FREIGHT FACTS AND FIGURES 2004

OFFICE OF FREIGHT MANAGEMENT AND OPERATIONS

U.S. Department of Transportation
Federal Highway Administration

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Freight Facts and Figures 2004 is a snapshot of the volume and value of freight flows in the United States, the physical network over which freight moves, the economic conditions that generate freight movements, the industry that carries freight, and the safety, energy, and environmental consequences of freight transportation. This snapshot helps planners, decisionmakers, and the public understand the magnitude and importance of freight transportation in the global economy. An electronic version of this publication is also available on www.ops.fhwa.dot.gov/freight.

OFFICE OF FREIGHT MANAGEMENT AND OPERATIONS

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I. THE NATION SERVED BY FREIGHT

Freight transportation has grown dramatically with the growth and spread of population and economic activity within the United States, and with the increasing interdependence of economies across the globe. The U.S. population grew by 27 percent between 1980 and 2002, while the economy, measured by Gross Domestic Product (GDP), nearly doubled in real terms. Other indicators of economic growth such as employment and household income have also risen, by 37 percent and 16 percent respectively. Foreign trade has grown faster than the overall economy, more than doubling between 1980 and 2002, reflecting unprecedented global interconnectivity.

	1980	1990	2000	2002	Percent change, 1980 to 2002
Resident population (thousands)	227,225	249,623	282,224	288,369	26.9
Households (thousands)	80,776	93,347	104,705	109,927	36.1
Median household income ($2000)	35,057	38,256	41,990	40,612	15.8
Civilian labor force (thousands)	106,940	125,840	142,583	144,863	35.5
Employed (thousands)	99,303	118,793	136,891	136,485	37.4
Agriculture (percent)	3.4	2.7	2.5	2.4	-0.7
Mining	1.0	0.6	0.4	0.4	-47.3
Construction	6.3	6.5	7.0	7.1	55.6
Manufacturing	22.1	18.0	14.8	13.3	-17.3
Transportation, communication, and other public utilities	6.6	6.9	7.2	7.1	48.4
Wholesale and retail trade	20.3	20.7	20.6	20.6	39.2
Finance, insurance, and real estate	6.0	6.8	6.4	6.7	52.3
Services	29.0	33.1	36.7	37.9	79.9
Public administration	5.4	4.7	4.4	4.5	15.8
Business establishments (thousands)	NA	6,176	7,070	NA	NA
Governments	[1]81,831	[2]85,006	NA	87,576	7.0
Gross domestic product ($2000 millions)	5,161,664	7,112,492	9,816,969	10,083,009	95.3
Foreign trade ($2000 millions)	1,041,907	1,411,117	2,515,491	2,276,438	118.5
Goods (percent)	84.2	76.9	79.4	78.0	102.5
Services (percent)	15.8	23.1	20.6	22.0	203.3

Key: NA = not available. [1]1982 [2]1992

TABLE 1-1. ECONOMIC AND SOCIAL CHARACTERISTICS OF THE UNITED STATES
Sources: Unless otherwise stated all data from: U.S. Department of Commerce, U.S. Census Bureau, *Statistical Abstract of the United States: 2003* (Washington, 2003), available at http://www.census.gov/statab/www/ as of June 10, 2004.
Median Household Income: U.S. Department of Commerce, U.S. Census Bureau, Historical Income Tables, table H-6, available at www.census.gov/hhes/income/histinc/h0601.html as of August 23, 2004.
Gross Domestic Product: U.S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts, Gross Domestic Product, available at www.bea.doc.gov as of June 10, 2004.
Foreign trade: U.S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts, U.S. International Transactions, available at www.bea.doc.gov as of June 10, 2004.

Economic activity and the demand for freight transportation are no longer concentrated almost exclusively in the Northeast manufacturing belt of the United States, with raw materials flowing from the South and West. Population, employment, and income figures show a spread of economic activity throughout the United States.

Table 1-2. Population and Gross State Product (GSP) by Region

	1980	1990	2000	2001	Percent change, 1980 to 2002
Resident population (thousands)	**226,546**	**248,791**	**281,423**	**285,318**	**26**
Northeast	49,136	50,828	53,594	53,950	10
Midwest	58,868	59,670	64,390	64,820	10
South	75,372	85,454	100,235	101,955	35
West	43,173	52,837	63,198	64,593	50
GSP ($2000 millions)	**5,054,549**	**6,994,329**	**9,891,180**	**9,902,150**	**96**
Northeast	1,107,283	1,604,121	2,138,194	2,144,044	94
Midwest	1,262,917	1,566,939	2,158,477	2,134,236	69
South	1,608,531	2,220,755	3,257,418	3,285,346	104
West	1,075,817	1,602,514	2,337,090	2,338,524	117
GSP per capita ($2000)	**22,311**	**28,113**	**35,147**	**34,706**	**56**
Northeast	22,535	31,560	39,896	39,741	76
Midwest	21,453	26,260	33,522	32,926	53
South	21,341	25,988	32,498	31,789	51
West	24,919	30,329	36,980	36,204	45

Demand for freight transportation is expected to grow with increases in population and economic activity. Over the next ten years the U.S. economy is projected to increase by 38 percent and the U.S population by 9 percent. Transportation and warehousing employment is expected to increase by 22 percent over this period, faster than employment as a whole at 15 percent.

Figure 1-1. Economic and Population Projections: 2002 to 2012 (Index, 2002 = 100)

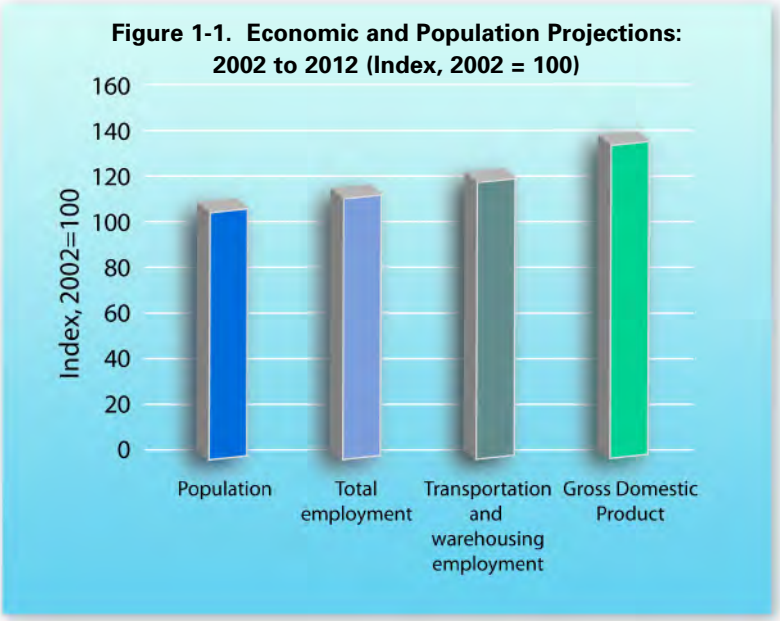


TABLE 1-2. Population and Gross State Product (GSP) by Region
Sources: U.S. Department of Commerce, U.S. Census Bureau, *Statistical Abstract of the United States: 2003* (Washington: 2003); and Bureau of Economic Analysis, Regional Economic Accounts, available at http://www.bea.doc.gov/bea/regional/gsp/ as of June 11, 2004.

FIGURE 1-1. Economic and Population Projections, 2002 to 2012 (Index, 2002 = 100)
Sources: Population: U.S. Department of Commerce, U.S. Census Bureau, *Statistical Abstract of the United States: 2003* (Washington, 2003), available at http://www.census.gov/statab/www as of June 10, 2004.; Employment: U.S. Department of Labor, Bureau of Labor Statistics, BLS Releases 2002-12 Employment Projection, press release, February 11, 2004, table 1, available at www.bls.gov as of June 23, 2004; Gross Domestic Product: Congressional Budget Office, *The Budget and Economic Outlook: Fiscal Years 2003-2012* (Washington, DC: 2002), available at http://www.cbo.gov as of June 24, 2004.

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

	Tons (millions)			Value ($ billions)		
Mode	**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.
[1]Other 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)

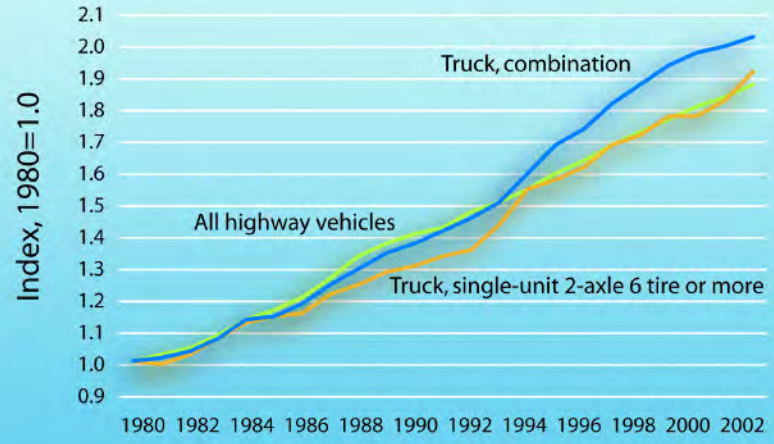
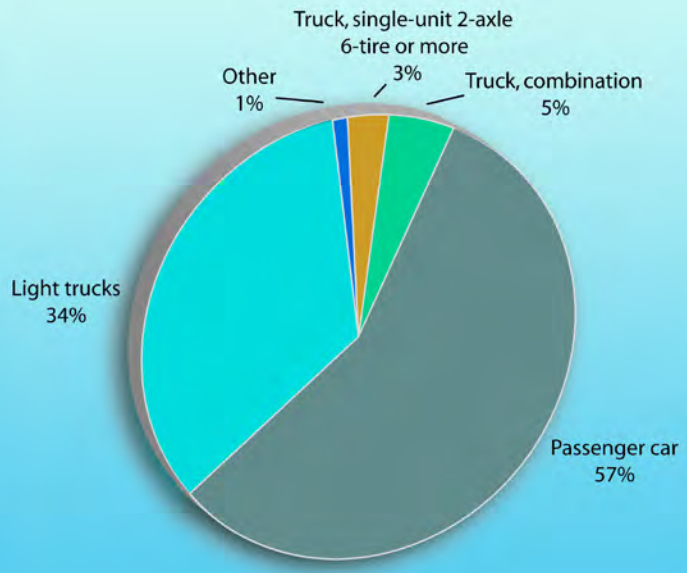


TABLE 2-1. Freight Shipments by Weight and Value
Source: U.S. Department of Transportation, Federal Highway Administration, Freight Analysis Framework, 2002.

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.

Figure 2-2. Highway Vehicle-Miles of Travel by Vehicle Type: 2002



Note: "Other" comprises bus and motorcycle. Light trucks include pickups, minivans, and sport utility vehicles.

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 2-3. Estimated Average Daily Truck Traffic: 1998

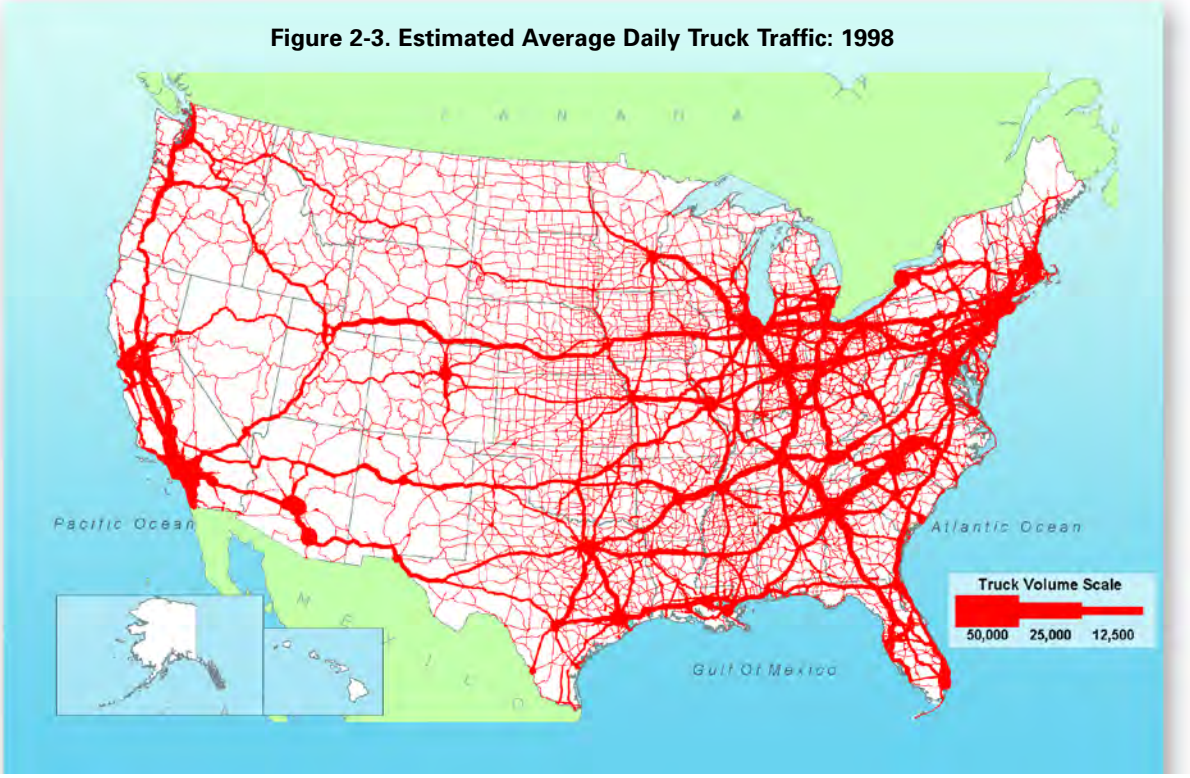
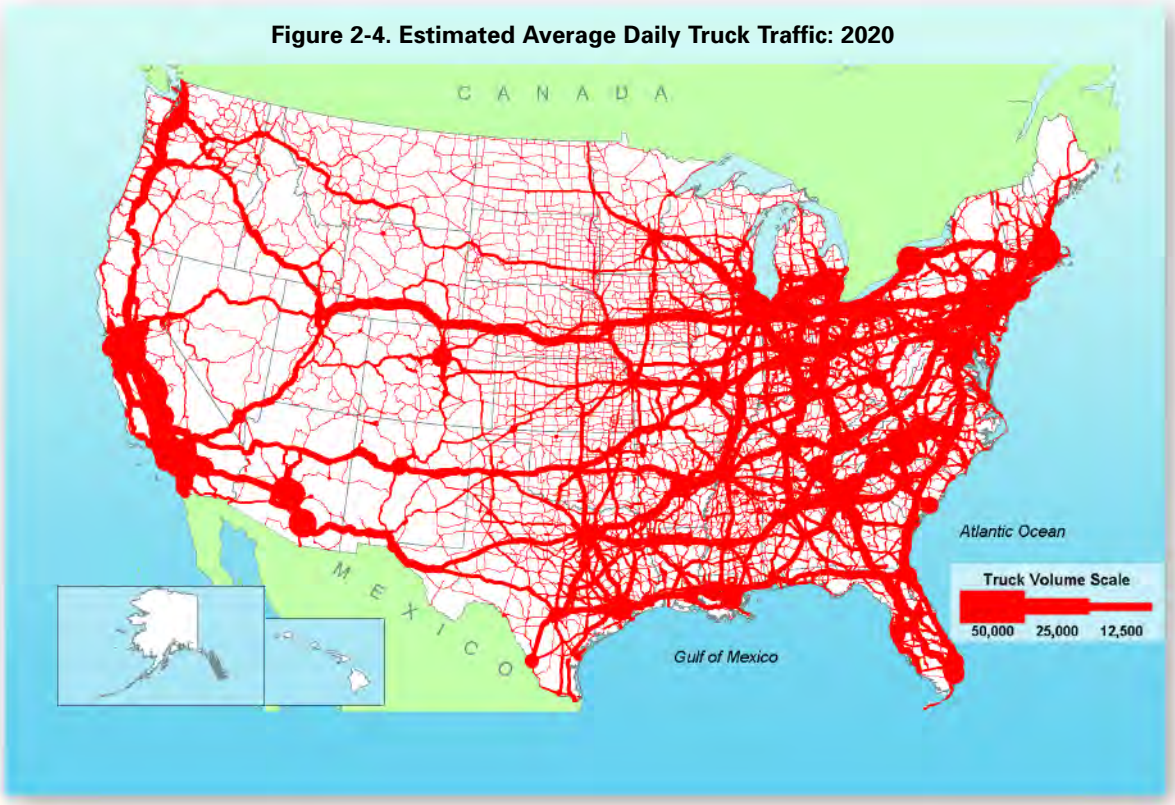


FIGURE 2-2. Highway Vehicle-Miles of Travel by Vehicle Type: 2002
Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues), table VM-1, available at www.fhwa.dot.gov/ohim/ohimstat.htm as of July 14, 2004.

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.

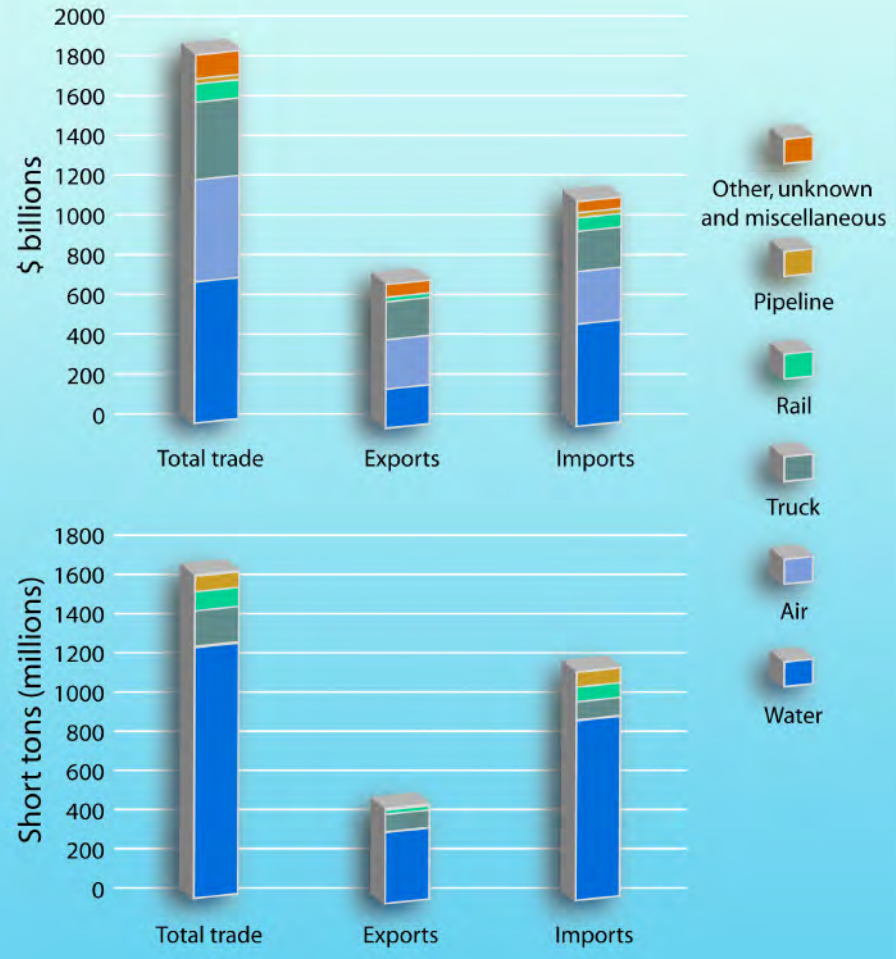
Figure 2-4. Estimated Average Daily Truck Traffic: 2020



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)

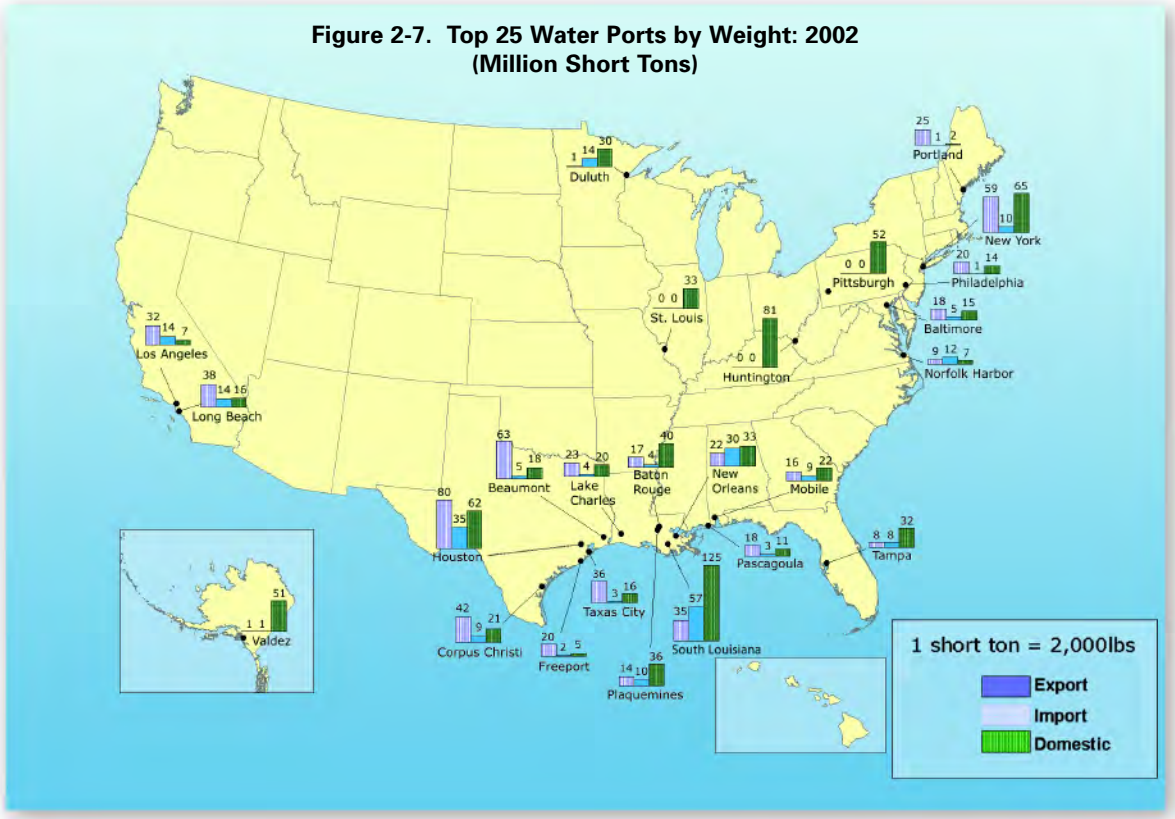
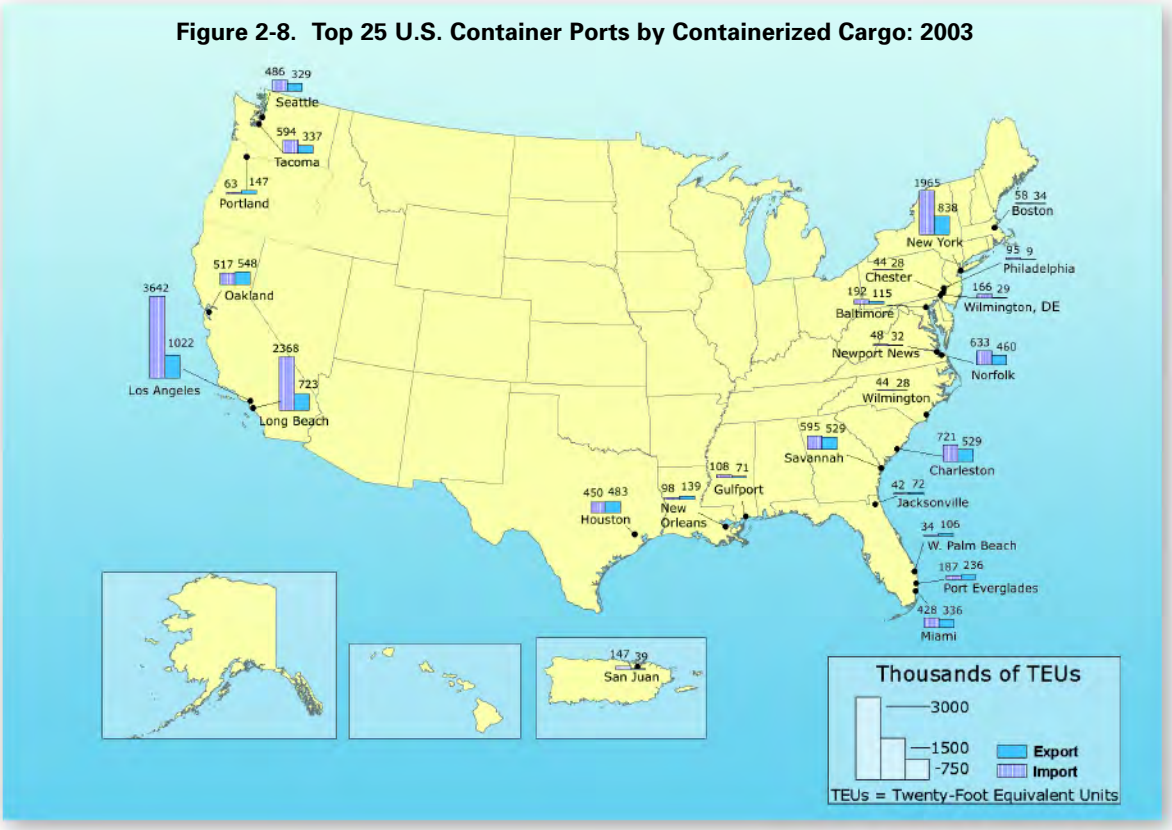


FIGURE 2-6. Top 25 U.S. Foreign Trade Freight Gateways by Value: 2003 ($ billions)
Source: U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics 2004*, (Washington, DC: forthcoming)

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

	1997		2000		2001	
Mode	**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.
[1]Other 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 (NATFA) 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.
[1]Other 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.
[2]Foreign 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 Operations[1]

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 airports [3]		**74,754**	**71,426**	**73,433**
Top 25 as % of U.S. total		**69.7%**	**71.0%**	**73.5%**

[1]All-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.
[2]Anchorage includes a large proportion of all-cargo operations in-transit.
[3]Limited 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 Operations[1]
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

	Value		Tons		Ton-miles	
Transportation mode	**$ 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.
[1]Truck 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.
[3]Excludes 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

		Value		Tons		Ton-miles	
Hazard class	**Description**	**$ 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 (Washingon, DC: 1999), available at www.bts.gov as of August 26, 2004.

III. THE FREIGHT TRANSPORTATION SYSTEM

Freight is carried via an extensive network of roads, railroad, waterways, and pipelines. Road infrastructure has increased slowly over the past two decades despite a large increase in the volume of traffic. Between 1980 and 2002, route miles of public roads increased by 3 percent compared with a 101 percent increase in vehicle-miles traveled. Miles of railroad dropped by more than 20 percent over this same period, while rail shipments (measured in ton-miles) increased by 64 percent.

Table 3-1. Miles of Infrastructure by Mode

	1980	1990	2000	2002	Percent change, 1980-2002
Public roads, route miles	3,859,837	3,866,926	3,951,099	3,981,671	3.2
National Highway System (NHS)	N	N	161,189	161,537	N
Interstates	41,120	45,074	46,675	46,747	13.7
Other NHS	N	N	114,514	114,790	N
Freight intermodal connectors [1]	N	N	N	1,791	N
Other	N	N	9,910	3,820,134	N
Strategic Highway Corridor Network (STRAHNET)	N	N	62,066	62,792	N
Interstate	N	N	46,675	46,747	N
Non-Interstate	N	N	15,389	16,045	N
Railroad	183,077 [2]	175,909	170,512	141,391	-22.8
Class I	NA	133,189	120,597	99,943	NA
Regional	NA	18,375	20,978	15,048	NA
Local	NA	24,337	28,937	26,400	NA
Inland waterways					
Navigable channels	11,000	11,000	11,000	11,000	0.0
Great Lakes-St. Lawrence Seaway	2,342	2,342	2,342	2,342	0.0
Pipelines					
Oil	218,393	208,752	176,996	NA	NA
Gas	1,051,774	1,206,894	1,379,500	1,432,700	36.2

Key: N = not applicable; NA = not available.
[1] Excludes intermodal connectors serving intercity bus, Amtrak, and public transit facilities.
[2] Excludes Class III railroads.

TABLE 3-1. MILES OF INFRASTRUCTURE BY MODE
Sources: Public roads: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, (Washington, DC: Annual issues).
Intermodal connectors: U.S. Department of Transportation, Federal Highway Administration, Office of Planning, National Highway System Intermodal Connectors, available at http://www.fhwa.dot.gov/hep10/nhs/intermodalconnectors/index.html as of August 24, 2004.
Rail: Association of American Railroads, *Railroad Facts* (Washington, DC: various issues).
Navigable channels: U.S. Army Corps of Engineers.
Great Lakes-St. Lawrence Seaway: Great Lakes-St. Lawrence Seaway System, "Seaway Facts," available at http://www.greatlakes-seaway.com/en/aboutus/seawayfacts.html as of May 11, 2004.
Oil pipelines: Eno Transportation Foundation, Inc., *Transportation in America, 2002* (Washington, DC: 2002).
Gas pipelines: American Gas Association, *Gas Facts* (Arlington, VA: Annual issues).

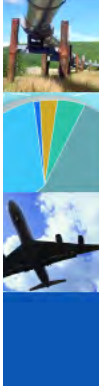
Table 3-2. Number of U.S. Vehicles, Vessels, and Other Conveyances

	1980	1990	2000	2001	2002
Highway	**161,490,159**	**193,057,376**	**225,821,241**	**235,331,381**	**234,624,135**
Truck, single-unit 2-axle 6-tire or more	4,373,784	4,486,981	5,926,030	5,703,500	5,650,619
Truck, combination	1,416,869	1,708,895	2,096,619	2,154,174	2,276,661
Truck, total	5,790,653	6,195,876	8,022,649	7,857,674	7,927,280
Trucks as percent of all highway vehicles	3.6	3.2	3.6	3.3	3.4
Rail					
Class I, locomotive	28,094	18,835	20,028	19,745	20,506
Class I, freight cars [1]	1,168,114	658,902	560,154	499,860	477,751
Nonclass I freight cars [1]	102,161	103,527	132,448	125,470	130,590
Car companies and shippers freight cars [1]	440,552	449,832	688,194	688,806	691,329
Water	**38,788**	**39,445**	**41,354**	**41,588**	**41,002**
Nonself-propelled vessels [2]	31,662	31,209	33,152	33,042	32,381
Self-propelled vessels [3]	7,126	8,236	8,202	8,546	8,621
Oceangoing steam and motor ships [4]	864	636	454	443	426
US Flag fleet as percent of world fleet [4]	3.5	2.7	1.6	1.6	1.5

[1]Beginning with 2001 data, Canadian-owned U.S. railroads are excluded. This accounts for about 47,000 cars in 2000.
[2]Nonself-propelled vessels include dry-cargo barges, tank barges, and railroad-car floats.
[3]Self-propelled vessels include dry cargo, passenger, off-shore support, tankers, and towboats.
[4]1,000 gross tons and over.

A vast number of vehicles and vessels are used to move goods over the transportation network. The number of commercial trucks has climbed steadily over the past twenty years, but their share of the total highway vehicle fleet remained constant. The total number of commercial trucks grew by nearly 40 percent between 1980 and 2002. The character of the fleet has changed, however, as the number of combination trucks grew twice as fast as the number of single-unit trucks over this period, 60 percent versus 30 percent. The number of rail freight cars has declined since 1980 as newer cars typically have greater capacity than older ones.

TABLE 3-2. NUMBER OF U.S. VEHICLES, VESSELS, AND OTHER CONVEYANCES
Sources: Highway: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues).
Rail: Association of American Railroads, *Railroad Facts 2003* (Washington, DC: 2003).
Water: Nonself-propelled vessels and self-propelled vessels: U.S. Army, Corps of Engineers, *Waterborne Transportation Lines of the United States, Volume 1, National Summaries* (New Orleans, LA : Annual issues).
Oceangoing steam motor ships: U.S. Department of Transportation, Maritime Administration, *Merchant Fleets of the World* (Washington, DC: Annual issues).



Most heavy truck mileage is made in the carriage of commodities. Only about 10 percent of truck miles are made for other reasons such as carrying household goods, garbage, and craftsmen's equipment.

The average weight of heavy trucks (those over 10,000 pounds) using the road system diverged between 1987 and 1997. The number of light-heavy trucks (10,000 to 19,500 pounds) and heavy-heavy trucks (over 26,000 pounds) both grew by 40 percent over this period. At the same time, the number of medium-heavy trucks (19,501 to 26,000 pounds) declined by 5 percent. VMT grew in all weight classes, but showed the same general pattern with faster growth in the light-heavy and the heavy-heavy categories and slower growth in the medium-heavy category. The 60,000 to 80,000 pounds average weight category is the largest both in number of trucks and VMT because in most cases 80,000 pounds is the maximum allowed on the highway system.

Table 3-3. Truck Miles by Primary Load Carried[1] (millions of miles)

Primary Load carried	1992	1997
Total	**116,580**	**157,364**
Farm products	8,638	10,020
Live animals	2,543	2,767
Animal feed	2,022	2,172
Mining products	1,383	1,553
Logs and other forest products	3,097	3,705
Lumber and fabricated wood products	3,801	5,087
Processed foods	17,547	23,742
Textile mill products	2,523	4,944
Building materials	12,041	15,571
Furniture or hardware	2,894	3,278
Paper products	5,255	6,404
Chemicals	3,935	4,999
Petroleum	4,581	4,942
Plastics and/or rubber	1,887	2,710
Primary metal products	3,778	4,747
Fabricated metal products	2,894	3,359
Machinery	3,678	7,400
Transportation equipment	5,197	6,298
Glass products	587	626
Miscellaneous products of manufacturing	2,920	5,196
Industrial "waste" water	201	210
Mixed cargoes	10,787	18,412
Recyclable products	878	1,286
Hazardous waste (EPA manifest)	424	466
Hazardous waste (non-EPA manifest)	115	83
Household goods	2,072	4,015
Scrap, refuse, or garbage	2,528	3,326
Craftsman's equipment	3,924	5,047
Personal transportation	996	953
Passengers	117	277
No load carried	1,905	1,794
Other and not reported [2]	1,431	1,976

[1] Excludes pickups, panels, minivans, sport utilities, and station wagons
[2] Includes vehicles which, though licensed, were not operated or were wrecked or inoperative for more than 6 months during 1997.

TABLE 3-3. Truck Miles for Trucks, Excluding Pickups, Panels, Minivans, Sport Utilities, and Station Wagons (millions of miles)
Source: U.S. Department of Commerce, U.S. Census Bureau, *Vehicle Inventory and Use Survey 1997: United States* (Washington, DC: 1999), available at http://www.census.gov/svsd/www/97vehinv.html as of August 17, 2004.

Because of its effect on roads and bridges, governments at all levels are very concerned with truck weight. Truck weight enforcement activity, measured by the number of weighs, has increased over the past few years. Less than 1 percent of weighs discover violations.

Table 3-4. Number and Vehicle Miles Traveled (VMT) of Trucks by Average Weight (Including Vehicle and Load)[1]

	1987		1992		1997		Percent change, 1987-1997	
Average weight (pounds)	Number (thousands)	VMT (millions)	Number (thousands)	VMT (millions)	Number (thousands)	VMT (millions)	Number	VMT
Total	**3,624**	**89,972**	**4,008**	**104,987**	**4,701**	**147,873**	**30**	**64**
Light-heavy	**1,030**	**10,768**	**1,259**	**14,012**	**1,436**	**19,815**	**39**	**84**
10,001 to 14,000	525	5,440	694	8,000	819	11,502	56	111
14,001 to 16,000	242	2,738	282	2,977	316	3,951	31	44
16,001 to 19,500	263	2,590	282	3,035	301	4,362	15	68
Medium-heavy	**766**	**7,581**	**732**	**8,143**	**729**	**10,129**	**-5**	**34**
19,501 to 26,000	766	7,581	732	8,143	729	10,129	-5	34
Heavy-heavy	**1,829**	**71,623**	**2,017**	**82,832**	**2,536**	**117,930**	**39**	**65**
26,001 to 33,000	377	5,411	387	5,694	428	7,092	13	31
33,001 to 40,000	209	4,113	233	5,285	257	6,594	23	60
40,001 to 50,000	292	7,625	339	9,622	400	13,078	37	72
50,001 to 60,000	188	7,157	227	8,699	311	12,653	66	77
60,001 to 80,000	723	45,439	781	51,044	1,070	74,724	48	64
80,001 to 100,000	28	1,254	33	1,529	46	2,427	64	94
100,001 to 130,000	8	440	12	734	18	1,051	129	139
130,001 or more	4	185	5	227	6	312	34	69

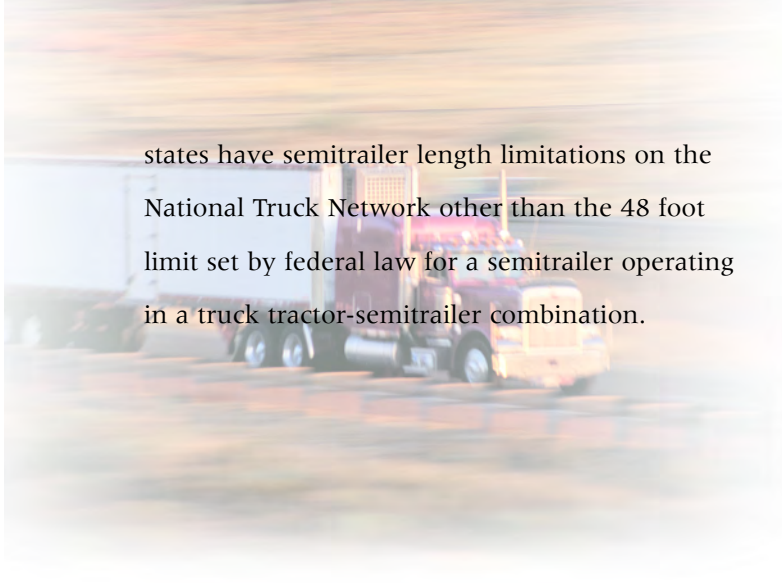
[1]Excludes trucks with an average weight of 10,000 pounds or less.
Note: Weight includes the empty weight of the vehicle plus the average weight of the load carried.

In addition to weight, state and federal governments are also interested in the length and other characteristics of commercial trucks using the road system. Twenty nine

Table 3-5. Commercial Vehicle Weight Enforcement Activities

	2000	2001	2002	2003
All weighs	192,991,221	198,459,894	208,429,680	177,369,377
Weigh-in-motion	92,908,114	98,177,442	106,662,180	95,078,759
Static weighs [1]	100,103,107	100,282,452	101,861,470	82,290,618
Semiportable scales	NA	902,380	592,604	522,758
Fixed scales	NA	98,751,448	99,710,078	81,276,662
Portable scales	NA	628,624	1,558,788	491,198
Violations [2]	653,720	663,706	657,308	515,587
Axle weight violations	NA	281,681	271,308	254,910
Gross weight violations	NA	141,707	144,518	132,258
Bridge weight violations	NA	240,318	241,482	128,419
Permits [3]	3,483,746	3,402,522	3,566,236	3,544,449
Non-divisible trip permits	NA	2,685,971	2,603,257	2,629,392
Non-divisible annual permits	NA	197,328	251,245	234,607
Divisible trip permits	NA	226,100	240,782	258,206
Divisible annual permits	NA	289,400	422,522	377,482
Divisible overwidth permits	NA	3,723	48,430	44,762

Key: NA = not available.
[1]Static weighs include the total vehicles weighed from semiportable, portable, and fixed scales.
[2]Violations include those from axle, gross, and bridge formula weight limits.
[3]Permits issued are for divisible and non-divisible loads on a trip or annual basis, as well as the overwidth movement of a divisible load.



states have semitrailer length limitations on the National Truck Network other than the 48 foot limit set by federal law for a semitrailer operating in a truck tractor-semitrailer combination.

Table 3-6. Semitrailer Length Limitations On National Truck Network by State (48 Feet Unless Otherwise Specified)

State	Length limitation (feet and inches)
Alabama	53-6
Arizona	57-6
Arkansas	53-6
California [1]	48-0
Colorado	57-4
Delaware	53-0
Illinois	53-0
Indiana [2]	48-6
Iowa	53-0
Kansas	57-6
Kentucky	53-0
Louisiana	59-6
Mississippi	53-0
Missouri	53-0
Montana	53-0
Nebraska	53-0
Nevada	53-0
New Mexico	57-6
North Dakota	53-0
Ohio	53-0
Oklahoma	59-6
Oregon	53-0
Pennsylvania	53-0
Rhode Island	48-6
South Dakota	53-0
Tennessee	50-0
Texas	59-0
Wisconsin [3]	48-0
Wyoming	57-4

[1]Semitrailers up to 53 feet may also operate without a permit by conforming to a kingpin-to-rearmost axle distance of 38 feet.
[2]Semitrailers up to 53 feet in length may operate without a permit by conforming to a kingpin-to-rearmost axle distance of 40 feet and 6 inches. Semitrailers that are consistent with 23 CFR 23 658.13(h) may operate without a permit provided the distance from the kingpin to the center of the rear axle is 46 feet or less.
[3]Semitrailers up to 53 feet in length may operate without a permit by conforming to a kingpin-to-rearmost axle distance of 41 feet, measured to the center of the rear tandem assembly. Semitrailers that are consistent with 23 CFR 658.13(h) may operate without a permit provided the distance from the kingpin to the center of the rear axle is 46 feet or less.
Note: The National Truck Network is the composite of the individual network of highways from each state on which vehicles authorized by the Surface Transportation Assistance Act of 1982 are allowed to operate.

TABLE 3-4. Number and Vehicle Miles Traveled (VMT) of Trucks by Average Weight (Including Vehicle and Load)1
Sources: U.S. Department of Commerce, U.S. Census Bureau, *1997 Vehicle Inventory and Use Survey: United States* (Washington, DC: 1999), available at http://www.census.gov/econ/www/viusmain.html as of July 1, 2004; U.S. Department of Commerce, U.S. Census Bureau, *1992 Truck Inventory and Use Survey: United States* (Washington, DC: 1995), available at http://www.census.gov/econ/www/viusmain.html as of July 1, 2004.

TABLE 3-5. Commercial Vehicle Weight Enforcement Activities
Source: U.S. Department of Transportation, Federal Highway Administration, Annual State Certifications of Size and Weight Enforcement on Federal-aid Highways, as prescribed under CFR Part 657.

TABLE 3-6. Semitrailer Length Limitations On National Truck Network by State (48 Feet Unless Otherwise Specified)
Source: U.S. Department of Transportation, Federal Highway Administration, Truck Size and Weight, Route Designations - Length, Width and Weight Limitations, *Code of Federal Regulations*, Title 23, Part 658.

Another important variable for road users is the speed limit. Speed limits for trucks vary from state to state and often differ with limits set for passenger vehicles.

Table 3-7. Maximum Posted Speed Limits on Rural Interstates: September 2004 (miles per hour)

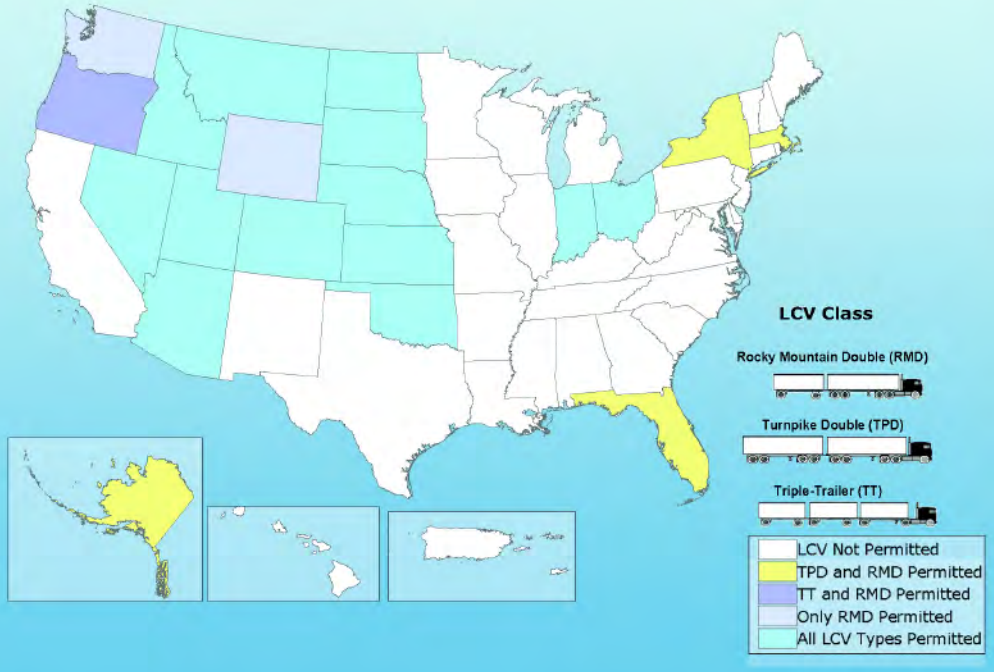
State	Truck	Car
Alabama	70	70
Alaska	65	65
Arizona	75	75
Arkansas	65	70
California	55	70
Colorado	75	75
Connecticut	65	65
Delaware	65	65
District of Columbia[1]	55	55
Florida	70	70
Georgia	70	70
Hawaii	60	60
Idaho	65	75
Illinois	55	65
Indiana	60	65
Iowa	65	65
Kansas	70	70
Kentucky	65	65
Louisiana	70	70
Maine	65	65
Maryland	65	65
Massachusetts	65	65
Michigan	55	70
Minnesota	70	70
Mississippi	70	70
Missouri	70	70
Montana	65	75
Nebraska	75	75
Nevada	75	75
New Hampshire	65	65
New Jersey	65	65
New Mexico	75	75
New York	65	65
North Carolina	70	70
North Dakota	75	75
Ohio	55	65
Oklahoma	75	75
Oregon	55	65
Pennsylvania	65	65
Rhode Island	65	65
South Carolina	70	70
South Dakota	75	75
Tennessee	70	70
Texas	65	75
Utah	75	75
Vermont	65	65
Virginia	65	65
Washington	60	70
West Virginia	70	70
Wisconsin	65	65
Wyoming	75	75

[1]Urban Interstate.
Note: 55 miles per hour (mph) = 89 kilometers per hour (kph); 60 mph = 97 kph; 65 mph = 105 kph; 70 mph = 113 kph.

TABLE 3-7. MAXIMUM POSTED SPEED LIMITS ON RURAL INTERSTATES: SEPTEMBER 2004 (MILES PER HOUR)

Source: Insurance Institute for Highway Safety, Maximum Posted Speed Limits for Passenger Vehicles as of September 2004, available at http://www.hwysafety.org/safety_facts/state_laws/speed_limit_laws.htm as of September 8. 2004.

Figure 3-1. Permitted Longer Combination Vehicles (LCVs) by State and Truck Configuration



Fourteen states and six state turnpike authorities allow at least one type of Longer Combination Vehicle (LCV) on at least some parts of the road network.

As highway traffic increases over the next twenty years, the conditions that truckers will encounter on the roads are expected to worsen considerably (figures 3-2 and 3-3).

FIGURE 3-1. PERMITTED LONGER COMBINATION VEHICLES (LCVS) BY STATE AND TRUCK CONFIGURATIONSource: U.S. Department of Transportation, Federal Highway Administration, *Comprehensive Truck Size and Weight Study, Volume II* (Washington, DC: 2000).

Figure 3-2. National Highway System Estimated Peak Period Congestion: 1998

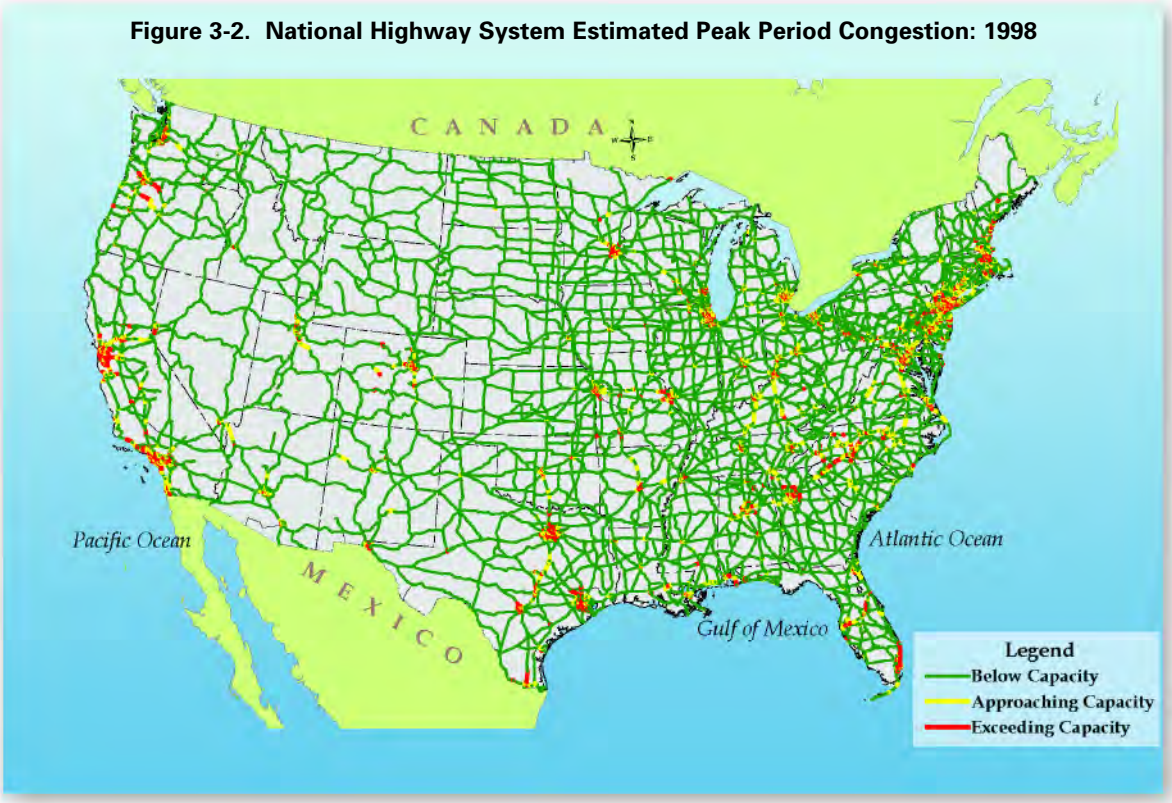


Figure 3-3. National Highway System Estimated Peak Period Congestion: 2020

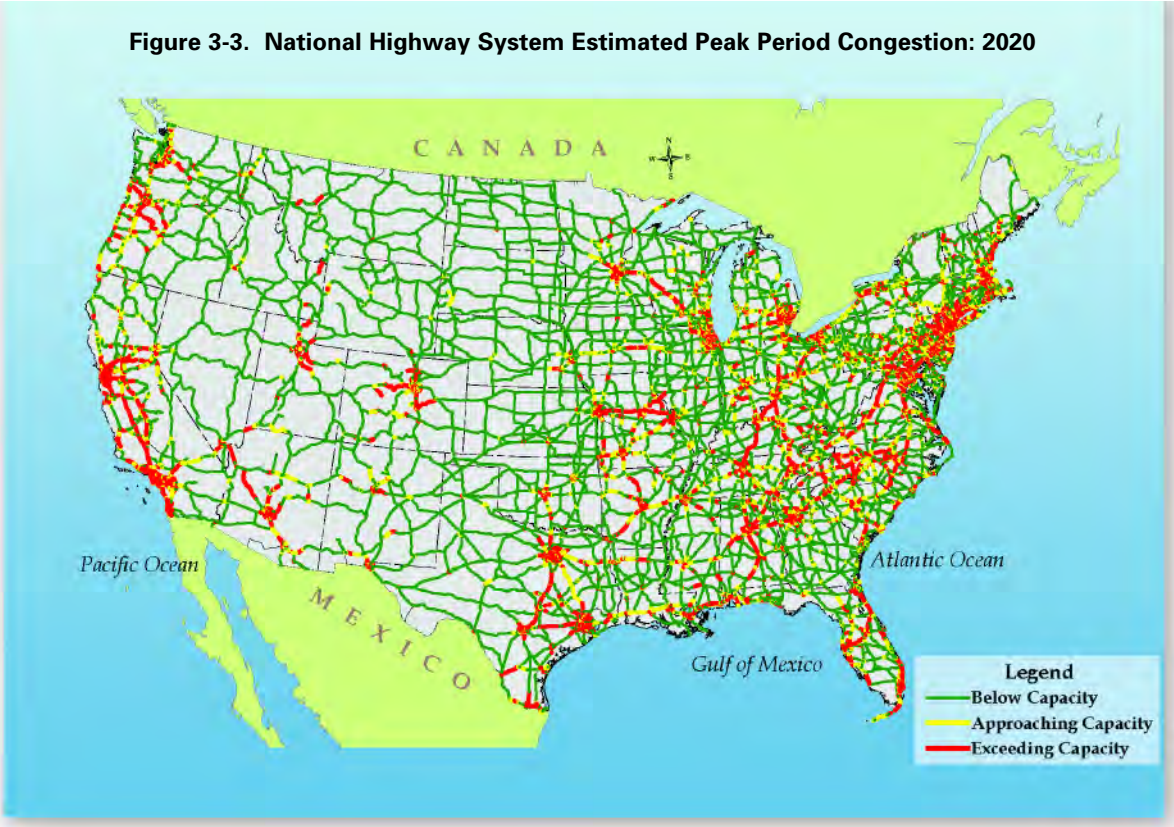


FIGURE 3-2. National Highway System Estimated Peak Period Congestion: 1998
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework.

FIGURE 3-3. National Highway System Estimated Peak Period Congestion: 2020
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework.

IV. THE FREIGHT TRANSPORTATION INDUSTRY

The freight industry has many components, encompassing companies large and small. All told there were about 200,000 transportation and warehousing establishments in 2002, with more than half of those primarily engaged in trucking. Trucking revenue accounts for about 35 to 40 percent of the transportation and warehousing sector, including revenue from railroading (at about $37 billion according to the Association of American Railroads). Revenue generated by warehousing is a small percentage of the entire transportation and warehousing sector.

Table 4-1. Economic Characteristics of Transportation and Warehousing in Freight Dominated Modes North American Industry Classification System (NAICS) Basis

	Establishments		Revenue ($ thousands)		Payroll ($ thousands)		Paid Employees	
	1997	2002	1997	2002	1997	2002	1997	2002
Transportation and warehousing[1]	**178,025**	**200,706**	**318,245,044**	**S**	**346,182,**	**116,767,289**	**2,920,777**	**3,751,022**
Rail transportation	NA	NA	NA	NA	NA	NA	NA	NA
Water transportation	1,921	1,954	24,019,168	26,651,477	2,834,114	3,110,424	72,857	69,017
Truck transportation [1]	103,798	113,237	141,225,398	167,151,284	38,471,272	47,465,798	1,293,790	1,464,877
Pipeline transportation	2,311	2,410	26,836,992	27,845,032	2,660,576	3,389,781	49,280	51,089
Support activities for transportation	30,675	34,458	39,758,245	62,524,885	12,592,441	17,837,033	411,640	519,278
Couriers and messengers	10,887	12,540	39,812,433	54,735,251	14,071,630	17,083,438	530,839	584,939
Warehousing and storage [1]	6,497	12,123	10,657,925	S	2,926,119	15,890,514	109,760	534,768

Key: NA = not available; S = estimates do not meet publication standards because of high sampling variability or poor response quality.
[1]Enterprise support establishments are included in 2002 but not 1997, thus the two years are not comparable.
Notes: Total includes air transportation, transit and ground passenger transportation, and scenic and sightseeing transportation. Data are for establishments in which transportation is the primary business. Data exclude transportation provided privately, such as trucking organized "in-house" by a grocery company. Data are not collected for rail transportation nor for governmental organizations even when their primary activity would be classified in industries covered by the census. For example, data are not collected for publicly-operated buses and subway systems. Data for 2002 are preliminary and subject to change.

Table 4-2. Economic Characteristics of Freight Railroads: 2002

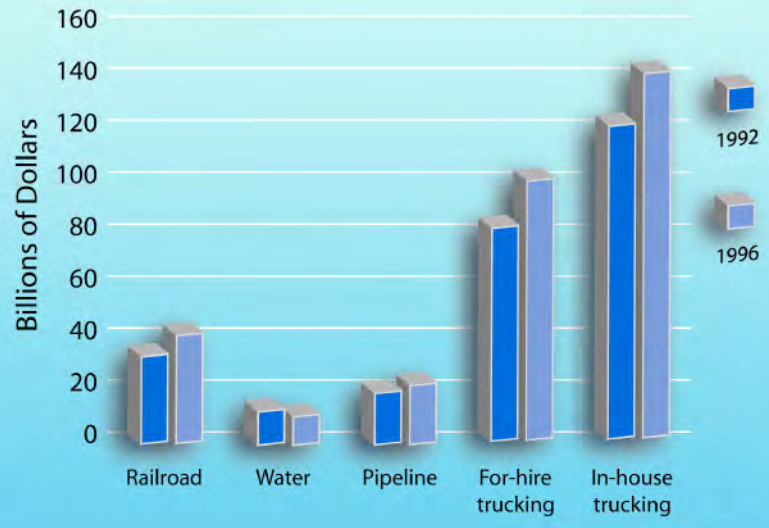
	Class I	Non-Class I	Total
Number of railroads	7	545	552
Freight revenue (billions $)	34.1	2.8	36.9
Operating revenue (billions $)	35.3	NA	NA
Employees	157,372	19,688	177,060

Key: NA = not available.

TABLE 4-1. ECONOMIC CHARACTERISTICS OF TRANSPORTATION AND WAREHOUSING IN FREIGHT DOMINATED MODES NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS) BASIS
Source: U.S. Department of Commerce, U.S. Census Bureau, *2002 Economic Census: Table 2. Advance Comparative Statistics for the United States, 1997 NAICS Basis,* available at http://www.census.gov/econ/census02/advance/TABLE2.htm.

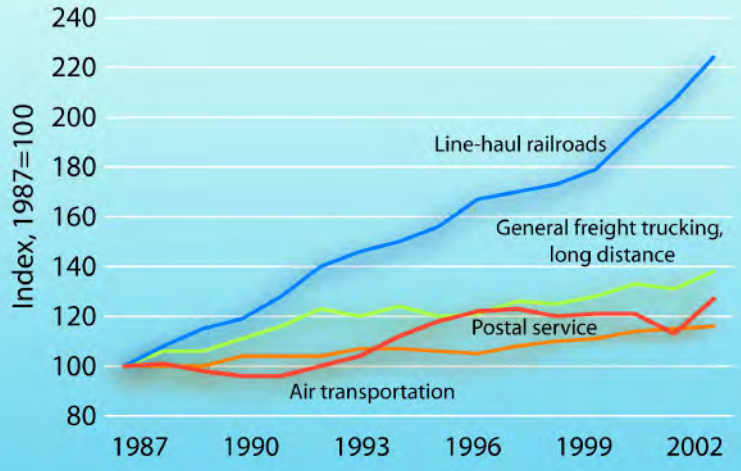
TABLE 4-2. ECONOMIC CHARACTERISTICS OF FREIGHT RAILROADS: 2002
Source: Association of American Railroads, *U.S. Freight Railroad Statistics* (Washington, DC: 2004), available at http://www.aar.org/PubCommon/Documents/AboutTheIndustry/Statistics.pdf as of August 24, 2004.

Figure 4-1. Value Added by Freight Transportation to GDP by Mode



In general, moving goods is cheaper now than in the past. Productivity has improved in both long distance railroading and long distance trucking over the past decade, but much more quickly in rail than road transportation. Between 1987 and 2002, output per hour worked more than doubled in line-haul railroading but grew only 40 percent in long distance, general freight trucking. Line-haul railroads primarily engage in operating railroads for the transport of passengers and/or cargo over a long distance within a rail network. These establishments do not include switching and terminal operations nor short distance (or local) railroads. Long distance, general freight trucking establishments are operations other than those primarily engaged in local trucking and specialized trucking. Specialized trucking establishments are primarily engaged in the transportation of freight which, because of size, weight, shape, or other inherent characteristics, requires specialized equipment, such as flatbeds, tankers, or refrigerated trailers.

Figure 4-2: Productivity in Selected Transportation Industries: 1987-2002 (Output per Employee,[1] Index, 1987 = 100)



[1]Based on the number of paid hours. Real gross domestic product in the business and nonfarm business sectors is the basis of the output components of the productivity measures. These output components are based on and are consistent with the National Income and Product Accounts (NIPA), including the gross domestic product (GDP) measure, prepared by the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce.

Employment in many transportation industries has remained steady or has grown over the past two decades, but it has plummeted in rail transportation as productivity has soared. Between 1980 and 2003,

rail employment declined nearly 60 percent. Consequently, in 2003 rail transportation employed only 5 percent of those working in the transportation and warehousing industry compared with 18 percent in 1980. By comparison, employment in trucking, in 2003, accounted for about one-third of employment in transportation and warehousing.

Table 4-3. Employment in For-Hire Transportation Primarily Serving Freight[1] (Thousands)

	1980	1990	2000	2003
Total U.S. labor force [2]	**90,528**	**109,487**	**131,785**	**129,931**
Transportation and warehousing	**2,961**	**3,476**	**4,410**	**4,177**
Rail transportation	518	272	232	215
Water transportation	NA	57	56	53
Truck transportation	NA	1,122	1,406	1,328
Pipeline transportation	NA	60	46	40
Support activities for transportation	NA	364	537	516
Postal service	673	825	880	809
Couriers and messengers	NA	375	605	567
Warehousing and storage	NA	407	514	522

Key: NA = not available.
[1]Annual averages.
[2]Excludes farm employment.
Note: These data include workers employed in transportation industries but not necessarily in a transportation occupation, such as a lawyer working for a trucking company. Moreover, these data exclude workers in transportation occupations employed by non-transportation industries, such as a truck driver employed by a retail company.

Freight transportation is a big part of the economy. The value generated by transportation services in moving goods and people on the transportation system is about 5 percent of GDP. In the transportation services sector about 60 percent of the value is generated by for-hire transportation services and the rest is generated by "in-house" transportation (transportation provide by businesses for their own use). In-house trucking accounted for $142 billion in GDP in 1996 and for-hire trucking accounted for $101 billion.

FIGURE 4-1. Value Added by Freight Transportation to GDP by Mode
Source: U.S. Department of Transportation, Bureau of Transportation Statistics, special tabulation, September 2000.

FIGURE 4-2: Productivity in Selected Transportation Industries: 1987-2002 (Output per Employee, Index, 1987 = 100)
Source: U.S. Department of Labor, Bureau of Labor Statistics, Industry Productivity, available at http://www.bls.gov/ as of March 2004.

TABLE 4-3. Employment in For-Hire Transportation Primarily Serving Freight (Thousands)
Source: U.S. Department of Labor, Bureau of Labor Statistics, Current Employment Statistics survey, available at www.bls.gov as of July 15, 2004.

Freight transportation is a major employer, with truck driving by far the largest freight transportation and freight transportation-related occupation in the United States. In 2002, there were approximately 2.9 million truck drivers, including driver/sales workers. Of these 2.9 million drivers about 53 percent drive heavy/tractor trailer trucks, 34 percent drive light/delivery service trucks, and about 13 percent are drivers/sales workers.

Table 4-4. Employment in Selected Freight Transportation and Freight Transportation-Related Occupations

Occupation (SOC code)	1999	2001	2002
Vehicle operators, pipeline operators, and primary support			
Driver/sales worker (53-3031)	385,210	378,220	368,730
Truck drivers, heavy and tractor-trailer (53-3032)	1,558,400	1,548,480	1,520,880
Truck drivers, light or delivery services (53-3033)	1,085,050	996,000	977,920
Locomotive engineers (53-4011)	19,940	30,730	28,250
Rail yard engineers, dinkey operators, and hostlers (53-4013)	5,070	4,840	4,600
Railroad brake, signal, and switch operators (53-4021)	14,500	17,070	15,030
Railroad conductors and yardmasters (53-4031)	36,680	40,910	38,070
Sailors and marine oilers (53-5011)	27,200	28,650	25,360
Captains, mates, and pilots of water vessels (53-5021)	20,660	22,180	22,530
Ship engineers (53-5031)	6,800	7,470	8,020
Bridge and lock tenders (53-6011)	6,970	4,500	3,900
Gas compressor and gas pumping station operators (53-7071)	6,940	6,070	6,920
Pump operators, except wellhead pumpers (53-7072)	13,480	12,920	12,360
Transportation equipment manufacturing and maintenance occupations			
Bus and truck mechanics and diesel engine specialists (49-3031)	273,320	254,420	254,470
Rail car repairers (49-3043)	7,230	11,860	13,520
Transportation Infrastructure construction and maintenance occupations			
Rail-track laying and maintenance equipment operators (47-4061)	8,620	11,680	10,450
Signal and track switch repairers (49-9097)	3,720	8,550	7,990
Dredge operators (53-7031)	1,910	2,920	2,850
Secondary support service occupations			
Dispatchers, except police, fire, and ambulance (43-5032)	171,560	170,050	168,380
Postal service mail carriers (43-5052)	352,550	355,120	347,420
Shipping, receiving, and traffic clerks (43-5071)	886,230	802,600	792,470
Transportation inspectors (53-6051)	22,440	27,670	28,340
Tank car, truck, and ship loaders (53-7121)	20,830	19,430	16,960

Key: SOC = Standard Occupational Classification.

TABLE 4-4. EMPLOYMENT IN SELECTED FREIGHT TRANSPORTATION AND FREIGHT TRANSPORTATION-RELATED OCCUPATIONS
Source: U.S. Department of Labor, Bureau of Labor Statistics, *Occupational Employment and Wages, 2002* (Washington, DC: November 2003), available at http://www.bls.gov/oes as of July 6, 2004.

V. SAFETY, ENERGY, AND ENVIRONMENTAL CONSEQUENCES OF FREIGHT TRANSPORTATION

As freight grows to a larger share of total transportation activity, its negative aspects become a larger part of the safety, energy, and environmental consequences of transportation. Particularly in environmental matters, freight is only now being separated from the air quality and other problems of general traffic. Most of our current knowledge is in safety, with some in energy consumption. More knowledge is needed to understand and fix the problems.

Table 5-1. Transportation Fatalities by Freight Transportation Mode

	1980	1990	2000	2003[5]
Total transportation fatalities (passenger and freight)	**NA**	**47,347**	**44,333**	**NA**
Highway (passenger and freight)	**51,091**	**44,599**	**41,945**	**42,643**
Large truck occupants [1]	1,262	705	754	723
Others killed in crashes involving large trucks	4,709	4,567	4,528	4,263
Large truck occupants [1] (percent)	2.5	1.6	1.8	1.7
Others killed in crashes involving large trucks (percent)	9.2	10.2	10.8	10.0
Railroad (passenger and freight)	**1,417**	**1,297**	**937**	**856**
Highway-rail crossing [2]	833	698	425	324
Railroad [2,3]	584	599	512	532
Waterborne (passenger and freight)	**487**	**186**	**137**	**76**
Vessel-related [4]	206	85	49	28
Freight ship	8	0	0	3
Tank ship	4	5	0	0
Tug / towboat	14	13	0	8
Offshore supply	NA	2	2	0
Fishing vessel	60	47	28	15
Mobile offshore drilling units	NA	0	0	0
Platform	NA	1	0	0
Freight barge	NA	0	1	0
Tank barge	NA	0	0	0
Miscellaneous	56	11	4	2
Not vessel-related [4]	281	101	88	48
Pipeline	**19**	**9**	**38**	**12**
Hazardous liquid pipeline	4	3	1	0
Gas pipeline	15	6	37	12

Key: NA not available.
[1]Large trucks are defined as trucks over 10,000 pounds gross vehicle weight rating, including single-unit trucks and truck tractors.
[2]Includes Amtrak.
[3]Includes train accidents and other incidents. Most fatalities are trespassers who are included under other incidents (499 in 2003).
[4]Vessel-related casualties include those involving damage to vessels such as collisions or groundings. Fatalities not related to vessel casualties include deaths from falling overboard or from accidents involving onboard equipment.
[5]Railroad fatalities are preliminary. Waterborne fatalities are for 2002.
Note: Caution must be exercised in comparing fatalities across modes because significantly different definitions are used.

Nearly 5,000 people died in crashes involving large trucks in 2003, although only 723 of those were large truck occupants. Fatalities involving large trucks are about 12 percent of all highway fatalities, while trucks account for about 8 percent of highway VMT. Despite a rise in the amount of large truck travel, the number of fatalities involving large trucks declined 16 percent from 1980 to 2003.

TABLE 5-1. Transportation Fatalities by Freight Transportation Mode
Sources: U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics 2004* (Washington, DC: forthcoming).

Table 5-2. Injured Persons by Freight Transportation Mode

	1980	1990	2000	2003[5]
TOTAL injured persons (passenger and freight)	**NA**	**NA**	**3,240,424**	**NA**
Highway (passenger and freight)	**NA**	**3,231,000**	**3,189,000**	**2,889,000**
Large truck occupants [1]	N	42,000	31,000	27,000
Others injured in crashes involving large trucks	N	108,000	109,000	95,000
Large truck occupants [1] (percent)	N	1.3	1.0	0.9
Others injured in crashes involving large trucks (percent)	N	3.3	3.4	3.3
Railroad (passenger and freight)	**62,246**	**25,143**	**11,643**	**8,872**
Highway-rail grade crossing [2]	3,890	2,407	1,219	997
Railroad [2,3]	58,356	22,736	10,424	7,875
Waterborne (passenger and freight)	**NA**	**NA**	**697**	**676**
Vessel-related [4]	180	175	130	157
Freight ship	NA	10	4	7
Tank ship	NA	13	3	0
Tug / towboat	NA	19	10	17
Offshore supply	NA	9	5	0
Fishing vessel	NA	31	24	41
Mobile offshore drilling units	NA	13	0	0
Platform	NA	9	1	0
Freight barge	NA	3	2	0
Tank barge	NA	3	0	0
Miscellaneous	NA	12	6	9
Not related to vessel casualties [4]	NA	NA	567	519
Pipeline	**192**	**76**	**81**	**71**
Hazardous liquid pipeline	15	7	4	5
Gas pipeline	177	69	77	66

Key: NA = not available.
[1]Large trucks are defined as trucks over 10,000 pounds gross vehicle weight rating, including single-unit trucks and truck tractors.
[2] Includes Amtrak. [3]Includes train accidents and other incidents. Most injuries (5,950 in 2003) involve workers on duty.
[4]Vessel-related injuries include those involving damage to vessels, such as collisions or groundings. Injuries not related to vessel casualties include those from falls overboard or from accidents involving onboard equipment.
[5]Railroad injuries are preliminary. Waterborne fatalities are for 2002.
Note: Numbers may not add to totals due to some injuries being counted in more than one mode.

About 120,000 people are injured each year in freight transportation. Like fatalities, most injuries involve trucks. Yet, these injuries account for less than 5 percent of the total number of people injured on the highway each year. Approximately, 10 percent of injures are the result of non-highway related incidents, mostly railroading. Since 1980, railroading has become much safer with a drop in injuries of more than 80 percent.

TABLE 5-2. Injured Persons by Freight Transportation Mode
Sources: U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics 2004* (Washington, DC: forthcoming).

Large trucks were involved in about 7 percent of all highway crashes in 2003. The estimated number of crashes in 2003 is up about 23 percent since 1990, a good deal less than the roughly 50 percent increase in truck miles driven over the same period.

Table 5-3. Transportation Accidents by Freight Transportation Mode

	1980	1990	2000	2003[5]
Highway (passenger and freight)	**NA**	**6,471,000**	**6,394,000**	**6,328,000**
Large truck[1]	NA	372,000	438,000	457,000
Large truck[1] (percent of total)	NA	5.7	6.9	7.2
Rail (passenger and freight)				
Highway-rail grade crossing [2,3]	10,796	5,715	3,502	2,928
Railroad [2,4]	8,205	2,879	2,983	2,950
Waterborne (passenger and freight)				
Vessel-related	4,624	3,613	3,887	4,110
Pipeline				
Hazardous liquid pipeline	246	180	147	128
Gas pipeline	1,524	198	234	241

Key: NA = not available.
[1]Large trucks are defined as trucks over 10,000 pounds gross vehicle weight rating, including single-unit trucks and truck tractors.
[2]Includes Amtrak. [3]Includes both accidents and incidents. Most highway-rail grade crossing accidents are also counted under highway. [4]Train accidents only.
[5]Railroad fatalities are preliminary. Waterborne fatalities are for 2002.

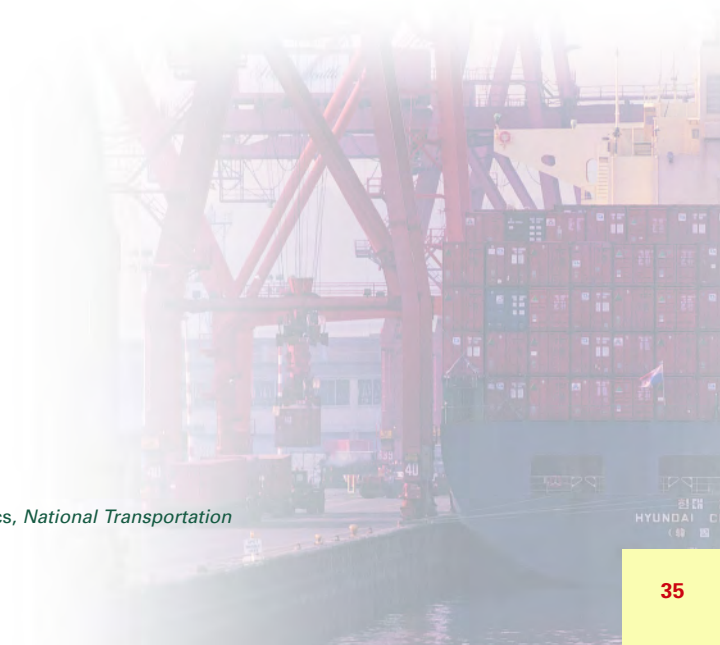


TABLE 5-3. Transportation Accidents by Freight Transportation Mode
Sources: U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics 2004* (Washington, DC: forthcoming).

Table 5-4. Hazardous Materials Transportation Incidents

	1980	1990	2000	2003
Total	**15,719**	**8,879**	**17,556**	**15,191**
Accident-related	486	297	390	318
Air	**223**	**297**	**1,419**	**753**
Accident-related	0	0	1	0
Highway	**14,161**	**7,296**	**15,062**	**13,615**
Accident-related	347	249	327	276
Rail	**1,271**	**1,279**	**1,058**	**813**
Accident-related	134	48	62	42
Water[1]	**34**	**7**	**17**	**10**
Accident-related	2	0	0	0
Other[2]	**30**	**0**	**0**	**0**
Accident-related	3	0	0	0

[1]Water category only includes packaged (nonbulk) marine. Non-packaged (bulk) marine hazardous materials incidents are reported to the U.S. Coast Guard and are not included.
[2]Other category includes freight forwarders and modes not otherwise specified.
Notes: Hazardous materials transportation incidents required to be reported are defined in the Code of Federal Regulations (CFR), 49 CFR 171.15, 171.16 (Form F 5800.1). Hazardous materials deaths and injuries are caused by the hazardous material in commerce. Accident related means vehicular accident or derailment. Each modal total also includes incidents caused by human error, package failure, and causes not elsewhere classified.

Because most hazardous materials are transported by road, most incidents related to hazardous materials transportation are on the highways. In 2003, 90 percent of all incidents were highway related. Moreover, 85 percent of injuries and all fatalities in hazardous materials transportation, a total of five, occurred in highway transportation.

A very small share of hazardous material transportation incidents are the result of vehicular accident or derailment (known as "accident-related"). In 2003, only 2 percent of incidents were accident-related. Most incidents occur because of human error or package failure, particularly during loading and unloading. While only 2 percent of incidents were accident-related in 2003, they accounted for nearly three quarters of all property damage.

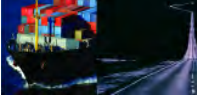
Table 5-5. Commercial Motor Carrier Compliance Review Activity by Safety Rating

	1999		2001		2003	
Safety rating	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Satisfactory	3,485	47.9	4,904	58.0	4,995	59.9
Conditional	2,543	34.9	2,524	29.9	2,346	28.1
Unsatisfactory	1,122	15.4	749	8.9	757	9.1
Not rated	128	1.8	274	3.2	242	2.9
Total	**7,278**	**100.0**	**8,451**	**100.0**	**8,340**	**100.0**

Note: A compliance review is an on-site examination of a motor carrier's records and operations to determine whether the carrier meets the Federal Motor Carrier Safety Administration's safety fitness standard. This entails having adequate safety management controls in place to ensure acceptable compliance with applicable safety requirements to reduce the risk associated with: alcohol and controlled substance testing violations; commercial driver's license standard violations; inadequate levels of financial responsibility; the use of unqualified drivers; improper use and driving of motor vehicles; unsafe vehicles operating on the highways; failure to maintain crash registers and copies of crash reports; the use of fatigued drivers; inadequate inspection, repair, and maintenance of vehicles; transportation of hazardous materials; driving and parking rule violations; violation of hazardous materials regulations; motor vehicle crashes and hazardous materials incidents.

TABLE 5-4. Hazardous Materials Transportation Incidents
Source: U.S. Department of Transportation, Research and Special Programs Administration, Office of Hazardous Materials Safety, Hazardous Materials Information System Database, available at http://hazmat.dot.gov as of July 16, 2004.

TABLE 5-5. Commercial Motor Carrier Compliance Review Activity by Safety Rating
Source: U.S. Department of Transportation, Federal Motor Carrier Administration, Motor Carrier Management Information System (MCMIS), June 25, 2004 data snapshot, available at http://www.fmcsa.dot.gov/ as of October 2004.



The safety fitness of motor carriers has improved markedly over the past few years. In 2003, the share of motor carriers being rated satisfactory was 60 percent, up from 48 percent in 1999.

Almost a quarter of roadside inspections of commercial vehicles result in the vehicle being taken out-of-service (OOS) for a serious violation. A much lower percentage of driver and hazardous materials inspections result in OOS orders. In 2002, only 7 percent of driver inspections and 6 percent of hazardous materials inspections resulted in an OOS order.

Table 5-6. Roadside Safety Inspection Activity Summary By Inspection Type

	2000		2001		2002	
	Number	Percent	Number	Percent	Number	Percent
All inspections						
Number of inspections	2,453,776	100.0	2,747,829	100.0	3,017,080	100.0
With no violations	639,593	26.1	743,577	27.1	831,974	27.6
With violations	1,814,183	73.9	2,004,252	72.9	2,185,106	72.4
Driver inspections						
Number of inspections	2,396,688	100.0	2,685,568	100.0	2,959,934	100.0
With no violations	1,459,538	60.9	1,657,098	61.7	1,871,238	63.2
With violations	937,150	39.1	1,028,470	38.3	1,088,696	36.8
With OOS violations	191,031	8.0	204,120	7.6	212,942	7.2
Vehicle inspections						
Number of inspections	1,908,300	100.0	2,073,386	100.0	2,175,558	100.0
With no violations	584,389	30.6	604,303	29.1	664,938	30.6
With violations	1,323,911	69.4	1,469,083	70.9	1,510,620	69.4
With OOS violations	452,850	23.7	484,546	23.4	498,251	22.9
Hazardous materials inspections						
Number of inspections	133,486	100.0	186,024	100.0	173,905	100.0
With no violations	101,098	75.7	148,955	80.1	139,643	80.3
With violations	32,388	24.3	37,069	19.9	34,262	19.7
With OOS violations	9,964	7.5	10,280	5.5	9,986	5.7

Key: OOS = out of service.
Note: A roadside inspection is an examination of individual commercial motor vehicles and drivers to determine if they are in compliance with the Federal Motor Carrier Safety Regulations and/or Hazardous Materials Regulations. Serious violations result in the issuance of driver or vehicle out of service (OOS) orders. These violations must be corrected before the driver or vehicle can return to service. Moving violations also may be recorded in conjunction with a roadside inspection.

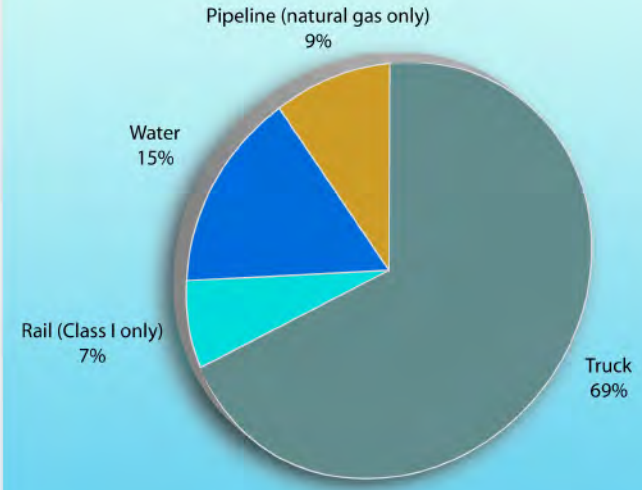
TABLE 5-6. Roadside Safety Inspection Activity Summary By Inspection Type
Source: U.S. Department of Transportation, Federal Motor Carrier Administration, Motor Carrier Management Information System (MCMIS), September 19, 2003 data snapshot, available at www.fmcsa.dot.gov as of October 2004.

Table 5-7. Fuel Consumption by Transportation Mode

	1980	1990	2000	2002
Highway				
Gasoline, diesel and other fuels (million gallons)	114,960	130,755	162,555	167,730
Truck, total	19,960	24,490	35,229	36,756
Single-unit 2-axle 6-tire or more truck	6,923	8,357	9,563	10,305
Combination truck	13,037	16,133	25,666	26,451
Truck (percent of total)	17.4	18.7	21.7	21.9
Rail, Class I (in freight service)				
Distillate / diesel fuel (million gallons)	3,904	3,115	3,700	3,730
Water				
Residual fuel oil (million gallons)	8,952	6,326	6,410	4,848
Distillate / diesel fuel oil (million gallons)	1,478	2,065	2,261	2,079
Gasoline (million gallons)	1,052	1,300	1,124	1,081
Pipeline				
Natural gas (million cubic feet)	634,622	659,816	642,210	667,027

In addition to safety concerns, freight transportation also has major implications for energy use and the environment. The number of gallons of fuel burned by commercial trucks has nearly doubled over the past twenty years, while fuel use in several other modes has declined. Between 1980 and 2002, the fuel consumed in highway freight transportation increased from 20 billion to 37 billion gallons annually. This is due to a substantial increase in the number of trucks on the road, an increase in the average number of miles traveled per truck, and a doubling of truck vehicle miles traveled (vmt). Over the same period, fuel use in Class I freight rail declined from 3.9 to 3.7 billion gallons.

Figure 5-1. Energy Consumption by Freight Transportation Mode: 2002



Note: Data do not include energy consumed by oil pipelines in their operation (crude petroleum and petroleum products) nor slurry pipelines.

TABLE 5-7. Fuel Consumption by Transportation Mode
Sources: Highway: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues), table VM-1and similar tables in earlier editions.
Rail: Association of American Railroads, *Railroad Facts 2003* (Washington, DC: October 2003), p. 40.
Water: U.S. Department of Energy, Energy Information Administration, *Fuel Oil and Kerosene Sales* (Washington, DC: Annual issues), tables 2, 4, and similar tables in earlier editions.
Pipeline: U.S. Department of Energy, Natural Gas Annual 2002, DOE/EIA-0131(02) (Washington, DC: January 2004), table 15 and similar tables in earlier editions.

FIGURE 5-1. Energy Consumption by Freight Transportation Mode: 2002
Sources: Truck: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, (Washington, DC: Annual issues). **Rail:** Association of American Railroads, *Railroad Facts* (Washington, DC: October 2002), p. 40. **Water:** U.S. Department of Energy, Energy Information Administration, *Fuel Oil and Kerosene Sales* (Washington, DC: Annual issues); U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues), table MF-24 and similar tables in earlier editions. **Pipeline:** U.S. Department of Energy, *Natural Gas Annual 2001*, DOE/EIA-0131(01) (Washington, DC: November 2002), table 15 and similar tables in earlier editions.

In 2002, trucking accounted for 69 percent of freight transportation energy consumption. Water transportation accounted for 15 percent, natural gas pipelines 9 percent, and Class I rail only 7 percent.

Table 5-8. Single-Unit 2-Axle 6-Tire or More Truck Fuel Consumption and Travel

	1980	1990	2000	2002
Number registered (thousands)	4,374	4,487	5,926	5,651
Vehicle-miles (millions)	39,813	51,901	70,500	75,887
Fuel consumed (million gallons)	6,923	8,357	9,563	10,305
Average miles traveled per vehicle	9,103	11,567	11,897	13,430
Average miles traveled per gallon	5.8	6.2	7.4	7.4
Average fuel consumed per vehicle (gallons)	1,583	1,862	1,614	1,824

Over the past two decades, average fuel consumption of single-unit trucks increased by nearly 30 percent. Between 1980 and 2002, the fuel consumed increased 49 percent whereas miles traveled increased by 91 percent. As a result, over these years, miles per gallon increased from 5.8 to 7.4.

In contrast to single-unit trucks, the average fuel consumption of combination trucks has not changed over the past twenty years. Consequently, the gallons of fuel consumed have doubled between 1980 and 2002 along with the number of miles traveled.

Table 5-9. Combination Truck Fuel Consumption and Travel

	1980	1990	2000	2002
Number registered (thousands)	1,417	1,709	2,097	2,277
Vehicle-miles traveled (millions)	68,678	94,341	135,020	138,643
Fuel consumed (million gallons)	13,037	16,133	25,666	26,451
Average miles traveled per vehicle	48,472	55,206	64,399	60,898
Average miles traveled per gallon	5.3	5.8	5.3	5.2
Average fuel consumed per vehicle (gallons)	9,201	9,441	12,241	11,618

TABLE 5-8. SINGLE-UNIT 2-AXLE 6-TIRE OR MORE TRUCK FUEL CONSUMPTION AND TRAVEL
Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues).

TABLE 5-9. COMBINATION TRUCK FUEL CONSUMPTION AND TRAVEL
Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues).

Diesel prices were about 16 percent higher in March 2004 than 10 years earlier (in inflation-adjusted terms). Over that period prices bottomed out in March 1999 at just under $1.00 a gallon (in current dollars). Except for the period July 2001 through September 2002, prices have generally been above the $1.40 mark since February 2000 (also in current dollars).

With more freight being moved and fuel consumed, air quality is affected by emissions from freight vehicles. Since 1990, emissions from heavy-duty highway vehicles per mile of operation have declined.

Figure 5-2. Monthly Diesel Prices (cents per gallon)

Table 5-10: Estimated National Average Vehicle Emissions Rates of Heavy-duty Vehicles (grams per mile)

	1990	1995	2000	2003
Gasoline (assuming zero RFG)				
Exhaust HC	3.66	2.16	1.22	0.82
Nonexhaust HC	2.74	2.07	1.62	1.41
Total HC	6.40	4.24	2.84	2.24
Exhaust CO	85.61	54.16	31.08	20.60
Exhaust NO_x	7.19	6.11	5.26	4.91
Diesel				
Exhaust HC	2.21	1.23	0.79	0.61
Exhaust CO	10.06	6.32	4.10	3.37
Exhaust NO_x	23.34	20.49	18.05	13.92

Key: CO = carbon monoxide; HC = hydrocarbon; NOx = nitrogen oxide; RFG = reformulated gasoline.
Notes: Heavy-duty vehicles are defined as 8,501 lbs or more gross vehicle weight rating.

FIGURE 5-2. Monthly Diesel Prices (cents per gallon)
Source: U.S. Department of Energy, Energy Information Agency, U.S. Petroleum Prices, available at www.eia.doe.gov as of July 15, 2004.

TABLE 5-10: Estimated National Average Vehicle Emissions Rates of Heavy-duty Vehicles (grams per mile)
Source: U.S. Environmental Protection Agency, National Vehicle and Fuel Emissions Laboratory.

APPENDIX A. SELECTED METRIC TABLES

Table 2-1M. Freight Shipments by Weight and Value

Mode	Metric Tonnes (millions) 1998	2010	2020	Value ($ billions) 1998	2010	2020
Total	**13,854**	**19,392**	**23,449**	**9,312**	**18,339**	**29,954**
Domestic	**12,232**	**17,073**	**20,445**	**7,876**	**15,152**	**24,075**
Air	8	16	24	545	1,308	2,246
Highway	9,470	13,544	16,447	6,656	12,746	20,241
Rail	1,773	2,293	2,625	530	848	1,230
Water	982	1,220	1,349	146	250	358
International	**1,621**	**2,319**	**3,004**	**1,436**	**3,187**	**5,879**
Air	8	15	22	530	1,182	2,259
Highway	380	665	970	772	1,724	3,131
Rail	325	470	634	116	248	432
Water	123	181	236	17	34	57
Other[1]	784	989	1,142	NA	NA	NA

Key: NA = Not available.
[1]Other 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. 1 ton = 0.91 metric tonne.

Table 2-2M. U.S. Merchandise Trade with Canada and Mexico

Mode	1997 Value ($ billions)	1997 Weight (millions of metric tonnes)	2000 Value ($ billions)	2000 Weight (millions of metric tonnes)	2001 Value ($ billions)	2001 Weight (millions of metric tonnes)
Truck	323	NA	429	NA	395	164
Rail	70	NA	94	NA	93	88
Air	28	NA	45	NA	37	0
Water	22	NA	33	NA	29	194
Pipeline	14	NA	24	NA	26	72
Other[1]	19	NA	29	NA	33	1
Total	**475**	**NA**	**653**	**NA**	**614**	**519**

Key: NA = not available.
[1]Other 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 ton = 0.91 metric tonne.

TABLE 2-1M. FREIGHT SHIPMENTS BY WEIGHT AND VALUE
Source: U.S. Department of Transportation, Federal Highway Administration, Freight Analysis Framework, 2002.

TABLE 2-2M. U.S. MERCHANDISE TRADE WITH CANADA AND MEXICO
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 2-8M. Top 25 Airports by Landed Weight of All-Cargo Operations[1]
Rankings based on 2002

Airport	Rank	Landed weight (thousands of metric tonnes) 2000	2001	2002
Anchorage, AK (Ted Stevens Anchorage International) [2]	1	7,333	7,055	8,159
Memphis, TN (Memphis International)	2	5,732	6,228	8,007
Louisville, KY (Louisville International-Standiford Field)	3	3,617	3,653	3,812
Miami, FL (Miami International)	4	2,657	2,771	2,879
Los Angeles, CA (Los Angeles International)	5	2,624	2,657	2,756
New York, NY (John F. Kennedy International)	6	2,534	2,307	2,642
Indianapolis, IN (Indianapolis International)	7	2,616	2,862	2,121
Chicago, IL (O'Hare International)	8	1,870	1,825	2,011
Newark, NJ (Newark Liberty International)	9	1,779	1,628	1,595
Oakland, CA (Metropolitan Oakland International)	10	1,643	1,487	1,584
Fort Worth, TX (Dallas/Fort Worth International)	11	1,534	1,402	1,343
Philadelphia, PA (Philadelphia International)	12	1,319	1,318	1,330
Ontario, CA (Ontario International)	13	1,107	1,172	1,310
Atlanta, GA (William B. Hartsfield International)	14	989	946	1,058
Covington/Cincinnati, OH (Cincinnati/Northern Kentucky International)	15	828	889	946
San Francisco, CA (San Francisco International)	16	1,149	918	939
Honolulu, HI (Honolulu International)	17	628	716	880
Dayton, OH (James M. Cox Dayton International)	18	2,026	1,310	814
Seattle, WA (Seattle-Tacoma International)	19	961	869	799
Phoenix, AZ (Sky Harbor International)	20	835	760	787
Portland, OR (Portland International)	21	800	732	740
Denver, CO (Denver International)	22	817	729	710
Boston, MA (Logan International)	23	638	591	577
Rockford, IL (Greater Rockford)	24	593	618	572
Orlando, FL (Orlando International)	25	610	554	565
Top 25 airports		**47,237**	**45,995**	**48,936**
United States, all airports [3]		**67,815**	**64,796**	**66,617**
Top 25 as % of U.S. total		**69.7%**	**71.0%**	**73.5%**

[1]All-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.
[2]Anchorage includes a large proportion of all-cargo operations in-transit.
[3]Limited 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.

TABLE 2-8M. Top 25 Airports by Landed Weight of All-Cargo Operations
Rankings based on 2002
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 December16, 2003.

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

Transportation mode	Value		Metric tonnes		Tonne-kilometers	
	$ Billion	Percent	(Millions)	Percent	(Billions)	Percent
All modes, Total	**466.4**	**100.0**	**1,419.9**	**100.0**	**385.2**	**100.0**
Single modes, total	**452.7**	**97.1**	**1,398.6**	**98.5**	**378.0**	**98.1**
Truck [1]	298.2	63.9	789.1	55.6	109.4	28.4
For-hire	134.3	28.8	305.1	21.5	66.0	17.1
Private [2]	160.7	34.5	474.2	33.4	42.1	10.9
Rail	33.3	7.1	87.7	6.2	109.1	28.3
Water	27.0	5.8	129.9	9.1	99.6	25.9
Air	8.6	1.8	0.1	Z	0.1	Z
Pipeline [3]	85.7	18.4	392.0	27.6	S	S
Multiple modes, total	**5.7**	**1.2**	**5.5**	**0.4**	**4.5**	**1.2**
Parcel, U.S. Postal Service or courier	2.9	0.6	0.1	Z	0.1	Z
Other	2.9	0.6	5.3	0.4	4.4	1.1
Unknown and other modes, total	**7.9**	**1.7**	**15.8**	**1.1**	**2.7**	**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.
[1]Truck 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.
[3]Excludes most shipments of crude oil.
Notes: 1 ton = 0.91 metric tonne; 1 ton-mile = 1.46 tonne-kilometer.

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

Hazard Class	Description	Value		Metric tonnes		Tonne-kilometers	
		$ Billions	Percent	Millions	Percent	Billions	Percent
Class 1	Explosives	4.3	0.9	1.4	0.1	S	S
Class 2	Gases	40.9	8.8	104.3	7.3	31.9	8.3
Class 3	Flammable liquids	335.6	72.0	1,146.9	80.8	233.6	60.6
Class 4	Flammable solids	3.9	0.8	10.7	0.8	14.0	3.6
Class 5	Oxidizers and organic peroxides	4.5	1.0	8.4	0.6	6.5	1.7
Class 6	Toxics	10.1	2.2	5.8	0.4	4.1	1.1
Class 7	Radioactive materials	2.7	0.6	0.1	Z	0.1	Z
Class 8	Corrosive materials	40.4	8.7	83.1	5.9	60.1	15.6
Class 9	Miscellaneous dangerous goods	23.9	5.1	59.3	4.2	33.2	8.6
Total		**466.4**	**100.0**	**1,419.9**	**100.0**	**385.2**	**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.
Note: 1 ton = 0.91 metric tonne; 1 ton-mile = 1.46 tonne-kilometer.

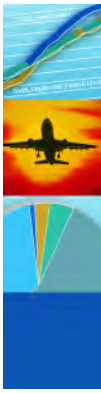
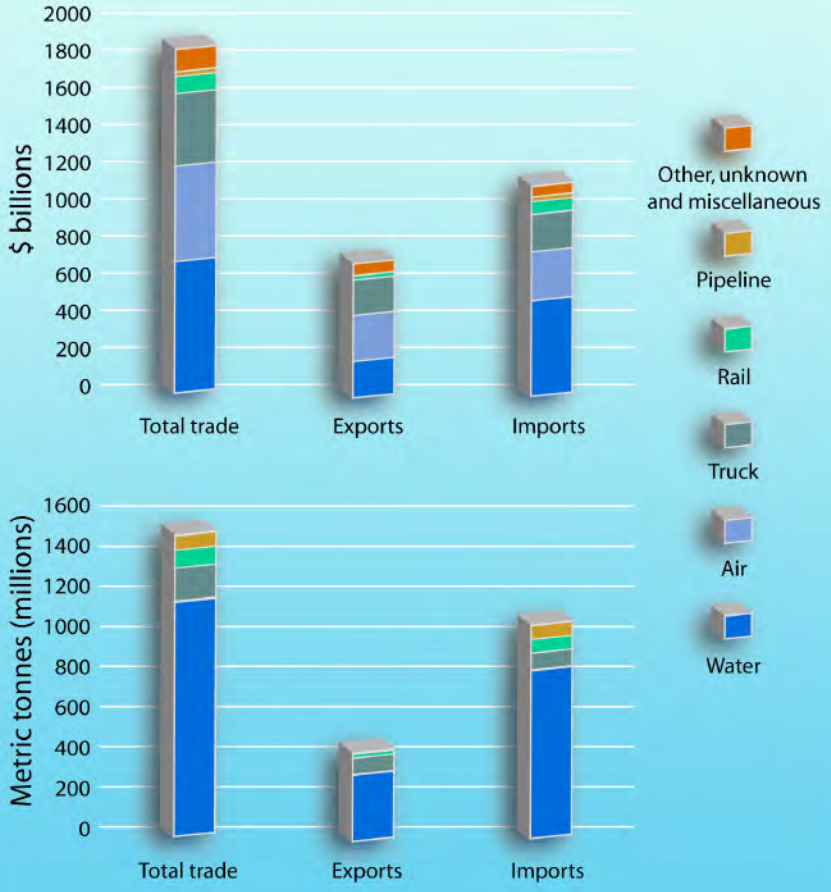


TABLE 2-9M. U.S. Hazardous Materials Shipments by Transportation Mode: 1997
Source: U.S. Department of Transportation, Bureau of Transportation Statistics, U.S. Department of Commerce, U.S. Census Bureau, *1997 Commodity Flow Survey, Hazardous Materials* (Washington, DC: December 1999), table 1.

TABLE 2-10M. 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.

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



Note: 1 short ton = 1 metric tonne.

FIGURE 2-5M. 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.

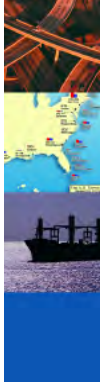


Table 3-1M. Kilometers of Infrastructure by Mode

	1980	1990	2000	2002	Percent change, 1980-2002
Public roads, route kilometers	6,211,806	6,223,214	6,358,677	6,407,878	3.2
National Highway System (NHS)	N	N	259,409	259,969	N
Interstates	66,176	72,540	75,116	75,232	13.7
Other NHS	N	N	184,292	184,737	N
Freight intermodal connectors[1]	N	N	N	2,883	NA
Other	N	N	9,269	6,147,910	N
Strategic Highway Corridor Network (STRAHNET)	N	N	99,886	101,054	N
Interstate	N	N	75,116	75,232	N
Non-Interstate	N	N	24,766	25,822	N
Railroad	294,634[2]	283,098	274,412	227,547	-22.8
Class I	NA	,347	194,082	160,843	NA
Regional	NA	29,572	33,761	24,217	NA
Local	NA	39,167	46,570	42,487	NA
Inland waterways					
Navigable channels	17,703	17,703	17,703	17,703	0.0
Great Lakes-St. Lawrence Seaway	3,769	3,769	3,769	3,769	0.0
Pipelines					
Oil	351,469	335,954	284,847	NA	NA
Gas	1,692,666	1,942,308	2,220,090	2,305,707	36.2

Key: N = not applicable; NA = not available.
[1]Excludes intermodal connectors serving intercity bus, Amtrak, and public transit facilities.
[2]Excludes Class III railroads.
Note: 1 mile = 1.61 kilometers.

TABLE 3-1M. Kilometers of Infrastructure by Mode
Sources: Public roads: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues).
Intermodal connectors: U.S. Department of Transportation, Federal Highway Administration, Office of Planning, National Highway System Intermodal Connectors, available at http://www.fhwa.dot.gov/hep10/nhs/intermodalconnectors/index.html as of August 24, 2004.
Rail: Association of American Railroads, *Railroad Facts* (Washington, DC: various issues).
Navigable channels: U.S. Army Corps of Engineers.
Great Lakes-St. Lawrence Seaway: Great Lakes-St. Lawrence Seaway System, "Seaway Facts," available at http://www.greatlakes-seaway.com/en/aboutus/seawayfacts.html as of May 11, 2004.
Oil Pipelines: Eno Transportation Foundation, Inc., *Transportation in America, 2002* (Washington, DC: 2002).
Gas Pipelines: American Gas Association, *Gas Facts* (Arlington, VA: Annual issues).

Table 3-3M. Truck Kilometers by Primary Load Carried[1] (millions of kilometers)

Primary load carried	1992	1997
Total	**187,617**	**253,252**
Farm products	13,902	16,126
Live animals	4,093	4,452
Animal feed	3,255	3,495
Mining products	2,226	2,499
Logs and other forest products	4,983	5,962
Lumber and fabricated wood products	6,117	8,187
Processed foods	28,240	38,209
Textile mill products	4,061	7,957
Building materials	19,379	25,060
Furniture or hardware	4,658	5,276
Paper products	8,457	10,307
Chemicals	6,333	8,044
Petroleum	7,372	7,954
Plastics and/or rubber	3,037	4,361
Primary metal products	6,079	7,639
Fabricated metal products	4,658	5,406
Machinery	5,919	11,909
Transportation equipment	8,363	10,135
Glass products	945	1,007
Miscellaneous products of manufacturing	4,700	8,362
Industrial "waste" water	324	338
Mixed cargoes	17,360	29,631
Recyclable products	1,413	2,070
Hazardous waste (EPA manifest)	683	750
Hazardous waste (non-EPA manifest)	185	133
Household goods	3,334	6,461
Scrap, refuse, or garbage	4,068	5,353
Craftsman's equipment	6,316	8,122
Personal transportation	1,603	1,533
Passengers	189	446
No load carried	3,065	2,887
Other and not reported [2]	2,303	3,180

Key: NA = not available.
Note: 1 mile = 1.61 kilometers.
[1]Excludes pickups, panels, minivans, sport utilities, and station wagons
[2]Includes vehicles which, though licensed, were not operated or were wrecked or inoperative for more than 6 months during 1997.

TABLE 3-3M. Truck Kilometers for Trucks, Excluding Pickups, Panels, Minivans, Sport Utilities, and Station Wagons (millions of kilometers)
Source: U.S. Department of Commerce, U.S. Census Bureau, *Vehicle Inventory and Use Survey 1997: United States* (Washington, DC: 1999) available at http://www.census.gov/svsd/www/97vehinv.html as of August 17, 2004.

Table 3-4M. Number and Vehicle Kilometers Traveled (VKT) of Trucks by Average Weight (Including Vehicle and Load)[1]

	1987		1992		1997		Percent change, 1987-1997	
Average weight (kilograms)	Number (thousands)	VKT (millions)	Number (thousands)	VKT (millions)	Number (thousands)	VKT (millions)	Number	VKT
Total	**3,624**	**144,796**	**4,008**	**168,960**	**4,701**	**237,979**	**30**	**64**
Light-heavy	**1,030**	**17,329**	**1,259**	**22,551**	**1,436**	**31,889**	**39**	**84**
4,536 to 6,350	525	8,754	694	12,875	819	18,510	56	111
6,351 to 7,257	242	4,407	282	4,791	316	6,359	31	44
7,258 to 8,845	263	4,168	282	4,885	301	7,020	15	68
Medium-heavy	**766**	**12,200**	**732**	**13,104**	**729**	**16,301**	**-5**	**34**
8,846 to 11,793	766	12,200	732	13,104	729	16,301	-5	34
Heavy-heavy	**1,829**	**115,266**	**2,017**	**133,305**	**2,536**	**189,789**	**39**	**65**
11,794 to 14,969	377	8,708	387	9,163	428	11,413	13	31
14,969 to 18,144	209	6,619	233	8,505	257	10,612	23	60
18,144 to 22,680	292	12,271	339	15,485	400	21,047	37	72
22,680 to 27,216	188	11,518	227	13,999	311	20,362	66	77
27,216 to 36,287	723	73,127	781	82,147	1,070	120,256	48	64
36,288 to 45,359	28	8	2,01 33	2,460	46	3,906	64	94
45,360 to 58,967	8		708 12	1,181	18	1,691	129	139
58,967 or more	4	298	5	365	6	502	34	69

[1]Excludes trucks with an average weight of 4,535 kilograms or less.
Notes: Weight includes the empty weight of the vehicle plus the average weight of the load carried; 1 mile = 1.61 kilometers; 1 pound = 0.45 kilogram.

Table 5-7M. Fuel Consumption by Transportation Mode

	1980	1990	2000	2002
Highway				
Gasoline, diesel and other fuels (million litres)	435,171	494,962	615,338	634,928
Truck, total	75,557	92,705	133,356	139,137
Single-unit 2-axle 6-tire or more truck	26,206	31,635	36,200	39,010
Combination truck	49,350	61,070	97,156	100,127
Truck (percent of total)	17.4	18.7	21.7	21.9
Rail, Class I (in freight service)				
Distillate / diesel fuel (million litres)	14,778	11,792	14,006	14,120
Water				
Residual fuel oil (million litres)	33,887	23,947	24,264	18,351
Distillate / diesel fuel oil (million litres)	5,595	7,817	8,559	7,870
Gasoline (million litres)	3,982	4,921	4,255	4,093
Pipeline				
Natural gas (million cubic meters)	17,970	18,684	18,185	18,888

Note: 1 gallon = 3.8 liters; 1 cubic foot = 0.03 cubic meters.

TABLE 3-4M. Number and Vehicle Kilometers Traveled (VKT) of Trucks by Average Weight (Including Vehicle and Load)[1]
Source: U.S. Department of Commerce, U.S. Census Bureau, *1997 Vehicle Inventory and Use Survey: United States* (Washington, DC: 1999), available at http://www.census.gov/econ/www/viusmain.html as of July 1, 2004; U.S. Department of Commerce, U.S. Census Bureau, *1992 Truck Inventory and Use Survey: United States* (Washington, DC: 1995), available at http://www.census.gov/econ/www/viusmain.html as of July 1, 2004.

TABLE 5-7M. Fuel Consumption by Transportation Mode
Sources: Highway: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues), table VM-1and similar tables in earlier editions.
Rail: Association of American Railroads, *Railroad Facts 2003* (Washington, DC: October 2003), p. 40.
Water: U.S. Department of Energy, Energy Information Administration, *Fuel Oil and Kerosene Sales* (Washington, DC: Annual issues), tables 2, 4, and similar tables in earlier editions.
Pipeline: U.S. Department of Energy, *Natural Gas Annual 2002,* DOE/EIA-0131(02) (Washington, DC: January 2004), table 15 and similar tables in earlier editions.

Table 5-8M. Single-Unit 2-Axle 6-Tire or More Truck Fuel Consumption and Travel

	1980	1990	2000	2002
Number registered (thousands)	4,374	4,487	5,926	5,651
Vehicle-kilometers (millions)	64,073	83,527	113,459	122,128
Fuel consumed (million litres)	26,206	31,635	36,200	39,010
Average kilometers traveled per vehicle	14,649	18,615	19,146	21,613
Average kilometers traveled per litre	2.4	2.6	3.1	3.1
Average fuel consumed per vehicle (litres)	5,992	7,050	6,109	6,904

Note: 1 mile = 1.61 kilometers; 1 gallon = 3.8 liters.

Table 5-9M. Combination Truck Fuel Consumption and Travel

	1980	1990	2000	2002
Number registered (thousands)	1,417	1,709	2,097	2,277
Vehicle-kilometers traveled (millions)	110,527	151,827	217,294	223,124
Fuel consumed (million litres)	49,350	61,070	97,155	100,127
Average kilometers traveled per vehicle	78,008	88,845	103,640	98,005
Average kilometers traveled per litre	2.2	2.5	2.2	2.2
Average fuel consumed per vehicle (litres)	34,831	35,737	46,339	43,980

Note: 1 mile = 1.61 kilometers; 1 gallon = 3.8 liters.

TABLE 5-8M. Single-Unit 2-Axle 6-Tire or More Truck Fuel Consumption and Travel
Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics,* (Washington, DC: Annual issues).

TABLE 5-9M. Combination Truck Fuel Consumption and Travel
Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues).

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16. Abstract

This report provides a snapshot of freight transportation, focusing on the volume and value of freight shipments, the extent of the freight network, industry employment and productivity patterns, its safety record, energy use, and the environmental consequences of freight movements. Economic and social characteristics of the United States are also provided as background information. Metric data are available for several tables as well.

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