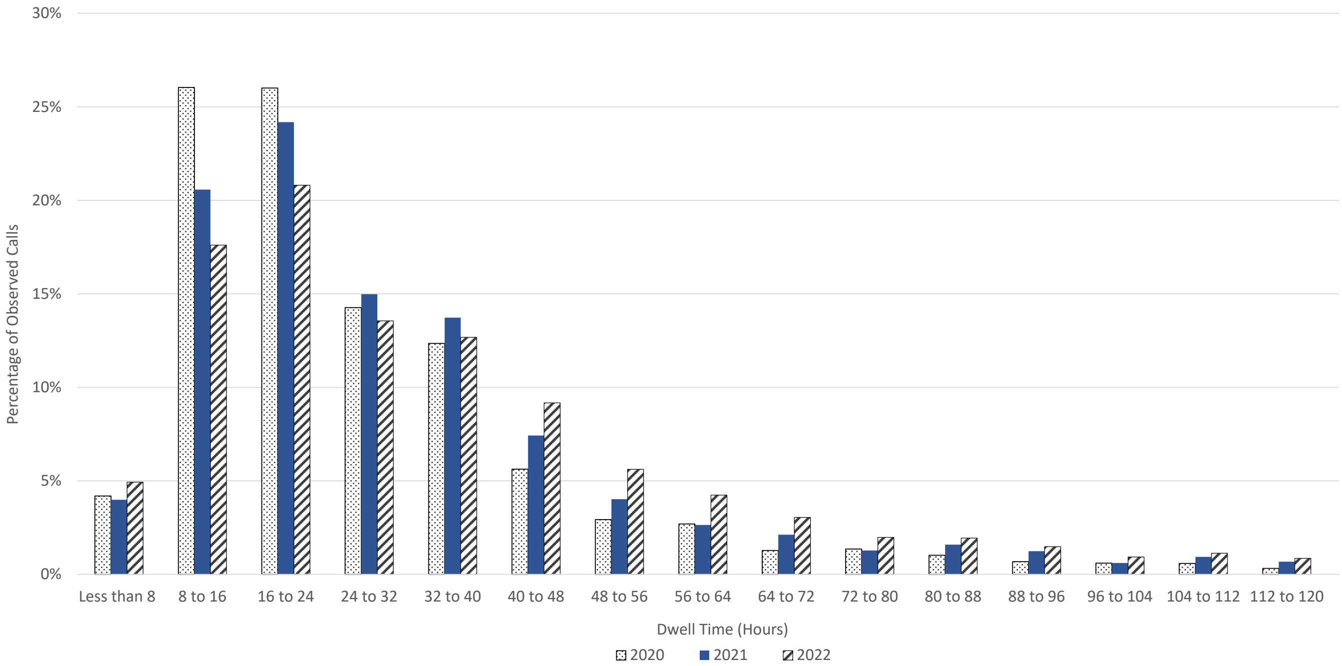
Figure 4-4: Monthly Average Container Vessel Dwell Times at the Top 25 U.S. Container Ports January 2019 to June 2023



NOTES: AIS signals are susceptible to interference, which can result in missing or incomplete dwell time records. This issue may impact the reliability of our estimated dwell times. However, in collaboration with the USACE, BTS takes numerous data quality steps each year, including verifying port terminal boundaries to account for expansion or reconfiguration and changes in vessel activity such as bunkering at each port terminal. Vessel calls of less than 4 hours or more than 120 hours (about 5 days) were excluded as representing calls either too short for significant cargo handling or too long for normal operations. Ports located on rivers / the Great Lakes and handle primarily barges, which are not equipped with AIS and thus not included in these tanker dwell times.

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, calculated using AIS data from the U.S. Coast Guard's Nationwide Automatic Identification System (NAIS) archive, processed by U.S. Army Engineer Research and Development Center, Coastal and Hydraulics Laboratory, through the AIS Analysis Package (AISAP) software package, as of November 2023.

Figure 4-5: Distribution of Observed Container Vessel Dwell Times, 2020-2022



NOTES: AIS signals are susceptible to interference, which can result in missing or incomplete dwell time records. This issue may impact the reliability of our estimated dwell times. However, in collaboration with the USACE, BTS takes numerous data quality steps each year, including verifying port terminal boundaries to account for expansion or reconfiguration and changes in vessel activity such as bunkering at each port terminal. Vessel calls of less than 4 hours or more than 120 hours (about 5 days) were excluded as representing calls either too short for significant cargo handling or too long for normal operations. Ports located on rivers / the Great Lakes and handle primarily barges, which are not equipped with AIS and thus not included in these tanker dwell times.

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, calculated using AIS data from the U.S. Coast Guard's Nationwide Automatic Identification System (NAIS) archive, processed by U.S. Army Engineer Research and Development Center, Coastal and Hydraulics Laboratory, through the AIS Analysis Package (AISAP) software package, as of January 2023.

4.2.6 Dwell Time of Tanker Vessel

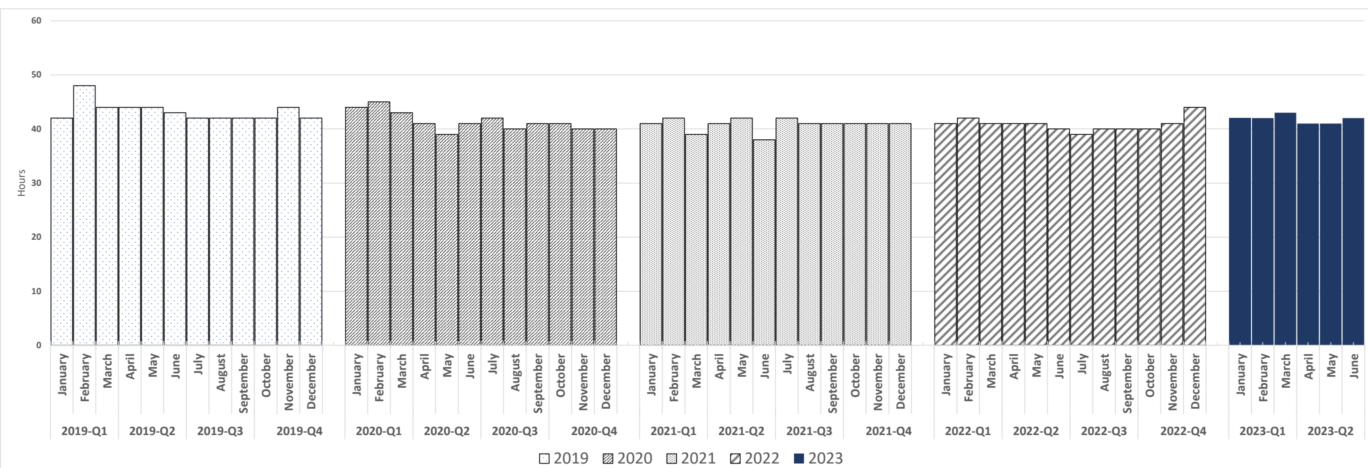
Tankers are the leading vessel type calling at the Nation's top tonnage ports, carrying liquid bulk commodities such as fuels that accounted for nearly 40 percent of U.S. vessel imports by tonnage in 2022.[33] At these top ports by tonnage,[34] the average tanker vessel dwell time was estimated at 41.0 hours (about 1 day 17 hours) in 2022, up by about 12 minutes from 40.8 hours (about 1 day 17 hours) in 2021 (Figure 4-6). In general, tanker dwell times were taking about 17 percent longer than container vessel dwell times, likely because it takes more time to pump petroleum and crude oil than to lift shipping containers from a vessel of similar size. However, this difference in dwell times is slightly increasing as tanker vessel dwell times have remained consistent while container ship dwell times have increased, likely due to port congestion around container terminals. Since the middle of 2022, tanker vessel dwell times have been mostly static and consistent with the monthly average of 41 hours.[35] Average tanker dwell times for individual ports are shown online in Port Profiles.

[33] U.S. Department of Transportation, Bureau of Transportation Statistics, analysis based upon U.S. Department of Transportation, Census Bureau, USA Trade Online, available at USA Trade Online * Home (census.gov) as of November 2023.

[34] The ports of Cincinnati Northern KY; Huntington Tristate, KY, OH, WV; Mid-Ohio Valley Port, OH and WV; St. Louis Metro Port, IL and MO are located on rivers and may handle primarily liquid bulk barges, which are not equipped with AIS and thus not included in the tanker dwell times.

[35] U.S. Department of Transportation, Bureau of Transportation Statistics, calculated using AIS data from the U.S. Coast Guard's Nationwide Automatic Identification System (NAIS) archive, processed by U.S. Army Engineer Research and Development Center, Coastal and Hydraulics Laboratory, through the AIS Analysis Package (AISAP) software package, as of November 2022.

Figure 4-6: Tanker/Liquid Bulk Vessel Dwell Times at the Top U.S. Ports
January 2019 to June 2023



NOTES: AIS signals are susceptible to interference, which can result in missing or incomplete dwell time records. This issue may impact the reliability of our estimated dwell times. However, in collaboration with the USACE, BTS takes numerous data quality steps each year, including verifying port terminal boundaries to account for expansion or reconfiguration and changes in vessel activity such as bunkering at each port terminal. Vessel calls of less than 4 hours or more than 120 hours (about 5 days) were excluded as representing calls either too short for significant cargo handling or too long for normal operations. Ports located on rivers / the Great Lakes and handle primarily barges, which are not equipped with AIS and thus not included in these tanker dwell times.

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, calculated using AIS data from the U.S. Coast Guard's Nationwide Automatic Identification System (NAIS) archive, processed by U.S. Army Engineer Research and Development Center, Coastal and Hydraulics Laboratory, through the AIS Analysis Package (AISAP) software package, as of November 2023.

5. Looking Ahead

BTS has identified several port data gaps which impact the ability to measure port capacity and throughput as well as the performance of the Nation's supply chain. For example, the lack of nationally consistent information on port cargo handling equipment such as mobile harbor cranes and the lack of comprehensive TEU data that include those of the empty containers and those handled by RO/RO prevents a consistent way to measure port capacity.

Additionally, data are incomplete regarding intermodal connections to the Nation's freight facilities, including marine terminals. Intermodal and roadway connections to ports can be a key limiting factor on port throughput and productivity, especially during peak seasons. While rail and truck volumes out of port facilities are measured, the time it takes for a truck to drop off an empty and pick up a loaded container at a port is not tracked as a federal measure. This leaves a gap in understanding the ability of ports to efficiently deliver containers to their destinations and accept empty containers.

BTS has been working on closing many of these data gaps, including expanding the data on intermodal freight facilities which are included in the National Transportation Atlas Database (NTAD).[36] NTAD currently includes geospatial data on intermodal facilities that handle air-to-truck cargo, freight rail trailer on flat car and container on flat car (TOFC/COFC), and marine RO/RO. Work continues to develop data on intermodal facilities that handle liquid bulk. Including the data on liquid bulk would be a valuable addition to the understanding of strategic port capacity in the US. Petroleum and derivative products remain critical to the functioning of the US economy.

Unprecedented volumes of containerized imports and the related disruptions to supply chains inspired enactment of the Ocean Shipping Reform Act (OSRA) of 2022 (P.L. 117-146) on June 16, 2022. Subject to the availability of appropriations, Section 16 of the OSRA included mandates for the Bureau of Transportation Statistics (BTS) to produce statistics on the total street dwell times (the amount of time an empty or loaded container or a bare or loaded chassis spent between exiting the gate and returning to the terminal) for intermodal shipping containers and chassis as well as the average out-of-service percentage for chassis. BTS was granted the authority to collect data from each port, marine terminal operator, and chassis owner or provider with a fleet of over 50 chassis operating in the common carriage as deemed necessary to produce these statistics.

In a closely related effort, BTS has partnered with the U.S. Department of Agriculture (USDA) and the Federal Maritime Commission to explore options for reviving reports on the availability of empty intermodal shipping containers, reports formerly produced by the USDA's Marketing Service. Those reports provided weekly snapshots of intermodal shipping container availability, including dry/general purpose 20-foot, 40-foot, and 40-foot-high cube, as well as 20-foot and 40-foot refrigerated containers at several key locations across the country. These reports provide estimates of equipment availability for the current week and projections for two weeks out.

[36] https://www.bts.gov/ntad