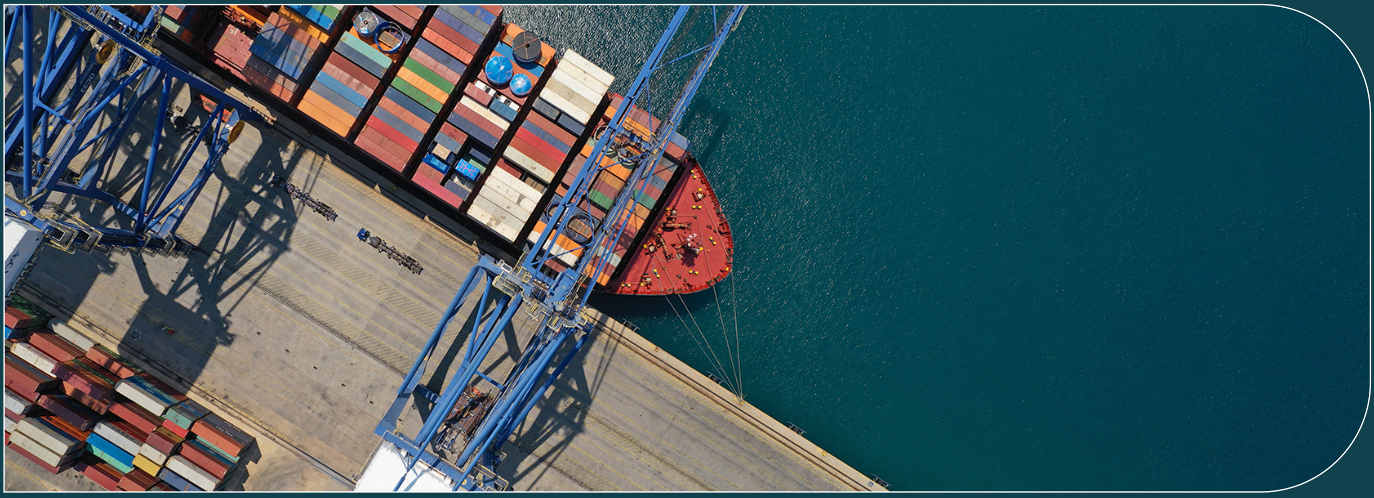
U.S. Department of Transportation
Office of the Secretary of Transportation

2023 Port Performance Freight Statistics Program: Annual Report to Congress



Bureau of Transportation Statistics

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2023 Port Performance Freight Statistics Program: Annual Report to Congress

Bureau of Transportation Statistics

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Quality Assurance Statement

The Bureau of Transportation Statistics (BTS) provides high-quality information to serve government, industry and the public in a manner that promotes public understanding. Standards and policies are used to ensure and maximize the quality, objectivity, utility, and integrity of its information. BTS reviews quality issues on a regular basis and adjusts its programs and processes to ensure continuous quality improvement.

Notice

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 2023 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 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 2020 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 2022.

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

1. Introduction

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 statistics 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 sixth 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 *Technical Documentation*[3] details the process used to identify the top 25 ports and calculate their capacity and throughput.

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.

[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)

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 are 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 that stretch along 226 miles through 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 man-made harbors. San Pedro Bay in California, for example, is a natural harbor where the Ports of Los Angeles and Long Beach are located with other public and private waterfront facilities. When cargo statistics are published for harbors, 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 city government. Port definitions are essential for identifying the top 25 ports. Without a clear port definition, it is impossible to measure port performance in a nationally consistent manner.

2.1. Port Definitions

Among possible definitions considered for use in these Annual Reports, Federal definitions offer a nationally consistent approach to determining what a "port" is, therefore providing a starting place from which to measure the 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 Working Group to use the USACE statistical definitions of ports, which align with the Federal, State, and city legislative definitions associated with the port. These legislative port definitions are relatively stable over time, although some ports have successfully petitioned USACE to alter their boundaries. Most USACE-defined ports are consistent with the common perception of a facility located within a single harbor, yet some, like the Ports of Cincinnati-Northern Kentucky, cover an extended stretch of river that is not commonly perceived as one entity. In some cases, ports that work together under a common marketing label, such as the Northwest Seaport Alliance (Port of Tacoma and Port of Seattle), are nevertheless defined separately by USACE. 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.

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 usually 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 managing 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**—Building and maintaining terminal infrastructure and providing major capital equipment, but 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, ports may also offer concessions to tenants that make infrastructure improvements. For example, the Maryland Port Administration granted a 50-year concession for the Baltimore Seagirt Marine Terminal that included a commitment by the concessionaire to deepen the Port of Baltimore's channel.

- **Operators**—Directly operating some or all the terminals in the jurisdiction. For example, the Port of Houston Authority is an operating port.

- **Jurisdictional bodies**—Under which private terminals are responsible for providing and operating their 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 of the 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.

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 are 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 authorities 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 total volume of petroleum processed, but not how much was received by vessel versus pipeline. Nationally consistent data are limited for 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, cargo types handled and geographic location 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 generally 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 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[4] 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 lead 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, but containerized cargo includes the highest value and most time-sensitive commodities. Approximately 90 percent of dry, non-bulk manufactured goods in international trade are currently shipped in containers.

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

[4] 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).

in terms of TEU. Forty-foot Equivalent Units (FEU, equal to 2 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 about 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, or 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 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.

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.[5] Table 2-1 summarizes these key components and their connection to throughput and capacity measures.

[5] 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 clear.	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.

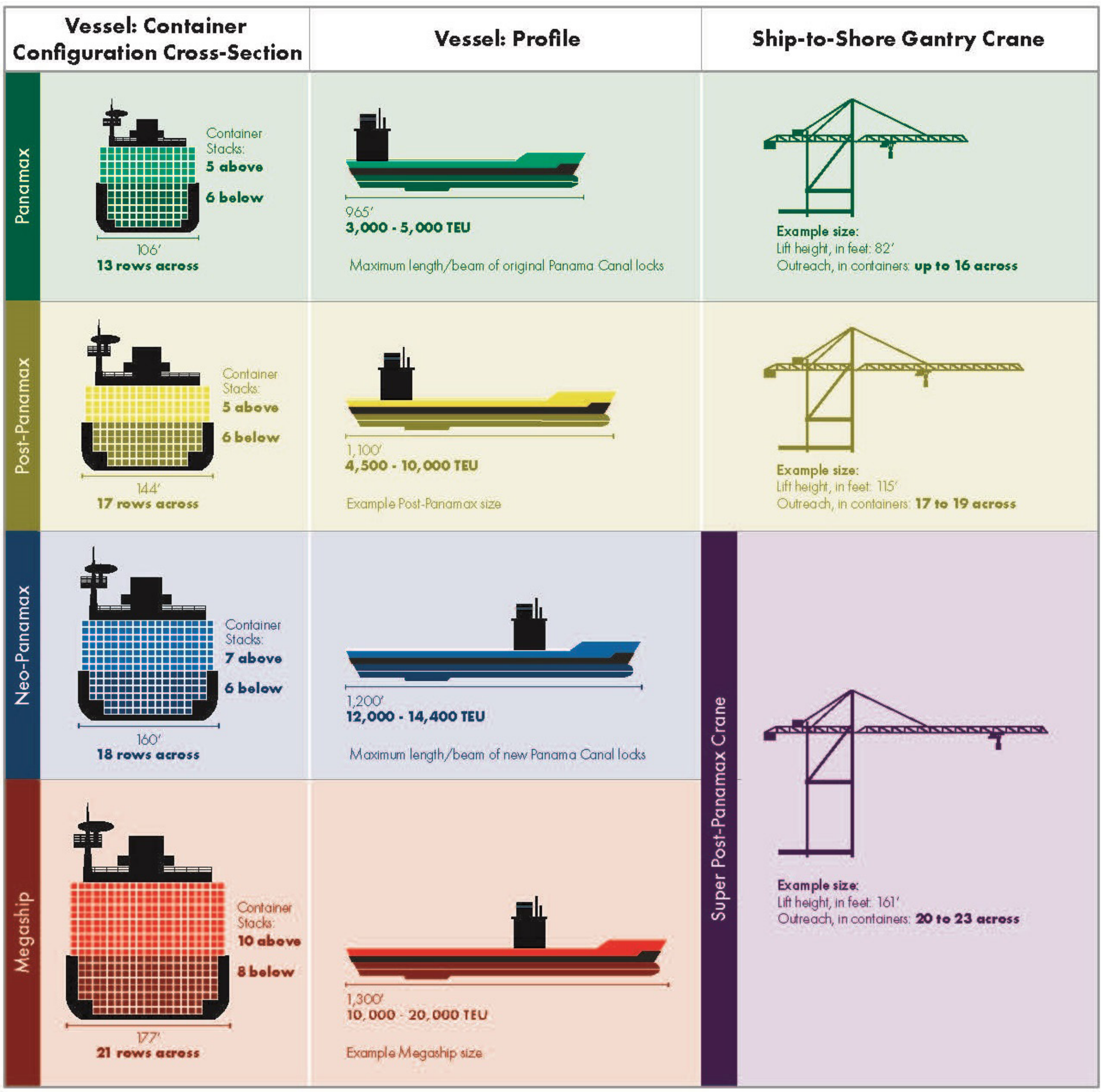
Figure 2-1 illustrates how changes in vessel size impact port infrastructure. Larger vessels require greater berth lengths, larger loading and unloading equipment, and more cargo/ container storage space.

2.3 Port Geography

Ports are generally 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

FIGURE 2-1 Container Vessel Size & Corresponding Port Infrastructure



All cranes or vessels in a column are to scale with each other, but scale differs between columns 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 3 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 that stretch over a distance of many miles. These ports also typically handle smaller vessels than coastal ports, including barges.

2.4 Lists of the Top 25 Ports

The FAST Act requires the Port Performance Freight Statistics Program 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. This approach is unchanged from previous reports.

Tonnage statistics are not categorized as 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*[6] describes these approaches for defining dry bulk cargo in additional detail.

Figures/tables 2-2 through 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 50 ports were identified, 46 are located within the contiguous United States, 2 (Anchorage and Valdez) in Alaska, 1 (Honolulu) in Hawaii, and 1 (San Juan) in Puerto Rico. The Baltimore, Houston, Mobile, New Orleans, and Virginia ports are in the top 25 for all three cargo categories. Due to statistical boundary and definitional changes, the 2020 data used to rank the ports may not be comparable to that of previous years. More detailed statistics on throughput and capacity are available at https://www.bts.gov/ports.

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

TABLE 2-2 List of Top 25 Ports by Total Tonnage (Ranked by short tons)

1. Houston Port Authority, TX	14. Lake Charles Harbor District
2. South Louisiana, LA, Port of	15. Port Arthur
3. Corpus Christi	16. Port Freeport
4. New York, NY & NJ	17. Mid-Ohio Valley Port, OH and WV
5. New Orleans	18. Baltimore
6. Long Beach	19. Cincinnati-Northern KY, Ports of
7. Baton Rouge, LA	20. Texas City
8. Beaumont	21. St. Louis Metro Port, IL and MO
9. Los Angeles	22. Huntington-Tristate, KY, OH, WV
10. Virginia, VA, Port of	23. Philadelphia Regional Port
11. Mobile, AL	24. Tampa Port Authority
12. Plaquemines Port District	25. Valdez
13. Savannah	

FIGURE 2-2 Location of Top 25 Ports by Total Tonnage

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, based upon 2020 data (latest available) provided by U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center. Special tabulation as of January 2023.

TABLE 2-3 List of Top 25 Ports by Dry Bulk Tonnage (Ranked by short tons)

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

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

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, based upon 2020 data (latest available) provided by U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center. Special tabulation as of January 2023.

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

1. Los Angeles	14. Honolulu
2. Long Beach	15. Baltimore
3. New York, NY & NJ	16. Port Everglades
4. Savannah	17. Philadelphia Regional Port
5. Houston Port Authority, TX	18. New Orleans
6. Virginia, VA, Port of	19. Alaska, AK, Port of
7. Oakland	20. Mobile, AL
8. Charleston	21. Wilmington, NC
9. Tacoma	22. Wilmington, DE
10. Seattle	23. Boston
11. San Juan	24. South Jersey, Port of, NJ
12. Jacksonville	25. Gulfport
13. Miami	

FIGURE 2-4 Location of Top 25 Container Ports by TEU

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, based upon 2020 data (latest available) provided by U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center. Special tabulation as of January 2023.

TABLE 2-5 Top 25 Ports by Tonnage, Dry Bulk, and Container (Alphabetical order)

	Top 25 Rank					
Port		**Tonnage**		**Dry Bulk**		**Container by TEU**
Alaska, AK, Port of					✓	19
Baltimore	✓	18	✓	13	✓	15
Baton Rouge, LA	✓	7	✓	5		
Beaumont	✓	8				
Boston					✓	23
Charleston					✓	8
Cincinnati-Northern KY, Ports of	✓	19	✓	8		
Corpus Christi	✓	3	✓	22		
Duluth-Superior, MN and WI			✓	10		
Gulfport					✓	25
Honolulu					✓	14
Houston Port Authority, TX	✓	1	✓	12	✓	5
Huntington-Tristate, KY, OH, WV	✓	22	✓	14		
Illinois Waterway Ports Terminals			✓	20		
Indiana (Northern District)			✓	11		
Jacksonville					✓	12
Kalama			✓	15		
Lake Charles Harbor District	✓	14				
Long Beach	✓	6			✓	2
Longview			✓	24		
Los Angeles	✓	9			✓	1
Miami					✓	13
Mid-America Port, IA, IL and MO			✓	18		
Mid-Ohio Valley Port, OH and WV	✓	17	✓	7		
Mobile, AL	✓	11	✓	6	✓	20
New Bourbon Port Authority, MO			✓	16		
New Orleans	✓	5	✓	2	✓	18
New York, NY & NJ	✓	4			✓	3
Oakland					✓	7
Philadelphia Regional Port	✓	23			✓	17
Pittsburgh			✓	19		
Plaquemines Port District	✓	12	✓	3		
Port Arthur	✓	15				
Port Everglades					✓	16
Port Freeport	✓	16				
South Jersey, Port of, NJ					✓	24
Portland			✓	17		
San Juan					✓	11
Savannah	✓	13			✓	4
Seattle			✓	23	✓	10
South Louisiana, LA, Port of	✓	2	✓	1		
St. Louis Metro Port, IL and MO	✓	21	✓	9		
Tacoma					✓	9
Tampa Port Authority	✓	24	✓	25		
Texas City	✓	20				
Two Harbors			✓	21		
Valdez	✓	25				
Virginia, VA, Port of	✓	10	✓	4	✓	6
Wilmington, DE					✓	22
Wilmington, NC					✓	21

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, based upon 2020 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 2021 & 2022

The United States is one of the world's largest trading nations, with nearly $6 trillion in exports and imports of goods and services in 2021 (the latest available annual data). Growth in U.S.-international trade accelerated at an unprecedented pace in response to the spike in consumer demand during the COVID-19 pandemic.

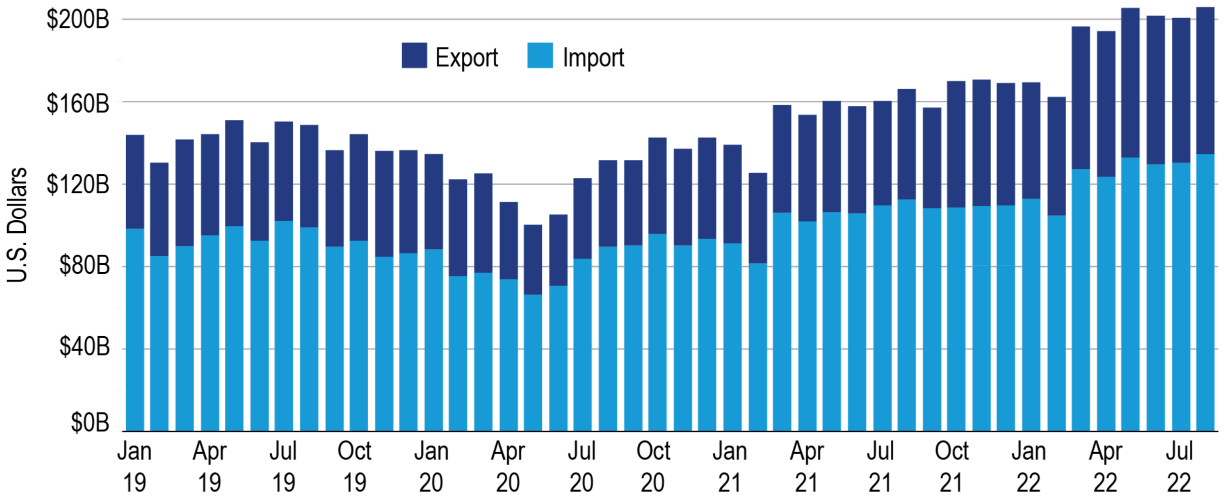
Of total U.S. international trade of goods and services, the import and export of goods alone exceeded $4.6 trillion (77.4 percent) in 2021, up from $3.8 trillion in 2020. The Nation's ports handled 41.1 percent (over $1.8 trillion) of the U.S. international trade by value in 2021. U.S. imports of goods grew by almost $506 billion or 21.5 percent while the export of goods grew by more than $329 billion or 23.0 percent between 2020 and 2021.[7]

Waterborne vessels are the leading transportation mode for U.S.-international trade in goods. As shown in figure 3-1, vessels transport U.S.-international freight at record levels, with cargo value peaking at more than $205 billion in May 2022—up $105 billion from the $100 billion low recorded in May 2020.[8]

[7] U.S. Department of Transportation, Bureau of Transportation Statistics analysis of U.S. Census Bureau, *U.S. Import & Export Merchandise Trade Statistics*, available at [Foreign Trade: Data - Historical Series (census.gov)] as of November 2022.

[8] 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 September 2022.

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



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) as of November 2022.

3.1 Supply Chain Challenges

Supply chain challenges and performance of the freight transportation system have affected the U.S. economy since the onset of the COVID-19 pandemic.[9] For example, container ports continue to be burdened by shortages, including but not limited to intermodal shipping containers and chassis, as the demand for ocean shipping and port services exceeds supply, contributing to disruptions throughout the supply chain.

Throughput measures reflect the amount of TEU handled by a port. Port capacity measure is a measure of the maximum TEU that can be handled by a port. On one hand, TEU capacity of vessels calling at U.S. ports has declined, decreasing by about 5.8 percent or 6 million TEU from 2019 to 2021. At the time of this writing, total TEU capacity calling at U.S. ports in 2022 is lower than in previous years. As figure 3-2 shows, monthly TEU capacity fell by an average of about 1.94 million in 2019 to 1.69 million in 2022, a decrease of about 252 thousand or 6.7 percent.

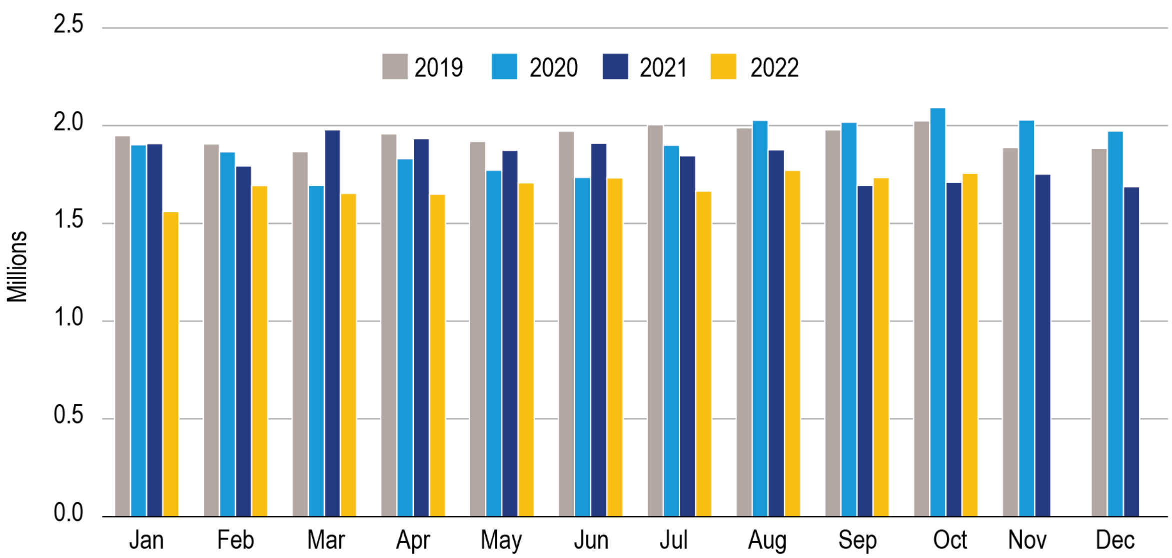
[9] U.S. Department of Transportation (USDOT), Bureau of Transportation Statistics, 2022 Transportation Statistics Annual Report, available at www.bts.gov/tsar as of December 2022.

TEU throughput and capacity has been trending upwards in the long-term, especially over the past few years. However, it appears that TEU throughput and capacity more recently may be declining, at least in the short-term.

On the other hand, TEU throughput has increased. As shown in the figure 3-3, monthly TEU throughput at select U.S. container ports peaked at about 4.7 million TEU in May 2022, up 1.7 million TEU or 58.5 percent from the March 2020 low of about 3.0 million TEU. The greatest increase in TEU handled, however, has taken place on the Atlantic coast where, between January 2019 and August 2022, the ports of New York and New Jersey, Virginia, and Savannah and the Gulf coast port of Houston outpaced the TEU throughput of the Pacific coast ports of Long Beach, Los Angeles, and Oakland. U.S. ports handled a monthly average in 2019 and 2020 of about 3.6 million TEU, before increasing to about 4.2 million TEU in 2021 and then to about 4.4 million TEU in 2022 through August.[10]

[10] U.S. Department of Transportation, Bureau of Transportation Statistics; analysis based on data sources cited in Monthly Container Port TEUs of November 2022.

FIGURE 3-2 Monthly TEU Capacity of Containerships Calling at U.S. Ports: January 2019 to October 2022

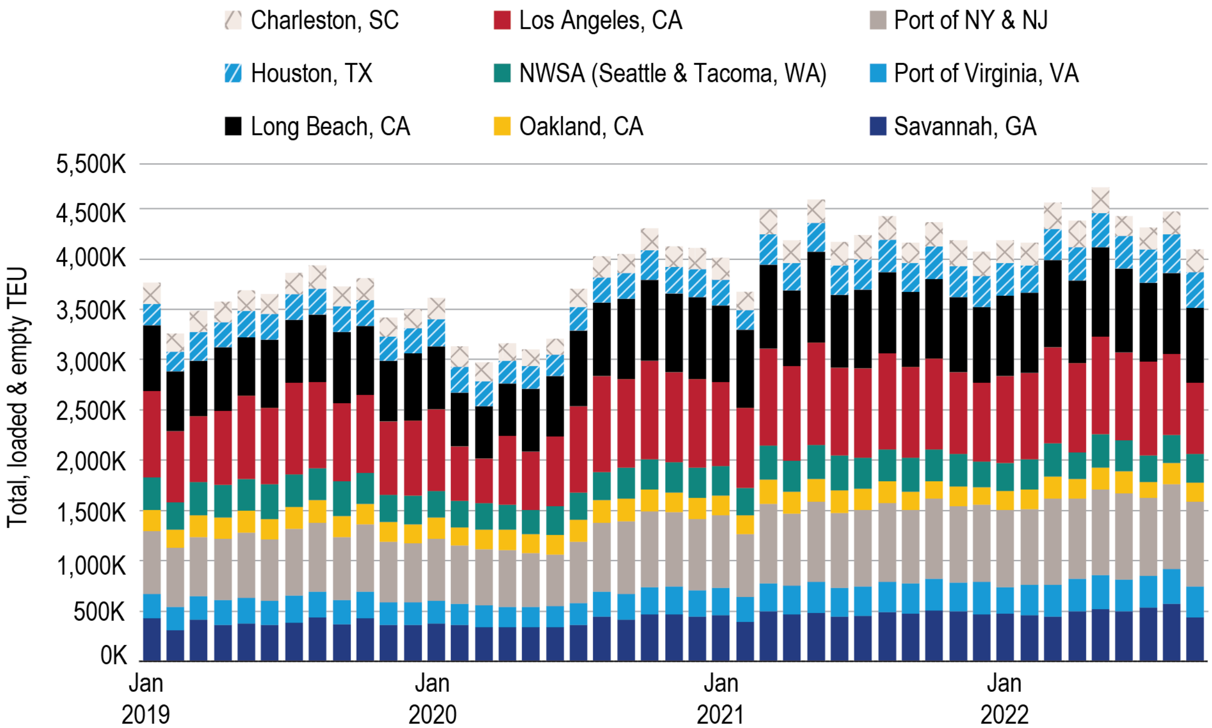


KEY: TEU = twenty-foot equivalent unit

NOTES: The monthly TEU capacity is now based on Vessel Management System (VMS) data. Previously it was based upon AIS data from IHS. VMS only counts vessels entering the port for an official reason, typically to load or unload cargo.

SOURCE: U.S. Department of Transportation, Maritime Administration, Office of Policy & Plans using the U.S. Customs & Border Protection, Vessel Monitoring System, special tabulation, available at Latest Supply Chain Indicators (bts.gov) as of November 2022.

FIGURE 3-3 20-Foot Equivalent Units (TEU) Handled by Select U.S. Container Ports: January 2019 to September 2022



SOURCES: U.S. Department of Transportation, Bureau of Transportation Statistics analysis; based upon TEU volumes at the ports of Charleston, SC, http://scspa.com/about/statistics/; Houston, https://porthouston.com/; Jacksonville, https://www.jaxport.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 2022.

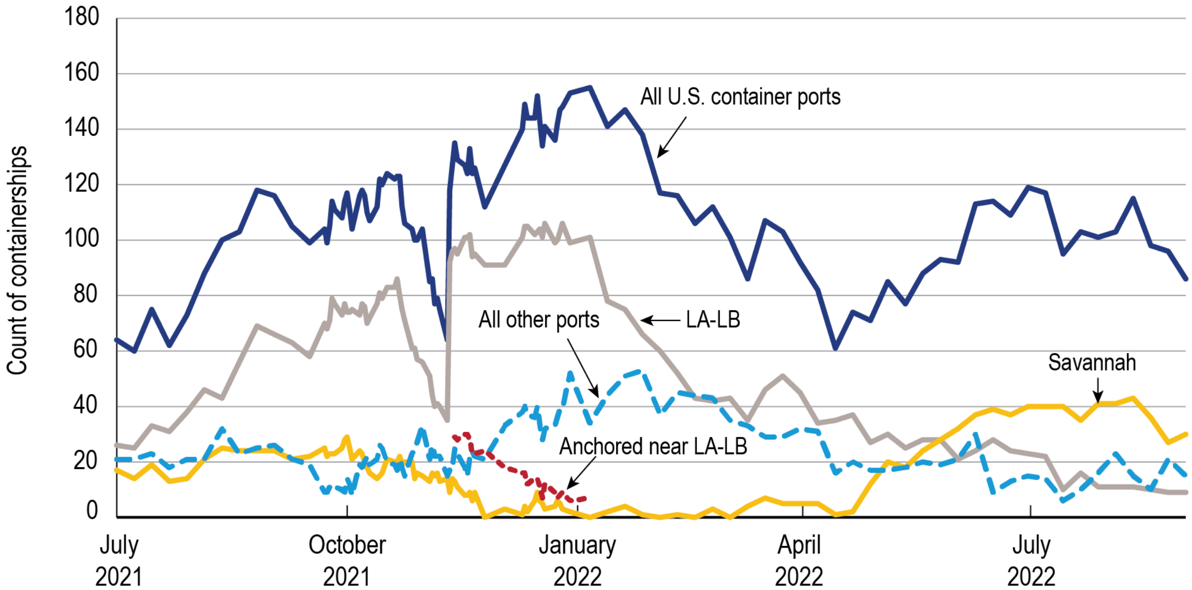
At the time of this writing, about 90 containerships were waiting to dock at container ports across the country (figure 3-4). This is down from the peak of more than 150 containerships in early February 2022. In early 2022, the ports of Los Angeles and Long Beach alone had more than 100 vessels waiting at anchorages in San Pedro Bay, in some cases spending many more days at anchor than at dock. More recently, since mid-2022, there has been a shift with more containerships waiting at anchorages near ports along the Atlantic and Gulf coasts then along the Pacific coast.[11]

The ports of Los Angeles and Long Beach, in coordination with the local vessel traffic system, have implemented a vessel queuing system to reduce congestion and emissions in and around the port complex. Depending on their direction of travel, vessels must either slow steam or stay 50 to 150 miles out to sea as they await their turn to enter the port, reducing the number of containerships anchored for extended periods in or near San Pedro Bay. This system has considerably decreased the number of containerships crowding the ports of Los Angeles and Long Beach.[12]

[11] U.S. Department of Transportation (USDOT), Bureau of Transportation Statistics, based upon USDOT, Maritime Administration, Office of Policy & Plans using the U.S. Customs & Border Protection, Vessel Monitoring System, special tabulation, available at Freight Indicators (dot.gov) as of November 2022.

[12] Pacific Merchant Shipping Association, *New Queuing Process for Container Vessels Bound For Ports of LA/ Long Beach to Improve Safety and Air Quality Off California Coast* (November 2021), available at New Queuing Process for Container Vessels (pmsaship.com) as of November 2022.

FIGURE 3-4 Weekly Number of Containerships Awaiting to Dock at all U.S. Ports: July 2021 to September 2022



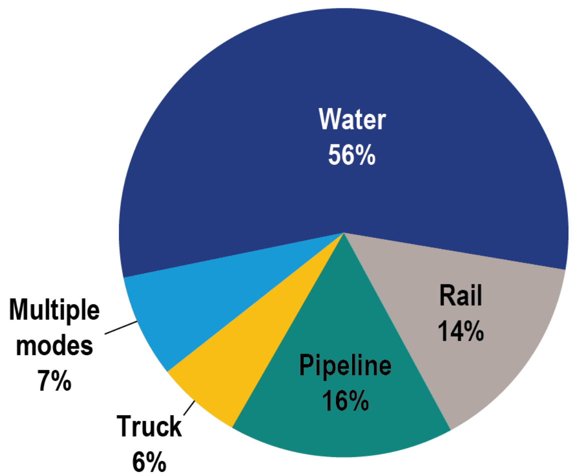
NOTES: In result of the vessel queuing system, Los Angeles and Long Beach totals include containerships in draft and holding areas. Data were reported at more frequent intervals, starting October 18, 2021.

SOURCE: U.S. Department of Transportation, Maritime Administration, Office of Policy & Plans, and the Marine Exchange of Southern California as of November 2022.

3.2 Record Low Water on the Mississippi and Ohio Rivers in 2022

The Mississippi River provides a vital link for freight movement in the United States. In 2020, the river carried more than half of the 165.5 million tons that moved between the 12 states[13] touching the Upper Mississippi System and Louisiana. More than half of the tonnage moved by water (figure 3-5) . The percentage of freight carried by the river to Louisiana is much higher for some states: 92 percent for Indiana, 81 percent for Missouri, 80 percent for Illinois, and 75 percent for Kentucky.[14] Today, that flow of freight has been hampered by low water levels on the Lower River. Barge must carry less cargo to reduce their drafts and barge tow must be reduced in number and length.

FIGURE 3-5 Percent Tonnage by Mode between States on the Upper Mississippi River System and Louisiana: 2020



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 2022.

Of the 12 states, as shown in figure 3-6, Illinois shipped the most freight to Louisiana in total (55 million tons) and by water (44 million tons) in 2020. Cereal grain accounted for 43 percent of the total tonnage between Illinois and Louisiana, and other

[13] 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.

[14] 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 2022.

agricultural products accounted for 26 percent.[15] The river carried 93 percent of the cereal grain between Illinois and Louisiana, compared to 6 percent by rail, and it carried 82 percent of "other agricultural products"[16] between those two states, compared to 15 percent by rail and 3 percent by truck.[17]

Our ability to move freight on the Mississippi River depends on water levels, whether too much due to flooding or too little due to drought. Currently, low water levels in the Lower Mississippi River due to scant rainfall have severely hampered fall 2022 barge shipments, especially on the vital stretch between Cairo, Illinois, and Memphis, Tennessee as shown in the following (figure 3-6). Groundings and the need for dredging have closed sections of the river and halted barge movements for intermittent periods. U.S. Coast Guard District 8 (New Orleans) reported a backup of more than 2,000 barges on the Lower Mississippi in early October. Low water also restricts the loads each barge can carry, and the narrower channel restricts the number of barges in a single tow.[18]

Rail shipment is the normal alternative to barges, but our rail system can have difficulty absorbing such a massive short-term shift.

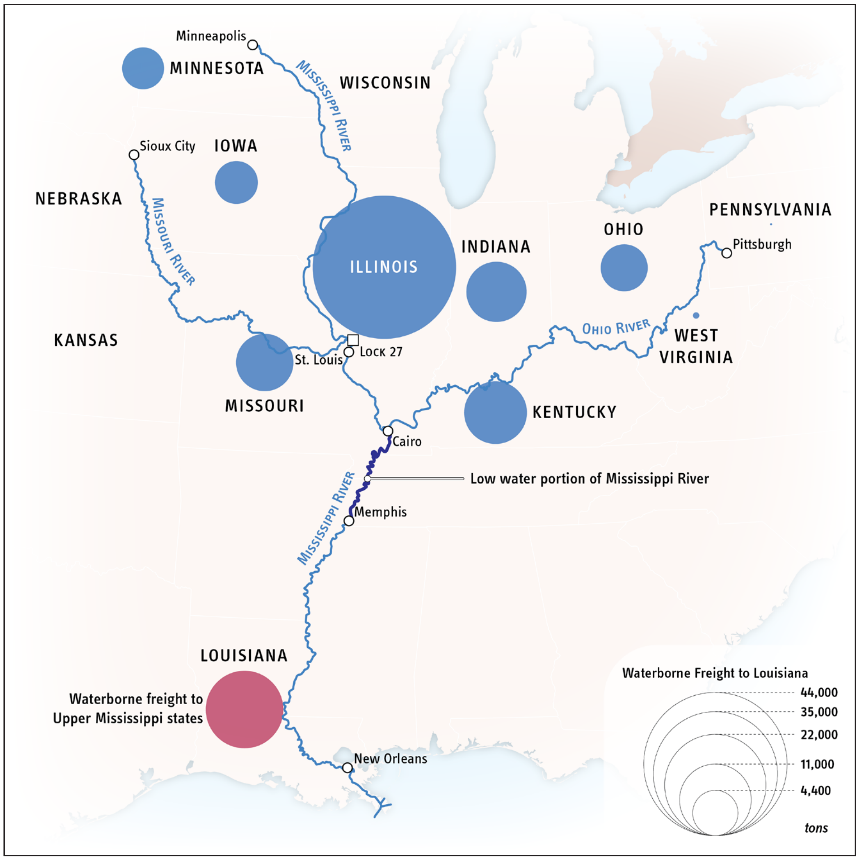
[15] U.S. Department of Transportation, Bureau of Transportation Statistics, Low Water on the Mississippi Slows Critical Freight Flows, available at [Low Water on the Mississippi Slows Critical Freight Flows (bts.gov)] as of November 2022.

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

[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 2022.

[18] U.S. Department of Transportation, Bureau of Transportation Statistics, *Low Water on the Mississippi Slows Critical Freight Flows*, available at [Low Water on the Mississippi Slows Critical Freight Flows (bts.gov)] as of November 2022.

FIGURE 3-6 Waterborne Tonnage between States on the Upper Mississippi River System and Louisiana: 2020

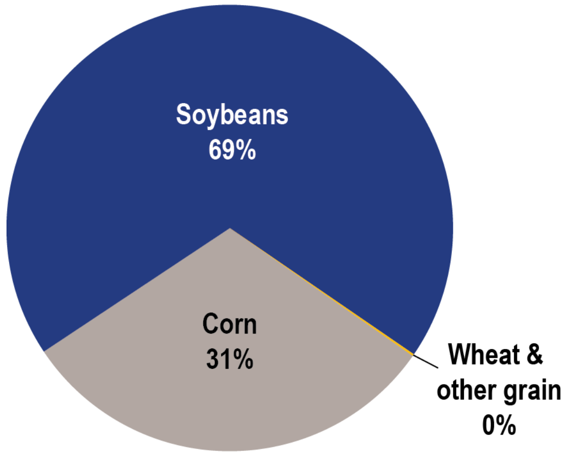


SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, Freight Analysis Framework (FAF, version 5.4), available at [Freight Analysis Framework (bts.gov)] as of November 2022.

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 2022, downbound (southbound) grain shipments from the Upper Mississippi through Lock 27, the southernmost lock on the river, have followed the 2021 pattern through October (figure 3-7), but many of those shipments have been stalled or delayed on the Lower River. [19]

Unfortunately, the low water has coincided with the peak shipping season for U.S. corn and soybeans, our nation's largest export crops. The October downbound grain and ag product shipments on the Lower Mississippi below Lock and Dam 27[20] were predominately soybeans and corn as shown in the following (figure 3-8), leaving those major export commodities most vulnerable to the Lower River disruption.

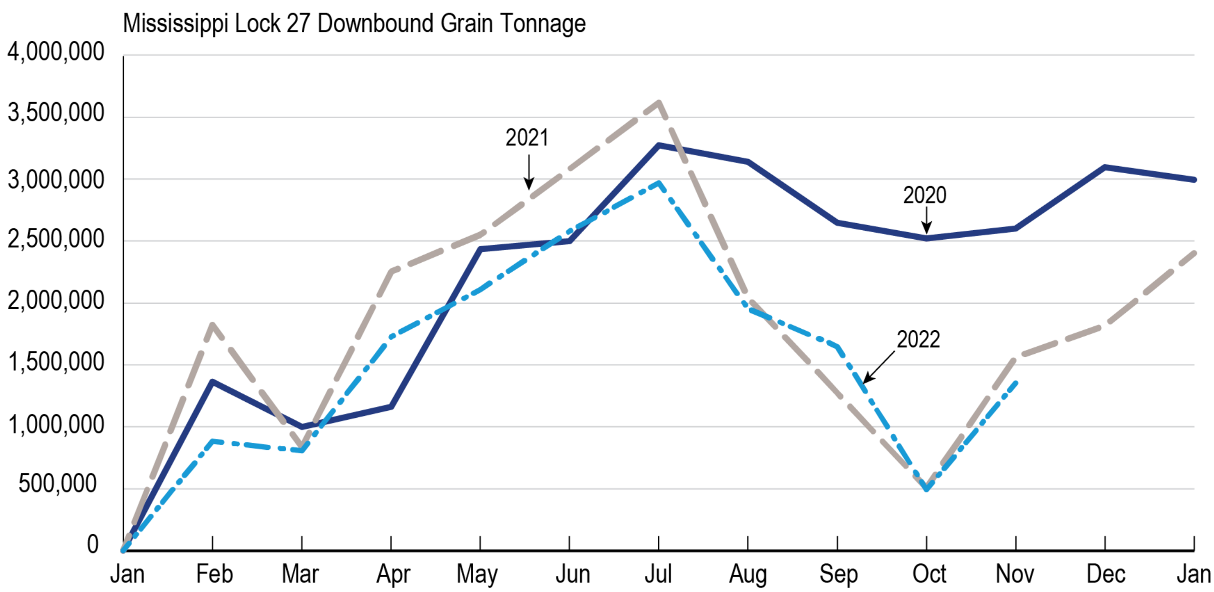
FIGURE 3-8 Downbound Grain & Agricultural Product Shares: October 2022



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 2022.

The implications are apparent in barge shipping rates. By early September, barge rates were already 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 (figure 3-9).

FIGURE 3-7 Monthly Downbound Barge Grain Shipments: 2020 to 2022



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 2022.

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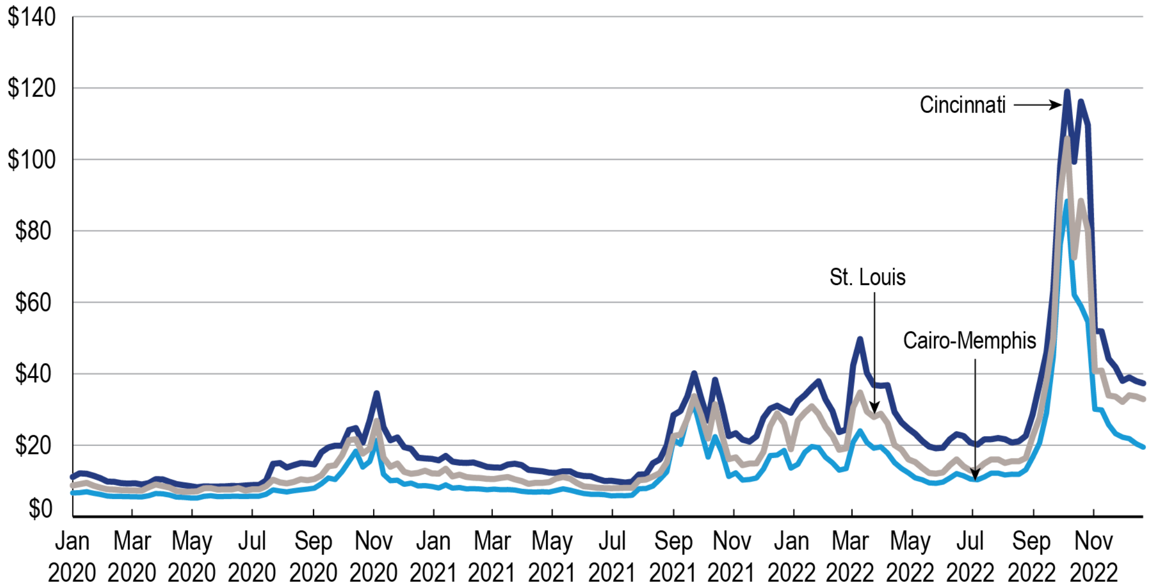
[19] U.S. Department of Transportation, Bureau of Transportation Statistics, analysis based upon *Downbound Grain Barge Rates* (11/9/22), available at [Latest Supply Chain Indicators (bts.gov)]() as of November 2022.

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

FIGURE 3-9 Weekly Downbound Grain Barge Rates: January 2020 to December 2022



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 *Downbound Grain Barge Rates* (12/27/22), available at Latest Supply Chain Indicators (bts.gov) as of January 2023.

World demand and grain prices have been rising due to Russia's invasion of Ukraine, drought in other producing areas, and increased consumption in China and elsewhere. Yet, despite the demand, U.S. grain and soybean exports are down due in part to the higher U.S. dollar and in part to the delivery delays caused by the compounded impact of low water and disruption to the supply chain. While domestic grain prices remain low, bid prices for U.S. export corn peaked in mid-October as the river delays were at their worst.

The Soy Transportation Coalition estimates that barge transportation accounts for about 6 percent of the delivered cost for soybeans shipped from Davenport, Iowa, to Shanghai. October barge rates were as much as 400 percent above average (figure 3-9), which would raise the delivered price of soybeans by about 24 percent,[21] placing U.S. producers at a cost disadvantage compared to those in Brazil and other competitors. Grain is not the only commodity affected. The Waterways Council noted that the low water has also delayed coal shipments that are "very much needed in Europe" due to the invasion of Ukraine.

Besides delaying loaded downbound barge tows moving from producing areas to destination ports such as Memphis, South Louisiana, and New Orleans, the low water also delays upbound tows moving fertilizer and cement for spring planting and construction, which also cuts the supply of empty barges for subsequent downbound trips.[22]

[21] U.S. Department of Transportation, Bureau of Transportation Statistics, analysis based upon *Downbound Grain Barge Rates* (12/27/22), available at Latest Supply Chain Indicators (bts.gov) as of January 2023.

[22] U.S. Department of Transportation, Bureau of Transportation Statistics, *Low Water on the Mississippi Slows Critical Freight Flows*, available at Low Water on the Mississippi Slows Critical Freight Flows (bts.gov) as of November 2022.

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 a mere 138 feet of clearance.[23]

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

TABLE 4-1 Port Capacity Measures

Element/Metric	Description
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
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
Berth length for container ships (feet)	A location to stop and secure a vessel at a container terminal to load / unload cargo, presenting the total linear footage
Container terminal size (acreage)	A designated area where loaded and empty containers are stored for transfer between vessels and truck or rail modes
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.

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). As shown in the following figure, 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.[24]

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

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 operated a total of 528 ship-to-shore gantry cranes in 2022, up 24 from 504 in 2019. This increase reflects the purchase of 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] As shown in the table 4-2, the number of cranes by port varies widely. Of ship-to-shore gantry cranes, 294 are classified as super post-Panamax, which are the most capable. Other marine terminals at ports may use mobile harbor cranes, or container vessels may be equipped with ship gear to unload/load cargo or transport containers onto trailers.[26]

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

4.1.3 Road & Rail Connections

Nearly all major U.S. ports have National Highway System (NHS) connectors,[27] 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 about 122 NHS connectors that range in length from a few hundred yards to almost 7 miles like Upriver Road which serves the Port of Corpus Christi. They handle annual average daily traffic from a few hundred to hundreds of thousands of vehicles, such as the port of Long Beach's Anaheim Street, which handles nearly 511 thousand vehicles daily.[28]

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[24] 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.

[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.

[26] 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.

[27] 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).

[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 August 2022. ***Intermodal Connectors***: USDOT, Federal Highway Administration, Intermodal Connectors (Port Terminal), available at Intermodal Connectors (dot.gov) as of August 2022.

TABLE 4-2 Number of Container Cranes at the Top 25 Container Ports: 2022

State(s)	Port	Other	Super Post Panamax	Total
Alabama	Mobile	0	4	4
Alaska	Alaska (Anchorage)	3	0	3
California	Long Beach	18	54	72
	Los Angeles	33	34	67
	Oakland	13	13	26
Delaware	Wilmington	2	0	2
Florida	Jacksonville	16	3	19
	Miami	7	6	13
	Port Everglades	9	6	15
Georgia	Savannah	8	30	38
Hawaii	Honolulu	8	0	8
Louisiana	New Orleans	5	4	9
Maryland	Baltimore	11	12	23
Massachusetts	Boston	6	6	12
Mississippi	Gulfport	3	0	3
New Jersey	South Jersey (Camden-Gloucester)	2	0	2
New York-New Jersey	New York-New Jersey	35	24	59
North Carolina	Wilmington	7	0	7
Pennsylvania	Philadelphia	6	5	11
Puerto Rico	San Juan	11	0	11
South Carolina	Charleston	3	24	27
Texas	Houston	14	14	28
Virginia	Virginia (Norfolk-Portsmouth)	0	28	28
Washington	Seattle	6	10	16
	Tacoma	8	17	25

NOTES: Based upon active marine terminals handling containerships 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. **Post-Panamax** are a class of cranes that can fully unload intermodal shipping containers from the largest containerships approximately 18 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 July 2022.

Of the top 25 container ports, 12 or 48.0 percent have on-dock rail, but all have nearby rail transfer facilities. However, 46 or 70.8 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 the table 4-3, the number of marine terminals handling containerships 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.

TABLE 4-3 Number of Terminals Handling Containerships with On-Dock Rail at the Top 25 Container Ports: 2022

State	Port	Number of container terminals	On-dock rail access
Alabama	Mobile	1	1
Alaska	Alaska (Anchorage)	1	1
California	Long Beach	6	5
	Los Angeles	8	8
	Oakland	5	0
Delaware	Wilmington	1	0
Florida	Jacksonville	3	3
	Miami	1	1
	Port Everglades	2	0
Georgia	Savannah	2	2
Hawaii	Honolulu	2	0
Louisiana	New Orleans	1	1
Maryland	Baltimore	2	1
Massachusetts	Boston	1	0
Mississippi	Gulfport	2	2
New Jersey	South Jersey (Camden-Gloucester)	1	1
New York	New York-New Jersey	5	5
North Carolina	Wilmington	1	1
Pennsylvania	Philadelphia	2	1
Puerto Rico	San Juan	2	0
South Carolina	Charleston	4	2
Texas	Houston	4	3
Virginia	Virginia (Norfolk-Portsmouth)	2	2
Washington	Seattle	2	2
	Tacoma	4	4

NOTES: Based upon active marine terminals handling containerships 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 July 2022.

4.2 Port Throughput Measures

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

4.2.1 Annual Number of Containers handled by Top 25 Tonnage Ports

The top 25 tonnage ports handled a total of 1,744 million tons of cargo—about 71.3 percent of the tonnage handled by the top 100 ranked ports. The top 100 ports account for 95.5 percent of the total tonnage handled by U.S. ports.

The highest tonnage figures are associated with ports, such as the ports of Houston, South Louisiana, and Corpus Christi, that handle large quantities of both liquid bulk cargo (e.g., petroleum or chemicals) and dry bulk cargo (e.g., coal or grain). In 2020, Houston was the top tonnage port, handling about 276 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 672 million tons of cargo, accounting for 70.4 percent of the dry bulk tons handled by the top 100 ranked dry bulk ports. The top 100 ports account for 94.2 percent of total dry bulk tonnage handled by U.S. ports.

The port of South Louisiana is in the top spot (figure 4-2) and handled 146 million short tons, by far the greatest volume of dry bulk cargo, more than 3 and 4 times the amounts handled, respectively, by the next ports on the list—the ports of New Orleans and the Plaquemines.[30]

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

The top 25 container ports handled a total of 39.8 million TEU, accounting for 96.5 percent of the loaded TEU handled by all U.S. 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 2020 top container port was the port of Los Angeles, California.[31]

[29] U.S. Department of Transportation, Bureau of Transportation Statistics, based upon 2020 data (most recently available), U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center. Special tabulation as of November 2022.

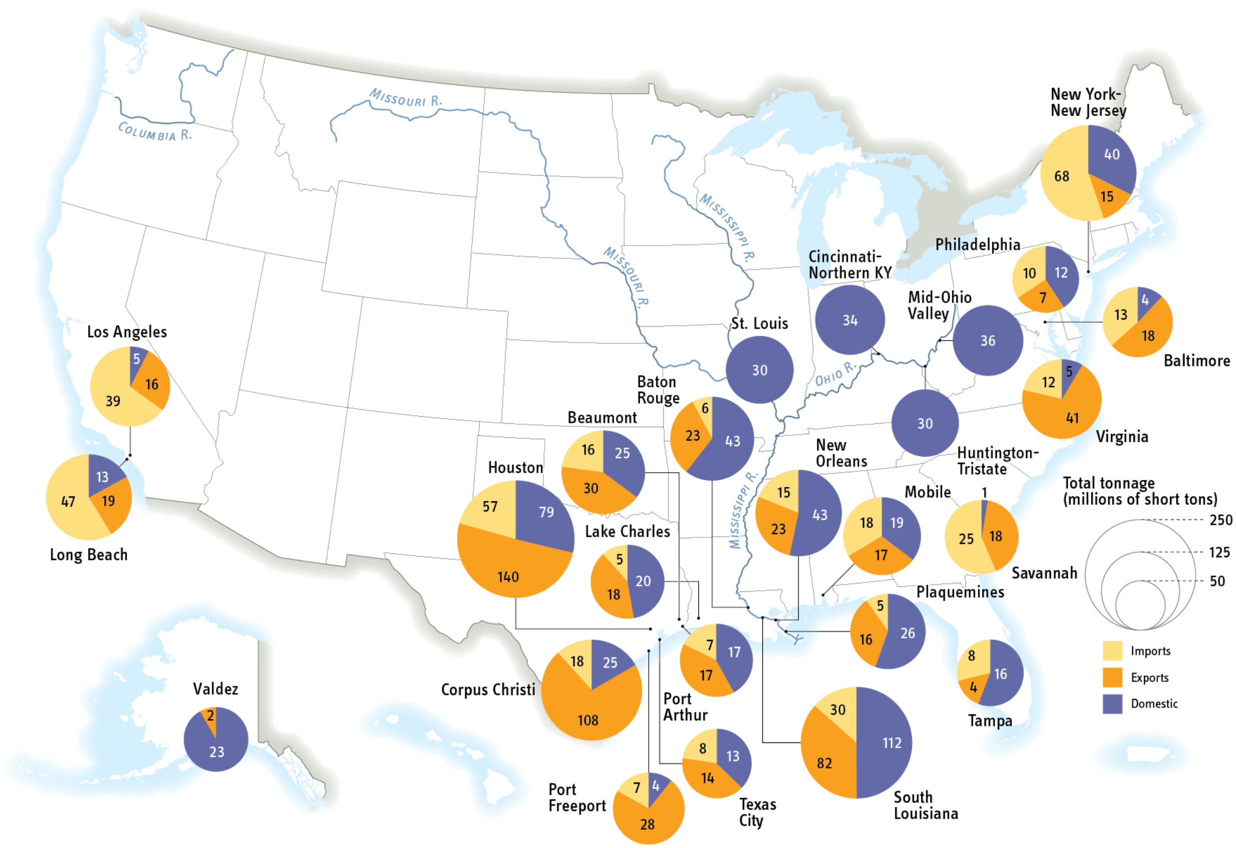
[30] U.S. Department of Transportation, Bureau of Transportation Statistics, based upon 2020 data (most recently available), U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center. Special tabulation as of November 2022.

[31] U.S. Department of Transportation, Bureau of Transportation Statistics, based upon 2020 data (most recently available) provided by U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center. Special tabulation as of November 2022.

TABLE 4-4 Port Throughput Measures

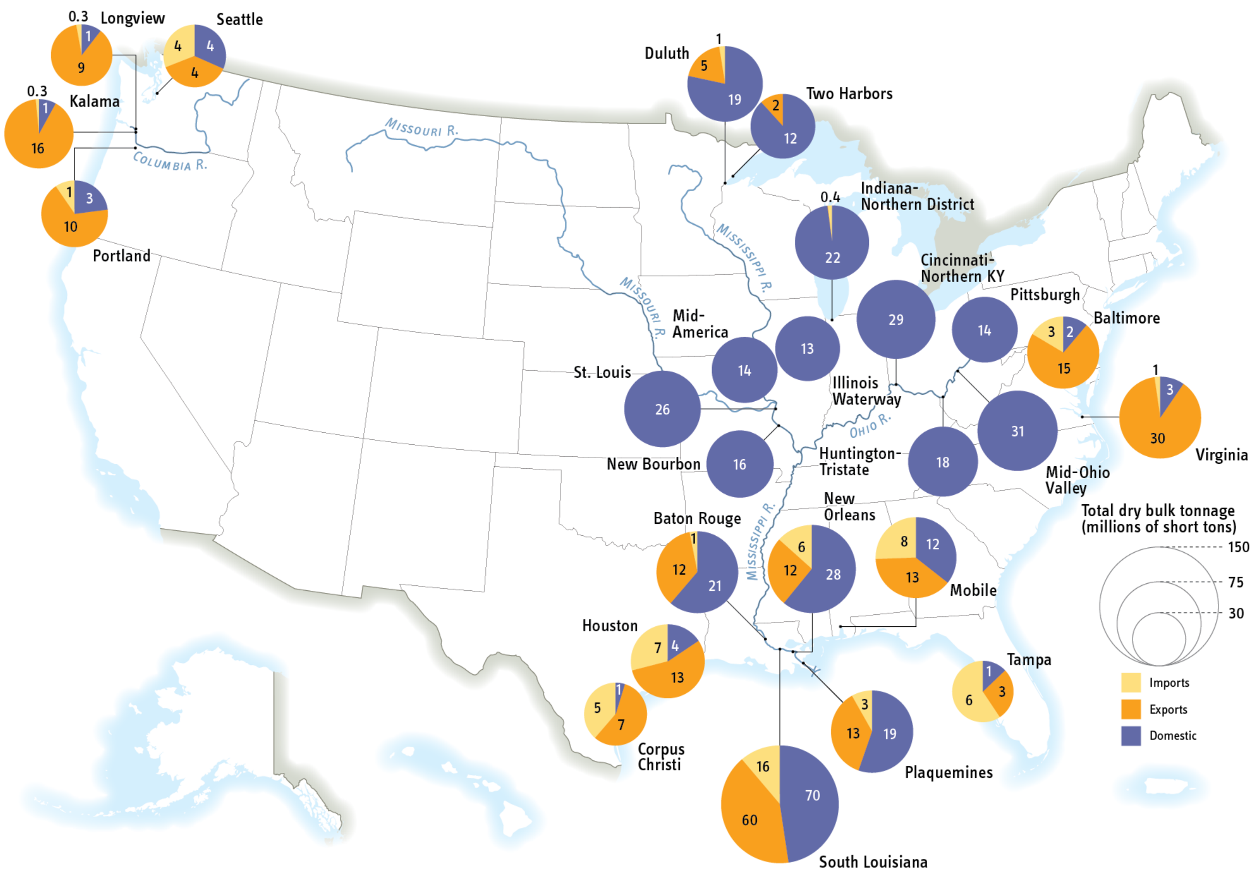
Element/Metric	Description
Annual total tonnage	Domestic, foreign, import, export, and total short tons, current year and percentage change from previous year
Annual container throughput	Inbound loaded, outbound loaded, empty, and total TEU, current year and percentage change from previous year
Annual dry bulk tonnage	Domestic, foreign, import, export, and total short tons, current year and percentage change from previous year
Annual vessel calls by vessel type	Current year and percentage change from previous year
Top 5 commodities	Total short tons current year and percentage share of total
Top 5 food and farm product commodities	Total short tons current year and percentage share of total
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: 2020



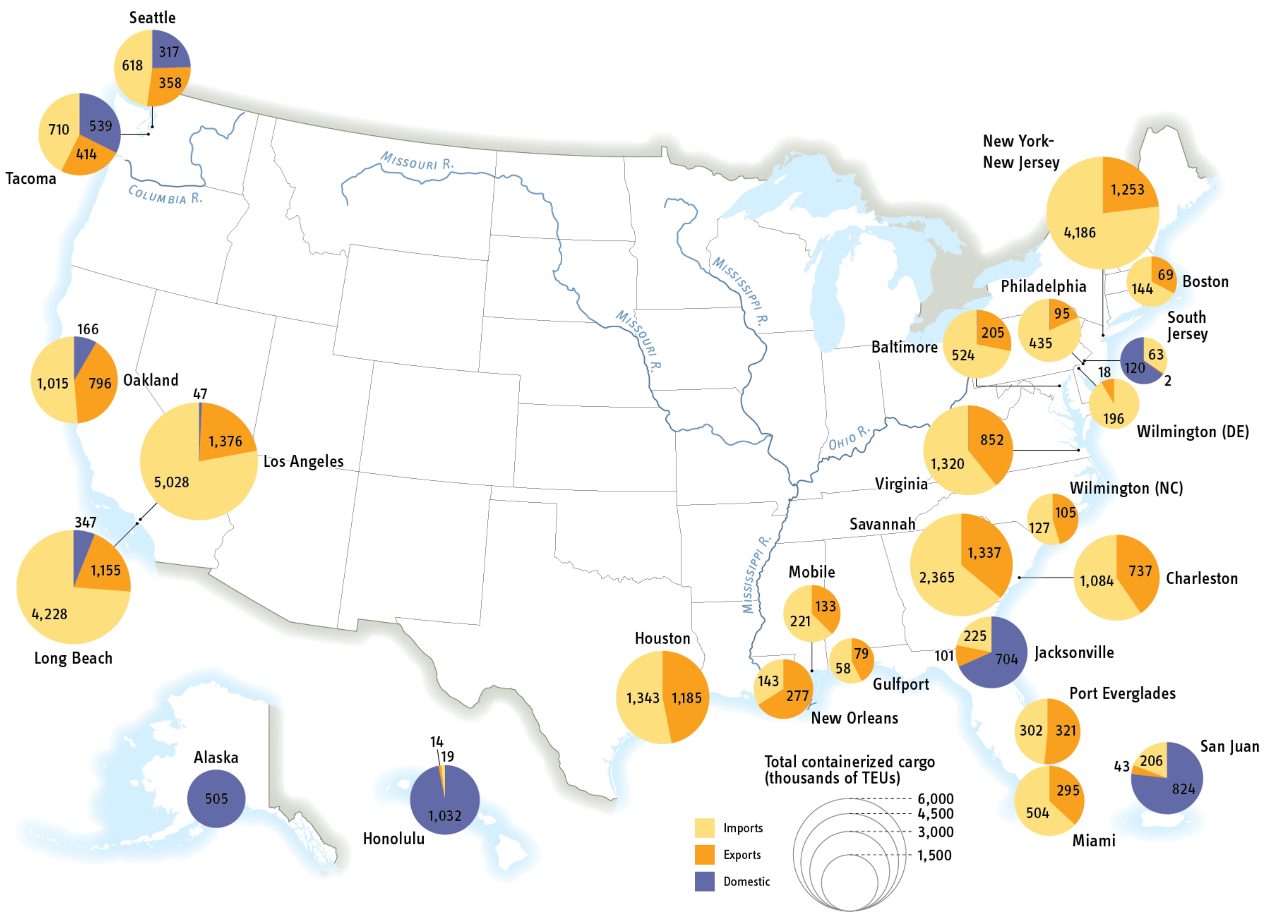
SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, based upon 2020 data (latest available) provided by U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center. Special tabulation as of November 2022.

FIGURE 4-2 Top 25 Ports by Dry Bulk Tonnage: 2020



SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, based upon 2020 data (latest available) provided by U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center. Special tabulation as of November 2022.

FIGURE 4-3 Top 25 Container Ports by TEU: 2020



SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, based upon 2020 data (latest available) provided by U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center. Special tabulation as of November 2022.

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 in order to provide sufficient capacity to discharge and load container TEU 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.

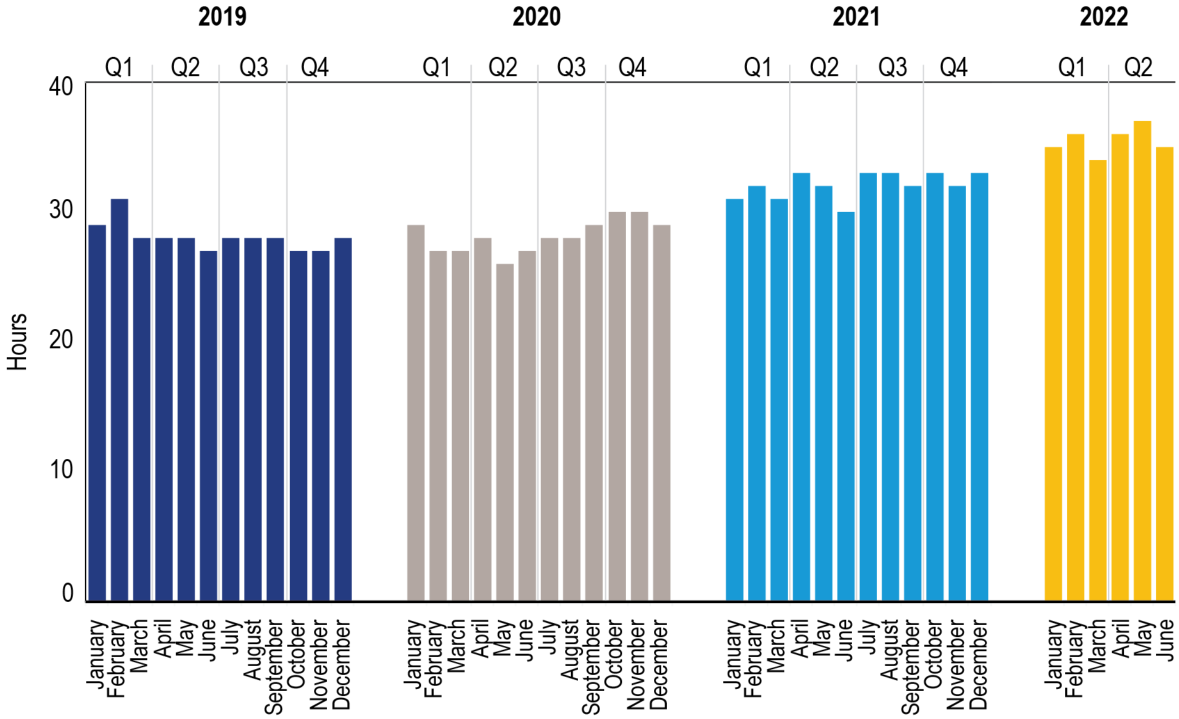
In collaboration with the U.S. Army Corps of Engineers, BTS uses the U.S. Coast Guard's (USCG) Automatic Identification System (AIS) data to calculate dwell times at berth for ship types, including container and liquid bulk (tanker) vessels. Additional information on the BTS' methodology can be found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

Vessel dwell times have increased in recent month for container vessels. However, they have decreased in recent month for tankers/liquid bulk vessels.

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 32.0 hours in 2021, up about 3.9 hours from 28.1 hours in 2020. Overall, as shown in the following figure 4-4, dwell times for container vessels fluctuated monthly, with dwell times increasing steadily since January 2021, remaining above a monthly average of 29.5 hours for the entire period

FIGURE 4-4 Monthly Average Container Vessel Dwell Times at the Top 25 U.S. Container Ports: January 2019 to June 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 our 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 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 2022.

shown. 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 in the online *Port Profiles*.

The distribution of the dwell times in figure 4-5 demonstrates the variability in dwell time, specifically the long "tail" of the figure 4-5. 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.

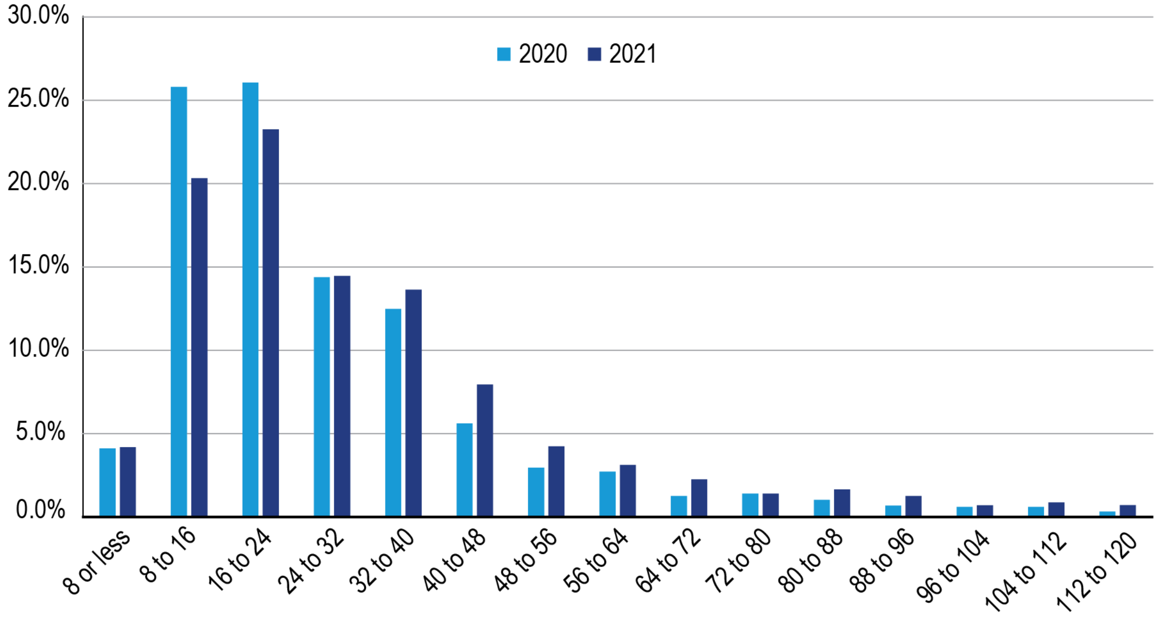
Furthermore, the comparison between the 2020 and 2021 distributions suggest that more vessels dwelled longer in 2021 than in 2020. For example, about 18.1 percent of the vessels dwelled between 32 and 48 hours in 2020, but this number increased to 21.5 percent in 2021.

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

[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 2022.

FIGURE 4-5 Distribution of Observed Container Vessel Dwell Times: 2020 and 2021



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 our 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 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 2022.

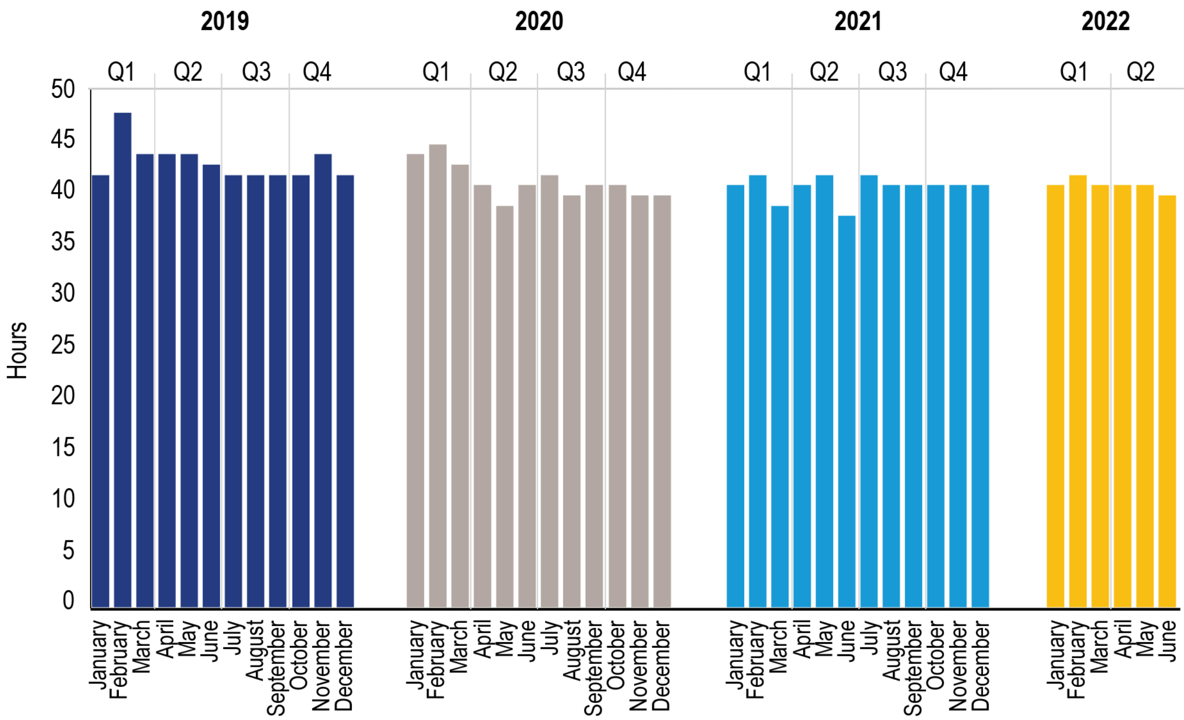
2021.[33] At these top ports by tonnage,[34] the average tanker vessel dwell time was estimated at 40.8 hours in 2021, down by about 36 minutes from 41.4 hours in 2020 (figure 4-6). In general, tanker dwell times were taking about a third longer than container vessel dwell times, likely because it takes 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 narrowing as tanker vessel dwell times have decreased while containership dwell times have increased like due to port congestion around container terminals. Since the middle of 2021, 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 in the online *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 January 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 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 our 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 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 2022.

5. Looking Ahead

BTS has identify 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. Lastly, data are incomplete in intermodal connections to the Nation's freight facilities, including marine terminals.

BTS has working on closing many of these data gap. For example, BTS has been expanding the data on intermodal freight facilities which are included in the National Transportation Atlas Database (NTAD). 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.

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. 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 Federal Maritime Commission to explore options for reviving reports on the availability of empty intermodal shipping containers, reports formerly produced by the U.S. Department of Agriculture's Agriculture 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 provided estimates of equipment availability for the current week and projections two weeks out.

Lastly, BTS is supporting the Freight Logistics Optimization Works (FLOW) Initiative, which is a joint effort of the U.S. Department of Transportation and the freight industry endeavor aimed at increasing data and information exchange among freight community stakeholders. BTS serves as the FLOW Independent Steward partnering with private sector participants from all major sectors of the supply chain to collect and protect supply chain related data. The date will be used to develop metrics and conduct statistical analysis that allow private sector partners to monitor capacity and demand of the national logistics system and to develop strategies to maximize operational efficiency.