

FREIGHT FACTS AND FIGURES 2 0 0 6



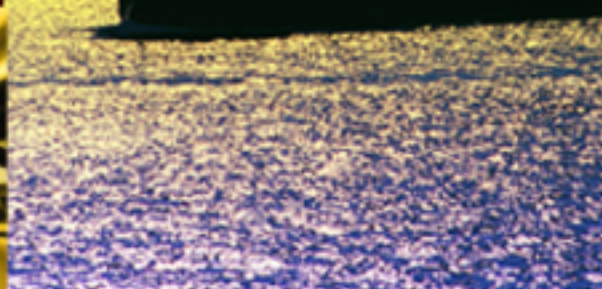
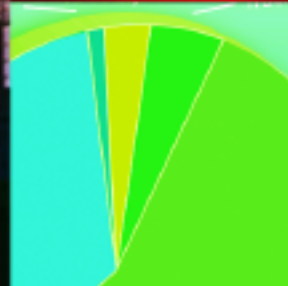
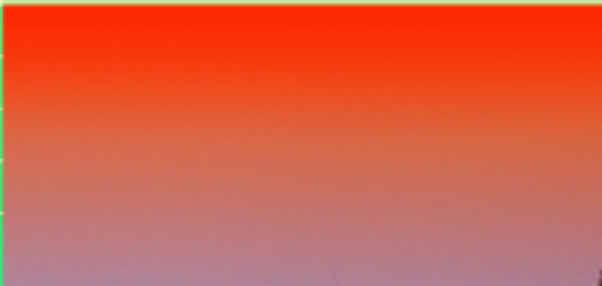
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U.S. Department of Transportation
Federal Highway Administration

QUALITY ASSURANCE STATEMENT

THE FEDERAL HIGHWAY ADMINISTRATION (FHWA) PROVIDES HIGH-QUALITY INFORMATION TO SERVE GOVERNMENT, INDUSTRY, AND THE PUBLIC IN A MANNER THAT PROMOTES PUBLIC UNDERSTANDING. STANDARDS AND POLICIES ARE USED TO ENSURE AND MAXIMIZE THE QUALITY, OBJECTIVITY, UTILITY, AND INTEGRITY OF ITS INFORMATION. FHWA PERIODICALLY REVIEWS QUALITY ISSUES AND ADJUSTS ITS PROGRAMS AND PROCESSES TO ENSURE CONTINUOUS QUALITY IMPROVEMENT.



Freight Facts and Figures 2006 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.



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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 29 percent between 1980 and 2004, while the economy, measured by gross domestic product (GDP), more than doubled in real terms. Other indicators of economic growth such as employment and household income have also risen, by 40 and 15 percent respectively. Foreign trade has grown faster than the overall economy, quadrupling in real value between 1980 and 2004, reflecting unprecedented global interconnectivity.

TABLE 1-1: ECONOMIC AND SOCIAL CHARACTERISTICS OF THE UNITED STATES

	1980	1990	2000	2004	Percent change, 1980 to 2004
Resident population (thousands)	227,225	249,623	(R) 282,192	293,655	29.2
Households (thousands)	80,776	93,347	104,705	112,000	38.7
Median household income (\$2000)	35,057	38,257	41,990	40,468	15.4
Civilian labor force (thousands)	106,940	125,840	142,583	147,401	37.8
Employed ¹ (thousands)	99,303	118,793	136,891	139,252	40.2
Agriculture, forestry, fishing, and hunting (percent)	NA	1.9	1.8	1.6	NA
Mining	NA	0.5	0.3	0.4	NA
Construction	NA	6.9	7.3	7.7	NA
Manufacturing	NA	16.8	14.4	11.8	NA
Wholesale and retail trade	NA	14.7	14.6	15.0	NA
Transportation and utilities	NA	5.1	5.4	5.0	NA
Information	NA	2.9	3.0	2.5	NA
Financial activities	NA	7.1	6.8	7.2	NA
Professional and business services	NA	9.4	10.0	10.1	NA
Education and health services	NA	17.5	19.1	20.6	NA
Leisure and hospitality	NA	8.0	8.2	8.5	NA
Other services	NA	4.3	4.7	5.0	NA
Public administration	NA	4.7	4.5	4.6	NA
Business establishments (thousands)	NA	6,176	7,070	NA	NA
Governments	² 81,831	³ 85,006	⁴ 87,576	NA	NA
Gross domestic product (\$2000 millions)	5,161,700	7,112,500	9,817,000	10,755,700	108.4
Foreign trade (\$2000 millions)	631,335	1,168,168	2,572,000	2,837,634	349.5
Goods (percent)	74.0	71.6	78.8	78.8	378.5
Services (percent)	26.0	28.4	21.2	21.2	266.7

Key: NA = not available; R = revised.

¹Based on the 2002 Census Industry Classification system. Data for 1990 do not appear in the source document; they are estimated using the Bureau of Labor Statistics crosswalk from the 1990 Census Industry Classification system to the 2002 Census Industry Classification system.

²1982

³1992

⁴2002

TABLE 1-1: ECONOMIC AND SOCIAL CHARACTERISTICS OF THE UNITED STATES

Sources: Unless otherwise stated all data from: U.S. Department of Commerce, Census Bureau, *Statistical Abstract of the United States: 2006* (Washington, DC: 2005) and earlier editions, available at

<http://www.census.gov/statab/www/> as of March 22, 2006.

Median household income: U.S. Department of Commerce, Census Bureau, Historical Income Tables, table H-6, available at www.census.gov/hhes/income/histinc/h06ar.html as of March 22, 2006.

Business establishments: U.S. Department of Commerce, Census Bureau, County Business Patterns, available at <http://www.census.gov/epcd/cbp/view/cbpview.html> as of March 22, 2006.

Gross domestic product and foreign trade: U.S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts Tables, tables 1.1.5, 1.1.6, 4.2.4, available at www.bea.doc.gov as of March 22, 2006.

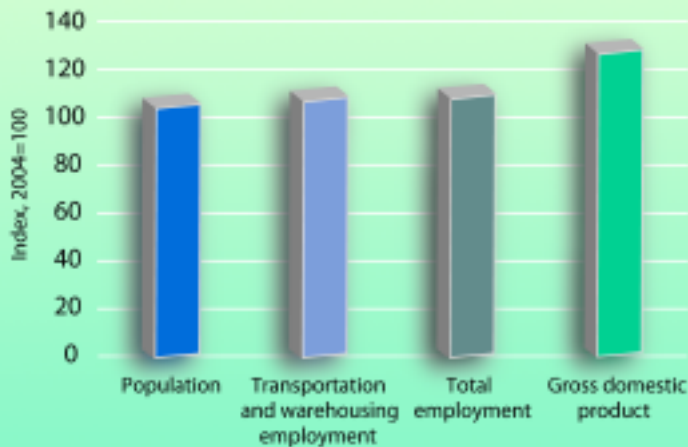
Economic activity and the demand for freight transportation are spread throughout the United States as shown by the distribution of population, employment, and income.

TABLE 1-2: POPULATION AND GROSS STATE PRODUCT (GSP) BY REGION

	1980	1990	2000	2004	2005	Percent change, 1980 to 2005
Resident Population (thousands)	226,549	248,789	(R) 282,193	(R) 293,657	296,410	31
Northeast	49,136	50,828	(R) 53,672	(R) 54,582	54,642	11
Midwest	58,868	59,670	(R) 64,497	(R) 65,694	65,972	12
South	75,372	85,454	(R) 100,566	(R) 105,994	107,505	43
West	43,173	52,837	(R) 63,458	(R) 67,387	68,291	58
GSP (\$ 2000 millions)	5,054,549	6,994,329	(R) 9,749,104	(R) 10,661,769	11,035,753	118
Northeast	1,107,283	1,604,121	(R) 2,077,436	(R) 2,243,557	2,305,997	108
Midwest	1,262,917	1,566,939	(R) 2,174,719	(R) 2,316,348	2,352,354	86
South	1,608,531	2,220,755	(R) 3,212,076	(R) 3,586,803	3,738,067	132
West	1,075,817	1,602,514	(R) 2,284,873	(R) 2,515,061	2,639,335	145
GSP per capita (\$ 2000)	22,311	28,113	(R) 34,548	(R) 36,307	37,231	67
Northeast	22,535	31,560	(R) 38,706	(R) 41,104	42,202	87
Midwest	21,453	26,260	(R) 33,718	(R) 35,260	35,657	66
South	21,341	25,988	(R) 31,940	(R) 33,840	34,771	63
West	24,919	30,329	(R) 36,006	(R) 37,323	38,648	55

Key: R = revised.

FIGURE 1-1: ECONOMIC AND POPULATION PROJECTIONS, 2004 TO 2014 (INDEX, 2004 = 100)



Demand for freight transportation grows with increases in population and economic activity. Over the next ten years the U.S. economy, as measured by GDP, is projected to increase by 32 percent and the U.S. population by 9 percent. Transportation and warehousing employment is expected to increase by 12 percent over this period, about the same as employment as a whole.

TABLE 1-2: POPULATION AND GROSS STATE PRODUCT (GSP) BY REGION

Sources: **Population: 1980-1990** — U.S. Department of Commerce, Census Bureau, *Statistical Abstract of the United States: 2004-2005* (Washington, DC: 2005); **2000-2005** — Ibid., Population Division, Annual Population Estimates, table 8, available at <http://www.census.gov/popest/states/NST-ann-est.html> as of June 6, 2006; **Gross State Product: 1980-1990** — U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts, available at <http://www.bea.doc.gov/bea/regional/gsp/> as of June 11, 2004; **2000-2005** — U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts, available at <http://www.bea.doc.gov/bea/regional/gsp/> as of June 6, 2006.

FIGURE 1-1: ECONOMIC AND POPULATION PROJECTIONS, 2004 TO 2014

Sources: **Population:** U.S. Department of Commerce, U.S. Census Bureau, *Statistical Abstract of the United States: 2006* (Washington, DC: 2005), available at <http://www.census.gov/statab/www/> as of March 23, 2006.

Employment: U.S. Department of Labor, Bureau of Labor Statistics, *Employment by Major Industry Division, 1994, 2004, and projected 2014*, available at www.bls.gov as of March 23, 2006.

GDP: Congressional Budget Office, *The Budget and Economic Outlook: Fiscal Years 2005-2014, CBO's Economic Projections for 2004 through 2014*, available at <http://www.cbo.gov> as of March 23, 2006.

II. FREIGHT FLOWS

The U.S. transportation system in 2002 moved, on average, 53 million tons of freight worth \$36 billion each day. Trucks moved about 60 percent of freight by weight, the same proportion expected in 2035. However, over this period tons transported overall are expected to almost double with international shipments growing somewhat faster than domestic shipments. Trucks transported two-thirds of freight by value. This share is expected to decline slightly by 2035 as the value of intermodal shipments increases.

TABLE 2-1. SHIPMENTS BY MODE AND WEIGHT: 2002 AND 2035 (MILLIONS OF TONS)

	2002				2035			
	Total	Domestic	Exports ³	Imports ³	Total	Domestic	Exports ³	Imports ³
Total	(P) 19,326	17,670	(P) 524	(P) 1,133	(P) 37,178	33,668	(P) 1,105	(P) 2,404
Truck	11,539	11,336	106	97	22,814	22,231	262	320
Rail	1,879	1,769	32	78	3,525	3,292	57	176
Water	701	595	62	44	1,041	874	114	54
Air, air & truck	(P) 10	3	(P) 3	(P) 4	(P) 27	10	(P) 7	(P) 10
Intermodal¹	1,292	196	317	780	2,598	334	660	1,604
Pipeline & unknown²	3,905	3,772	4	130	7,172	6,926	5	240

Key: P = preliminary.

¹Intermodal includes U.S. Postal Service and courier shipments and all intermodal combinations, except air and truck.

²Pipeline and unknown shipments are combined because data on region-to-region flows by pipeline are statistically uncertain.

³Data do not include imports and exports that pass through the United States from a foreign origin to a foreign destination by any mode.

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

TABLE 2-2. SHIPMENTS BY MODE AND VALUE: 2002 AND 2035 (BILLIONS OF DOLLARS)

	2002				2035			
	Total	Domestic	Exports ³	Imports ³	Total	Domestic	Exports ³	Imports ³
Total	(P) 13,120	11,083	(P) 735	(P) 1,302	(P) 38,399	29,592	(P) 2,623	(P) 6,184
Truck	8,856	8,447	201	208	23,767	21,655	806	1,306
Rail	382	288	26	68	702	483	63	156
Water	103	76	13	13	151	103	31	18
Air, air & truck	(P) 663	162	(P) 226	(P) 275	(P) 455	721	(P) 778	(P) 955
Intermodal¹	1,967	983	268	716	8,966	4,315	943	3,708
Pipeline and unknown²	1,149	1,127	1	22	2,357	2,315	1	41

Key: P = preliminary.

¹Intermodal includes U.S. Postal Service and courier shipments and all intermodal combinations, except air and truck.

²Pipeline and unknown shipments are combined because data on region-to-region flows by pipeline are statistically uncertain.

³Data do not include imports and exports that pass through the United States from a foreign origin to a foreign destination by any mode.

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

TABLE 2-1. SHIPMENTS BY MODE AND WEIGHT: 2002 AND 2035 (MILLIONS OF TONS)

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, 2006.

TABLE 2-2. SHIPMENTS BY MODE AND VALUE: 2002 AND 2035 (BILLIONS OF DOLLARS)

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, 2006.

TABLE 2-3. TOP COMMODITIES: 2002

Tons (millions)		Value (\$ billions)	
Total	(P) 19,326	Total	(P) 13,120
Coal n.e.c. ¹	2,687	Machinery	1,866
Gravel	2,048	Electronics	948
Cereal grains	1,330	Mixed freight	944
Crude petroleum	1,284	Motorized vehicles	855
Coal	1,261	Coal n.e.c. ¹	729
Nonmetal min. prods. ²	1,138	Textiles/leather	545
Gasoline	1,090	Pharmaceuticals	519
Waste/scrap	926	Unknown	458
Fuel oils	560	Chemical prods.	444
Natural sands	557	Misc. mfg. prods.	411

Key: P = preliminary.

¹ Natural gas, selected coal products, and products of petroleum refining, excluding gasoline, aviation fuel, and fuel oil.

² Nonmetallic mineral products.

Bulk products comprise nearly two-thirds of the tonnage but only one-fifth of the value of goods moved in 2002. Motor vehicles, machinery,

pharmaceuticals, and other manufactured goods comprise over two-thirds of commodity movements by value but only 15 percent of the tonnage.

TABLE 2-4. DOMESTIC MODE OF INTERNATIONAL SHIPMENTS BY WEIGHT AND VALUE: 2002 AND 2035

	Tons (millions)		Value (\$ billions)	
	2002	2035	2002	2035
Total	(P) 1,657	(P) 3,510	(P) 2,037	(P) 8,807
Truck¹	797	2,116	1,198	6,193
Rail	200	397	114	275
Water	106	168	26	49
Air, air & truck²	(P) 8	(P) 19	(P) 506	(P) 1,772
Intermodal³	22	50	52	281
Pipeline & unknown⁴	524	760	141	238

Key: P = preliminary.

¹Excludes truck moves to and from airports.

²Includes truck moves to and from airports.

³Intermodal includes U.S. Postal Service and courier shipments and all intermodal combinations, except air and truck.

⁴Pipeline and unknown shipments are combined because data on region-to-region flows by pipeline are statistically uncertain.

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

International trade is growing rapidly and is placing pressure on the domestic transportation network and the different modes. International shipments by truck include the inland portion of intermodal shipments through ports and truck movements across land borders with Canada and Mexico.

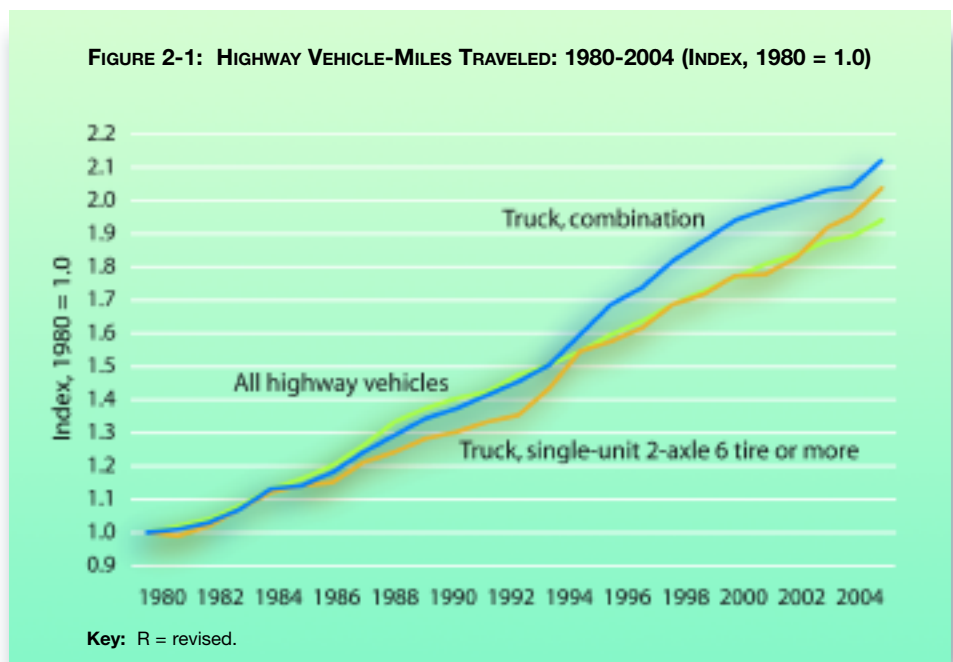
TABLE 2-3. TOP COMMODITIES: 2002

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, 2006.

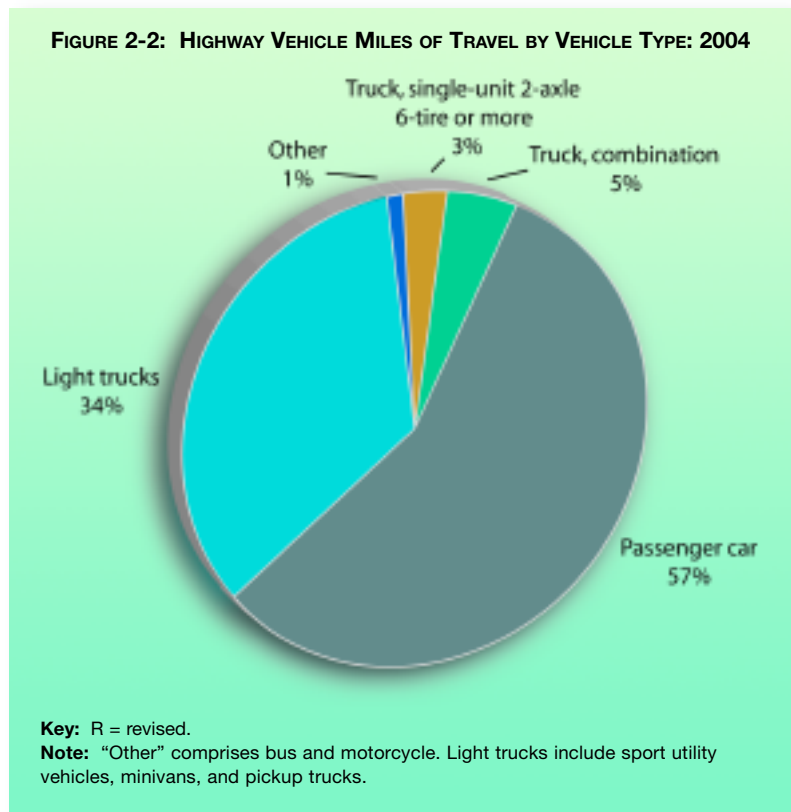
TABLE 2-4. DOMESTIC MODE OF INTERNATIONAL SHIPMENTS BY WEIGHT AND VALUE: 2002 AND 2035

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, 2006.

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 or so, 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, travel by combination trucks grew slightly faster than by single-unit trucks.



Despite doubling over the past two decades, truck traffic remains a relatively small share of highway traffic as a whole. In 2004, commercial trucks accounted for about 8 percent of highway vmt. Truck vmt is comprised of 64 percent combination truck and 36 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, that, in combination with increases in passenger travel, will add to existing congestion.

FIGURE 2-1: HIGHWAY VEHICLE-MILES TRAVELED: 1980-2004

Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, (Washington, DC: Annual issues), table VM-1, available at www.fhwa.dot.gov/policy/ohpi/hss/index.htm as of Jan. 20, 2006

FIGURE 2-2: HIGHWAY VEHICLE MILES OF TRAVEL BY VEHICLE TYPE: 2004

Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, (Washington, DC: Annual issues), table VM-1, available at www.fhwa.dot.gov/policy/ohpi/hss/index.htm as of Jan. 23, 2006.

FIGURE 2-3. ESTIMATED AVERAGE DAILY TRUCK TRAFFIC: 1998

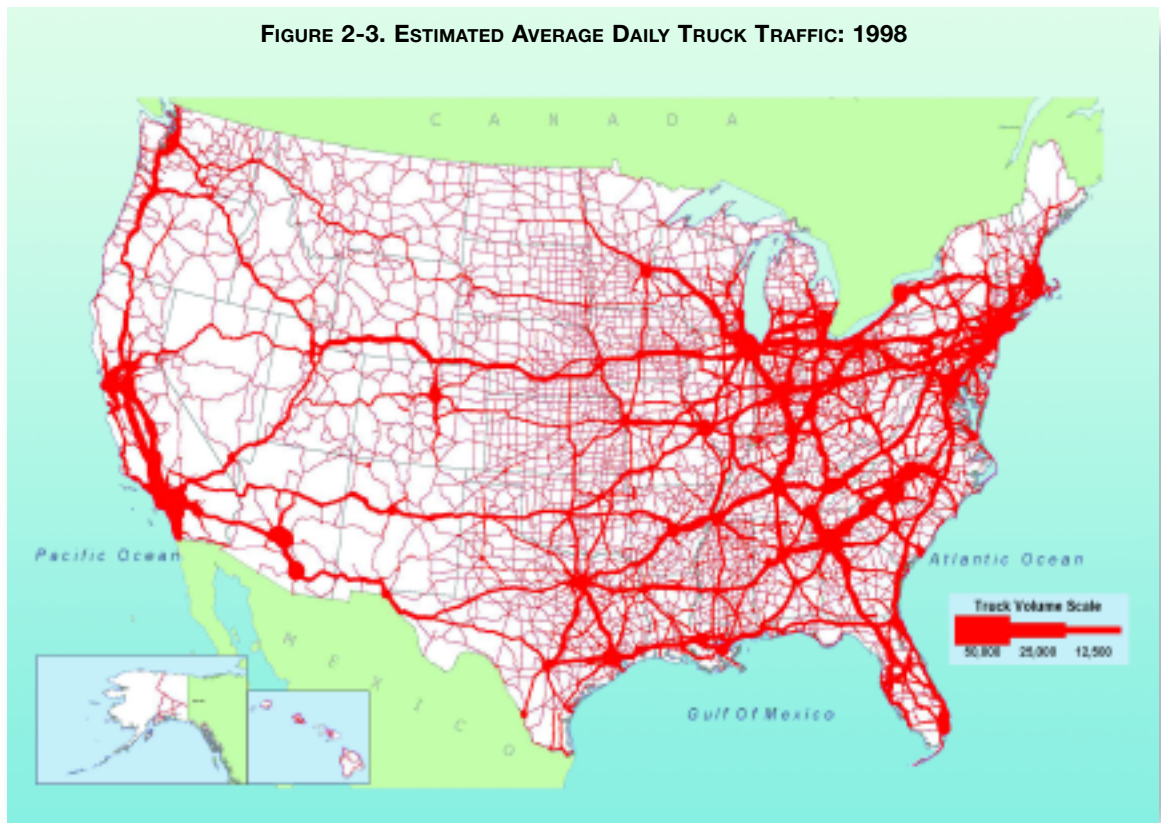


FIGURE 2-4. ESTIMATED AVERAGE DAILY TRUCK TRAFFIC: 2020

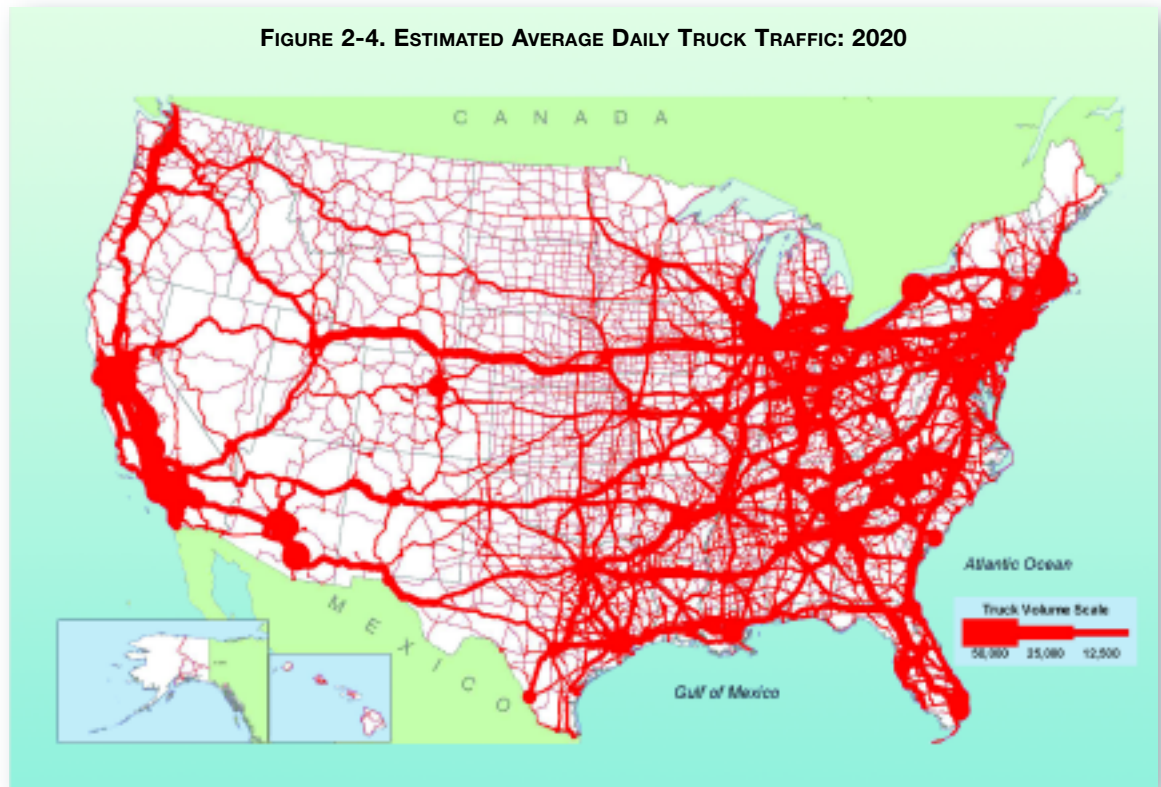


FIGURE 2-3. ESTIMATED AVERAGE DAILY TRUCK TRAFFIC: 1998

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

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, 2002.

Some of the most severe congestion problems are 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 by value has quadrupled.

Foreign trade has had a major impact on all the borders and coasts of the United States. Since 1950, the value of merchandise trade has grown in fifteen-fold in inflation adjusted terms. In 2005, ports and airports on the Atlantic Coast remain the most important, but growth in all other regions since 1950, particularly the Pacific Coast and Mexican border, has been much faster.

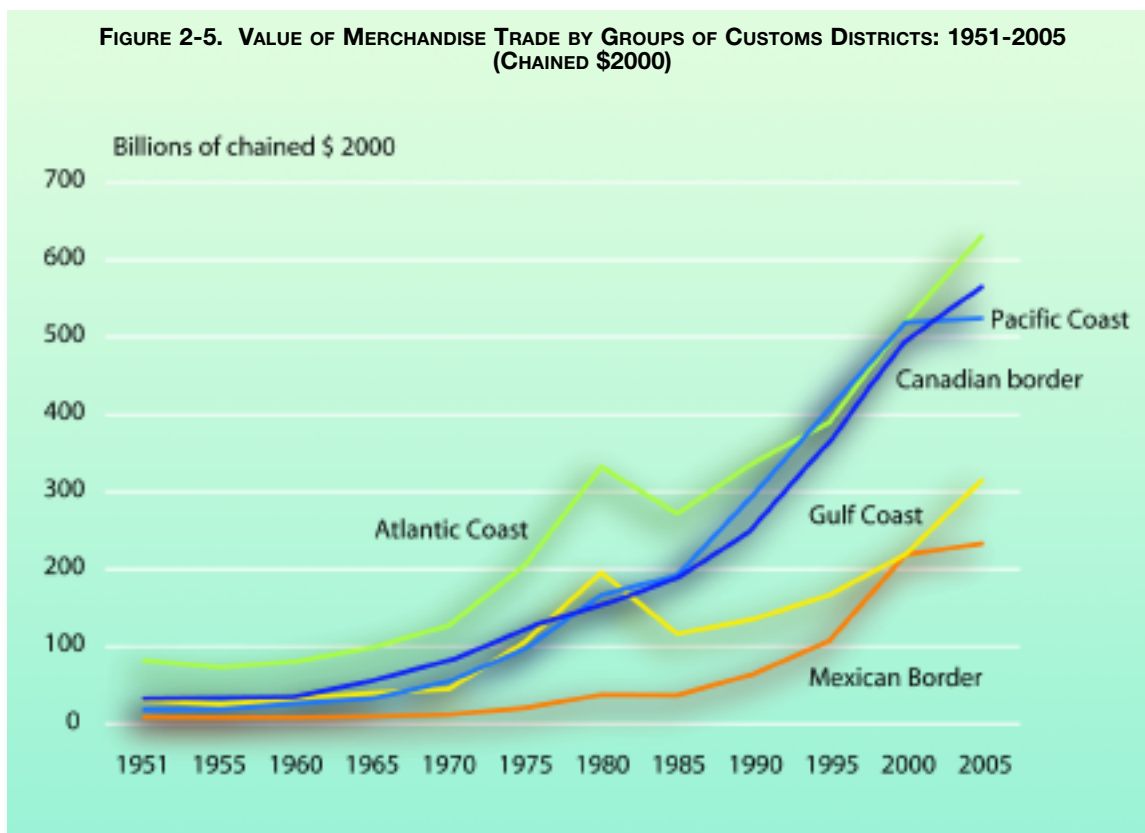


FIGURE 2-5. VALUE OF MERCHANDISE TRADE BY GROUPS OF CUSTOMS DISTRICTS: 1951-2005
Sources: 1950-1970: U.S. Census Bureau, *Historical Statistics of the United States, Colonial Times to 1970, Bicentennial Edition* (Washington, DC: 1975); 1975: U.S. Census Bureau, *Statistical Abstract of the United States: 1977* (Washington, DC: 1977); 1980-1985: U.S. Census Bureau, *Statistical Abstract of the United States: 1987* (Washington, DC: 1986); 1990-2000: U.S. Census Bureau, *Statistical Abstract of the United States: 2006* (Washington, DC: 2005); 2005: U.S. Census Bureau, Foreign Trade Division, FT920 - U.S. Merchandise Trade: Selected Highlights (Washington, DC: December 2005), available at <http://www.census.gov/foreign-trade/Press-Release/2005pr/12/ft920/> as of September 8, 2006; **Implicit GDP Deflator:** U.S. Department of Commerce, Bureau of Economic Analysis, Current-Dollar and "Real" Gross Domestic Product, available at www.bea.gov as of September 8, 2006.

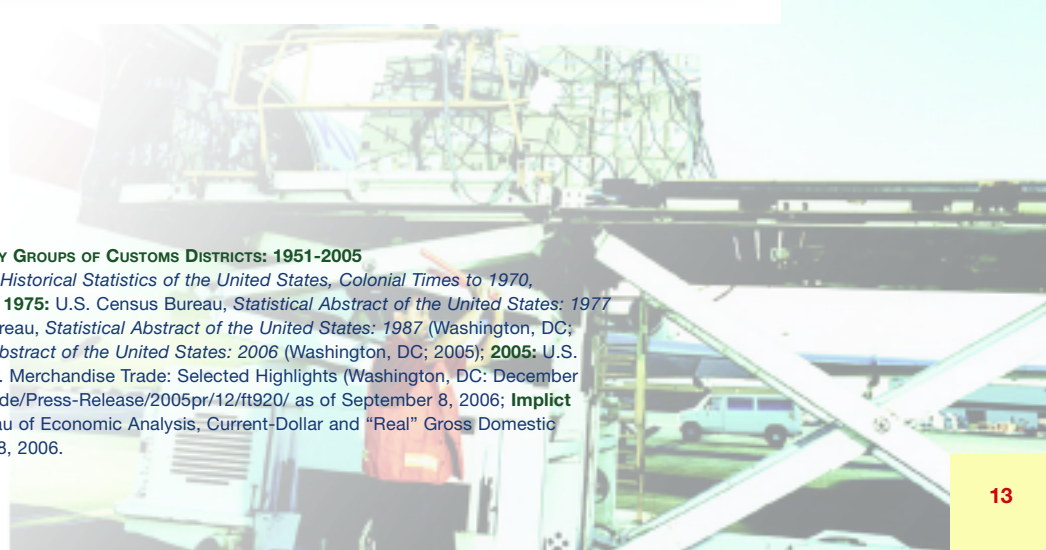
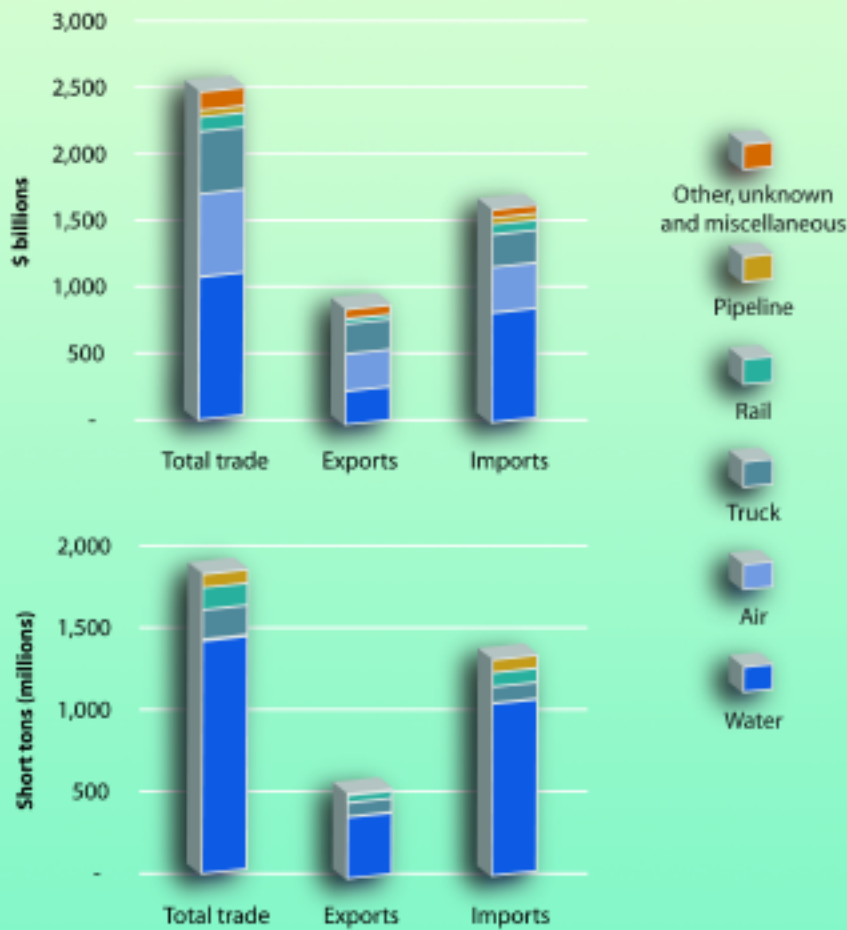


FIGURE 2-6. U.S. INTERNATIONAL MERCHANDISE TRADE BY MODE OF TRANSPORTATION: 2005



Note: 1 short ton = 2,000 pounds.

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 44 percent, with 25 percent moving by air and 19 percent moving by truck.

The top 25 foreign trade gateways measured by value of shipments are comprised of 9 airports, 11 water ports, and 5 border crossings. At these 25 gateways, imports com-

prise 65 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 very 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

Source: Compiled by U.S. Department of Transportation (USDOT), Research and Innovative Technology Administration (RITA), Bureau of Transportation Statistics (BTS), August 2006. **Water and air data**—U.S. Department of Commerce, U.S. Census Bureau, Foreign Trade Division, U.S. Exports of Merchandise and U.S. Imports of Merchandise, December 2005. **Total, truck, rail, pipeline, other and unknown data**—USDOT, RITA, BTS, Transborder Freight Data 2005; and special calculation, August 2006.

FIGURE 2-7. TOP 25 U.S. FOREIGN TRADE FREIGHT GATEWAYS BY VALUE: 2005 (\$ 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 2-8. Top 25 Water Ports by Weight: 2004 (Million Short Tons)



FIGURE 2-7. TOP 25 U.S. FOREIGN TRADE FREIGHT GATEWAYS BY VALUE: 2005

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *National Transportation Statistics* (Washington, DC: 2005), available at <http://www.bts.gov> as of October 16, 2006.

FIGURE 2-8. TOP 25 WATER PORTS BY WEIGHT: 2004

Source: U.S. Army Corps of Engineers, *2004 Waterborne Commerce of the United States, Part 5, National Summaries* (New Orleans, LA: 2006), table 5-2.

by foreign trade include Los Angeles, CA; Freeport, TX; Long Beach, CA; and Beaumont, TX. The top 25 water ports handle about two-thirds of all foreign and domestic goods moved by water.

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 1995 and 2005, about the same as growth in containerized cargo overall.

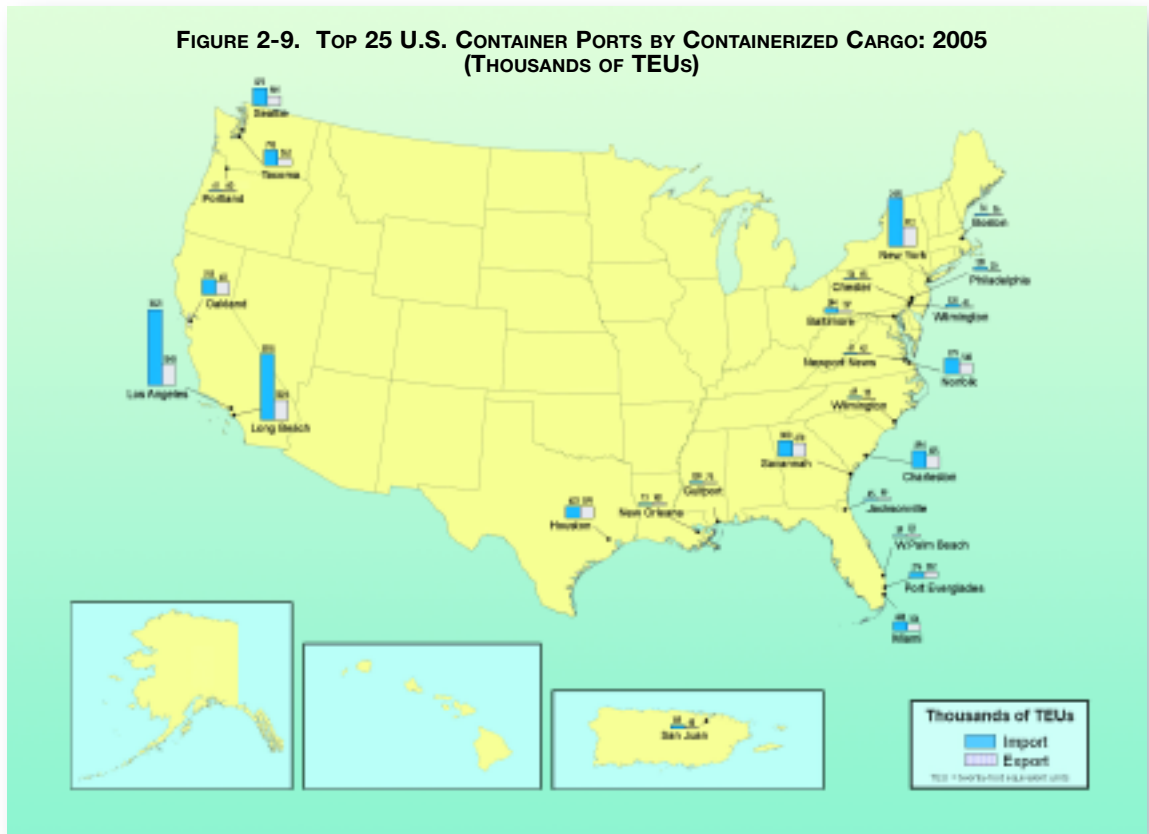


FIGURE 2-9. TOP 25 U.S. CONTAINER PORTS BY CONTAINERIZED CARGO: 2005
Source: U.S. Department of Transportation, Maritime Administration, *U.S. Waterborne Container Trade by U.S. Custom Ports, 1997-2005*, based on data provided by Port Import/Export Reporting Service, 2006, available at http://www.marad.dot.gov/MARAD_statistics/index.html as of April 27, 2006.

**TABLE 2-5. TOP 25 TRADING PARTNERS OF THE UNITED STATES (MERCHANDISE TRADE)
(\$ BILLIONS)**

Partner	2005					
	Rank	1998	2000	2002	2004	2005
Canada	1	329.0	405.6	371.4	445.0	499.3
Mexico	2	173.7	247.6	232.3	266.6	290.2
China	3	85.4	116.3	147.2	231.4	285.3
Japan	4	179.9	211.8	172.9	184.0	193.5
Germany	5	76.5	88.0	89.1	108.6	119.0
United Kingdom	6	73.9	85.0	74.1	82.4	89.7
South Korea	7	40.5	68.2	58.2	72.5	71.4
Taiwan	8	51.3	64.9	50.6	56.3	56.9
France	9	41.8	50.0	47.4	53.1	56.2
Malaysia	10	28.0	36.6	34.4	39.1	44.2
Italy	11	30.0	36.0	34.4	38.8	42.5
Netherlands	12	26.6	31.7	28.2	36.9	41.4
Venezuela	13	15.8	24.2	19.6	29.7	40.4
Brazil	14	25.3	29.2	28.2	35.0	39.8
Ireland	15	14.0	24.1	29.1	35.6	38.0
Singapore	16	34.0	37.0	31.0	34.9	35.8
Saudi Arabia	17	16.9	20.4	17.9	26.2	34.1
Belgium	18	22.3	23.9	23.2	29.3	31.6
Thailand	19	18.7	23.0	19.7	23.9	27.1
India	20	11.8	14.3	15.9	21.7	26.8
Israel	21	15.6	20.7	19.5	23.7	26.6
Nigeria	22	5.0	11.3	7.0	17.8	25.8
Hong Kong	23	23.5	26.1	21.9	25.1	25.2
Switzerland	24	15.9	20.1	17.2	20.9	23.7
Australia	25	17.3	18.9	19.6	21.8	23.1
Top 25 total¹		1,386.3	1,746.7	1,621.2	1,960.5	2,187.5
U.S. total trade		1,594.4	1,997.3	1,856.8	2,287.6	2,575.3
Top 25 as % of total		87	87	87	86	85

¹Represents top 25 trading partners in the reference year not necessarily the partners shown here.

By a wide margin, Canada is this country's top trading partner followed by Mexico and China. China's share of trade with the United States more than doubled between 1998 and 2005, from 5 percent of total merchandise trade to 11 percent.

Trade with Canada and Mexico has grown rapidly over the past decade. Trucks carry almost two-thirds of the value of goods traded with these countries. The value of goods carried by truck increased by about 50 percent between 1997 and 2005. By weight, the water and truck modes carry the largest share of goods traded.

Trade with Canada by land modes is much higher than trade with Mexico. Both have been growing rapidly over the past few years. Imports and exports to Mexico measured by value grew by 61 percent and 49 percent respectively between 1998 and 2005.

Imports and exports to Canada grew by 64 percent and 40 percent respectively.

TABLE 2-5. TOP 25 TRADING PARTNERS OF THE UNITED STATES (MERCHANDISE TRADE)

Source: U.S. Department of Commerce, International Trade Administration, TradeStats Express, available at <http://www.ita.doc.gov/> as of April 4, 2006.

TABLE 2-6. U.S. MERCHANDISE TRADE WITH CANADA AND MEXICO BY TRANSPORTATION MODE

Mode	1998		2000		2004		2005 ¹	
	Value (\$ billions)	Weight (millions of short tons)	Value (\$ billions)	Weight (millions of short tons)	Value (\$ billions)	Weight (millions short tons)	Value (\$ billions)	Weight (millions short tons)
Truck	350	NA	429	NA	453	NA	491	191
Rail	68	NA	94	NA	108	NA	116	141
Air	30	<1	45	1	32	<1	33	<1
Water	21	183	33	194	46	244	58	256
Pipeline	11	NA	24	NA	39	NA	52	86
Other	23	NA	29	NA	34	NA	39	5
Total	503	NA	653	526	712	NA	790	679

Key: NA = not available.

¹2005 data are from the U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, North American Freight Transportation (Washington, DC: 2003), tables A-1 and A-2, available at www.bts.gov as of August 12, 2006.

Notes: Individual modal totals may not sum to exact totals due to rounding. 1 short ton = 2,000 pounds. For value, "Other" is the difference between the total and the sum of the individual modes.

TABLE 2-7. U.S. LAND EXPORTS TO AND IMPORTS FROM CANADA AND MEXICO BY MODE (\$ MILLIONS)

	1998	2000	2004	2005
Exports to Canada, total	137,745.4	154,847.4	171,878.1	192,907.5
Truck	114,806.1	129,825.3	135,897.5	151,221.7
Rail	12,279.6	12,946.5	16,596.6	19,321.9
Pipeline	93.4	161.6	1,584.2	2,393.9
Other ¹	10,559.5	11,913.4	17,776.7	19,933.1
Mail	6.8	0.6	23.1	36.9
Exports to Mexico, total	70,173.8	97,158.9	97,303.7	104,276.5
Truck	60,432.1	82,389.2	79,349.2	83,341.2
Rail	6,188.8	10,495.8	13,632.9	15,747.7
Pipeline	73.4	301.8	87.2	543.3
Other ¹	3,470.0	3,972.0	4,216.4	4,622.7
Mail	0.1	(R) 0.0	18.1	21.6
Imports from Canada, total	162,105.7	210,270.5	236,734.9	265,402.1
Truck	108,856.7	127,816.3	132,762.1	143,695.6
Rail	37,374.1	49,699.2	57,947.2	60,606.3
Pipeline	11,120.1	23,117.1	36,828.3	48,766.5
Other ¹	4,575.1	9,571.0	8,994.4	12,184.4
Mail	1.7	4.1	0.2	0.1
FTZ ²	177.9	62.8	202.6	149.3
Imports from Mexico, total	84,102.9	113,436.5	127,646.3	135,400.5
Truck	65,883.7	88,668.7	104,943.8	112,267.6
Rail	12,029.7	21,056.1	20,183.4	20,782.2
Pipeline	2.4	11.5	0.3	0.0
Other ¹	917.8	1,573.9	1,838.7	1,990.2
Mail	0.2	0.6	0.0	0.0
FTZ ²	2,886.7	2,125.7	679.8	360.4

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.

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

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

TABLE 2-6. U.S. MERCHANDISE TRADE WITH CANADA AND MEXICO

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, Transborder Freight Data, August 2006.

Table 2-7. U.S. Land Exports to and Imports from Canada and Mexico by Mode

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, Transborder Surface Freight Data, available at www.bts.gov/transborder as of March 23, 2006.

TABLE 2-8. INCOMING TRUCK CONTAINER CROSSINGS BY STATE, U.S.-CANADIAN BORDER

State	1998	2000	2004	2005
Alaska	11,139	9,710	9,771	8,345
Idaho	44,683	53,102	48,266	51,157
Maine	(R) 391,027	394,067	(R) 509,976	492,542
Michigan	(R) 2,254,902	2,471,416	2,661,624	2,674,597
Minnesota	107,667	131,004	102,963	90,050
Montana	168,805	198,745	165,167	152,433
New York	NA	1,910,176	1,978,035	1,994,093
North Dakota	NA	340,301	351,968	355,885
Vermont	NA	226,109	281,538	288,486
Washington	(R) 715,759	497,405	(R) 666,080	667,856
Total U.S. - Canada border	NA	6,232,035	(R) 6,775,388	6,775,444

Key: NA = Not available; R = revised.

Note: Full or empty truck containers entering the United States. 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 United States from Canada.

TABLE 2-9. INCOMING TRUCK CONTAINER CROSSINGS BY STATE, U.S.-MEXICAN BORDER

State	1998	2000	2004	2005
Arizona	318,185	322,160	319,872	344,617
California	860,684	947,311	1,135,850	1,128,457
New Mexico	31,699	35,507	32,348	38,868
Texas	2,502,358	2,895,703	3,024,830	3,165,620
Total U.S. - Mexico border	3,712,926	4,200,681	4,512,900	4,677,562

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

Three border crossings — Laredo, TX; Otay Mesa/San Ysidro, CA; and El Paso, TX — account for nearly two-thirds of trucks coming into the United States from Mexico.

TABLE 2-8. INCOMING TRUCK CONTAINER CROSSINGS BY STATE, U.S.-CANADIAN BORDER

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, special tabulation 2006, based on data from U.S. Customs Service, Mission Support Services, Office of Field Operations, Operations Management Database.

TABLE 2-9. INCOMING TRUCK CONTAINER CROSSINGS BY STATE, U.S.-MEXICAN BORDER

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, special tabulation 2006, 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 half of all containers coming in to the United States from Canada by rail.

TABLE 2-10. INCOMING RAIL CONTAINER CROSSINGS BY STATE, U.S.-CANADIAN BORDER

State	1998	2000	2004	2005
Alaska	N	N	N	N
Idaho	37,579	50,240	78,133	88,821
Maine	46,882	60,358	44,299	44,909
Michigan	587,317	679,747	751,600	730,100
Minnesota	215,899	250,943	333,657	322,784
Montana	23,729	25,255	39,996	29,399
New York	140,422	257,155	276,112	295,236
North Dakota	NA	154,698	225,284	233,323
Vermont	43,551	51,069	56,764	53,851
Washington	82,828	65,372	145,064	142,134
Total U.S. - Canada border	1,178,207	1,594,837	1,950,909	1,940,557

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

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

On the Mexican border, Laredo, TX by itself accounts for 44 percent of all containers coming into the United States by rail.

TABLE 2-11. INCOMING RAIL CONTAINER CROSSINGS BY STATE, U.S.-MEXICAN BORDER

State	1998	2000	2004	2005
Arizona	35,812	50,602	46,899	46,831
California	7,755	9,115	15,091	18,313
New Mexico	N	N	N	N
Texas	344,339	512,108	613,315	663,415
Total U.S. - Mexico border	387,906	571,825	675,305	728,559

Key: N = not applicable.

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

TABLE 2-10. INCOMING RAIL CONTAINER CROSSINGS BY STATE, U.S.-CANADIAN BORDER

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, special tabulation 2006, based on data from U.S. Customs Service, Mission Support Services, Office of Field Operations, Operations Management Database.

TABLE 2-11. INCOMING RAIL CONTAINER CROSSINGS BY STATE, U.S.-MEXICAN BORDER

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, special tabulation 2006, based on data from U.S. Customs Service, Mission Support Services, Office of Field Operations, Operations Management Database.

The Federal Aviation Administration (FAA) reports that Anchorage International and Memphis International are two of the most important U.S. airports that handle all-cargo aircraft. All-cargo aircraft are dedicated to the exclusive transportation of cargo. They do not include aircraft carrying passengers as well as cargo. Of the top 25 airports that handle all-cargo operations, Memphis is also one of the fastest growing, up 41 percent since 2000, along with Houston (45 percent) and Honolulu (40 percent).

TABLE 2-12. TOP 25 AIRPORTS BY LANDED WEIGHT OF ALL-CARGO OPERATIONS¹

Airport	2004 Rank	Landed weight (thousands of short tons)				
		2000	2001	2002	2003	2004
Anchorage, AK (Ted Stevens Anchorage International) ²	1	8,084	7,777	8,994	9,007	9,844
Memphis, TN (Memphis International)	2	6,318	6,865	8,826	8,760	8,885
Louisville, KY (Louisville International-Standiford Field)	3	3,987	4,026	4,202	4,172	4,388
Miami, FL (Miami International)	4	2,929	3,055	3,174	3,239	3,423
Los Angeles, CA (Los Angeles International)	5	2,892	2,929	3,038	3,120	3,062
New York, NY (John F. Kennedy International)	6	2,793	2,543	2,912	2,937	2,898
Chicago, IL (O'Hare International)	7	2,062	2,012	2,217	2,351	2,359
Indianapolis, IN (Indianapolis International)	8	2,884	3,154	2,338	2,277	2,314
Newark, NJ (Newark Liberty International)	9	1,961	1,795	1,758	1,835	1,765
Oakland, CA (Metropolitan Oakland International)	10	1,811	1,639	1,746	1,695	1,703
Fort Worth, TX (Dallas/Fort Worth International)	11	1,691	1,546	1,481	1,481	1,431
Philadelphia, PA (Philadelphia International)	12	1,454	1,452	1,466	1,365	1,371
Ontario, CA (Ontario International)	13	1,220	1,291	1,444	1,338	1,326
Atlanta, GA (William B. Hartsfield International)	14	1,090	1,043	1,166	1,194	1,162
Covington/Cincinnati, OH (Cincinnati/Northern Kentucky International)	15	912	980	1,043	1,098	1,141
Honolulu, HI (Honolulu International)	16	692	789	970	1,017	970
Phoenix, AZ (Sky Harbor International)	17	920	838	867	779	801
Dayton, OH (James M. Cox Dayton International)	18	2,233	1,444	897	784	787
Denver, CO (Denver International)	19	900	803	783	747	763
San Francisco, CA (San Francisco International)	20	1,267	1,012	1,035	1,200	740
Portland, OR (Portland International)	21	882	807	816	749	718
Houston, TX (George Bush Intercontinental)	22	480	463	482	666	697
Minneapolis, MN (Minneapolis-St Paul International/Wold Chamberlain)	23	622	586	621	687	678
Rockford, IL (Greater Rockford)	24	654	681	630	625	677
Salt Lake City, UT (Salt Lake City International)	25	751	606	583	599	621
Top 25 airports³		52,381	50,701	53,942	53,947	54,526
United States, all airports⁴		74,743	71,441	73,433	73,072	74,297
Top 25 as % of U.S. total		70.1%	71.0%	73.5%	73.8%	73.4%

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

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

³Represents top 25 airports in the reference year not necessarily the airports shown here.

⁴Limited to airports with an aggregate landed weight in excess of 100 million pounds (50,000 short tons) annually.

Note: 1 short ton = 2,000 pounds.

TABLE 2-12. TOP 25 AIRPORTS BY LANDED WEIGHT OF ALL-CARGO OPERATIONS

Source: U.S. Department of Transportation, Federal Aviation Administration, Air Carrier Activity Information System

(ACAIS) database, All-Cargo Data, available at http://www.faa.gov/airports_airtraffic/airports/planning_capacity/passenger_allcargo_stats/passenger/index as of March 22, 2006.

Trucks move more than one-half of all hazardous materials shipped from within the United States. However, truck ton-miles of hazardous shipments account for a much smaller share, about one-third of all ton-miles, because such shipments travel relatively short distances. By contrast, rail accounts for only 5 percent of shipments by weight but 22 percent by ton-miles.

Table 2-13. U.S. Hazardous Materials Shipments by Transportation Mode: 2002

Transportation mode	Value		Tons		Ton-miles		Average miles per shipment
	\$ Billion	Percent	Millions	Percent	Billions	Percent	
All modes, total	660.2	100.0	2,191.5	100.0	326.7	100.0	136
Single modes, total	644.5	97.6	2,158.5	98.5	311.9	95.5	105
Truck ¹	419.6	63.6	1,159.5	52.9	110.2	33.7	86
For-hire	189.8	28.8	449.5	20.5	65.1	19.9	285
Private ²	226.7	34.3	702.2	32.0	44.1	13.5	38
Rail	31.3	4.7	109.4	5.0	72.1	22.1	695
Water	46.9	7.1	228.2	10.4	70.6	21.6	S
Air	1.6	0.2	0.1	0.003	0.1	0.03	2,080
Pipeline ³	145.0	22.0	661.4	30.2	S	S	S
Multiple modes, total	9.6	1.5	18.7	0.9	12.5	3.8	849
Parcel, U.S. Postal Service or Courier	4.3	0.6	0.2	0.01	0.1	0.04	837
Other	5.4	0.8	18.5	0.8	12.4	3.8	1,371
Unknown and other modes, total	6.1	0.9	14.2	0.6	2.3	0.7	57

Key: S = data are not published because of high sampling variability or other reasons.

¹Truck as a single mode includes shipments that went by private truck only, for-hire truck only, or a combination of both.

²Private truck refers to a truck operated by a temporary or permanent employee of an establishment or the buyer/receiver of the shipment.

³Excludes most shipments of crude oil.

TABLE 2-14. U.S. HAZARDOUS MATERIALS SHIPMENTS BY HAZARD CLASS: 2002

Hazard class	Description	Value		Tons		Ton-miles	
		\$ Billions	Percent	Millions	Percent	Billions	Percent
Class 1	Explosives	7.9	1.2	5.0	0.2	1.6	0.5
Class 2	Gases	73.9	11.2	213.4	9.7	37.3	11.4
Class 3	Flammable liquids	490.2	74.3	1,789.0	81.6	218.6	66.9
Class 4	Flammable solids	6.6	1.0	11.3	0.5	4.4	1.3
Class 5	Oxidizers and organic peroxides	5.5	0.8	12.7	0.6	4.2	1.3
Class 6	Toxic (poison)	8.3	1.3	8.5	0.4	4.3	1.3
Class 7	Radioactive materials	5.9	0.9	0.1	0.003	0.04	0.01
Class 8	Corrosive materials	38.3	5.8	90.7	4.1	36.3	11.1
Class 9	Miscellaneous dangerous goods	23.6	3.6	61.0	2.8	20.2	6.2
Total		660.2	100.0	2,191.5	100.0	326.7	100.0

Table 2-13. U.S. Hazardous Materials Shipments by Transportation Mode: 2002

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, *2002 Economic Census, Transportation, 2002 Commodity Flow Survey, Hazardous Materials* (Washington, DC: December 2004), table 1a.

TABLE 2-14. U.S. HAZARDOUS MATERIALS SHIPMENTS BY HAZARD CLASS: 2002

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, *2002 Economic Census, Transportation, 2002 Commodity Flow Survey, Hazardous Materials* (Washington, DC: December 2004), table 2a.

Flammable liquids, especially gasoline, are the predominant hazardous material transported in the United States. In terms of ton-miles, flammable liquids account for about 67 percent of total ton-miles of hazardous materials shipments. The next largest class of hazardous materials in terms of ton-miles is gases at about 11 percent.

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 2-15. DOMESTIC FREIGHT ACTIVITY BY TRANSPORTATION MODE FOR SELECTED COUNTRIES: 2003 (PERCENT SHARE OF TOTAL)

Mode	Canada	France	Germany	Italy	Japan	United Kingdom	United States
Water	¹ 5.0	² 6.7	13.1	³ 17.3	³ 41.3	³ 26.3	14.9
Oil pipeline	35.8	8.0	3.5	4.1	NA	3.8	14.5
Rail	37.5	16.9	17.7	9.8	4.0	7.5	39.5
Road	21.8	68.4	65.7	68.9	³ 54.6	62.4	31.1

Key: NA = not available.
¹Based on data from 2001.
²Based on data from 2000.
³Based on data from 2002.



TABLE 2-15. DOMESTIC FREIGHT ACTIVITY BY TRANSPORTATION MODE FOR SELECTED COUNTRIES: 2003

Sources: United States: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *National Transportation Statistics 2005* (Washington, DC: 2005).

All other countries: Organisation for Economic Cooperation and Development (OECD), *OECD in Figures — 2005 Edition* (Paris: 2005).





III. THE FREIGHT TRANSPORTATION SYSTEM

Freight is carried via an extensive network of roads, railroad, waterways, and pipelines. Road infrastructure increased slowly over the past two decades despite a large increase in the volume of traffic. Between 1980 and 2004, route miles of public roads increased by 4 percent compared with a 94 percent increase in vehicle miles traveled (vmt). Over the same period, miles of railroad dropped by more than 20 percent, while rail shipments (measured in ton-miles) increased by 81 percent.

TABLE 3-1. MILES OF INFRASTRUCTURE BY TRANSPORTATION MODE

	1980	1990	2000	2004	Percent change, 1980-2004
Public roads, route miles	3,859,837	3,866,926	3,951,101	3,997,462	3.6
National Highway System (NHS)	N	N	161,189	162,158	N
Interstates	41,120	45,074	46,673	46,837	13.9
Other NHS	N	N	114,516	115,321	N
Freight intermodal connectors ¹	N	N	N	NA	N
Other	N	N	3,789,912	3,835,303	N
Strategic Highway Corridor Network (STRAHNET)	N	N	62,066	62,257	N
Interstate	N	N	46,675	46,837	N
Non-Interstate	N	N	15,389	15,420	N
Railroad	183,077 ²	175,909	170,512	140,246	-23.4
Class I	NA	133,189	120,597	97,496	NA
Regional	NA	18,375	20,978	15,641	NA
Local	NA	24,337	28,937	27,109	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	1,189,200	1,369,300	1,462,300	39.0

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

¹Excludes intermodal connectors serving intercity bus, Amtrak, and public transit facilities.

²Excludes Class III railroads.

TABLE 3-1. MILES OF INFRASTRUCTURE BY TRANSPORTATION MODE

Sources: Public roads: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, (Washington, DC: Annual issues), table HM-16.

Freight 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 July 5, 2005

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 Jan. 26, 2006

Oil pipelines: 1980-2002: Eno Transportation Foundation, *Transportation in America, 2002* (Washington, DC: 2002). 2003: U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Office of Pipeline Safety, Pipeline Statistics, Internet site <http://ops.dot.gov/stats/lpo.htm> as of July 5, 2005.

Gas pipelines: American Gas Association, *Gas Facts* (Arlington, VA: Annual issues).



A vast number of vehicles and vessels move goods over the transportation network. The number of commercial trucks climbed 41 percent between 1980 and 2004, but their share of the total highway vehicle fleet remained constant. The character of the commercial truck fleet itself also remained stable, with the number of combination trucks and single-unit trucks both growing by about 40 percent over this period. In comparison, 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

	1980	1990	2000	2004
Highway	161,490,159	193,057,376	225,821,241	243,023,486
Truck, single-unit 2-axle 6-tire or more	4,373,784	4,486,981	5,926,030	6,161,028
Truck, combination	1,416,869	1,708,895	2,096,619	2,010,335
Truck, total	5,790,653	6,195,876	8,022,649	8,171,363
Trucks as percent of all highway vehicles	3.6	3.2	3.6	3.4
Rail				
Class I, locomotive	28,094	18,835	20,028	22,015
Class I, freight cars ¹	1,168,114	658,902	560,154	473,773
Nonclass I freight cars ¹	102,161	103,527	132,448	120,169
Car companies and shippers freight cars ¹	440,552	449,832	688,194	693,978
Water	38,788	39,445	41,354	40,290
Nonself-propelled vessels ²	31,662	31,209	33,152	31,296
Self-propelled vessels ³	7,126	8,236	8,202	8,994
Oceangoing steam and motor ships ⁴	864	636	454	412
US Flag fleet as percent of world fleet ⁴	3.5	2.7	1.6	1.4

¹Beginning with 2001 data, Canadian-owned U.S. railroads are excluded. This accounts for about 47,000 cars in 2000

²Nonself-propelled vessels include dry-cargo barges, tank barges, and railroad-car floats.

³Self-propelled vessels include dry cargo, passenger, off-shore support, tankers, and towboats.

⁴1,000 gross tons and over.

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 2005* (Washington, DC: 2005).

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-miles are made in the carriage of commodities. Nevertheless, about 20 percent of truck-miles are made with no product on board.

TABLE 3-3. TRUCK-MILES BY PRODUCTS CARRIED: 2002¹

Products carried	Millions of miles
Total²	145,172
Animals and fish, live	735
Animal feed and products of animal origin	2,088
Grains, cereal	1,368
All other agricultural products	2,661
Basic chemicals	876
Fertilizers and fertilizer materials	1,666
Pharmaceutical products	305
All other chemical products and preparations	1,351
Alcoholic beverages	1,124
Bakery and milled grain products	3,553
Meat, seafood, and their preparations	3,056
Tobacco products	445
All other products foodstuff	7,428
Logs and other wood in the rough	1,149
Paper or paperboard articles	3,140
Printed products	765
Pulp, newsprint, paper, paperboard	1,936
Wood products	3,561
Articles of base metal	3,294
Base metal in primary or semifinished forms	2,881
Nonmetallic mineral products	3,049
Tools, nonpowered	7,759
Tools, powered	6,478
Electronic and other electrical equipment	3,024
Furniture, mattresses, lamps, etc.	2,043
Machinery	3,225
Miscellaneous manufactured products	4,008
Precision instruments and apparatus	734
Textile, leather, and related articles	1,538
Vehicles, including parts	3,844
All other transportation equipment	636
Coal	301
Crude petroleum	132
Gravel or crushed stone	2,790
Metallic ores and concentrates	45
Monumental or building stone	462
Natural sands	1,089
All other nonmetallic minerals	499
Fuel oils	1,232
Gasoline and aviation turbine fuel	849
Plastic and rubber	2,393
All other coal and refined petroleum products	1,172
Hazardous waste (EPA manifest)	190
All other waste and scrape (non-EPA manifest)	2,647
Recyclable products	922
Mail and courier parcels	4,760
Empty shipping containers	794
Passengers	274
Mixed freight	14,659
Products, equipment, or materials not elsewhere classified	265
Products not specified	6,358
Not applicable ³	150
No product carried	28,977

¹Excludes pickups, panels, minivans, sport utilities, and station wagons.

²Detail lines may not add to total because multiple products/hazardous materials may be carried at the same time.

³Vehicles not in use. When the respondent had partial-year ownership of the vehicle, annual miles were adjusted to reflect miles traveled when not owned by the respondent.

TABLE 3-3. TRUCK-MILES BY PRODUCTS CARRIED: 2002

Source: U.S. Department of Commerce, Census Bureau, *Vehicle Inventory and Use Survey 2002: United States* (Washington, DC: 2004), available at <http://www.census.gov/svsd/www/02vehinv.html> as of July 6, 2005.

TABLE 3-4. NUMBER AND VEHICLE MILES TRAVELED (VMT) OF TRUCKS BY AVERAGE WEIGHT (INCLUDING VEHICLE AND LOAD)¹

Average weight (pounds)	1987		1992		1997		2002		Percent change, 1987-2002	
	Number (thousands)	VMT (millions)	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	147,876	5,415	145,624	49	62
Light-heavy	1,030	10,768	1,259	14,012	1,436	19,815	1,914	26,256	86	144
10,001 to 14,000	525	5,440	694	8,000	819	11,502	1,142	15,186	118	179
14,001 to 16,000	242	2,738	282	2,977	316	3,951	396	5,908	64	116
16,001 to 19,500	263	2,590	282	3,035	301	4,362	376	5,161	43	99
Medium-heavy	766	7,581	732	8,143	729	10,129	910	11,766	19	55
19,501 to 26,000	766	7,581	732	8,143	729	10,129	910	11,766	19	55
Heavy-heavy	1,829	71,623	2,017	82,832	2,536	117,931	2,591	107,602	42	50
26,001 to 33,000	377	5,411	387	5,694	428	7,093	437	5,845	16	8
33,001 to 40,000	209	4,113	233	5,285	257	6,594	229	3,770	10	-8
40,001 to 50,000	292	7,625	339	9,622	400	13,078	318	6,698	9	-12
50,001 to 60,000	188	7,157	227	8,699	311	12,653	327	8,950	74	25
60,001 to 80,000	723	45,439	781	51,044	1,070	74,724	1,179	77,489	63	71
80,001 to 100,000	28	1,254	33	1,529	46	2,427	69	2,950	144	135
100,001 to 130,000	8	440	12	734	18	1,051	26	1,571	238	257
130,001 or more	4	185	5	227	6	312	6	329	43	78

¹Excludes 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.

The weight profile of heavy trucks on the road (those over 10,000 pounds) changed between 1987 and 2002. The number of light-heavy trucks (between 10,000 and 19,500 pounds) and heavy-heavy trucks (over 26,000 pounds) increased 86 percent and 42 percent respectively. Over the same period, the number of medium-heavy

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	3,554,449
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.

¹Static weighs include the total vehicles weighed from semiportable, portable, and fixed scales.

²Violations include those from axle, gross, and bridge formula weight limits.

³Permits issued are for divisible and non-divisible loads on a trip or annual basis, as well as the overwidth movement of a divisible load.

TABLE 3-4. NUMBER AND VEHICLE MILES TRAVELED (VMT) OF TRUCKS BY AVERAGE WEIGHT (INCLUDING VEHICLE AND LOAD)

Sources: U.S. Department of Commerce, Census Bureau, *2002 Vehicle Inventory and Use Survey: United States* (Washington, DC: 2004), available at <http://www.census.gov/svsd/www/02vehinv.html> as of July 1, 2005; U.S.

Department of Commerce, Census Bureau, *1992 Truck Inventory and Use Survey: United States* (Washington, DC: 1995), available at <http://www.census.gov/svsd/www/97vehinv.html> as of July 1, 2005.

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.

trucks (between 19,501 and 26,000 pounds) grew by only 19 percent. Trucks between 60,000 and 80,000 pounds average weight form the largest category in both number of trucks and vmt because in most cases 80,000 pounds is the maximum allowed on the highway system.

Federal and state governments are very concerned about truck weight because of the damage that heavy trucks can do to roads and bridges. To monitor truck weight, approximately 200 million weighs are made each year, about half are weigh-in-motion and half static. Less than 1 percent of weighs discover violations.

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

TABLE 3-6. SEMITRAILER LENGTH LIMITATIONS ON THE 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

¹Semitrailers up to 53 feet may also operate without a permit by conforming to a kingpin-to-rear-most axle distance of 38 feet.

²Semitrailers up to 53 feet in length may operate without a permit by conforming to a kingpin-to-rear-most 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.

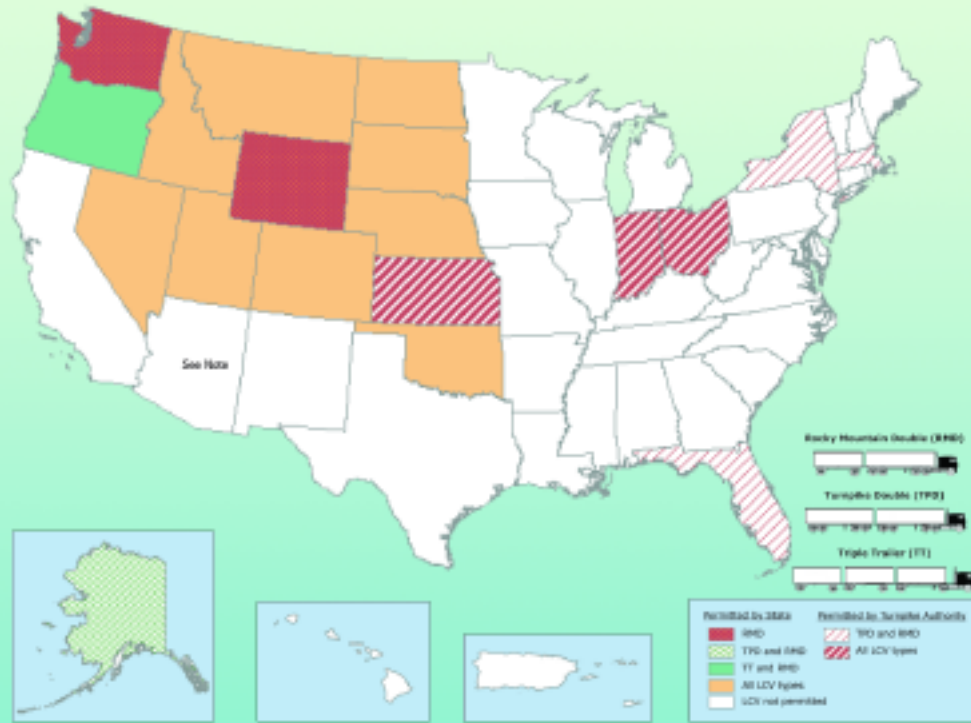
³Semitrailers up to 53 feet in length may operate without a permit by conforming to a kingpin-to-rear-most axle distance of 41 feet, measured to the center of the rear tandem assembly. Semitrailers that are consistent with 23 CFR 658.13(h) may operate without a permit provided the distance from the kingpin 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 3-6. SEMITRAILER LENGTH LIMITATIONS ON THE NATIONAL TRUCK NETWORK BY STATE

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.

FIGURE 3-1. PERMITTED LONGER COMBINATION VEHICLES (LCVs) BY STATE AND TRUCK CONFIGURATION



Note: LCVs (of all types) are only permitted on I-15 that traverses the northwest corner of the states.

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.

FIGURE 3-1. PERMITTED LONGER COMBINATION VEHICLES (LCVs) BY STATE AND TRUCK CONFIGURATION

Source: U.S. Department of Transportation, Federal Highway Administration, *Comprehensive Truck Size and Weight Study, Volume II* (Washington, DC: 2000).

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

As highway traffic increases over the next twenty years, the conditions that truckers will encounter on the roads are expected to worsen considerably.

TABLE 3-7. MAXIMUM POSTED SPEED LIMITS ON RURAL INTERSTATES: 2006 (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	65	70
Iowa	70	70
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	² 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	³ 65	³ 65
Washington	60	70
West Virginia	70	70
Wisconsin	65	65
Wyoming	75	75

¹ Urban Interstate.

² The maximum speed for trucks on the Ohio Turnpike is 65 miles per hour (mph).

³ Effective July 1, 2006, the posted speed limit on I-85 may be as high as 70 mph.

Note: 55 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: 2006

Source: Insurance Institute for Highway Safety, Maximum Posted Speed Limits for Passenger Vehicles as of June 2006, available at http://www.iihs.org/laws/state_laws/speed_limit_laws.html as of June 22, 2006.



FIGURE 3-2. NATIONAL HIGHWAY SYSTEM ESTIMATED PEAK PERIOD CONGESTION: 1998

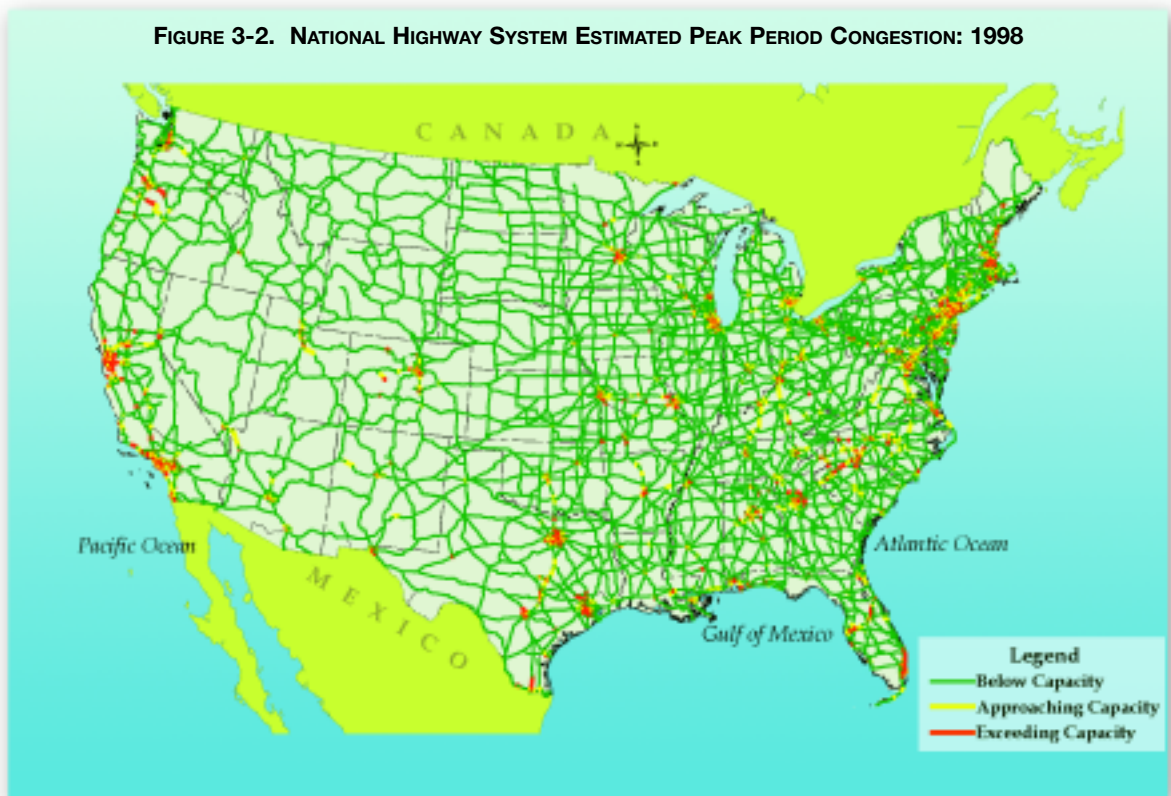


FIGURE 3-3. NATIONAL HIGHWAY SYSTEM ESTIMATED PEAK PERIOD CONGESTION: 2020

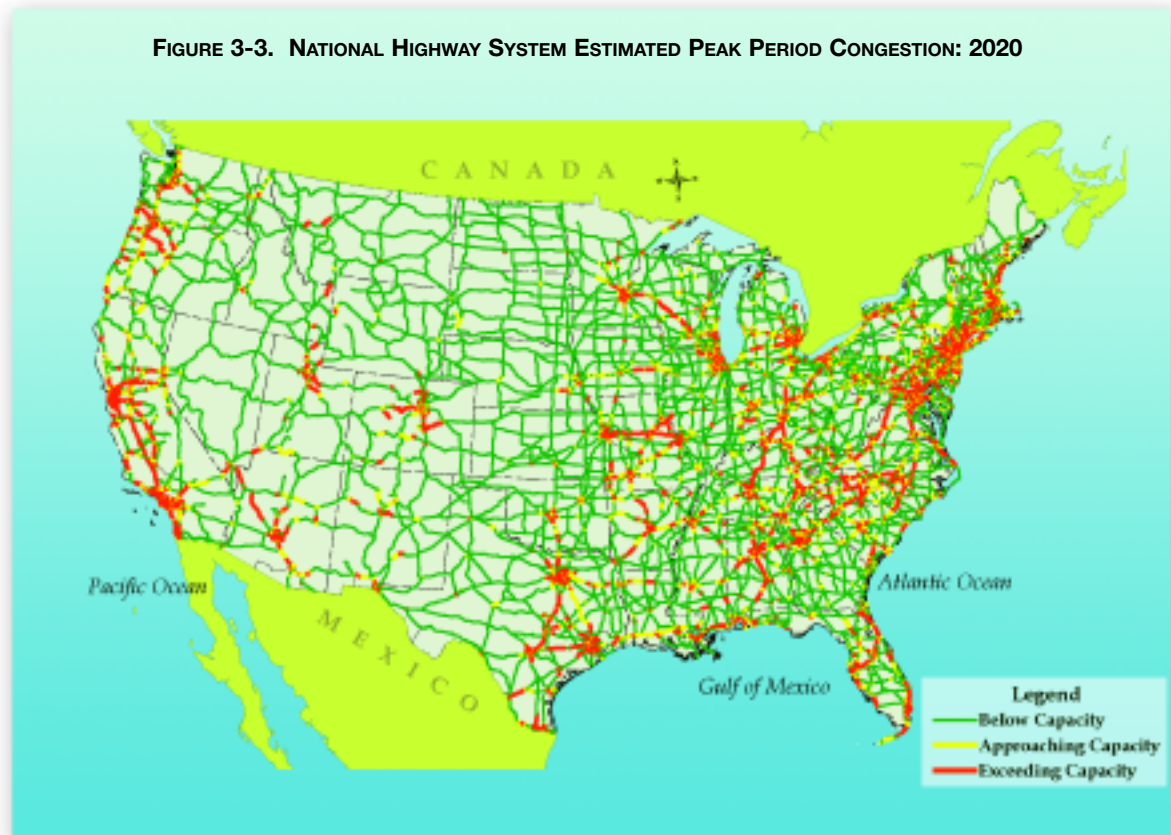


FIGURE 3-2. NATIONAL HIGHWAY SYSTEM ESTIMATED PEAK PERIOD CONGESTION: 1998
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, 2002.

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, 2002.

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 40 percent of the transportation and warehousing sector. 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 warehousing¹	178,025	200,421	318,245,044	394,456,801	82,346,182	118,251,681	2,920,777	3,757,426
Rail transportation	NA	NA	NA	NA	NA	NA	NA	NA
Water transportation	1,921	1,924	24,019,168	23,124,300	2,834,114	3,031,880	72,857	65,326
Truck transportation ¹	103,798	112,698	141,225,398	165,561,328	38,471,272	47,833,733	1,293,790	1,437,259
Pipeline transportation	2,311	2,512	26,836,992	27,641,362	2,660,576	3,082,558	49,280	46,556
Support activities for transportation	30,675	34,223	39,758,245	62,315,569	12,592,441	16,558,036	411,640	478,166
Couriers and messengers	10,887	12,754	39,812,433	59,373,155	14,071,630	17,431,848	530,839	578,257
Warehousing and storage ¹	6,497	12,637	10,657,925	17,924,787	2,926,119	18,689,122	109,760	639,174

Key: NA = not available; R = revised.

¹Enterprise 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

	Class I		Non-Class I		Total	
	1997	2002	1997	2002	1997	2002
Number of railroads	9	7	541	545	550	552
Freight revenue (billions \$)	32.3	34.1	3.0	2.8	35.3	36.9
Operating revenue (billions \$)	33.1	35.3	NA	NA	NA	NA
Employees	177,981	157,372	22,736	19,688	200,717	177,060

Key: NA = not available.

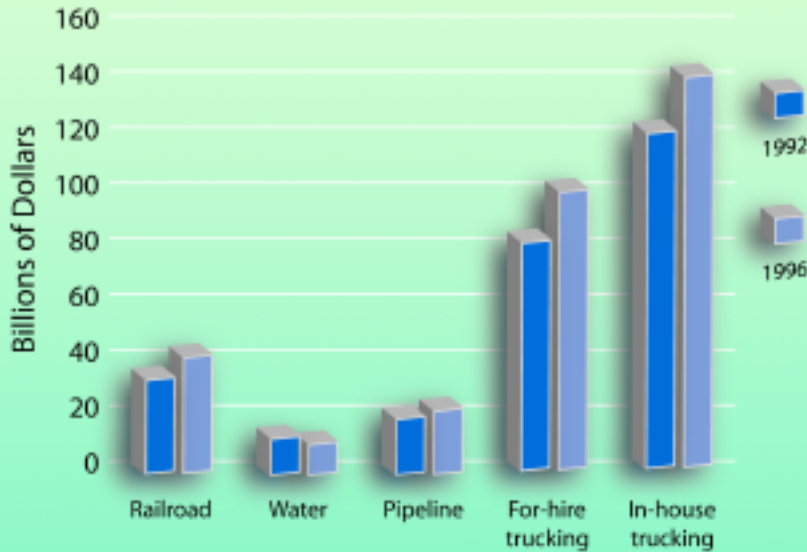
TABLE 4-1. ECONOMIC CHARACTERISTICS OF TRANSPORTATION AND WAREHOUSING IN FREIGHT DOMINATED MODES NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS) BASIS

Source: U.S. Department of Commerce, Census Bureau, *2002 Economic Census, Transportation and Warehousing, United States*, available at http://www.census.gov/econ/census02/data/us/US000_48.HTM as of September 14, 2005; U.S. Department of Commerce, Census Bureau, *1997 Economic Census, Transportation and Warehousing, United States*, available at http://www.census.gov/epcd/ec97/us/US000_48.HTM as of September 14, 2005.

TABLE 4-2. ECONOMIC CHARACTERISTICS OF FREIGHT RAILROADS

Source: Association of American Railroads, *Railroad Facts* (Washington, DC: Annual issues).

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

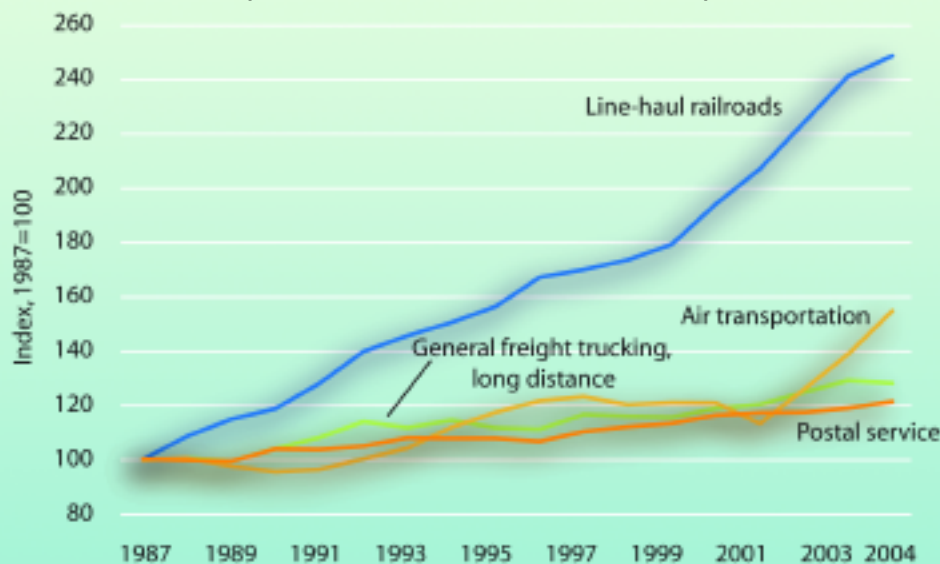


¹Based on the number of paid hours. Real gross domestic product in the business and nonfarm business sectors is the basis of the output components of the productivity measures. These output components are based on and are consistent with the National Income and Product Accounts (NIPA), including the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

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 gross domestic product. 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 provided by businesses for their own use).

In-house trucking accounted for \$142 billion of GDP in 1996 (the latest year for which data are available) and for-hire trucking accounted for \$101 billion.

Figure 4-2. Productivity in Selected Transportation Industries: 1987-2004 (OUTPUT PER EMPLOYEE,¹ INDEX, 1987 = 100)



¹Based 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.

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 2004, output per hour worked more than doubled in line-haul railroading but

grew only 55 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 or 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 engaged in the transportation of freight that, because of size, weight, shape, or other inherent characteristics, requires specialized equipment, such as flatbeds, tankers, or refrigerated trailers.

TABLE 4-3. EMPLOYMENT IN FOR-HIRE TRANSPORTATION PRIMARILY SERVING FREIGHT¹ (THOUSANDS)

	1980	1990	2000	2004	2005
Total U.S. labor force²	90,528	109,487	131,785	(R) 131,435	133,463
Transportation and warehousing	2,961	3,476	4,410	(R) 4,249	4,347
Rail transportation	518	272	232	(R) 226	228
Water transportation	NA	57	56	(R) 56	61
Truck transportation	NA	1,122	1,406	(R) 1,352	1,393
Pipeline transportation	NA	60	46	(R) 38	38
Support activities for transportation	NA	364	537	(R) 535	551
Couriers and messengers	NA	375	605	(R) 557	572
Warehousing and storage	NA	407	514	(R) 558	585

Key: NA = not available; R = revised.

¹Annual averages.

²Excludes 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.

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 2005, rail employment declined nearly 60 percent. Consequently, in 2005 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 2005 accounted for about one-third of employment in transportation and warehousing.

FIGURE 4-1: VALUE ADDED BY FREIGHT TRANSPORTATION TO GDP BY MODE

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, Special Tabulation, September 2000.

FIGURE 4-2. PRODUCTIVITY IN SELECTED TRANSPORTATION INDUSTRIES: 1987-2003

Source: U.S. Department of Labor, Bureau of Labor Statistics, Industry Productivity, available at <http://www.bls.gov/> as of September 12, 2006.

TABLE 4-3. EMPLOYMENT IN FOR-HIRE TRANSPORTATION PRIMARILY SERVING FREIGHT

Source: U.S. Department of Labor, Bureau of Labor Statistics, Current Employment Statistics survey, available at www.bls.gov as of May 3, 2006.

Freight transportation is a major employer, with truck driving by far the largest freight transportation occupation in the United States. There were nearly three million truck drivers in 2005; about 54 percent of these professionals drive heavy/tractor trailer trucks, 32 percent drive light/delivery service trucks, and about 14 percent are driver/sales workers.

TABLE 4-4. EMPLOYMENT IN SELECTED FREIGHT TRANSPORTATION AND FREIGHT TRANSPORTATION-RELATED OCCUPATIONS

Occupation (SOC code)	1999	2000	2004	2005
Vehicle operators, pipeline operators, and primary support				
Driver/sales worker (53-3031)	385,210	373,660	406,910	400,530
Truck drivers, heavy and tractor-trailer (53-3032)	1,558,400	1,577,070	1,553,370	1,624,740
Truck drivers, light or delivery services (53-3033)	1,085,050	1,033,220	938,730	938,280
Locomotive engineers (53-4011)	19,940	29,390	31,180	37,390
Rail yard engineers, dinkey operators, and hostlers (53-4013)	5,070	4,020	6,170	6,970
Railroad brake, signal, and switch operators (53-4021)	14,500	16,830	16,410	20,700
Railroad conductors and yardmasters (53-4031)	36,680	40,380	35,720	38,330
Sailors and marine oilers (53-5011)	27,200	30,090	27,570	31,090
Captains, mates, and pilots of water vessels (53-5021)	20,660	21,080	25,200	28,570
Ship engineers (53-5031)	6,800	7,370	10,330	13,240
Bridge and lock tenders (53-6011)	6,970	4,790	3,500	3,620
Gas compressor and gas pumping station operators (53-7071)	6,940	6,510	4,680	3,950
Pump operators, except wellhead pumpers (53-7072)	13,480	13,730	9,810	9,970
Transportation equipment manufacturing and maintenance occupations				
Bus and truck mechanics and diesel engine specialists (49-3031)	273,320	258,800	251,430	248,280
Rail car repairers (49-3043)	7,230	10,620	18,140	24,270
Transportation infrastructure construction and maintenance occupations				
Rail-track laying and maintenance equipment operators (47-4061)	8,620	9,940	10,430	13,510
Signal and track switch repairers (49-9097)	3,720	5,540	7,780	6,100
Dredge operators (53-7031)	1,910	3,100	1,730	1,720
Secondary support service occupations				
Dispatchers, except police, fire, and ambulance (43-5032)	171,560	167,180	165,910	172,550
Postal service mail carriers (43-5052)	352,550	354,980	344,050	347,180
Shipping, receiving, and traffic clerks (43-5071)	886,230	864,530	747,270	759,910
Transportation inspectors (53-6051)	22,440	26,520	24,140	25,570
Tank car, truck, and ship loaders (53-7121)	20,830	17,480	16,530	15,950

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, 2005 (Washington, DC: May 2005), available at <http://www.bls.gov/oes> as of May 24, 2006.

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

Growing demand for freight transportation heightens concerns about its safety, energy consumption, and environmental consequences. Most of our current knowledge is in safety, with some in energy consumption. More information is needed to understand and fix freight-related environmental issues.

TABLE 5-1. TRANSPORTATION FATALITIES BY FREIGHT TRANSPORTATION MODE

	1980	1990	2000	2004	2005
Total transportation fatalities (passenger and freight)	NA	47,347	44,384	(R) 45,005	NA
Highway (passenger and freight)	51,091	44,599	41,945	(R) 42,836	44,443
Large truck occupants ¹	1,262	705	754	(R) 766	803
Others killed in crashes involving large trucks	4,709	4,567	4,528	(R) 4,469	4,409
Large truck occupants ¹ (percent)	2.5	1.6	1.8	1.8	1.8
Others killed in crashes involving large trucks (percent)	9.2	10.2	10.8	10.4	10.3
Railroad (passenger and freight)	1,417	1,297	937	(R) 896	892
Highway-rail crossing ²	833	698	425	(R) 370	357
Railroad ^{2,3}	584	599	512	(R) 526	535
Waterborne (passenger and freight)	487	186	187	93	U
Vessel-related ⁴	206	85	53	36	U
Freight ship	8	0	0	2	U
Tank ship	4	5	0	3	U
Tug / towboat	14	13	2	1	U
Offshore supply	NA	2	3	0	U
Fishing vessel	60	47	30	14	U
Mobile offshore drilling units	NA	0	0	0	U
Platform	NA	1	0	0	U
Freight barge	NA	0	0	1	U
Tank barge	NA	0	0	0	U
Miscellaneous	56	11	6	6	U
Not vessel-related ⁴	281	101	134	57	U
Pipeline	19	9	38	(R) 23	19
Hazardous liquid pipeline	4	3	1	5	2
Gas pipeline	15	6	37	(R) 18	17

Key: NA = not available; R = revised.

¹Large trucks are defined as trucks over 10,000 pounds gross vehicle weight rating, including single-unit trucks and truck tractors.

²Includes Amtrak.

³Includes train accidents and other incidents. Most fatalities involve trespassers who are included under other incidents (467 in 2005).

⁴Vessel-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.

⁵Railroad fatalities are preliminary.

Note: Caution must be exercised in comparing fatalities across modes because significantly different definitions are used.

About 5,200 people died in crashes involving large trucks in 2005, although only 803 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 vehicle-miles traveled (vmt). Despite a doubling of large truck travel between 1980 and 2005, the number of fatalities involving large trucks declined 13 percent over this period.

TABLE 5-1. TRANSPORTATION FATALITIES BY FREIGHT TRANSPORTATION MODE

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *National Transportation Statistics 2006*, available at <http://www.bts.gov/> as of

September 15, 2006

TABLE 5-2. INJURED PERSONS BY FREIGHT TRANSPORTATION MODE

	1980	1990	2000	2004	2005
TOTAL injured persons (passenger and freight)	NA	NA	3,259,673	2,818,446	NA
Highway (passenger and freight)	NA	3,231,000	3,189,000	2,788,000	2,699,000
Large truck occupants ¹	NA	42,000	31,000	27,000	27,000
Others injured in crashes involving large trucks	NA	108,000	109,000	89,000	86,000
Large truck occupants ¹ (percent)	NA	1.3	1.0	1.0	1.0
Others injured in crashes involving large trucks (percent)	NA	3.3	3.4	3.2	3.2
Railroad (passenger and freight)	62,246	25,143	11,643	(R) 9,088	9,105
Highway-rail grade crossing ²	3,890	2,407	1,219	(R) 1,088	989
Railroad ^{2,3}	58,356	22,736	10,424	(R) 8,000	8,116
Waterborne (passenger and freight)	NA	NA	757	703	U
Vessel-related ⁴	180	175	150	198	U
Freight ship	8	10	5	4	U
Tank ship	9	13	3	7	U
Tug / towboat	27	19	10	22	U
Offshore supply	NA	9	5	5	U
Fishing vessel	28	31	23	36	U
Mobile offshore drilling units	NA	13	0	0	U
Platform	NA	9	0	0	U
Freight barge	NA	3	2	5	U
Tank barge	NA	3	0	1	U
Miscellaneous	98	12	8	25	U
Not related to vessel casualties ⁴	NA	NA	607	505	U
Pipeline	192	76	81	(R) 60	49
Hazardous liquid pipeline	15	7	4	(R) 16	2
Gas pipeline	177	69	77	(R) 44	47

Key: NA = not available; R = revised.

¹Large trucks are defined as trucks over 10,000 pounds gross vehicle weight rating, including single-unit trucks and truck tractors.

² Includes Amtrak.

³Includes train accidents and other incidents. Most injuries involve workers on duty (5,543 in 2005).

⁴Vessel-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.

⁵Railroad injuries are preliminary.

Note: Numbers may not add to totals due to some injuries being counted in more than one mode.

About 113,000 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

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *National Transportation Statistics 2006*, available at <http://www.bts.gov/> as of September 15, 2006.

Large trucks were involved in about 7 percent of all highway crashes in 2005. The estimated number of crashes in 2005 is up by about 12 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	2004	2005
Highway (passenger and freight)	NA	6,471,000	6,394,000	6,181,000	6,159,000
Large truck ¹	NA	372,000	438,000	416,000	442,000
Large truck ¹ (percent of total)	NA	5.7	6.9	6.7	7.2
Rail (passenger and freight)					
Highway-rail grade crossing ^{2,3}	10,796	5,715	3,502	(R) 3,074	3,040
Railroad ^{2,4}	8,205	2,879	2,983	(R) 3,367	3,187
Waterborne (passenger and freight)					
Vessel-related	4,624	3,613	5,403	4,962	NA
Pipeline					
Hazardous liquid pipeline	246	180	146	(R) 142	136
Gas pipeline	1,524	198	234	(R) 297	353

Key: NA = not available; R = revised.

¹Large trucks are defined as trucks over 10,000 pounds gross vehicle weight rating, including single-unit trucks and truck tractors.

²Includes Amtrak.

³Includes both accidents and incidents. Most highway-rail grade crossing accidents are also counted under highway.

⁴Train accidents only.

TABLE 5-3. TRANSPORTATION ACCIDENTS BY FREIGHT TRANSPORTATION MODE

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *National Transportation Statistics 2006*, available at <http://www.bts.gov/> as of

September 15, 2006.

TABLE 5-4. HAZARDOUS MATERIALS TRANSPORTATION INCIDENTS

	1980	1990	2000	2004	2005
Total	15,719	8,879	17,557	(R) 14,879	14,624
Accident-related	486	297	(R) 394	(R) 329	315
Air	223	297	1,419	995	1,505
Accident-related	0	0	(R) 3	0	7
Highway	14,161	7,296	15,063	(R) 13,097	12,359
Accident-related	347	249	(R) 329	(R) 282	263
Rail	1,271	1,279	1,058	(R) 771	693
Accident-related	134	48	62	(R) 47	45
Water¹	34	7	17	(R) 16	67
Accident-related	2	0	0	0	0
Other²	30	0	0	0	0
Accident-related	3	0	0	0	0

Key: R = revised.

¹Water 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.

²Other 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 fatalities caused by human error, package failure, and causes not elsewhere classified.

Because most hazardous materials are transported by truck, most incidents related to hazardous materials transportation are on the highways. In 2005, 85 percent of all incidents were highway-related. Moreover, 71 percent of fatalities in hazardous materials transportation occurred in highway transportation during 2005.

A very small share of hazardous material transportation incidents are the result of a vehicular crash or derailment (referred to as “accident-

related”). In 2005, 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 2005, they accounted for nearly 80 percent of all property damage.

TABLE 5-5. COMMERCIAL MOTOR CARRIER COMPLIANCE REVIEW ACTIVITY BY SAFETY RATING

Safety rating	2000		2004		2005	
	Number	Percent	Number	Percent	Number	Percent
Satisfactory	5,309	51.1	(R) 4,424	57.8	5,098	64.3
Conditional	3,354	32.3	(R) 2,307	30.2	1,699	21.4
Unsatisfactory	1,481	14.3	(R) 702	9.2	441	5.6
Not rated	245	2.4	(R) 218	2.8	692	8.7
Total	10,389	100.0	(R) 7,651	100.0	7,930	100.0

Key: R = revised

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, Pipeline and Hazardous Materials Safety Administration, Office of Hazardous Materials Safety, Hazardous Materials Information System Database, available at <http://hazmat.dot.gov> as of May 24, 2006.

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), Compliance Review Activity by Safety Rating for Calendar Years, available at <http://www.fmcsa.dot.gov/> as of May 4, 2006.

The safety fitness of motor carriers has improved markedly over the past few years. In 2005, the share of motor carriers rated satisfactory was 64 percent, up from 51 percent in 2000.

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 2005, 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		2003		2004		2005	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
All inspections								
Number of inspections	2,453,776	100.0	(R) 3,013,872	100	(R) 3,019,262	100.0	2,867,124	100.0
With no violations	639,593	26.1	(R) 812,783	27.0	(R) 810,814	26.9	772,850	27.0
With violations	1,814,183	73.9	(R) 2,201,089	73.0	(R) 2,208,448	73.1	2,094,274	73.0
Driver inspections								
Number of inspections	2,396,688	100.0	(R) 2,957,646	100.0	(R) 2,962,085	100.0	2,808,360	100.0
With no violations	1,459,538	60.9	(R) 1,883,071	63.7	(R) 1,893,106	63.9	1,782,300	63.5
With violations	937,150	39.1	(R) 1,074,575	36.3	(R) 1,068,979	36.1	1,026,060	36.5
With OOS violations	191,031	8.0	(R) 200,256	6.8	(R) 197,338	6.7	184,609	6.6
Vehicle inspections								
Number of inspections	1,908,300	100.0	(R) 2,164,847	100.0	(R) 2,252,986	100.0	2,093,394	100.0
With no violations	584,389	30.6	(R) 675,167	31.2	(R) 698,396	31.0	649,658	31.0
With violations	1,323,911	69.4	(R) 1,489,680	68.8	(R) 1,554,590	69.0	1,443,736	69.0
With OOS violations	452,850	23.7	(R) 495,621	22.9	(R) 531,927	23.6	489,754	23.4
Hazardous materials inspections								
Number of inspections	133,486	100.0	(R) 181,592	100.0	(R) 179,213	100.0	170,962	100.0
With no violations	101,098	75.7	(R) 148,409	81.7	(R) 145,763	81.3	139,191	81.4
With violations	32,388	24.3	(R) 33,183	18.3	(R) 33,450	18.7	31,771	18.6
With OOS violations	9,964	7.5	(R) 9,575	5.3	9,957	5.6	9,496	5.6

Key: OOS = out of service; R = revised.

Notes: 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 (MCMS), Roadside Inspection Activity Summary for Calendar Years, available at

www.fmcsa.dot.gov as of May 4, 2006.



Table 5-7. Fuel Consumption by Transportation Mode

	1980	1990	2000	2003	2004
Highway					
Gasoline, diesel and other fuels (million gallons)	114,960	130,755	162,555	(R) 170,069	173,750
Truck, total	19,960	24,490	35,229	(R) 32,696	33,968
Single-unit 2-axle 6-tire or more truck	6,923	8,357	9,563	(R) 8,880	9,263
Combination truck	13,037	16,133	25,666	(R) 23,815	24,705
Truck (percent of total)	17.4	18.7	21.7	(R) 19.2	19.6
Rail, Class I (in freight service)					
Distillate / diesel fuel (million gallons)	3,904	3,115	3,700	3,826	4,059
Water					
Residual fuel oil (million gallons)	8,952	6,326	6,410	3,874	4,690
Distillate / diesel fuel oil (million gallons)	1,478	2,065	2,261	2,217	2,140
Gasoline (million gallons)	1,052	1,300	1,124	1,107	1,005
Pipeline					
Natural gas (million cubic feet)	634,622	659,816	642,210	(R) 591,492	571,853

Key: R = revised.

The number of gallons of fuel burned by commercial trucks nearly doubled over the past twenty years, while fuel use in several other modes declined. Between 1980 and 2004, the fuel consumed in highway freight transportation increased from 20 billion to 34 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 vmt. Over the same period, fuel use in Class I freight rail increased marginally from 3.9 to 4.1 billion gallons.

In 2004, trucking accounted for 68 percent of freight transportation energy consumption. Water transportation accounted for 16 percent, natural gas pipelines for 8 percent, and Class I rail for 8 percent.

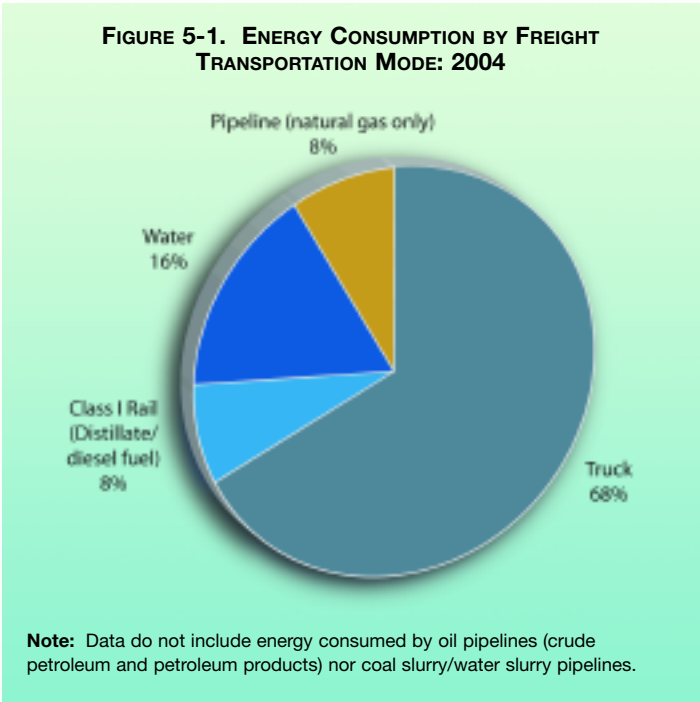


Table 5-7. Fuel Consumption by Transportation Mode
Sources: **Highway:** U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2004* (Washington, DC: 2005), table VM-1 and similar tables in earlier editions.
Rail: Association of American Railroads, *Railroad Facts* (Washington, DC: November 2005), p. 40.
Water: U.S. Department of Energy, Energy Information Administration, *Fuel Oil and Kerosene Sales 2004* (Washington, DC: 2005), tables 2, 4, and similar tables in earlier editions.
Pipeline: U.S. Department of Energy, *Natural Gas Annual 2004*, DOE/EIA-0131(04) (Washington, DC: December 2005), table 15 and similar tables in earlier editions.

FIGURE 5-1. ENERGY CONSUMPTION BY FREIGHT TRANSPORTATION MODE: 2004
Sources: **Truck:** U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, (Washington, DC: Annual issues), table VM-1. **Rail:** Association of American Railroads, *Railroad Facts* (Washington, DC: 2005), p. 40. **Water:** U.S. Department of Energy, Energy Information Administration, *Fuel Oil and Kerosene Sales* (Washington, DC: Annual issues), tables 2 and 4; U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues), table MF-24. **Pipeline:** U.S. Department of Energy, *Natural Gas Annual 2004*, DOE/EIA-0131(04) (Washington, DC: December 2005), table 15.

Over the past two decades, miles traveled per gallon by single-unit trucks increased by more than 50 percent. Between 1980 and 2004, the fuel consumed increased 34 percent whereas miles traveled increased by 104 percent. As a result, over these years, miles per gallon increased from 5.8 to 8.8.

TABLE 5-8. SINGLE-UNIT 2-AXLE 6-TIRE OR MORE TRUCK FUEL CONSUMPTION AND TRAVEL

	1980	1990	2000	2003	2004
Number registered (thousands)	4,374	4,487	5,926	(R) 5,849	6,161
Vehicle-miles (millions)	39,813	51,901	70,500	(R) 77,757	81,107
Fuel consumed (million gallons)	6,923	8,357	9,563	(R) 8,880	9,263
Average miles traveled per vehicle	9,103	11,567	11,897	(R) 13,295	13,164
Average miles traveled per gallon	5.8	6.2	7.4	(R) 8.8	8.8
Average fuel consumed per vehicle (gallons)	1,583	1,862	1,614	(R) 1,518	1,503

Key: R = revised

In contrast to single-unit trucks, miles traveled per gallon by combination trucks increased by only 12 percent over the past twenty years. Consequently, the gallons of fuel consumed increased by nearly 90 percent between 1980 and 2004 along with a doubling of miles traveled.

TABLE 5-9. COMBINATION TRUCK FUEL CONSUMPTION AND TRAVEL

	1980	1990	2000	2003	2004
Number registered (thousands)	1,417	1,709	2,097	(R) 1,908	2,010
Vehicle-miles traveled (millions)	68,678	94,341	135,020	(R) 140,160	145,398
Fuel consumed (million gallons)	13,037	16,133	25,666	(R) 23,815	24,705
Average miles traveled per vehicle	48,472	55,206	64,399	(R) 73,445	72,325
Average miles traveled per gallon	5.3	5.8	5.3	(R) 5.9	5.9
Average fuel consumed per vehicle (gallons)	9,201	9,441	12,241	(R) 12,479	12,289

Key: R = revised.

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

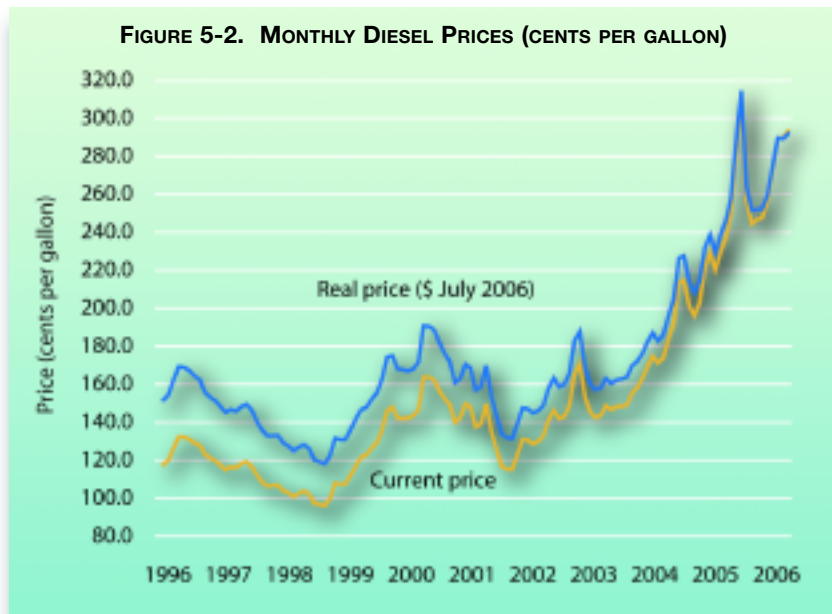
TABLE 5-8. SINGLE-UNIT 2-AXLE 6-TIRE OR MORE TRUCK FUEL CONSUMPTION AND TRAVEL

Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2004* (Washington, DC: 2005), table VM-1 and similar tables in earlier editions.

TABLE 5-9. COMBINATION TRUCK FUEL CONSUMPTION AND TRAVEL

Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2004* (Washington, DC: 2005), table VM-1 and similar tables in earlier editions.





Diesel prices were about 93 percent higher in July 2006 than 10 years earlier (in inflation-adjusted terms). Over that period prices bottomed out in February 1999 at \$1.18 a gallon (in \$ July 2006).

Energy intensity is the amount of energy used in producing a given level of output or activity, in this case transportation.

Since 1980 the energy intensity of both trucking and freight rail have improved.

However, over the same period, domestic freight water transportation, measured by Btu per ton-mile, has become less energy efficient.

TABLE 5-10: ENERGY INTENSITIES OF DOMESTIC FREIGHT MODES

	1980	1990	2000	2002	2003
Highway (Btu per vehicle-mile)	24,757	22,795	(R) 23,448	(R) 23,461	23,461
Railroad (Class I) (Btu per freight car-mile)	18,742	16,619	14,917	15,003	15,016
Railroad (Class I) (Btu per ton-mile)	597	420	352	345	344
Water (Btu per ton-mile)	358	387	473	(R) 470	417

Key: Btu = British thermal unit; R = revised.

Air quality is affected by emissions from freight vehicles. Compared with gasoline fueled cars and trucks, diesel fueled heavy trucks emit small amounts of carbon monoxide (CO) but large amounts of nitrogen oxides (NO_x).

Freight transportation is a major source of NO_x emissions accounting for 27 percent of all U.S. NO_x emissions and half of emissions from mobile sources. Freight transportation also accounts for about one-third of emissions of particulate matter 10 microns in diameter (PM-10) from mobile sources. Most PM-10, however, comes from agricultural

FIGURE 5-2. MONTHLY DIESEL PRICES
Sources: Diesel price: U.S. Department of Energy, Energy Information Agency, U.S. Petroleum Prices, available at www.eia.doe.gov as of September 5, 2006. Consumer price index: U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index – All Urban Consumers, Monthly, available at www.bls.gov as of September 5, 2006.

TABLE 5-10: ENERGY INTENSITIES OF DOMESTIC FREIGHT MODES
Source: Oak Ridge National Laboratory, *Transportation Energy Data Book: Edition 25* (Oak Ridge, TN: 2006).

TABLE 5-11: ESTIMATED NATIONAL AVERAGE VEHICLE EMISSIONS RATES OF HEAVY-DUTY AND LIGHT-DUTY VEHICLES (GRAMS PER MILE)

	1990	2000	2002	2004	2005
Gasoline (assuming zero RFG)					
Cars					
Exhaust HC	2.79	0.97	0.81	0.61	0.52
Nonexhaust HC	1.21	0.92	0.84	0.77	0.72
Total HC	3.99	1.89	1.65	1.37	1.25
Exhaust CO	42.89	18.53	17.58	13.79	12.57
Exhaust NO _x	2.70	1.29	1.20	1.00	0.92
Light trucks					
Exhaust HC	3.68	1.45	1.24	0.96	0.78
Nonexhaust HC	1.36	0.97	0.89	0.80	0.76
Total HC	5.04	2.42	2.13	1.76	1.54
Exhaust CO	56.23	26.81	24.32	18.76	16.23
Exhaust NO _x	2.62	1.54	1.50	1.32	1.21
Heavy trucks					
Exhaust HC	3.66	1.22	0.98	0.73	0.64
Nonexhaust HC	2.74	1.62	1.48	1.35	1.24
Total HC	6.40	2.84	2.46	2.08	1.88
Exhaust CO	85.61	31.08	24.73	18.46	16.73
Exhaust NO _x	7.19	5.26	5.01	4.62	4.28
Diesel					
Cars					
Exhaust HC	0.68	0.80	0.73	0.60	0.58
Exhaust CO	1.49	1.78	1.73	1.59	1.57
Exhaust NO _x	1.83	1.81	1.62	1.43	1.32
Light trucks					
Exhaust HC	1.59	1.02	0.96	0.98	0.80
Exhaust CO	2.67	1.77	1.66	1.68	1.37
Exhaust NO _x	2.71	1.76	1.67	1.59	1.37
Heavy trucks					
Exhaust HC	2.21	0.79	0.69	0.58	0.54
Exhaust CO	10.06	4.10	3.58	3.19	3.05
Exhaust NO _x	23.34	18.05	15.52	12.50	11.45

Key: CO = carbon monoxide; HC = hydrocarbon; NO_x = nitrogen oxides; RFG = reformulated gasoline.

fields, wildfires, and fugitive dust. Consequently, freight transportation is a minor factor when considering total PM-10 emissions.

Trucks are by far the largest contributor to freight emissions nationally, producing two-thirds of NO_x and PM-10 from the freight sector. The U.S. Environmental Protection Agency passed new rules requiring the use of ultra low sulfur diesel (ULSD) fuel in heavy-duty trucks and other diesel-powered highway vehicles beginning in June 2006. ULSD will reduce emissions of NO_x and PM and enable the use of advanced pollution control technologies to meet 2007 emissions standards.

TABLE 5-11: ESTIMATED NATIONAL AVERAGE VEHICLE EMISSIONS RATES OF HEAVY-DUTY AND LIGHT-DUTY VEHICLES
Source: U.S. Environmental Protection Agency, National Vehicle and Fuel Emissions Laboratory.

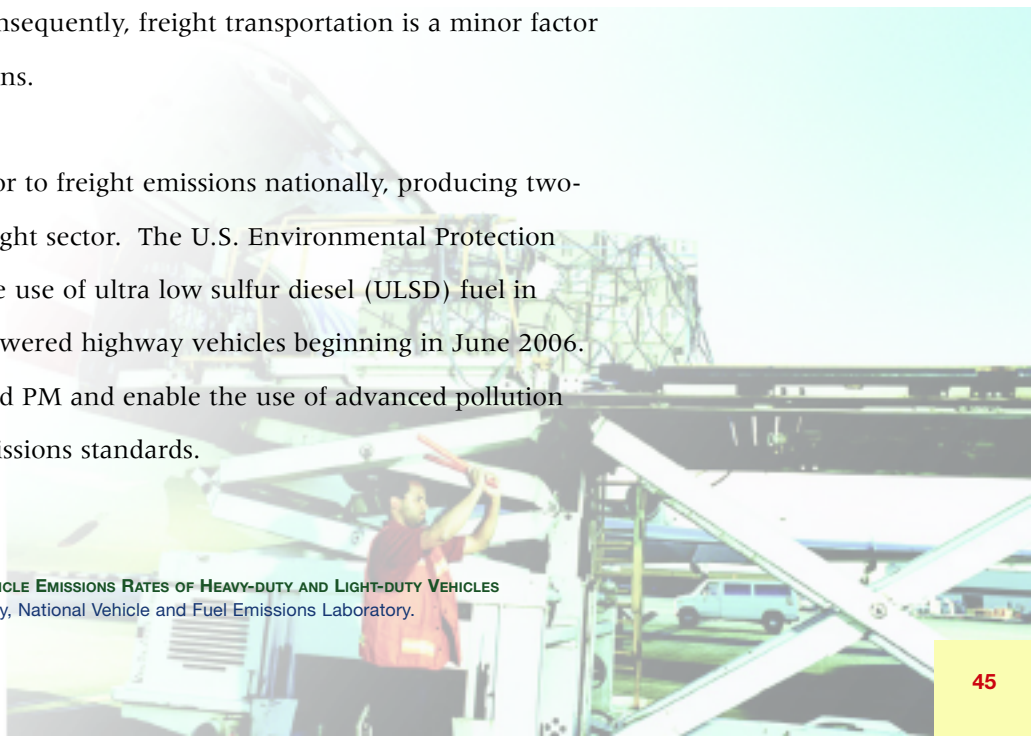


TABLE 5-12: NITROGEN OXIDES (NO_x) AND PARTICULATE MATTER (PM-10) EMISSIONS BY FREIGHT TRANSPORTATION MODE: 2002

Mode	NO _x Emissions					PM-10 Emissions			
	Tons	Percent	As percent of:		Tons	Percent	As percent of:		
			All mobile sources	All sources			All mobile sources	All sources	
Heavy-duty vehicles	3,782,000	66.8	33.0	17.9	120,000	64.7	23.3	0.5	
Freight railroads	857,200	15.1	7.5	4.1	21,300	11.5	4.1	0.1	
Marine vessels	1,011,000	17.9	8.8	4.8	44,000	23.7	8.5	0.2	
Air freight	8,200	0.1	0.1	0.0	300	0.2	0.1	0.0	
Total	5,658,400	100.0	49.4	26.8	185,600	100.0	36.0	0.8	

TABLE 5-13: CURRENT AND FUTURE NITROGEN OXIDES (NO_x) EMISSIONS BY FREIGHT TRANSPORTATION MODE

	Tons			Percent change, 2002-2010	Percent change, 2002-2020
	2002	2010	2020		
Heavy-duty trucks	3,782,000	2,186,900	662,600	-42	-82
Freight rail	857,200	563,200	486,400	-34	-43
Commercial marine	1,011,000	987,200	938,600	-2	-7
Air freight	8,200	10,000	12,400	22	51
Freight total	5,658,400	3,747,299	2,099,999	-34	-63

TABLE 5-14: CURRENT AND FUTURE PARTICULATE MATTER (PM-10) EMISSIONS BY FREIGHT TRANSPORTATION MODE

	Tons			Percent change, 2002-2010	Percent change, 2002-2020
	2002	2010	2020		
Heavy-duty trucks	120,000	65,380	34,760	-46	-71
Freight rail	21,300	17,890	15,360	-16	-28
Commercial marine	44,000	45,330	46,960	3	7
Air freight	300	290	270	-3	-10
Freight total	185,600	128,889	97,349	-31	-48

TABLE 5-12: NITROGEN OXIDES (NO_x) AND PARTICULATE MATTER (PM-10) EMISSIONS BY FREIGHT TRANSPORTATION MODE: 2002

Source: U.S. Department of Transportation, Federal Highway Administration, *Impacts of Freight Movement on Air Quality*, prepared by ICF Consulting, January 26, 2005, based on U.S. Environmental Protection Agency, National Emissions Inventory.

TABLE 5-13: CURRENT AND FUTURE NITROGEN OXIDES (NO_x) EMISSIONS BY FREIGHT TRANSPORTATION MODE

Source: U.S. Department of Transportation, Federal Highway Administration, *Impacts of Freight Movement on Air Quality*, prepared by ICF Consulting, January 26, 2005, based on U.S. Environmental Protection Agency, National Emissions Inventory.

Table 5-14: Current and Future Particulate Matter (PM-10) Emissions by Freight Transportation Mode

Source: U.S. Department of Transportation, Federal Highway Administration, *Impacts of Freight Movement on Air Quality*, prepared by ICF Consulting, January 26, 2005, based on U.S. Environmental Protection Agency, National Emissions Inventory.

APPENDIX A. SELECTED METRIC TABLES

TABLE 2-1M. SHIPMENTS BY MODE AND WEIGHT: 2002 AND 2035 (MILLIONS OF METRIC TONNES)

	2002				2035			
	Total	Domestic	Exports ³	Imports ³	Total	Domestic	Exports ³	Imports ³
Total	(P) 17,532	16,030	(P) 475	(P) 1,028	(P) 33,727	30,543	(P) 1,002	(P) 2,181
Truck	10,468	10,284	96	88	20,697	20,168	238	291
Rail	1,704	1,605	29	71	3,198	2,987	52	160
Water	636	539	57	40	945	793	103	49
Air, air & truck	(P) 9	3	(P) 13	(P) 4	(P) 24	9	(P) 16	(P) 9
Intermodal¹	1,172	178	287	707	2,357	303	599	1,455
Pipeline & unknown²	3,543	3,421	4	118	6,506	6,284	5	218

Key: P = preliminary.

¹ Intermodal includes U.S. Postal Service and courier shipments and all intermodal combinations, except air and truck.

² Pipeline and unknown shipments are combined because data on region-to-region flows by pipeline are statistically uncertain.

³ Data do not include imports and exports that pass through the United States from a foreign origin to a foreign destination by any mode.

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

TABLE 2-3M. TOP COMMODITIES: 2002

	Metric Tonnes (millions)		Value (\$ billions)	
	Total	(P) 17,532	Total	(P) 13,120
Coal n.e.c. ¹	2,437		Machinery	1,866
Gravel	1,858		Electronics	948
Cereal grains	1,207		Mixed freight	944
Crude petroleum	1,165		Motorized vehicles	855
Coal	1,144		Coal n.e.c. ¹	729
Nonmetal min. prods. ²	1,032		Textiles/leather	545
Gasoline	989		Pharmaceuticals	519
Waste/scrap	840		Unknown	458
Fuel oils	508		Chemical prods.	444
Natural sands	505		Misc. mfg. prods.	411

Key: P = preliminary.

¹ Natural gas, selected coal products, and products of petroleum refining, excluding gasoline, aviation fuel, and fuel oil.

² Nonmetallic mineral products.

TABLE 2-1M. SHIPMENTS BY MODE AND WEIGHT: 2002 AND 2035 (MILLIONS OF METRIC TONNES)

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, *Freight Analysis Framework*, 2006.

TABLE 2-3. TOP COMMODITIES: 2002

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, *Freight Analysis Framework*, 2006.

TABLE 2-4M. DOMESTIC MODE OF INTERNATIONAL SHIPMENTS BY WEIGHT AND VALUE: 2002 AND 2035

	Metric Tonnes (millions)		Value (\$ billions)	
	2002	2035	2002	2035
Total	(P) 1,503	(P) 3,184	(P) 2,037	(P) 8,807
Truck¹	723	1,919	1,198	6,193
Rail	181	360	114	275
Water	97	152	26	49
Air, air & truck²	(P) 7	(P) 17	(P) 506	(P) 1,772
Intermodal³	20	46	52	281
Pipeline & unknown⁴	475	689	141	238

Key: P = preliminary.

¹Excludes truck moves to and from airports.

²Includes truck moves to and from airports.

³Intermodal includes U.S. Postal Service and courier shipments and all intermodal combinations, except air and truck.

⁴Pipeline and unknown shipments are combined because data on region-to-region flows by pipeline are statistically uncertain.

Note: Numbers may not add to total due to rounding. 1 ton = 0.91 metric tonne.

TABLE 2-6M. U.S. MERCHANDISE TRADE WITH CANADA AND MEXICO BY TRANSPORTATION MODE

Mode	1998		2000		2004		2005 ¹	
	Value (\$ billions)	Weight (millions of metric tonnes)	Value (\$ billions)	Weight (millions of metric tonnes)	Value (\$ billions)	Weight (millions of metric tonnes)	Value (\$ billions)	Weight (millions of metric tonnes)
Truck	350	NA	429	NA	453	NA	491	173
Rail	68	NA	94	NA	108	NA	116	128
Air	30	<1	45	<1	32	<1	33	<1
Water	21	166	33	176	46	222	58	232
Pipeline	11	NA	24	NA	39	NA	52	78
Other	23	NA	29	NA	34	NA	39	5
Total	503	NA	653	477	712	NA	790	616

Key: NA = not available.

¹2005 data are from the U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, North American Freight Transportation (Washington, DC: 2003), tables A-1 and A-2, available at www.bts.gov as of August 12, 2006.

Notes: Individual modal totals may not sum to exact totals due to rounding. 1 ton = 0.91 metric tonne. For value, "Other" is the difference between the total and the sum of the individual modes.

TABLE 2-4M. DOMESTIC MODE OF INTERNATIONAL SHIPMENTS BY WEIGHT AND VALUE: 2002 AND 2035

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, *Freight Analysis Framework*, 2006.

TABLE 2-6M. U.S. MERCHANDISE TRADE WITH CANADA AND MEXICO BY TRANSPORTATION MODE

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *Transborder Freight Data*, August 2006.

FIGURE 2-6M. U.S. INTERNATIONAL MERCHANDISE TRADE BY MODE OF TRANSPORTATION: 2005

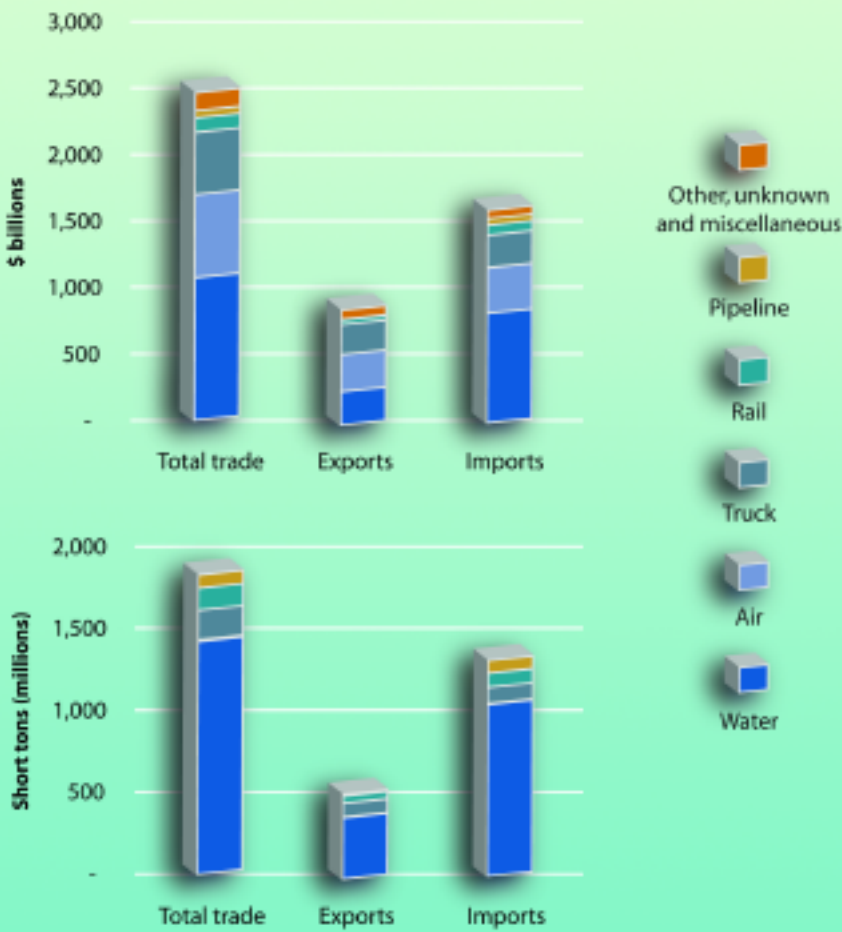


FIGURE 2-6M. U.S. INTERNATIONAL MERCHANDISE TRADE BY MODE OF TRANSPORTATION: 2005

Source: Compiled by U.S. Department of Transportation (USDOT), Research and Innovative Technology Administration (RITA), Bureau of Transportation Statistics (BTS), August 2006. **Water and air data**—U.S. Department of Commerce, U.S. Census Bureau, Foreign Trade Division, U.S. Exports of Merchandise and U.S. Imports of Merchandise, December 2005. **Total, truck, rail, pipeline, other and unknown data**—USDOT, RITA, BTS, Transborder Freight Data 2005; and special calculation, August 2006.



TABLE 2-12M. TOP 25 AIRPORTS BY LANDED WEIGHT OF ALL-CARGO OPERATIONS¹

Airport	2004 Rank	Landed weight (thousands of metric tonnes)				
		2000	2001	2002	2003	2004
Anchorage, AK (Ted Stevens Anchorage International) ²	1	7,333	7,055	8,159	8,171	8,931
Memphis, TN (Memphis International)	2	5,732	6,228	8,007	7,947	8,061
Louisville, KY (Louisville International-Standiford Field)	3	3,617	3,653	3,812	3,785	3,981
Miami, FL (Miami International)	4	2,657	2,771	2,879	2,938	3,106
Los Angeles, CA (Los Angeles International)	5	2,624	2,657	2,756	2,830	2,778
New York, NY (John F. Kennedy International)	6	2,534	2,307	2,642	2,664	2,629
Chicago, IL (O'Hare International)	7	1,870	1,825	2,011	2,133	2,140
Indianapolis, IN (Indianapolis International)	8	2,616	2,862	2,121	2,065	2,099
Newark, NJ (Newark Liberty International)	9	1,779	1,628	1,595	1,664	1,601
Oakland, CA (Metropolitan Oakland International)	10	1,643	1,487	1,584	1,537	1,545
Fort Worth, TX (Dallas/Fort Worth International)	11	1,534	1,402	1,343	1,344	1,298
Philadelphia, PA (Philadelphia International)	12	1,319	1,318	1,330	1,238	1,244
Ontario, CA (Ontario International)	13	1,107	1,172	1,310	1,213	1,203
Atlanta, GA (William B. Hartsfield International)	14	989	946	1,058	1,083	1,055
Covington/Cincinnati, OH (Cincinnati/Northern Kentucky International)	15	828	889	946	996	1,035
Honolulu, HI (Honolulu International)	16	628	716	880	923	880
Phoenix, AZ (Sky Harbor International)	17	835	760	787	707	727
Dayton, OH (James M. Cox Dayton International)	18	2,026	1,310	814	712	714
Denver, CO (Denver International)	19	817	729	710	678	692
San Francisco, CA (San Francisco International)	20	1,149	918	939	1,089	671
Portland, OR (Portland International)	21	800	732	740	679	651
Houston, TX (George Bush Intercontinental)	22	435	420	437	604	632
Minneapolis, MN (Minneapolis-St Paul International/Wold Chamberlain)	23	564	532	564	624	615
Rockford, IL (Greater Rockford)	24	593	618	572	567	614
Salt Lake City, UT (Salt Lake City International)	25	682	550	529	544	563
Top 25 airports³		47,519	45,995	48,936	48,940	49,465
United States, all airports⁴		67,806	64,810	66,617	66,290	67,401
Top 25 as % of U.S. total		70.1%	71.0%	73.5%	73.8%	73.4%

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

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

³Represents top 25 airports in the reference year not necessarily the airports shown here.

⁴Limited to airports with an aggregate landed weight in excess of 45,360 metric tonnes (50,000 short tons) annually.

Note: 1 short ton = 0.91 metric tonne.

TABLE 2-12M. TOP 25 AIRPORTS BY LANDED WEIGHT OF ALL-CARGO OPERATIONS

Source: U.S. Department of Transportation, Federal Aviation Administration, Air Carrier Activity Information System (ACAIS) database, All-Cargo Data, available at http://www.faa.gov/airports_airtraffic/airports/planning_capacity/passenger_allcargo_stats/passenger/index as of March 22, 2006.

TABLE 2-13M. U.S. HAZARDOUS MATERIALS SHIPMENTS BY TRANSPORTATION MODE: 2002

Transportation mode	Value		Metric tonnes		Tonne-kilometers		Average kilometers per shipment
	\$ Billion	Percent	(Millions)	Percent	(Billions)	Percent	
TOTAL all modes	660.2	100.0	1,988.1	100.0	477.0	100.0	219
Single modes, total	644.5	97.6	1,958.2	98.5	455.4	95.5	169
Truck ¹	419.6	63.6	1,051.9	52.9	160.8	33.7	138
For-hire	189.8	28.8	407.8	20.5	95.1	19.9	459
Private ²	226.7	34.3	637.0	32.0	64.4	13.5	61
Rail	31.3	4.7	99.2	5.0	105.2	22.1	1,118
Water	46.9	7.1	207.0	10.4	103.1	21.6	S
Air	1.6	0.2	0.1	Z	0.1	Z	3,347
Pipeline ³	145.0	22.0	600.0	30.2	S	S	S
Multiple modes, total	9.6	1.5	17.0	0.9	18.2	3.8	1,366
Parcel, U.S. Postal Service or courier	4.3	0.6	0.2	Z	0.2	Z	1,347
Other	5.4	0.8	16.8	0.8	18.1	3.8	2,206
Unknown and other modes, total	6.1	0.9	12.9	0.6	3.4	0.7	92

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

¹Truck as a single mode includes shipments that went by private truck only, for-hire truck only, or a combination of both.

²Private truck refers to a truck operated by a temporary or permanent employee of an establishment or the buyer/receiver of the shipment.

³Excludes most shipments of crude oil.

Note: 1 ton = 0.91 metric tonne; 1 ton-mile = 1.46 tonne-kilometer.

TABLE 2-14M. U.S. HAZARDOUS MATERIALS SHIPMENTS BY HAZARD CLASS: 2002

Hazard Class	Description	Value		Metric tonnes		Tonne-kilometers	
		\$ Billions	Percent	Millions	Percent	Billions	Percent
Class 1	Explosives	7.9	1.2	4.5	0.2	2.3	0.5
Class 2	Gases	73.9	11.2	193.6	9.7	54.4	11.4
Class 3	Flammable liquids	490.2	74.3	1,622.9	81.6	319.1	66.9
Class 4	Flammable solids	6.6	1.0	10.3	0.5	6.4	1.3
Class 5	Oxidizers and organic peroxides	5.5	0.8	11.5	0.6	6.2	1.3
Class 6	Toxics	8.3	1.3	7.7	0.4	6.2	1.3
Class 7	Radioactive materials	5.9	0.9	0.1	0.003	0.1	0.01
Class 8	Corrosive materials	38.3	5.8	82.3	4.1	52.9	11.1
Class 9	Miscellaneous dangerous goods	23.6	3.6	55.4	2.8	29.4	6.2
Total		660.2	100.0	1,988.1	100.0	477.0	100.0

Note: 1 ton = 0.91 metric tonne; 1 ton-mile = 1.46 tonne-kilometer.

TABLE 2-13M. U.S. HAZARDOUS MATERIALS SHIPMENTS BY TRANSPORTATION MODE: 2002

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, U.S. Department of Commerce, U.S. Census Bureau, *2002 Economic Census, Transportation, 2002 Commodity Flow Survey, Hazardous Materials* (Washington, DC: December 2004), table 1a.

TABLE 2-14M. U.S. HAZARDOUS MATERIALS SHIPMENTS BY HAZARD CLASS: 2002

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, *2002 Economic Census, Transportation, 2002 Commodity Flow Survey, Hazardous Materials* (Washington, DC: December 2004), table 2a.

TABLE 3-1M. KILOMETERS OF INFRASTRUCTURE BY TRANSPORTATION MODE

	1980	1990	2000	2004	Percent change, 1980-2004
Public roads, route kilometers	6,211,806	6,223,214	6,358,681	6,433,291	3.6
National Highway System (NHS)	N	N	259,409	260,968	N
Interstates	66,176	72,540	75,113	75,377	13.9
Other NHS	N	N	184,296	185,591	N
Freight intermodal connectors ¹	N	N	N	NA	N
Other	N	N	6,099,272	6,172,322	N
Strategic Highway Corridor Network (STRAHNET)	N	N	99,886	100,193	N
Interstate	N	N	75,116	75,377	N
Non-Interstate	N	N	24,766	24,816	N
Railroad	294,634 ²	283,098	274,412	225,704	-23.4
Class I	NA	214,347	194,082	156,905	NA
Regional	NA	29,572	33,761	25,172	NA
Local	NA	39,167	46,570	43,628	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	1,913,832	2,203,675	2,353,344	39.0

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

¹Excludes intermodal connectors serving intercity bus, Amtrak, and public transit facilities.

²Excludes Class III railroads.

Note: 1 mile = 1.61 kilometers.

TABLE 3-1M. KILOMETERS OF INFRASTRUCTURE BY TRANSPORTATION MODE

Sources: Public roads: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, (Washington, DC: Annual issues), table HM-16.

Freight 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 July 5, 2005.

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 Jan. 26, 2006.

Oil pipelines: 1980-2002: Eno Transportation Foundation, *Transportation in America, 2002* (Washington, DC: 2002). 2003: U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Office of Pipeline Safety, Pipeline Statistics, Internet site <http://ops.dot.gov/stats/lpo.htm> as of July 5, 2005.

Gas pipelines: American Gas Association, *Gas Facts* (Arlington, VA: Annual issues).]

TABLE 3-3M. TRUCK-KILOMETERS BY PRODUCTS CARRIED: 2002¹

Products carried	Millions of kilometers
Total²	233,632
Animals and fish, live	1,182
Animal feed and products of animal origin	3,360
Grains, cereal	2,202
All other agricultural products	4,283
Basic chemicals	1,410
Fertilizers and fertilizer materials	2,681
Pharmaceutical products	491
All other chemical products and preparations	2,174
Alcoholic beverages	1,808
Bakery and milled grain products	5,717
Meat, seafood, and their preparations	4,918
Tobacco products	717
All other products foodstuff	11,954
Logs and other wood in the rough	1,849
Paper or paperboard articles	5,053
Printed products	1,231
Pulp, newsprint, paper, paperboard	3,115
Wood products	5,731
Articles of base metal	5,301
Base metal in primary or semifinished forms	4,637
Nonmetallic mineral products	4,906
Tools, nonpowered	12,487
Tools, powered	10,425
Electronic and other electrical equipment	4,866
Furniture, mattresses, lamps, etc.	3,288
Machinery	5,190
Miscellaneous manufactured products	6,449
Precision instruments and apparatus	1,181
Textile, leather, and related articles	2,475
Vehicles, including parts	6,186
All other transportation equipment	1,024
Coal	484
Crude petroleum	212
Gravel or crushed stone	4,490
Metallic ores and concentrates	73
Monumental or building stone	744
Natural sands	1,753
All other nonmetallic minerals	802
Fuel oils	1,983
Gasoline and aviation turbine fuel	1,366
Plastic and rubber	3,851
All other coal and refined petroleum products	1,886
Hazardous waste (EPA manifest)	306
All other waste and scrape (non-EPA manifest)	4,261
Recyclable products	1,484
Mail and courier parcels	7,660
Empty shipping containers	1,278
Passengers	440
Mixed freight	23,591
Products, equipment, or materials not elsewhere classified	426
Products not specified	10,232
Not applicable ³	241
No product carried	46,634

¹ Excludes pickups, panels, minivans, sport utilities, and station wagons.

² Detail lines may not add to total because multiple products/hazardous materials may be carried at the same time.

³ Vehicles not in use. When the respondent had partial-year ownership of the vehicle, annual miles were adjusted to reflect miles traveled when not owned by the respondent.

Note: 1 mile = 1.61 kilometers

TABLE 3-3M. TRUCK-KILOMETERS BY PRODUCTS CARRIED: 2002

Source: U.S. Department of Commerce, U.S. Census Bureau, *Vehicle Inventory and Use Survey 2002: United States* (Washington, DC: 2004), available at <http://www.census.gov/svsd/www/02vehinv.html> as of July 6, 2005.

TABLE 3-4M. NUMBER AND VEHICLE-KILOMETERS TRAVELED (VKT) OF TRUCKS BY AVERAGE WEIGHT (INCLUDING VEHICLE AND LOAD)¹

Average weight (kilograms)	1987		1992		1997		2002		Percent change, 1987-2002	
	Number (thousands)	VKT (millions)	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	237,983	5,415	234,359	49	62
Light-heavy	1,030	17,329	1,259	22,551	1,436	31,890	1,914	42,254	86	144
4,536 to 6,350	525	8,754	694	12,875	819	18,510	1,142	24,440	118	179
6,351 to 7,257	242	4,407	282	4,791	316	6,359	396	9,508	64	116
7,258 to 8,845	263	4,168	282	4,885	301	7,021	376	8,306	43	99
Medium-heavy	766	12,200	732	13,104	729	16,302	910	18,935	19	55
8,846 to 11,793	766	12,200	732	13,104	729	16,302	910	18,935	19	55
Heavy-heavy	1,829	115,266	2,017	133,305	2,536	189,791	2,591	173,169	42	50
11,794 to 14,969	377	8,708	387	9,163	428	11,414	437	9,407	16	8
14,969 to 18,144	209	6,619	233	8,505	257	10,612	229	6,067	10	-8
18,144 to 22,680	292	12,271	339	15,485	400	21,047	318	10,779	9	-12
22,680 to 27,216	188	11,518	227	13,999	311	20,362	327	14,404	74	25
27,216 to 36,287	723	73,127	781	82,147	1,070	120,256	1,179	124,707	63	71
36,288 to 45,359	28	2,018	33	2,460	46	3,906	69	4,747	144	135
45,360 to 58,967	8	708	12	1,181	18	1,691	26	2,528	238	257
58,967 or more	4	298	5	365	6	502	6	530	43	78

¹Excludes trucks with an average weight of 10,000 pounds 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	2003	2004
Highway					
Gasoline, diesel and other fuels (million liters)	435,171	494,962	615,338	(R) 643,781	657,715
Truck, total	75,557	92,705	133,356	(R) 123,737	128,585
Single-unit 2-axle 6-tire or more truck	26,206	31,635	36,200	(R) 33,616	35,064
Combination truck	49,350	61,070	97,156	(R) 90,120	93,520
Truck (percent of total)	17.4	18.7	21.7	(R) 19.2	19.6
Rail, Class I (in freight service)					
Distillate / diesel fuel (million liters)	14,778	11,792	14,006	14,483	15,365
Water					
Residual fuel oil (million liters)	33,887	23,947	24,264	14,665	17,754
Distillate / diesel fuel oil (million liters)	5,595	7,817	8,559	8,392	8,101
Gasoline (million liters)	3,982	4,921	4,255	4,192	3,804
Pipeline					
Natural gas (million cubic meters)	17,970	18,684	18,185	(R) 16,749	16,193

Key: R = revised.

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

Sources: U.S. Department of Commerce, Census Bureau, *2002 Vehicle Inventory and Use Survey: United States* (Washington, DC: 2004), available at <http://www.census.gov/svsd/www/02vehinv.html> as of July 1, 2005; U.S. Department of Commerce, 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 2004* (Washington, DC: 2005), table VM-1 and similar tables in earlier editions.

Rail: Association of American Railroads, *Railroad Facts* (Washington, DC: November 2005), p. 40.

Water: U.S. Department of Energy, Energy Information Administration, *Fuel Oil and Kerosene Sales 2004* (Washington, DC: 2005), tables 2, 4, and similar tables in earlier editions.

Pipeline: U.S. Department of Energy, *Natural Gas Annual 2004*, DOE/EIA-0131(04) (Washington, DC: December 2005), 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	2003	2004
Number registered (thousands)	4,374	4,487	5,926	(R) 5,849	6,161
Vehicle-Kilometers (millions)	64,073	83,527	113,459	(R) 125,138	130,529
Fuel consumed (million liters)	26,206	31,635	36,200	(R) 33,616	35,064
Average kilometers traveled per vehicle	14,649	18,615	19,146	(R) 21,396	21,186
Average kilometers traveled per liter	2.4	2.6	3.1	(R) 3.7	3.7
Average fuel consumed per vehicle (liter)	5,992	7,050	6,109	(R) 5,748	5,691

Key: R = revised.

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

TABLE 5-9M. COMBINATION TRUCK FUEL CONSUMPTION AND TRAVEL

	1980	1990	2000	2003	2004
Number registered (thousands)	1,417	1,709	2,097	(R) 1,908	2,010
Vehicle-kilometers traveled (millions)	110,527	151,827	217,294	(R) 225,566	233,995
Fuel consumed (million liters)	49,350	61,070	97,155	(R) 90,151	93,520
Average kilometers traveled per vehicle	78,008	88,845	103,640	(R) 118,198	116,396
Average kilometers traveled per liter	2.2	2.5	2.2	(R) 2.5	2.5
Average fuel consumed per vehicle (liters)	34,831	35,737	46,339	(R) 47,240	46,520

Key: R = revised.

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 2004* (Washington, DC: 2005), table VM-1 and similar tables in earlier editions.

TABLE 5-9M. COMBINATION TRUCK FUEL CONSUMPTION AND TRAVEL

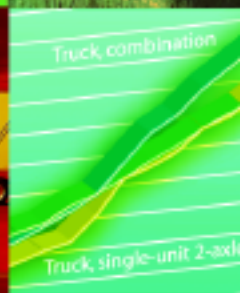
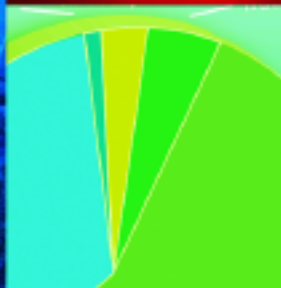
Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2004* (Washington, DC: 2005), table VM-1 and similar tables in earlier editions.



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