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The Changing Tide of U.S.-International Container Trade: Differences Among the U.S. Atlantic, Gulf, and Pacific Coasts

By Matthew Chambers

This BTS special report examines historical U.S. maritime trends, changes in U.S. trading partners, and current U.S. marine trade patterns. More specifically, it compares container vessel calls, container vessel capacity, and the average deadweight tonnage of vessels calling at U.S. Pacific Coast seaports¹ and, increasingly, along the U.S. Atlantic² and Gulf Coasts.³

The report highlights the typical container port and terminal construction projects recently completed along the Pacific Coast by the United States, China, and other U.S. trading partners. In addition, the report shows the U.S. population center, which has a historical relationship with the location and cargo flow of major U.S. seaports.

Historical Trends

August 15, 1962, marked the opening of the world's first container terminal at the Port of New York and New Jersey's Elizabeth-Port Authority Marine Terminal.⁴ Major seaports up and down the Atlantic Coast and along the Gulf and Pacific Coasts have since adopted the technology, which uses containers, measured in twenty-foot equivalent units (TEUs), and built dedicated container terminals that have revolutionized maritime trade and transportation.

Today, many seaports are busily refreshing port infrastructure and building modern container terminals. Modern port terminal facilities are far more capable of quickly and efficiently loading and unloading ocean liners than those of yesteryear, many of which were built to accommodate 10,000 deadweight ton "Liberty-size" cargo ships—a refer-

ence to the hundreds of surplus World War II era Liberty ships put into liner service after the war.⁵ In comparison, today's liner service⁶ is provided by container vessels that average 51,263 deadweight tons.⁷

Even though container trade originated with Atlantic and Gulf Coast seaports, since 1985 Pacific Coast ports have dominated the market share in terms of TEUs.⁸ However, in the past few years, Atlantic and Gulf Coast container ports have narrowed the gap in merchandise trade value by container vessel as they regained market share (figure 1).

Trading Partners

During the past decade, many rising U.S. trade partners in Asia surpassed their European counterparts and are challenging, or even exceeding, U.S. trade partners in North America (in terms of merchandise trade value). China became the second largest U.S. trading partner in 2006, surpassing Mexico. Further, China appears to be on track to top Canada's total trade value with the United States.⁹ However, container vessels carry the majority of the China trade value, whereas container trade accounts for only a fraction of the value of U.S.-Canada trade—which is why Canada does not appear in the table 1 listing of top U.S. container vessel trading partners.¹⁰

⁵ U.S. Department of Transportation, Maritime Administration. *Maritime Administration's Last Liberty Ship Reaches Greece*. Jan. 19, 2009. <http://www.marad.dot.gov/> (accessed June 2011).

⁶ A service provided between set U.S. ports and foreign ports on a fixed schedule.

⁷ U.S. Department of Transportation, Maritime Administration. *Vessel Calls Snapshot, 2010*. May 2011. <http://www.marad.dot.gov/> (accessed June 2011).

⁸ U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics. *America's Container Ports: Linking Markets at Home and Abroad. January 2011*. <http://www.bts.gov/> (Accessed June 2011).

⁹ U.S. Department of Commerce, U.S. Census Bureau, Foreign Trade Division. *USA Trade Online*. <http://www.usatradeonline.gov/> (accessed September 2011).

¹⁰ U.S. Department of Commerce, U.S. Census Bureau, Foreign Trade Division. *USA Trade Online*. <http://www.usatradeonline.gov/> (accessed September 2011).

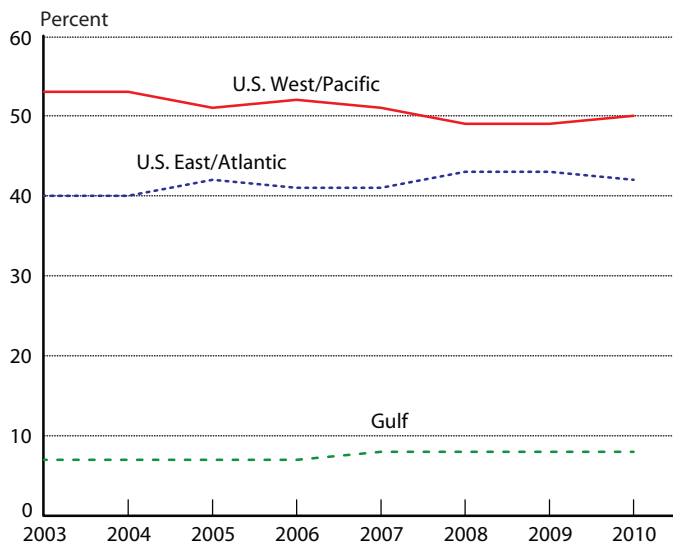
¹ U.S. West/Pacific coast includes seaports from Barrow, AK south to San Diego, CA, including HI.

² U.S. East/Atlantic coast includes seaports from Eastport, ME south to Miami, FL, including PR.

³ U.S. Gulf coast includes seaports from Key West, FL west to Brownsville, TX.

⁴ The Port Authority of New York and New Jersey. *Port History, 2011*. <http://www.panynj.gov/> (accessed June 2011).

Figure 1: Coastal Market Shares of U.S. Merchandise Trade Value by Container Vessel, 2003–2010



SOURCE: U.S. Department of Commerce, U.S. Census Bureau, Foreign Trade Division. *USA Trade Online*. <http://www.usatradeonline.gov/> (accessed September 2011).

Table 1: Top 10 U.S. Container Vessel Trading Partners, 2003 and 2010

Ranked by 2010 containerized value in billions of dollars

Country	2003	2010	Percentage Change
China	\$120.02	\$270.33	125%
Japan	\$59.86	\$63.80	7%
Germany	\$23.64	\$36.32	54%
Korea, South	\$20.54	\$29.25	42%
Taiwan	\$19.83	\$23.65	19%
Brazil	\$10.82	\$18.61	72%
India	\$7.14	\$18.11	154%
United Kingdom	\$14.60	\$17.62	21%
Italy	\$13.69	\$15.94	16%
France	\$10.73	\$15.79	47%

SOURCE: U.S. Department of Commerce, U.S. Census Bureau, Foreign Trade Division. *USA Trade Online*. <http://www.usatradeonline.gov/> (accessed September 2011).

Container Trade Partners

The total container vessel value of each of the top 10 U.S. trade partners increased between 2003 and 2010 (table 1). U.S.-China container vessel value more than doubled between 2003 and 2010. U.S.-India containerized trade value also more than doubled, whereas the U.S.-Japan trade remained about the same during that time period.

Asia accounts for 5 of the top 10 U.S. container trading partners (table 1). Further, 9 out of the top 10 container ports are located in Asia, resulting in the increased Pacific Coast market share (e.g., at the ports of Los Angeles and Long Beach).¹¹ Many seaports in Asia have built new container port terminals or expanded capacity at existing ones in order to handle this growing trade in goods, for example port terminals in Yantian, China.¹²

Current Patterns

Transatlantic Container Trade

Even today, the Atlantic Ocean hosts some of the most heavily transited sea lanes.¹³ These routes provide passage for vessels, including containerships transiting between the United States and Europe, the East Coast of South America, the West Coast of Africa, and even Asia via the Panama and Suez Canals. In addition, containerships move TEUs from port to port around the world using transshipment hubs.¹⁴

Overall, container vessel calls at U.S. seaports were up by 7.3 percent in 2010 from 2009.¹⁵ Several shipping lines are upgrading their liner services. For example, a partnership operated through a Vessel Sharing Agreement (VSA)¹⁶ announced an upgrade of their joint transpacific services. Shipping lines commonly use VSAs in accordance with Federal regulations for sharing of vessel space.¹⁷ More specifically, they are adding ports of call, deploying larger vessels, and expanding transpacific services, including ones transiting the Panama Canal.¹⁸

Container Vessel Calls

Larger container vessels call at U.S. Pacific Coast seaports than at U.S. Atlantic and Gulf Coast seaports. The Pacific Coast seaports (e.g., Port of Los Angeles)¹⁹ have the

¹¹ U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics. *America's Container Ports: Linking Markets at Home and Abroad*. January 2011. <http://www.bts.gov/> (accessed June 2011).

¹² Yantian International Container Terminals. *Milestones*. <http://www.yict.com.cn/> (accessed June 2011).

¹³ Central Intelligence Agency. *World Fact Book, 2009*. <https://www.cia.gov/library/publications/the-world-factbook/index.html> (accessed June 2011).

¹⁴ Transshipment involves transfer goods from one conveyance (e.g., containership) to another or from one mode of transportation to another.

¹⁵ U.S. Department of Transportation, Maritime Administration. *Vessel Calls Snapshot, 2010*. May 2011. <http://www.marad.dot.gov/> (accessed June 2011).

¹⁶ For additional information on Vessel Sharing Agreements, please visit the Federal Maritime Commission at <http://www.fmc.gov/> (accessed July 2011).

¹⁷ National Archives and Records Administration, Government Printing Office, Title 46—Shipping, Part 535—Ocean Common Carrier and Marine Terminal Operator Agreements Subject to the Shipping Act of 1984. <http://ecfr.gpoaccess.gov/> (accessed October 2011).

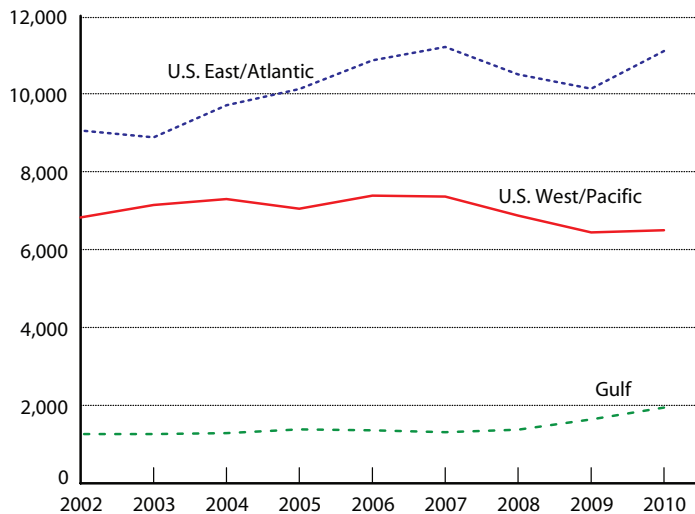
¹⁸ Maersk Lines. *New Trans-Pacific Coverage to Answer Customer Need*. March 2, 2011. <https://www.maerskline.com/> (accessed July 2011).

¹⁹ U.S. Army Corps of Engineers – Los Angeles District, *Port of Los Angeles Channel Deepening Project*, <http://www.spl.usace.army.mil/> (accessed September 2011).

needed channel depths, whereas the Atlantic Coast seaports (e.g., the Port of New York/New Jersey²⁰) are dredging to accommodate the larger containerships. The average container vessel calling along the Pacific Coast is 4,345 TEUs. In comparison, the average containership calling at Gulf Coast ports is 2,919 TEUs, while those calling at the Atlantic Coast ports average 4,044 TEUs.²¹

Since 2009, Atlantic Coast ports have shown growth in container vessel calls. The number of container vessels calls increased on both the Atlantic and Gulf Coasts. However, Pacific Coast calls declined between 2007 and 2009 before experiencing an upswing in 2010 (figure 2). Vessel calls on all coasts struck a low in 2009, coinciding with a U.S. business cycle that fell to a low in June 2009.²² Total transit times and shipping costs, including intermodal costs (e.g., truck or rail), affect a shippers' supply-chain decision on how to route cargo to the Atlantic, Gulf, or Pacific coasts.

Figure 2: Container Vessels Calls at U.S. Seaports by Coast, 2002-2010



SOURCE: U.S. Department of Transportation, Maritime Administration. *Maritime Vessels Calls at U.S. Ports by Vessel Type*. <http://www.marad.dot.gov/> (accessed June 2011).

Atlantic and Gulf Coast container vessel calls increased by 22 and 54 percent, respectively, between 2002 and 2010 (table 2). Along the Atlantic Coast, the South Atlantic saw the largest increase in calls. The Gulf Coast container ports grew the most percentagewise, albeit from a much lower base. During the same period, Pacific Coast vessel calls declined by 5 percent.

²⁰ U.S. Army Corps of Engineers - New York District, *New York & New Jersey Harbor (50 ft Deepening) Navigation Project*. <http://www.nan.usace.army.mil/> (accessed September 2011).

²¹ U.S. Department of Transportation, Maritime Administration. *Vessel Calls Snapshot, 2010*. May 2011. <http://www.marad.dot.gov/> (accessed June 2011).

²² National Bureau of Economic Research, *U.S. Business Cycle Expansions and Contractions*. <http://www.nber.org/cycles.html> (accessed October 2011).

Table 2: Container Vessels Calls at U.S. Seaports by Coast, 2002 and 2010

Coast	Region	2002	2010	Difference	Percent
Atlantic	North Atlantic	3,043	3,340	297	10%
	South Atlantic	5,444	7,309	1,865	34%
	Puerto Rico	568	442	(126)	-22%
Atlantic total		9,055	11,091	2,036	22%
Gulf total		1,262	1,943	681	54%
Pacific	Pacific Northwest	1,787	1,643	(144)	-8%
	Pacific Southwest	5,034	4,853	(181)	-4%
Pacific total		6,821	6,496	(325)	-5%
Total, all		17,138	19,530	2,392	14%

SOURCE: U.S. Department of Transportation, Maritime Administration. *Maritime Vessels Calls at U.S. Ports by Vessel Type*. <http://www.marad.dot.gov/> (accessed June 2011).

Deployed TEU Capacity on Container Vessels

Shipping lines are deploying an ever increasing amount of capacity (as measured in terms of TEUs),²³ which has grown from 51,757,000 TEUs in 2002 to 76,792,000 TEUs in 2010, a 48 percent increase, or 25 million TEUs.²⁴ The Atlantic Coast accounts for the majority of this growth, increasing by about 16 million TEUs between 2002 and 2010, or 62 percent. The Pacific Coast follows with an increase of about 6 million TEUs, or 26 percent. The Gulf Coast, with much smaller capacity, more than doubled, increasing by 103 percent, or nearly 3 million TEUs, during the same period. Such increases are due to shipping lines increasing supply (e.g., deployed TEU capacity) to keep up with growing demand.

Average Tonnage of Container Vessel

The average deadweight tons (dwt) of container vessels calling along the Pacific Coast is nearly 18,000 tons larger than that of vessels calling on ports along the Gulf Coast and about 7,500 dwt larger than those calling on the Atlantic seaboard (table 3). Many factors (e.g., bridge clearance, channel depth, port and terminal infrastructure, and the Panama Canal) may limit the size and ports where post-Panamax containerships call.²⁵ The [BTS Fact Sheet: Atlantic Coast U.S. Seaports \(October 2010\)](#) highlights efforts

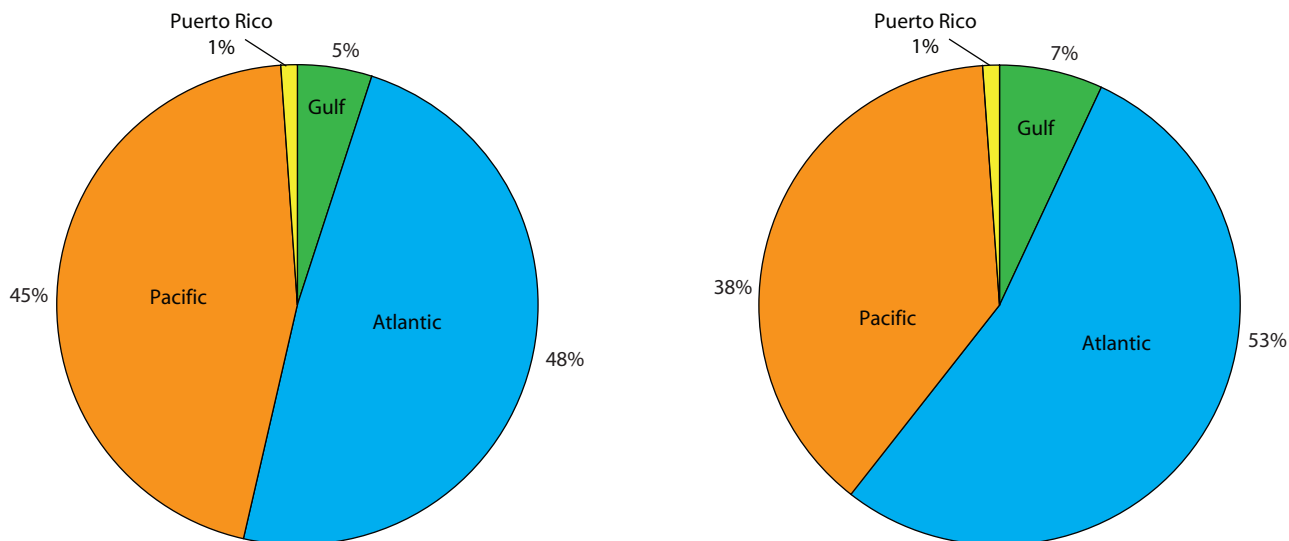
²³ Container vessel capacity is the sum of the U.S. vessel calls weighted by vessel TEU. For additional information, please see U.S. Department of Transportation, Maritime Administration. *Maritime Vessels Calls at U.S. Ports by Vessel Type*. <http://www.marad.dot.gov/> (accessed June 2011).

²⁴ U.S. Department of Transportation, Maritime Administration. *Maritime Vessels Calls at U.S. Ports by Vessel Type*. <http://www.marad.dot.gov/> (accessed June 2011).

²⁵ According to the Maritime Administration's *Glossary of Shipping Terms*, Panamax vessels are largest that can traverse the Panama Canal. Current maximum dimensions are: length 294.1 meters (965 feet); width 32.3 meters (106 feet); draft 12.0 meters (39.5 feet) in tropical fresh water; height 57.91 meters (190 feet) above the water.

Figure 3: Deployed TEU Capacity on Container Vessel by U.S. Coast, 2002 and 2010

Percent based on the number of TEUs



SOURCE: U.S. Department of Transportation, Maritime Administration. *Maritime Vessels Calls at U.S. Ports by Vessel Type*. <http://www.marad.dot.gov/> (accessed June 2011).

Table 3: Average Tonnage of Container Vessels at U.S. Seaports by Coast, 2002 and 2010

In terms of deadweight tons

Coast	Region	2002	2010	Difference	Percent
Atlantic	North Atlantic	40,977	53,256	12,279	30%
	Puerto Rico	21,762	23,526	1,765	8%
	South Atlantic	42,636	49,749	7,113	17%
Atlantic total		40,769	49,760	8,991	22%
Gulf total	Gulf	31,831	39,475	7,644	24%
Pacific	Pacific Northwest	45,510	53,044	7,534	17%
	Pacific Southwest	46,055	58,813	12,758	28%
Pacific total		45,912	57,354	11,441	25%
Total, all		42,158	51,263	9,105	22%

NOTE: Deadweight tons – is the total weight in long tons (2,240 pounds) that a vessel is transporting, including ballast and bunker fuel, crew and equipment, and cargo.

SOURCE: U.S. Department of Transportation, Maritime Administration. *Maritime Vessels Calls at U.S. Ports by Vessel Type*. <http://www.marad.dot.gov/> (accessed June 17, 2011).

underway at the major Atlantic container ports of New York/ New Jersey, Virginia, Savannah, and Charleston, including improving bridge clearance, building double stack rail lines, and constructing new container terminals to prepare for an expanded Panama Canal.²⁶

Building Blocks

Across the country and around the world, many ports and terminals are under construction. In addition, ports and ter-

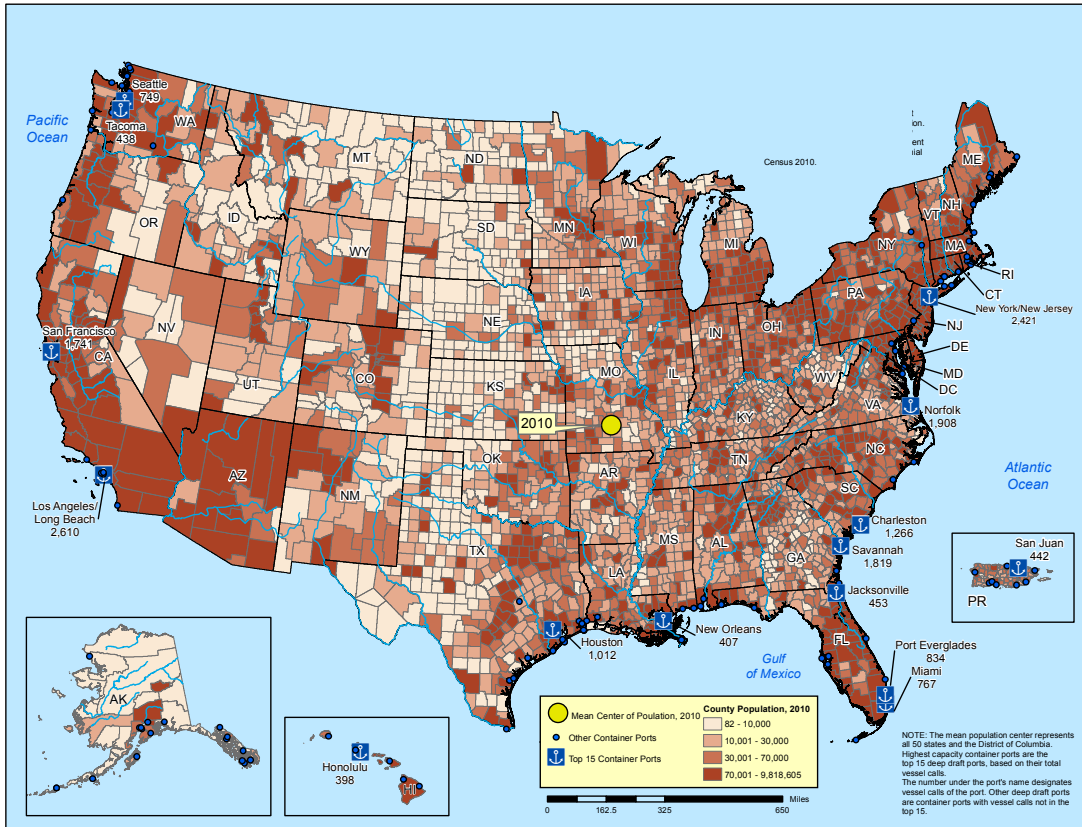
minals are making efforts to increase capacity and efficiency. Port expansions are necessary to facilitate the growth in imports, especially between the United States and its container vessel trading partners in Asia (e.g., China). Further, they are necessary to handle increasingly oversize container vessels.

U.S. Pacific Coast Ports and Terminals

The Port of Los Angeles has begun a multiyear terminal construction project that includes upgrading the China Shipping and TraPac terminals. The upgrades at the latter include pier-side dredging, extending berths, and install-

²⁶ U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics. BTS Special Report: *Atlantic Coast U.S. Seaports*. <http://www.bts.gov/> (accessed October 2011).

Figure 4: U.S. Population in Relationship to Container Ports, 2010



SOURCE: U.S. Department of Transportation, Maritime Administration. *Maritime Vessels Calls at U.S. Ports by Vessel Type*. <http://www.marad.dot.gov/> (accessed June 2011).

ing on-dock rail.²⁷ The Port of Long Beach has started the construction phase of the Middle Harbor Redevelopment Project, which will yield a new container terminal.²⁸ The Port of Tacoma is extending berths at its Washington United Terminals.²⁹

Select International Container Ports or Terminal Developments

Yantian International Container Terminals, which opened with 13,000 TEUs in 1994, increased its annual throughput to 2 million TEUs in 2000 and to over 10 million TEUs in 2010.³⁰ The port of Ningbo increased its capacity, resulting in an increase in annual throughput from 4 million TEUs³¹ in

2003 to more than 10.4 million TEUs³² in 2009. The Port of Guangzhou increased its annual throughput from 4.68 million TEUs³³ in 2005 to 12.7 million TEUs³⁴ in 2010.

The port of Hong Kong increased its annual throughput from 22.6 million TEUs in 2005 to 23.7 million TEUs in 2010 without enlarging its footprint.³⁵ Hong Kong International Terminals (HIT) has increased its efficiency by deploying an information technology solution. For example, the port is automating gates and yard operations, making drop off and pickup appointments, and texting container locations to drivers to keep trucks and container traffic moving.³⁶

Over the past 5 years, the PSA Singapore Terminals have grown from 20 million TEUs³⁷ to an annual throughput of

²⁷ Port of Los Angeles. *A Profile of the Port of Los Angeles, Capital Improvements and Jobs*. <http://www.portoflosangeles.org/> (accessed July 2011).

²⁸ Port of Long Beach. *Construction to Begin on Major Terminal Modernization: First Phase of Massive Middle Harbor Project to Start in Spring* (Feb. 15, 2011), <http://www.polb.com/> (accessed July 2011).

²⁹ Port of Tacoma. *Washington United Terminals Berth Expansion*, <http://www.portoftacoma.com/> (accessed July 2011).

³⁰ Yantian International Container Terminals. *Annual Throughput, 2010*. <http://www.yict.com.cn/> (accessed June 2011).

³¹ Port of Ningbo. *Status Quo of Ningbo Port-a Grand Oriental Port*. <http://english.ningbo.gov.cn/> (accessed August 2011).

³² Port of Ningbo. *Port of Ningbo in 2010*. <http://english.ningbo.gov.cn/> (accessed August 2011).

³³ Port of Guangzhou. *Ports of Guangzhou Achieved a New Leap Forward*, <http://www.gzport.gov.cn/> (accessed August 2011).

³⁴ Port of Guangzhou. *Historical Highlights of the Ports of Guangzhou*, <http://www.gzport.gov.cn/> (accessed August 2011).

³⁵ Port of Hong Kong. *Port of Hong Kong in Figures, 2011*, <http://www.mardep.gov.hk/> (accessed August 2011).

³⁶ Hong Kong International Terminals (HIT). *Technology Advancement*. <http://www.hit.com.hk/> (accessed August 2011).

³⁷ Port of Singapore. *Heritage*. <http://www.singaporepsa.com/> (accessed August 2011).

27.7 million TEUs.³⁸ The ports of Dubai and Fujairah in the United Arab Emirates handled a combined annual throughput of 11.6 million TEUs³⁹ in 2010, up from 9.9 million TEUs⁴⁰ in 2006. The Port of Rotterdam nearly doubled its annual throughput, up from 3.1 million TEUs in 2000 to 5.7 million TEUs in 2010.⁴¹

U.S. Population in Relationship to Major U.S. Container Ports, 2010

The U.S. population movement to the west and south⁴² has changed the ultimate destination for many imported consumer goods. Shippers are routing more cargo through U.S. South Atlantic and Gulf Coasts (table 3), placing inland points and nearby consumers in easy reach.

³⁸ Port of Singapore. *Highlights*. <http://www.singaporepsa.com/> (accessed August 2011).

³⁹ Port of Dubai, *DP World Handled 50 Million TEU in 2010*, <http://www.dpworld.ae/> (accessed August 2011).

⁴⁰ Port of Dubai, *UAE records 19% growth in 2007*, <http://www.dpworld.ae/> (accessed August 2011).

⁴¹ Port of Rotterdam, *Container: TEU time series*, <http://www.portofrotterdam.com/> (accessed August 2011).

⁴² U.S. Department of Commerce, U.S. Census Bureau, *Fact for Features: 2010 Center of Population* (March 2001), <http://www.census.gov/> (accessed July 2011).

The mean center of population⁴³ helps show the relationship between the U.S. population and major U.S. container ports (figure 4). Shifts in the center's location may be indicative of new and emerging freight traffic patterns as well as long-term changes in freight routing as the population center shifts from the mid Atlantic to the mid west region of the United States.

⁴³ According to the U.S. Census Bureau, this point is the place where an imaginary, flat, weightless and rigid map of the United States would balance perfectly if all 308,745,538 residents counted in the 2010 Census were of identical weight. For additional information, please visit: <http://www.census.gov/>.

About This Report

Matthew Chambers, a Senior Transportation Specialist, in the Bureau of Transportation Statistics (BTS) prepared this report. BTS is a component of the U.S. Department of Transportation's Research and Innovative Technology Administration (RITA).

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