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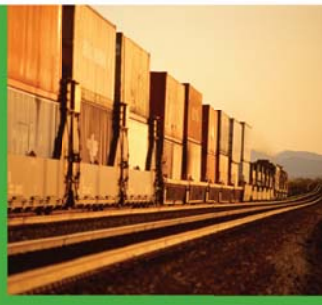

Comprehensive Regional Goods Movement Plan and Implementation Strategy Task 14

Port Activity and Competitiveness Tracker (PACT)

Progress Report

FREIGHTWORKS
SOUTHERN CALIFORNIA DELIVERS THE GOODS

Port Activity and Competitiveness Tracker (PACT)

Prepared for
Southern California Association of Governments

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Executive Summary

This report highlights key factors that help determine the competitiveness of the San Pedro Bay Area ports in comparison to other West Coast and U.S. ports. Several recent trends have made this a necessary exercise, including challenging economic conditions, major changes to the international waterway system (i.e., Panama Canal Expansion), and measures taken by other North American Ports to improve their market competitiveness. Any of these trends could potentially impact the market share of international waterborne cargo received through the San Pedro Bay Ports. Therefore, it is critical to understand and monitor key indicators to ensure an understanding of San Pedro Bay Port competitiveness relative to other marine ports. Developing this knowledge will also help the San Pedro Bay Ports to take appropriate action to remain competitive moving forward.

In this report, the following key topics are discussed:

- Comparative Port Costs;
- Ocean Shipping;
- Intermodal Rail;
- Panama Canal Expansion;
- Summary of Existing Port Infrastructure and Expansion Projects at West Coast Ports;
- Strategies to Reduce Greenhouse Gas Emissions and Air Pollution at West Coast Ports; and
- Inland Infrastructure Projects to Improve Port Operations.

SUMMARY OF KEY REPORT FINDINGS

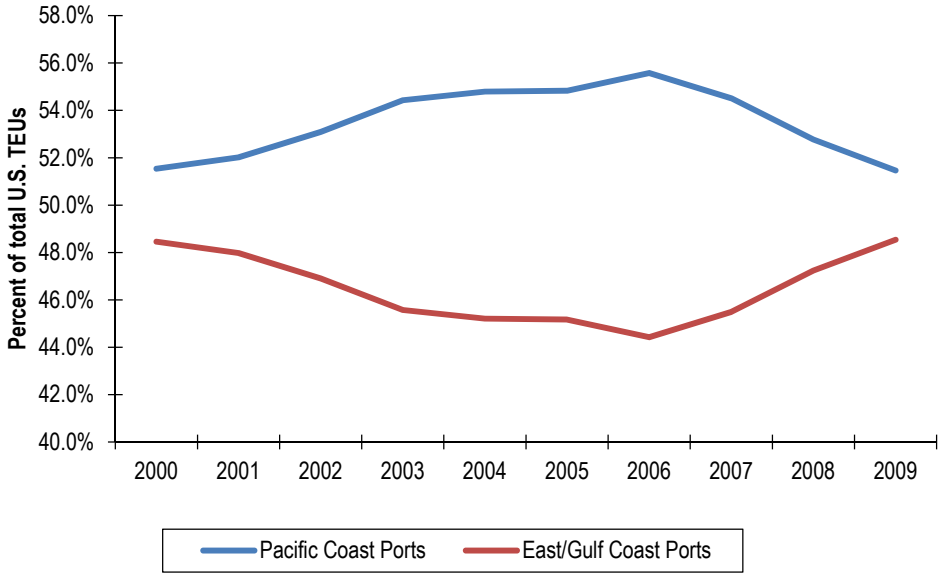
Following analysis of the data presented in this report, a number of findings stood out that may impact Port competitiveness moving forward:

Container Volumes

- When analyzing West Coast Ports only, a slow but noticeable shift in total 20-foot equivalent unit (TEU) percentage is occurring from U.S. West Coast Ports to Canadian and Mexican West Coast Ports. This is a result of newly opened Ports, such as Prince Rupert in Canada, as well as changes in shipper distribution strategies.
- The total share of TEUs moving into and out of the U.S. by water has seen a slight shift to Gulf Coast and East Coast Ports since 2006, taking some of the

share of West Coast Ports. Combined U.S. East Coast/Coast Ports have increased their share of U.S. TEUs from 44.4 percent to 48.5 percent, while U.S. Pacific Coast Ports have dropped from 55.6 percent to 51.5 percent. This more closely resembles the distribution in the year 2000.

Figure ES.1 Comparison of Pacific and East/Gulf Port Share of Total U.S. 20-Foot Equivalent Units
2000-2009



Source: American Association of Port Authorities (AAPA).

- The share of total *value* of U.S. goods moved through Los Angeles area ports also decreased from 25.3 percent in 2004 to 22.4 percent in 2009.
- The TEUs that the Panama Canal handled decreased by 3.9 percent from 2008 to 2009, while revenues increased by 8.4 percent. This may be a result of the doubling of transit fees over the last five years (and a 16.6 percent increase from 2008 to 2009).

Rates

- Although ports publish wharfage rates in their tariffs, these are not the rates that are actually charged. Ports negotiate leases with individual tenants, and terms can vary considerably. Thus, it is very difficult to compare the wharfage rates of the various ports.
- Dockage rates in Seattle and Tacoma are considerably higher than at other West Coast ports. For example, in Seattle, 24-hour rates for 300-meter vessels have a dockage fee of $20,381, compared to $6,472 at the Port of Los Angeles.
- Because railroad rates are confidential, only anecdotal information is available. From 2003 to 2009, intermodal rail rates for BNSF increased

annually by an estimated eight percent on average. There is concern among West Coast ports over the impact of steady increases in rail rates on West Coast market share.

- The Canadian National Railway Company's rates from Prince Rupert to Chicago are reportedly about $300 per container lower than BNSF and UP intermodal rates to Chicago from Los Angeles. In addition, intermodal travel times from Prince Rupert are 100 hours to Chicago. The steepest grade on the route is less than one percent, as major infrastructure improvements have been made on the CN line from the West Coast to Chicago. Expansion of the Prince Rupert Container Terminal is planned, which would quadruple the capacity of the terminal to two million TEUs.

Travel Time and Reliability

- Prince Rupert has a two-day Asia shipment-time advantage over San Pedro Bay Ports because it is about 1,000 nautical miles closer to Asian ports. The other ports to the north of the San Pedro Bay ports also have a shipping-time advantage, but Prince Rupert is the fastest.
- Approximate travel time from Los Angeles to Chicago is 90 hours, although the BNSF "Premium Run" can deliver in as little as 51 hours.
- The reliability of all-water ocean service works well for East Coast markets, but retailer and importers shipping to interior destinations have not switched to all-water service in great numbers. Nevertheless, eastern railroads are investing heavily in infrastructure to improve networks from East Coast ports to interior destinations such as Chicago and the Ohio Valley.
- The San Pedro Bay Ports remain highly competitive partly due to the reliability of service. This reliability comes from the high frequency of both vessel service and rail service at the ports.

Other

- Recent Federal grants have been awarded to other regions, including those that could benefit from the expansion of the Panama Canal.
- Recent Federal grants are consistent with current U.S. DOT policy toward rail transportation, which is to both expand passenger train service and draw freight off highways.
- Currently, only Norfolk, Virginia; Charleston, South Carolina; and Halifax, Nova Scotia have the 50-foot-plus channel depth to accommodate 12,500-TEU ships that will be able to transit the new Panama Canal locks after 2014. The Port of Baltimore and Port of New York/New Jersey will complete dredging to 50 feet by 2014 (although the Bayonne Bridge needs more vertical clearance to access the large container terminals in New Jersey and Staten Island).

TRACKING OF KEY INDICATORS MOVING FORWARD

The findings above highlight both the major challenges and the opportunities facing continued growth at the San Pedro Bay Ports. Moving forward, several key indicators should be tracked consistently (as often as data allows) to monitor Port performance and competitiveness. This includes the following key indicators:

- Comparison of TEUs Shipped by Port;
- Comparison of Trade Value by Port;
- Comparison of Trade Weight by Port;
- Ocean carrier rates;
- Comparison of infrastructure development programs;
- Comparison of environmental programs; and
- Rail transit time and other service-level indicators to key hubs like Chicago.

West Coast, Gulf Coast, and East Coast ports should be analyzed in comparison to the San Pedro Bay Ports, as recent investments in the Panama Canal and East Coast rail infrastructure could have an impact on the routing of goods originating in Asia.

1 Introduction

There are many economic and transportation factors that affect how ocean carriers and importers/exporters choose a port of entry or exit; e.g., port costs, freight costs and travel times to/ inland destinations, highway and railroad infrastructure, warehousing and distribution facilities, labor issues, environmental regulations, regulatory uncertainty, etc. Increasing east-west rail rates, environmental and infrastructure fees, the opening of the expanded Panama Canal in 2014, the early success of the Canadian start-up port in Prince Rupert, and recent studies of port elasticity have increased interest in preserving the long-term competitiveness of the San Pedro Bay Ports. Recognizing the potential for cargo diversion, the Ports of Los Angeles and Long Beach have postponed the collection of the Infrastructure Cargo Fee (ICF), and have recently adopted reduced wharfage charges for intermodal cargo flowing through the ports. They have also joined with other U.S. West Coast ports in writing to the western railroad companies requesting a joint effort to protect the West Coast's market share of U.S.-Asian trade.

The purpose of this report is not to predict future container flows or port market shares. Instead, it aims to explore past trends and to monitor activity at West Coast ports and gateways. The intent is to inform decision-makers in Southern California of policies and programs along the West Coast and other regions of the country (such as infrastructure development, rail service improvements, pricing strategies, and environmental initiatives) that ultimately could impact the competitive environment.

The Port Activity and Competitiveness Tracker (PACT) is a compendium of information about the following major West Coast container gateways, listed from north to south:

- Port of Prince Rupert (BC);
- Port of Vancouver (BC);
- Port of Seattle;
- Port of Tacoma;
- Port of Portland;
- Port of Oakland;
- Port of Los Angeles;
- Port of Long Beach;
- Port of San Diego;
- Port of Manzanillo (Mexico); and
- Port of Lazaro Cardenas (Mexico).

The ongoing expansion of the Panama Canal and the proposed port at Punta Colonet in Mexico will also be discussed.

1.1 CONTAINER VOLUMES AND MARKET SHARES

The first step was to look at recent trends in container volumes. Port market shares were then calculated. Four major sources of data were reviewed:

1. American Association of Port Authorities (AAPA) 1990-2009 data;
2. Individual port web sites 2009 and 2010 data;
3. Port Import Export Reporting Service (PIERS), Journal of Commerce, U.S. Port Rankings (loaded containers only); and
4. Census Bureau Data (U.S. International Trade Data, FT 920).

The American Association of Port Authorities (AAPA) reports container volumes for all ports in North America in one convenient location and shows volumes for even the smallest container ports. Data are currently available for 1990 to 2009.[1] Because the AAPA collects data from the ports themselves, the ports' web site data are generally consistent with the AAPA figures, although small discrepancies exist.

The PIERS data are available for major ports but they are generally not comparable to the AAPA data because PIERS reports loaded container figures only. Furthermore, the PIERS data often do not correspond well to the ports' own data on loaded containers.

The data confirm a modest shift in container volume from West Coast ports to Gulf and East Coast ports. Among the West Coast ports there has also been a shift from U.S. ports to Canadian and Mexican ports. Part of this shift can be explained by the early success of Prince Rupert in Canada, and a "four corners" logistic strategy adopted by some large shippers involving the use of distribution centers in the northwest, southwest, southeast, and northeast. For Walmart, the strategy involved a large distribution center along the Gulf Coast. Walmart opened a 4 million-square-foot distribution facility in Baytown, Texas, outside of Houston. In August of 2007, Target opened a 1.5 million-square-foot site near the Port of Savannah, Georgia, for inbound distribution. The Port of Savannah area has 20 distribution centers, including sites for Walmart, Target Stores, Lowes, IKEA, and Home Depot that generate more than 500,000 TEUs a year combined.

Part of this strategy was shippers' interest in diversifying their route structure as a hedge against potential congestion in Southern California and labor strife along the West Coast. The congestion experienced by the Ports of Los Angeles and Long Beach in the fall of 2004 was short-lived, however, and the recession further reduced pressure on port capacity.

[1] American Association of Port Authorities: http://www.aapa-ports.org.

Furthermore, shipping a container via an all-water service from Asia to the East Coast costs about $300 to $500 less than shipping it to the West Coast and moving it all the way across the country via intermodal rail. However, the all-water route adds 7 to 10 days to the overall voyage – plus additional truck/costs to move goods inland from East Coast ports make the all-water route to the East Coast the less desirable option.[2] Looking ahead, the real battleground will be the competition for discretionary cargo – containers that can flow through any West Coast gateway (including the Panama Canal) – to reach inland destinations. The key regional battlegrounds are the Chicago area, Columbus and the Ohio Valley, Dallas/Houston, Texas, and southeastern United States (Savannah, Atlanta, and Charleston). Which gateways will be chosen by this discretionary Asian container trade will depend on relative levels of service, reliability, and cost.

As shown in Table 1.1, North American ports handled a total of 44.3 million 20-foot equivalent units (TEU) of containerized cargo in 2009, up from 34.7 million in 2000, but down from 52.7 million in 2007. The Pacific Coast ports accounted for 52.9 percent of total North American container volumes in 2009, while the Atlantic and Gulf Coast ports accounted for 39.1 percent and 8.0 percent, respectively. While the Pacific Coast's share has grown from 50.1 percent in 2000 to 52.9 percent in 2009, its share has dipped 2.6 percent since its peak in 2006. The combined Los Angeles/Long Beach share of total North American volume dropped from a high of 30.6 percent in 2006 to 26.6 percent in 2009. Table 1.1 reveals that the Atlantic and Gulf Coasts have gained market share slightly over the Pacific Coast in recent years.

The same general pattern is apparent when the focus is on U.S. ports alone. Table 1.2 shows that the Gulf and Atlantic Coasts have gained market share at the expense of the Pacific Coast of the U.S. As a share of total U.S. port volume, the Los Angeles/Long Beach Ports combined dropped from a high of 35.5 percent in 2006 to 31.7 percent in 2009. As shown in Table 1.3, a recent forecast of San Pedro Bay cargo volumes predicts that by 2030, the Ports of Los Angeles and Long Beach could regain market share and reach 37 percent of total U.S. TEUs by 2030.

[2] Journal of Commerce, February 22, 2010.

Table 1.1 Container Volumes for North American Ports by Coast (in TEUs)

2000 to 2009

	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000
Pacific Coast	23,457,343	27,350,391	28,876,511	28,549,509	26,249,674	24,091,534	21,960,143	19,627,235	17,654,635	17,372,796
Share of NA	52.9%	53.8%	54.8%	55.5%	54.4%	54.2%	53.6%	52.2%	50.6%	50.1%
Atlantic Coast	17,321,787	19,731,732	20,032,448	19,517,921	18,806,384	17,347,419	16,228,629	15,362,327	14,702,458	14,762,740
Share of NA	39.1%	38.8%	38.0%	38.0%	39.0%	39.0%	39.6%	40.9%	42.1%	42.6%
Gulf Coast	3,562,631	3,782,380	3,763,572	3,351,704	3,209,254	3,043,105	2,748,637	2,577,509	2,555,770	2,526,100
Share of NA	8.0%	7.4%	7.1%	6.5%	6.6%	6.8%	6.7%	6.9%	7.3%	7.3%
Total	44,341,761	50,864,503	52,672,531	51,419,135	48,265,312	44,482,058	40,937,409	37,567,071	34,912,863	34,661,636
Share of NA	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
LA/LB Combined	11,816,592	14,200,110	15,667,504	15,759,218	14,194,442	13,101,292	11,837,064	10,629,901	9,646,479	9,480,216
LA/LB Share	26.6%	27.9%	29.7%	30.6%	29.4%	29.5%	28.9%	28.3%	27.6%	27.4%

Source: American Association of Port Authorities (AAPA).

Table 1.2 Container Volumes for United States Ports by Coast (in TEUs)

2000 to 2009

	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000
Pacific Coast	19,190,436	22,597,601	24,533,899	24,682,917	23,010,813	21,179,635	19,393,888	17,363,499	15,951,497	15,665,731
Share of US	51.5%	52.8%	54.5%	55.6%	54.8%	54.8%	54.4%	53.1%	52.0%	51.5%
Atlantic Coast	15,565,499	17,685,066	17,942,603	17,490,972	16,783,183	15,406,352	14,401,682	13,621,445	13,009,212	13,042,455
Share of US	41.7%	41.3%	39.9%	39.4%	40.0%	39.9%	40.4%	41.7%	42.4%	42.9%
Gulf Coast	2,533,494	2,544,927	2,531,517	2,239,123	2,174,416	2,068,671	1,837,957	1,717,918	1,703,104	1,687,577
Share of US	6.8%	5.9%	5.6%	5.0%	5.2%	5.4%	5.2%	5.3%	5.6%	5.6%
Total	37,289,429	42,827,594	45,008,019	44,413,012	41,968,412	38,654,658	35,633,527	32,702,862	30,663,813	30,395,763
Share of US	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
LA/LB Combined	11,816,592	14,200,110	15,667,504	15,759,218	14,194,442	13,101,292	11,837,064	10,629,901	9,646,479	9,480,216
LA/LB Share	31.7%	33.2%	34.8%	35.5%	33.8%	33.9%	33.2%	32.5%	31.5%	31.2%

Source: American Association of Port Authorities (AAPA).

Table 1.3 Forecasted Containers Moving in the U.S. and the Ports of L.A./Long Beach (in TEUs)

	Actual					Forecasted				
	2000	**2005**	**2006**	**2007**	**2008**	**2010**	**2015**	**2020**	**2025**	**2030**
U.S. Total	30,396	41,968	44,413	45,008	42,828	39,129	50,653	63,348	77,563	94,031
LA/LB Total	9,480	13,983	15,760	15,668	14,338	12,814	16,959	21,827	27,691	34,563
LA/LB Share of Total US	31%	33%	35%	35%	33%	33%	33%	34%	36%	37%

	Actual					Forecasted				
	2000	**2005**	**2006**	**2007**	**2008**	**2010**	**2015**	**2020**	**2025**	**2030**
U.S. Total	30,396	41,968	44,413	45,008	42,828	39,129	50,653	63,348	77,563	94,031
LA/LB Total	9,480	13,983	15,760	15,668	14,338	12,814	16,959	21,827	27,691	34,563
LA/LB Share of Total US	31%	33%	35%	35%	33%	33%	33%	34%	36%	37%

Source: 2009 San Pedro Bay Container Forecast Update, IHS Global Insight and The Tioga Group, Inc.

Table 1.4 spotlights the major Pacific Coast ports. Canadian Pacific Coast ports have gained in market share for all Pacific Coast ports, growing from 7.1 percent in 2000 to 10.3 percent in 2009. Similarly, Mexican ports have gained market share, increasing from 2.7 percent in 2000 to 7.9 percent in 2009. U.S. ports' share dropped from 90.2 percent in 2000 to 81.8 percent in 2009 for all TEUs through Pacific Coast ports. Increased volume through the Port of Prince Rupert and the Ports of Lazaro Cardenas and Manzanillo contributed to the decline in the U.S. share of total Pacific Coast port activity. The market share for the Ports of Los Angeles and Long Beach combined dropped from a high of 55.2 percent in 2006 to 50.4 percent in 2009. During the 2002 port lockout and during the 2004 congestion experienced by the San Pedro Bay ports, a significant amount of cargo was diverted to Manzanillo.

Table 1.5 takes a closer look at the major ports in North America revealing which ports have gained or lost market share. Metro Port Vancouver, the largest port in Canada, handled almost 2.2 million TEUs in 2009. Prince Rupert handled about 265,000. Seattle and Tacoma both handled nearly 1.6 million TEUs in 2009. On the Mexican west coast, Manzanillo handled around 1.1 million TEUs in 2009. For the U.S., the top three container ports in 2009 were Los Angeles (6.7 million TEUs), Long Beach (5.1 million TEUs), and New York/New Jersey (4.6 million TEUs). New York/New Jersey saw a modest reduction in TEUs from 2007 to 2009, while Houston saw a slight gain despite the recession. Savannah has grown substantially from 949,000 TEUs in 2000 (2.7 percent market share) to 2.4 million TEUs in 2009 (5.3 percent market share).

Table 1.4 Container Volumes for Major Pacific Coast Ports by Country (TEUs)

2000 to 2009

	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000
Canada										
Metro Port Vancouver (BC)	2,152,468	2,492,107	2,495,522	2,302,399	2,140,223	1,982,488	1,791,568	1,558,786	1,197,142	1,230,020
Share of PC	9.2%	9.1%	8.6%	8.1%	8.2%	8.2%	8.2%	7.9%	6.8%	7.1%
Prince Rupert	265,225	181,894	16,703	0	0	0	0	0	0	0
Share of PC	1.1%	0.7%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total Canada	2,417,693	2,674,001	2,512,225	2,302,399	2,140,223	1,982,488	1,791,568	1,558,786	1,197,142	1,230,020
Share of PC	10.3%	9.8%	8.7%	8.1%	8.2%	8.2%	8.2%	7.9%	6.8%	7.1%
Mexico										
Lazaro Cardenas	585,449	524,791	270,240	160,696	132,479	43,445	1,646	134	0	759
Share of PC	2.5%	1.9%	0.9%	0.6%	0.5%	0.2%	0.0%	0.0%	0.0%	0.0%
Manzanillo	1,110,350	1,409,782	1,409,614	1,249,630	872,569	830,777	709,209	638,597	458,472	426,717
Share of PC	4.7%	5.2%	4.9%	4.4%	3.3%	3.4%	3.2%	3.3%	2.6%	2.5%
Other	153,415	144,216	150,533	153,867	93,590	55,189	63,832	66,219	47,524	49,569
Share of PC	0.7%	0.5%	0.5%	0.5%	0.4%	0.2%	0.3%	0.3%	0.3%	0.3%
Total Mexico	1,849,214	2,078,789	1,830,387	1,564,193	1,098,638	929,411	774,687	704,950	505,996	477,045
Share of PC	7.9%	7.6%	6.3%	5.5%	4.2%	3.9%	3.5%	3.6%	2.9%	2.7%
United States										
Anchorage	343278	544315	504844	485760	516367	543831	521993	463395	360615	432296
Share of PC	1.5%	2.0%	1.7%	1.7%	2.0%	2.3%	2.4%	2.4%	2.0%	2.5%
Honolulu	1,049,420	1,124,388	1,125,382	1,113,789	1,077,468	1,041,455	980,840	945,460	923,943	461,102
Share of PC	4.5%	4.1%	3.9%	3.9%	4.1%	4.3%	4.5%	4.8%	5.2%	2.7%
Long Beach	5,067,597	6,350,125	7,312,465	7,289,365	6,709,818	5,779,852	4,658,124	4,524,038	4,462,959	4,600,787
Share of PC	21.6%	23.2%	25.3%	25.5%	25.6%	24.0%	21.2%	23.0%	25.3%	26.5%
Los Angeles	6,748,995	7,849,985	8,355,039	8,469,853	7,484,624	7,321,440	7,178,940	6,105,863	5,183,520	4,879,429
Share of PC	28.8%	28.7%	28.9%	29.7%	28.5%	30.4%	32.7%	31.1%	29.4%	28.1%
Oakland	2,050,030	2,236,244	2,388,182	2,390,262	2,272,525	2,043,122	1,923,136	1,707,827	1,643,577	1,776,922
Share of PC	8.7%	8.2%	8.3%	8.4%	8.7%	8.5%	8.8%	8.7%	9.3%	10.2%
Portland	174,203	245,459	260,128	214,484	160,479	274,609	339,571	255,745	278,491	290,943
Share of PC	0.7%	0.9%	0.9%	0.8%	0.6%	1.1%	1.5%	1.3%	1.6%	1.7%
San Diego	95,515	90,028	93,671	103,058	101,509	92,834	93,188	15,480	0	0
Share of PC	0.4%	0.3%	0.3%	0.4%	0.4%	0.4%	0.4%	0.1%	0.0%	0.0%
Seattle	1,584,596	1,704,492	1,973,505	1,987,360	2,087,929	1,775,858	1,486,465	1,438,872	1,315,109	1,488,020
Share of PC	6.8%	6.2%	6.8%	7.0%	8.0%	7.4%	6.8%	7.3%	7.4%	8.6%
Tacoma	1,545,853	1,861,352	1,924,934	2,067,186	2,066,447	1,797,560	1,738,068	1,470,826	1,320,274	1,376,379
Share of PC	6.6%	6.8%	6.7%	7.2%	7.9%	7.5%	7.9%	7.5%	7.5%	7.9%
Other	530,949	591,213	595,749	561,801	533,647	509,074	473,563	435,993	463,009	359,853
Share of PC	2.3%	2.2%	2.1%	2.0%	2.0%	2.1%	2.2%	2.2%	2.6%	2.1%
Total United States	19,190,436	22,597,601	24,533,899	24,682,917	23,010,813	21,179,635	19,393,888	17,363,499	15,951,497	15,665,731
	81.8%	82.6%	85.0%	86.5%	87.7%	87.9%	88.3%	88.5%	90.4%	90.2%
Total Pacific Coast	23,457,343	27,350,391	28,876,511	28,549,509	26,249,674	24,091,534	21,960,143	19,627,235	17,654,635	17,372,796
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
LA/LB Combined	11,816,592	14,200,110	15,667,504	15,759,218	14,194,442	13,101,292	11,837,064	10,629,901	9,646,479	9,480,216
LA/LB Share of PC	50.4%	51.9%	54.3%	55.2%	54.1%	54.4%	53.9%	54.2%	54.6%	54.6%

Source: American Association of Port Authorities (AAPA).

Table 1.5 Container Volumes for North American Major Ports by Country (in TEUs)

2000 to 2009

	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000
Canada										
Metro Port Vancouver (BC)	2,152,468	2,492,107	2,495,522	2,302,399	2,140,223	1,982,488	1,791,568	1,558,786	1,197,142	1,230,020
Share of NA	4.9%	4.9%	4.7%	4.5%	4.4%	4.5%	4.4%	4.1%	3.4%	3.5%
Prince Rupert	265,225	181,894	16,703	0	0	0	0	0	0	0
Share of NA	0.6%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Halifax	344,811	387,347	490,072	529,890	550,462	525,553	541,650	524,336	541,640	548,404
Share of NA	0.8%	0.8%	0.9%	1.0%	1.1%	1.2%	1.3%	1.4%	1.6%	1.6%
Montreal	1,247,690	1,473,914	1,363,021	1,288,910	1,254,560	1,226,296	1,108,837	1,054,603	989,427	1,014,148
Share of NA	2.8%	2.9%	2.6%	2.5%	2.6%	2.8%	2.7%	2.8%	2.8%	2.9%
Other Canada	163,787	185,405	236,752	208,150	218,179	189,218	176,460	161,943	162,179	157,733
Share of NA	0.4%	0.4%	0.4%	0.4%	0.5%	0.4%	0.4%	0.4%	0.5%	0.5%
Total Canada	4,173,981	4,720,667	4,602,070	4,329,349	4,163,424	3,923,555	3,618,515	3,299,668	2,890,388	2,950,305
Share of NA	9.4%	9.3%	8.7%	8.4%	8.6%	8.8%	8.8%	8.8%	8.3%	8.5%
Mexico										
Lazaro Cardenas	585,449	524,791	270,240	160,696	132,479	43,445	1,646	134	0	759
Share of NA	1.3%	1.0%	0.5%	0.3%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%
Manzanillo	1,110,350	1,409,782	1,409,614	1,249,630	872,569	830,777	709,209	638,597	458,472	426,717
Share of NA	2.5%	2.8%	2.7%	2.4%	1.8%	1.9%	1.7%	1.7%	1.3%	1.2%
Veracruz	564,315	716,046	729,717	674,872	620,858	591,736	571,867	548,422	543,327	540,014
Share of NA	1.3%	1.4%	1.4%	1.3%	1.3%	1.3%	1.4%	1.5%	1.6%	1.6%
Other Mexico	618,237	665,623	652,871	591,576	507,570	437,887	402,645	377,388	356,863	348,078
Share of NA	1.4%	1.3%	1.2%	1.2%	1.1%	1.0%	1.0%	1.0%	1.0%	1.0%
Total Mexico	2,878,351	3,316,242	3,062,442	2,676,774	2,133,476	1,903,845	1,685,367	1,564,541	1,358,662	1,315,568
Share of NA	6.5%	6.5%	5.8%	5.2%	4.4%	4.3%	4.1%	4.2%	3.9%	3.8%
United States										
Anchorage	343,278	544,315	504,844	485,760	516,367	543,831	521,993	463,395	360,615	432,296
Share of NA	0.8%	1.1%	1.0%	0.9%	1.1%	1.2%	1.3%	1.2%	1.0%	1.2%
Honolulu	1,049,420	1,124,388	1,125,382	1,113,789	1,077,468	1,041,455	980,840	945,460	923,943	461,102
Share of NA	2.4%	2.2%	2.1%	2.2%	2.2%	2.3%	2.4%	2.5%	2.6%	1.3%
Long Beach	5,067,597	6,350,125	7,312,465	7,289,365	6,709,818	5,779,852	4,658,124	4,524,038	4,462,959	4,600,787
Share of NA	11.4%	12.5%	13.9%	14.2%	13.9%	13.0%	11.4%	12.0%	12.8%	13.3%
Los Angeles	6,748,995	7,849,985	8,355,039	8,469,853	7,484,624	7,321,440	7,178,940	6,105,863	5,183,520	4,879,429
Share of NA	15.2%	15.4%	15.9%	16.5%	15.5%	16.5%	17.5%	16.3%	14.8%	14.1%
Oakland	2,050,030	2,236,244	2,388,182	2,390,262	2,272,525	2,043,122	1,923,136	1,707,827	1,643,577	1,776,922
Share of NA	4.6%	4.4%	4.5%	4.6%	4.7%	4.6%	4.7%	4.5%	4.7%	5.1%

Source: American Association of Port Authorities (AAPA).

Table 1.5 Container Volumes for North American Major Ports by Country (in TEUs) (continued)

2000 to 2009

Portland (OR)	174,203	245,459	260,128	214,484	160,479	274,609	339,571	255,745	278,491	290,943
Share of NA	0.4%	0.5%	0.5%	0.4%	0.3%	0.6%	0.8%	0.7%	0.8%	0.8%
Seattle	1,584,596	1,704,492	1,973,505	1,987,360	2,087,929	1,775,858	1,486,465	1,438,872	1,315,109	1,488,020
Share of NA	3.6%	3.4%	3.7%	3.9%	4.3%	4.0%	3.6%	3.8%	3.8%	4.3%
Tacoma	1,545,853	1,861,352	1,924,934	2,067,186	2,066,447	1,797,560	1,738,068	1,470,826	1,320,274	1,376,379
Share of NA	3.5%	3.7%	3.7%	4.0%	4.3%	4.0%	4.2%	3.9%	3.8%	4.0%
Baltimore	525,296	612,877	610,466	627,947	602,475	557,877	528,899	508,068	493,135	508,320
Share of NA	1.2%	1.2%	1.2%	1.2%	1.2%	1.3%	1.3%	1.4%	1.4%	1.5%
Charleston	1,181,353	1,635,534	1,754,376	1,968,474	1,986,586	1,863,917	1,690,847	1,592,834	1,528,034	1,632,747
Share of NA	2.7%	3.2%	3.3%	3.8%	4.1%	4.2%	4.1%	4.2%	4.4%	4.7%
Hampton Roads	1,745,228	2,083,278	2,128,366	2,046,285	1,981,955	1,808,933	1,646,279	1,437,779	1,303,797	1,347,364
Share of NA	3.9%	4.1%	4.0%	4.0%	4.1%	4.1%	4.0%	3.8%	3.7%	3.9%
Jacksonville	753,647	697,494	710,073	768,239	777,318	727,660	692,422	683,836	698,903	708,028
Share of NA	1.7%	1.4%	1.3%	1.5%	1.6%	1.6%	1.7%	1.8%	2.0%	2.0%
Miami	807,069	828,349	884,945	976,514	1,054,462	1,009,500	1,041,483	980,743	955,671	868,178
Share of NA	1.8%	1.6%	1.7%	1.9%	2.2%	2.3%	2.5%	2.6%	2.7%	2.5%
New York/New Jersey	4,561,527	5,265,058	5,299,105	5,092,806	4,785,318	4,478,480	4,067,812	3,749,014	3,316,275	3,050,006
Share of NA	10.3%	10.4%	10.1%	9.9%	9.9%	10.1%	9.9%	10.0%	9.5%	8.8%
Philadelphia	222,900	255,994	253,492	247,211	204,912	178,046	147,413	215,061	178,834	198,680
Share of NA	0.5%	0.5%	0.5%	0.5%	0.4%	0.4%	0.4%	0.6%	0.5%	0.6%
Port Everglades	796,160	985,095	948,680	864,030	797,238	653,628	569,697	554,041	621,421	676,760
Share of NA	1.8%	1.9%	1.8%	1.7%	1.7%	1.5%	1.4%	1.5%	1.8%	2.0%
San Juan	1,673,745	1,684,883	1,695,134	1,729,294	1,727,389	1,625,704	1,665,765	1,740,325	2,057,733	2,333,788
Share of NA	3.8%	3.3%	3.2%	3.4%	3.6%	3.7%	4.1%	4.6%	5.9%	6.7%
Savannah	2,356,512	2,616,126	2,604,312	2,160,168	1,901,520	1,662,021	1,521,206	1,327,939	1,077,478	948,699
Share of NA	5.3%	5.1%	4.9%	4.2%	3.9%	3.7%	3.7%	3.5%	3.1%	2.7%
Houston	1,797,198	1,794,309	1,768,627	1,606,786	1,594,366	1,437,585	1,243,866	1,147,489	1,057,869	1,061,525
Share of NA	4.1%	3.5%	3.4%	3.1%	3.3%	3.2%	3.0%	3.1%	3.0%	3.1%
New Orleans	229,067	235,324	250,649	175,957	200,766	258,468	251,187	243,127	307,925	278,932
Share of NA	0.5%	0.5%	0.5%	0.3%	0.4%	0.6%	0.6%	0.6%	0.9%	0.8%
Other US	2,075,755	2,216,913	2,255,315	2,131,243	1,978,450	1,815,112	1,739,514	1,610,580	1,578,250	1,476,858
Share of NA	4.7%	4.4%	4.3%	4.1%	4.1%	4.1%	4.2%	4.3%	4.5%	4.3%
Total US	37,289,429	42,827,594	45,008,019	44,413,012	41,968,412	38,654,658	35,633,527	32,702,862	30,663,813	30,395,763
Share of NA	84.1%	84.2%	85.4%	86.4%	87.0%	86.9%	87.0%	87.1%	87.8%	87.7%
Total NA	44,341,761	50,864,503	52,672,531	51,419,135	48,265,312	44,482,058	40,937,409	37,567,071	34,912,863	34,661,636
Share of NA	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
LA/LB Combined	11,816,592	14,200,110	15,667,504	15,759,218	14,194,442	13,101,292	11,837,064	10,629,901	9,646,479	9,480,216
LA/LB Share	26.6%	27.9%	29.7%	30.6%	29.4%	29.5%	28.9%	28.3%	27.6%	27.4%

Source: American Association of Port Authorities (AAPA).

Although PIERS suggests that Oakland gained volume in loaded containers from 2008 to 2009 (1,394,864 to 1,398,420), the Port's own web site shows a drop in loaded TEUs (1,709,386 to 1,671,550), as shown in Table 1.6. The Port's totals for 2008 and 2009 also are higher than estimated by PIERS.

Table 1.6 Comparison of PIERS and Port Web Site Data for Loaded Container Volumes (in TEUs)
Oakland, Los Angeles, and Long Beach, 2009 and 2008

Port of Oakland	2009	2008	% Change
PIERS Data	1,398,420	1,394,684	-0.3%
Port Data	1,671,550	1,709,386	2.2%
Difference	*-273,130*	*-314,702*	
Port of Los Angeles			
PIERS Data	5,028,998	5,670,897	11.3%
Port Data	5,193,297	5,921,092	12.3%
Difference	*-164,299*	*-250,195*	
Port of Long Beach			
PIERS Data	3,765,560	4,611,671	18.3%
Port Data	3,886,950	4,876,414	20.3%
Difference	*-121,390*	*-264,743*	

Source: PIERS and Port web sites.

As shown in Table 1.7, cargo volumes through the Ports of Los Angeles and Long Beach in 2010 have increased significantly relative to 2009. For both ports combined, inbound loads (imports) grew by 17.2 percent. Outbound loads (exports) grew by 12.7 percent, and empties grew by 30.4 percent. Overall container volume grew by 19.1 percent in 2010.

Table 1.7 Container Volumes at Ports of Long Beach and Los Angeles

2010

POLB

	Inbound Loads	Outbound loads	Empties	Total
January	217,925	113,183	97,697	428,805
February	207,920	123,208	82,006	413,134
March	206,652	130,495	85,627	422,774
April	241,245	130,155	113,659	485,059
May	264,505	138,659	121,551	524,715
June	262,053	116,112	141,935	520,100
July	293,878	126,177	167,826	587,881
August	311,240	126,039	173,723	611,002
September	288,905	124,021	161,864	574,790
October	303,168	150,581	159,872	613,621
November	274,480	142,628	141,199	558,307
December	256,889	141,140	125,282	523,311
Total	**3,128,860**	**1,562,398**	**1,572,241**	**6,263,499**
% change from 2009	**23.4%**	**15.6%**	**33.2%**	**23.6%**

POLA

	Inbound Loads	Outbound loads	Empties	Total
January	296,305	141,243	135,421	572,969
February	267,361	147,926	110,172	525,459
March	269,634	161,817	118,799	550,250
April	302,225	158,338	134,721	595,284
May	342,171	160,621	186,628	689,420
June	371,889	154,558	203,871	730,318
July	369,389	146,369	214,988	730,746
August	399,151	147,609	217,078	763,838
September	373,249	139,800	198,563	711,612
October	349,545	151,049	181,790	682,385
November	333,710	170,319	162,941	666,971
December	299,305	161,625	151,722	612,652
Total	**3,973,935**	**1,841,274**	**2,016,695**	**7,831,903**
% change from 2009	**12.8%**	**10.3%**	**28.4%**	**15.8%**

Both ports 2010

	Inbound Loads	Outbound loads	Empties	Total
January	514,230	254,426	233,118	1,001,774
February	475,281	271,134	192,178	938,593
March	476,286	292,312	204,426	973,024
April	543,470	288,493	248,380	1,080,343
May	606,676	299,280	308,179	1,214,135
June	633,942	270,670	345,806	1,250,418
July	663,267	272,546	382,814	1,318,627
August	710,391	273,648	390,801	1,374,840
September	662,154	263,821	360,427	1,286,402
October	652,713	301,630	341,662	1,296,006
November	608,190	312,947	304,140	1,225,278
December	556,194	302,765	277,004	1,135,963
Total	**7,102,795**	**3,403,672**	**3,588,936**	**14,095,402**
% change from 2009	**17.2%**	**12.7%**	**30.4%**	**19.1%**

Source: Port of Long Beach and Port of Los Angeles web sites.

1.2 VALUE AND WEIGHT OF IMPORTS/EXPORTS

Another metric to help understand the value that ports bring to the general economy is the value and weight of the goods moving into and out of the port. While analysis of TEUs is important in understanding volume, value and weight provide additional insights. For instance, a port that moves low volume or weight may still be critical to the nation or region's economy because of the high value of commodities that it moves. Table 1.8 compares the value of goods moved by LA area ports (vessels only, includes all the ports in the Los Angeles Customs District) to other major port areas. Table 1.9 shows weight.

Table 1.8 Value of Goods Imported/Exported at U.S. Customs Districts

Maritime Trade Only

VALUE	2010		2009		2008		2007		2006		2005		2004	
Customs District**	Value (mil $, thr April)	% of Total Value	Value (millions $)	% of Total Value	Value (millions $)	% of Total Value	Value (millions $)	% of Total Value	Value (millions $)	% of Total Value	Value (millions $)	% of Total Value	Value (millions $)	% of Total Value
Los Angeles, CA	**96,957**	**21.4%**	**272,872**	**22.4%**	**349,509**	**20.7%**	**337,811**	**23.2%**	**317,589**	**23.9%**	**272,460**	**23.5%**	**251,715**	**25.3%**
New York City, NY	53,138	11.7%	146,050	12.0%	190,492	11.3%	166,140	11.4%	149,674	11.3%	132,408	11.4%	114,535	11.5%
Norfolk, VA	15,692	3.5%	45,504	3.7%	60,287	3.6%	54,570	3.7%	48,724	3.7%	45,204	3.9%	37,975	3.8%
Charleston, SC	16,238	3.6%	44,985	3.7%	62,413	3.7%	60,944	4.2%	55,360	4.2%	53,159	4.6%	46,544	4.7%
Savannah, GA	20,112	4.4%	53,088	4.4%	65,927	3.9%	55,950	3.8%	46,259	3.5%	40,060	3.4%	32,313	3.3%
New Orleans, LA	34,295	7.6%	84,455	6.9%	142,447	8.4%	104,766	7.2%	89,824	6.8%	75,129	6.5%	62,770	6.3%
San Francisco, CA	16,790	3.7%	46,250	3.8%	62,117	3.7%	51,200	3.5%	47,609	3.6%	43,002	3.7%	35,549	3.6%
Seattle, WA	21,968	4.8%	64,105	5.3%	82,844	4.9%	77,756	5.3%	73,708	5.6%	73,734	6.3%	60,329	6.1%
Miami, FL	13,229	2.9%	36,560	3.0%	46,801	2.8%	42,599	2.9%	40,869	3.1%	37,592	3.2%	31,853	3.2%
Houston-Galveston, TX	60,067	13.3%	152,057	12.5%	223,186	13.2%	169,618	11.7%	149,928	11.3%	126,731	10.9%	98,105	9.9%
All Other Districts	104,634	23.1%	269,792	22.2%	404,720	23.9%	334,510	23.0%	308,029	23.2%	261,711	22.5%	222,153	22.4%
TOTAL	**453,123**	**100.0%**	**1,215,719**	**100.0%**	**1,690,742**	**100.0%**	**1,455,864**	**100.0%**	**1,327,575**	**100.0%**	**1,161,190**	**100.0%**	**993,841**	**100.0%**

Source: U.S. International Trade Data, U.S. Census Bureau, FT 920. http://www.census.gov/foreign-trade/Press-Release/ft920_index.html#2010.

Note: Customs Districts incorporate movements from the larger area. For example, Los Angeles does not mean movements only from the Port of Los Angeles. It includes the Port of Long Beach and others as well. San Francisco, for example, also includes the Port of Oakland. For more information on this, see the District definitions on-line: http://www.census.gov/foreign-trade/schedules/d/distcode.html.

Table 1.9 Weight of Goods Imported/Exported at U.S. Customs Districts

TONNAGE	2010		2009		2008		2007		2006		2005		2004	
Customs District	Weight (mil kg, thr April)	% of Weight	Weight (millions kg)	% of Total Weight	Weight (millions kg)	% of Total Weight	Weight (millions kg)	% of Total Weight	Weight (millions kg)	% of Total Weight	Weight (millions kg)	% of Total Weight	Weight (millions kg)	% of Total Weight
Los Angeles, CA	**37,535**	**9.1%**	**107,128**	**8.9%**	**124,919**	**9.1%**	**127,865**	**9.3%**	**126,223**	**9.1%**	**111,562**	**8.3%**	**102,747**	**7.9%**
New York City, NY	26,101	6.3%	77,903	6.5%	88,906	6.5%	87,231	6.3%	86,163	6.2%	84,754	6.3%	80,644	6.2%
Norfolk, VA	18,716	4.5%	45,448	3.8%	52,137	3.8%	43,010	3.1%	34,319	2.5%	33,206	2.5%	30,598	2.3%
Charleston, SC	5,081	1.2%	12,689	1.1%	17,827	1.3%	19,757	1.4%	22,752	1.6%	20,576	1.5%	19,285	1.5%
Savannah, GA	10,735	2.6%	29,748	2.5%	34,617	2.5%	35,421	2.6%	32,863	2.4%	29,230	2.2%	26,239	2.0%
New Orleans, LA	74,865	18.1%	218,179	18.2%	250,528	18.2%	262,930	19.1%	261,374	18.9%	251,521	18.6%	249,027	19.1%
San Francisco, CA	13,899	3.4%	41,943	3.5%	47,813	3.5%	43,281	3.1%	44,655	3.2%	41,992	3.1%	38,034	2.9%
Seattle, WA	14,142	3.4%	43,270	3.6%	48,703	3.5%	47,338	3.4%	46,578	3.4%	46,643	3.5%	40,807	3.1%
Miami, FL	5,308	1.3%	14,615	1.2%	16,669	1.2%	19,039	1.4%	20,866	1.5%	20,759	1.5%	17,865	1.4%
Houston-Galveston, TX	84,387	20.4%	244,156	20.3%	255,134	18.5%	253,657	18.4%	251,705	18.2%	254,756	18.9%	250,412	19.2%
All Other Districts	122,581	29.7%	366,459	30.5%	440,463	32.0%	437,170	31.8%	454,224	32.9%	453,782	33.6%	449,962	34.5%
TOTAL	**413,350**	**100.0%**	**1,201,538**	**100.0%**	**1,377,716**	**100.0%**	**1,376,700**	**100.0%**	**1,381,724**	**100.0%**	**1,348,783**	**100.0%**	**1,305,620**	**100.0%**

Source: U.S. International Trade Data, U.S. Census Bureau, FT 920. http://www.census.gov/foreign-trade/Press-Release/ft920_index.html#2010.

Over the past five years, the Los Angeles area ports have seen a decline in the percentage of total U.S. value being moved through them, from 25.3 percent of total value in 2004 down to 22.4 percent in 2009. The percentage of total weight, however, has increased slightly. In terms of value, Los Angeles ports still move by far the largest percentage of goods – the next closest port is Houston-Galveston, which moves 12.5 percent of total value. In terms of weight, Houston and New Orleans move the most by far in the nation.

1.3 TOP COMMODITIES MOVING THROUGH U.S. WEST COAST PORTS

This section highlights key commodities moving through major U.S. West Coast ports. Table 1.10 provides a comparison of the top 10 types of commodities, by value, that move through these Ports.

The Ports of Los Angeles and Long Beach top imports include machinery and electronics, as well as vehicles and apparel. Machinery, plastics, vehicles, and iron/are major exports by value at these Ports. Comparatively, the Port of Seattle imports many of the same items. However, the top import category at the Port of Seattle is toys, games, sporting equipment, and related items. Besides this, many of the same commodities that are in near the top of the Los Angeles/Beach list are top commodities for Seattle. Concerning exports, the major commodity exported by the Port of Seattle includes seeds, fruits, and other foodstuffs. Food-related items are not in the top 10 of exports by value at the Los Angeles area ports.

The Port of Tacoma list of top imported goods includes many of the same that are at the top of the other ports. This includes imports of electronics, machinery, vehicles, footwear, toys, apparel, and others. Concerning exports, the Port of Tacoma's primary exports in terms of value are food related items, including oil seeds, fruit, cereals, meat, and vegetables.

The Port of Oakland, which is a major export port for central and northern California goods, also is a major exporter of foodstuffs grown in the region. Fruits, meat, and other foodstuffs are major exports. In addition, machinery-related items also are a major export. In terms of imports, the Port imports much in terms of machinery and related items, electronic parts, and furniture.

Finally, the Port of San Diego is a relatively small Port, which most dominant import in terms of value is vehicles, by a significant margin. Eighty-seven percent of all import value is vehicle related. In terms of exports, San Diego exports machinery and related items, ships and other floating structures, and plastics, among other commodities.

Table 1.10 Top 10 Commodities Imported/Exported through Major U.S. West Coast Ports
2009 by Commodity

Los Angeles Customs District (consists primarily of Ports of LA and LB)

Imports					Exports				
Rank	Commodity	Vessel Value ($US)	% of total	% Cumul	Rank	Commodity	Vessel Value ($US)	% of total	% Cumul
1	Electric Machinery Etc; Sound Equip; Tv Equip; Pts	38,458,208,172	17%	17%	1	84 Nuclear Reactors, Boilers, Machinery Etc.; Parts	8,088,197,318	15%	15%
2	Nuclear Reactors, Boilers, Machinery Etc.; Parts	36,777,498,598	17%	34%	2	39 Plastics And Articles Thereof	5,112,320,854	10%	25%
3	Vehicles, Except Railway Or Tramway, And Parts Etc	18,524,923,396	8%	43%	3	87 Vehicles, Except Railway Or Tramway, And Parts Etc	3,590,333,197	7%	32%
4	Apparel Articles And Accessories, Knit Or Crochet	12,202,134,959	6%	48%	4	85 Electric Machinery Etc; Sound Equip; Tv Equip; Pts	2,745,827,875	5%	37%
5	Mineral Fuel, Oil Etc.; Bitumin Subst; Mineral Wax	11,742,805,181	5%	54%	5	72 Iron And Steel	1,929,667,617	4%	41%
6	Toys, Games & Sport Equipment; Parts & Accessories	11,333,319,548	5%	59%	6	29 Organic Chemicals	1,818,598,098	3%	44%
7	Apparel Articles And Accessories, Not Knit Etc.	10,565,506,002	5%	63%	7	38 Miscellaneous Chemical Products	1,605,573,200	3%	47%
8	Furniture; Bedding Etc; Lamps Nesoi Etc; Prefab Bd	9,395,202,832	4%	68%	8	27 Mineral Fuel, Oil Etc.; Bitumin Subst; Mineral Wax	1,594,570,568	3%	50%
9	Footwear, Gaiters Etc. And Parts Thereof	8,864,261,261	4%	72%	9	52 Cotton, Including Yarn And Woven Fabric Thereof	1,548,152,397	3%	53%
10	Plastics And Articles Thereof	6,158,268,122	3%	75%	10	90 Optic, Photo Etc, Medic Or Surgical Instrments Etc	1,506,732,123	3%	56%

Port of Seattle

Imports					Exports				
Rank	Commodity	Vessel Value ($US)	% of total	% Cumul	Rank	Commodity	Vessel Value ($US)	% of total	% Cumul
1	Toys, Games & Sport Equipment; Parts & Accessories	5,028,796,279	20%	20%	1	Oil Seeds Etc.; Misc Grain, Seed, Fruit, Plant Etc	1,619,154,326	20%	20%
2	Electric Machinery Etc; Sound Equip; Tv Equip; Pts	3,427,703,930	13%	33%	2	Nuclear Reactors, Boilers, Machinery Etc.; Parts	803,285,794	10%	30%
3	Nuclear Reactors, Boilers, Machinery Etc.; Parts	2,812,835,597	11%	44%	3	Fish, Crustaceans & Aquatic Invertebrates	548,567,004	7%	37%
4	Apparel Articles And Accessories, Knit Or Crochet	1,804,250,870	7%	51%	4	Cereals	469,145,957	6%	43%
5	Apparel Articles And Accessories, Not Knit Etc.	1,420,569,976	6%	57%	5	Meat And Edible Meat Offal	412,265,871	5%	48%
6	Vehicles, Except Railway Or Tramway, And Parts Etc	1,083,312,212	4%	61%	6	Prep Vegetables, Fruit, Nuts Or Other Plant Parts	362,664,970	5%	53%
7	Furniture; Bedding Etc; Lamps Nesoi Etc; Prefab Bd	1,058,936,292	4%	66%	7	Paper & Paperboard & Articles (inc Papr Pulp Artl)	346,925,081	4%	57%
8	Footwear, Gaiters Etc. And Parts Thereof	1,057,691,431	4%	70%	8	Edible Fruit & Nuts; Citrus Fruit Or Melon Peel	304,125,479	4%	61%
9	Aircraft, Spacecraft, And Parts Thereof	805,319,648	3%	73%	9	Wood And Articles Of Wood; Wood Charcoal	207,988,324	3%	64%
10	Plastics And Articles Thereof	724,609,004	3%	76%	10	Inorg Chem; Prec & Rare-earth Met & Radioact Compd	206,734,711	3%	66%

Source: USA Trade On-line Data; Created by STAT-USA and the U.S. Census Bureau's Foreign Trade Division.

Table 1.10 Top 10 Commodities Imported/Exported through Major U.S. West Coast Ports (continued)

2009 by Commodity

Port of Tacoma

Imports					Exports				
Rank	Commodity	Vessel Value ($US)	% of total	% Cumul	Rank	Commodity	Vessel Value ($US)	% of total	% Cumul
1	Electric Machinery Etc; Sound Equip; Tv Equip; Pts	3,105,111,484	16%	16%	1	Oil Seeds Etc.; Misc Grain, Seed, Fruit, Plant Etc	1,211,036,511	20%	20%
2	Vehicles, Except Railway Or Tramway, And Parts Etc	3,012,714,480	16%	32%	2	Cereals	700,441,293	12%	32%
3	Nuclear Reactors, Boilers, Machinery Etc.; Parts	2,967,115,078	15%	47%	3	Meat And Edible Meat Offal	410,777,613	7%	39%
4	Footwear, Gaiters Etc. And Parts Thereof	1,469,620,702	8%	55%	4	Inorg Chem; Prec & Rare-earth Met & Radioact Compd	333,401,273	6%	44%
5	Toys, Games & Sport Equipment; Parts & Accessories	1,443,784,342	8%	62%	5	Prep Vegetables, Fruit, Nuts Or Other Plant Parts	312,855,605	5%	49%
6	Furniture; Bedding Etc; Lamps Nesoi Etc; Prefab Bd	1,073,225,734	6%	68%	6	Nuclear Reactors, Boilers, Machinery Etc.; Parts	306,302,792	5%	54%
7	Articles Of Iron Or Steel	613,628,974	3%	71%	7	Iron And Steel	282,741,466	5%	59%
8	Plastics And Articles Thereof	604,181,460	3%	74%	8	Paper & Paperboard & Articles (inc Papr Pulp Artl)	224,221,452	4%	63%
9	Apparel Articles And Accessories, Not Knit Etc.	524,060,161	3%	77%	9	Wood And Articles Of Wood; Wood Charcoal	205,610,144	3%	66%
10	Apparel Articles And Accessories, Knit Or Crochet	463,716,396	2%	79%	10	Food Industry Residues & Waste; Prep Animal Feed	162,236,426	3%	69%

Port of Oakland

Imports					Exports				
Rank	Commodity	Vessel Value ($US)	% of total	% Cumul	Rank	Commodity	Vessel Value ($US)	% of total	% Cumul
1	Nuclear Reactors, Boilers, Machinery Etc.; Parts	4,664,758,045	22%	22%	1	Edible Fruit & Nuts; Citrus Fruit Or Melon Peel	2,510,519,289	20%	20%
2	Electric Machinery Etc; Sound Equip; Tv Equip; Pts	2,544,985,952	12%	34%	2	Meat And Edible Meat Offal	1,566,260,820	12%	32%
3	Furniture; Bedding Etc; Lamps Nesoi Etc; Prefab Bd	1,164,163,956	6%	40%	3	Nuclear Reactors, Boilers, Machinery Etc.; Parts	819,480,407	6%	39%
4	Beverages, Spirits And Vinegar	1,128,318,450	5%	45%	4	Beverages, Spirits And Vinegar	609,106,406	5%	43%
5	Apparel Articles And Accessories, Knit Or Crochet	976,950,694	5%	50%	5	Inorg Chem; Prec & Rare-earth Met & Radioact Compd	533,549,111	4%	48%
6	Vehicles, Except Railway Or Tramway, And Parts Etc	932,749,458	4%	54%	6	Vehicles, Except Railway Or Tramway, And Parts Etc	506,086,335	4%	52%
7	Apparel Articles And Accessories, Not Knit Etc.	882,980,573	4%	58%	7	Electric Machinery Etc; Sound Equip; Tv Equip; Pts	475,467,724	4%	55%
8	Toys, Games & Sport Equipment; Parts & Accessories	683,362,044	3%	62%	8	Cereals	445,012,666	4%	59%
9	Plastics And Articles Thereof	610,349,556	3%	64%	9	Optic, Photo Etc, Medic Or Surgical Instrments Etc	377,750,738	3%	62%
10	Optic, Photo Etc, Medic Or Surgical Instrments Etc	525,015,643	2%	67%	10	Iron And Steel	364,650,635	3%	65%

Port of San Diego

Imports					Exports				
Rank	Commodity	Vessel Value ($US)	% of total	% Cumul	Rank	Commodity	Vessel Value ($US)	% of total	% Cumul
1	Vehicles, Except Railway Or Tramway, And Parts Etc	3,594,480,220	87%	87%	1	Nuclear Reactors, Boilers, Machinery Etc.; Parts	7,800,726	15%	15%
2	Edible Fruit & Nuts; Citrus Fruit Or Melon Peel	182,056,225	4%	91%	2	Ships, Boats And Floating Structures	4,467,123	8%	23%
3	Electric Machinery Etc; Sound Equip; Tv Equip; Pts	149,296,237	4%	95%	3	Plastics And Articles Thereof	4,062,234	8%	31%
4	Nuclear Reactors, Boilers, Machinery Etc.; Parts	62,852,609	2%	96%	4	Art Of Stone, Plaster, Cement, Asbestos, Mica Etc.	3,203,262	6%	37%
5	Articles Of Iron Or Steel	34,059,094	1%	97%	5	Organic Chemicals	2,908,588	5%	42%
6	Ships, Boats And Floating Structures	32,549,907	1%	98%	6	Edible Fruit & Nuts; Citrus Fruit Or Melon Peel	2,843,461	5%	48%
7	Fish, Crustaceans & Aquatic Invertebrates	23,624,209	1%	98%	7	Electric Machinery Etc; Sound Equip; Tv Equip; Pts	2,520,223	5%	53%
8	Iron And Steel	23,142,529	1%	99%	8	Textile Art Nesoi; Needlecraft Sets; Worn Text Art	2,224,544	4%	57%
9	Optic, Photo Etc, Medic Or Surgical Instrments Etc	19,381,046	0%	99%	9	Fish, Crustaceans & Aquatic Invertebrates	2,142,437	4%	61%
10	Fertilizers	9,239,899	0%	100%	10	Raw Hides And Skins (no Furskins) And Leather	1,667,786	3%	64%

Source: USA Trade On-line Data; Created by STAT-USA and the U.S. Census Bureau's Foreign Trade Division.

Note: Does not include the Port of Portland, as it was not included in this dataset.

1.4 PANAMA CANAL TEUS, TRANSITS, AND TOLLS

As shown in Table 1.11, the Panama Canal handled 12,555,000 TEUs in 2008 and 12,082,000 TEUs in 2009, for a decrease of 3.9 percent. This percentage decrease is smaller than the reductions in container traffic experienced by most U.S. ports in 2009.

The Panama Canal reported 13,147 transits in 2008 and 12,855 in 2009, a decrease of 2.3 percent. Container vessel transits experienced a 5.4 percent decrease, but vehicle carrier transits dropped by 74.2 percent – an indication of the severity of the recession's impact on the automobile industry in 2009.

The Panama Canal Authority collected $1,436,810,000 in tolls in 2009 and $1,316,032,000 in 2008, for an increase of 8.4 percent. This increase in revenue, despite a reduction in demand, reflects the doubling of transit fees over the last five years. The 2010 rate was $72 per TEU, up 14.3 percent compared to the 2009 rate of $63, which in turn was up 16.6 percent from the 2008 rate of $54 per TEU. For 2011, the rates for containers are as follows:[3]

- $74.00 applicable to total TEU allowance[4] when carrying passengers or cargo;
- $65.60 applicable to total TEU allowance when in ballast without passengers or cargo;
- $8.00 applicable to TEUs with cargo on-board during the transit; and
- $82.00 applicable to TEUs on-deck in vessels other than full container.

[3] http://www.pancanal.com/eng/op/tariff/1010-0000.pdf.

[4] Total TEU allowance is the sum of total allowable containers a vessel may carry in enclosed spaces below and above the upper deck, plus the total allowable containers that a vessel may carry above the upper deck.

Table 1.11 Panama Canal Container Volumes, Transits, and Tolls

2008 and 2009

	2009	2008	% Change
TEUS	12,082,000	12,555,000	-3.9%
Transits by Vessel Type			
Container	3,364	3,544	-5.4%
Dry Bulk	2,687	2,420	9.9%
Refrigerated	1,972	2,166	-9.8%
Tankers	2,317	2,066	10.8%
General Cargo	865	767	11.3%
Vehicle Carriers	469	817	-74.2%
Other	944	1,126	-19.3%
Passenger	237	241	-1.7%
Total Transits	12,855	13,147	-2.3%
Tolls ($1000)	1,436,810	1,316,032	8.4%

Source: Panama Canal Authority Web Site.

2 Comparative Port Costs

This section highlights key costs charged by West Coast ports to shipping companies while using wharves, docking, and storing cargo on port property. In addition, terminals and stevedoring companies charge for their services (lift costs, gate costs, demurrage, etc.). Shipping companies also pay for pilots, tugs, customs clearance, security surcharges, container storage, and cleaning, but these additional costs are not tabulated in this report. The Mexican Ports of Lazaro Cardenas and Manzanillo are discussed separately near the end of this section.

2.1 HARBOR MAINTENANCE TAX

One major cost difference that favors Canadian and Mexican ports is the Harbor Maintenance Tax (HMT) imposed on imports into U.S. ports. Congress included the first HMT in the Water Resources Development Act of 1986 as a means to offset higher dredging costs and a general budget deficit. Originally, the HMT applied to many (but not all) imports, exports, and intercoastal shipments through most U.S. seaports. In a 1998 Supreme Court decision, the tax on exports was deemed unconstitutional.[5]

In 1998, the tax was initially set at 0.04 percent of the value of the cargo, but in 1990 the rate was raised to 0.125 percent of the value. For example, a shipper importing a 40-foot container filled with cargo valued at $100,000 would pay $125. U.S. ports and shippers alike complain that the Federal government collects significantly more than it spends on dredging projects. As shown in Table 2.1, less than one-half of the HMT revenues were spent in FY 2008, down from 83 percent in Fiscal Year (FY) 2000. The Fund now has a surplus of $4.7 billion. Thus, a significant portion of the HMT revenue is not being used for its intended purpose. Unspent funds are being held "on the books" for the purpose of reducing the size of the Federal debt and deficit.[6]

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[5] United States Shoe Corporation argued that the HMT violated the constitutional prohibition against taxes being assessed against exports. In a unanimous decision, the U.S. Supreme Court held in 1998 that, although the Export Clause bars Congress from imposing any tax on exports, it does not rule out a user fee. The user fee, though, must lack attributes of a generally applicable tax or duty. It may only be a charge designed as compensation for a government-supplied service, facility, or benefit. As the HMT lacks the features of a user fee, it was found to violate the Export Clause.

[6] RAMP: Realize America's Maritime Promise: http://www.ramphmtf.org/.html.

Table 2.1 Harbor Maintenance Tax Expenditures and Revenues
FY 2000 to FY 2007

Fiscal Year	Expenditures (in Million Dollars)	Revenues (in Million Dollars)	Ratio of Expenditures to Revenues
2000	$631.2	$760.6	83%
2001	$669.4	$810.8	83%
2002	$645.2	$710.8	91%
2003	$685.1	$804.5	85%
2004	$681.4	$922.4	74%
2005	$708.8	$1,123.0	63%
2006	$697.2	$1,275.0	55%
2007	$751.0	$1,416.0	53%
2008	$766.0	$1,600.0	48%

Source: Realize America's Maritime Promise (RAMP), http://operations.usace.army.mil/nav/09octweda/WEDA-East2009BillHansonHMTF.pdf.

There also is concern that, while fees are collected from cargo shippers, expenditures are being made to improve noncargo ports and marinas. There also are equity issues associated with HMT revenue distribution among the nation's top commercial ports. About one-fifth of HMT Fund expenditures are spent in Louisiana, mainly because of the high expense of maintaining the Baton Rouge to Gulf Coast section of the Mississippi River, even pre-Katrina.[7] The ports of Mobile, Alabama, and Portland, Oregon, also are relatively expensive to maintain. HMT revenues are redistributed from ports that are large import gateways with naturally deep channels to lower-volume ports that require frequent dredging to maintain adequate channel depths and widths. The Ports of Los Angeles, Long Beach, Seattle, and Tacoma, and to a lesser degree, Boston, New York, and Houston are large net generators of HMT revenue.

Monies from the HMT Fund are spent only if Congress appropriates the funds. Legislation has been introduced in the 111th Congress that has varying objectives regarding the HMT.

- H.R. 3447 would spend down the surplus in the Harbor Maintenance Trust Fund (HMTF).
- H.R. 2355 would increase the tax rate and expand use of the HMTF for landside port infrastructure improvements.

[7] Congressional Research Service: Harbor Maintenance Trust Fund Expenditures. http://assets.opencrs.com/rpts/R41042_20100125.pdf.

- H.R. 3486, H.R. 638, S. 551, and S. 1509 would repeal the tax on nonbulk cargo shipped on the Great Lakes and along the coasts in an effort to divert truck cargo from congested highways to waterways.
- H.R. 4844 requires any appropriations bill brought to the House or Senate floor that spends any of the funds in the HMTF, spend at least an amount equal to the amount of HMTF revenue projected in the Administration's budget request plus interest. None of these bills has been reported out of committee.[8]

The information below summarizes wharfage, dockage, and demurrage rates assessed by West Coast port authorities, as reported in published port tariffs.

2.2 WHARFAGE

The principal revenue source for most cargo ports is "wharfage," a charge on the volume or weight of the cargo, whichever produces the higher revenue. Definitions of wharfage vary from port to port, but here is the definition used by both the Ports of Los Angeles and Long Beach:

> ***Wharfage:*** *The charge assessed against all merchandise, calculated in accordance with the wharfage charges set forth in this tariff for the passage of that merchandise onto, over, through, or under wharves or wharf premises or between vessels or overside vessels (to or from barge, lighter, or water) when berthed at wharves or wharf premises or when moored in a slip adjacent to a wharf or wharf premise. Wharfage is solely the charge for use of wharves or wharf premises, and does not include charges for any other service or facility. (Long Beach Tariff No. 4, Item 300; Los Angeles Tariff No. 4, Item 500).*

Port tariffs are quite complex, with different rates for different commodity groups. Depending on the port, exemptions or discounts may apply to bunker fuels, empty containers, Hawaiian trade, European cargo, intermodal cargo, transshipment cargo, etc. Units of measurement also vary from port to port. Some rates vary by the size of the container, other ports such as Portland just use a single "container" category, but have different rates for loaded containers and empty containers.

Published tariffs contain wharfage rates for containerized cargo; however, comparing the published rates of the west coast ports would be misleading. Ports negotiate leases with their tenants, including provisions for revenue sharing when volume exceeds a certain threshold. As a result, it is very difficult to assess the relative competitiveness of west coast gateways using wharfage as a metric because the lease terms may vary significantly. Besides, to date ocean carriers typically charge large shippers a so-called "Group Four" ocean rate,

[8] Congressional Research Service: Harbor Maintenance Trust Fund Expenditures Summary. http://opencrs.com/document/R41042/.

which is the same for the Pacific Northwest and Pacific Southwest ports regardless of the differences in wharfage rates. Thus, the shipper may see little difference in rates from one U.S. west coast port to the next.

2.3 DOCKAGE RATES

Dockage is a charge for berthing vessels at a wharf and typically depends on the length of the vessel and the amount of time the vessel spends at the wharf. Again, definitions vary from port to port, but this is the definition used by the Ports of Los Angeles and Long Beach.

> *The charge, calculated in accordance with the dockage charges named in this tariff, assessed against a vessel for berthing at or making fast to a municipal wharf, pier, bulkhead structure, or bank (inside berth), or for mooring to another vessel so berthed (outside berth). (Long Beach Tariff No. 4, Item 250; Los Angeles Tariff No. 4, Item 400.)*

Table 2.2 shows sample dockage rates for 250-meter and 300-meter vessels for a 24-hour period. The table shows that dockage rates in Seattle and Tacoma are considerably higher than at other West Coast ports.

As part of its effort to reduce ship emissions, the Port of Long Beach has offered a 15-percent reduction in dockage fees (Tier 1) to ships that reduce their speeds to 12 knots or less within 20 nautical miles of the Port, and a 25-percent reduction in dockage fees (Tier 2) for ships that reduce speeds within 40 nautical miles of the Port. This program has received approval for the year 2012.

Table 2.3 shows more detailed information, including the range of rates and a few examples between the extremes.

Port tariffs typically show detailed rate tables by the length of the vessel in meters. For example, the longest container vessels afloat are the Maersk E Series, including the Emma Maersk and her sister vessels, which have a capacity of 13,800 TEUs and are 397.7 meters long. They would pay the maximum dockage rate. More typical are third-generation to fifth-generation container vessels which range in length from 250 meters to 335 meters.

Table 2.2 Dockage Rates (24 Hours) for 250-Meter and 300-Meter Vessels, by Port

	Vessel Length 250 m	Vessel Length 300 m
Prince Rupert	CN $6,252 (US $5,881*)	CN $7,502 (US $7,057*)
Vancouver	CN $2,448 (US $2,302*)	CN $2,938 (US $2,763*)
Seattle	$14,114	$20,381
Tacoma		
Terminals north of 11th Street	$12,238	$16,900
Terminals south of 11th Street	$11,622	$16,115
Portland	$1,452	$19,997
Oakland	$4,754	$6,799
Los Angeles	$4,524	$6,472
Long Beach	$4,463	$6,379
San Diego	$4,524	$6,472

*At exchange rate of 1 CN = $0.9407 U.S., as of June 30, 2010.

Table 2.3 Dockage Rates by Port

Port	Description	Tariff Item
Prince Rupert	Berthage Fees (equivalent to dockage) (means a charge in respect of a Vessel that occupies a berth or is fast to or tied up alongside any other Vessel occupying a berth at Authority Property) **For working periods for each hour or portion thereof per meter:** $1.042 (e.g., 250 m vessel for 24 hours: $6,252; e.g., 300 m vessel for 24 hours: $7,502; e.g., 390 m vessel for 24 hours: $9,753). **For non-working periods for each hour or portion thereof per meter:** $0.26 "Non working period" means a period defined as a non working period in the collective agreement between the British Columbia Maritime Employers Association and International Longshoreman's and Warehouseman's Union – Canadian Area The minimum charge for Vessels is 4 hours. **Harbour Fees (means a toll on a vessel that comes into or uses the Harbour):** $0.0788 per registered gross tonne (1,000 kilograms)	3000 1000
Vancouver, BC	Berthage Fees (equivalent to dockage) for former Fraser River Port Authority and former Vancouver Port Authority **For working periods for each hour or portion thereof per meter:** $0.408 (e.g., 250 m vessel for 24 hours: $2,448 ; e.g., 300 m vessel for 24 hours: $2,938; e.g., 390 m vessel for 24 hours: $3,819). **For non-working periods for each hour or portion thereof per meter:** $0.26 Non working periods are presently Labour Day, noon Christmas Eve to Midnight Christmas Day, and noon New Years Eve to Midnight New Year's Day. The minimum charge for Vessels is $300 for both working and non-working periods.	2B06(d) and (e)
Seattle	NOTE: The Port of Seattle generally does not charge fees to container customers. The tariff generally does not apply to container customers. **Rate per 24- hour period or fraction thereof:** Detailed table for vessels ranging in length from less than 30 meters to over 290 meters ≤30 meters: $205 (minimum rate) e.g., 250 meters: $14,114 ≥290 meters: $18,096 plus $2,285 for all terminals except Pier 86	7000 (D)
Tacoma	**Rate per 24- hour period or fraction thereof:** Detailed table for vessels ranging in length from less than 107 meters to over 290 meters Charge A applies to all terminals north of 11th St. Charge B applies to all terminals south of 11th St. ≤107 meters: Charge A: $1,263; Charge B: $1,197 e.g., 250 meters: Charge A: $12,238; Charge B: $11,622 ≥290 meters: Charge A: $15,689; Charge B: $14,904 plus $1,211 for each 15 meters or fraction thereof of length in excess of 290 meters	224

Table 2.3 Dockage Rates by Port (continued)

Portland	**Rate per 24- hour period or fraction thereof:** Detailed table for vessels ranging in length from less than 107 meters to over 290 meters "Lay" rate: To qualify for 50% of the regular dockage rate, the vessel must be idle at its working berth waiting to discharge and/or load cargo. For vessels at a working berth which have operations interrupted for 1 or more consecutive 24-hour periods due to lack of cargo or labor availability, lay status may also be granted. ≤ 107 meters: Regular: $1,452; Lay: $726 e.g., 250 meters: Regular: $14,009; Lay: $7,005 ≥290 meters: Regular: $17,958; Lay: $8,979 plus $2,039 for each 15 meters or fraction thereof of length in excess of 290 meters	2100-2215
Oakland	**Rate per 24- hour period or fraction thereof:** Detailed table for vessels ranging in length from less than 30 meters to over 390 meters ≤ 30 meters: $84 (minimum rate) e.g., 250 meters: $4,754 e.g., 300 meters: $6,799 ≥390 meters: $11,977 plus $34 per lineal meter over 390 meters	(I) 04130
Los Angeles	**Rate per 24- hour period or fraction thereof:** Detailed table for vessels ranging in length from less than 30 meters to over 390 meters ≤ 30 meters: $80 (minimum rate) e.g., 250 meters: $4,524 e.g., 300 meters: $6,472 ≥390 meters: $11,400 (maximum rate) plus $32 per lineal meter over 390 meters	[A]480
Long Beach	**Rate per 24- hour period or fraction thereof:** Detailed table for vessels ranging in length from less than 30 meters to over 390 meters ≤ 30 meters: $77 (minimum rate) e.g., 250 meters: $4,463 e.g., 300 meters: $6,379 ≥390 meters: $11,242 (maximum rate) plus $29 per lineal meter over 390 meters	260
San Diego	**Rate per 24- hour period or fraction thereof:** Detailed table for vessels ranging in length from less than 30 meters to over 390 meters ≤ 30 meters: $78 (minimum rate) e.g., 250 meters: $4,524 e.g., 300 meters: $6,472 ≥390 meters: $11,400 (maximum rate) plus $31.50 per lineal meter over 390 meters	0575"A"
Manzanillo	See Discussion in Section 2.5	
Lazaro Cardenas	See Discussion in Section 2.5	

2.4 DEMURRAGE RATES AND FREE TIME

Demurrage is a charge collected by marine terminals for cargo left on the terminal or wharf after the expiration of "free time." Free time is the number of days that cargo can stay on the terminal or wharf without being charged demurrage. Free time is typically longer for exports than for imports.

Free time and demurrage terms for the various ports are described in Table 2.4. Port authorities require terminals to collect demurrage when due; however, some high-volume customers have negotiated longer periods of free time with the terminals, essentially providing a free warehouse to these customers for up to 21 days. From this table, it is evident that Los Angeles/Beach demurrage rates compare favorably with other West Coast ports. The Port of Oakland and Port of San Diego have more favorable terms than the San Pedro Bay Ports, but U.S. Ports on the West Coast in general have lower demurrage rates than Vancouver and Prince Rupert in Canada. Details by port are shown in Table 2.5.

Table 2.4 Demurrage and Free Time of West Coast Ports

	Free Time (Days)	Demurrage Rate (Daily)
Prince Rupert	4	$102 (first 6 days per day after free time expires)
Vancouver	3	$200 (first 5 days per day after free time expires)
Seattle	5*	$49 (first 5 days per day after free time expires)*
Tacoma	5	$17.02 (per day after free time expires)
Portland	10	N/A
Oakland	5	$34 (first 5 days per day after free time expires)
Los Angeles	4	$43.66 (first 5 days per day after free time expires)
Long Beach	4	$44 (first 5 days per day after free time expires)
San Diego	7	$12.6 (first 5 days per day after free time expires)
Manzanillo	N/A	See Section 2.5
Lazaro Cardenas	N/A	N/A

*At Seattle, demurrage free time and days do not apply to container terminals and container shipments.

Table 2.5 Demurrage and Free Time at West Coast Ports
In Detail

<table>
<tr><th>Port</th><th>Description</th><th>Tariff Item</th></tr>
<tr><td>Prince Rupert</td><td>Free Time:
Import general cargo: 4 days
Import refrigerated containers: 2 days
(Exclusive of Saturdays, Sundays, and ILWU holidays)
Export general cargo: 5 days
Export refrigerated cargo: 2 days
(Exclusive of Saturdays, Sundays, and ILWU holidays)

Demurrage on containers of any size:
<table><tr><td>Import general cargo</td><td>Per calendar day</td></tr><tr><td>1- 5 days</td><td>$102</td></tr><tr><td>6-10 days</td><td>$153</td></tr><tr><td>11 days or more</td><td>$204</td></tr><tr><td>Import refrig. cargo</td><td></td></tr><tr><td>1- 3 days</td><td>$204</td></tr><tr><td>4 days or more</td><td>$305</td></tr></table>
Demurrage on containers of any size:
<table><tr><td>Export general cargo</td><td>Per calendar day</td></tr><tr><td>1- 5 days</td><td>$22.50</td></tr><tr><td>6-10 days</td><td>$51.00</td></tr><tr><td>11 days or more</td><td>$76.50</td></tr><tr><td>Export refrig. cargo</td><td></td></tr><tr><td>1- 3 days</td><td>$203.50</td></tr><tr><td>4 days or more</td><td>$305.50</td></tr></table></td><td>Terminal Services Tariff, Fairview Terminal, published by Maher Terminals

Section VI

Section V</td></tr>
<tr><td>Vancouver, BC</td><td>Free Time (Centerm Terminal)
Import cargo: 3 days
Export cargo: 7 days
Demurrage on containers (Centerm terminal)
<table><tr><td>Imports</td><td></td></tr><tr><td>First 5 days</td><td>$100/TEU</td></tr><tr><td>Thereafter</td><td>$200/TEU</td></tr><tr><td>Exports</td><td></td></tr><tr><td>First 7 days</td><td>$35/TEU</td></tr><tr><td>Thereafter</td><td>$90/TEU</td></tr></table>Free Time (Deltaport and Vanterm Terminals)
Import cargo: 3 days
Export cargo: 5 days

Demurrage on containers (Deltaport and Vanterm Terminals)
<table><tr><td>Imports</td><td></td></tr><tr><td>First 5 days</td><td>$100/TEU</td></tr><tr><td>Next 5 days</td><td>$150/TEU</td></tr><tr><td>Thereafter</td><td>$200/TEU</td></tr><tr><td>Exports</td><td></td></tr><tr><td>First 5 days</td><td>$25/TEU</td></tr><tr><td>Next 5 days</td><td>$50/TEU</td></tr><tr><td>Thereafter</td><td>$75/TEU</td></tr></table></td><td>6500

3100
Terminal Services Tariff for Centerm Terminal, DP World

6400

3100
TSI Terminal Systems Tariff, Deltaport and Vanterm Terminals</td></tr>
</table>

Table 2.5 Demurrage and Free Time at West Coast Ports (continued)
In Detail

<table>
<tr><td>Seattle</td><td colspan="3">NOTE: Demurrage Rates and Free Time do not apply to container shipments at the Port of Seattle.
Free Time exclusive of Saturdays, Sundays and legal holidays
Containers, inbound and outbound: 5 days</td><td>5000</td></tr>
<tr><td></td><td>Demurrage by length of container:</td><td>For first five calendar days, per day</td><td>For each additional day over five days</td><td></td></tr>
<tr><td></td><td>Inbound</td><td></td><td></td><td></td></tr>
<tr><td></td><td>20 ft</td><td>$24</td><td>$46</td><td>5020</td></tr>
<tr><td></td><td>35-40 ft.</td><td>$49</td><td>$97</td><td></td></tr>
<tr><td></td><td>45 ft and over</td><td>$67</td><td>$131</td><td></td></tr>
<tr><td></td><td>Outbound</td><td></td><td></td><td></td></tr>
<tr><td></td><td>20 ft</td><td>$16</td><td>$32</td><td></td></tr>
<tr><td></td><td>35-40 ft.</td><td>$32</td><td>$67</td><td></td></tr>
<tr><td></td><td>45 ft and over</td><td>$44</td><td>$87</td><td></td></tr>
<tr><td></td><td colspan="3"></td><td></td></tr>
<tr><td>Tacoma</td><td colspan="3">Free time for import containers: 5 days
Free time for export containers: 10 days
Fee time for containers arrived at North Intermodal yard with unknown
5 days</td><td>657</td></tr>
<tr><td></td><td>Demurrage by length of container:</td><td>Container only per day</td><td>Chassis only or chassis with container per day</td><td></td></tr>
<tr><td></td><td>0-7 meters</td><td>$8.46</td><td>$17.02</td><td></td></tr>
<tr><td></td><td>7-13meters</td><td>$17.02</td><td>$17.02</td><td></td></tr>
<tr><td></td><td>13 meters and over</td><td>$17.02</td><td>$17.02</td><td></td></tr>
<tr><td></td><td colspan="3"></td><td>657.010-657.030</td></tr>
<tr><td>Portland</td><td colspan="3">Free Time exclusive of Saturdays, Sundays and legal holidays
Free Time, Inbound and Outbound: 10 days
Demurrage: N/A</td><td>Section VIII 1.B.(2)</td></tr>
<tr><td>Oakland</td><td colspan="3">Free Time exclusive of Saturdays, Sundays and legal holidays
Inbound and outbound for coastwise, inland waterways, other domestic: 5 days
5 days
Inbound for Alaska, Foreign, and Hawaiian: 7 days
Outbound for Alaska, Foreign, and Hawaiian: 10 days</td><td>(R) 08120</td></tr>
<tr><td></td><td>Demurrage on containers by length of container:</td><td>For first five days, per day</td><td>For each additional 5 calendar days, per day</td><td></td></tr>
<tr><td></td><td>0-7 meters</td><td>$19</td><td>$38</td><td></td></tr>
<tr><td></td><td>7-9 meters</td><td>$21</td><td>$42</td><td>(I)08145</td></tr>
<tr><td></td><td>9-11.9 meters</td><td>$30</td><td>$62</td><td></td></tr>
<tr><td></td><td>11.9-13 meters</td><td>$34</td><td>$66</td><td></td></tr>
<tr><td></td><td>Over 13 meters</td><td>$44</td><td>$88</td><td></td></tr>
<tr><td></td><td colspan="3"></td><td></td></tr>
</table>

Table 2.5 Demurrage and Free Time at West Coast Ports (continued)
In Detail

<table>
<tr><td>Los Angeles</td><td colspan="3">Free Time exclusive of Saturdays, Sundays and legal holidays
Import containers foreign and offshore trade and inter-coastal trade: 4 days
Export containers foreign and offshore trade and inter-coastal trade: 6 days
Import and export coastwise trade: 5 days</td><td>[C]720</td></tr>
<tr><td></td><td>Demurrage by length of container:</td><td>For first five calendar days, per day</td><td>For each additional 5 calendar days, per day</td><td></td></tr>
<tr><td></td><td>0-7 meters</td><td>$21.83</td><td>$43.60</td><td></td></tr>
<tr><td></td><td>7-9 meters</td><td>$26.68</td><td>$53.36</td><td></td></tr>
<tr><td></td><td>9-13 meters</td><td>$43.66</td><td>$87.32</td><td>[A]780</td></tr>
<tr><td></td><td>Over 13 meters</td><td>$57.00</td><td>$114.00</td><td></td></tr>
<tr><td>Long Beach</td><td colspan="3">Free Time exclusive of Saturdays, Sundays and legal holidays
Import containers:
All trades: 4 days
Export containers:
Coastwise trade: 5 days
Inter-coastal trade: 10 days
Foreign and offshore trade: 6 days</td><td>404</td></tr>
<tr><td></td><td>Demurrage by length of container:</td><td>For first five calendar days, per day</td><td>For each additional day over five days</td><td></td></tr>
<tr><td></td><td>Inbound</td><td></td><td></td><td></td></tr>
<tr><td></td><td>20 ft</td><td>$21</td><td>$40</td><td>408</td></tr>
<tr><td></td><td>35-40 ft.</td><td>$44</td><td>$87</td><td></td></tr>
<tr><td></td><td>45 ft and over</td><td>$58</td><td>$116</td><td></td></tr>
<tr><td></td><td>Outbound</td><td></td><td></td><td></td></tr>
<tr><td></td><td>20 ft</td><td>$14</td><td>$28</td><td></td></tr>
<tr><td></td><td>35-40 ft.</td><td>$28</td><td>$58</td><td></td></tr>
<tr><td></td><td>45 ft and over</td><td>$38</td><td>$77</td><td></td></tr>
<tr><td>San Diego</td><td colspan="3">Free Time:
Inbound trade: 7 days
Outbound trade: 10 days</td><td>0705"A"</td></tr>
<tr><td></td><td>Demurrage on containers by length of container:</td><td>For first five calendar days, per day</td><td>For each additional 5 calendar days, per day</td><td></td></tr>
<tr><td></td><td>0-7 meters</td><td>$6.30</td><td>$12.60</td><td></td></tr>
<tr><td></td><td>7-9 meters</td><td>$7.35</td><td>$14.70</td><td></td></tr>
<tr><td></td><td>Over 9 meters</td><td>$12.60</td><td>$25.20</td><td></td></tr>
<tr><td>Manzanillo</td><td colspan="3">See Section 2.5</td><td></td></tr>
<tr><td>Lazaro Cardenas</td><td colspan="3">N/A</td><td></td></tr>
</table>

2.5 FEES AND CHARGES AT THE PORTS OF LAZARO CARDENAS AND MANZANILLO

The Mexican Ports are discussed separately, as the terminology used to describe costs at these ports differs and can be confusing when comparing with the other ports above.

Port of Manzanillo

This port charges fees for storing and handling of cargo (which most likely reflects demurrage as described above), fixed and variable port fees (or general tariffs), docking rates, and mooring charges. Dockage rates are charged by weight, which is different from the other ports, where it is based on length of ship. No information was found on wharfage charges specifically. Table 2.6 highlights the key charges.

Table 2.6 Fees at the Port of Manzanillo

Fees for Storage, handling and custody of merchandise (Pesos)	
Full Container per Unit	
1 to 7 days	732
08 to 10 days	919
11 and on	1130
Empty Container per Unit	
01 a 07 days	100
08 to 10 days	199
11 and on	276
General cargo, each 500 Kg. or fraction	
01 to 07 days	18
08 to 10 days	31
11 and on	35

Fees For Infrastructure Use for Commercial Ships (Pesos)	
Fixed Port Fee (pesos)	
For all ships (containers)	19,777.27
Variable Port Fee (pesos/ton)	
Ships that stay more than 48 Hrs.	1.14
Ships that stay between 24 and 48 Hrs.	1.05
Ships that stay less than 24 Hrs.	1.02
Unspecialized Docking Fee (pesos per ton)	
Ships that stay more than 48 Hrs.	5.23
Ships that stay between 24 and 48 Hrs.	5.13
Ships that stay less than 24 Hrs.	5.03
Specialized Docking Fee (pesos per ton)	
Ships that stay more than 48 Hrs.	9.25
Ships that stay between 24 and 48 Hrs.	9.07
Ships that stay less than 24 Hrs.	8.79
Mooring Fee	
Per Tonnage	5.7

Source: Port of Manzanillo web site: http://www.puertomanzanillo.com.mx/php/esp/?eCodSeccion=1.

The Port of Lazaro Cardenas has similar charges. However, no data on storage fees is available. Mooring fees, however, are charged by container and not by ton, as it is at the Port of Manzanillo. The fees for the main container terminals are shown in Table 2.7.

Table 2.7 Fees at the Port of Lazaro Cardenas, Container Terminals Isla de Enmedio and Isla Cayacal

Fees For Infrastructure Use for Commercial Ships (Pesos)	
Fixed Port Fee (pesos)	
For all ships (containers)	19,777.27
Variable Port Fee (pesos/ton)	
Ships that stay more than 48 Hrs.	1.14
Ships that stay between 24 and 48 Hrs.	1.05
Ships that stay less than 24 Hrs.	1.02
Unspecialized Docking Fee (pesos per ton)	
Ships that stay more than 48 Hrs.	5.23
Ships that stay between 24 and 48 Hrs.	5.13
Ships that stay less than 24 Hrs.	5.03
Specialized Docking Fee (pesos per ton)	
Ships that stay more than 48 Hrs.	9.25
Ships that stay between 24 and 48 Hrs.	9.07
Ships that stay less than 24 Hrs.	8.79
Mooring Fee	
20 foot container	98
40 foot container	100

Source: Port of Lazaro Cardenas web site: http://www.puertolazarocardenas.com.mx/Infraestructura/Tarifas/Esquema%20Tarifario.pdf.

3 Ocean Shipping

3.1 DISTANCES AND TRAVEL TIMES

Shorter travel times are important to a variety of shippers, especially those carrying time-sensitive goods. Northern West Coast ports have an advantage in travel time when shipping goods to and from Asia, which is a major West Coast trading partner. Table 3.1 shows distances in nautical miles and travel times from three alternative Asian ports to selected North American ports. A vessel speed of 20 knots is assumed in the table. A typical container vessel may be rated at 25 knots, but recently ocean carriers have been "slow steaming," reducing the speed of ships to 20 to 22 knots in order to reduce fuel consumption and emissions. Some ships are even operating at 17 to 19 knots ("extra slow steaming"). The effect of slow steaming on travel time on a voyage from Shanghai to Long Beach (5,726 nautical miles) is summarized below.

- **Normal speed (25 knots).** 9 days and 13 hours;
- **Slow steaming (20 knots).** 11 days and 22 hours; and
- **Extra slow steaming (18 knots).** 13 days and 6 hours.

As shown in Table 3.1, Prince Rupert has a two-day advantage over Los Angeles and Long Beach, as it is located approximately 1,000 nautical miles closer to Asian ports.

Table 3.1 Ocean Shipping Distances and Travel Times from Asian Ports to North American Ports

	FROM:					
	Shanghai		**Hong Kong**		**Tokyo**	
	Nautical Miles		Nautical Miles		Nautical Miles	
TO:	Days	Hours	Days	Hours	Days	Hours
Prince Rupert	4,762		5,331		3,820	
	9	22	11	3	7	23
Vancouver, BC	5,103		5,760		4,283	
	10	15	12	0	8	22
Seattle	5,071		5,728		4,251	
	10	14	11	22	8	21
Tacoma	5,091		5,748		4,271	
	10	15	11	23	8	22
Portland	5,135		5,756		4,307	
	10	17	12	0	8	23
Oakland	5,412		6,036		4,547	
	11	*7*	*12*	14	9	11
Los Angeles/Long Beach	5,726		6,341		4,850	
	11	22	13	5	10	2
San Diego	5,794		6,428		4,931	
	12	2	13	9	10	7
Manzanillo	6,855		7,486		5,980	
	14	7	15	14	12	11
Lazaro Cardenas	7,004		7,625		6,118	
	14	14	15	21	12	18
	Via Panama Canal					
Houston	9,883		10,568		9,247	
	20	14	22	0	19	6
New Orleans	9,759		10,445		9,124	
	20	8	21	18	19	0
Charleston	9,923		10,609		9,288	
	20	16	22	2	19	8
Norfolk	10,141		10,287		9,506	
	21	3	22	13	19	19
New York	10,343		11,028		9,707	
	21	13	22	23	20	5

Source: Distance and time calculator from http://www.searates.com/reference/portdistance/.

Note: Assumes "slow steaming" with ship speed of 20 knots.

3.2 OCEAN CARRIER FREIGHT RATES

Many shippers enter into contracts with ocean carriers; thus, actual rates vary from customer to customer. However, a benchmark for ocean carrier rates is the "spot" rate charged by carriers for containers that are not booked under annual contracts with large shippers. These rates have fluctuated significantly over the last two years. During the summer of 2009, rates were down $800 to $1,200 per 40-foot equivalent unit (FEU) relative to the fall of 2008. Figure 3.1 shows Non-Vessel Operating Common Carrier (NVOCC)[9] spot rates for a full 40-foot container from Hong Kong to Los Angeles. On September 22, 2008, the rate was $2,078, but fell dramatically in 2009 to a low of $871 on July 6, and held at that level until early August. On August 10, 2009, the rate increased from $871 to $1,300. On March 15, 2010, the rate was $1,807. On May 10, 2010, the rate jumped to $2,189, and again to $2,607 on June 13, 2010. After reaching a peak of $2,838 on August 2, 2010, the rate has gradually dropped to $2,079 as of November 15, 2010.

In March of 2010, the Transportation Stabilization Agreement (TSA), a discussion group of 15 carriers in the eastbound Pacific trade lanes, recommended an $800 per FEU increase in rates for service from Asia to U.S. West Coast ports and $1,000 per FEU increase to U.S. Gulf Coast ports, as well as to U.S. interior points, via all-water or intermodal services. The increase in the reported Hong Kong to Los Angeles spot rate from $1,807 (March 15) to $2,607 (June 13) reflects that the TSA was largely successful in achieving the recommended rate increase.

Ocean carrier rates depend greatly on cargo demand and the supply of container vessels. All of the top 25 commodity categories in the Asia-U.S. trade in 2009 were down relative to 2008 cargo volume; most by double-digits. Industry analysts have estimated $15 billion in combined transpacific carrier losses in 2009, with a 30 percent drop in the value of assets. Shipping lines returned chartered ships, delayed delivery of ships on order or canceled orders entirely, scrapped some older ships early, added ships to specific strings in order to operate them at slower speeds and reduce fuel consumption, and, where necessary, laid up ships in port. More than 560 ships, representing 11 percent of the global container fleet (capacity equivalent to some 1.44 million TEUs), were idle as of January 2010.[10] As a result of these actions, some shippers, particularly exporters, had difficulty booking space on ships as the economy began to recover and demand for goods increased. In April and May of 2010, however, idle vessels began to return to service. The gradual decline in spot rates through the summer and early fall of 2010 reflects the increase in vessel availability.

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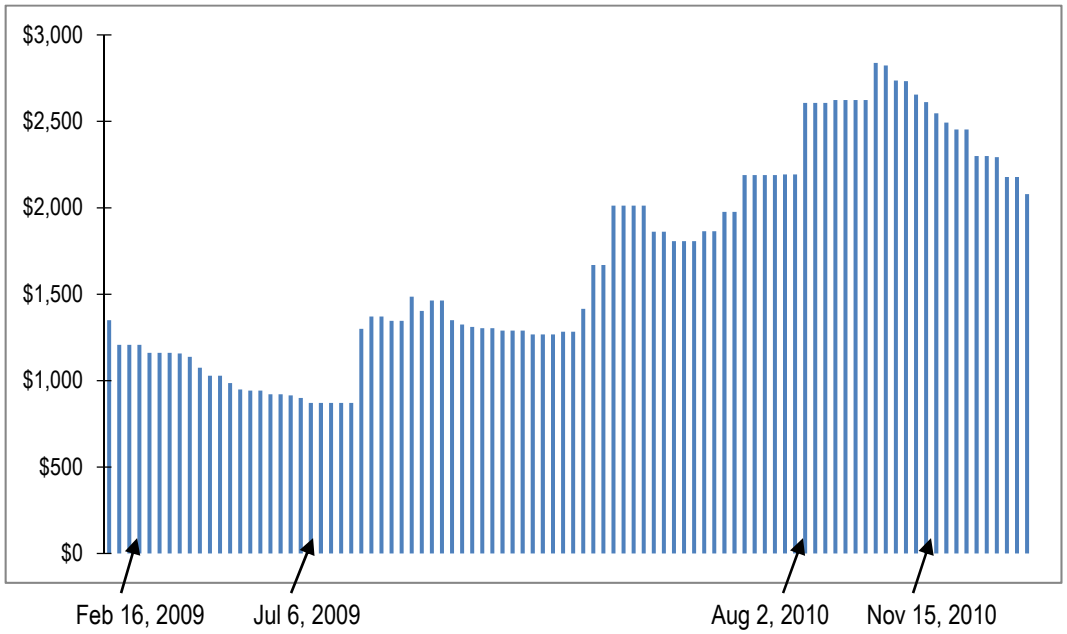
[9] U.S. designation for a shipment consolidator or freight forwarder, who does not own any vessel, but functions s a "carrier" by issuing its own bills of lading and assuming responsibility for the shipments (Business dictionary.com).

[10] Transportation Stabilization Agreement, http://www.tsacarriers.org/markets.html, and Journal of Commerce, March 29, 2010.

Figure 3.1 Container Weekly Container Spot Rates, February 2009 to November 2010

Dollar/Full Container Load, Hong Kong to Los Angeles



Source: Journal of Commerce, based on Drewry Shipping Consultants' research. Based on NVOCC rates, excluding terminal handling charges in Hong Kong.

Another index of ocean carrier rates is the weekly New Shanghai Containerized Freight Index. Clarkson PLC helped devise the index in October of 2009 to act as a benchmark for container-shipping futures. As shown in Table 3.2, the index tracks spot rates for shipments from the Port of Shanghai to the U.S. East and West Coasts, Europe, the Mediterranean, and the Persian Gulf/Sea. For the U.S., only two figures are available, representing a West Coast "base port" (Los Angeles, Long Beach, and Oakland combined) and East Coast "base port" (New York, Norfolk, Charleston, and Savannah combined). The data are compiled from 15 shipping lines and 15 freight forwarders. The "comprehensive" index shown at the bottom of the table is normalized to a $1,000 base index as of October 16, 2009.

The table implies that shipping from China to the U.S. East Coast is about 60 percent more expensive than shipping to the U.S. West Coast. The distance from Shanghai to the U.S. East Coast (based on Norfolk as a midpoint) is about 77 percent farther than to Los Angeles/Beach.

One great uncertainty that will affect freight rates is the cost of fuel. The recent approval by the International Maritime Organization (IMO) of a North American Emission Control Area will help clean the air, but it is likely to increase the cost of bunker fuel.[11]

[11] Environmental Protection Agency: http://www.epa.gov/OTAQ/oceanvessels.htm.

Table 3.2 New Shanghai Containerized Freight Index

To Base Ports	Base Index Oct 16, 2009	Nov 5, 2010	Nov 12, 2010	Dollar Change	Percent Change
U.S. West Coast (per FEU)	$1,431	$2,063	$2,111	$(48.00)	-2.3%
U.S. East Coast (per FEU)	$2,439	$3,291	$3,375	$(84.00)	-2.6%
Europe (per TEU)	$1,232	$1,448	$1,479	$(31.00)	-2.1%
Mediterranean (per TEU)	$1,279	$1,387	$1,428	$(41.00)	-3.0%
Persian Gulf/Red Sea (per TEU)	$660	$855	$853	$2.00	0.2%
Comprehensive Index	$1,000	$1,199	$1,221	$(22.17)	-1.8%

Source: Shanghai Shipping Exchange, http://en.chineseshipping.com.cn/html/index_scfi.asp.

Note: The freight rate includes ocean freight and surcharges, including BAF/FAF, EBS/EBA, CAF/YAS, PSS, WRS, PCS, and SCS/SCF/PTF/PCC. Rates to U.S. are per FEU; other rates are per TEU.

Base ports defined:
Europe – Hamburg/Antwerp/Felixtowe/Le Havre;
Mediterranean Sea – Barcelona/Valencia/Genoa/Naples;
U.S. West Coast – Los Angeles/Long Beach/Oakland;
U.S. East Coast – New York/Savannah/Norfolk/Charleston; and
Persian Gulf and Red Sea – Dubai.

4 Intermodal Rail

The cost of moving goods by rail from the West Coast to inland markets has an impact on the competitiveness of West Coast ports, especially as Gulf Coast and East Coast ports are looking to attract more cargo from Asian markets after the widening of the Panama Canal and the completion of various East Coast rail infrastructure improvements. In August of 2009, the six major West Coast ports wrote a letter to Matt Rose, President and CEO of the Burlington Northern Santa Fe (BNSF) Railway, and to James Young, President and CEO of the Union Pacific Railroad (UP), asking them to work jointly with the ports to protect West Coast cargo from being diverted to ports on the Gulf Coast and East Coast. The letter was signed by the Executive Directors of the Port of Los Angeles, Port of Long Beach, Port of Oakland, Port of Portland, Port of Tacoma, and Port of Seattle.[12] The concern about the impact of steady increases in rail rates on West Coast market share was the primary motivation for writing the letter. See Appendix A for excerpts of the letter.

While rail cost may be a factor in competitiveness of the port, another factor that may be of more importance to many goods coming from Asia is reliability and frequency of rail service. The San Pedro Bay Ports have very frequent rail service, which reduces the risk of late delivery. (See section on BNSF Railway and UP Railroad, below.) As a result of the port and the large manufacturing base located in the Los Angeles area, the number of eastbound rail destinations that connect to the ports and the SCAG region is greater than at any other West Coast gateway. In addition, the large population of the SCAG region provides superior domestic rail backhaul opportunities for west bound rail movements.

This chapter highlights current major intermodal rail trends and themes that may have an impact on the competitive landscape for Ports.

Rail Rates

Rail rates cannot be obtained directly from the railroads as they are proprietary. Anecdotal information is available, however, from the Journal of Commerce and Pacific Shipper. "*There is still a healthy spread between intermodal rail and long-haul trucking rates from the West Coast. In 2007, rail service from Los Angeles-Long Beach to Chicago cost about $1,200 per container, compared to about $1,700 by truck.*"[13]

[12] The Cunningham Report, August 9, 2009.

[13] Pacific Shipper, October 15, 2007.

According to BNSF's Steve Branscum, from 2003 to 2009, intermodal rail rates increased at an average annual rate of 8 percent.[14] Increasing the 2007 cost (from the previous paragraph) by eight percent per year would imply that rates from Los Angeles-Long Beach to Chicago may have approached $1,400 per container in 2009. Future railroad rate increases are likely. According to stock analyst Lee A. Klaskow of Longbow Research, UP "will continue to generate core price increases of roughly four to six percent over the next few years."[15]

The Journal of Commerce reports that "The rail cost is rolled into the total intermodal through rate charged by the ocean carrier, and the shipper never knows what margin the ocean carrier retains on the rail cost…The prevailing supposition in the industry is that shipping through the U.S. Northwest ports involves higher intermodal rail rates than in the Pacific Southwest because of the higher volumes moving through Los Angeles-Long Beach. But BNSF and UP say all of the West Coast gateways are important in their business plans, so it makes no sense for railroads to give a rate advantage to any gateway."[16]

According to Professor Robert Leachman of U.C. Berkeley, "Importers cannot get rate quotes from railroads. They can only get rate quotes from steamship lines for Inland Point Intermodal (IPI) service,[17] or for Store-Door (SD) service,[18] or Container Yard (CY) service,[19] and they get rate quotes from intermodal marketing companies (IMC) for landside movement of domestic boxes. The IMCs and the steamship lines in turn have rates with the railroads. But the importers do not know those rates. Conversely, the railroads do not know what

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[14] Journal of Commerce, March 22, 2010.

[15] Journal of Commerce, March 29, 2010.

[16] Journal of Commerce, January 24, 2011.

[17] IPI is a door-to-door service the customer buys from the Line. The customer pays one price to the Line for one bill of lading covering the whole move. The Line dispatches an empty box to the origin shipper's dock in Asia, it picks up the box once it is loaded and brings the box to the origin port, it hauls the box across the ocean to the destination port, it pays the destination port terminal operator to put the box in a railroad well car (or it pays a drayman to dray the box to an off-dock rail terminal), it pays the railroad to haul the box from origin railroad ramp to destination railroad ramp, then it pays another drayman to deliver the box to the consignee's dock.

[18] SD is a door-to-door service the customer buys from the Line, but the consignee dock must be within the range of local dray from the destination port terminal. So there's no railroad involvement.

[19] CY is a rate for door-to-destination-port-terminal service the customer buys from the Line. The customer must separately procure a dray or long-distance truck haul from the destination port terminal to the customer's destination for the box. For boxes moving under CY rates, the Line does not know where the box is going, the Line only knows the customer will come get the box at the destination port terminal.

the steamship lines and IMCs are charging the importers. Typically, the steamship line providing an SD or a CY rate for the marine box, the Third-Party Logistics Operator (3PL) providing a rate for transloading the marine box contents into domestic boxes, and the IMC providing a domestic intermodal rate know absolutely nothing about what the other two service providers are charging, nor do they know the overall origin-destination move the goods are actually making."[20]

Canadian National

West Coast U.S. ports are understandably concerned about diversion of traffic to Prince Rupert in British Columbia. The Canadian National Railway Company's (CN) rates from Prince Rupert to Chicago are approximately $300 per container lower than BNSF and UP intermodal rates to Chicago from Los Angeles.[21] This is one reason why Prince Rupert's container volume increased by 45.8 percent between 2008 and 2009.

Intermodal travel times from Prince Rupert are 100 hours to Chicago, 133 hours to Memphis, and 135 hours to Detroit.[22] In early November 2007, the first train from Prince Rupert to Chicago completed the trip in 92 hours. To prepare for the new service, CN spent $25 million to widen tunnels, reinforce bridges, and build sidings along the route.[23]

Prince Rupert is served by China Overseas Chipping Company (COSCO) and Hanjin Lines. As reported by Cargo Shipping News:

> *Tim Marsh, Vice President of sales for Cosco Container Line in New Jersey, says the route has worked out "extremely well." He points out that a highlight for customers "is the reduced sailing time, which in turn leads to environmental benefits" as two days shorter transit means less fuel has been burned getting their goods to market. Los Angeles is getting increasingly difficult and expensive, Marsh says, pointing to recently imposed truck fees, Alameda Corridor rail charges, and the added burden of the harbor maintenance fee. Shipping via Prince Rupert has financial advantages as well as time savings.*[24]

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[20] Professor Robert Leachman, U.C. Berkeley, e-mail to Cambridge Systematics, February 8, 2011.

[21] Journal of Commerce, August 24, 2009.

[22] Canadian National Railway, http://www.cn.ca/en/shipping-prince-rupert-transit-time-advantage.htm.

[23] 54 North, A Newsletter from the Prince Rupert Port, November 2007.

[24] Cargo Shipping News, May 2009.

Other important information on CN:

- CN has daily service from Prince Rupert to Memphis.
- The steepest grade between Canada's Pacific Northwest and its Chicago/end points is one percent in the Rockies.
- CN purchased track in Wisconsin and Minnesota to provide a mainline route directly into Chicago and then on to Memphis. In addition, CN purchased 119 miles of track around Chicago – this reduced the trip to Memphis by 12 hours.[25]

The CN system map is shown in Appendix A.

BNSF Railway and UP Railroad

The Burlington Northern Santa Fe (BNSF) Railway and Union Pacific Railroad (UP) are striving to protect their market share by improving their intermodal services from West Coast ports to the eastern half of the country. There currently are approximately 60 double-stack train departures per week from the Los Angeles/Beach area. Approximate travel time from Los Angeles to Chicago is 90 hours, which compares favorably with CN service from Prince Rupert to Chicago. In addition, BNSF operates "premium" trains from Southern California to Chicago at up to 79 mph, which allows shipment in as little as 51 hours, which even surpasses truck travel time using team drivers.[26] However, once trains get to Chicago, western railroads interline with the eastern rail carriers. Two days of transit time can be lost when containers are unloaded at western rail ramps and trucked through the City to eastern rail carrier ramps.

Other key highlights of BNSF and UP Service:

- Both UP and BNSF have been experimenting with longer double-stack container trains. BNSF operates a regular 10,000-foot train out of Los Angeles harbor; 12,000-foot trains are also being introduced. In January 2010, the UP tested a "monster" 18,000-foot (nearly 3.5 miles) train from Texas to Los Angeles. The train carried 600 containers and 9 locomotives.[27]
- In September of 2009, UP started construction of a $370 million, 785-acre intermodal terminal in Joliet, Illinois, west of Chicago. The Joliet facility, along with UP's existing intermodal ramp at Rochelle, Illinois, will serve destinations north, south, and east of Chicago without having to move through the City.

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[25] Cargo Shipping News, May 2009.

[26] Journal of Commerce, February 16, 2009.

[27] Los Angeles Times, January 13, 2010.

- UP has new ramps in San Antonio, Laredo, and Dallas, Texas, and the Port of Tacoma. Service has also recently started on the improved Donner Pass in Northern California that serves the Port of Oakland. UP is also working to double track the Sunset Corridor from Los Angeles to El Paso. These are part of UP's strategy to expand capacity and reduce transit times to destinations east of the Rocky Mountains.
- BNSF is working to improve its east-west routes. BNSF has initiated new intermodal services from the West Coast to Chicago, Memphis, Atlanta, and Kansas City, which are intended to attract new business, as well as keep existing customers. An expedited service from Southern California to Atlanta runs six trains each week with a transit time of about 87 hours, and competes with all-water services from Asia to Savannah.[28]

The BNSF and UP system maps are shown in the Appendix.

East Coast Railroad Projects

The East Coast ports and eastern railroads are working hard to capture a larger market share of Asian imports. The reliability of all-water ocean service works well for East Coast markets, but retailers and importers shipping to interior destinations have not switched to all-water services in great numbers. Reverse inland point intermodal (RIPI) market shares[29] from East Coast ports to the Midwest and mid-South are in the low single-digits.[30]

Nevertheless, eastern railroads are investing hundreds of millions of dollars to improve networks from East Coast ports to interior destinations, such as Chicago and the Ohio Valley. Three major railroad improvement programs are underway, which are designed to improve double-stack container service to interior points:

1. Norfolk Southern's (NS) Heartland Corridor;
2. Norfolk Southern's Crescent Corridor; and
3. CSX's National Gateway Project.

NS and CSX system maps can be found in Appendix A.

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[28] Journal of Commerce, September 28, 2009.

[29] RIPI market shares refer to the percentage of goods that are shipped from Asian countries to eastern ports in the United States, and then moved by truck/rail to inland North American destinations (i.e., Hong Kong to Columbus, Ohio via Charleston, South Carolina.

[30] Journal of Commerce, February 22, 2010.

Heartland Corridor Project

For the last three years, NS has been working on the Heartland Corridor Project. This project is expanding vertical clearances inside 28 Appalachian tunnels, and making other upgrades to accommodate double-stack trains from the Atlantic Coast to the Midwest. The $290 million project will allow NS to offer shipping lines a faster route from the Atlantic Coast to distribution hubs in Columbus, Ohio (Rickenbacker Global Logistics Park) and Chicago. Construction is expected to be completed in August 2010.

Crescent Corridor Project

Norfolk Southern's $2.5 billion Crescent Corridor project will result in a major intermodal rail line connecting New Jersey with Louisiana. The line will pass through 13 states, connecting the Cities of New York City, Memphis, and New Orleans. Overall, the project will upgrade and expand existing rail lines, and will construct several new intermodal terminals. It is expected to take trucks off of highways such as I-81. This project is expected to be completed by 2014, coinciding with the reopening of the expanded Panama Canal. A U.S. Department of Transportation (DOT) description of project scope and benefits is shown below.

National Gateway Project

The $842 million National Gateway rail improvement program, sponsored by CSX, runs north-south along part of the Eastern Seaboard, and then turns westward across Pennsylvania and Ohio. CSX's Robert Sullivan said the National Gateway project is being developed because the railroad anticipates a "significant increase in cargo coming through the East Coast ports" when the Panama Canal is enlarged.[31] This project will also reopen in 2014, at the same time that the expanded Panama Canal reopens.

The National Gateway project will improve ports, upgrade rail lines, and prepare bridges and tunnels to accommodate double-stack trains. Project improvements focus on three major freight corridors:

1. I-95 Corridor between North Carolina and Baltimore, Maryland, via Washington, D.C.;
2. I-70/I-76 corridor between Washington, D.C. and northwest Ohio via Pittsburgh, Pennsylvania; and
3. Carolina Corridor between Wilmington, North Carolina, and Charlotte, North Carolina.

[31] Journal of Commerce, February 22, 2010.

The three projects discussed above have received significant financial support from the Federal government. The Heartland Corridor received a grant of $95 million in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU),[32] while the Crescent and National Gateway corridors received grants of $105 million and $98 million, respectively, from the Transportation Investment Generating Economic Recovery (TIGER) program, which provided a total of $1.5 billion for projects across the country. A U.S. DOT description of project scope and benefits is shown in Appendix A.

Chicago CREATE Project

Another big winner in the recent competition for TIGER grants was the Chicago Region Environmental and Transportation Efficiency Program (CREATE). The purpose of the CREATE project is to relieve congestion on rail lines in the major freight hub of Chicago, which is also a significant freight bottleneck in the nation's goods movement network. The projects will focus on major issues, such as freight movement efficiency, freight/rail conflict, and highway/conflict. CREATE includes 70 priority projects along four key freight corridors in the Chicago region, as shown in Figure 4.1.

[32] Only $84.4 million of the $95 million will be available due to obligation limitations and rescissions (http://www.efl.fhwa.dot.gov/files/projects/heartland/HCCP_Financial_Plan_Update_May_2009_signed.pdf).

Figure 4.1 Chicago CREATE Projects

Source: CREATE.

A U.S. DOT description of the CREATE project scope and benefits is shown in Appendix A. In terms of funding, the project received a $100 million TIGER I grant. The total cost of the CREATE project is estimated at $3 billion. CREATE also received $100 million from SAFETEA-LU, and another $133 million from the American Recovery and Reinvestment Act (ARRA). The ARRA grant was part of a $1.2 billion award for high-speed rail in Illinois.

Rail Policy and Competition

In the Southern California Association of Governments (SCAG) region, the Colton Crossing grade separation was the only project awarded TIGER I funds; a total of $33.8 million. A U.S. DOT description of the project follows below. The Port of Los Angeles was awarded $16 million in TIGER II funds for the West Basin Rail Yard improvements.

Colton Grade Separation

The project eliminates the mainline at-grade rail crossing of the UP and the BNSF Railway at Colton in San Bernardino County. This crossing is on the major east-west corridor for each of the two carriers, and at its peak in 2006 the crossing handled 129 trains a day. The trains that wait and queue behind the crossing create a major choke point for traffic moving to and from Southern California. The recent Federal grants discussed above, including the Colton Grade Separation, are consistent with current U.S. DOT policy toward rail transportation. As reported by the Journal of Commerce on March 24, 2010:

> *U.S. Department of Transportation Deputy Secretary John Porcari told the Senate Environment and Public Works Committee in a March 24 hearing that DOT's preference for freight shipping is to keep goods on waterways and rail as much as possible, getting them away from trucks except for the final delivery.*
>
> *Committee Chairman Barbara Boxer, D-Calif., asked Porcari whether the concept of DOT's discretionary "TIGER" grant program could work in the next multi-year surface transportation bill. That $1.5 billion pool of stimulus funds allowed DOT to send grants to multimodal projects that cross state lines, instead of disbursing money under state-allocation formulas or for specific transport modes.*
>
> *Porcari said that "in our goods movement hierarchy – where we want to keep goods movement on water as long as possible, and then on rail as long as possible and truck it for the last miles – it's a big step forward."*
>
> *He also said "I think the TIGER grants point the way to the future in intermodal transportation." The largest category of awards, Porcari said, "was freight rail capacity projects, which have a number of environmental benefits, including reduced fuel consumption but also take some of the goods movement off the highway network and move it through more efficient modes."*
>
> *Those comments follow similar remarks by DOT Secretary Ray LaHood in an interview with the* Journal of Commerce.
>
> *LaHood said DOT policy has "paid a lot of attention to the freight rail companies" to both expand passenger train service and draw freight off highways. "We've made a huge investment in their opportunity to build*

capacity," he said. And the DOT is working with ports "again, to take trucks off the road and to really utilize the marine highways."[33]

The improvements to the rail system on the East Coast will clearly improve the competitiveness of the all-water route from Asia; however, it is not clear at this stage whether significant swings in market share will result. A commentary by Curtis D. Spenser, President of IMS Worldwide in Webster, Texas, in the November 30, 2009 issue of the Journal of Commerce sheds important light on the competition for discretionary cargo.

If you are involved in international transportation on the East Coast, you are probably watching the attention being paid to recent trends in intermodal shipping that suggest growth in discretionary freight moving all-water through East Coast ports.

You are also probably trying to sort out if you will participate in the 25 percent rerouting of this freight away from those "evil" port terminals on the West Coast that have traditionally moved the Far East freight to Chicago, Dallas and, heck, even all the way to New Jersey.

However, a careful study of the statistics should warn you to keep the champagne corked for a few more years. Yes, there has been market share erosion, from 2006 through 2009 so far, of approximately 5 percent in inbound TEUs.

The news and statistics are not new, nor did they come about without an in-depth study by beneficial cargo owners determining that a "SoCal-only port strategy" was probably not a good idea after the labor lockout and equipment and manpower shortages of 2002-2004.

However, a landslide of rerouted discretionary freight just hasn't happened. And it's important to look at the drivers that created the shift in the first place to see if they are still valid.

I am not saying discretionary freight will not be fluid, flowing toward the lowest-cost alternatives. In fact, with the transportation and distribution center infrastructure in place, there always will be beneficial cargo owners looking for ways to reduce costs for that share of freight that can be shipped all-water to the Gulf and East Coast ports directly. But costs are key in this equation.

We can't get away from the fundamentals of costs, and so far, unless the destination is less than 300 miles from the East Coast, we are just not there yet. We could get there, but I have another theory about that; it has to do with the western railroads.

The western rail carriers do not occupy the top slots of the Class I railroads because they are short-sighted. On the contrary, they are very sophisticated public corporations. There are some really smart people working at those companies, and they can read the tea leaves just like you and I.

[33] Journal of Commerce Online, March 24, 2010.

> *A five percent drop in market share may not make them change intermodal "mini-landbridge" pricing, especially since the "all-in rate" was dropping faster than oil prices fell in 2008. With the ocean carriers dropping prices in all lanes, the effect of adjusting mini-landbridge pricing was not necessary, in their view.*
>
> *However, if these same railroads see a market share drop approach seven to eight percent West Coast to East Coast, they have it in their power to immediately "equalize inland rates" with the stroke of a pen. And, in my humble opinion, that is exactly what they would do.*
>
> *These guys are not going to lose market share, which, once gone, will not come back. They would adjust their rates to compete with all-water Gulf Coast or East Coast service into Dallas or Chicago. Losing those two markets just won't happen. It may happen in Columbus, Atlanta, etc., but the western railroads would not sacrifice Chicago or Dallas for a couple of percentage points in profit differential.*
>
> *The bottom line is, East Coast versus West Coast routing comes down to two key issues for non-time sensitive finished goods: consistency and costs.*
>
> *Today, there are really no consistency issues with any ports on the West Coast. We probably won't have congestion and delays there for another 10 years, if projections such as those by IHS Global Insight for trade and GDP are close to correct.*
>
> *Furthermore, until pricing on all-water routes and trucking or intermodal rail rates change going from east to west, the numbers just don't pencil out for destinations farther than 300 miles from the coast. The Panama Canal will affect the size of vessels making the all-water transit, but only consumer demand will influence the number of TEUs transiting the canal, or being rerouted from west to east.*
>
> *Stay tuned, there is a lot more of this debate to come.* Journal of Commerce, *November 2009.*

East Coast ports hope that the NS and CSX railroad improvements in combination with the Panama Canal expansion will increase their market share of Asian trade. However, currently only Norfolk, Virginia; Charleston, South Carolina; and Halifax, Nova Scotia have the 50-foot-plus channel depth to accommodate the 12,500-TEU ships that will be able to transit the new Panama Canal locks. The Port of Baltimore has signed an agreement with Ports America, which will operate the Seagirt Container Terminal and dredge the channel depth to 50 feet by 2014. The Port Authority of New York/New Jersey is dredging its channel to 50 feet, but the low air draft of the Bayonne Bridge will curtail access to the large container terminals in New Jersey and Staten Island until the bridge can be raised or rebuilt with more vertical clearance.

5 The Panama Canal

The Panama Canal Authority currently is constructing a series of improvements to the Canal that will accommodate 12,500-TEU vessels. Currently, the Canal is limited to "Panamax" sized vessels of about 4,000 to 5,000 TEUs. A referendum authorizing the construction of the expanded canal was passed by Panamanian voters on October 22, 2006. Funding became available in December 2006, and the project is expected to open in 2014. The overall estimated cost of the construction of Third Set of Locks is $5.25 billion.

The existing Canal has two lock lanes. Each of these two lanes uses three chambers or steps to allow the transit of vessels between sea level and Gatun Lake's level. The locks on the Pacific end of the Canal are separated in two complexes: one is located in Miraflores, with two steps; and the other is in Pedro Miguel, with a single step. The locks on the Atlantic end consist of a single complex in Gatun, which has three steps.

As described by the Panama Canal Authority,[34] the project consists of adding a third lane, through the construction of two lock facilities, one at each end of the Canal. Each of the new lock facilities will have three consecutive chambers, designed to move vessels from sea level to the level of Gatun Lake and back down again. Each chamber will have three lateral water reutilization basins, for a total of 9 basins per lock and 18 basins in total (see Figures 5.1 and 5.2). The project also entails excavating new access channels to the new locks, widening and deepening the existing navigational channels in Gatun Lake, and deepening the Culebra Cut.

Table 5.1 shows vessel size limitations before and after the improvements are made.

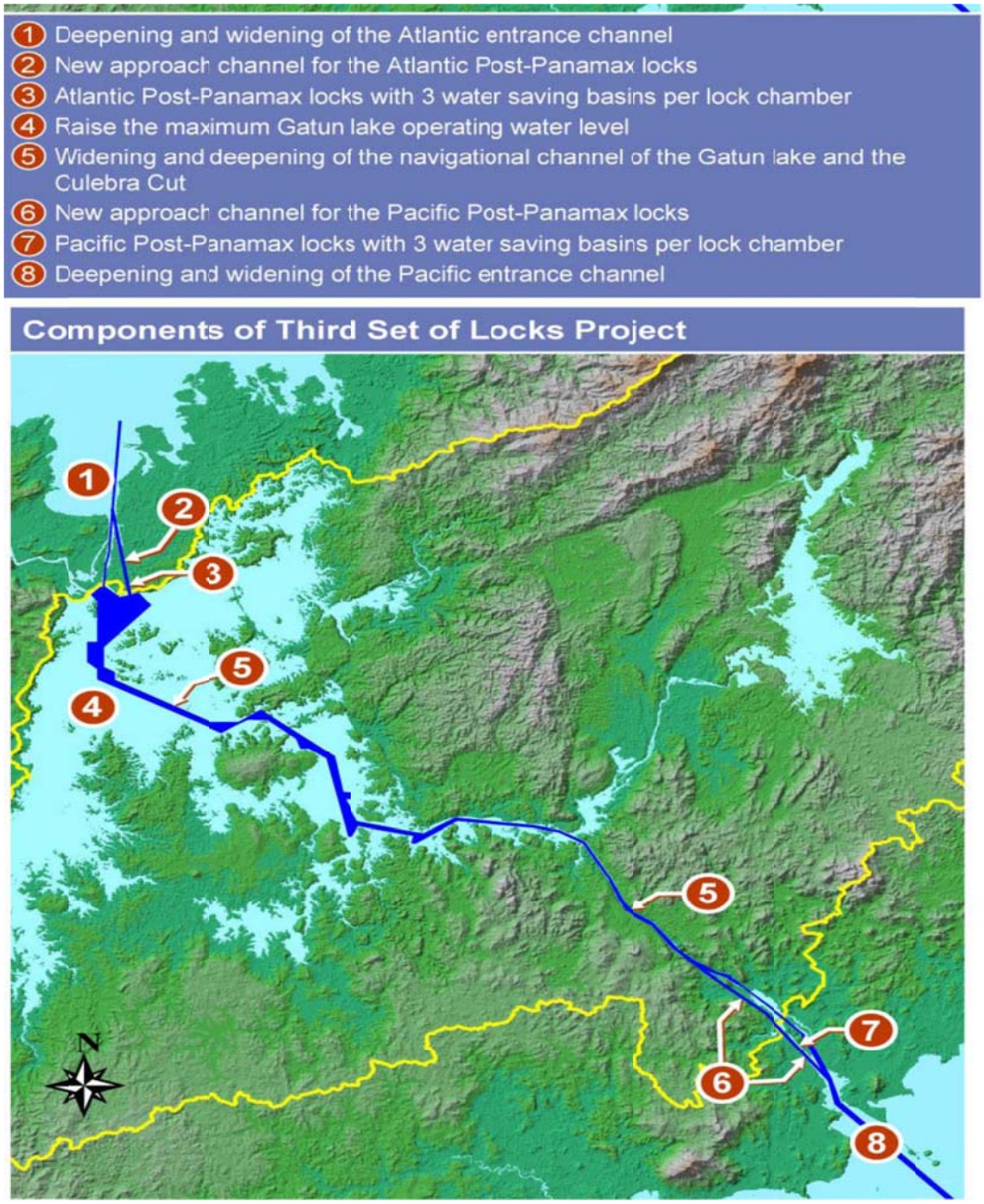
Table 5.1 Panama Canal Vessel Limitations Before and After Construction of the Third Set of Locks

	Before	After
Length	965 feet (294m)	1,200 feet (366m)
Beam	106 feet (32.3m)	160 feet (49m)
Draft	39.5 feet (12m)	50 feet (15m)

Source: Drewry Supply Chain Advisors, U.S. Transpacific Intermodal Today and Tomorrow, September 2008.

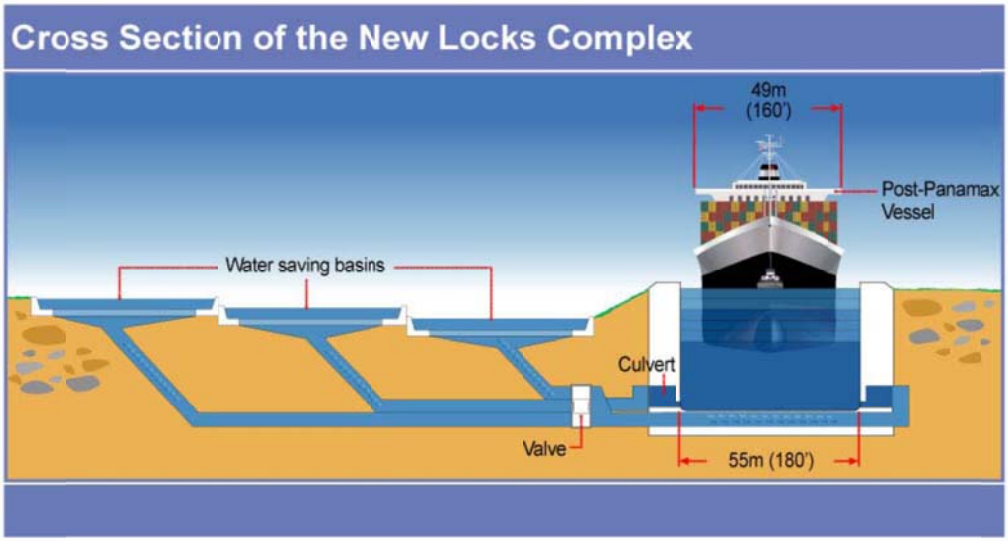
[34] Panama Canal Authority, Proposal for the Expansion of the Panama Canal Third Set of Locks Project, April 24, 2006.

Figure 5.1 Components of the Panama Canal Third Set of Locks Project



Source: Panama Canal Authority.

Figure 5.2 Cross Section of the New Locks Complex



Source: Panama Canal Authority.

Impact of the Panama Canal on Port Market Shares

There are differing opinions on the impact of the Canal expansion on port market shares. In a 2008 study, Drewry Supply Chain Advisors predicted Atlantic and Gulf ports could seize up to 25 percent of the West Coast's cargo base. They warn that "without radical action, intermodal distribution to the Midwest and beyond will gradually die."[35]

Dan Smith of The Tioga Group, however, disagrees. "The Drewry report understates the importance of transit time and reliability in shipper routing choices and the role of the Southern California consumer market" and "ignores the substantial investments being made in West Coast port and rail intermodal capacity, and significant capacity limits on alternative routes."[36]

Professor Asaf Ashar of the National Ports and Waterways Institute at the University of New Orleans agrees with Smith that "The expansion of the canal will be a bump, not a sea change. We won't see much of a change – maybe a percent or two – because most of the big retailers already are going all-water."

Professor Ashar believes cost savings will not be large enough to enable all-water service to capture a much bigger market share. That is because the Panama Canal Authority already is taking its share of the savings through higher tolls, now set at $72 per TEU, which it will probably increase further in years to come.

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[35] Drewry Supply Chain Advisors, U.S. Transpacific Intermodal Today and Tomorrow, September 2008.

[36] Journal of Commerce, March 23, 2009.

West Coast Strategies to Counter Panama Canal Expansion

While the Drewry report predicts a fairly steep drop in West Coast market share, the report also lists several steps that West Coast Ports could take to stem the tide:

- **Port expansion.** Increasing port capacity through terminal expansions and modernization could enhance the West Coast ports competitive position.
- **Port terminal reconfiguration to increase throughput.** This would involve use of extended gate hours to make use of all 24 hours in the day. Drewry also mentions that loading 53-foot containers on vessels could also improve supply chain efficiency.
- **Expansion of on-dock rail infrastructure and increased trackage to selected markets.** This strategy could certainly counterbalance the strides made by NS and CSX railroads on the East Coast.

6 Summary of Existing Infrastructure and Expansion Proposals at West Coast Ports

All West Coast ports are engaged in various levels of capacity expansion and operational improvements. This section will discuss existing port infrastructure and terminals, as well as the planned expansions at the ports. Each major West Coast Port will be analyzed, from Prince Rupert in Canada down to Lazaro Cardenas in Mexico.

Table 6.1 provides a summary of existing port infrastructure at competing West Coast ports.

Table 6.1 Summary of Existing Port Infrastructure at Competing West Coast Ports

	Planned Acres at Ports	Long Term Capacity: Planned Acres at 10,000 TEU per Acre*	Existing Annual Container Capacity (TEUs)	Number Terminals	Depth (deepest berth, in meters)
Prince Rupert	200	2,000,000	500,000	1	18.7
Vancouver	710	7,100,000	N/A	4	15.9
Seattle	464	4,640,000	N/A	4	15.2
Tacoma	828	8,280,000	N/A	6	15.5
Portland	200	2,000,000	700,000	1	13.1
Oakland	764	7,640,000	N/A	10	15.2
Los Angeles	2,188	23,328,456	13,744,000	8	16.8
Long Beach	1,882	19,872,038	10,272,000	7	16.8
San Diego	150	1,500,000	115,000	1	12.8
Manzanillo	625	6,250,000	2,130,000	1	16.0
Lazaro Cardenas	210	2,100,000	2,180,000	2	18.0

Source: 2006, Moffat and Nichol, as found within IHS Global Insight and TIOGA Group's 2007 San Pedro Bay Cargo Forecast. Other data taken from Port web sites.

* Data for the Ports of LA/Long Beach are planned acreage for 2035 and the TEU forecast from IHS Global Insight and TIOGA Group, resulting in estimated productivity of 10,662 annual TEUs/and 10,559 TEUs/for the Ports of Los Angeles and Long Beach, respectively. Estimated existing annual capacity for the Ports of LA/Beach is computed by multiplying existing acreage by 8,000 TEUs per acre per year, which assumes roughly a doubling of existing productivity.

6.1 PRINCE RUPERT

The Prince Rupert Container Terminal is a 59.4-acre facility with a single 360-meter (1,181-foot) berth with a depth of 18.7 meters (61.4 feet) along side. The terminal has a design capacity of 500,000 TEUs annually. The terminal handled 265,259 TEUs in 2009.

The container yard has a capacity of 9,000 TEUs and 72 refrigerated container ("reefer") plugs. The terminal's intermodal yard has 6,100 meters (20,000 feet) of track with a capacity of 400 TEUs. There are seven working tracks for loading and unloading of containers and six storage tracks. The terminal is served by the Canadian National Railway.

Expansion of the terminal is planned that would quadruple the capacity of the terminal to two million TEUs.

6.2 VANCOUVER, BRITISH COLUMBIA

The Vancouver Port Authority recently merged with the Frasier River Port Authority. The complex has four major container terminals:

- **Centerm** is a 28-hectare (69.2-acre) facility that handles containers, as well as other cargo, and has two deep-sea berths and five container cranes. It has a depth of 15.5 meters alongside.
- **Deltaport** is a 160-acre terminal with two berths with a total length of 670 meters (2,198 feet) and a depth of 15.85 meters (52 feet) alongside. The terminal includes storage space for 24,000 TEU in a 62-acre container yard with 600 440v reefer plugs. Deltaport has an on-dock intermodal yard with eight 3,500-foot tracks. [37]
- **Vanterm** is a 76-acre facility with two container berths totaling 690 meters (2,030 feet) with a depth of 15.5 meters (51 feet) alongside and one conventional berth. The terminal has a 30-acre container yard with a capacity of 10,332 TEU and 360 440v reefer plugs. Vanterm has an on-dock intermodal yard with nine tracks (6 by 1,000 feet and 3 by 1,200 feet). [38]
- **Frasier Surrey Docks** is a 130-acre multipurpose terminal with two container berths with a depth of 11.7 meters alongside. The terminal has four container cranes and 30,654 square meters of covered storage area. The Frasier Surrey Docks Terminal has the ability to hold up to 18,000 feet of railcars in the holding tracks. The holding tracks allow for quick placement of rail cars into the 9,000 feet of on-dock working track. [39]

[37] Terminal Systems Inc: http://www.tsi.bc.ca/t3/index.php?id=90.

[38] Terminal Systems Inc: http://www.tsi.bc.ca/t3/index.php?id=vanterm_info.

[39] Fraser Surrey Docks: http://www.fsd.bc.ca/map.html.

The Port's expansion plans include:

- **Deltaport Third Berth Project** will increase the capacity at Deltaport by up to 600,000 TEUs by adding a third berth and 20 hectares of container storage facilities to the existing two-berth container terminal.[40]
- **The Terminal 2 Project** is a proposal to expand container capacity at Roberts Bank by adding a new three-berth container facility. The schedule for Terminal 2 is yet to be determined. The development of Terminal 2 is part of the Port's broader initiative to expand container terminal facilities at the Port in response to the growth in containerized trade with Pacific Rim nations.[41]

6.3 SEATTLE

The Port of Seattle has four major container terminals:

- **Terminal 5** is a 182-acre container facility with three berths, totaling 2,900 feet (884 meters). Depth at berth is 45 feet (14 meters) at Berth 1 and 50 feet (15 meters) at Berths 2 and 3. There are six container handling cranes at the terminal, 600 reefer plugs, and an 80,000 square feet covered transit shed with truck access. Terminal 5 has on-dock rail with a loading capacity of 54 five-platform double-stack railcars (two full trains) for both BNSF and UP. It also has an adjacent storage facility for 54 five-platform railcars, a 30-acre intermodal yard with six working tracks, and can assemble full BNSF and UP trains for direct access to mainline track.[42]
- **Terminal 18** is 196 acres with four container berths, totaling 1,353 meters with a depth of 50 feet alongside. The terminal has seven container-handling cranes, 1,227 reefer plugs, and a 97,000 square feet transit shed. Terminal 18 has on-dock rail with a loading capacity of 54 five-platform double-stack railcars and an adjacent storage facility for 54 five-platform double-stack railcars.[43]
- **Terminal 30** is a 65-acre facility with two berths, totaling 2,700 feet (823 meters, with a depth of 50 feet (15 meters) alongside. The terminal has six cranes and 451 reefer plugs. Terminal 30 lacks rail access on-site, but is within two miles of both the UP and BNSF rail yards.[44]

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[40] Terminal Systems Inc: http://www.tsi.bc.ca/t3/index.php?id=104.

[41] Port Metro Vancouver: http://www.portmetrovancouver.com/projects/ongoing_projects/terminal_2.aspx.

[42] Port of Seattle: http://www.portseattle.org/seaport/cargo/terminal5.shtml.

[43] Port of Seattle: http://www.portseattle.org/seaport/cargo/terminal18.shtml.

[44] Port of Seattle: http://www.portseattle.org/seaport/cargo/terminal30.shtml.

- **Terminal 46** is an 88-acre facility with two berths, totaling 2,300 feet (701 meters) with a depth of 50 feet (15 meters) alongside. The terminal has five container handling cranes and 426 reefer plugs. Terminal 46 has dedicated in-gate and out-gate lanes for the efficient transportation of intermodal cargo to near-dock UP and BNSF rail yards.[45]

Expansion plans at the Port of Seattle include the dredging of East Waterway of the Duwamish River. The Port and the U.S. Army Corps of Engineers are dredging the first 3,000 feet (914 meters) of the waterway. The project, estimated at $7.5 million (the Port's share is $4 million), will help make several more of the Port's container berths deep enough to accommodate the next generation of container ships; some of which can carry 6,000 TEUs. This will help create additional jobs on the waterfront and throughout the region. Under terms of the agreement, the channel between Terminals 46, 37, 39, and 25 to the east and 18 to the west will be dredged to a depth of 51 feet (16 meters) in those areas where it does not already reach that depth.[46]

6.4 TACOMA

The Port of Tacoma has six major terminals**:**

- **APM Terminals** operates an 875-acre container terminal with two berths, totaling 2,200 feet (670.6 meters) and a depth of 51 feet (15.5 meters) alongside. The terminal has 5 100-foot gauge cranes, 4,700 container parking stalls, and 875 reefer outlets.[47]
- **Husky Terminal** is a 93-acre container facility with two berths, totaling 2,700 feet (823 meters) with a depth of 51 feet (15.5 meters) alongside. The terminal has four container cranes and 600 reefer plugs.[48]
- **Olympic Container Terminal** is a 54-acre facility with one 1,100 feet (335 meters) berth with a depth of 51 feet (15.5 meters) alongside. The terminal has four cranes and 300 reefer plugs.[49]
- **Pierce County Terminal** is a 141-acre facility with two berths, totaling 2,260 feet (689 meters) with a depth of 51 feet (15.5 meters) alongside. The terminal has seven cranes and 764 reefer plugs.[50]

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[45] Port of Seattle: http://www.portseattle.org/seaport/cargo/terminal46.shtml.

[46] Port of Seattle: http://www.portseattle.org/business/seaport/expansion.shtml#dredge.

[47] Port of Tacoma: http://www.portoftacoma.com/page.aspx?cid=559.

[48] Port of Tacoma: http://www.portoftacoma.com/Page.aspx?cid=560.

[49] Port of Tacoma: http://www.portoftacoma.com/Page.aspx?nid=107.

- **Totem Ocean Trailer Express (TOTE) Terminal** is a 47-acre terminal specializing in RO/RO cargo with two dolphin piers (one is an operating berth and the other is a lay-up berth) with a depth of 50 feet (15.2 meters). The terminal has three (200,000-pound capacity) RO/RO ramps and 140 reefer plugs.[51]
- **Washington United Terminals** is a 102-acre facility with two berths, totaling 2,000 feet with a depth of 51 feet (15.5 meters) alongside. The terminal has six cranes and 390 reefer plugs.[52]

The Port has four on-dock intermodal rail yards. Each is served by the BNSF Railway and UP, with switching and terminal rail service provided by Tacoma Rail, a division of Tacoma Public Utilities. They include the North Intermodal Yard, South Intermodal Yard, Hyundai Intermodal Yard, and Pierce County Intermodal Yard.[53]

Terminal rail services include:

- **APM Terminals** is served by South Intermodal Yard (SIM) located near dock – Yard features include: served by BNSF and UP railroads; 32 acres (12.9 hectares); four ramp tracks totaling 8,645 feet (2,634 meters).[54]
- **Husky Terminal** has on-dock access to the North Intermodal Yard (NIM) – Yard features include: served by BNSF and UP railroads; 26 acres (10.5 hectares); eight ramp tracks totaling 26,750 feet (8,153.4 meters).[55]
- **Olympic Container Terminal** has on-dock access to the North Intermodal Yard (NIM) – Yard features include: served by BNSF and UP railroads; 26 acres (10.5 hectares); eight ramp tracks totaling 26,750 feet (8,153.4 meters).[56]
- **Pierce County Terminal** has on-dock access to PCT Intermodal Yard – Yard features include: served by BNSF railroad; 30 acres (12.1 hectares); 12 ramp tracks totaling 25,200 feet (7,680 meters).[57]

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[50] Port of Tacoma: http://www.portoftacoma.com/Page.aspx?nid=109.

[51] Port of Tacoma: http://www.portoftacoma.com/Page.aspx?nid=111.

[52] Port of Tacoma: http://www.portoftacoma.com/Page.aspx?nid=112.

[53] Port of Tacoma: http://www.portoftacoma.com/Page.aspx?nid=120.

[54] Port of Tacoma: http://www.portoftacoma.com/page.aspx?cid=559.

[55] Port of Tacoma: http://www.portoftacoma.com/Page.aspx?cid=560.

[56] Port of Tacoma: http://www.portoftacoma.com/Page.aspx?nid=107.

[57] Port of Tacoma: http://www.portoftacoma.com/Page.aspx?nid=109.

- **Washington United Terminals** has on-dock access to Hyundai Intermodal Yard (HIM) – Yard features include: served by BNSF and UP railroads; 35 acres (14 hectares); four ramp tracks totaling 17,210 feet (5,245.6 meters).[58]

Expansion plans include:

- **Washington United Terminals Berth Extension** will extend an existing berth by 600 feet to support two new super post-Panamax cranes capable of serving ships up to 24 containers wide.[59]
- **Lincoln Avenue Grade Separation Project** will eliminate conflicts between port trucks and trains on the most important connector between Interstate 5 and the Port. The Project will allow trucks unrestricted access to APM Terminals and will aid in the flow of goods through the Port's South and North Intermodal Yards and APM Terminals.[60]

6.5 PORTLAND

Terminal 6 handles container operations at the Port of Portland. The terminal has three berths served by eight gantry cranes along with other port-owned, cargo-handling equipment. Along with steamships, Terminal 6 also handles container barges that move over 4,000 containers per month to four ports on the Columbia-Snake River system. Combined berth length at the Terminal is 869 meters with a depth of 40 to 43 feet alongside. The Terminal has 620 480v reefer plugs and an annual throughput capacity of approximately 700,000 TEUs.[61]

There is a 52.5-acre intermodal yard with eight tracks (totaling 20,185 feet) at the terminal with an annual capacity of 1,100 trains (840,000 TEUs). Distance from vessel to train is 457 meters (1,500 feet).[62]

Expansion plans include the Columbia River Channel Deepening Project, currently underway, which will deepen the existing 40-foot channel that links the Port of Portland to the Pacific Ocean to 43 feet in order to accommodate the new generation of large deep-draft cargo vessels. Over 25 percent of the 103.5-mile channel has been dredged thus far. However, the project currently is stalled due to environmental and funding issues.[63]

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[58] Port of Tacoma: http://www.portoftacoma.com/Page.aspx?nid=112.

[59] Port of Tacoma: http://www.portoftacoma.com/Page.aspx?cid=4211.

[60] Port of Tacoma: http://www.portoftacoma.com/Page.aspx?nid=362.

[61] Port of Portland: http://www.portofportland.com/pdfpop/T6_Brochure.pdf.

[62] Port of Portland: http://www.portofportland.com/pdfpop/T6_Brochure.pdf.

[63] Port of Portland: http://www.channeldeepening.com/.

6.6 OAKLAND

The Port of Oakland has 10 container terminals:

- **Ports America Terminal**
  - Berths 20 to 22. It contains three berths, totaling 674.2 meters in length with 12.8-meter depth at all berths. Covered storage area totals 10,408 square meters. Total terminal area (excluding berth area) is 23.8 hectares. The terminal operates four A-frame cranes and has 357 480v reefer outlets.[64]
  - Berth 23. It contains one 289.9-meter berth with a depth of 12.8 meters alongside. The terminal (excluding berth area) is 19.0 hectares. It has two modified A-frame cranes and 240 480v reefer outlets. There is no covered storage at this terminal.[65]
  - Berth 24. It contains one 393.2-meter berth with a depth of 12.8 meters alongside. The terminal (excluding berth area) is 21.1 hectares. It has three modified A-frame cranes and 261 480v reefer outlets. There is no covered storage at this terminal.[66]
- **Transbay Container Terminal** (Berths 25 and 26). It includes a total berth length of 320.1 meters with a depth of 12.8 meters alongside. The terminal's area is 20.0 hectares. It has two modified A-frame cranes and 308 480v reefer outlets.[67]
- **Trapac Terminal** (Berth 30). The terminal has one 327.7-meter berth with a depth of 12.8 meters alongside. The terminal has an area of 13.4 hectares, two modified A-frame articulated boom cranes, one modified A-frame crane, and 282 480v reefer outlets.[68]
- **Outer Harbor Terminal** (Berths 32 and 33). The terminal has two in-line berths totaling 468 meters along with two dolphins and 11.3 meters of depth alongside. Covered storage area totals 3,699 square meters. The terminal is 26.4 hectares, and has a storage capacity of 5,500 TEUs (one-high). The terminal also has 74 240v reefer outlets and three A-frame cranes.[69]

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[64] Port of Oakland: http://www.portofoakland.com/maritime/terminal_berth20-22.asp.

[65] Port of Oakland: http://www.portofoakland.com/maritime/terminal_berth23.asp.

[66] Port of Oakland: http://www.portofoakland.com/maritime/terminal_berth24.asp.

[67] Port of Oakland: http://www.portofoakland.com/maritime/terminal_berth25-26.asp.

[68] Port of Oakland: http://www.portofoakland.com/maritime/terminal_berth30.asp.

[69] Port of Oakland: http://www.portofoakland.com/maritime/terminal_berth32-34.asp.

- **Ben E. Nutter Marine Container Terminal** (Berths 35, 37, and 38). It contains a total berth space of 931 meters and one dolphin. Depth alongside berths is 12.8 meters at Berths 35 and 37 and 11.3 meters at Berth 38. The terminal totals 23.5 hectares and contains 310 480v reefer outlets, along with three low-profile cranes and one modified A-frame articulated boom crane.[70]
- **Hanjin Terminal** (Berths 55 and 56). The terminal has two in-line berths totaling 731.5 meters with 15.2 meters of depth alongside. The terminal is 48.6 hectares and includes 332 480v reefer outlets and four modified A-frame cranes.[71]
- **Oakland International Container Terminal** (Berths 57 to 59). The three in-line berths total 1,097.3 meters with a depth of 15.2 meters alongside. The terminal is 59.4 hectares, and contains six modified A-frame cranes and 898 480v reefer outlets.[72]
- **APL Terminal** (Berths 60 to 63). The four in-line berths total 836 meters with a depth of 12.8 meters alongside. The terminal is 32.1 hectares and has four modified A-frame articulated boom cranes and 454 480v reefer outlets.[73]
- **Charles P. Howard Terminal** (Berths 67 and 68). The two in-line berths total 593.1 meters and the terminal includes a 21.3-meter dolphin. Depth at berth is 12.8 meters. The terminal totals 20.4 hectares (excluding berth area) and contains three modified A-frame articulated boom cranes, one low-profile crane, and 234 480v reefer outlets.[74]
- **Ninth Avenue Terminal** (Berths 82 to 84).

Rail services at the Port of Oakland are summarized below.

- Oakland International Gateway (BNSF) terminal has 41 double-stack car spots, 1,245 parking slots, 8 truck gates, and an annual lift capacity of 300,000 lifts.[75]

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[70] Port of Oakland: http://www.portofoakland.com/maritime/terminal_berth35-38.asp.

[71] Port of Oakland: http://www.portofoakland.com/maritime/terminal_berth55-56.asp.

[72] Port of Oakland: http://www.portofoakland.com/maritime/terminal_berth57-59.asp.

[73] Port of Oakland: http://www.portofoakland.com/maritime/terminal_berth60-63.asp.

[74] Port of Oakland: http://www.portofoakland.com/maritime/terminal_berth67-68.asp.

[75] Port of Oakland: http://www.portofoakland.com/maritime/terminal_rail1.asp.

- Railport-Oakland (UPRR) terminal has 2,800 parking slots, 70 double-stack car spots, and an annual lift capacity of 450,000 lifts.[76]
- Rail access is available at Trapac Terminal, Outer Harbor Terminal, Oakland International Container Terminal, and Charles P. Howard Terminal.[77]

There are several capacity enhancement projects currently planned at the Port of Oakland that collectively are called the "Oakland Global Trade and Industry Center."

Marine Terminal Redevelopment

The Port of Oakland recently entered into a 50-year concession and lease agreement with Ports America Outer Harbor Terminals, LLC. Ports America plans to invest in marine terminal facility improvements. These include new entry and exit gates and substantial upgrades to container handling systems to expand capacity for increasing intermodal cargo volumes.

Intermodal Rail Terminal

The proposed Outer Harbor Intermodal Terminal (OHIT) project will provide two rail yards; each with 6 4,000-foot-long loading tracks and wide-span electric powered rail-mounted cranes for container handling over each track group. OHIT will also provide 12 4,000-foot-long storage tracks and container buffer areas with container stack capacity of 18,000 TEUs, lead tracks near West Grand Avenue and tail tracks extending south of 7th Street, truck gates at two locations along Maritime Street, and an Administrative/Operations building, parking and maintenance buildings. The project will allow the railroads to load and unload containers more efficiently, and will help to address the port-wide intermodal throughput goal. It will also reduce congestion on mainline tracks adjacent to the Port.[78]

7th Street Grade Separation

The proposed project will allow for the expansion of UP and BNSF rail yards, and will maximize the benefit of the OHIT. Without the 7th Street grade separation, the benefits of the OHIT would be offset by a new bottleneck in the

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[76] Port of Oakland: http://www.portofoakland.com/maritime/terminal_rail2.asp.

[77] Port of Oakland: http://www.portofoakland.com/maritime/terminal_berth30.asp; http://www.portofoakland.com/maritime/terminal_berth32-34.asp; http://www.portofoakland.com/maritime/terminal_berth57-59.asp; and http://www.portofoakland.com/maritime/terminal_berth67-68.asp.

[78] Port of Oakland: http://www.portofoakland.com/pdf/tcif_03.pdf.

form of long, slow train movements conflicting with at-grade truck traffic running through and bifurcating the Port complex.[79]

Trade and Logistics Facilities

The project proposes to incorporate more than 100 acres of the former Oakland Army Base adjacent to marine terminals to create new industrial space for goods movement companies to process their cargo. It will also attract other industrial uses that may benefit from being close to a thriving Port, such as manufacturing, assembly, or research and development facilities.

In addition, the Port of Oakland proposes to improve Martinez Subdivision rail line between the Port of Oakland at Milepost 2.75 to Milepost 9.35 in Richmond. The project will increase rail capacity through the addition of two mainline tracks, crossovers, and signaling. Over 66 trains (Amtrak, BNSF, UPRR) use this corridor's two mainline tracks per day, and current congestion and delays can be severe. This project is expected to nearly double capacity on the Martinez Subdivision, and will accommodate the additional 22 UP and BNSF trains anticipated by 2020.[80]

6.7 LOS ANGELES

The Port of Los Angeles has eight container terminals (one unleased), with four on-dock rail yards.[81] The Port also has several dry bulk, liquid bulk, break bulk, and roll-on/off terminals, but only the container terminals are summarized here.

Berth 100: (Operator: West Basin Container Terminal LLC)

- Land area: 75 acres;
- Total berth length: 1,200 feet;
- Berths: One;
- Height: 15 feet;
- Water depth: 45 to 53 feet;
- Cranes: Four super post-Panamax cranes; and
- Terminal features: Three transtainers, tophandlers, sidehandlers, forklifts, UTRs, bombcarts, and on-dock rail facility.

China Shipping, the primary user of Berth 100, is in the midst of a six-year expansion project at the Port of Los Angeles. Upon completion, container

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[79] Port of Oakland: http://www.portofoakland.com/pdf/tcif_01.pdf.

[80] Port of Oakland: http://www.portofoakland.com/pdf/tcif_02.pdf.

[81] Port of L.A.: http://www.portofla.org/facilities/container.asp.

terminal capacity will increase to accommodate an annual throughput of 1.5 million TEUs. The facility will expand to 142 acres of backland and 2,500 feet of wharves served by 10 post-Panamax cranes.

A series of environmental projects are included in the expansion project, including:

- The use of Alternative Maritime Power™ (AMP™) by all cargo ships calling at the terminal by 2011. AMP™ eliminates the release of roughly a ton of ship emissions every 24 hours a ship is at berth. China Shipping was the first container terminal in the world to use AMP™ when it opened the West Basin Container Terminal at Berth 100 in 2004. AMP™ is a one-of-a-kind air quality program that focuses on reducing emissions from vessels docked at the Port of Los Angeles. Instead of running on diesel power while at berth, AMP™-equipped ships "plug in" to shore side electrical power – literally an alternative power source for oceangoing vessels.
- Use of low-sulfur fuel on container ships within 40 nautical miles of the Port.
- One-hundred percent compliance with the Port's Vessel Speed Reduction Program (VSRP) for ships transiting within 40 nautical miles of the Port.
- Use of alternative-fueled tractors.
- Use of electric rubber-tired gantry cranes.
- Diesel particulate filters for use on lower-emission switcher locomotives.
- A main terminal building constructed to "Gold" certification-level Leadership in Energy and Environmental Design (LEED).

The China Shipping project also includes several community beautification initiatives, including the development of a new community park in San Pedro (Plaza Park), implementing a Beautification Plan along area corridors and extensive landscaping along Front Street, which runs parallel to the terminal perimeter.[82]

Berth 121 to 131: (Operator: West Basin Container Terminal LLC)

- Land area: 186 acres;
- Total berth length: 3,500 feet;
- Berths: Four;
- Height: 15 feet;
- Water depth: 35 to 45 feet;
- Cranes: Five post-Panamax cranes; three Panamax cranes; and
- Terminal features: 13 transtainers, tophandlers, sidehandlers, forklifts, UTRs, bombcarts, and on-dock rail facility.

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[82] http://www.portoflosangeles.org/newsroom/2009_releases/news_120109_chinashipping.asp.

Berths 135 to 139: (Operator: Trans Pacific Container Service Corporation (TraPac)

- Land area: 173 acres;
- Total berth length: 4,050 feet;
- Berths: Five;
- Height: 15.0 to 15.7 feet; and
- Water depth: 35 to 53 feet.
- Cranes: 11 post-Panamax cranes with 100-foot gauge and 40-long-ton main hoist capacity.
- Terminal features: 28,000-square-foot maintenance shop; 546 reefer plugs (wheels); 48 grounded plugs; three portable generators that maintain an additional 96 plugs; wash system for the exterior of containers; wash system for the interior of containers; 10 transtainers; 12 side-handlers; and four top lifts.

In August of 2009, the Port of Los Angeles approved a long-term lease with TraPac that allows for a major expansion of the terminal. The five-year, $245 million expansion project will deepen the waterside at Berths 144 to 147, upgrade approximately 50 additional acres of existing land to modern container handling backland standards, and construct a new on-dock rail facility. Surface road improvements and a new main gate configuration will also improve traffic flow into and out of the terminal facilities, and an energy-efficient administration building will be constructed to meet LEED "Gold" standards. The project also involves several environmental mitigations, including emission reduction strategies and creation of a one-mile, open-space Buffer area between the TraPac terminal and the Wilmington community.

Berths 206 to 209: (Operator: Not Yet Leased)

- Land area: 86 acres;
- Total berth length: 2,180 feet;
- Berths: One to two;
- Height: 15.5 feet;
- Water depth: 40 to 45 feet;
- Cranes: Three 50-foot-gauge cranes, and one 34-foot-gauge crane; and
- Terminal features: Container freight station.

Berths 212 to 225: (Operator: Yusen Terminals, Inc.)

- Land area: 185 acres;
- Total berth length: 5,800 feet;
- Berths: Five;
- Height: 15 feet;

- Water depth: 35 to 45 feet;
- Cranes: Four super post-Panamax cranes with 100-foot-gauge and 60-long-ton main hoist capacity, four post-Panamax cranes with 100-foot-gauge and 40-long-ton capacity, two Panamax cranes with 50-foot-gauge and 40-long-ton capacity; and
- Terminal features: 21,937-square-foot administration/in-gate building; 23,386-square-foot maintenance and repair building with 10 bays; 4,798-square-foot marine building; 1,200 wheeled slots (including 500 reefer plugs); 16 entry lanes with six scales; seven exit lanes; and near-dock rail facility.

Berths 226 to 236: (Operator: Seaside Transportation Services, LLC)

- Land area: 205 acres;
- Total berth length: 4,700 feet;
- Berths: Three;
- Height: 13.8 to 15 feet;
- Water depth: 38 to 45 feet;
- Cranes: Eight post-Panamax-plus cranes with 100 feet gauge and 50-long-ton main hoist capacity; and
- Terminal features: Maintenance and repair facility, refrigerated container wash rack, transtainers, top/side handlers, and on-dock rail facility.

Berths 302 to 305: (Operator: Eagle Marine)

- Land area: 292 acres;
- Total berth length: 4,000 feet;
- Berths: Four;
- Height: 15 feet;
- Water depth: 50 feet;
- Cranes: 12 super post-Panamax 100-foot-gauge cranes; and
- Terminal features: 55,00-square-foot maintenance and repair facility; on-dock rail service accommodates up to 64 five-platform double-stack railcars (equivalent to nearly three full trains); two dedicated lead rail tracks provide flexible entrance/exit points off the main rail line within the Alameda Corridor; gate complex includes intermodal control tower; 13 inbound and 12 outbound lanes; integrated, real-time computer system for vessel, rail, and gate operations; 600 refrigerated container plugs; and wash system for interior/exterior of containers.

Berths 401 to 406: (Operator: APM Terminals)

- Land area: 484 acres;
- Total berth length: 7,190 feet;
- Berths: Six;
- Height: 15.2 feet;
- Water depth: 55 feet;
- Cranes: 14 super post-Panamax 100-foot-gauge cranes; and
- Terminal features: Administration building; vessel operations building; rail operations building; maintenance and repair facility/purpose dock; on-dock service is designed for 12 loading tracks, each approximately 2,500 feet and capable of handling eight 305-foot double-stack railcars for a total capacity of 96 railcars; six adjacent storage tracks, each 6,400 feet and capable of handling 21 305-foot double-stack railcars, for a total capacity of 126 railcars; transportation corridor for rail and highway traffic; three advanced gate complexes with 36 inbound lanes and 20 outbound lanes; and 1,800 refrigerated container plugs.

6.8 LONG BEACH

The Port of Long Beach has seven container terminals, five of which have on-dock rail yards.[83] The Port also has several dry bulk, liquid bulk, break bulk, and roll-on/off terminals, but only the container terminals are summarized here. A new container terminal on Pier S is under consideration.

[83] Port of Long Beach: http://www.polb.com/economics/cargotenant/containerized/default.asp.

Pier E Berths E24-E26

Total Terminal Area	95 ac.	38.4 ha.
Length of Berths	2,100 ft.	640 m
Wharf Height	17-17.7 ft.	5.2-5.4 m
Gantry Cranes	5	
Clear Lift/Above Water	113-137 ft.	34.4-41.76 m
Boom Outreach	122-141 ft.	37.2-42.98 m
Backreach	50 ft.	15.2 m
Open Storage Area	57.9 ac.	23.4 ha.
Design Depth of Water	48 ft.	14.6 m
Special Equipment & Facilities	Grounded and chassis operation. Two RO/RO ramps, one stern ramp. 50 foot gauge container cranes, transtainers, top handlers, side handlers. Storage space for 14,400 TEU grounded containers. 2,500 FEU chassis slots, 400 reefer outlets. 11 lane main-gate and 6 scales. Rail spurs.	

Pier F Berths F6-F10 (Operator: Long Beach Container Terminal, Inc.)

Total Terminal Area	102 ac.	41.3 ha.
Length of Berths	2,750 ft.	838 m
Wharf Height	14.4 ft.	4.4 m
Gantry Cranes	7	
Clear Lift/Above Water	124 ft.	37.8 m
Boom Outreach	156 ft.	47.6 m
Backreach	50 ft.	15.2 m
Open Storage Area	73.8 ac.	29.9 ha.
Design Depth of Water	50 ft.	15.2 m
Special Equipment & Facilities	Grounded and chassis operation. 100 foot gauge container cranes of 40-long-ton capacity; 45 tons without spreader. Two transtainers, four high stacking. 10,000 TEU ground capacity, including 240 reefer outlets. 3,600 FEU chassis slots, 504 FEU chassis stacked vertically. On dock rail transfer facility.	

On April 13, 2009, the Port of Long Beach approved a $750 million plan to consolidate common operations and wharves of Piers E and F into one terminal (the Middle Harbor Project). The project would rehabilitate and modernize container terminal facilities, including replacement of obsolete and deteriorated wharf structures with adequate, well-equipped wharf areas, along with channels and berths of sufficient width, length, and depth to allow access to the docks by existing and future cargo vessels; and provide for replacement of obsolete gantry cranes with new generation cranes that are able to reach across the new, larger vessels. The project will link new and improved dock and wharf operations to planned and existing on-dock intermodal railyard facilities and separate on-dock intermodal terminal lead track operations (i.e., loading/unloading and switching) from mainline track operations.[84]

Pier T Berths T132 to T140 (Operator: Total Terminals International)

Total Terminal Area	385 ac.	155.8 ha.
Length of Berths	5,000 ft.	1,524 m
Wharf Height	14.7 ft.	4.5 m
Gantry Cranes	14	
Clear Lift/Above Water	151 ft.	46 m
Boom Outreach	205 ft.	62.5 m
Backreach	75 ft.	22.9 m
Open Storage Area	267 ac.	108.1 ha.
Design Depth of Water	55 ft.	16.8 m
Special Equipment & Facilities	100 foot gauge container gantry cranes, 1,850 reefer outlets including 200 dual 240/480-volt units, on-dock rail with the capacity for four trains.	

[84] Port of Long Beach: http://www.polb.com/civica/filebank/blobdload.asp?BlobID=6227.

Pier G Berths G226 to G236 (Operator: International Transportation Service, Inc.)

Total Terminal Area	246 ac.	99.6 ha.
Length of Berths	6379 ft.	1,945 m
Wharf Height	15 ft.	4.6 m
Gantry Cranes	17	
Clear Lift/Above Water	106-137 ft.	32.3-41.8 m
Boom Outreach	117-169 ft.	35.7-51.5 m
Backreach	35-75 ft.	10.7-22.9 m
Open Storage Area	86.4 ac.	35 ha.
Design Depth of Water	36-42 ft.	11-12.8m
Special Equipment & Facilities	Grounded and chassis operation. 50 & 100 foot gauge container cranes. Eleven 40-long-ton and seven 30-long-ton capacity transtainers. Space for storing 12,800 TEU containers on ground, including 384 reefer outlets. Wheeled: 307 20-foot units and 1,500 40-foot units. 4,000 TEU chassis slots. Container freight station with 70,000 square feet (6,505 m2). On dock rail transfer facility.	

Pier J Berths J243-J247, J266-J270 (Operator: Pacific Maritime Services)

Total Terminal Area	256 ac.	103.6 ha.
Length of Berths	5,900 ft.	1,799 m
Wharf Height	14.6 ft.	4.5m
Gantry Cranes	15	
Clear Lift/Above Water	108-154 ft.	32.9-46.9 m
Boom Outreach	118-223 ft.	36-68 m
Backreach	75 ft.	22.9 m
Open Storage Area	192.4 ac.	77.8 ha.
Design Depth of Water	42-50 ft.	12.8-15.2 m
Special Equipment & Facilities	Grounded and chassis operation. 100 foot gauge container cranes. Eight 40-ton transtainers. Space for storing 3001 wheeled imports, 6088 TEU of empty containers storage. 6228 TEUs ground import storage. Complete reefer container service. Container and chassis repair, with 685 wheeled reefer outlets. On dock rail container transfer facility.	

Pier A Berths A88-A96 (Operator: SSAT Long Beach LLC)

Total Terminal Area	200 ac.	80.9 ha.
Length of Berths	3,600 ft.	1,097 m
Wharf Height	14.2 ft.	4.3 m
Gantry Cranes	10	
Clear Lift/Above Water	146 ft.	44.5 m
Boom Outreach	179 ft.	56.6 m
Backreach	50 ft.	15.2 m
Open Storage Area	90 ac.	36.4 ha.
Design Depth of Water	50 ft.	15.2 m
Special Equipment & Facilities	On-dock railyard capable of simultaneously working two 8,000-foot-long stack trains. 100 foot gauge container cranes. Main gate with 16 entry/exit lanes and a secondary gate with 13 entry/exit lanes. 652 terminal reefer outlets. Storage for 24,000 TEUs.	

Pier C Berths C60-C62 (Operator: SSA Terminals)

Total Terminal Area	70 ac.	28.3 ha.
Length of Berths	1,800 ft.	549 m
Wharf Height	14.5 ft.	4.4 m
Gantry Cranes	3	
Clear Lift/Above Water	145 ft.	44.2 m
Boom Outreach	176 ft.	53.6 m
Backreach	50 ft.	15.2 m
Open Storage Area	56.9 ac.	23.2 ha.
Design Depth of Water	42 ft.	12.8 m
Special Equipment & Facilities	100 foot gauge container cranes, 50 tons with cargo beam. 4,000 TEU grounded capacity, 1,384 40-ft. chassis slots, 2,014 FEU stacked and 114 spaces for reefer boxes. Additional 17.2 acres as off-dock container yard.	

6.9 SAN DIEGO

The Port of San Diego has two major terminals:

- Tenth Avenue Terminal handles primarily break bulk, bulk, and reefer cargo. It has eight berths with a combined berth length of 4,620 feet. Depth alongside Berths 1 and 2 is 9.5 meters; depth alongside Berths 3 to 6 is 1.7 to 10.9 meters. The terminal also has two transit sheds with a total area of 36,002 square meters.[85]
- National City Terminal handles vehicles, lumber, and major project cargo; and has container handling capability of eight berths (5,965 feet). Six ladder rail tracks on terminal. Depth at berth is 10.6 meters for seven of the berths, and 6.1 meters for the other berth. There is one transit shed at the terminal with an area of 3,756 square meters.[86]

BNSF provides rail service to the Port of San Diego.

[85] Port of San Diego, Maritime Business Plan (2008), http://www.portofsandiego.org/component/docman/doc_details/532-maritime-business-plan-dec-2008.html.

[86] Port of San Diego, Maritime Business Plan (2008), http://www.portofsandiego.org/component/docman/doc_details/532-maritime-business-plan-dec-2008.html.

Expansion plans at the port include:

- The Dole Container storage space will be increased to 2,000 TEUs during the first phase of the project, increasing annual capacity to 140,000 TEUs. The second phase of the project will increase storage space to 2,600 TEUs to meet projected 2030 cargo levels.[87]
- A new 20-acre containerized banana terminal is planned with a single berth (32-foot depth) and a 100,000 square feet cold storage facility. TEU forecasts are 116,126 in 2010, climbing to 209,755 by 2030.[88]
- The Port is also planning to construct a new 30 to 40-acre single-berth (45-foot depth) container terminal for refrigerated cargo and lumber.[89]

6.10 PUNTA COLONET

Punta Colonet is 80 miles south of Ensenada and about 100 miles south of the U.S. border. The Mexican government is interested in granting a concession to develop Punta Colonet as a deep water port, with a new rail connection to the U.S.

Options for connecting to the U.S. rail system are:

- BNSF at San Diego (the shortest route);
- UP at Yuma, Arizona; and
- BNSF and UP in El Paso, Texas, via a new line operated by Ferromex, Mexico's second-largest railroad.

The cost of connecting Punta Colonet to the U.S. distribution network would be significant, and depending on the route chosen would require trains to negotiate steep grades.

In October 2008, Mexico's Secretariat of Communications and Transportation (SCT) announced a new schedule of activities for the bidding process. In early 2009, it announced that the project would be postponed, partly because the recession has slowed the demand for cargo. But the port project is also affected by permits the United States must give to Mexico to open its borders to rail, and these may take at least eight years to be granted, according to the SCT.

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[87] Port of San Diego, Maritime Business Plan (2008), http://www.portofsandiego.org/component/docman/doc_details/532-maritime-business-plan-dec-2008.html.

[88] Port of San Diego, Maritime Business Plan (2008), http://www.portofsandiego.org/component/docman/doc_details/532-maritime-business-plan-dec-2008.html.

[89] Port of San Diego, Maritime Business Plan (2008), http://www.portofsandiego.org/component/docman/doc_details/532-maritime-business-plan-dec-2008.html.

Therefore, the SCT announced that it currently is working with companies, port operators, and large users of this Port to jointly redesign the bid that will make the project viable. The agency said the redesign does not mean a reduction in the amount of investment for the Port, which amounts to about U.S. $5 billion, since instead of one large project there will be several small ones.[90]

6.11 MANZANILLO

The Port of Manzanillo is host to 14 operating firms, which contribute 100 percent private, national, and foreign capital investment that is used to handle all types of cargo and provide world-class performance; all while maintaining a privileged position to compete against other ports on the Mexican Pacific.

Highlights of the port include:

- The minerals facilities, primarily gypsum, which have a storage capacity of 60,000 tons of cargo and a vessel performance of 2,000 tons per hour.
- Freezing chambers in the fishery terminal with storage capacity of 3,500 tons of seafood products.
- The Specialized Terminal for Container handling (TEC), with an operating capacity for up to three simultaneous ships, and yields of up to 120 boxes per hour-ship.
- A new bulk facility with three storage silos that can stock up to 7,000 tons each.
- The Comercializadra La Junta, a bulk-handling facility with a discharge capacity of up to 1,000 tons per hour and storage for 50,000 tons.
- Two multipurpose facilities for handling general and containerized cargo. A facility for the specialized handling of bulk liquid products, such as palm oil and fish oil, with storage capacity of 13,900 cubic meters.
- A refrigerated terminal to store perishable products with a capacity of 3,000 tons.
- A storehouse for handling bulk cement with capacity of 25,000 tons operated by APASCO.
- Two warehouses operated by CEMEX, one to handle 50,000 tons of clinker and the second to handle 16,000 tons of bulk cement.
- The Port has a static capacity of 49,069 TEUs, and a dynamic capacity of 2,132,667 TEUs.

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[90] Banderas News, January 19, 2010. http://banderasnews.com/1001/nz-puntacolonet.htm.

6.12 LAZARO CARDENAS

The Port of Lazaro Cardenas can handle ships with capacities of up to 12,500 TEUs. The access channel has a depth of 18.0 meters, and the turning basin depth is 16.5 meters. [91]

The Middle Island Container Terminal has one ship berth with a quay length of 286 meters and a depth of 14 meters alongside. Ships are worked by two ship-to-shore gantry cranes with lifting capacity of 45 tons under the hook. The terminal covers 15.4 hectares and has an operational capacity of about 180,000 TEUs per year.[92]

Cayacal Island Container Terminal was completed in 2007, covers an area of 48 hectares, and has two ship berths. There is a total quay length of 600 meters with a 16-meter depth alongside. There are 4 cranes with a lifting capacity of 63 tons under the hook. The terminal has a total operating capacity of 2 million TEUs per year.[93]

Kansas City Southern of Mexico provides rail service to the Port. Daily intermodal rail service is provided to Laredo (944 miles, 63 hours), San Luis Potosi (481 miles, 30 hours), Salinas Victoria (799 miles, 52.5 hours), Pantaco (540 miles, 33 hours), and Veracruz (816 miles, 74 hours). Kansas City Southern, which acquired the former TFM, has been able to invest incrementally in building up line capacity and improving service.[94]

Expansion plans for Lazaro Cardenas includes a new 125-hectare container terminal. It will be built next to the Cayacal Island Container Terminal, and will have 1,425 meters of quay with a depth alongside of 16.5 meters. The terminal is expected to be complete in late 2010 or in 2011.[95]

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[91] Lazaro Cardenas Port Handbook, 2009-2010, http://www.lazarocardenasport.com.mx/api/.

[92] Lazaro Cardenas Port Handbook, 2009-2010, http://www.lazarocardenasport.com.mx/api/.

[93] Lazaro Cardenas Port Handbook, 2009-2010, http://www.lazarocardenasport.com.mx/api/.

[94] Lazaro Cardenas Port Handbook, 2009-2010, http://www.lazarocardenasport.com.mx/api/.

[95] Lazaro Cardenas Port Handbook, 2009-2010, http://www.lazarocardenasport.com.mx/api/.

7 West Coast Port Strategies to Reduce Greenhouse Gases and Air Pollution

Ports are major hubs of the freight system. At these facilities, numerous mobile and stationary emissions sources result in the emission of significant pollutants that can harm air quality and threaten the health of residents in nearby communities. Additionally, much of the supporting drayage equipment at ports tends to be older, which means that they are less efficient and more polluting.

West Coast ports, as well as other ports around the country and world, have taken a number of concrete steps in an attempt to reduce the impact of port emissions on nearby communities and on the environment in general. The majority of the West Coast ports are located in populated urban centers, which demand cleaner air for health and quality-of-life reasons, among others. In this section, we will discuss several of the major emissions reduction strategies implemented by West Coast ports as well as ports around the world.

7.1 PORT EMISSIONS REDUCTION STRATEGIES

A large variety of methods exist that can help reduce emissions at ports. This section will focus on several of the major ones that currently are in place. These strategies vary from operations improvements at ports to improved/technologies.

- **Marine vessel speed reduction.** This strategy involves the reduction of ship speeds upon entering a certain area. Slower ship speeds demand less power from the vessel's engine, which lowers fuel consumption and therefore reduces emissions. Several programs, including the speed reduction program at the San Pedro Bay Ports, are voluntary. Incentives can be offered to reduce speeds.
- **Shore power (also known as "cold ironing").** Large, idling container ships emit substantial amounts of harmful emissions into the air around ports while docked. It is standard practice for vessels to switch to their auxiliary engines (cleaner than main engines, but still cause emissions). Shore power would allow the vessel to plug into the electric grid, which would eliminate the use of engines altogether. This would lower greenhouse gas (GHG) emissions around ports.
- **Longer gate hours at ports.** Keeping port gate hours open for longer may encourage some trucks to pick up shipments during off-peak hours,

especially if incentivized to do so. A more even distribution of truck trips to a port will result in less peak-hour truck trips, which reduces congestion and idling at the port gates; this reduces emissions.

- **Clean cargo handling equipment.** Replacing diesel-fueled cargo handling equipment at ports (including drayage trucks, cranes) with electric or alternative fuels is another way to reduce emissions at ports.
- **RFID or GPS tags on trucks in the Port.** Some marine terminals require incoming trucks to have electronic tags that allow a central operator to monitor the location of the truck. This improves operations and efficiency at the port (which in turn reduces emissions) because 1) operators are able to efficiently direct trucks to their pick-up locations at major ports; and 2) upon entry, trucks only need to be scanned at entry (less paper to check at the checkpoint). Both of these benefits should reduce needless driving and idling.
- **Appointment systems for truck visits.** Ports that have appointment systems can control the number of trucks that appear at the Port at certain times of day. Ports with these systems require trucks to call in advance to get a time slot assigned. This prevents crowding at the Port during certain peak-periods, which reduces congestion and idling. A reduction in congestion and idling results in lower emissions around the Port.
- **Virtual Container Yard (VCY).** VCY's allow ocean carriers to connect with motor carriers in order to reduce costs for both. Basically, both parties can access a public web site where they can share information. For example, a truck may move goods from the Port of Los Angeles to Bakersfield. After that is complete, the trucker can post that he has an empty backhaul back to the port. Parties in need of shipment to the Port can get in touch with the trucker to in advance to pick up a shipment to bring to the port. This reduces empty truck trips, which reduces unnecessary traffic at the port – reducing emissions.
- **Clean truck mandates.** Some states and ports require that trucks entering ports meet certain emissions criteria – this is usually based on the production year of the truck. For example, the Port of Oakland has banned all pre-1993 trucks as of January 1, 2010. Often, grants and financing are provided to help carriers upgrade their fleets or to buy upgrade kits.
- **Fee reduction for cleaner ships.** Some ports have reduced fees for vessels that have reduced their emissions, thus incentivizing the use of more emissions-friendly ships.

Other strategies exist to reduce emissions at ports. However, those above provide a good overview of some commonly used strategies. Next, we discuss the strategies employed at the West Coast ports.

7.2 WEST COAST PORT EMISSIONS REDUCTION STRATEGIES

In this section, we highlight major environmental strategies at each of the ports. The focus will be less on action plans than it will be on concrete actions that have been taken up to this point to reduce GHGs. Future strategies for ports will be discussed briefly (if applicable).

Before diving into strategies of individual ports, it is important to mention the regional collaborations that ports have engaged in to tackle environmental and air quality issues. This includes:

- **West Coast Collaborative –** Several of the ports along the West Coast (including Vancouver and the California Association of Port Authorities) are a part of this collaborative, which is a public-private group committed to reducing diesel emissions on the West Coast. The Collaborative is focused on creating, supporting, and implementing diesel emissions reductions projects.[96]
- **Northwest Ports Clean Air Strategy –** This is a collaborative strategy between the three major ports in the Puget Sound Region: Ports of Vancouver, Seattle, and Tacoma. The goal of the strategy is "to reduce maritime and port-related emissions that affect air quality and climate change in the Pacific Northwest via a collaborative approach led by (the three ports). The purpose of this Strategy is to reduce diesel and greenhouse gas emissions in the region by achieving early reductions in advance of, and complementary to, applicable regulations."[97] Short-term efforts to reduce diesel and GHG emissions in the region focus on:
  - Switching to use of electricity and cleaner fuels and increasing fuel efficiency;
  - Retrofitting existing engines;
  - Ensuring best available engine technologies for new equipment purchased in this timeframe;
  - Initiating demonstration projects to evaluate promising emissions reduction technologies; and
  - Continued operational efficiency improvements during port development.
- **San Pedro Bay Ports Clean Air Action Plan (CAAP) –** The CAAP, which is planned to be updated in 2010, is a collaborative effort between the Ports of Los Angeles and Long Beach to "improve quality in the South Coast Air

[96] West Coast Collaborative: http://westcoastcollaborative.org/index.htm.

[97] Port of Seattle: http://www.portseattle.org/downloads/community/environment/NWCleanAirStrat_200712.pdf.

Basin. The CAAP is a sweeping plan aimed at significantly reducing the health risks posed by air pollution from port-related ships, trains, trucks, terminal equipment, and harbor craft."

Ports involved in the above regional collaborative efforts, especially the latter two, base many of their emissions reduction strategies on the actions suggested in these strategies and plans. Next, we discuss actions taken by individual ports to combat emissions.

7.3 PRINCE RUPERT

Many of the strategies discussed in the previous section do not apply to Prince Rupert, as the majority of the traffic moving through this port (around 98 percent) is pure marine/intermodal. There is relatively little truck movement. This, in itself, is a strategy to reduce GHG emissions. In addition, the marine terminal was built with the option of exploring shore power down the line.[98] However, no other concrete strategies to reduce emissions were reported on the Port web site.[99]

7.4 VANCOUVER

The Port of Vancouver is located within a dense urban area. An advantage of this is that goods moving to Vancouver are close to market and require little further transport into the city. A major disadvantage of locating ports in urban areas is the direct impact on air quality and health that concentrated port emissions have on residents. As a result, Vancouver has developed several strategies to lower emissions, including involvement in the Northwest Ports Clean Air Strategy. At this point, this includes:[100]

- **Technology and Fuels:**
  - The port has gotten commitments from several shipping lines to use cleaner fuels, both in the port area and out at sea.
  - Implemented the "Vessel Opacity Program," which addresses visible emissions. The program includes education of vessel operators regarding excessive opacity levels, and follow-up with specific vessels as required.
  - Installed air quality monitoring facilities near the Port to ensure good air quality and to monitor air quality.

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[98] Prince Rupert Port Authority with 3PLWIRE, http://www.3plwire.com/2009/03/05/prince-rupert-port-authority-an-interview-with-shaun-stevenson/.

[99] Port of Prince Rupert: http://www.rupertport.com/.

[100] Port Metro Vancouver: http://www.portmetrovancouver.com//.aspx.

- Biodiesel is being used for equipment at several container terminals.
- All ship-to-shore cranes are electrically powered – no diesel cranes exist at the Port. Upon lowering containers, the cranes generate energy sent back to the electricity grid.
- RFID system was introduced to improve the flow of goods through the terminal and to reduce unnecessary trips.
- Introduced mandatory appointment (reservation) systems to better manage truck traffic.
- Port introduced stringent environmental requirements to phase out older, more polluting trucks.
- Locomotives have technology that shuts down the engine when idling.

- **Operations and Pricing:**
  - Implemented the "Ports Differentiated Harbour Dues Program" in April 2007, which reduces fees for vessels that reduce emissions.
  - Several terminal equipment anti-idling initiatives. One group has an active anti-idling program, and the port has received a commitment from the International Longshore and Warehouse Union (ILWU) to reduce unnecessary idling of terminal equipment.
  - The Port introduced a container truck licensing system to improve efficiencies of trucks accessing ports.
  - Implemented extended gate hours to reduce congestion, idling and emissions.
  - Truck idle reduction education was rolled out in 2006 and 2007.

The Port of Vancouver has implemented many of the technologies and operational changes listed at the beginning of this section, making it one of the more active ports along the West Coast concerning efforts to reduce emissions.

7.5 SEATTLE

The Port of Seattle is a participant in the Northwest Ports Clean Air Strategy. A major marketing strategy for the Port of Seattle and Port of Tacoma is the term "Green Gateway." A study[101] found that shipping goods from ports as far south in Asia as Singapore through Seattle/Tacoma and then by rail to a large swath of the country is less polluting than:

[101] 2009 Study by Herbert Engineering, Inc.

- Shipping into other West Coast ports and then moving by rail to the rest of the nation; and
- Shipping through the Panama Canal to various East Coast ports.

As a result of these findings, the port has marketed itself as the "Green Gateway." In addition to this finding, the following steps have been taken at the Port to reduce emissions:[102]

- Nearly 200 pieces of cargo-handling equipment at the terminals have been retrofitted with emissions reducing devices and switched to biodiesel, low-sulfur diesel, or a blend of the two.
- The at-berth clean fuels program (ABC Fuels) was implemented in 2009, which provides incentives for container ship operators to use low-sulfur diesel while they are docked in Seattle.
- Plan to reduce dirty trucks serving the Port of Seattle. On January 1, 2011, all pre-1994 trucks will be banned from the Port. The plan includes measures to scrap old trucks, compensate owners of the older trucks, and help with buying newer trucks. This targets the 25 percent of trucks that currently are older and most polluting.
- RFID tags have been piloted at Terminal 18 to improve operating efficiency at the Port – resulting in reduced emissions.

7.6 TACOMA

The Port of Tacoma's has the following strategies to reduce emissions:

- Two major trucking companies that serve the Port recently added diesel-electric hybrid trucks – the first at a West Coast Port – and upgraded their fleet to 2009 with the latest available diesel-engine technology;[103]
- Many ships using clean burning diesel voluntarily at the Port of Tacoma; and
- According the 2008 Northwest Ports Clean Air Strategy Implementation Report, nearly 50 percent of the cargo handling equipment at the Port of Tacoma already meets environmental standards set by the Strategy, more than Vancouver or Seattle.[104]

[102] Port of Seattle: http://www.portseattle.org/seaport/cargo/GreenGateway.shtml.

[103] Ibid.

[104] Northwest Ports Clean Air Strategy 2008 Implementation Report.

- A clean trucks program has been developed to meet the goals of the Northwest Ports Clean Air Strategy. This includes:
  - **By 2010 –** Equivalent diesel emissions level of 1994 or newer heavy-duty truck engine model year; and
  - **By 2015 –** Eighty percent of heavy-duty drayage trucks reach the equivalent diesel emissions level of 2007 or newer engine model year.

7.7 PORTLAND

The Port of Portland, which handles considerably less traffic than Vancouver or Seattle, has also been active in promoting emissions reduction. Several strategies here include:[105]

- Ultralow-sulfur diesel and B20 blend of biodiesel are used in container handling equipment;
- Reach stackers at the container terminal have anti-idling features; and
- Automated truck gates at the container terminal have reduced truck-idling times.

California Ports and CARB Regulations

Ports in California are bound to stringent regulatory requirements that require ports to reduce emissions in a number of ways. These regulations are implemented and monitored by the California Air Resources Board (CARB). These are the requirements and deadlines for CARB's Port Truck Rule:

- **September 30, 2009 –** All drayage trucks must be registered in the CARB statewide drayage truck registry.
- **January 1, 2010 –** Drayage trucks of engine model years pre-1994 are prohibited at ports. All drayage trucks of engine model years 1994-2003 must install a CARB-verified Level 3 Diesel Particulate Filter to reduce particulate matter (PM) emissions by 85 percent.
- **January 1, 2012 –** All drayage trucks of engine model year 2004 must install a CARB-verified Level 3 Diesel Particulate Filter to reduce PM emissions by 85 percent.

[105] Port of Portland: http://www.portofportland.com/PDFPOP/Newsroom_Environmental_Fact_Sheet.pdf.

- **January 1, 2013 –** All drayage trucks of engine model years 2005 and 2006 install a CARB-verified Level 3 Diesel Particulate Filter to reduce PM emissions by 85 percent.
- **January 1, 2014 –** All drayage trucks must meet 2007 engine emission standards.

In addition to these regulations, two other regulations impact drayage truck idling at California Ports, discussed below.

- **Idling Regulation for Commercial Motor Vehicles –** California regulations prohibit operators of diesel-fueled commercial motor vehicles (with gross vehicular weight rating of 10,000 pounds or more), including drayage trucks, from idling their vehicles for more than 5.0 minutes (see 22 C.C.R. §2485). The commercial vehicle idling rule provides several exceptions, including an exception that allows an operator to idle his/her vehicle while queuing in a nonresidential area (locations beyond 100 feet from a residential area).
- **Regulation of Marine Terminal Operators –** Since 2002, California Health and Safety Code §40720 has required each marine terminal operator in the State of California to operate in a manner that does not cause the engines on trucks to idle, or the trucks to queue, for more than 30 minutes while waiting to enter a terminal gate ("Truck Idling Rule"). Marine terminal operators are subject to significant fines if they cause delays that exceed the 30-minute limitation, or if the marine terminal operators allow trucks to queue inside the terminal yard in order to circumvent the time limitation set forth by regulation. However, if a marine terminal operator implements a scheduling or appointment system, the terminal shall only be subject to a fine for a truck that makes use of the appointment system and that idles or queues for more than 30 minutes outside the terminal gate.

Several other port-related CARB regulations exist, which will not be discussed here.

7.8 OAKLAND

In late 2009, the Port passed an ordinance to comply with the CARB regulation deadlines discussed above. Port facility operators will only permit access to their facilities to drayage trucks that are either 1) compliant with CARB's Port Truck Rule, 2) have been exempted, or issued a waiver or extension for compliance by CARB, or 3) have obtained a Port Temporary Noncompliance Pass.[106] The Port of Oakland's clean truck program has resulted in replacement of 92 dirty trucks and in 706 trucks retrofitted with diesel-emission filters.[107]

[106] Port Of Oakland: http://www.portofoakland.com/pdf/ctmp_truckRuleUpdate.pdf.

[107] The Cunningham Report, Volume 15, No. 15, April 12, 2010.

The Port has also developed a "Maritime Air Quality Improvement Plan" (MAQIP) to achieve the 2020 goal of reducing cancer health risk associated with the Port's maritime operations by 85 percent from 2005 levels. Because of the link established between diesel particulate matter (DPM) and human health risks, reduction of DPM is the goal of the MAQIP.

The MAQIP identifies seven primary control measures:

- Early action retrofit and/or replacement of port drayage trucks;
- Compliance with CARB's shore power regulation;
- Design and operational efficiencies;
- Participation in pilot and verification projects for NO_x and DPM reduction strategies;
- Early action construction emissions reductions;
- Support of enforcement of regulations by CARB and BAAQMD through coordination with Port tenants; and
- Accountability, monitoring and reporting.[108]

Besides the MAQIP and the clean truck program, Oakland has also implemented Virtual Container Yard (VCY) software to improve port operations and efficiency.

7.9 SAN PEDRO BAY PORTS – PORT OF LOS ANGELES AND PORT OF LONG BEACH

The Ports of Los Angeles and Long Beach, collectively called the San Pedro Bay Ports, are recognized leaders in port emissions reduction. Both ports have implemented numerous strategies to improve air quality and reduce GHGs in recent years. The guiding document for reducing emissions in the region is the San Pedro Bay Ports Clean Air Action Plan, originally adopted in 2006. In summary, the original document includes the following strategies to reduce pollution by 45 percent by 2012:

- A truck replacement program to phase out all "dirty" diesel trucks from the ports in five years, replaced with a new generation of clean or retrofitted vehicles and driven by people who earn at least the prevailing wage;
- Aggressive milestones with measurable goals for air quality improvements;
- Recommendations to eliminate emissions of ultrafine particulates;
- A technology advancement program to reduce green house gases; and

[108] Port of Oakland: http://www.portofoakland.com/pdf/maqip_executive_summary.pdf.

- A public participation process with environmental organizations and the business communities.[109]

In 2010, the action plan is in the process of being updated. No major fees or tariffs were added to the proposed update, which will be reviewed by the harbor commissions of both ports in the summer of 2010.

Recently, measurements were reported on the success of the port clean air program. Air quality monitoring stations reported that diesel particulate in the area (Wilmington) declined 45 percent from 2006 to 2009, while at another station (San Pedro) the decline was 34 percent. Much of the decline can likely be attributed to the cleaner trucks moving at the ports.[110] Several other combined Los Angeles/Beach initiatives include:

- The Ports together have implemented a program called "OffPeak," which incentivizes the pick-up of goods from the ports at night and on weekends. This reduces traffic around the port, which reduces emissions; and
- All the switch/helper locomotives providing switching services to the ports had to be equipped with 15-minute idle limit devices. By 2011, all Class I switchers are required to have this technology, followed by line-haul locomotives in 2014.[111]

7.10 LOS ANGELES

The following are specific strategies implemented at the **Port of Los Angeles** to reduce air pollution:[112]

- Shore power (cold ironing) was installed for in-service container ships in 2004, being the first port in the world to do so.
- An air quality monitoring system was installed to help monitor the progress and effectiveness of pollution reduction measures.
- The Port of Los Angeles Clean Truck Program is a major component of the pollution reduction strategy. It has the following deadlines:

[109] Port of Long Beach: http://www.polb.com/news/displaynews.asp?NewsID=107&targetid=1.

[110] The Cunningham Report, Volume 15, No 15, April 12, 2010.

[111] Ports of Los Angeles and Long Beach, *San Pedro Bay Ports Clean Air Action Plan Source Specific Standards*.

[112] Port of Los Angeles: http://www.portoflosangeles.org/idx_environment.asp.

  - **October 1, 2008 –** All pre-1989 trucks were banned from entering the Port;
  - **January 1, 2010 –** The 1989 to 1993 trucks will be banned, in addition to the 1994 to 2003 trucks that have not been retrofitted; and
  - **January 1, 2012 –** All trucks that do not meet the 2007 Federal Clean Truck Emissions Standards will be banned from the Port.
- Several electric drayage trucks are operating in the Port.

7.11 LONG BEACH

The following are specific strategies implemented at the **Port of Long Beach** to reduce air pollution:[113]

- An air quality monitoring system was installed to help monitor the progress and effectiveness of pollution reduction measures.
- The Port has committed up to $10 million for a one-year incentive program to encourage vessel operators to use low-sulfur (0.2 percent sulfur or less) fuel during their approach or departure to the Port (Main Engine Low-Sulfur Fuel Incentive Program).
- A voluntary ship speed reduction program has been successful in lowering emissions. In 2009, more than 90 percent of vessels participated in this program. In return for participation in the program, the vessel operators can earn dockage rate reductions.
- Through education and outreach to vessel operators and citations from the Port's Harbor Patrol officers, the Port encourages proper maintenance, operational controls, and use of alternative fuels to reduce emissions.
- The Port of Los Beach Clean Truck Program is a major component of the pollution reduction strategy. It has the following deadlines:
  - **October 1, 2008 –** All pre-1989 trucks were banned from entering the Port;
  - **January 1, 2010 –** Pre-1993 trucks were be banned, and also barred nearly all 1994 to 2003 engines; and
  - **January 1, 2012 –** All trucks that do not meet the 2007 Federal Clean Truck Emissions Standards will be banned from the Port.

The Port's combined goal was to reduce truck emissions at Ports by 80 percent by 2012 – this goal was achieved two years early due to the success of the program.[114]

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[113] Port of Long Beach: http://www.polb.com/environment/default.asp.

[114] http://www.nrdc.org/media/2009/091001.asp.

7.12 SAN DIEGO

The Port of San Diego currently is working on creating its own Clean Truck program to cut emissions and add enforcement to regulate trucks not meeting CARB standards.[115] In addition to this, the Port has championed a voluntary vessel speed reduction program. Three other strategies were identified in the Port's Clean Air Program as ready to move on to the next step of implementation:

- Shore power (cold ironing);
- Replacing older trucks (discussed in the clean truck program above); and
- Replacing and retrofitting existing cargo handling equipment.

7.13 MEXICAN PORTS OF MANZANILLO AND LAZARO CARDENAS

No information was found on projects or initiatives that aim to reduce GHG emissions at these ports. On-line sources were searched and various attempts were made to contact Port staff.

[115] http://www.landlinemag.com/todays_news/Daily/2010/Apr10/041910/041910-04.htm.

8 Inland Infrastructure Projects to Improve Port Operations

The competitiveness of a port relies heavily on whether supporting modes (truck and rail) are able to access a port easily and profitably. For example, primary goods-movement barriers along the West Coast are the mountain ranges (Cascade and Sierra Nevada Mountain Ranges, for example). Another common problem is severe congestion in major cities that slow down truck or rail movements into and out of the Port.

This section discusses some of the major infrastructure projects that are currently underway or were recently completed that significantly improve the flow of goods to and from West Coast ports. For each of the ports, major projects that impact the flow of goods to/the terminals are discussed.

8.1 PRINCE RUPERT

Prince Rupert is a pure intermodal facility that does not have the congestion issues of the other West Coast ports located in large urban areas. The City of Prince Rupert has a population of only 14,000 people, and most goods are not destined for the local population. Instead, the port was designed to efficiently move goods from the ship to inland destinations throughout Canada and the U.S.

A number of projects are planned or underway that will improve access to and from the Port of Prince Rupert by rail and by trucks. This includes several projects that are part of Canada's Asia Pacific Gateway and Corridor Initiative (APGCI).

- **Highway 16 Improvements near Vanderhoof**[116] **–** Highway 16 is the only highway that leads to the Port of Prince Rupert, so it is important that this route is in good working order. The planned improvements include a two kilometer auxiliary passing lane and intersection improvements on Highway 16.
- **Twinning of Simon Fraser Bridge**[117] **–** Twinning of this bridge will reduce traffic congestion and enhance the efficient delivery of goods between the Port of Prince Rupert and the Prince George Inland Container Terminal.

[116]http://www.tc.gc.ca/canadasgateways/apgci/document/gateway_map_final_may2.pdf.

[117]http://www.tc.gc.ca/canadasgateways/apgci/document/gateway_map_final_may2.pdf.

- **Highway 97 Upgrade**[118] **–** Highway 97 is the major north-south artery in British Columbia. This project will upgrade 4.2 kilometers of this highway to four lanes, easing congestion and improving safety. This will support access by truck to and from Prince Rupert from the south.
- **CN Rail Investments from Prince Rupert to Memphis, Tennessee**[119] **–** CN has been making significant improvements to make its Prince Rupert to U.S. rail line competitive with other ports. First, CN invested heavily in upgrades to its rail traffic control system west of Prince George. In addition, CN extended sidings that will result in a double track system from Prince Rupert all the way to Memphis, Tennessee, with the capacity to handle 2 million TEUs annually, which is the projected movement on this route by 2020.

8.2 VANCOUVER

The Port of Vancouver is also a part of APGCI in Canada. Much money and effort is being invested to make the route between the U.S. Midwest and Vancouver/Rupert as seamless and competitive as possible. In addition, the city has developed a program called the Gateway Program to improve the movement of people, goods, and transit through Metro Vancouver.[120] Projects that are planned to improve flows to and from the Port of Vancouver include:

- **Deltaport Third Berth**[121] **–** This project is an initiative to expand capacity at the Deltaport container terminal in Delta, British Columbia. The project increases capacity of the terminal by 600,000 TEUs.
- **South Fraser Perimeter Road**[122] **–** This is a large project that requires the construction of a 40-kilometer four-lane road connecting Deltaport to Highway 1 and will provide a designated east-west truck route that enhances international freight movement and reduces impacts on local roads in and around Vancouver. This project is a part of the Gateway Program.
- **Roberts Bank Rail Corridor Road/Rail Grade Separations**[123] **–** This project will include the construction of up to nine road/grade separations, road closures, network reconfigurations and traffic management measures to

[118] http://www.tc.gc.ca/canadasgateways/apgci/document/gateway_map_final_may2.pdf.

[119] http://investincanada.gc.ca/eng/advantage-canada/asia-pacific-gateway/apgci.aspx.

[120] Gateway Program: http://www.gatewayprogram.bc.ca/.

[121] Port Metro Vancouver: http://portmetrovancouver.com/projects/ongoing_projects/Deltaport_Third_Berth_Project.aspx.

[122] http://www.tc.gc.ca/canadasgateways/apgci/projects.html.

[123] http://www.tc.gc.ca/canadasgateways/apgci/projects.html.

increase truck/capacity and reduce impact on communities along a 70-kilometer stretch of rail. This corridor connects international container terminals and the national rail network.

- **North Fraser Perimeter Road, United Boulevard Extension**[124] **–** This project involves building a new bridge over the Brunette River, extending a four-lane roadway, and constructing a four-lane overpass to enhance the connection between ports and railyards. This project will also improve rail efficiency. This project is a part of the Gateway Program.
- **Pitt River Bridge and Mary Hill Interchange**[125] **–** This project involves the construction of a seven-lane bridge to connect trade-related and transportation facilities on both sides of the Pitt River. This project will enhance the flow of goods moving to and from the Vancouver area and from the Port. It is also a part of the Gateway Program.
- **Canadian Pacific Railway (CPR) to expand capacity between prairies and Port of Vancouver by 12 percent**[126] **–** A 12-percent increase is significant added rail capacity from Calgary to the Port of Vancouver. The total expansion will cost around $500 million, which CPR divided into three phases.
- **Port Mann/Highway 1 Project**[127] **–** This project involves the construction of a new 10-lane Port Mann Bridge, a widening of Highway 1, upgrading Highway 1 interchanges, and improving access and safety of Highway 1. The project spans a distance of 37 kilometers from downtown Vancouver to the suburb of Langley. The project will be complete in 2013. It is a part of the Gateway Program.

8.3 SEATTLE

The Port of Seattle is located on the south side of a major urban area. Various projects were recently completed and are ongoing in order to improve landside access to the Port. These are discussed below.

- **SR 519 (South Atlantic Street) South Seattle Intermodal Access Improvements –** This project improves truck access to the Port by improving access to the freeway network from the Port. First, the project connected SR 519 with on/ramps to I-5/-90, providing better and more fluid Port access to and from the Interstate highway network. Next, the project improves

[124] http://www.tc.gc.ca/canadasgateways/apgci/projects.html.

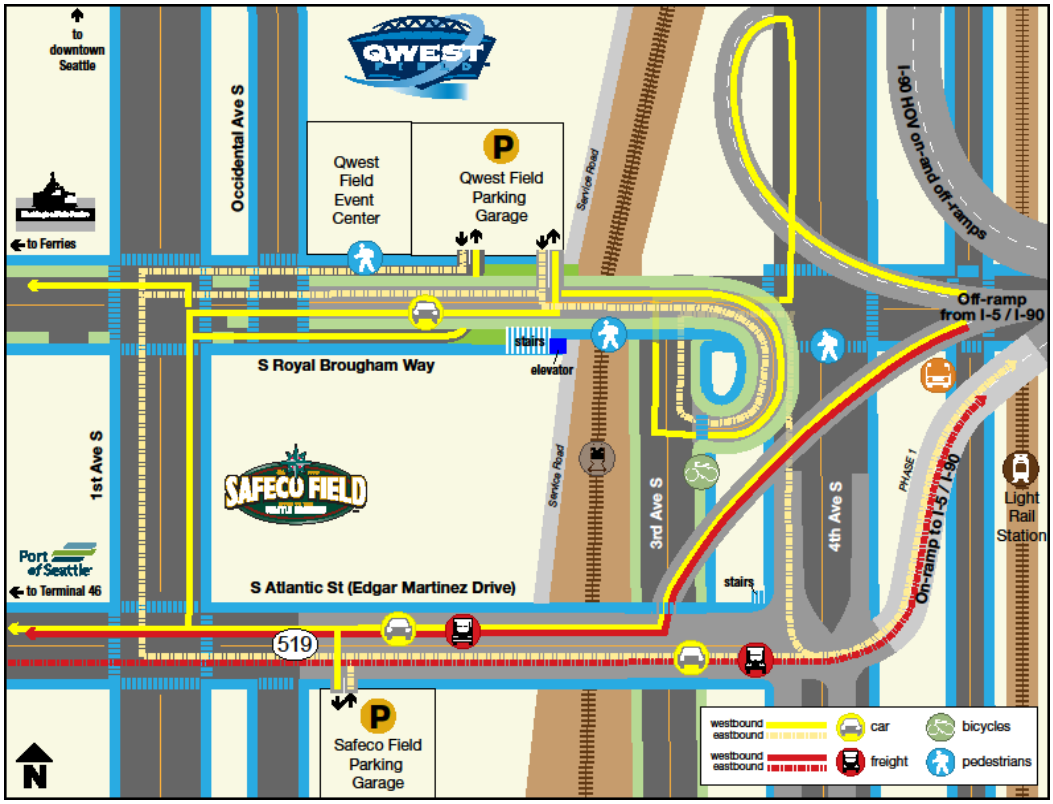
[125] http://www.tc.gc.ca/canadasgateways/apgci/projects.html.

[126] Business Edge News Magazine: http://www.businessedge.ca/archives/article.cfm/port-bottlenecks-threaten-china-trade-9285.

[127] Port Mann/Highway 1 Project: http://www.pmh1project.com/.

traffic in the area by creating new bridges over existing railroad tracks on South Royal Brougham Way for cars//. The project also improves on/ramps and intersection for South Atlantic Avenue, which is a critical for improved Port access. Overall, the project separated freight, commuter, and pedestrian traffic to improve the experience for all stakeholders. A map of new modal routing is shown in Figure 8.1.[128]

Figure 8.1 SR 519 Revised Traffic Flow Map



Source: WA State DOT: http://www.wsdot.wa.gov/projects/sr519/.

- **I-90 Snoqualmie Pass East to Keechelus Dam Project**[129] **–** I-90 is a critical freight corridor for goods moving to and from the Seattle area and the Port of Seattle. The Interstate crosses the Cascades and needs to be updated to meet future expected traffic volumes. This $571 million project for the improvement of five miles of I-90 currently is underway, and the results of the project will be the following:

[128] Washington State DOT: http://www.wsdot.wa.gov/projects/sr519/.

[129] Washington State DOT: http://www.wsdot.wa.gov/Projects/I90/SnoqualmiePassEast/.

- Congestion Relief – Capacity will be increased by 50 percent in each direction on I-90. Curves will be smoothed, pavement will be replaced, and bridges will be replaced.
- Safety Improvements – More safeguards against avalanches and rock/ debris slides.
- Environment – Wildlife movement will be improved as will the flow of water under the roadway.

The project is scheduled to be complete in 2015. This is one step of several to improve long-term operations and safety on I-90.

- **Alaskan Way Viaduct Project**[130] **–** This is a major project will widen and earthquake-proof one of Seattle's major north/arteries. While container truck traffic does not move on this road, it has an impact on overall traffic in the area, which has an impact on congestion in the Port area and keeps this congestion manageable. Overall, the cost of the bored tunnel going through Seattle will be approximately $2 billion.
- **FAST Corridor Improvements**[131] **–** The Freight Action Strategy for Seattle-Tacoma (FAST) Corridor Partnership was established in 1998 to pursue funding for 25 (including FAST2) high-priority transportation improvement projects along the railroad mainline and truck corridors near Puget Sound ports between Everett and Tacoma. The goals of the partnership are to improve mainline rail capacity and connectivity, eliminate roadway chokepoints where rail and arterial roads intersect, and to provide safe rail crossings and establish reliable truck links between ports, rail yards, and freight distribution centers.
- **East Marginal Way Grade Separation**[132] **–** This project, costing $49 million and scheduled for completion in 2011, will improve access among port terminals, UP and BNSF railyards, and local manufacturers' and distribution warehouses. The project will provide a north/bound grade separation on Duwamish Avenue South, relocating East Marginal Way. The benefits of the project are:
  - Improved safety by eliminating rail/conflicts at the existing at-grade crossing;
  - Reduce vehicle delay at railroad tracks through grade separation;

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[130] Port of Seattle: http://www.portseattle.org/community/development/viaduct.shtml.

[131] Puget Sound Regional Council: http://www.psrc.org/transportation/freight/fast.

[132] Puget Sound Regional Council: http://www.psrc.org/assets/1851/EMW_FAST090907.pdf.

  - Improved air quality; and
  - Improved and more efficient movement of freight with heavy multimodal traffic.

- **I-5 – SR 509 Corridor Completion and Freight Improvement Project**[133] **–** This project is meant to improve freight movements in the Seattle area by relieving congestion on busy I-5 south of Seattle. Up to 9,000 trucks per day will be able bypass I-5 and use SR 509 instead, which will improve access to the Ports. Upon completion, this project in conjunction with the Alaskan Way Viaduct will provide an alternative to travel north-south through Seattle, which will improve flows throughout the region. SR 509 will provide a direct route to/the marine ports to the industrial areas south of Seattle and southern King County. Total costs for the project will be around $1.3 billion. Funding has become an issue, so the project is being completed in phases.
- **Seattle-Duwamish ITS Project**[134] **–** This is a state-of-the-art traffic management system that improves the flow of traffic between container terminals and rail yards in Seattle's Duwamish area by helping trucks avoid at-grade crossings occupied by freight trains.

8.4 TACOMA

The Port of Tacoma has several projects underway that improve links between the Port and the region's interstate and rail network. Several projects, such as the FAST Corridor group that benefits the Port of Seattle, also have benefits for the Port of Tacoma. Other projects that improve the flow of goods to/the Port of Tacoma are discussed here.

- **Lincoln Avenue Grade Separation**[135] **–** This project will remove the at-grade intersection of railroad tracks and Lincoln Avenue near the Port of Tacoma. Lincoln Avenue is the primary connector between I-5 and the Port of Tacoma, so this project will have a major impact on congestion and safety.
- **Extension of SR 167 to connect to SR 159 –** This project will enhance freight mobility from the Port of Tacoma to the rest of the State's highway network.

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[133] Washington State DOT: http://www.wsdot.wa.gov/Projects/I5/SR509FreightCongestionRelief/.

[134] Waterfront Coalition: http://www.portmod.org/POLICY/Infrastructure%20Projects.htm.

[135] Port of Tacoma: http://www.portoftacoma.com/lincoln-ave.

8.5 PORTLAND

The Port of Portland is improving access to its marine terminals in several ways, including:

- **Leadbetter Street Extension/Overcrossing**[136] **–** The Leadbetter Street Loop will be completed to connect to Marine Drive, which will improve truck flows. A bridge will be built over the railroad tracks to avoid at-grade conflicts, which will improve safety and congestion.
- **I-5 Columbia Boulevard Improvement**[137] **–** This project will result in the construction of a full interchange at Columbia Boulevard and I-5, which would have significant benefits for goods movement to and from the Port.
- **New I-84 interchange near or at 257th Avenue**[138] **–** This would improve flows moving from the Port to I-84.
- **223rd Avenue Widening**[139] **–** This project would widen 223rd Avenue between Halsey Street and Marine Drive, improving the flow of goods to and from the Port.

8.6 OAKLAND

The Port of Oakland has large expansion plans, which will improve the Port's connections to the regions rail and highway networks. Below is a listing of the major projects that are planned or were recently completed to improve goods movement to and from the Port.

- **7th Street Grade Crossing**[140] **–** This project will improve the railroad connections to the Port as well as improve truck access to local highways. Replacement of the railroad bridge will allow for widening of 7th Street, a major arterial street that connects the Port with I-880 and the region. Overall, rail and highway access to the Port will be improved. This project, along with the projects to realign Maritime Street and to construct the Outer Harbor

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[136] Port of Portland: http://www.portofportland.com/Prp_Infrstrctr_Prjcts.aspx.

[137] Waterfront Coalition: http://www.portmod.org/POLICY/Infrastructure%20Projects.htm.

[138] Waterfront Coalition: http://www.portmod.org/POLICY/Infrastructure%20Projects.htm.

[139] Waterfront Coalition: http://www.portmod.org/POLICY/Infrastructure%20Projects.htm.

[140] Waterfront Coalition: http://www.portmod.org/POLICY/Infrastructure%20Projects.htm.

Intermodal Terminal Project, is a part of the former Oakland Army Base Redevelopment Project.

- **Outer Harbor Intermodal Terminal Project**[141] **–** This project will allow longer trains to be loaded/more efficiently at the Port. This will also relieve congestion for mainline railroads along the Port.
- **Richmond Connector**[142] **–** This project would provide an at-grade rail connection between BNSF's Stockton Subdivision and UP's Martinez Subdivision north of Richmond, California. Trains face congestion and delays currently at this critical rail approach area north of the Port of Oakland.
- **Tehachapi Rail Improvement Project**[143] **–** This project increases capacity and improves freight train operations on Sierra Nevada terrain. This is a current bottleneck for goods moving into and out of California to the rest of the nation.
- **Donner Summit Rail Improvements**[144] **–** This project will reduce the time it takes to move containers by train to the Port of Oakland by approximately one day. As a result of this project, double-stack trains can take a shorter route to the Port of Oakland from the east. Rail congestion will be reduced as a result of the ability to double-stack containers moving over the Summit. Donner Pass is located in the Lake Tahoe Region near I-80.

8.7 LOS ANGELES AND LONG BEACH

There are numerous inland projects underway, as well as regional collaborative efforts to improve goods movement to and from the Port of Los Angeles and the Port of Long Beach. This includes:

Port of Los Angeles

- **Southern California International Gateway (SCIG)**[145] **–** This is a new near-dock facility to be operated by BNSF which is meant to handle Port-related intermodal containers. Today, the containers moving between the BNSF

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[141] Port of Oakland: http://www.portofoakland.com/newsroom/pressrel/view.asp?id=98.

[142] Waterfront Coalition: http://www.portmod.org/POLICY/Infrastructure%20Projects.htm.

[143] Port of Oakland: http://www.portofoakland.com/newsroom/pressrel/view.asp?id=98.

[144] Port of Oakland: http://www.portofoakland.com/newsroom/pressrel/view.asp?id=98.

[145] Port of L.A.: http://www.portoflosangeles.org/maritime/good_movements.asp.

railyard and the ports travel on the I-710 highway. Once the Southern California International Gateway is constructed, it is estimated that one million trucks annually will be removed from the I-710 highway.

- **SR 74 Expressway/Schuyler Heim Bridge Replacement**[146] **–** The SR 47 Expressway will include a bridge connecting Terminal Island to Alameda Street north of Anaheim Street and south of the Pacific Coast Highway. This project will replace the seismically deficient Heim lift bridge with a fixed span bridge. Total cost is estimated to be around $390 million. This project would reduce approximately six to seven percent of port-related traffic on the I-710 freeway.
- **TraPac Container Terminal Railyard**[147] **–** This is a new on-dock railyard at the terminal that will improve the flow of goods moving into and out of the Port.

  Recently completed projects:

  - $49 million Badger Avenue bridge replacement project;
  - $48 million New Dock Street – Henry Ford Avenue Grade Separation Project;
  - $37 million Seaside Avenue – Navy Way Grade Separation Project; and
  - $20 million Anaheim Street Viaduct Reconstruction Project.

Port of Long Beach

- **Gerald Desmond Bridge Replacement Project**[148] **–** The Gerald Desmond Bridge connects Long Beach with Terminal Island. It is quickly deteriorating and is not able to handle today and future traffic volumes. As a result, the port is planning to replace this bridge for $1.1 billion. This is a critical bridge for the movement of goods in the United States, as approximately 15 percent of all goods entering the country use this bridge.
- **Middle Harbor Redevelopment Project**[149] **–** This project will modernize two shipping terminals with on-dock rail. In addition, it will reduce pollution and will double capacity of these facilities.
- **Pier G Modernization**[150] **–** This is a major renovation of Pier G, which includes adding on-dock rail. Additional dock space will also be added to Pier G.

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[146] Port of L.A.: http://www.portoflosangeles.org/maritime/good_movements.asp.

[147] Port of L.A.: http://www.portoflosangeles.org/facilities/rail_intermodal_yards.asp.

[148] Port of Long Beach: http://www.polb.com/about/projects/gdb.asp.

[149] Port of Long Beach: http://www.polb.com/about/projects/default.asp.

[150] Port of Long Beach: http://www.polb.com/about/projects/default.asp.

- **On-Dock Rail Support Facility**[151] **–** This project will redevelop an existing railyard on Pier B and will remove rail bottlenecks at the Port. The renovation will also increase on-dock rail capacity, which will reduce truck movements. The EIR currently is being drafted for this facility.

Trade Corridor Improvement Funds (TCIF)

- **TCIF projects**[152] **–** Various landside projects that can impact efficiency at the port are included as projects in the Trade Corridor Improvement Fund. This fund provides funding for projects along "trade corridors of national significance." This includes projects such as rail track realignment at Ocean Boulevard, West Basin Road Rail Access Improvements, and others. As of December 2009, the recommended programming target for southern California projects is $1.65 billion dollars.

American Recovery and Reinvestment Act of 2009

- **ARRA projects**[153] **–** The American Recovery and Reinvestment Act of 2009 (also known as the Recovery Act or the Stimulus) includes various projects that impact transportation efficiency in southern California.

Southern California National Freight Gateway Collaboration

- **Southern California National Freight Gateway Collaboration**[154] **–** This group of public agencies at the local, regional, state, and Federal level was formed to address the daunting environmental and infrastructure challenges presented by growth in domestic and waterborne freight moving by ships, trucks and trains within and through the southern California region. This group addresses the complex regional issues associated with freight growth through several initiatives. For one, the group is working with public agencies and private sector stakeholders to link projects of national significance to national funding priorities. The group is also furthering collaboration among local, state, and Federal agencies to tackle infrastructure issues that have an impact on local and regional as well as the national economy. Finally, this collaboration is highlighting the importance of the San Pedro Bay Ports and the southern California region as an area of national significance in terms of freight infrastructure.

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[151] Port of Long Beach: http://www.polb.com/about/projects/default.asp.

[152] TCIF web site: http://www.catc.ca.gov/programs/tcif.htm.

[153] ARRA web site: http://www.recovery.gov.

[154] Southern California National Freight Gateway Collaboration web site: http://www.freightcollaboration.org/Content/10000/aboutthecollaboration.html.

8.8 SAN DIEGO

The Port of San Diego's efforts to improve connections with the region include the following projects:

- **Port Freeway Access Project**[155] **–** The Port of San Diego is working to improve access to the Port from the region's freeways. The goals of the program are to improve direct access to the Port from I-5 and I-15, as opposed to having trucks move through neighborhoods. This includes four separate projects that are under discussion:
  - Harbor Drive at 32nd Street – This project proposes to build an elevated structure in the median of Harbor Drive that will connect to I-15 over the freight, rail, and trolley tracks at the Harbor Drive and 32nd Street intersection. This project will also add direct connectors on eastbound Harbor Drive to I-15. This will eliminate truck traffic at the congested intersection of Harbor Drive at 32nd Street.
  - Tenth Avenue at Cesar Chavez Parkway – This project entails constructing a two-lane, grade separated structure from the western side of Cesar Chavez Parkway over the railroad tracks. This improvement would provide dedicated truck access to the truck routes and the freeways. This would reduce rail accidents with trucks, reduce delays caused by the current at-grade crossing, and would result in less truck trips moving through the Barrio Logan neighborhood.
  - Bay Marina Drive at I-5 – This project would add more lanes to Bay Marina Drive. Other improvements would be made to this road to improve efficiency of truck movements to the Port.
  - Harbor Drive at Civic Center Drive – This is a proposed extension of Tidelands Avenue so that it connects to Harbor Drive. This would add an additional northbound lane on Cleveland Avenue, a right-turn lane on westbound Civic Center Drive, and add through lanes on Civic Center Drive between Tidelands Avenue and Cleveland Avenue. This project will also add a second on-ramp to northbound I-5 Plaza Boulevard ramp structure as well as a second lane to I-5 northbound and Wilson Avenue. Other improvements are also included in this.

[155] Port of San Diego: http://www.portofsandiego.org/community-service/1221-port-freeway-access-project-moves-forward-with-approval-of-funds-to-caltrans.html.

8.9 MEXICAN PORTS OF MANZANILLO AND LAZARO CARDENAS

These ports are positioning themselves to compete with other Ports to the north by developing inland links through Mexico and up to the United States. The Port of Lazaro Cardenas markets its link as an "Asia Pacific Corridor," with ships arriving from Asia being unloaded and then shipped by rail into the United States (through Texas and then up to Kansas City). This is a major rail corridor for this Port. Attempts to reach the Ports to discuss inland projects that improve Port competitiveness were unsuccessful.

A Background Documents, Figures, and Maps

Figure 0.1 Letter from West Coast Port Executives to Rail Executives

We are writing to engage you in confronting several challenges currently affecting the U.S. West Coast ports that handle two thirds of all U.S. trade. We are writing jointly to emphasize the unanimity of our positions on these critical issues and the need for immediate action. Ultimately, these issues affect not only the businesses and communities that depend on our ports, but rail customers and shareholders as well as the overall national economy.

West Coast ports are facing increased competition from Canada, Mexico and Panama because they have an effective national strategy to serve America's Heartland. We need to respond in kind with a collaborative, intermodal, strategic plan to ensure that we remain competitive in order to serve our own national markets and protect the hundreds of thousands of family-wage jobs that depend on U.S. goods movement supply chains.

Our customers have emphasized the following critical factors which are causing major diversions of cargo that used to flow through West Coast ports:

- The global recession that started in late 2008 and will continue through 2010.
- A projected slow rate of growth estimated to start late 2010 or 2011.
- Dramatic shifts in Worldwide Supply Chain Management, influenced by the financial results of the Ocean Carriers, BCO's shifting cargo to new Distribution and Transload facilities that are closer to the major population centers, along with large rail rate increases over the past few years. Intermodal rail economics are an increasingly influential driver of routing decisions, and while some rate changes are to be expected, recent increases are unsustainable and leading to lost cargo that will be very challenging to recoup.

Shippers who have historically relied on West Coast ports to reach inland U.S. markets have already begun to divert this cargo to ports in Canada, Mexico, Gulf Ports, and South Atlantic ports, all of which is to the detriment of the West Coast ports. Regardless of the cause, U.S. West Coast ports and the railroads serving them are witnessing a structural cargo shift that requires immediate and coordinated attention.

Figure 0.2 Canadian National Railway Company System Map

Figure 0.3 BNSF Intermodal System Map

Figure 0.4 Union Pacific System Map

Figure 0.5 Norfolk Southern Capacity Enhancement Corridors

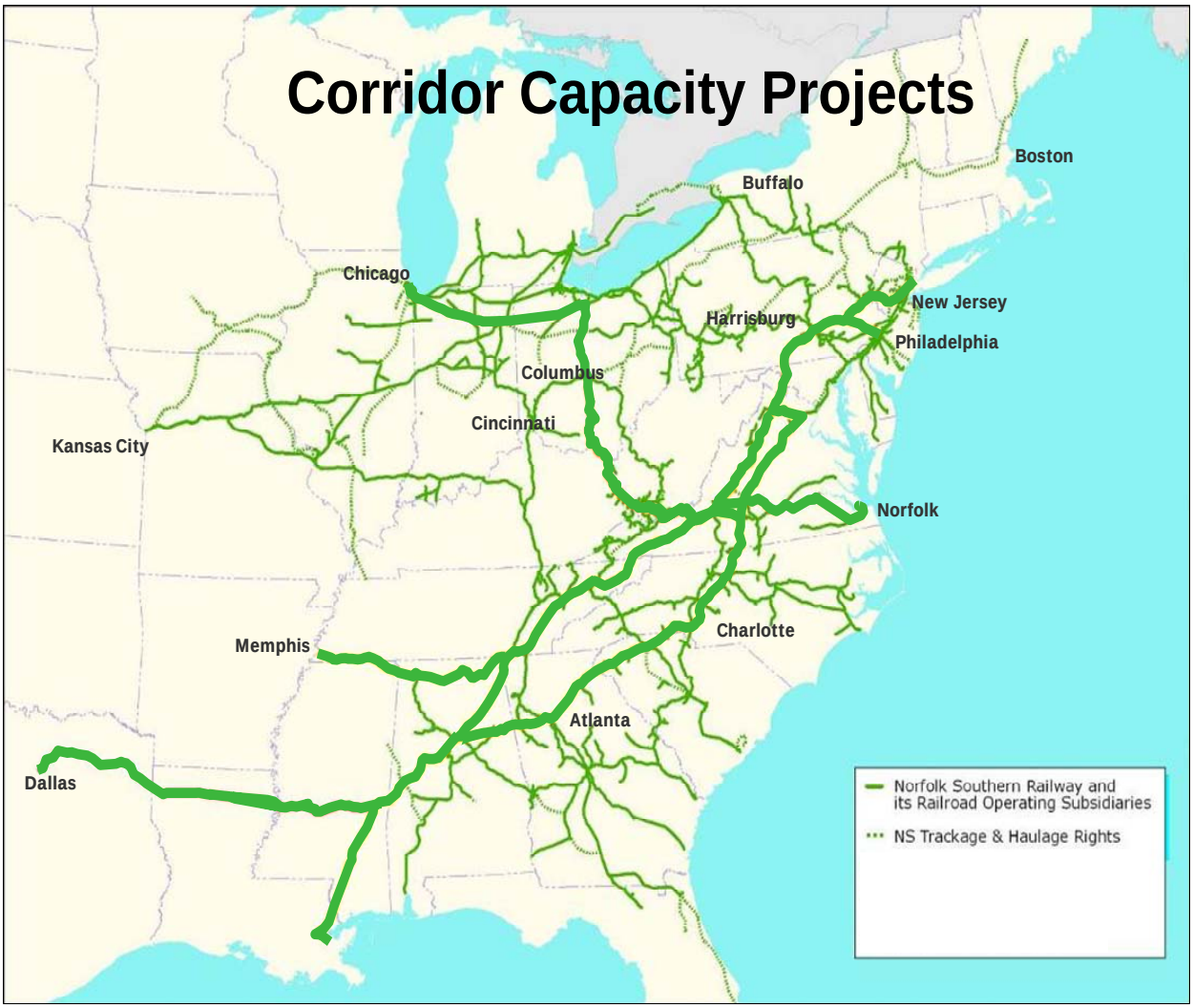

Figure 0.6 CSX Intermodal System Map

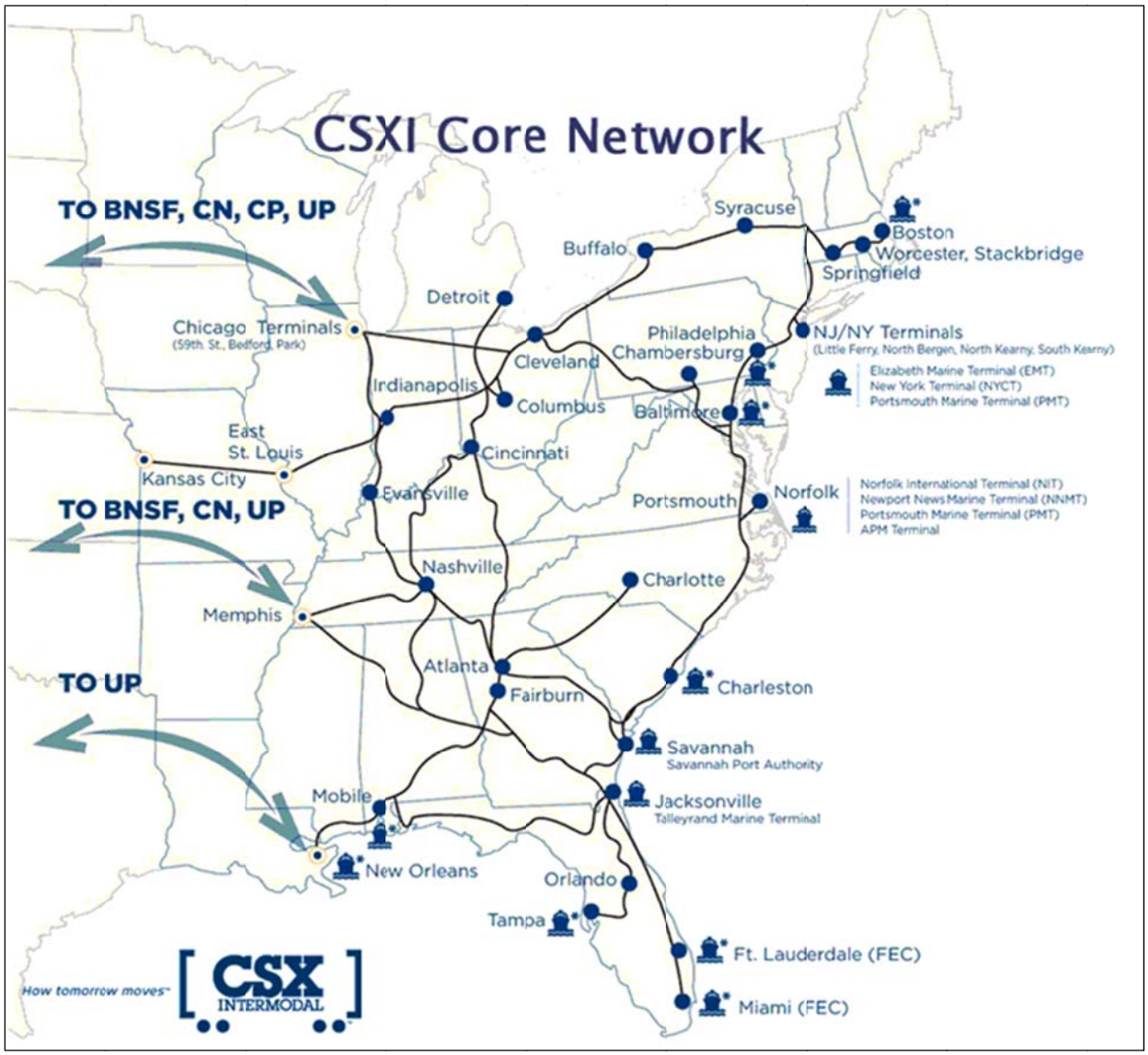

Table 0.1 Project Descriptions from the U.S. DOT

Project	Project Description
Crescent Corridor	The Crescent Corridor is a major intermodal freight program centered on the continued development of Norfolk Southern's rail intermodal route from the Gulf Coast to the Mid-Atlantic. The TIGER grant supports construction of two new intermodal facilities in Memphis, Tennessee, and Birmingham, Alabama – both critical components of the full corridor plan. Construction of these new facilities includes pad and support tracks, trailer, and container parking areas, lead tracks, and related ancillary buildings and features. Once fully-developed, the Crescent Corridor will improve domestic rail intermodal service between the Northeast and Southeast for the terminal host cities of Memphis, Birmingham, Atlanta, Charlotte, Knoxville, Roanoke, Greencastle, Harrisburg, Bethlehem, Philadelphia, and Northern New Jersey. Connecting this 2,500-mile network of existing rail lines with regional intermodal freight distribution centers will strengthen domestic and international freight distribution in the Southeast, Gulf Coast and Mid-Atlantic markets.
National Gateway	The National Gateway Project is a package of rail infrastructure and intermodal terminal projects that will enhance transportation service options along three major freight rail corridors owned and operated by CSX through the Midwest and along the Atlantic coast. The improvements will allow trains to carry double-stacked containers, increase freight capacity, and make the corridor more marketable to major East Coast ports and shippers. TIGER funds will help complete the first corridor project, from Northwest Ohio to Chambersburg, Pennsylvania, through West Virginia and Maryland. The National Gateway project will improve existing rail capabilities on a major freight rail corridor spanning multiple states. Modifying vertical clearances to allow for double-stack intermodal trains will provide relief to congested rail and highway corridors by enabling trains to carry more freight. The increased capacity and improved economies of scale will provide a cost-effective alternative to long-haul trucking, directly reducing highway congestion and highway maintenance costs. The project's benefits include reduced greenhouse gas emissions and fuel usage, lower transportation costs, improved service reliability, shorter transport times, improved highway safety and expanded access to rail services.
Colton Grade Separation	The project eliminates the mainline at-grade rail crossing of the Union Pacific Railroad and the BNSF Railway at Colton in San Bernardino County. This crossing is on the major east-west corridor for each of the two carriers, and at its peak in 2006 the crossing handled 129 trains a day. The trains that wait and queue behind the crossing create a major choke point for traffic moving to and from Southern California. The project will reduce travel time, save on inventory costs, and improve reliability for the movement of goods across the country. Approximately 40 percent of all containerized traffic entering or leaving the United States passes through the ports of Los Angeles and Long Beach. More than 60 percent of the volume from these ports is moved inland through the L.A. Basin and the vast majority of this volume moves via rail over Colton Crossing. The crossing is also of vital importance to California's local economy, as 40 percent of its traffic is not port-related.

Project	Project Description
CREATE	The CREATE Program is a package of 78 projects that address freight rail congestion in the Chicago area – a nationally significant freight bottleneck adversely affecting the delivery of goods throughout the country. The program is the product of extensive outreach and planning among Federal, state, local, and private stakeholders. TIGER funds will be used to complete the highest priority projects in the CREATE Program. These include installing new traffic control systems; constructing a new rail bridge; and making other significant improvements to signals, switches, roadways, sidewalks, and other components. About 25 percent of rail traffic in the United States travels through the Chicago region, which is home to six of the seven Class I railroads and multiple passenger rail carriers. Each day, nearly 1,300 passenger and freight trains, or 40,000 rail cars, are handled in the Chicago region. The congestion created by these rail movements delays the movement of goods throughout the country. The CREATE Program is designed to address key systemic issues related to freight movement, freight/passenger rail conflict and highway/rail conflict. By investing in priority projects along four rail corridors, CREATE will construct additional capacity and improve connections throughout the Chicago metropolitan rail network.

Table 0.2 Sources for this Report

Source	Source Link
American Association of Port Authorities	http://www.aapa-ports.org
Banderas News	http://banderasnews.com/1001/nz-puntacolonet.htm
Business Edge News Magazine	http://www.businessedge.ca
Canadian National Railway	http://www.cn.ca/en
Cargo Shipping News	N/A
Census Bureau: U.S. International Trade Data	http://www.census.gov/foreign-trade/Press-Release/ft920_index.html#2010
Congressional Research Service Report: Harbor Maintenance Trust Fund Expenditures	http://assets.opencrs.com/rpts/R41042_20100125.pdf
Drewry Supply Chain Advisors	http://www.drewry.co.uk/
Federal Highway Administration	http://www.fhwa.dot.gov
Fraser Surrey Docks LP	http://www.fsd.bc.ca/
Gateway Program	http://www.gatewayprogram.bc.ca/
Herbert Engineering	http://www.herbert.com/
Journal of Commerce	http://www.joc.com
Land Line Magazine	http://www.landlinemag.com
Natural Resources Defense Council	http://www.nrdc.org
Pacific Shipper	http://www.pacificshipper.com

Source	Source Link
Panama Canal Authority: Proposal for the Expansion of the Panama Canal Third Set of Locks Project, April 24, 2006	Proposal for the Expansion of the Panama Canal Third Set of Locks Project, April 24, 2006
Port Import Export Reporting Service (PIERS)	http://www.piers.com/
Port Metro Vancouver	http://www.portmetrovancouver.com/
Port of Lazaro Cardenas	http://puertolazarocardenas.com.mx/api/index.php?option=com_content&task=blogsection&id=44&Itemid=222
Port of Long Beach	http://www.polb.com/
Port of Los Angeles	http://www.portoflosangeles.org/
Port of Manzanillo	http://www.puertomanzanillo.com.mx/php/eng/
Port of Oakland	http://www.portofoakland.com/
Port of Portland	http://www.portofportland.com/POP_Home.aspx?ep=7d2acf4cd5204a27a999e9dc869f9555
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Prince Rupert Port Authority	http://www.rupertport.com/
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RAMP: Realize America's Maritime Promise	http://www.ramphmtf.org/about.html
San Pedro Bay Container Forecast Update, 2009. The Tioga Group Inc, IHS Global Insight	http://www.portoflosangeles.org/pdf/SPB_Container_Forecast_Update_2009.pdf
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United States Environmental Protection Agency (EPA)	http://www.epa.gov
USA Trade On-line Data: Created by STAT-USA and the U.S. Census Bureau's Foreign Trade Division	http://www.usatradeonline.gov/
Washington State DOT	http://www.wsdot.wa.gov
Waterfront Coalition	http://www.portmod.org/
West Coast Collaborative	http://westcoastcollaborative.org/