

II. FREIGHT FLOWS

In terms of tons transported, domestic freight transportation grew by about 20 percent over the past decade and is expected to increase another 65 percent to 70 percent by 2020. International shipments are expected to increase even faster over this period (by about 85 percent). In 1998, excluding commodities transported by pipeline, trucks moved 71 percent of total tonnage and 80 percent of the total value of U.S. shipments. By 2020, trucks are expected to haul about three quarters of total tonnage, followed by rail (14 percent), water (7 percent), and air (less than 1 percent).

Table 2-1. Freight Shipments by Weight and Value

Mode	Tons (millions)			Value (\$ billions)		
	1998	2010	2020	1998	2010	2020
Total	15,271	21,376	25,848	9,312	18,339	29,954
Domestic	13,484	18,820	22,537	7,876	15,152	24,075
Air	9	18	26	545	1,308	2,246
Highway	10,439	14,930	18,130	6,656	12,746	20,241
Rail	1,954	2,528	2,894	530	848	1,230
Water	1,082	1,345	1,487	146	250	358
International	1,787	2,556	3,311	1,436	3,187	5,879
Air	9	16	24	530	1,182	2,259
Highway	419	733	1,069	772	1,724	3,131
Rail	358	518	699	116	248	432
Water	136	199	260	17	34	57
Other ¹	864	1,090	1,259	NA	NA	NA

Key: NA = not available.

¹Other includes international shipments that moved via pipeline or by an unspecified mode.

Notes: Domestic shipments by pipeline are excluded. Modal numbers may not add to totals due to rounding.

As the demand for goods and services grows, so does the amount of truck traffic on the nation's highways.

Commercial truck travel has doubled over the past two decades, about the same as highway travel as a whole.

Consequently, truck vehicle miles traveled (VMT) as a share of all VMT has remained relatively stable. Over this period, combination trucks travel grew slightly faster than single unit trucks.

Figure 2-1. Highway Vehicle-Miles Traveled: 1980 to 2002 (Index, 1980 = 1.0)

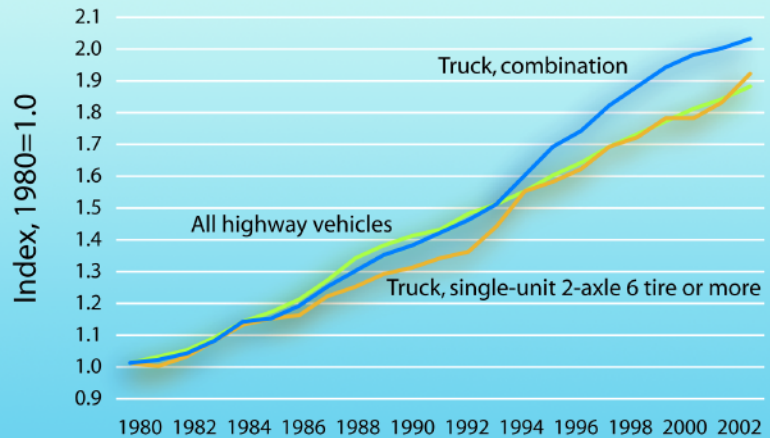
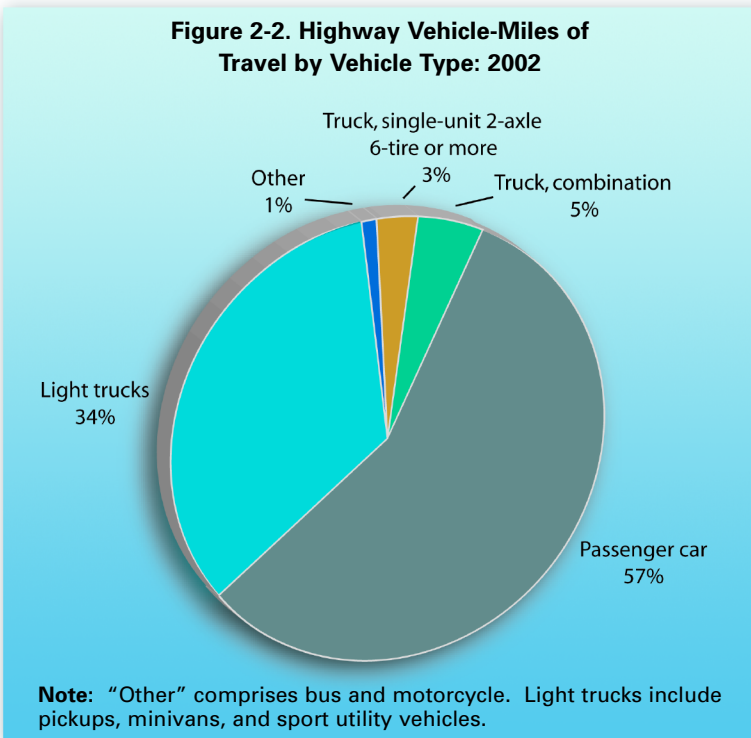


TABLE 2-1. FREIGHT SHIPMENTS BY WEIGHT AND VALUE

Source: U.S. Department of Transportation, Federal Highway Administration, Freight Analysis Framework, 2002.

FIGURE 2-1. HIGHWAY VEHICLE-MILES TRAVELED: 1980 TO 2002 (INDEX, 1980 = 1.0)

Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual Issues), table VM-1, available at www.fhwa.dot.gov/ohim/ohimstat.htm as of July 14, 2004.



Despite doubling over the past two decades, truck traffic remains a relatively small share of highway traffic as a whole. In 2002, commercial trucks accounted for about 8 percent of highway VMT. Truck VMT comprised 65 percent combination truck and 35 percent single-unit truck.

Truck traffic is concentrated on major routes connecting population centers, ports, border crossings, and other major hubs of activity. Most of these routes will experience increases in truck traffic over the next twenty years, which, in

combination with increases in passenger travel, will add to existing congestion.

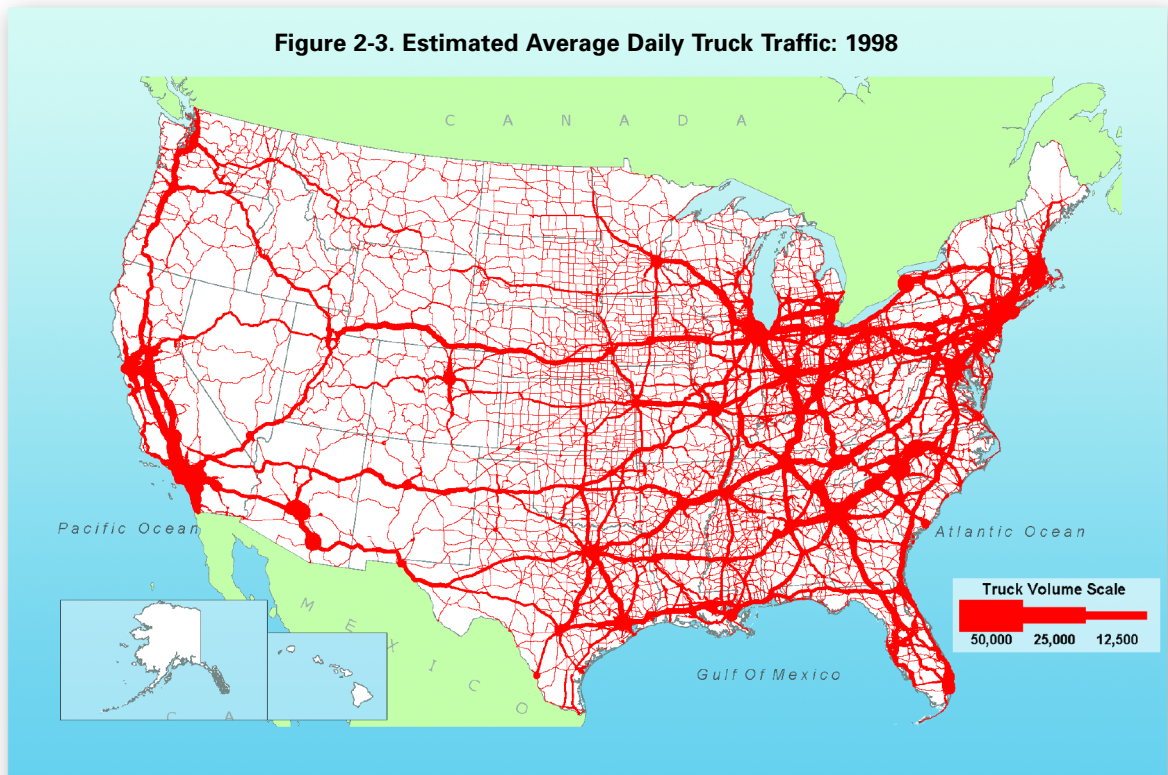
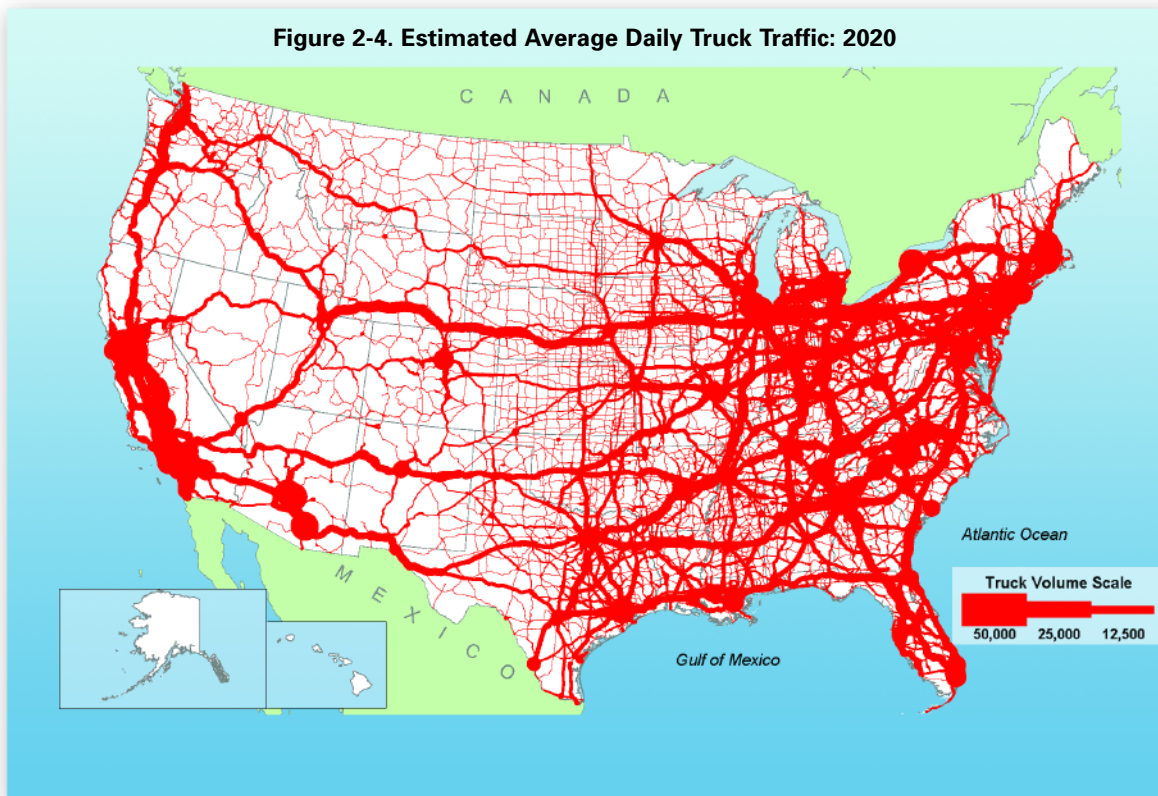


FIGURE 2-2. HIGHWAY VEHICLE-MILES OF TRAVEL BY VEHICLE TYPE: 2002
 Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues), table VM-1, available at www.fhwa.dot.gov/ohim/ohimstat.htm as of July 14, 2004.

FIGURE 2-3. ESTIMATED AVERAGE DAILY TRUCK TRAFFIC: 1998
 Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework.



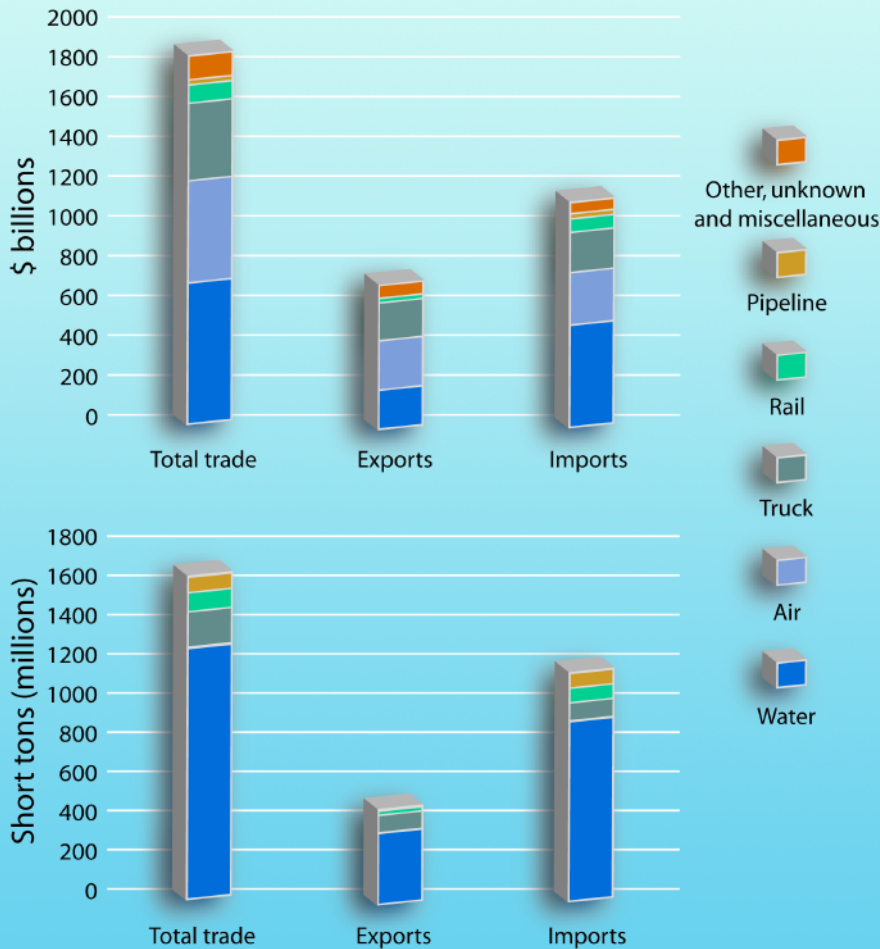
Some of the most severe congestion problems will be found near ports, airports, and border crossings stemming from the rapid growth of international trade. Over the past two decades U.S. foreign trade in goods has doubled.

FIGURE 2-4. ESTIMATED AVERAGE DAILY TRUCK TRAFFIC: 2020

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework.



Figure 2-5. U.S. International Merchandise Trade by Mode of Transportation: 2001



Note: 1 short ton = 2,000 lbs.

Nearly 80 percent of freight tons in U.S. foreign trade are transported by ship. Although the vast majority of freight tonnage in U.S. foreign trade moves by water, air and truck transportation are nearly as important when freight value is considered. By value, the water share drops to 40 percent, with 28 percent moving by air and 21 percent moving by truck.

The top 25 foreign trade gateways measured by value of shipments are comprised of 8 airports, 11 water ports, and 6 border crossings. At these 25 gateways, imports comprised 64

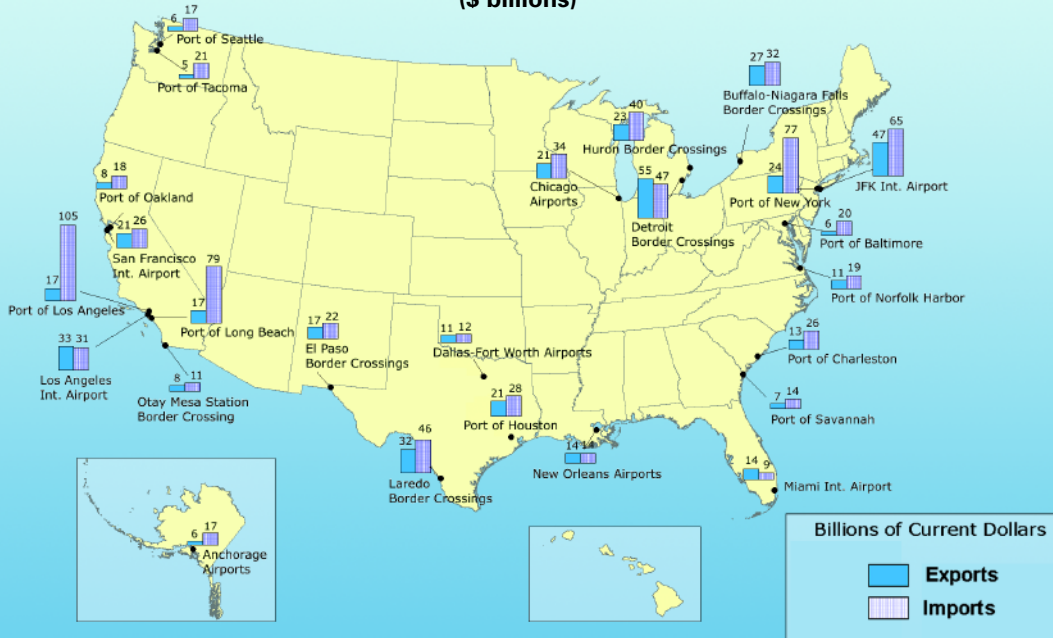
percent of the total. Ports with very large shares of imports relative to exports are mostly water ports (such as the ports of Los Angeles, CA, Long Beach, CA, and Tacoma, WA). Anchorage International Airport also has a high proportion of imports relative to exports.

Measured in tons, the Port of South Louisiana handles the most freight of any water port in the United States. Water ports dominated by domestic trade include St. Louis, MO-IL, Pittsburgh, PA, Huntington, WV-KY-OH, and Valdez, AK. Water ports dominated by foreign trade include Portland, ME, Los Angeles, CA, Freeport, TX, and Beaumont, TX. The top 25 water ports handle about 70 percent of all foreign and domestic goods moved by water.

FIGURE 2-5. U.S. INTERNATIONAL MERCHANDISE TRADE BY MODE OF TRANSPORTATION: 2001

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, *U.S. International Trade and Freight Transportation Trends* (Washington, DC: 2003), table 7, available at www.bts.gov as of July 12, 2004.

Figure 2-6. Top 25 U.S. Foreign Trade Freight Gateways by Value: 2003 (\$ billions)



Note: Data for all air gateways include a low level (generally less than 2%-3% of the total value) of small user-fee airports located in the same region. Air gateways not identified by airport name include major airport(s) in the geographic area in addition to small regional airports.

Figure 2-7. Top 25 Water Ports by Weight: 2002 (Million Short Tons)

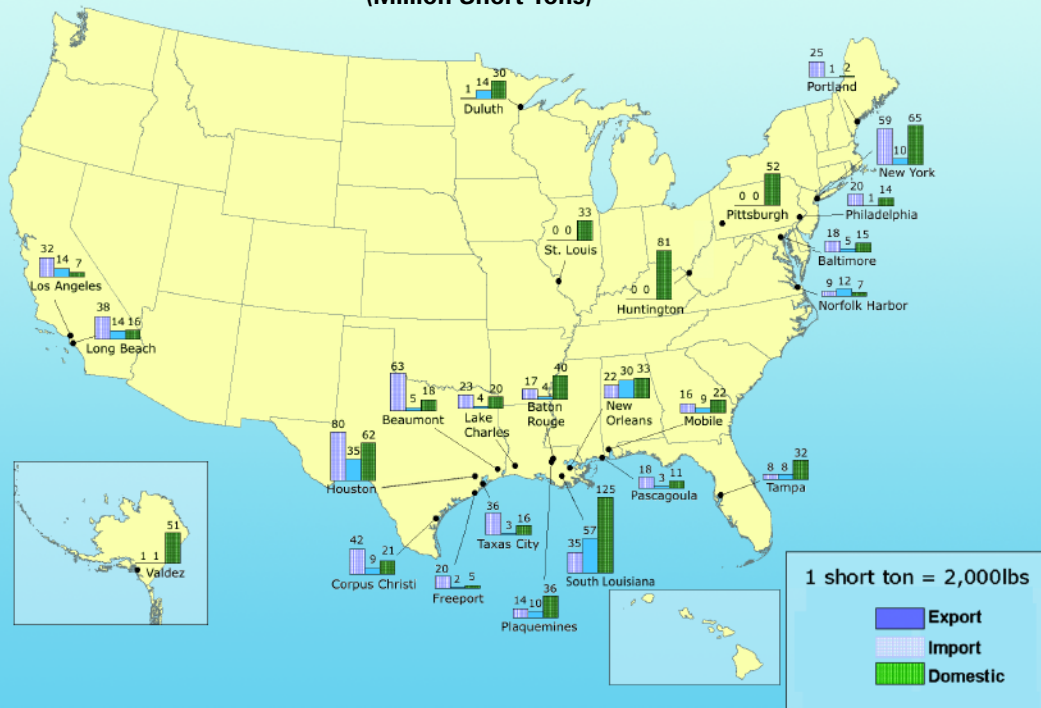


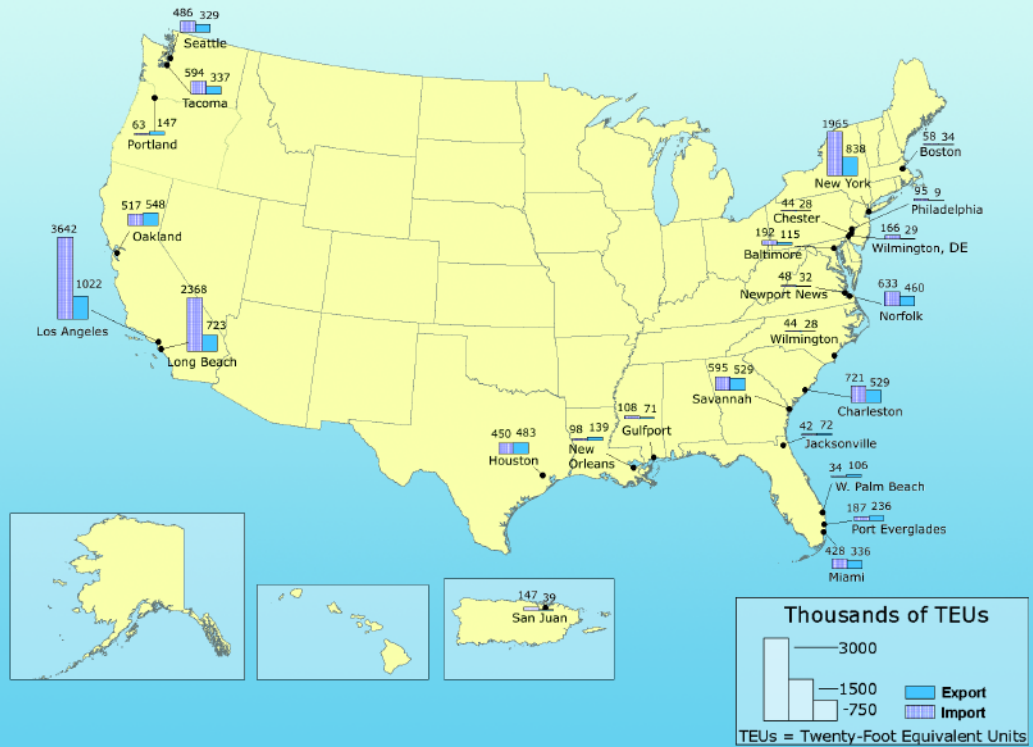
FIGURE 2-6. TOP 25 U.S. FOREIGN TRADE FREIGHT GATEWAYS BY VALUE: 2003 (\$ BILLIONS)

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics 2004*, (Washington, DC: forthcoming)

FIGURE 2-7. TOP 25 WATER PORTS BY WEIGHT: 2002 (MILLION SHORT TONS)

Source: U.S. Army Corps of Engineers, *Waterborne Commerce of the United States, Calendar Year 2002, Part 5, National Summaries* (New Orleans, LA: 2004).

Figure 2-8. Top 25 U.S. Container Ports by Containerized Cargo: 2003



Containerized cargo has grown rapidly over the past few years and is concentrated at a few large water ports. The Port of Los Angeles handles about one-fifth of all the container traffic at water ports in the United States. Together with the Port of Long Beach, this share increases to more than one-third. Container trade at the Ports of Los Angeles and Long Beach doubled between 1994 and 2003. Overall containerized cargo increased by about 75 percent over this period.

Table 2-2: U.S. Merchandise Trade with Canada and Mexico by Mode

Mode	1997		2000		2001	
	Value (\$ billions)	Weight (millions of short tons)	Value (\$ billions)	Weight (millions of short tons)	Value (\$ billions)	Weight (millions of short tons)
Truck	323	NA	429	NA	395	180
Rail	70	NA	94	NA	93	97
Air	28	NA	45	NA	37	0.5
Water	22	NA	33	NA	29	214
Pipeline	14	NA	24	NA	26	79
Other ¹	19	NA	29	NA	33	1.0
Total	475	NA	653	NA	614	572

Key: NA = not available.

¹Other includes "flyaway aircraft" (i.e., aircraft moving from the manufacturer to a customer and not carrying any freight), vessels moving under their own power, pedestrians carrying freight, and miscellaneous.

Notes: Individual modal totals may not sum to exact export or import totals due to rounding.

1 short ton = 2,000 lbs.



Trade with Canada and Mexico has skyrocketed since the signing of the North American Free Trade Agreement (NAFTA) in 1994. Trucks carry almost two-thirds of the value of goods traded with these countries. The value of goods carried by truck increased by about 20 percent between 1997 and 2001. By weight, the transportation modes of water and truck carry the largest share of goods traded.

Trade with Canada by land modes is significantly higher than trade with Mexico. However, trade across the Mexican border has grown much more quickly than trade on the Canadian border over the past few years. Imports and exports to Mexico measured by value grew 80 percent and 65 percent respectively between 1996 and 2003. Imports and exports to Canada, by contrast, grew by only 30 percent and 10 percent respectively.

Table 2-3. U.S. Land Exports to and Imports from Canada and Mexico by Mode (\$ millions)

	1996	2000	2002	2003
Exports to Canada, total	139,109.7	154,847.4	146,435.3	154,870.8
Truck	102,743.0	129,825.3	118,259.1	124,235.0
Rail	15,678.7	12,946.5	13,974.1	14,776.5
Pipeline	162.2	161.6	174.3	759.6
Other ¹	20,467.5	11,913.4	14,026.7	15,099.2
Mail	58.3	0.6	1.2	0.4
Exports to Mexico, total	51,753.4	97,158.9	85,157.8	85,614.8
Truck	44,091.8	82,389.2	70,924.7	70,550.8
Rail	5,119.2	10,495.8	10,143.0	11,264.9
Pipeline	2.3	301.8	567.9	155.3
Other ¹	2,540.1	3,972.0	3,521.5	3,643.3
Mail	–	–	0.6	0.4
Imports from Canada, total	156,206.6	210,270.5	194,820.7	207,448.4
Truck	98,400.8	127,816.3	117,985.3	116,714.1
Rail	39,811.0	49,699.2	46,966.8	49,980.9
Pipeline	12,796.2	23,117.1	21,832.3	31,451.3
Other ¹	4,968.4	9,571.0	7,992.7	9,236.6
Mail	6.9	4.1	0.4	0.3
FTZ ²	223.4	62.8	43.3	65.3
Imports from Mexico, total	63,312.2	113,436.5	114,380.8	114,842.5
Truck	48,350.0	88,668.7	90,593.6	92,535.0
Rail	12,297.7	21,056.1	20,790.7	19,701.7
Pipeline	8.1	11.5	0.6	0.2
Other ¹	639.2	1,573.9	1,548.9	1,600.1
Mail	1.5	0.6	0.2	
FTZ ²	2,015.6	2,125.7	1,446.8	1,005.4

Key: – = value too small to report.

¹Other includes “flyaway aircraft” or aircraft moving under their own power (i.e., aircraft moving from the manufacturer to a customer and not carrying any freight), powerhouse (electricity), vessels moving under their own power, pedestrians carrying freight, and unknown and miscellaneous.

²Foreign Trade Zones (FTZs) were added as a mode of transport for land import shipments beginning in April 1995. Although FTZs are treated as a mode of transportation in the Transborder Surface Freight Data, the actual mode for a specific shipment into or out of an FTZ is unknown because U.S. Customs does not collect this information.

Note: Numbers may not add to totals due to rounding.

FIGURE 2-8. TOP 25 U.S. CONTAINER PORTS BY CONTAINERIZED CARGO: 2003

Source: U.S. Department of Transportation, Maritime Administration, *Top 30 U.S. Container Ports by Direction, CY2003*, based on data provided by Port Import/Export Reporting Service, 2004.

TABLE 2-2. U.S. MERCHANDISE TRADE WITH CANADA AND MEXICO BY MODE

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, *International Trade and Freight Transportation Trends* (Washington, DC: 2003), tables 22 and C-11, available at www.bts.gov as of July 12, 2004.

TABLE 2-3. U.S. LAND EXPORTS TO AND IMPORTS FROM CANADA AND MEXICO BY MODE (\$ MILLIONS)

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, Transborder Surface Freight Data, available at www.bts.gov/transborder as of July 2, 2004.

Table 2-4: Incoming Truck Container Crossings by State, U.S.-Canadian Border

State	1998	2000	2003
Alaska	11,139	9,710	9,605
Idaho	44,683	53,102	49,967
Maine	391,480	394,067	485,682
Michigan	2,255,485	2,471,416	2,589,200
Minnesota	107,667	131,004	108,852
Montana	168,805	198,745	155,723
New York	NA	1,910,176	1,995,820
North Dakota	NA	340,301	328,337
Vermont	NA	226,109	284,606
Washington	715,663	497,405	597,453
Total U.S. - Canada border	NA	6,232,035	6,605,245

Key: NA = Not available.

Note: Full or empty truck containers entering the U.S. The data include containers moving as in-bond shipments.

Most trucks enter the United States through only four states: Texas, Michigan, New York, and California. Three border crossings — Detroit, MI, Buffalo-Niagara, NY, and Port Huron, MI — account for most trucks entering the US from Canada. Three border crossings — Laredo, TX, Otay Mesa/San Ysidro, CA, and El Paso, TX — account for nearly two thirds of trucks coming in to the United States from Mexico.

Table 2-5: Incoming Truck Container Crossings by State, U.S.-Mexican Border

State	1998	2000	2003
Arizona	318,185	322,160	310,948
California	860,684	947,311	1,091,189
New Mexico	31,699	35,507	32,039
Texas	2,502,358	2,895,703	2,911,050
Total U.S. - Mexico border	3,712,926	4,200,681	4,345,226

Note: Full or empty truck containers entering the U.S. The data include containers moving as in-bond shipments.

TABLE 2-4. INCOMING TRUCK CONTAINER CROSSINGS BY STATE, U.S.-CANADIAN BORDER

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, special tabulation 2004, based on data from U.S. Customs Service, Mission Support Services, Office of Field Operations, Operations Management Database.

TABLE 2-5. INCOMING TRUCK CONTAINER CROSSINGS BY STATE, U.S.-MEXICAN BORDER

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, special tabulation 2004, based on data from U.S. Customs Service, Mission Support Services, Office of Field Operations, Operations Management Database.

Most freight trains enter the United States through five states: Michigan, Texas, Minnesota, New York, and North Dakota. Three border crossings — Port Huron, MI, Detroit, MI, and International Falls, MN — account for more than half of all containers coming in to the U.S. from Canada by rail. One border crossing, Laredo, TX, accounts for almost three quarters of all containers coming in to the United States from Mexico by rail.

Table 2-6: Incoming Rail Container Crossings by State, U.S.-Canadian Border

State	1998	2000	2003
Alaska	N	N	N
Idaho	37,579	50,240	74,499
Maine	46,882	60,358	31,843
Michigan	587,317	679,747	757,819
Minnesota	215,899	250,943	306,966
Montana	23,729	25,255	28,176
New York	140,422	257,155	257,930
North Dakota	NA	154,698	219,001
Vermont	43,551	51,069	52,427
Washington	82,828	65,372	121,250
Total U.S. - Canada border	1,178,207	1,594,837	1,849,911

Key: N = not applicable; NA = not available.

Note: Full or empty rail containers entering the U.S. The data include containers moving as in-bond shipments.

Table 2-7: Incoming Rail Container Crossings by State, U.S.-Mexican Border

State	1998	2000	2003
Arizona	35,812	50,602	45,685
California	7,755	9,115	10,702
New Mexico	N	N	N
Texas	344,339	512,108	551,088
Total U.S. - Mexico border	387,906	571,825	607,475

Key: N = not applicable.

Note: Full or empty rail containers entering the U.S. The data include containers moving as in-bond shipments.

TABLE 2-6. INCOMING RAIL CONTAINER CROSSINGS BY STATE, U.S.-CANADIAN BORDER

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, special tabulation 2004, based on data from U.S. Customs Service, Mission Support Services, Office of Field Operations, Operations Management Database.

TABLE 2-7. INCOMING RAIL CONTAINER CROSSINGS BY STATE, U.S.-MEXICAN BORDER

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, special tabulation 2004, based on data from U.S. Customs Service, Mission Support Services, Office of Field Operations, Operations Management Database.

Table 2-8. Top 25 Airports by Landed Weight of All-Cargo Operations¹

Airport	2002 Rank	Landed weight (thousands of short tons)		
		2000	2001	2002
Anchorage, AK (Ted Stevens Anchorage International) ²	1	8,084	7,777	8,994
Memphis, TN (Memphis International)	2	6,318	6,865	8,826
Louisville, KY (Louisville International-Standiford Field)	3	3,987	4,026	4,202
Miami, FL (Miami International)	4	2,929	3,055	3,174
Los Angeles, CA (Los Angeles International)	5	2,892	2,929	3,038
New York, NY (John F. Kennedy International)	6	2,793	2,543	2,912
Indianapolis, IN (Indianapolis International)	7	2,884	3,154	2,338
Chicago, IL (O'Hare International)	8	2,062	2,012	2,217
Newark, NJ (Newark Liberty International)	9	1,961	1,795	1,758
Oakland, CA (Metropolitan Oakland International)	10	1,811	1,639	1,746
Fort Worth, TX (Dallas/Fort Worth International)	11	1,691	1,546	1,481
Philadelphia, PA (Philadelphia International)	12	1,454	1,452	1,466
Ontario, CA (Ontario International)	13	1,220	1,291	1,444
Atlanta, GA (William B. Hartsfield International)	14	1,090	1,043	1,166
Covington/Cincinnati, OH (Cincinnati/Northern Kentucky International)	15	912	980	1,043
San Francisco, CA (San Francisco International)	16	1,267	1,012	1,035
Honolulu, HI (Honolulu International)	17	692	789	970
Dayton, OH (James M. Cox Dayton International)	18	2,233	1,444	897
Seattle, WA (Seattle-Tacoma International)	19	1,060	958	881
Phoenix, AZ (Sky Harbor International)	20	920	838	867
Portland, OR (Portland International)	21	882	807	816
Denver, CO (Denver International)	22	900	803	783
Boston, MA (Logan International)	23	703	651	636
Rockford, IL (Greater Rockford)	24	654	681	630
Orlando, FL (Orlando International)	25	672	611	623
Top 25 airports		52,070	50,701	53,942
United States, all airports³		74,754	71,426	73,433
Top 25 as % of U.S. total		69.7%	71.0%	73.5%

¹All-Cargo operations are aircraft operations dedicated to the exclusive transportation of cargo. This does not include aircraft carrying passengers that may also be carrying cargo. Aircraft landed weight is the certificated maximum gross landed weight of the aircraft as specified by the aircraft manufacturers.

²Anchorage includes a large proportion of all-cargo operations in-transit.

³Limited to airports with an aggregate landed weight in excess of 100 million pounds (50,000 short tons) annually.

Note: 1 short ton = 2,000 lbs.

Two airports, Anchorage International and Memphis International, handle the largest amount of cargo (both domestic and foreign) landing by aircraft dedicated to freight transportation (so-called “all cargo” aircraft). Memphis International is also one of the fastest growing all-cargo airports in the top 25. Both Memphis International and Honolulu International grew 40 percent in terms of landed weight in all-cargo operations between 2000 and 2002.

TABLE 2-8. TOP 25 AIRPORTS BY LANDED WEIGHT OF ALL-CARGO OPERATIONS¹

Source: U.S. Department of Transportation, Federal Aviation Administration, ACAIS Database Report F5, CY 2002 and CY 2000, available at <http://www2.faa.gov/arp/planning/stats> as of December 16, 2003.

More than one-half of the hazardous material shipped from a location in the United States goes by truck. Ton-miles of hazardous materials transportation is nearly equal for truck, rail, and water modes, however, because rail and water shipments tend to be longer than those by truck.

Table 2-9. U.S. Hazardous Materials Shipments by Mode: 1997

Transportation mode	Value		Tons		Ton-miles	
	\$ Billion	Percent	Millions	Percent	Billions	Percent
All modes, total	466.4	100.0	1,565.2	100.0	263.8	100.0
Single modes, total	452.7	97.1	1,541.7	98.5	258.9	98.1
Truck ¹	298.2	63.9	869.8	55.6	74.9	28.4
For-hire	134.3	28.8	336.4	21.5	45.2	17.1
Private ²	160.7	34.5	522.7	33.4	28.8	10.9
Rail	33.3	7.1	96.6	6.2	74.7	28.3
Water	27.0	5.8	143.2	9.1	68.2	25.9
Air	8.6	1.8	0.1	Z	0.1	Z
Pipeline ³	85.7	18.4	432.1	27.6	S	S
Multiple modes, total	5.7	1.2	6.0	0.4	3.1	1.2
Parcel, U.S. Postal Service or courier	2.9	0.6	0.1	Z	0.1	Z
Other	2.9	0.6	5.9	0.4	3.0	1.1
Unknown and other modes, total	7.9	1.7	17.5	1.1	1.8	0.7

Key: S = data are not published because of high sampling variability or other reasons; Z = zero or less than 1 unit of measure.

¹Truck as a single mode includes shipments that went by private truck only, for-hire truck only, or a combination of both. ² Private truck refers to a truck operated by a temporary or permanent employee of an establishment or the buyer/receiver of the shipment.

³Excludes most shipments of crude oil.

TABLE 2-9. U.S. HAZARDOUS MATERIALS SHIPMENTS BY TRANSPORTATION MODE: 1997

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, U.S. Department of Commerce, U.S. Census Bureau, *1997 Commodity Flow Survey, Hazardous Materials* (Washington, DC:

December 1999), table 1.



Flammable liquids, predominantly gasoline, are the major hazardous material transported in the United States. In terms of ton-miles, flammable liquids account for about 60 percent of total ton-miles of hazardous materials shipments. The next largest class of hazardous materials in ton-miles is corrosive materials (such as sodium hydroxide) at about 15 percent.

Table 2-10. U.S. Hazardous Materials Shipments by Hazard Class: 1997

Hazard class	Description	Value		Tons		Ton-miles	
		\$ Billions	Percent	Millions	Percent	Billions	Percent
Class 1	Explosives	4.3	0.9	1.5	0.001	S	S
Class 2	Gases	40.9	8.8	115.0	7.3	21.8	8.3
Class 3	Flammable liquids	335.6	72.0	1,264.3	80.8	160.0	60.6
Class 4	Flammable solids	3.9	0.8	11.8	0.8	9.6	3.6
Class 5	Oxidizers and organic peroxides	4.5	1.0	9.2	0.6	4.5	1.7
Class 6	Toxics	10.1	2.2	6.4	0.4	2.8	1.1
Class 7	Radioactive materials	2.7	0.6	0.1	Z	0.05	Z
Class 8	Corrosive materials	40.4	8.7	91.6	5.9	41.2	15.6
Class 9	Miscellaneous dangerous goods	23.9	5.1	65.3	4.2	22.7	8.6
Total		466.4	100.0	1,565.2	100.0	263.8	100.0

Key: S = data are not published because of high sampling variability or other reasons; Z = zero or less than 1 unit of measure.

Table 2-11. Percent Share of Total Domestic Freight Activity by Mode: 1996

Mode	Canada	France	Germany	Italy	Japan	United Kingdom	United States
Air	0.14	0.08	0.01	0.11	0.09	0.01	0.29
Water	9.2	5.2	17.6	13.0	58.0	23.6	20.5
Oil pipeline	23.9	9.0	4.1	4.7	NA	5.5	16.6
Rail	50.5	20.7	19.6	8.7	3.1	6.3	36.3
Road	16.3	65.0	58.6	73.5	38.1	64.7	26.4

Key: NA = not available.

Despite the enormous amount of freight being moved by truck in the United States, the United States moves a much smaller share of its goods domestically by truck and a much greater share of goods by rail than countries in western Europe and Japan.

TABLE 2-10. U.S. HAZARDOUS MATERIALS SHIPMENTS BY HAZARD CLASS: 1997

Source: U.S. Department of Transportation, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, *1997 Commodity Flow Survey, Hazardous Materials* (Washington, DC: December 1999), table 2.

TABLE 2-11. PERCENT SHARE OF TOTAL DOMESTIC FREIGHT ACTIVITY BY MODE: 1996

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, *G-7 Countries: Transportation Highlights*, BTS99-01 (Washington, DC: 1999), available at www.bts.gov as of August 26, 2004.