

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 2007 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 implications of freight transportation. This snapshot helps decision makers, planners, and the public understand the magnitude and importance of freight transportation in the economy. An electronic version of this publication is available on www.ops.fhwa.dot.gov/freight.

The 2007 edition is expanded and reorganized to help the reader find information more easily. Chapter 1 summarizes basic demographic and economic characteristics of the United States that



contribute to the demand for raw materials, intermediate goods, and finished products. Chapter 2 identifies the freight that is moved and the trading partners who move it. Chapter 3 describes the freight transportation system; volumes of freight moving over the system; the amount of truck, train, and other activity required to move the freight; and the performance of the system. Chapter 4 highlights the transportation industry that operates the system. Chapter 5 covers the safety aspects, energy consumption, and environmental implications of freight transportation.

Many of the tables and figures are based on the Economic Census, which is conducted once every five years. The most recently published data from the Economic Census are for 2002.



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I. THE NATION SERVED BY FREIGHT

The Nation's 113 million households, 7.5 million business establishments, and 88,000 government units are part of an enormous economy that demands the movement of freight. The U.S. Gross Domestic Product (GDP) is expected to grow almost 3 percent per year, driven in part by a population that is expected to increase from 300 million people today to 380 million in 2035, resulting in even greater demands for freight transportation in the future.

Freight transportation has grown dramatically with the expansion 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 30 percent between 1980 and

TABLE 1-1. ECONOMIC AND SOCIAL CHARACTERISTICS OF THE UNITED STATES: 1980-2005

	1980	1990	2000	2004	2005	Percent change, 1980 to 2005
Resident population (thousands)	227,225	249,623	(R) 282,193	(R) 293,657	296,410	30.4
Households (thousands)	80,776	93,347	104,705	112,000	113,146	40.1
Median household income (\$2000)	35,057	38,257	41,990	40,468	NA	NA
Civilian labor force (thousands)	106,940	125,840	142,583	147,401	149,320	39.6
Employed ¹ (thousands)	99,303	118,793	136,891	139,252	141,730	42.7
Agriculture, forestry, fishing, and hunting (percent)	NA	1.9	1.8	1.6	1.6	NA
Mining	NA	0.5	0.3	0.4	0.4	NA
Construction	NA	6.9	7.3	7.7	7.9	NA
Manufacturing	NA	16.8	14.4	11.8	11.5	NA
Wholesale and retail trade	NA	14.7	14.6	15.0	15.1	NA
Transportation and utilities	NA	5.1	5.4	5.0	5.2	NA
Information	NA	2.9	3.0	2.5	2.4	NA
Financial activities	NA	7.1	6.8	7.2	7.2	NA
Professional and business services	NA	9.4	10.0	10.1	10.1	NA
Education and health services	NA	17.5	19.1	20.6	20.6	NA
Leisure and hospitality	NA	8.0	8.2	8.5	8.5	NA
Other services	NA	4.3	4.7	5.0	5	NA
Public administration	NA	4.7	4.5	4.6	4.6	NA
Business establishments (thousands)	NA	6,176	7,070	(R) 7,388	7,500	NA
Governments	² 81,831	³ 85,006	⁴ 87,576	NA	NA	NA
Gross domestic product (\$2000 millions)	5,161,700	7,112,500	9,817,000	(R) 10,703,500	11,048,600	114.0
Foreign trade (\$2000 millions)	631,335	1,168,168	2,572,000	(R) 2,832,692	3,013,471	377.3
Goods	467,359	836,787	2,027,800	2,236,538	2,393,053	412.0
Goods (percent)	74.0	71.6	78.8	(R) 79.0	79.4	7.3
Services	163,976	331,381	544,200	596,155	620,418	278.4
Services (percent)	26.0	28.4	21.2	(R) 21.0	20.6	-20.7

Key: NA = not available.

¹Based on the 2002 North American Industrial 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 Standard Industrial Classification system to the 2002 North American Industrial Classification System.

²1982

³1992

⁴2002

TABLE 1-1. ECONOMIC AND SOCIAL CHARACTERISTICS OF THE UNITED STATES: 1980-2005

Sources: Unless otherwise stated all data from: U.S. Department of Commerce, Census Bureau, *Statistical Abstract of the United States: 2007* (Washington, DC: 2007) and earlier editions, available at

<http://www.census.gov/compendia/statab/> as of May 31, 2007.

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 May 31, 2007.

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 May 31, 2007.

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 June 12, 2007.

2005 while the economy, measured by GDP, more than doubled in real terms. Other indicators of economic growth such as employment and household income have also risen by 40 percent and 15 percent respectively. Foreign trade grew faster than the overall economy, quadrupling in real value between 1980 and 2005, reflecting unprecedented global interconnectivity.

TABLE 1-2. POPULATION AND GROSS DOMESTIC PRODUCT (GDP) BY REGION: 1980-2006

	1980	1990	2000	2005	2006	Percent change, 1980 to 2006
Resident Population (thousands)	226,549	248,789	(R) 282,217	(R) 296,507	299,398	32
Northeast	49,136	50,828	(R) 53,675	(R) 54,679	54,741	11
Midwest	58,868	59,670	(R) 64,502	(R) 65,936	66,218	12
South	75,372	85,454	(R) 100,573	(R) 107,552	109,084	45
West	43,173	52,837	(R) 63,467	(R) 68,339	69,356	61
GDP (\$ 2000 millions)¹	5,054,549	6,994,329	(R) 9,203,792	(R) 10,923,830	11,291,419	123
Northeast	1,107,283	1,604,121	(R) 1,957,791	(R) 2,287,913	2,351,861	112
Midwest	1,262,917	1,566,939	(R) 2,083,730	(R) 2,333,148	2,377,114	88
South	1,608,531	2,220,755	(R) 3,044,624	(R) 3,696,021	3,831,479	138
West	1,075,817	1,602,514	(R) 2,117,647	(R) 2,606,748	2,730,965	154
GDP per capita (\$ 2000)¹	22,311	28,113	(R) 32,612	(R) 36,842	37,714	69
Northeast	22,535	31,560	(R) 36,475	(R) 41,842	42,963	91
Midwest	21,453	26,260	(R) 32,305	(R) 35,385	35,898	67
South	21,341	25,988	(R) 30,273	(R) 34,365	35,124	65
West	24,919	30,329	(R) 33,366	(R) 38,144	39,376	58

Key: R = revised.

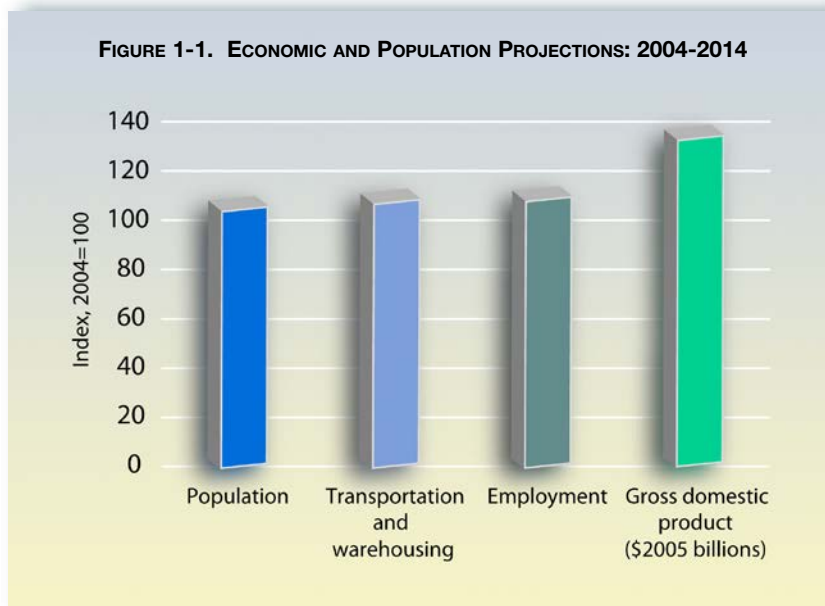
¹As of the October 26, 2006 release, the BEA renamed the gross state product (GSP) series to gross domestic product (GDP) by state.

The demand for freight transportation is spread throughout the United States by the distribution of population and economic activity as measured in GDP by State. While both population and economic activity have grown faster in the West and South than in the Northeast and Midwest, the growth in economic activity per capita has been highest in the Northeast.

TABLE 1-2. POPULATION AND GROSS STATE PRODUCT (GSP) BY REGION: 1980-2006

Sources: **Population:** 1980-1990—U.S. Department of Commerce, Census Bureau, *Statistical Abstract of the United States: 2004-2005* (Washington, DC: 2005); **2000-2006**—Ibid., Population Division, Annual Population Estimates, table 8, available at <http://www.census.gov/popest/states/NST-ann-est.html> as of June 7, 2007; **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; **2000-2006**—U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts, available at <http://www.bea.gov/bea/regional/gsp/> as of June 7, 2007.

Demand for freight transportation grows with increases in population and economic activity. The U.S. economy, as measured by GDP, is projected to increase by 39 percent and the U.S. population by 9 percent by 2014.



Transportation and warehousing employment is expected to increase by 12 percent over this period, about the same as employment as a whole.

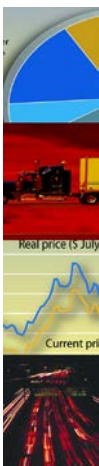


FIGURE 1-1. ECONOMIC AND POPULATION PROJECTIONS: 2004-2014
Sources: **Population:** U.S. Department of Commerce, U.S. Census Bureau, *Statistical Abstract of the United States: 2006* (Washington, DC: 2005), available at <http://www.census.gov/statab/www/> as of June 6, 2007.
Employment: U.S. Department of Labor, Bureau of Labor Statistics, *Employment by Major Industry Division*, 1994, 2004, and projected 2014, Table 1, Economic and Employment Projections, available at www.bls.gov as of June 6, 2007.
GDP: Congressional Budget Office, "The Budget and Economic Outlook: Fiscal Years 2005-2015," *CBO's Economic Projections for 2005 through 2015*, available at <http://www.cbo.gov> as of June 6, 2007.



Water
15%

Rail

II. FREIGHT TO BE MOVED AND TRADING PARTNERS

The American economy stretches across a continent with links to the world, drawing natural resources and manufactured products from many locations to serve markets at home and abroad. More freight is moving greater distances as part of far flung supply chains among distant trading partners.

TABLE 2-1. WEIGHT OF SHIPMENTS BY MODE: 2002, 2006, 2035 (MILLIONS OF TONS)

	2002				2006				2035			
	Total	Domestic	Exports ³	Imports ³	Total	Domestic	Exports ³	Imports ³	Total	Domestic	Exports ³	Imports ³
Total	(R) 19,328	17,670	(R) 525	1,133	20,974	18,985	620	1,369	(R) 37,212	33,668	(R) 1,112	(R) 2,432
Truck	11,539	11,336	106	97	12,659	12,389	169	101	22,814	22,231	262	320
Rail	1,879	1,769	32	78	2,040	1,905	41	95	3,525	3,292	57	176
Water	701	595	62	44	688	582	48	58	1,041	874	114	54
Air, air & truck	(R) 11	3	3	(R) 5	15	5	4	6	(R) 61	10	(R) 13	(R) 38
Intermodal¹	1,292	196	317	780	1,503	194	353	956	2,598	334	660	1,604
Pipeline & unknown²	3,905	3,772	4	130	4,068	3,909	6	153	7,172	6,926	5	240

Key: R = revised.

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 totals due to rounding.

The U.S. transportation system moved, on average, 53 million tons of freight worth \$36 billion each day in 2002. The Freight Analysis Framework (FAF) forecasts that tons transported will almost double by 2035 with international shipments growing somewhat faster than domestic shipments. The provisional estimate of tons moved in 2006 are consistent with annual growth rates in the FAF forecast for all modes except water, which declined slightly, and air and intermodal, which grew at faster rates.

TABLE 2-1. WEIGHT OF SHIPMENTS BY MODE: 2002, 2006, 2035 (MILLIONS OF TONS)

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, Version 2.2, 2007.

TABLE 2-2. VALUE OF SHIPMENTS BY MODE: 2002, 2006, 2035 (BILLIONS OF DOLLARS)

	2002				2006				2035			
	Total	Domestic	Exports ³	Imports ³	Total	Domestic	Exports ³	Imports ³	Total	Domestic	Exports ³	Imports ³
Total	(R) 13,228	11,083	(R) 778	(R) 1,367	14,935	12,104	1,128	1,703	(R) 41,869	29,592	(R) 3,392	(R) 8,884
Truck	8,856	8,447	201	208	9,765	9,069	428	267	23,767	21,655	806	1,306
Rail	382	288	26	68	430	319	33	77	702	483	63	156
Water	103	76	13	13	102	75	10	17	151	103	31	18
Air, air & truck	(R) 771	162	(R) 269	(R) 340	1,048	271	351	426	(R) 5,925	721	(R) 1,548	(R) 3,655
Intermodal¹	1,967	983	268	716	2,096	904	304	888	8,966	4,315	943	3,708
Pipeline and unknown²	1,149	1,127	1	22	1,494	1,466	1	28	2,357	2,315	1	41

Key: R = revised.

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 totals due to rounding.

The value of freight moved on the U.S. transportation system is increasing faster than tons transported, even when calculated in 2002 prices. The FAF 2006 provisional estimate and 2035 forecast expect the value of shipments to increase between 3.1 percent and 3.5 percent per year while tonnage is predicted to grow between 2.0 percent and 2.1 percent per year.

TABLE 2-3. TOP COMMODITIES: 2002

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

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

²Nonmetallic 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 2-2. VALUE OF SHIPMENTS BY MODE: 2002, 2006, 2035 (BILLIONS OF DOLLARS)

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, Version 2.2, 2007.

TABLE 2-3. TOP COMMODITIES: 2002

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, Version 2.2, 2007.

TABLE 2-4. 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	5
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.

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

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

³ Excludes most shipments of crude oil.

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 of ton-miles.

TABLE 2-5. 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 2-4. 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 2-5. HAZARDOUS MATERIALS SHIPMENTS BY HAZARD CLASS: 2002

Source: U.S. Department of Transportation, 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.

TABLE 2-6 NEW. DOMESTIC MODE OF EXPORTS AND IMPORTS BY WEIGHT AND VALUE: 2002 AND 2035

	Tons (millions)		Value (\$ billions)	
	2002	2035	2002	2035
Total	(R) 1,658	(R) 3,544	(R) 2,145	(R) 12,277
Truck¹	797	2,116	1,198	6,193
Rail	200	397	114	275
Water	106	168	26	49
Air & truck²	(R) 9	(R) 54	(R) 614	5,242
Intermodal³	22	50	52	281
Pipeline & unknown⁴	524	760	141	238

Key: R = revised.

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.

Notes: TABLE 2-6 NEW WAS UPDATED IN FEBRUARY 2008. IT DIFFERS FROM THE PRINT VERSION PUBLISHED IN NOVEMBER 2007. Numbers may not add to totals due to rounding.

International trade is growing rapidly and is placing demands on the domestic transportation network and on all modes. Trucks are the most common mode used to move imports and exports between international gateways and inland locations.

Foreign trade has had a major impact on all U.S. borders and coasts. Since 1950, the value of merchandise trade has increased sixteen-fold in inflation-adjusted terms.

In 2006, ports and airports on the Atlantic Coast remain the most important, but the land borders and other coasts are catching up.

FIGURE 2-1. VALUE OF MERCHANDISE TRADE BY COASTS AND BORDERS: 1950-2006

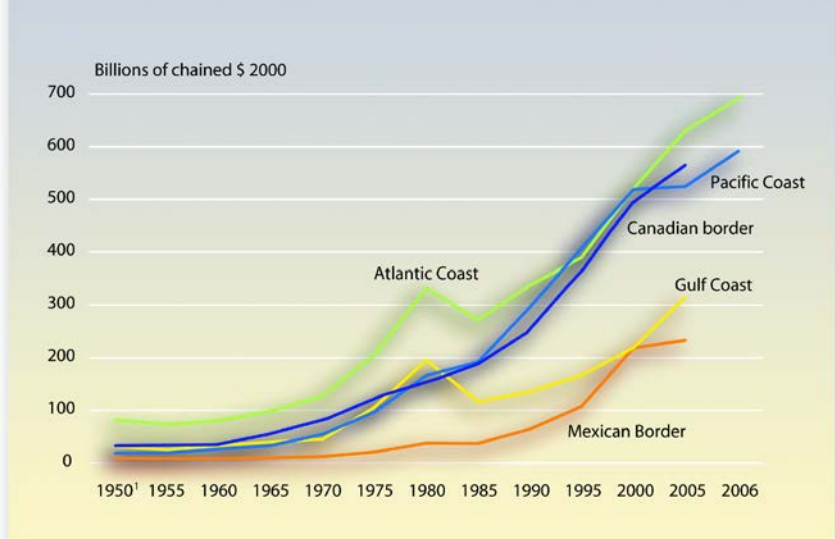
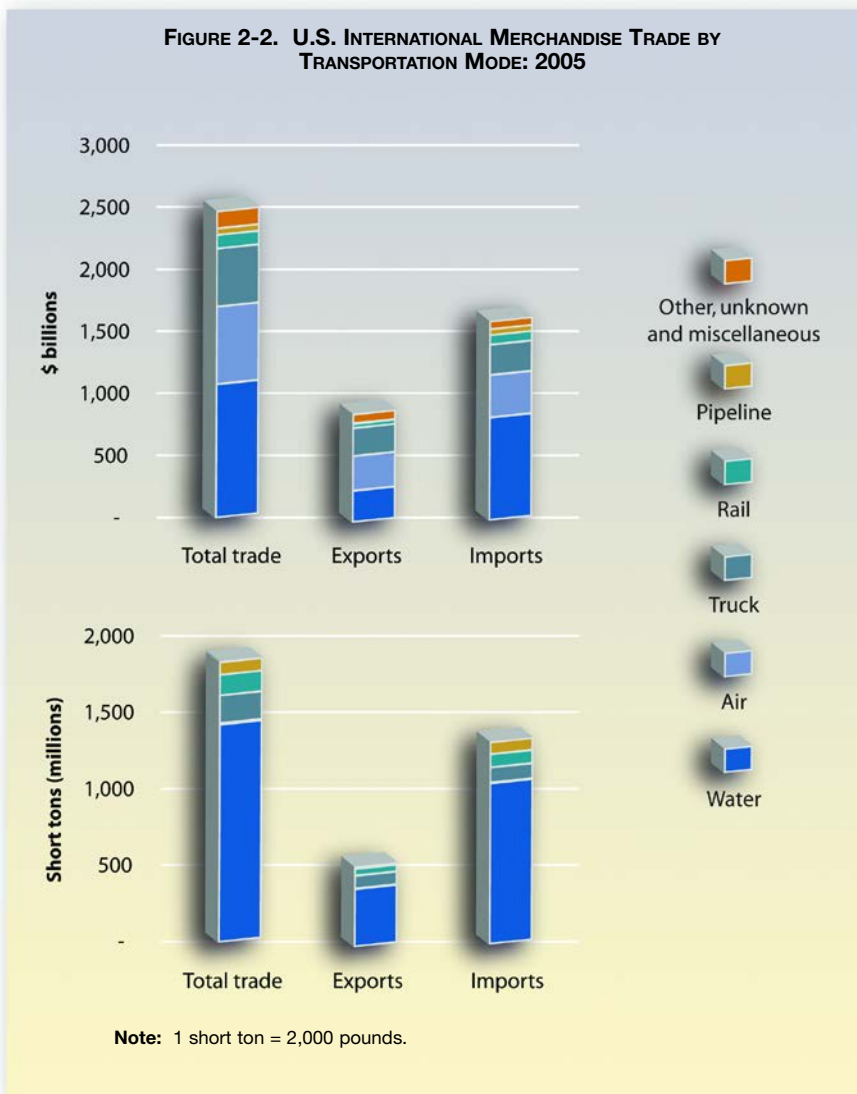


TABLE 2-6 NEW. DOMESTIC MODE OF EXPORTS AND IMPORTS BY WEIGHT AND VALUE: 2002 AND 2035

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, Version 2.2, 2008.

FIGURE 2-1. VALUE OF MERCHANDISE TRADE BY COASTS AND BORDERS: 1950-2006

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); 2005-2006: U.S. Census Bureau, Foreign Trade Division, FT920 - U.S. Merchandise Trade: Selected Highlights (Washington, DC: December 2006) as of September 6, 2007; **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 6, 2007.



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 air and truck accounting for 25 percent and 19 percent respectively. Rail and pipeline account for the balance.

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

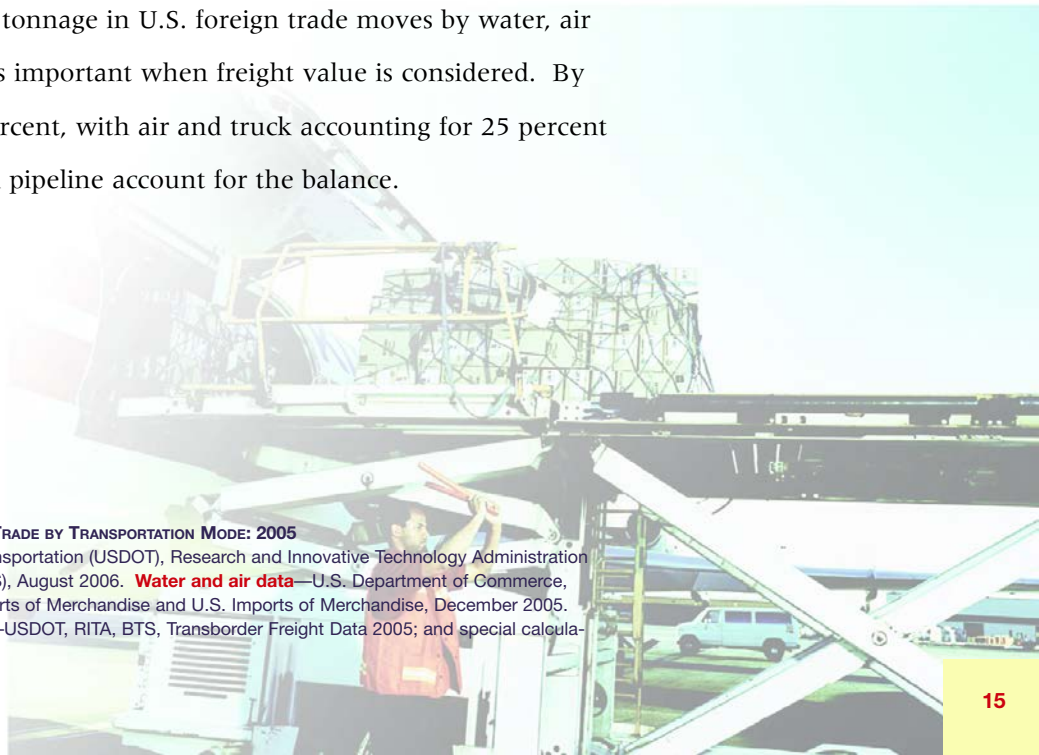
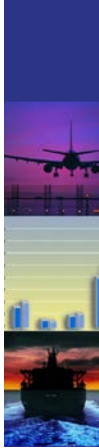


TABLE 2-7. TOP 25 TRADING PARTNERS OF THE UNITED STATES IN MERCHANDISE: 1998-2006 (CURRENT \$ BILLIONS)

Partner	2006 Rank	1998	2000	2002	2004	2006
Canada	1	329.0	405.6	371.4	445.0	533.7
China	2	85.4	116.3	147.2	231.4	343.0
Mexico	3	173.7	247.6	232.3	266.6	332.4
Japan	4	179.9	211.8	172.9	184.0	207.7
Germany	5	76.5	88.0	89.1	108.6	130.4
United Kingdom	6	73.9	85.0	74.1	82.4	98.8
South Korea	7	40.5	68.2	58.2	72.5	78.3
France	8	41.8	50.0	47.4	53.1	61.4
Taiwan	9	51.3	64.9	50.6	56.3	61.2
Malaysia	10	28.0	36.6	34.4	39.1	49.1
Netherlands	11	26.6	31.7	28.2	36.9	48.4
Venezuela	12	15.8	24.2	19.6	29.7	46.2
Brazil	13	25.3	29.2	28.2	35.0	45.6
Italy	14	30.0	36.0	34.4	38.8	45.2
Singapore	15	34.0	37.0	31.0	34.9	42.5
Saudi Arabia	16	16.9	20.4	17.9	26.2	39.5
Ireland	17	14.0	24.1	29.1	35.6	37.2
Belgium	18	22.3	23.9	23.2	29.3	35.8
India	19	11.8	14.3	15.9	21.7	31.9
Thailand	20	18.7	23.0	19.7	23.9	30.6
Nigeria	21	5.0	11.3	7.0	17.8	30.1
Israel	22	15.6	20.7	19.5	23.7	30.1
Switzerland	23	15.9	20.1	17.2	20.9	28.6
Australia	24	17.3	18.9	19.6	21.8	26.0
Hong Kong	25	23.5	26.1	21.9	25.1	25.7
Top 25 total¹		1,386.3	1,746.7	1,621.2	1,960.5	2,439.5
U.S. total trade		1,594.4	1,997.3	1,856.8	2,287.6	2,892.3
Top 25 as % of total		87	87	87	86	84

¹Represents the top 25 trading partners in the reference year, not necessarily the top 25 partners in previous years.

By a wide margin, Canada is this country's top trading partner followed by China and Mexico. China's share of trade with the United States more than doubled between 1998 and 2006, from 5 percent of total merchandise trade to nearly 12 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

TABLE 2-8. VALUE AND WEIGHT OF U.S. MERCHANDISE TRADE WITH CANADA AND MEXICO BY TRANSPORTATION MODE: 1998-2006

Mode	1998		2000		2005 ¹		2006	
	Value (current \$ billions)	Weight (millions of short tons)	Value (current \$ billions)	Weight (millions of short tons)	Value (current \$ billions)	Weight (millions short tons)	Value (current \$ billions)	Weight (millions short tons)
Truck	350	NA	429	NA	491	191	534	NA
Rail	68	NA	94	NA	116	141	129	NA
Air	30	<1	45	1	33	<1	36	<1
Water	21	183	33	194	58	256	70	251
Pipeline	11	NA	24	NA	52	86	57	NA
Other	23	NA	29	NA	39	5	40	NA
Total	503	NA	653	526	790	679	865	NA

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. TOP 25 TRADING PARTNERS OF THE UNITED STATES IN MERCHANDISE: 1998-2006 (\$ BILLIONS)

Source: U.S. Department of Commerce, International Trade Administration, TradeStats Express, available at <http://www.ita.doc.gov/> as of June 12, 2007.

TABLE 2-8. VALUE AND WEIGHT OF U.S. MERCHANDISE TRADE WITH CANADA AND MEXICO BY TRANSPORTATION MODE: 1998-2006

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, Transborder Freight Data, September 2007.

countries. By weight, the water and truck modes carry the largest share of goods traded. Trucks carried the dominant share by value.

TABLE 2-9. U.S. LAND EXPORTS TO AND IMPORTS FROM CANADA AND MEXICO BY TRANSPORTATION MODE: 1998-2006 (CURRENT \$ MILLIONS)

	1998	2000	2005	2006
Exports to Canada, total	137,745.4	154,847.4	192,907.5	209,283.2
Truck	114,806.1	129,825.3	151,221.7	164,318.1
Rail	12,279.6	12,946.5	19,321.9	22,477.8
Pipeline	93.4	161.6	2,393.9	2,180.0
Other ¹	10,559.5	11,913.4	19,933.1	20,263.4
Mail	6.8	0.6	36.9	43.8
Exports to Mexico, total	70,173.8	97,158.9	104,276.5	116,749.2
Truck	60,432.1	82,389.2	83,341.2	92,991.6
Rail	6,188.8	10,495.8	15,747.7	17,271.2
Pipeline	73.4	301.8	543.3	707.0
Other ¹	3,470.0	3,972.0	4,622.7	5,779.1
Mail	0.1	(R) <0.1	(R) 2.2	0.3
Imports from Canada, total	162,105.7	210,270.5	265,402.1	278,889.2
Truck	108,856.7	127,816.3	143,695.6	149,884.0
Rail	37,374.1	49,699.2	60,606.3	63,258.4
Pipeline	11,120.1	23,117.1	48,766.5	53,865.2
Other ¹	4,575.1	9,571.0	12,184.4	11,736.0
Mail	1.7	4.1	0.1	0.2
FTZ ²	177.9	62.8	149.3	145.5
Imports from Mexico, total	84,102.9	113,436.5	135,400.5	155,205.1
Truck	65,883.7	88,668.7	112,267.6	126,463.6
Rail	12,029.7	21,056.1	20,782.2	25,863.5
Pipeline	2.4	11.5	0.0	55.4
Other ¹	917.8	1,573.9	1,990.2	2,399.2
Mail	0.2	0.6	(R) <0.1	(R) <0.1
FTZ ²	2,886.7	2,125.7	360.4	423.3

Key: R = revised.

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.

Trade with Canada by land modes is much higher than trade with Mexico. Both have been growing rapidly over the past few years. Imports from and exports to Mexico measured by value grew by 85 percent and 66 percent respectively between 1998 and 2006. Imports from and exports to Canada grew by 72 percent and 52 percent respectively over the same period.



III. THE FREIGHT TRANSPORTATION SYSTEM



Freight in America travels over one of the world’s largest networks of highways, railroads, waterways, pipelines, and airways. Existing and anticipated increases in the number of freight vehicles, vessels, and other conveyances on both public and private infrastructure are stressing system capacity and maintenance requirements and threatening system performance.

TABLE 3-1. MILES OF INFRASTRUCTURE BY TRANSPORTATION MODE: 1980-2005

	1980	1990	2000	2005	Percent change, 1980-2005
Public roads, route miles	3,859,837	3,866,926	3,951,101	4,011,631	3.9
National Highway System (NHS)	N	N	161,189	162,373	N
Interstates	41,120	45,074	46,673	46,871	14.0
Other NHS	N	N	114,516	115,502	N
Other	N	N	3,789,912	3,849,257	N
Strategic Highway Corridor Network (STRAHNET)	N	N	62,066	62,450	N
Interstate	N	N	46,675	46,873	N
Non-Interstate	N	N	15,389	15,577	N
Railroad	¹ 183,077	175,909	170,512	140,810	-23.1
Class I	NA	133,189	120,597	95,664	N
Regional	NA	18,375	20,978	15,388	N
Local	NA	24,337	28,937	22,519	N
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	159,512	N
Gas	1,051,774	1,189,200	1,369,300	1,437,500	36.7

Key: N = not applicable; NA = not available; R = revised.
¹Excludes Class III railroads.

Road infrastructure increased slowly over the past two decades despite a large increase in the volume of traffic. Between 1980 and 2005, route miles of public roads increased by 3.9 percent compared with a 96 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: 1980-2005

Sources: **Public roads:** U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, (Washington, DC: annual issues), table HM-16. **Rail:** Association of American Railroads, *Railroad Facts* (Washington, DC: various issues). **Navigable channels:** U.S. Army Corps of Engineers. **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 June 6, 2007. **Gas pipelines:** American Gas Association, *Gas Facts* (Arlington, VA: annual issues).

TABLE 3-2. NUMBER OF U.S. VEHICLES, VESSELS, AND OTHER CONVEYANCES: 1980-2005

	1980	1990	2000	2005
Highway	161,490,159	193,057,376	225,821,241	247,421,120
Truck, single-unit 2-axle 6-tire or more	4,373,784	4,486,981	5,926,030	6,395,240
Truck, combination	1,416,869	1,708,895	2,096,619	2,086,759
Truck, total	5,790,653	6,195,876	8,022,649	8,481,999
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	22,779
Class I, freight cars ¹	1,168,114	658,902	560,154	474,839
Nonclass I freight cars ¹	102,161	103,527	132,448	120,195
Car companies and shippers freight cars ¹	440,552	449,832	688,194	717,211
Water	38,788	39,445	41,354	41,028
Nonself-propelled vessels ²	31,662	31,209	33,152	32,052
Self-propelled vessels ³	7,126	8,236	8,202	8,976
Oceangoing steam and motor ships ⁴	864	636	454	406
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.

A vast number of vehicles and vessels move goods over the transportation network. The number of commercial trucks climbed 46 percent between 1980 and 2005. In comparison, the number of

rail freight cars has declined since 1980 with improved utilization and the deployment of larger cars. The number of U.S.-flag water vessels increased slightly over the same period while the world fleet expanded substantially in number and size of vessels.

The growing demand for goods and services contributes to the increase in travel by trucks at a slightly faster rate than for all vehicles.

FIGURE 3-1. HIGHWAY VEHICLE MILES TRAVELED BY TRUCKS AND ALL VEHICLES: 1980-2005

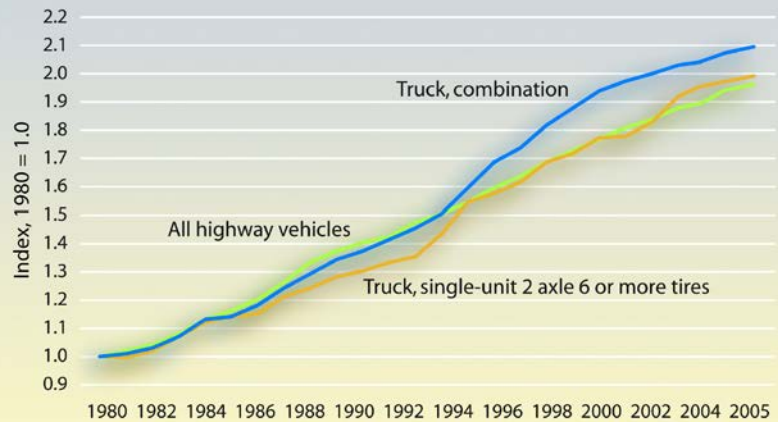


TABLE 3-2. NUMBER OF U.S. VEHICLES, VESSELS, AND OTHER CONVEYANCES: 1980-2005

Sources: Highway: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues). **Rail:** Association of American Railroads, *Railroad Facts* (Washington, DC: annual issues).

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 and US Flag fleet: U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics* (Washington, DC: annual issues).

FIGURE 3-1. HIGHWAY VEHICLE MILES TRAVELED BY TRUCKS AND ALL VEHICLES: 1980-2005

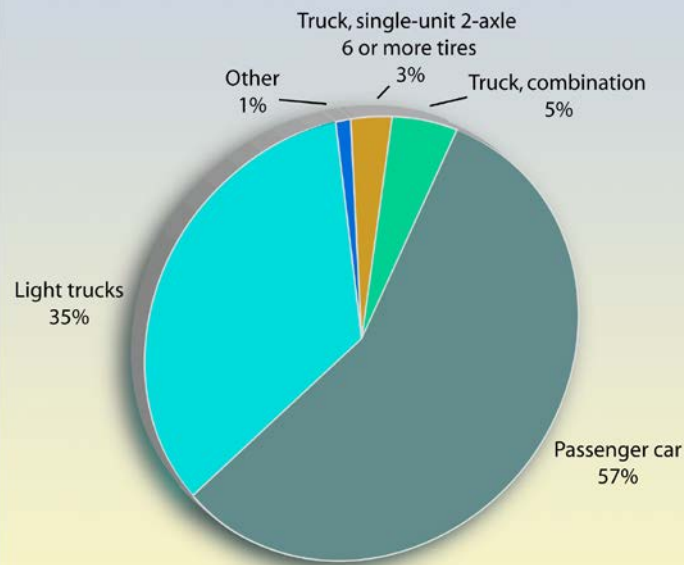
Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues), table VM-1, available at www.fhwa.dot.gov/policy/ohpi/hss/index.htm as of June 1, 2007.



Despite doubling over the past two decades, truck traffic remains a relatively small share of highway traffic as a whole. In 2005, commercial trucks accounted for about 8 percent of highway vmt. Approximately two-thirds of commercial truck travel is by truck tractors hauling semitrailers and by other combinations, while the remaining third is by single unit trucks with 6 or more tires.

The nation's truck fleet has grown significantly in number and distance driven. Of trucks weighing

FIGURE 3-2. HIGHWAY VEHICLE MILES TRAVELED BY VEHICLE TYPE: 2005



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

TABLE 3-3. TRUCKS AND TRUCK MILES BY AVERAGE WEIGHT: 1987-2002¹

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

Key: VMT = vehicle miles traveled.

¹Excludes trucks with an average weight of 10,000 pounds or less.

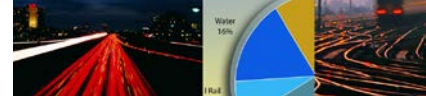
Note: Weight includes the empty weight of the vehicle plus the average weight of the load carried.

FIGURE 3-2. HIGHWAY VEHICLE MILES TRAVELED BY VEHICLE TYPE: 2005

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 of June 3, 2007.

TABLE 3-3. TRUCKS AND TRUCK MILES BY AVERAGE WEIGHT: 1987-2002

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.



more than 10,000 pounds registered to businesses, individuals, and organizations other than government, most growth has occurred at either end of the weight spectrum. Distance traveled has more than doubled in 15 years for trucks weighing between 10,000 pounds and 26,000 pounds and for trucks weighing over 80,000 pounds. Trucks between 60,000 pounds and 80,000 pounds form the largest category in both number of trucks and vmt because in most cases 80,000 pounds is the maximum weight allowed on the highway system without special permits.

In addition to weight, Federal and state governments place limits on 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 3-4. SEMITRAILER LENGTH LIMITATIONS ON THE NATIONAL TRUCK NETWORK BY STATE: 2007

State	Length limitation (feet and inches)
States not listed	48-0
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.

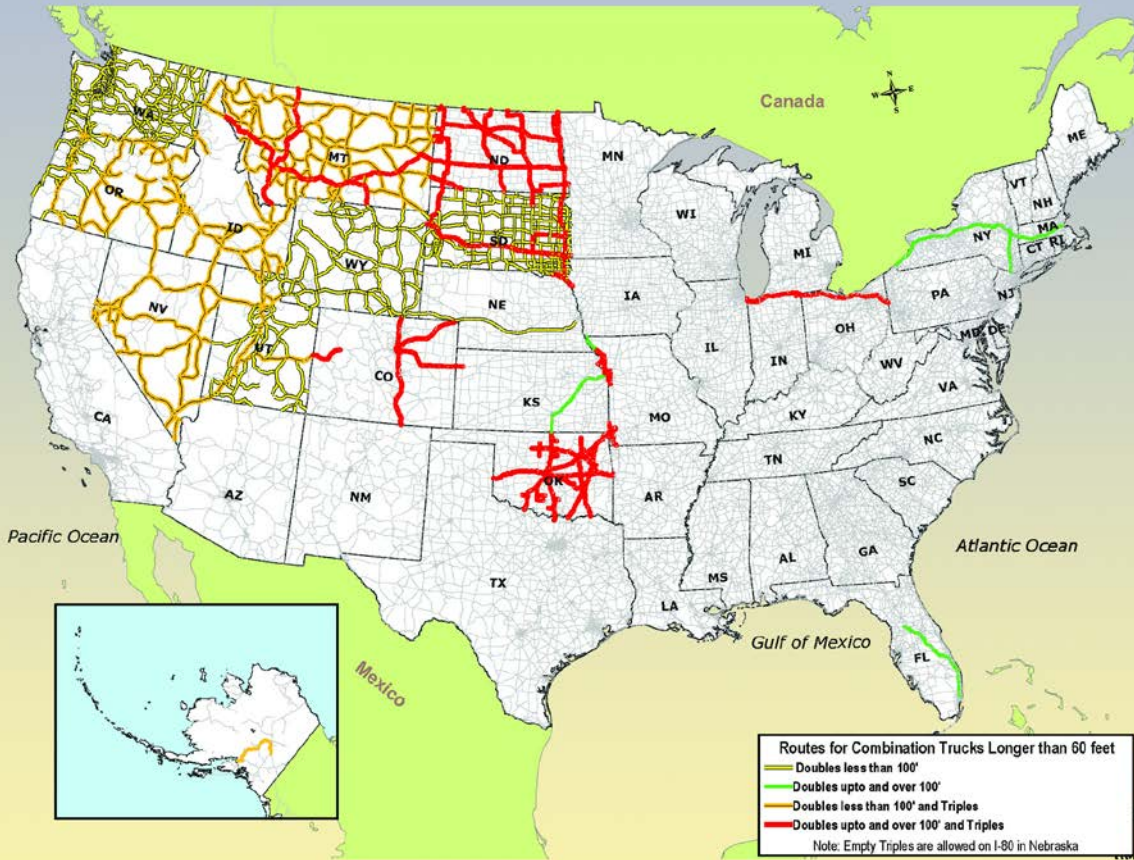
³Semitrailers up to 53 feet in length may operate without a permit by conforming to a kingpin-to-rear-most axle distance of 41 feet, measured to the center of the rear tandem assembly. Semitrailers that are consistent with 23 CFR 658.13(h) may operate without a permit provided the distance from the kingpin 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 3-4. SEMITRAILER LENGTH LIMITATIONS ON THE NATIONAL TRUCK NETWORK BY STATE: 2007

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 3-3. PERMITTED LONGER COMBINATION VEHICLES ON THE NATIONAL HIGHWAY SYSTEM: 2007



All states allow doubles consisting of a 28-foot semitrailer and a 28-foot trailer behind the tractor. Fourteen states and six state turnpike authorities allow longer combinations on at least some parts of the road network. Allowable routes for longer combination vehicles have been frozen since 1991.



FIGURE 3-3. PERMITTED LONGER COMBINATION VEHICLES ON THE NATIONAL HIGHWAY SYSTEM: 2007

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, 2007.



TABLE 3-5. TRUCK MILES BY PRODUCTS CARRIED: 2002¹

Products carried	Millions of miles
Total²	(R) 145,173
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

KEY: R = revised.

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.

Trucking is primarily about moving freight. About 80 percent of the travel by trucks, excluding panels, pickups, vans, minivans, and government-owned vehicles, is for the movement of goods.

TABLE 3-5. TRUCK MILES BY PRODUCTS CARRIED: 2002

Source: U.S. Department of Commerce, Census Bureau, *Vehicle Inventory and Use Survey 2002, United States Summary* (Washington, DC: 2004), available at <http://www.census.gov/svsd/www/02vehinv.html> as of July 26, 2007.

TABLE 3-6. TRUCKS, TRUCK MILES, AND AVERAGE DISTANCE BY RANGE OF OPERATIONS AND JURISDICTIONS: 2002

	Number of trucks (thousands)	Truck miles (millions)	Miles per truck (thousands)
Total	5,520.5	145,172.5	26.3
Off the road	182.9	2,262.8	12.4
50 miles or less	2,942.4	42,531.1	14.5
51 to 100 miles	684.7	19,161.6	28.0
101 to 200 miles	243.5	11,779.9	48.4
201 to 500 miles	231.6	17,519.7	75.7
501 miles or more	293.0	26,706.4	91.2
Not reported	716.3	25,061.1	35.0
Not applicable	226.1	149.9	0.7
Operated in Canada	1.7	72.0	42.7
Operated in Mexico	1.6	29.3	18.5
Operated within the home base state	4,196.4	84,973.9	20.2
Operated in states other than the home base state	495.6	40,901.2	82.5
Not reported	599.1	19,046.1	31.8
Not applicable	226.1	149.9	0.7

Note: Includes trucks registered to companies and individuals in the United States except pickups, minivans, other light vans, and sport utilities.

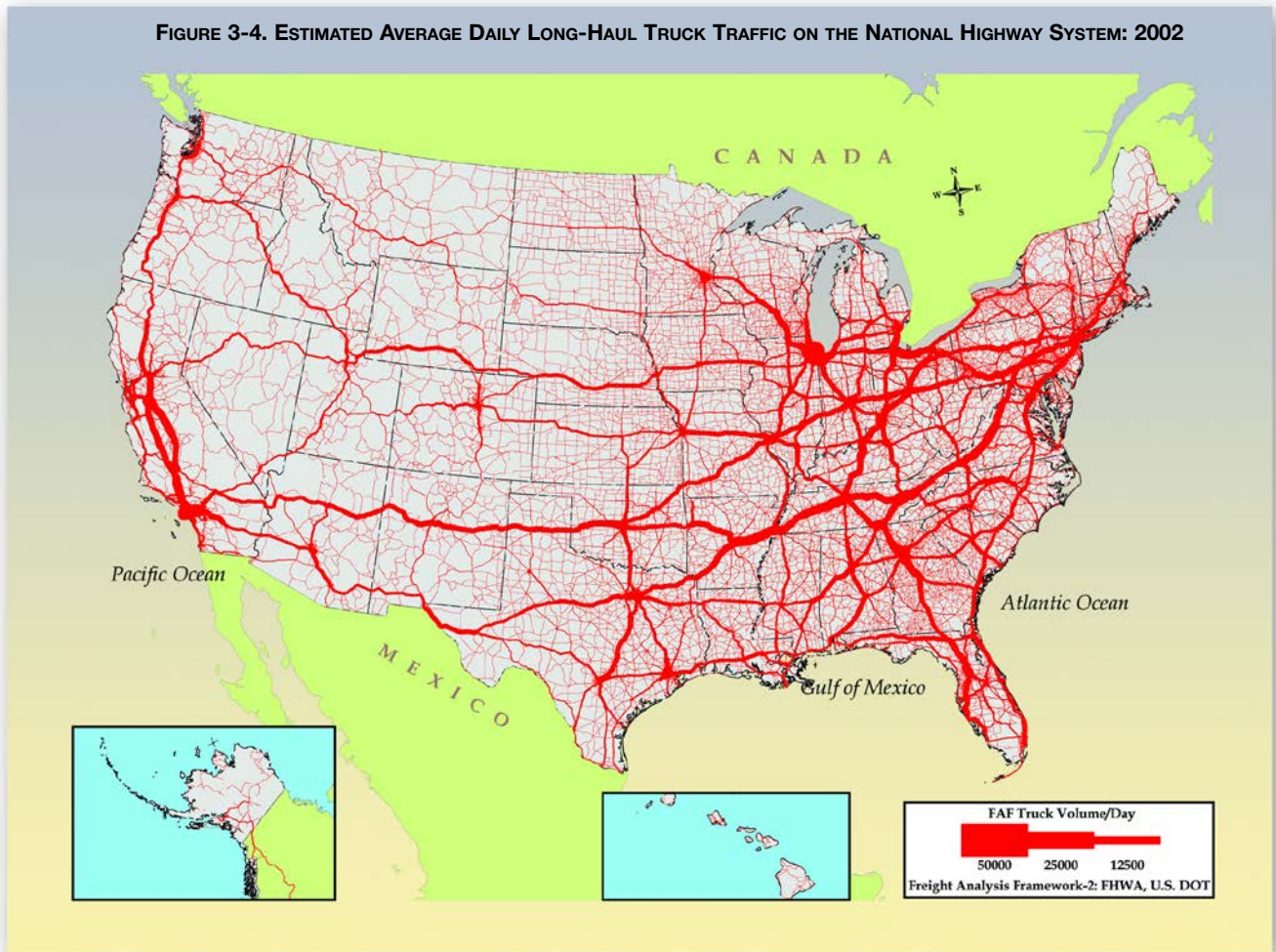
Most trucks larger than pickups, minivans, other light vans, and sport utility vehicles typically operate close to home. About one-half of all trucks typically travel to destinations within 50 miles of their base, and almost three-fourths stayed within their base state. Less than 10 percent of trucks larger than pickups, minivans, other light vans, and sport utility vehicles typically travel to places more than 200 miles away, but these trucks account for over 35 percent of the mileage.



TABLE 3-6. TRUCKS, TRUCK MILES, AND AVERAGE DISTANCE BY RANGE OF OPERATIONS AND JURISDICTIONS: 2002

Source: U.S. Census Bureau, 2002 Economic Census, *Vehicle Inventory and Use Survey 2002, United States Summary*, Table 3a (Washington, DC: 2004), available at <http://www.census.gov/svsd/www/02vehinv.html> as of October 16, 2007.

FIGURE 3-4. ESTIMATED AVERAGE DAILY LONG-HAUL TRUCK TRAFFIC ON THE NATIONAL HIGHWAY SYSTEM: 2002



Long-haul truck traffic is concentrated on major routes connecting population centers, ports, border crossings, and other major hubs of activity. Long-haul trucks as defined in the FAF carry freight between places at least 50 miles apart.



FIGURE 3-4. ESTIMATED AVERAGE DAILY LONG-HAUL TRUCK TRAFFIC ON THE NATIONAL HIGHWAY SYSTEM: 2002

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, Version 2.2, 2007.

By 2035, long-haul truck traffic between places at least 50 miles apart is expected to increase dramatically on Interstate highways and other arterials throughout the nation. These trucks are expected to travel 600 million miles per day.

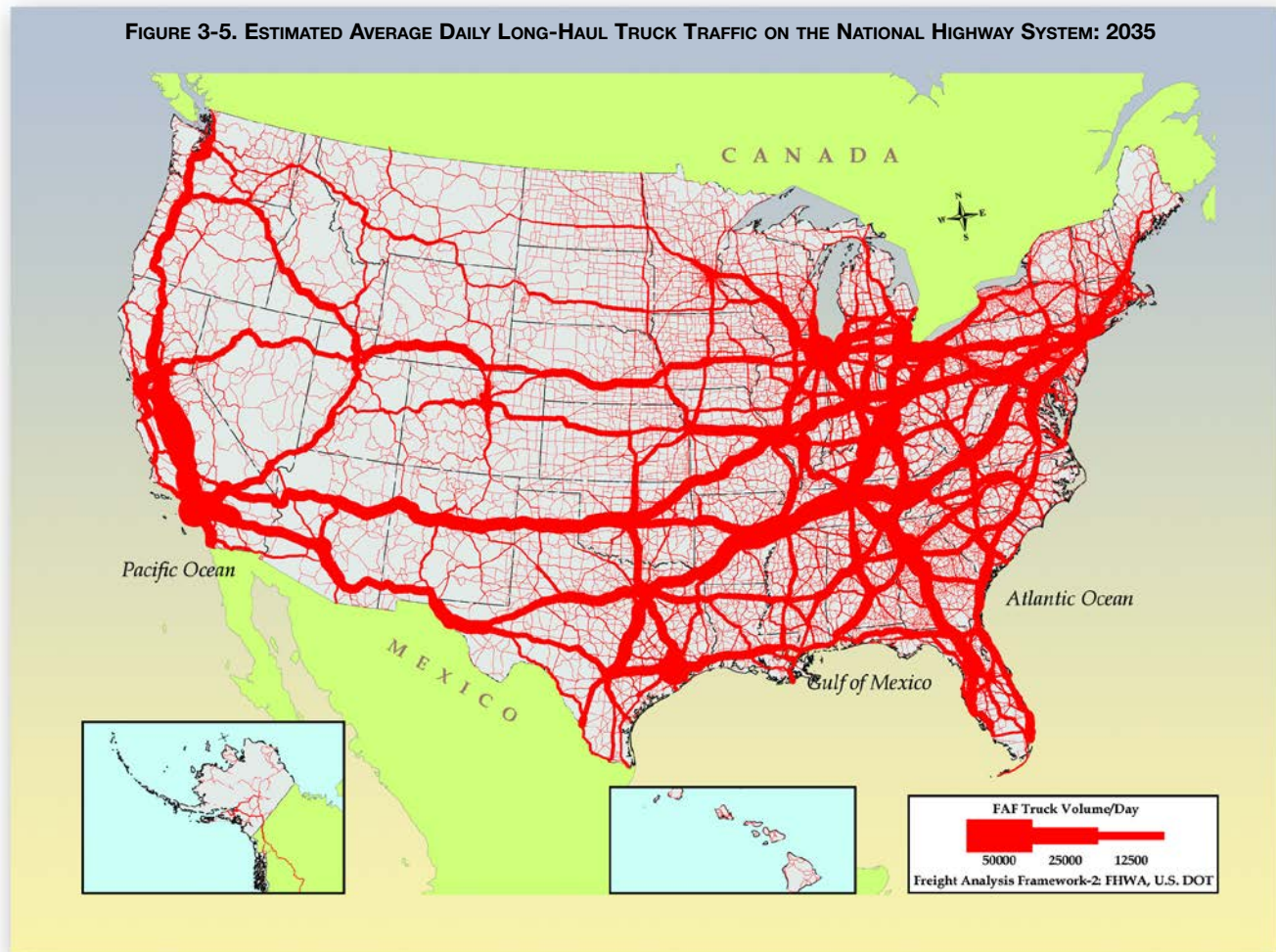
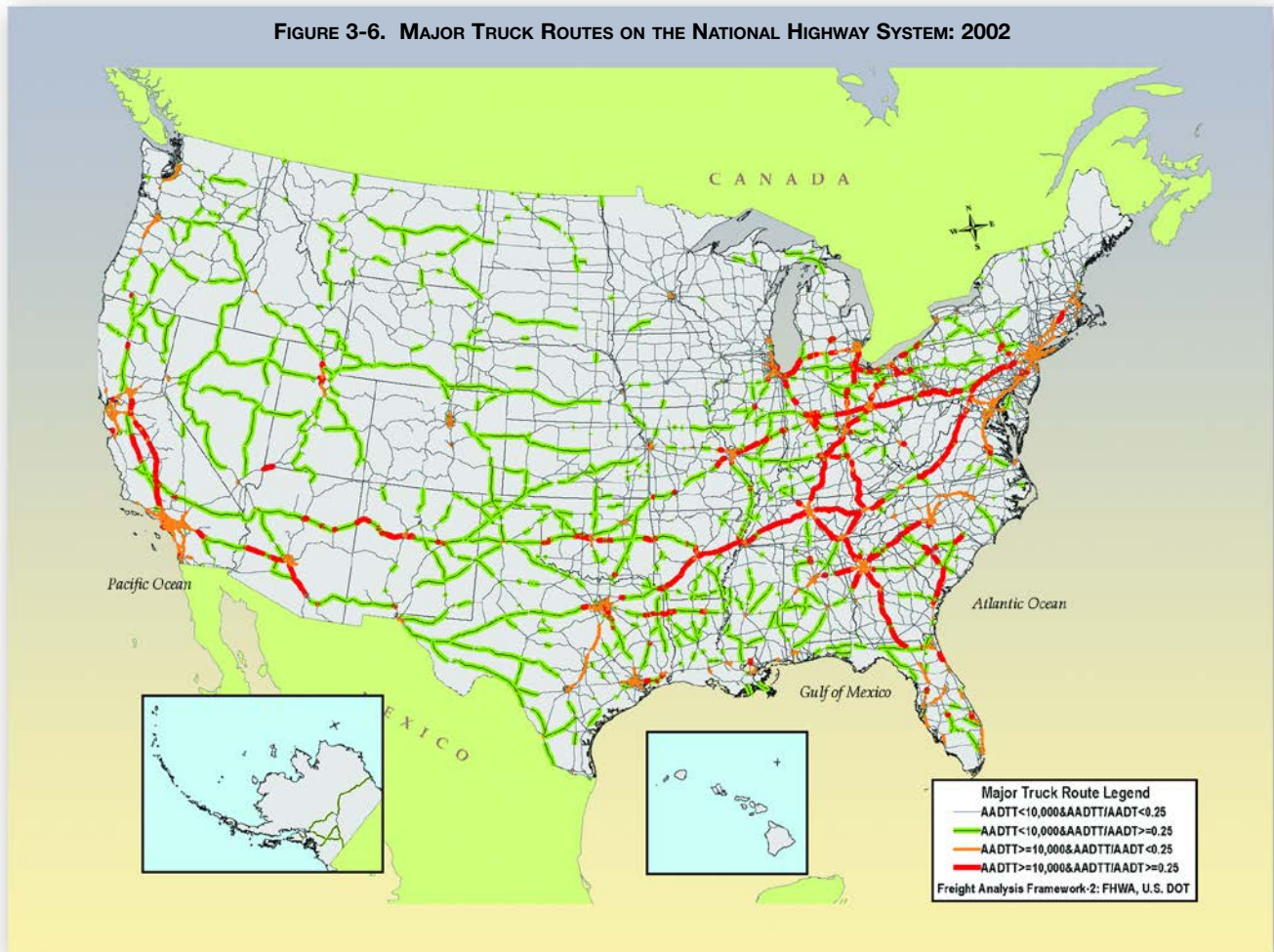


FIGURE 3-5. ESTIMATED AVERAGE DAILY LONG-HAUL TRUCK TRAFFIC ON THE NATIONAL HIGHWAY SYSTEM: 2035

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, Version 2.2, 2007.



FIGURE 3-6. MAJOR TRUCK ROUTES ON THE NATIONAL HIGHWAY SYSTEM: 2002

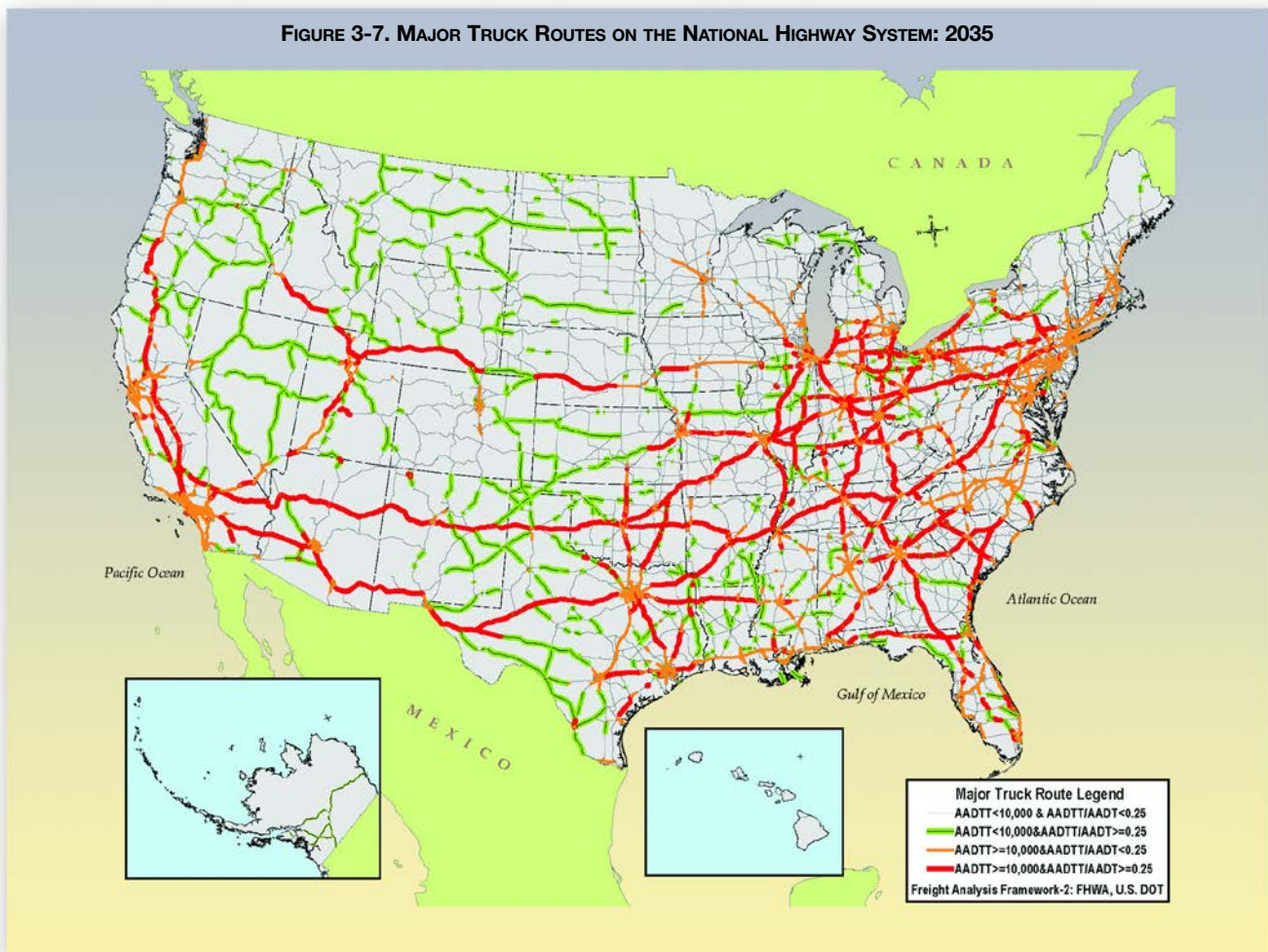


Selected routes carry a significant concentration of trucks, either as an absolute number or as a percentage of the traffic stream. More than 4,000 miles of the National Highway System (NHS) carry more than 10,000 trucks per day on sections where at least every fourth vehicle is a truck.

FIGURE 3-6. MAJOR TRUCK ROUTES ON THE NATIONAL HIGHWAY SYSTEM: 2002

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, Version 2.2, 2007.

FIGURE 3-7. MAJOR TRUCK ROUTES ON THE NATIONAL HIGHWAY SYSTEM: 2035

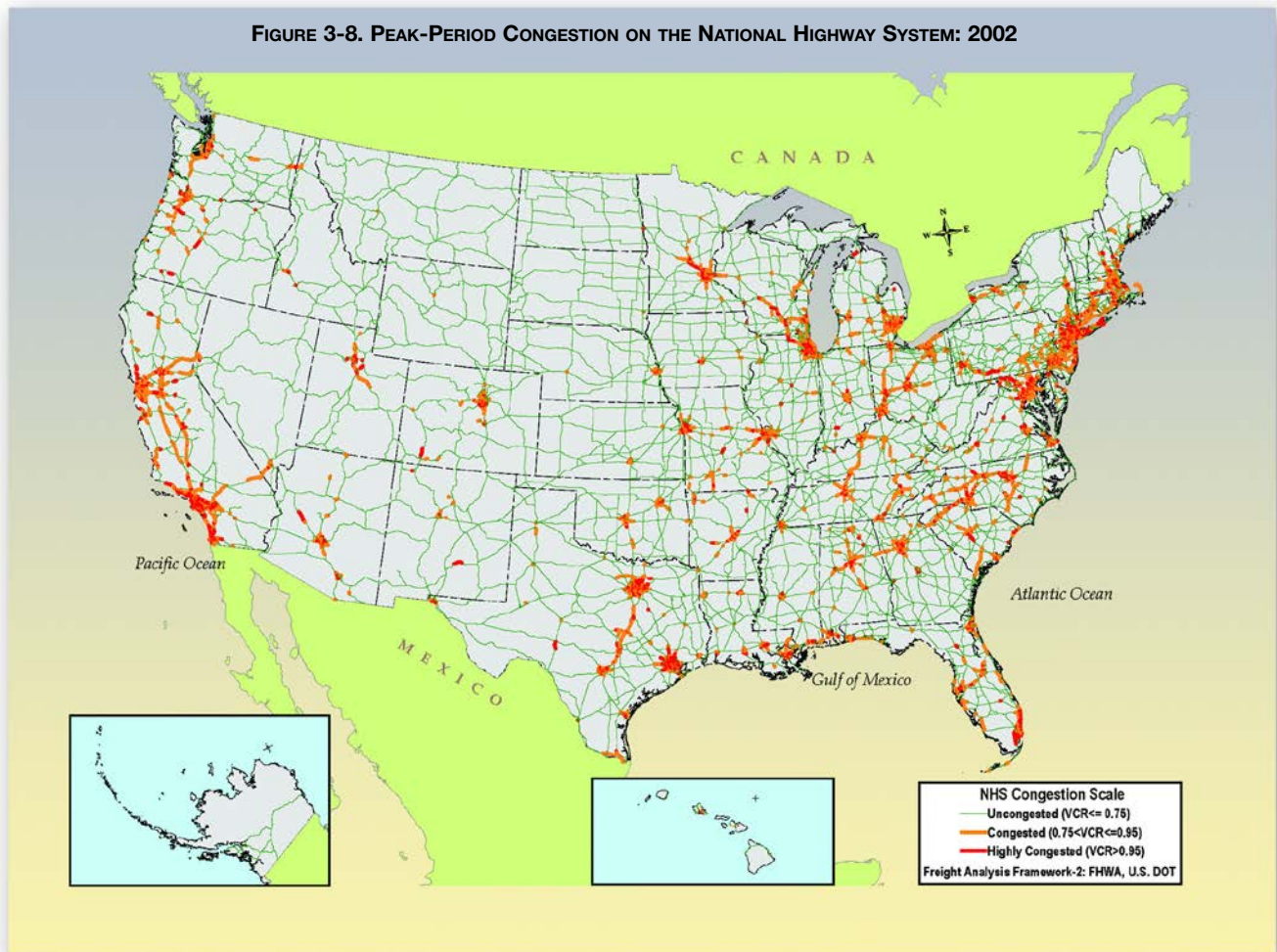


The number of NHS miles carrying large volumes and high percentages of trucks is forecast to increase dramatically by 2035. Segments with more than 10,000 trucks per day and where at least every fourth vehicle is a truck are forecast to exceed 14,000 miles, an increase of almost 230 percent from 2002.

FIGURE 3-7. MAJOR TRUCK ROUTES ON THE NATIONAL HIGHWAY SYSTEM: 2035

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, Version 2.2, 2007.

FIGURE 3-8. PEAK-PERIOD CONGESTION ON THE NATIONAL HIGHWAY SYSTEM: 2002



Recurring congestion caused by volumes of passenger vehicles and trucks that exceed capacity on roadways during peak periods is concentrated primarily in major metropolitan areas. In 2002, peak-period congestion resulted in traffic slowing below posted speed limits on more than 10,600 miles of the NHS and created stop-and-go conditions on an additional 6,700 miles.

FIGURE 3-8. PEAK-PERIOD CONGESTION ON THE NATIONAL HIGHWAY SYSTEM: 2002

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, Version 2.2, 2007.



Increases in truck and passenger vehicle traffic are forecast to expand recurring, peak-period congestion to 40 percent of the NHS in 2035 compared with 11 percent in 2002. This will slow traffic on nearly 20,000 miles of the NHS and create stop-and-go conditions on an additional 45,000 miles.

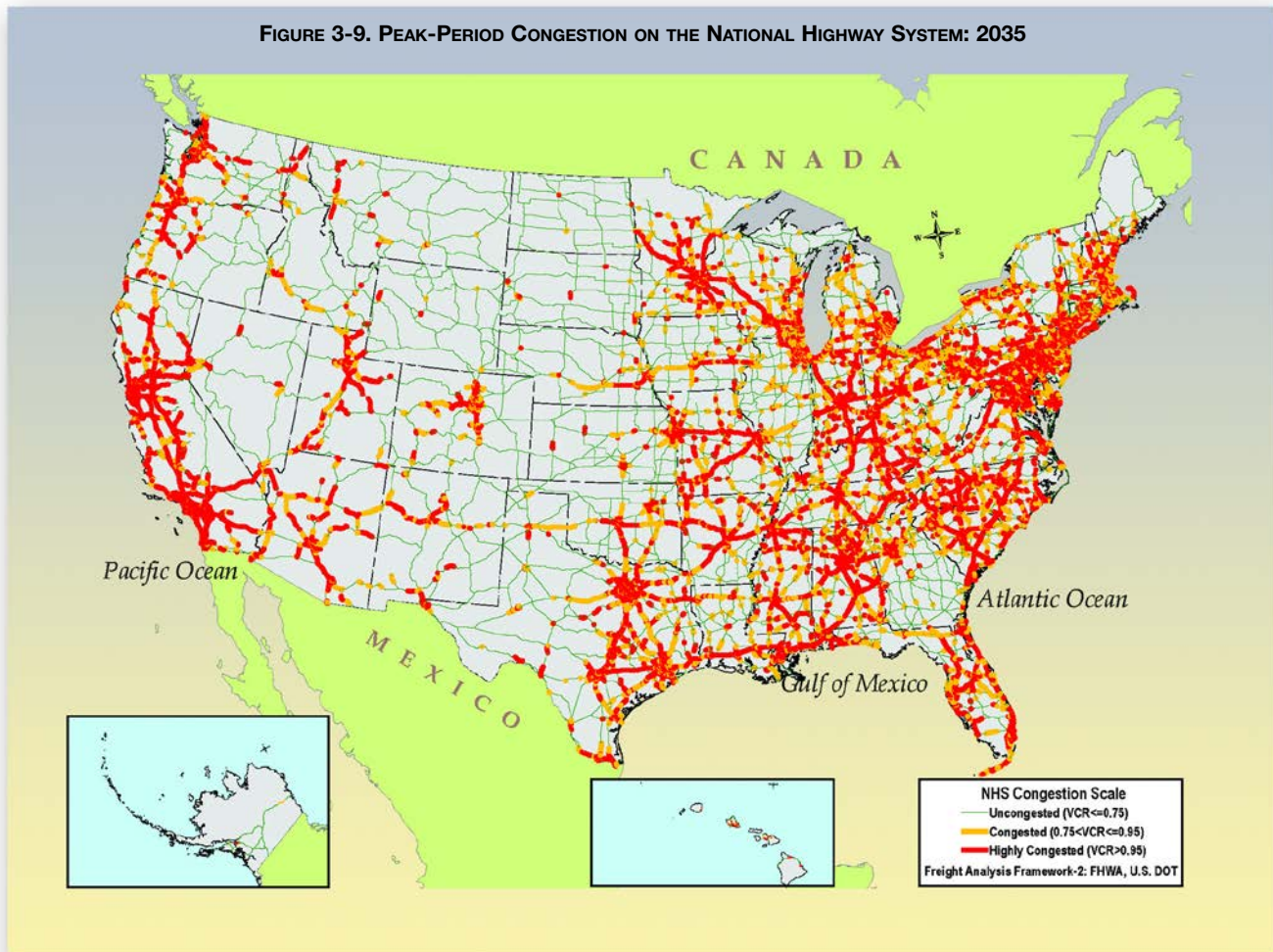
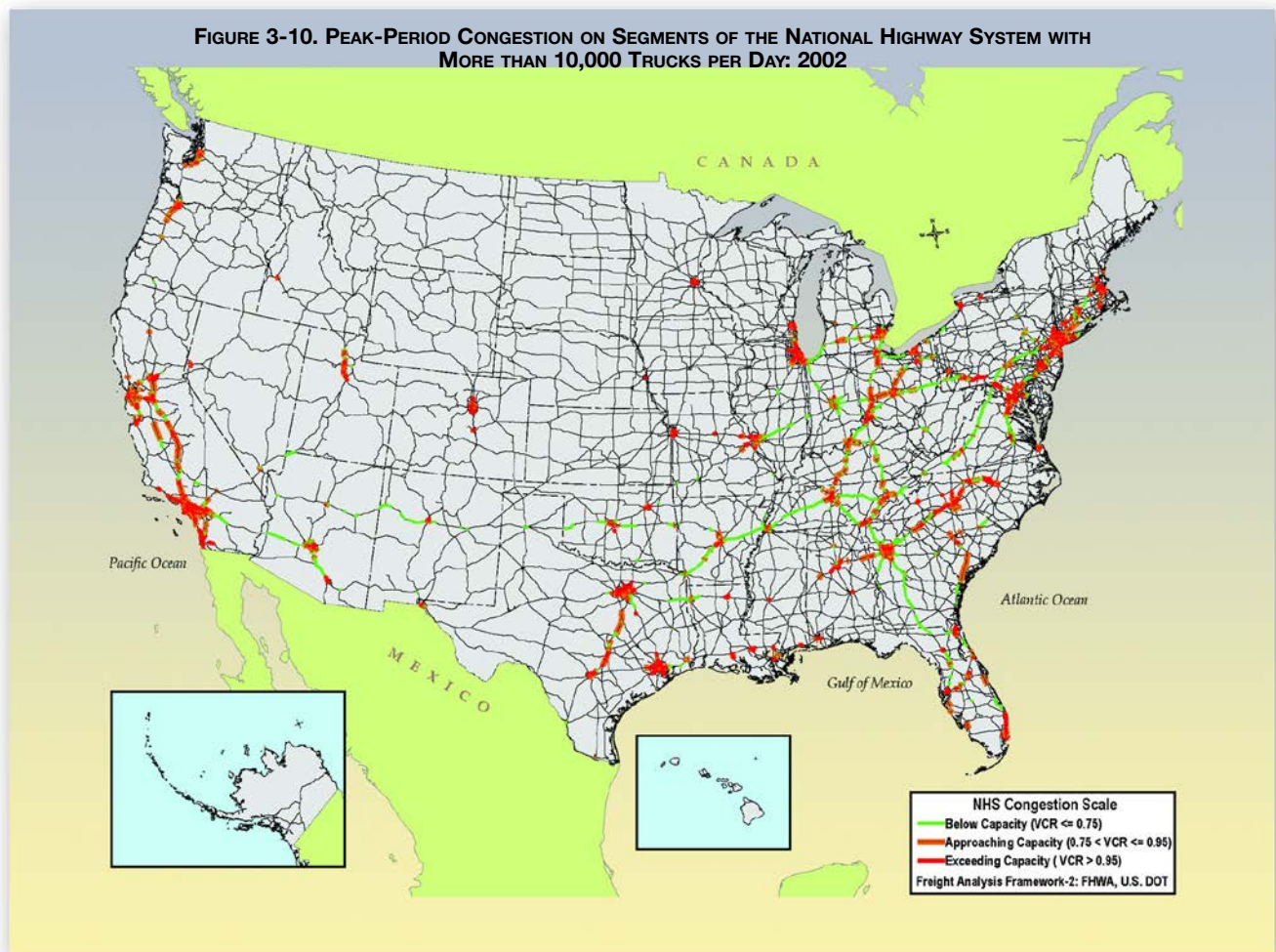


FIGURE 3-9. PEAK-PERIOD CONGESTION ON THE NATIONAL HIGHWAY SYSTEM: 2035

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, Version 2.2, 2007.



Congested highways carrying a large number of trucks substantially impede interstate commerce, and trucks on those segments contribute significantly to congestion. Recurring congestion slows or stops traffic on over 6,300 miles of the NHS that carry more than 10,000 trucks per day.

FIGURE 3-10. PEAK-PERIOD CONGESTION ON SEGMENTS OF THE NATIONAL HIGHWAY SYSTEM WITH MORE THAN 10,000 TRUCKS PER DAY: 2002
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, Version 2.2, 2007.

The number of NHS miles with recurring congestion and a large number of trucks is forecast to increase four fold between 2002 and 2035. On highways carrying more than 10,000 trucks per day, recurring congestion will slow traffic on more than 4,800 miles and create stop-and-go conditions on an additional 23,300 miles.

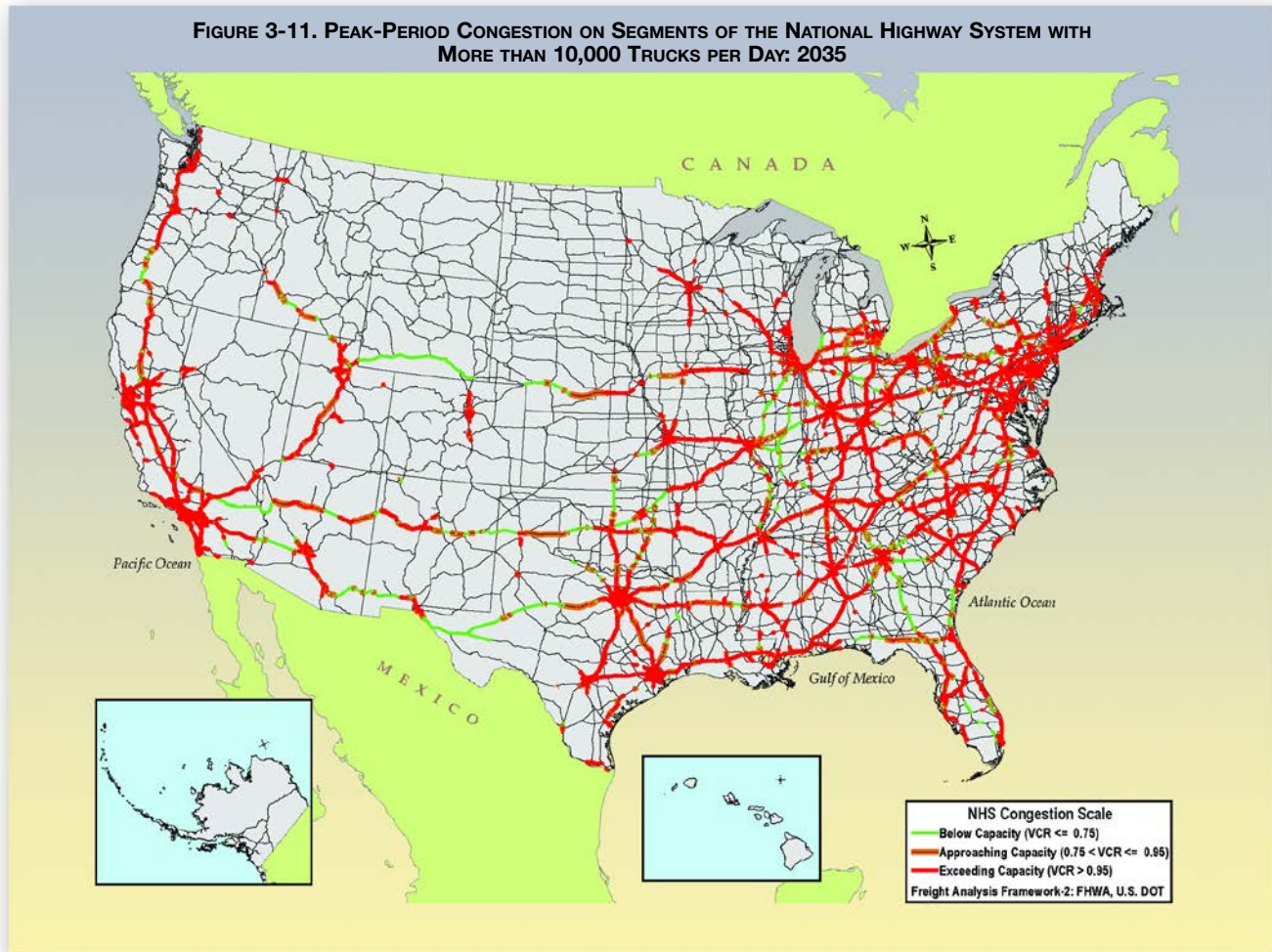


FIGURE 3-11. PEAK-PERIOD CONGESTION ON SEGMENTS OF THE NATIONAL HIGHWAY SYSTEM WITH MORE THAN 10,000 TRUCKS PER DAY: 2035

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, Version 2.2, 2007.



TABLE 3-7. MAXIMUM POSTED SPEED LIMITS ON RURAL INTERSTATES: 2007 (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	(R) 60	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	³ 75
Utah	75	75
Vermont	65	65
Virginia	⁴ 65	⁴ 65
Washington	60	70
West Virginia	70	70
Wisconsin	65	65
Wyoming	75	75

Key: R = revised.

¹Urban Interstate.

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

³In sections of I-10 and I-20 in rural West Texas, the speed limit for passenger cars and light trucks is 80 miles per hour. For large trucks, the speed limit is 70 miles per hour in the daytime and 65 miles per hour at night.

⁴Effective July 1, 2006, the posted speed limit on I-85 may be as high as 70 mph.

Delay, reliability, and similar performance measures are typically based on the difference between speed limits and actual speeds. Speed limits for trucks vary from state to state and often differ from limits set for passenger vehicles.



TABLE 3-7. MAXIMUM POSTED SPEED LIMITS ON RURAL INTERSTATES: 2007 (MILES PER HOUR)

Source: Insurance Institute for Highway Safety, Maximum Posted Speed Limits for Passenger Vehicles as of May 2007, available at http://www.iihs.org/laws/state_laws/speed_limit_laws.html as of May 24, 2007.

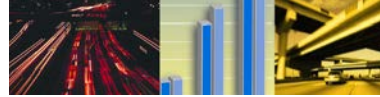
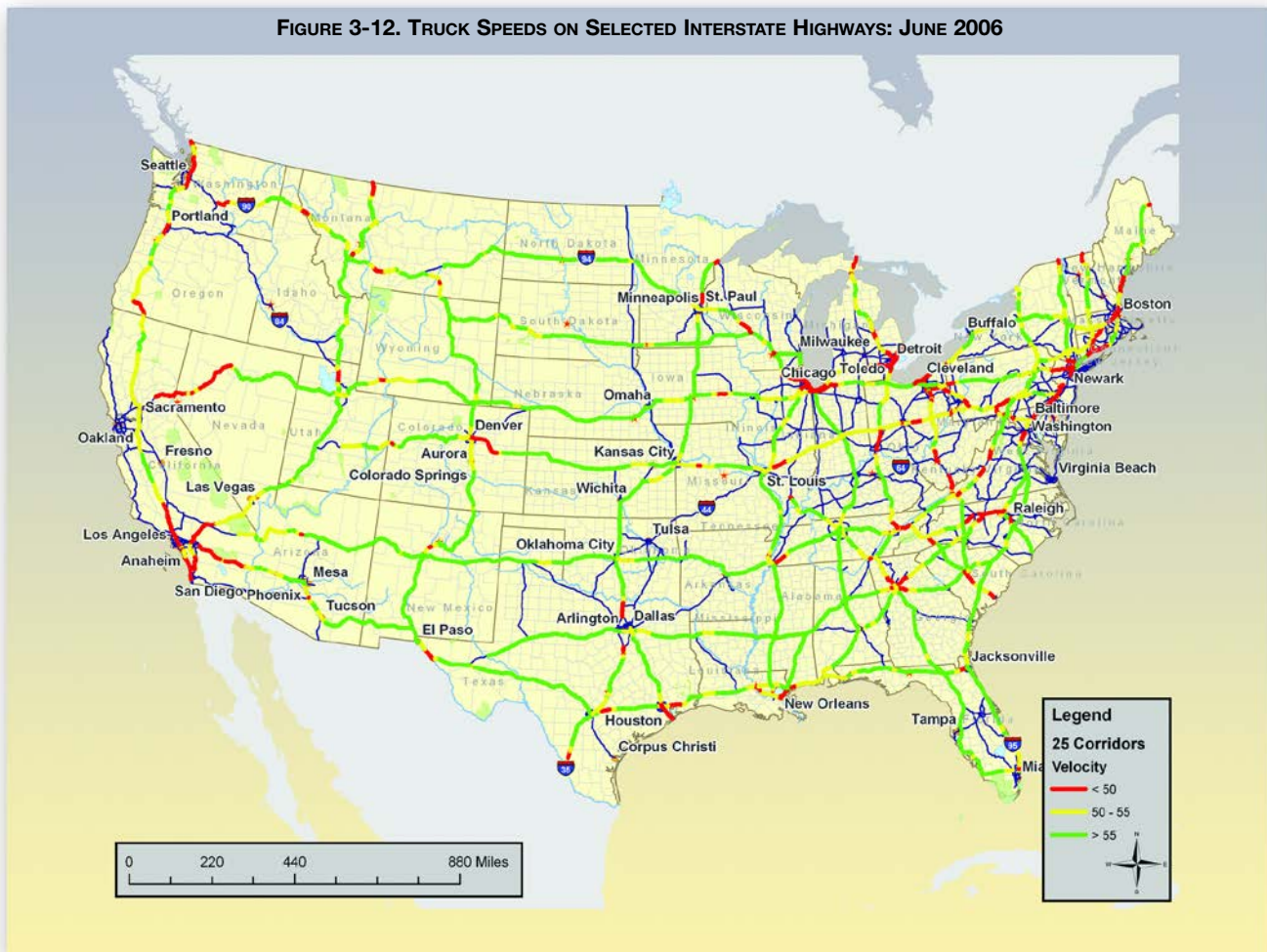


FIGURE 3-12. TRUCK SPEEDS ON SELECTED INTERSTATE HIGHWAYS: JUNE 2006



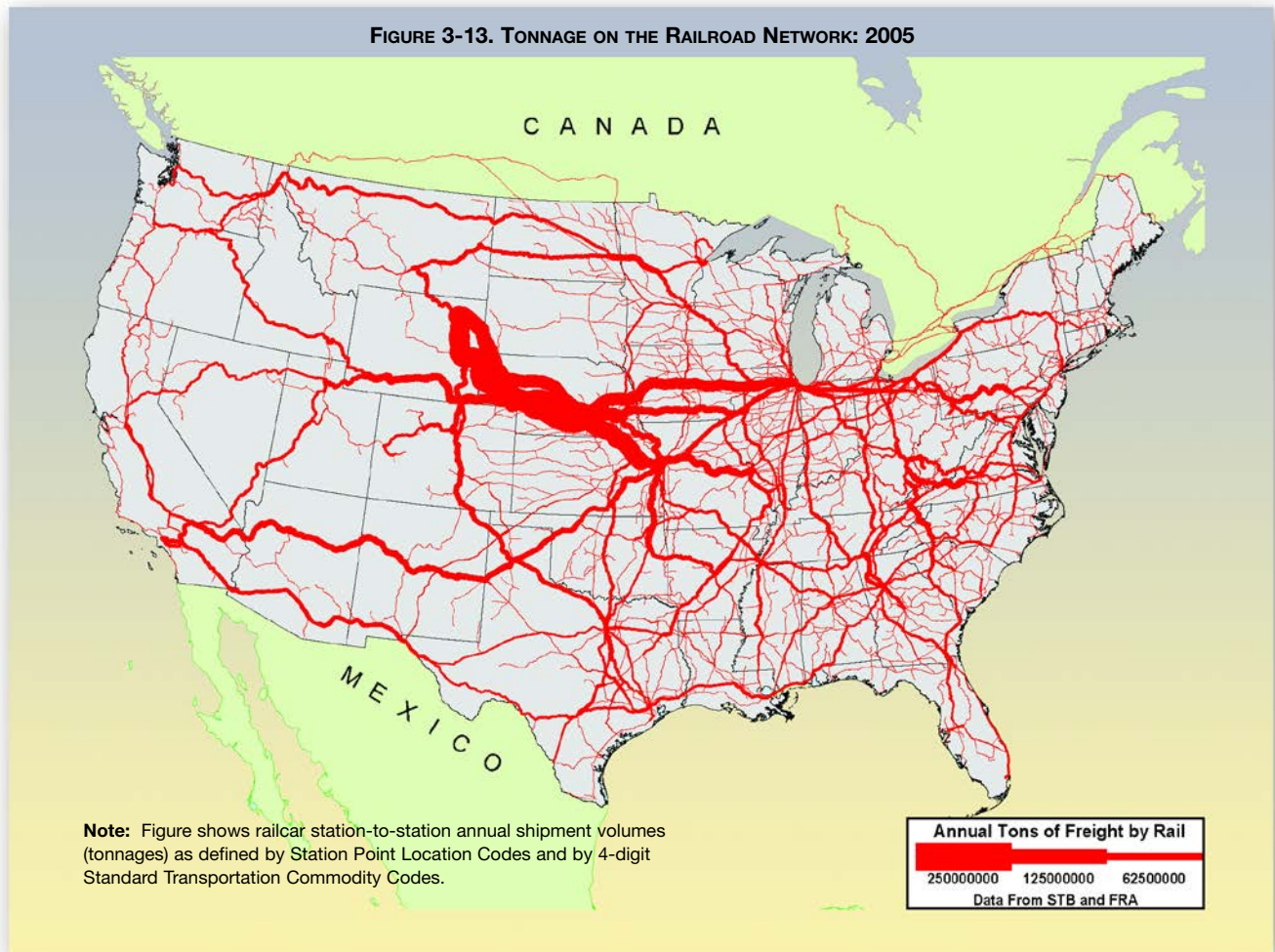
The Federal Highway Administration is working with the motor carrier and communications industries to measure the speed and reliability of major truck routes based on the movements of over 300,000 trucks. Speed and reliability data are collected continuously and can be displayed for various time periods and geographic resolutions. A description of the program is available at http://www.ops.fhwa.dot.gov/freight/freight_analysis/performance_meas/fpmtraveltime/index.htm

FIGURE 3-12. TRUCK SPEEDS ON SELECTED INTERSTATE HIGHWAYS: JUNE 2006

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Performance Measurement, 2007.



FIGURE 3-13. TONNAGE ON THE RAILROAD NETWORK: 2005



Although trucks carry most of the tonnage and value of freight, railroads carry vast quantities of goods over large distances. Bulk commodities such as coal and grain, moving in unit trains, dominate some rail routes, while intermodal trains carrying a wide variety of high-value products in containers dominate other routes.

FIGURE 3-13. TONNAGE ON THE RAILROAD NETWORK: 2005

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, 2007; based on Surface Transportation Board, Annual Carload Waybill Sample; and rail freight flow assignments done by Oak Ridge National Laboratory.

The United States makes use of an extensive coast line, several large rivers, and the Tenn-Tom Canal to move commodities at a very low cost per ton, albeit at relatively slow speeds.

FIGURE 3-14. TONNAGE ON THE DOMESTIC WATERWAY NETWORK: 2005

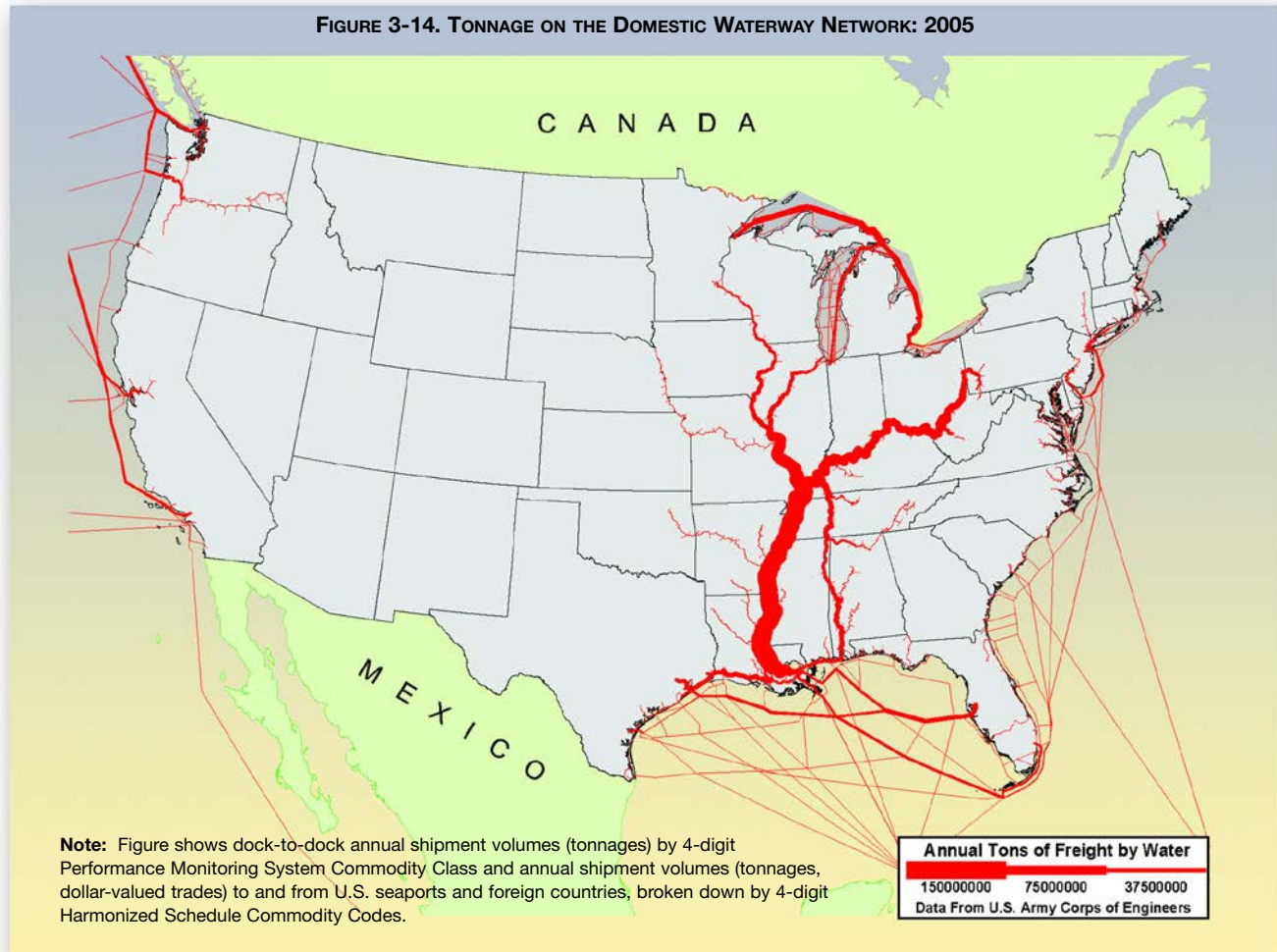
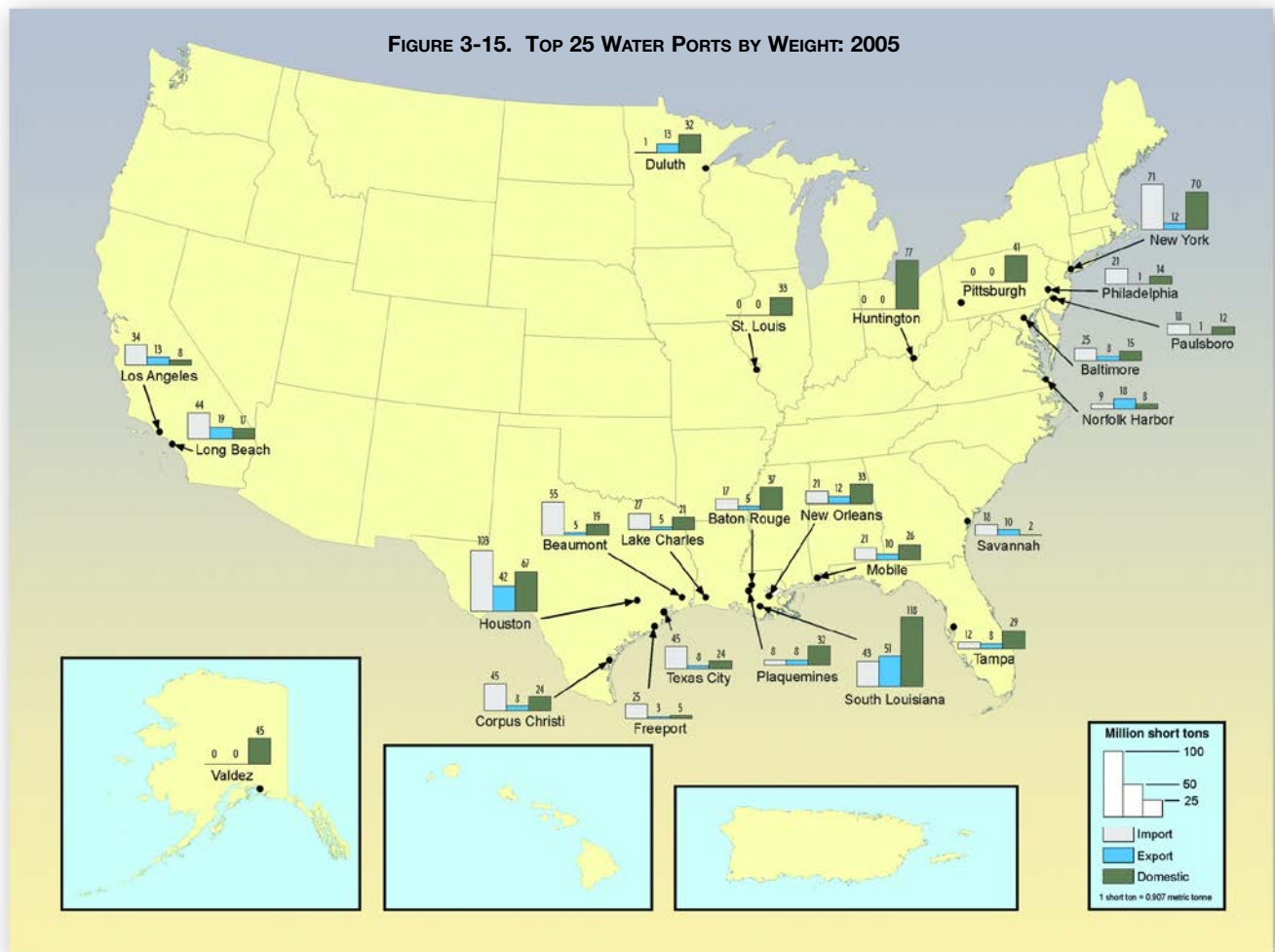


FIGURE 3-14. TONNAGE ON THE DOMESTIC WATERWAY NETWORK: 2005

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, 2007; based on U.S. Army Corps of Engineers (USACE), Annual Vessel Operating Activity and Lock Performance Monitoring System data, as processed for USACE by the Tennessee Valley Authority; and USACE, Institute for Water Resources, Waterborne Foreign Trade Data.



The top 25 water ports handle about two-thirds of the weight of all foreign and domestic goods moved by water. These goods are primarily bulk commodities such as coal, crude petroleum, and grain.



FIGURE 3-15. TOP 25 WATER PORTS BY WEIGHT: 2005
Source: U.S. Army Corps of Engineers, *2005 Waterborne Commerce of the United States*, Part 5, National Summaries (New Orleans, LA: 2006), table 5-2.

Containerized cargo has grown rapidly over the past few years and is concentrated at a few large water ports. The Ports of Los Angeles and Long Beach together handle about one-third of all container traffic at water ports in the United States. Container trade at these two ports doubled between 1997 and 2006, slightly higher than the growth rate reported for container cargo overall.

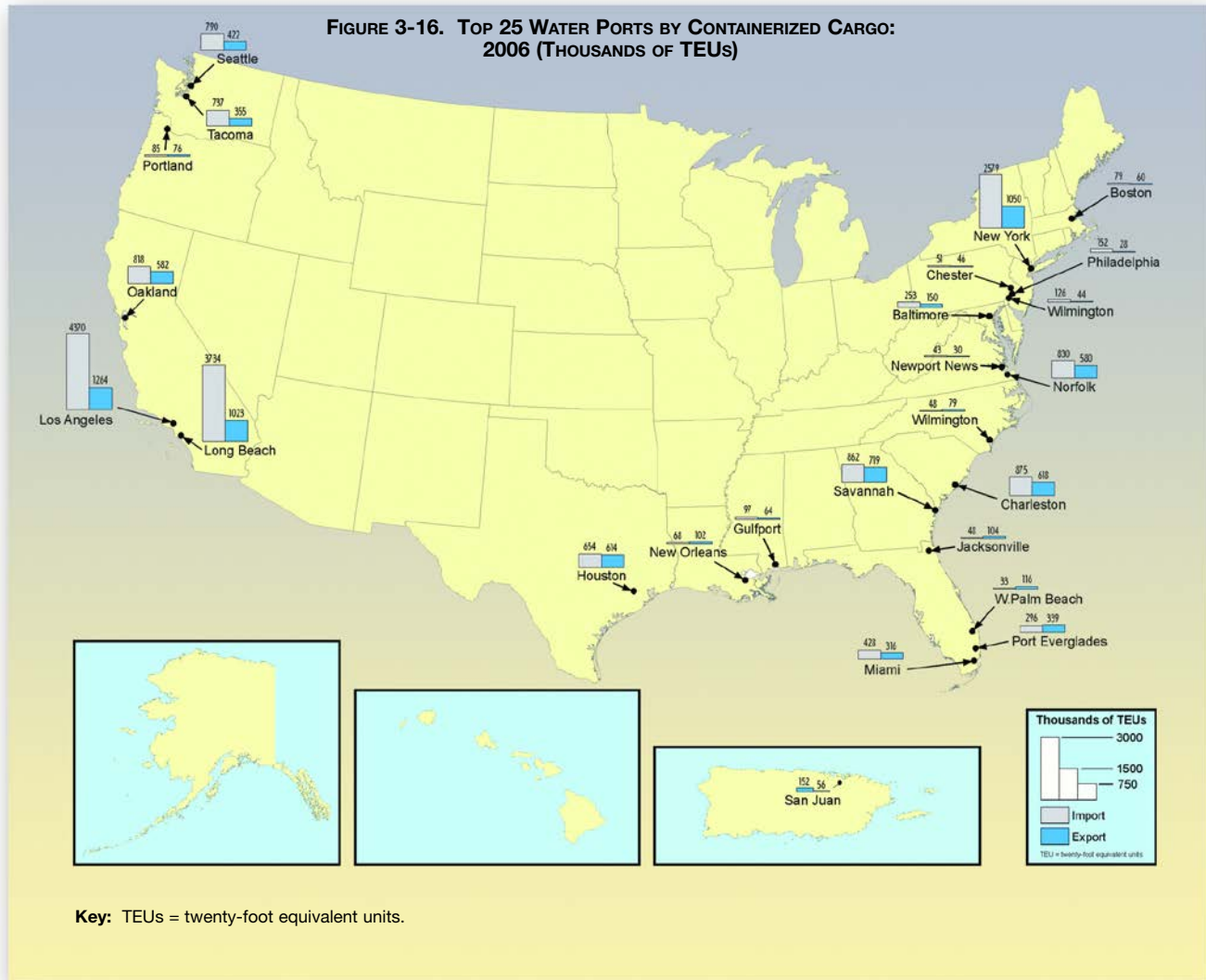


FIGURE 3-16. TOP 25 WATER PORTS BY CONTAINERIZED CARGO: 2006 (THOUSANDS OF TEUs)

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 June 12, 2007.

TABLE 3-8. TOP 25 AIRPORTS BY LANDED WEIGHT OF ALL-CARGO OPERATIONS: 2000-2005¹

Airport	2005 Rank	Landed weight (thousands of short tons)				
		2000	2002	2003	2004	2005
Anchorage, AK (Ted Stevens Anchorage International) ²	1	8,084	8,994	9,007	9,844	10,364
Memphis, TN (Memphis International)	2	6,318	8,826	8,760	8,885	9,343
Louisville, KY (Louisville International-Standiford Field)	3	3,987	4,202	4,172	4,388	4,591
Miami, FL (Miami International)	4	2,929	3,174	3,239	3,423	3,550
Los Angeles, CA (Los Angeles International)	5	2,892	3,038	3,120	3,062	2,927
New York, NY (John F. Kennedy International)	6	2,793	2,912	2,937	2,898	2,811
Indianapolis, IN (Indianapolis International)	7	2,884	2,338	2,277	2,314	2,545
Chicago, IL (O'Hare International)	8	2,062	2,217	2,351	2,359	2,412
Newark, NJ (Newark Liberty International)	9	1,961	1,758	1,835	1,765	1,870
Oakland, CA (Metropolitan Oakland International)	10	1,811	1,746	1,695	1,703	1,797
Fort Worth, TX (Dallas/Fort Worth International)	11	1,691	1,481	1,481	1,431	1,655
Philadelphia, PA (Philadelphia International)	12	1,454	1,466	1,365	1,371	1,401
Ontario, CA (Ontario International)	13	1,220	1,444	1,338	1,326	1,344
Atlanta, GA (William B. Hartsfield International)	14	1,090	1,166	1,194	1,162	1,014
Honolulu, HI (Honolulu International)	15	692	970	1,017	970	828
Covington/Cincinnati, OH (Cincinnati/Northern Kentucky International)	16	912	1,043	1,098	1,141	812
San Francisco, CA (San Francisco International)	17	1,267	1,035	1,200	740	797
Dayton, OH (James M. Cox Dayton International)	18	2,233	897	784	787	789
Phoenix, AZ (Sky Harbor International)	19	920	867	779	801	778
Denver, CO (Denver International)	20	900	783	747	763	763
Portland, OR (Portland International)	21	882	816	749	718	747
Houston, TX (George Bush Intercontinental)	22	480	482	666	697	710
Seattle, WA (Seattle-Tacoma International)	23	1,060	881	796	531	709
Minneapolis, MN (Minneapolis-St Paul International/Wold-Chamberlain)	24	622	621	687	678	702
Chicago/Rockford, IL (Chicago/Rockford International)	25	654	630	625	677	696
Top 25 airports³		51,796	53,786	53,920	54,436	55,955
United States, all airports⁴		74,743	73,433	73,072	74,297	76,091
Top 25 as % of U.S. total		69.3%	73.2%	73.8%	73.3%	73.5%

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.

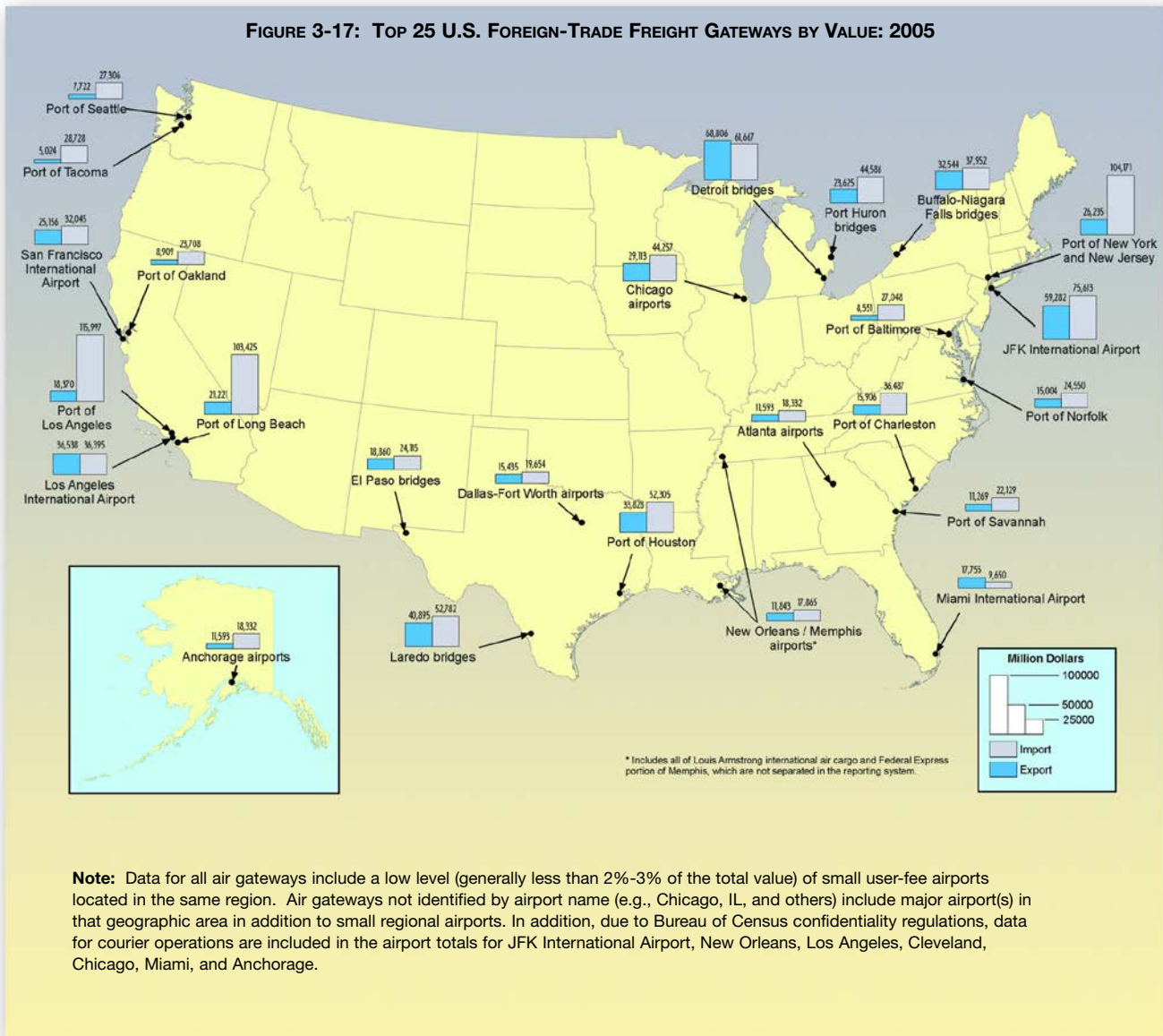
Note: 1 short ton = 2,000 pounds.

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 and do not include aircraft carrying passengers as well as cargo.

TABLE 3-8. TOP 25 AIRPORTS BY LANDED WEIGHT OF ALL-CARGO OPERATIONS: 2000-2005

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 June 6, 2007.

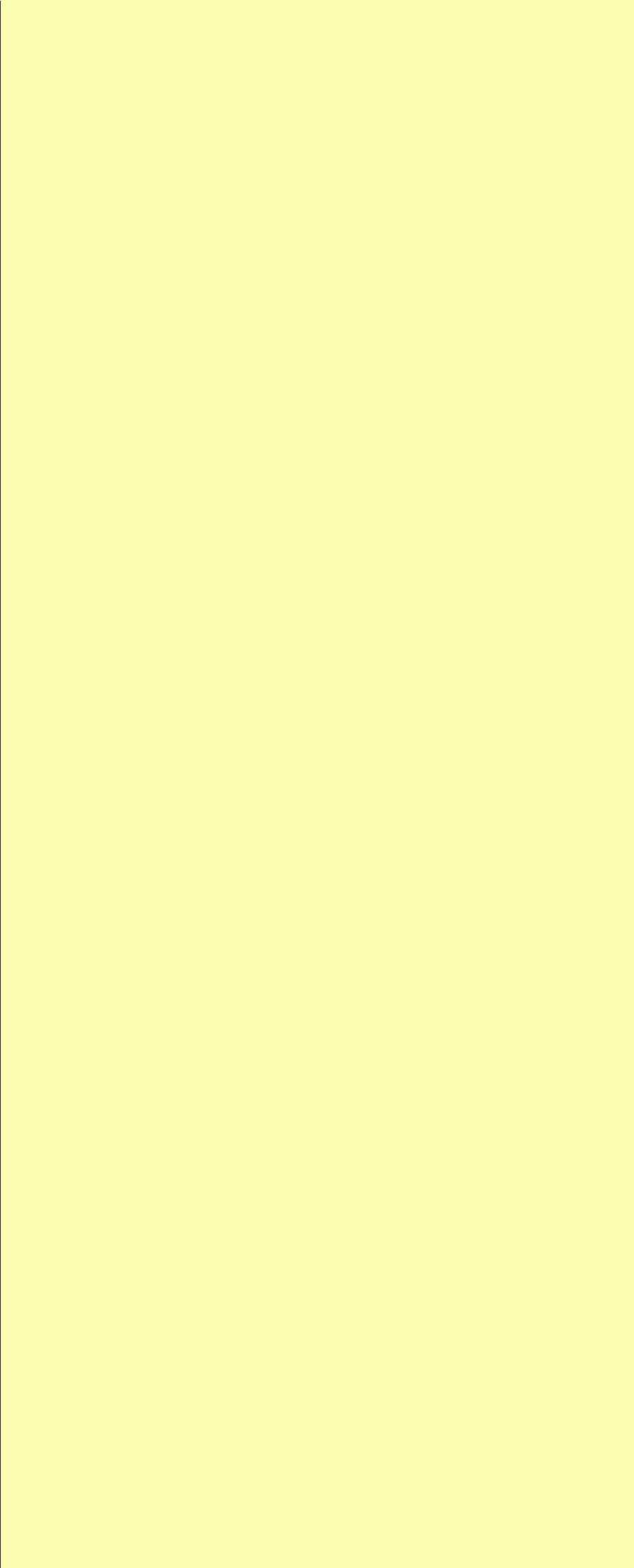
FIGURE 3-17: TOP 25 U.S. FOREIGN-TRADE FREIGHT GATEWAYS BY VALUE: 2005



Transportation facilities for bringing international trade into and out of the United States demonstrate the importance of all modes and intermodal combinations to global connectivity. The top 25 foreign-trade gateways measured by value of shipments are comprised of 9 airports, 11 water ports, and 5 land-border crossings

FIGURE 3-17: 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 2006* (Washington, DC: 2006), available at www.bts.gov as of October 16, 2006.



IV. THE FREIGHT TRANSPORTATION INDUSTRY

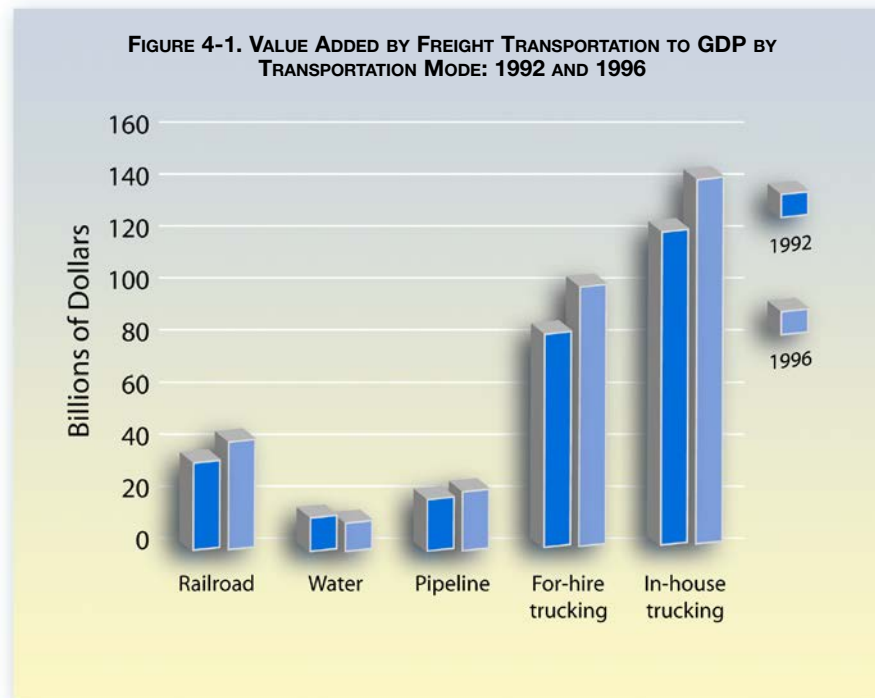
The private sector owns a significant share of assets in the transportation industry: \$925 billion in equipment plus \$515 billion in private structures, compared to \$429 billion in transportation equipment plus \$2.1 trillion in highways owned by public agencies.¹

Freight railroad facilities and services are almost entirely private, while trucks in the private sector operate over public highways, air-cargo services in the private sector operate in public airways and mostly public airports, and ships in the private sector serve public waterways and both public and private port facilities. Pipelines are mostly in the private sector, although significantly controlled by public regulation. In the public sector, virtually all truck routes are owned by state or local governments, airports and harbors are typically owned

by public authorities (although terminals are usually owned or managed by private operators), air and water navigation is mostly federal, and safety is regulated by all levels of government.

Freight transportation is a big part of the economy. The value

generated by transportation services in moving goods and people on the transportation system is about 5 percent of GDP. In the transportation services sector about 60 percent of the value is generated by for-hire transportation services and the rest is generated by “in-house” transportation (transportation 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.



¹Fixed assets are for 2005 and include both passenger and freight transportation. See Bureau of Economic Analysis at <http://www.bea.gov/bea/dn/FA2004>.

FIGURE 4-1. VALUE ADDED BY FREIGHT TRANSPORTATION TO GDP BY TRANSPORTATION MODE: 1992 AND 1996

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, special tabulation, September 2000.

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 ESTABLISHMENTS IN FREIGHT-DOMINATED MODES: 1997 AND 2002

	Establishments		Revenue (Current \$ thousands)		Payroll (Current \$ thousands)		Paid Employees	
	1997	2002	1997	2002	1997	2002	1997	2002
Transportation and warehousing¹	178,025	(R) 199,618	318,245,044	(R) 382,152,040	82,346,182	(R) 115,988,733	2,920,777	(R) 3,650,859
Rail transportation	NA	NA	NA	NA	NA	NA	NA	NA
Water transportation	1,921	(R) 1,890	24,019,168	(R) 23,331,333	2,834,114	(R) 3,194,391	72,857	(R) 66,153
Truck transportation ¹	103,798	(R) 112,642	141,225,398	(R) 164,218,769	38,471,272	(R) 47,750,111	1,293,790	(R) 1,435,210
Pipeline transportation	2,311	(R) 2,188	26,836,992	(R) 22,031,419	2,660,576	(R) 2,476,638	49,280	(R) 36,790
Support activities for transportation	30,675	(R) 33,942	39,758,245	(R) 57,414,131	12,592,441	(R) 16,202,043	411,640	(R) 465,616
Couriers and messengers	10,887	(R) 12,655	39,812,433	(R) 58,164,869	14,071,630	(R) 17,175,401	530,839	(R) 561,514
Warehousing and storage ¹	6,497	(R) 12,671	10,657,925	(R) 16,547,657	2,926,119	(R) 17,183,289	109,760	(R) 565,533

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.

TABLE 4-2. ECONOMIC CHARACTERISTICS OF FREIGHT RAILROADS: 2000 AND 2005

	Class I		Non-Class I		Total	
	2000	2005	2000	2005	2000	2005
Number of railroads	8	7	552	553	560	560
Freight revenue (billions \$)	33.1	44.5	3.2	3.4	36.3	47.9
Operating revenue (billions \$)	34.1	46.1	NA	NA	NA	NA
Employees	168,360	162,438	23,448	19,369	191,808	181,807

Key: NA = not available.

Revenue grew while employment declined in both the national (Class 1) railroads and the regional and local railroads during the first half of the decade. More recent indicators suggest that employment is now on the rise.

TABLE 4-1. ECONOMIC CHARACTERISTICS OF TRANSPORTATION AND WAREHOUSING ESTABLISHMENTS IN FREIGHT-DOMINATED MODES: 1997 AND 2002

Sources: 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 July 2, 2007; 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 July 2, 2007.

TABLE 4-2. ECONOMIC CHARACTERISTICS OF FREIGHT RAILROADS: 2000 AND 2005

Sources: Association of American Railroads, *Railroad Facts* (Washington, DC: annual issues). Ibid, *U.S. Freight Railroad Statistics*, as of August 2, 2007.

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 2005, output-per-hour worked more than doubled in line-haul railroading but grew only 37 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.

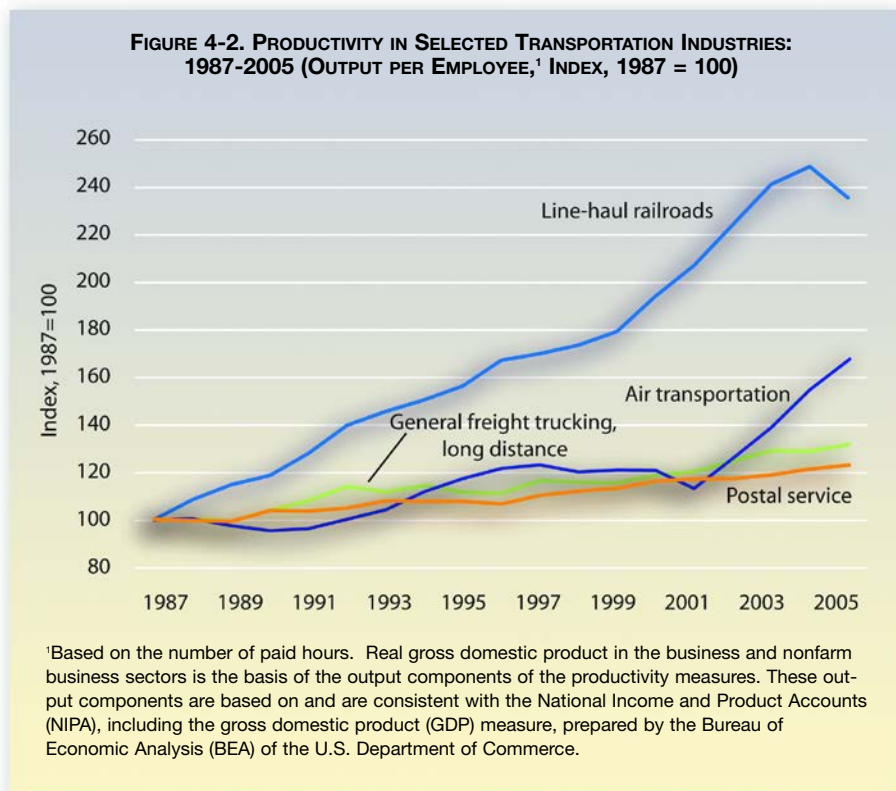


FIGURE 4-2. PRODUCTIVITY IN SELECTED TRANSPORTATION INDUSTRIES: 1987-2005 (OUTPUT PER EMPLOYEE,¹ INDEX, 1987 = 100)
Source: U.S. Department of Labor, Bureau of Labor Statistics, *Industry Productivity*, available at <http://www.bls.gov/> as of June 12, 2007.



Employment in many transportation industries has remained steady or has grown over the past two decades with the notable exception of railroads. While the long-term trend may have reversed in recent months, rail employment declined nearly 60 percent between 1980 and 2006. Consequently, in 2006 rail transportation employed only 5 percent of those working in the transportation and warehousing industry compared with 18 percent in 1980. Employment in trucking in 2006 accounted for about one-third of employment in transportation and warehousing.

TABLE 4-3. EMPLOYMENT IN FOR-HIRE TRANSPORTATION ESTABLISHMENTS PRIMARILY SERVING FREIGHT: 1980-2006¹ (THOUSANDS)

	1980	1990	2000	2005	2006
Total U.S. labor force²	90,528	109,487	131,785	(R) 133,703	136,174
Transportation and warehousing	2,961	3,476	4,410	(R) 4,361	4,466
Rail transportation	518	272	232	228	225
Water transportation	NA	57	56	61	64
Truck transportation	NA	1,122	1,406	(R) 1,398	1,437
Pipeline transportation	NA	60	46	38	39
Support activities for transportation ³	NA	364	537	(R) 552	571
Couriers and messengers	NA	375	605	572	585
Warehousing and storage	NA	407	514	(R) 595	636

Key: NA = not available; R = revised.

¹Annual averages.

²Excludes farm employment.

³Industries in the Support Activities for Transportation subsector provide services which support transportation.

These services may be provided to transportation carrier establishments or to the general public. This subsector includes a wide array of establishments, including air traffic control services, marine cargo handling, and motor vehicle towing.

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.



TABLE 4-3. EMPLOYMENT IN FOR-HIRE TRANSPORTATION ESTABLISHMENTS PRIMARILY SERVING FREIGHT: 1980-2006¹ (THOUSANDS)

Source: U.S. Department of Labor, Bureau of Labor Statistics, Current Employment Statistics survey, available at www.bls.gov as of June 3, 2007.

TABLE 4-4. EMPLOYMENT IN SELECTED FREIGHT TRANSPORTATION AND FREIGHT TRANSPORTATION-RELATED OCCUPATIONS: 2000-2006

Occupation (SOC code)	2000	2004	2005	2006
Vehicle operators, pipeline operators, and primary support				
Driver/sales worker (53-3031)	373,660	406,910	400,530	396,680
Truck drivers, heavy and tractor-trailer (53-3032)	1,577,070	1,553,370	1,624,740	1,673,950
Truck drivers, light or delivery services (53-3033)	1,033,220	938,730	938,280	941,590
Locomotive engineers (53-4011)	29,390	31,180	37,390	36,870
Rail yard engineers, dinkey operators, and hostlers (53-4013)	4,020	6,170	6,970	5,820
Railroad brake, signal, and switch operators (53-4021)	16,830	16,410	20,700	22,810
Railroad conductors and yardmasters (53-4031)	40,380	35,720	38,330	37,110
Sailors and marine oilers (53-5011)	30,090	27,570	31,090	31,690
Captains, mates, and pilots of water vessels (53-5021)	21,080	25,200	28,570	29,170
Ship engineers (53-5031)	7,370	10,330	13,240	14,190
Bridge and lock tenders (53-6011)	4,790	3,500	3,620	3,700
Gas compressor and gas pumping station operators (53-7071)	6,510	4,680	3,950	3,900
Pump operators, except wellhead pumpers (53-7072)	13,730	9,810	9,970	10,030
Transportation equipment manufacturing and maintenance occupations				
Bus and truck mechanics and diesel engine specialists (49-3031)	258,800	251,430	248,280	254,850
Rail car repairers (49-3043)	10,620	18,140	24,270	23,810
Transportation infrastructure construction and maintenance occupations				
Rail-track laying and maintenance equipment operators (47-4061)	9,940	10,430	13,510	13,680
Signal and track switch repairers (49-9097)	5,540	7,780	6,100	5,980
Dredge operators (53-7031)	3,100	1,730	1,720	1,780
Secondary support service occupations				
Dispatchers, except police, fire, and ambulance (43-5032)	167,180	165,910	172,550	185,410
Postal service mail carriers (43-5052)	354,980	344,050	347,180	346,990
Shipping, receiving, and traffic clerks (43-5071)	864,530	747,270	759,910	763,350
Transportation inspectors (53-6051)	26,520	24,140	25,570	23,790
Tank car, truck, and ship loaders (53-7121)	17,480	16,530	15,950	15,360

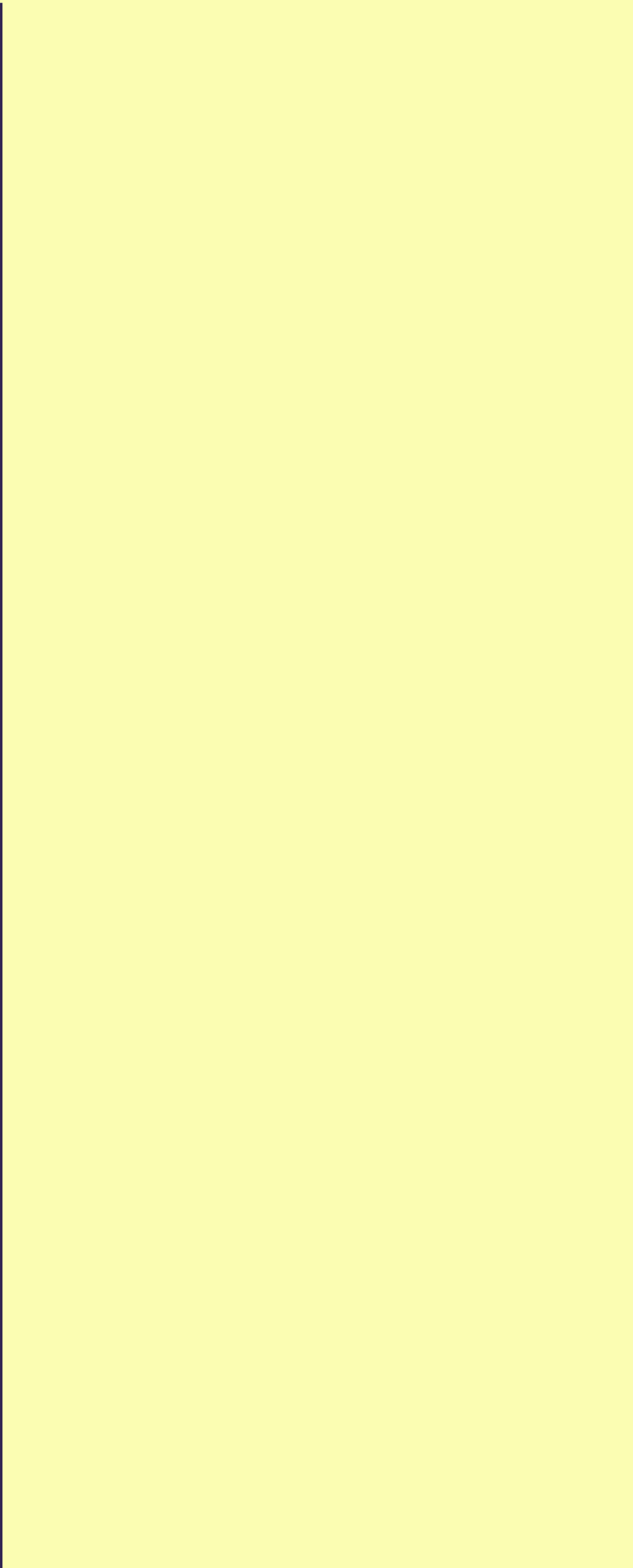
Key: SOC = Standard Occupational Classification.

Freight transportation jobs are not limited to for-hire carriers. Truck driving is by far the largest freight transportation occupation in the United States, and many drivers work for retailers and other establishments with shipper-owned trucks. There were more than 3.6 million truck drivers in 2006; about 56 percent of these professionals drive heavy/tractor trailer trucks, 31 percent drive light/delivery service trucks, and about 13 percent are driver/sales workers. Many industry analysts believe the number of truck drivers is below demand and that driver shortages will worsen in the future.

TABLE 4-4. EMPLOYMENT IN SELECTED FREIGHT TRANSPORTATION AND FREIGHT TRANSPORTATION-RELATED OCCUPATIONS: 2000-2006

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 June 3, 2007.







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

Growing demand for freight transportation heightens concerns about its safety, energy consumption, and environmental impacts. While safety in all freight modes continues to be monitored actively, the availability of energy consumption data has declined with the demise of the Vehicle Inventory and Use Survey, and the environmental implications of freight transportation are being considered separately from passenger travel only recently.

TABLE 5-1. FATALITIES BY FREIGHT TRANSPORTATION MODE: 1980-2006

	1980	1990	2000	2005	2006
Total transportation fatalities (passenger and freight)	NA	(R) 47,350	44,384	NA	NA
Highway (passenger and freight)	51,091	44,599	41,945	(R) 43,510	(P) 42,642
Large truck occupants ¹	1,262	705	754	(R) 804	805
Others killed in crashes involving large trucks	4,709	4,567	4,528	(R) 4,409	NA
Large truck occupants ¹ (percent)	2.5	1.6	1.8	(R) 1.9	NA
Others killed in crashes involving large trucks (percent)	9.2	10.2	10.8	(R) 10.1	NA
Railroad (passenger and freight)	1,417	1,297	937	(R) 885	915
Highway-rail crossing ²	833	698	425	(R) 358	368
Railroad ^{2,3}	584	599	512	(R) 528	553
Waterborne (passenger and freight)	487	186	(R) 111	(R) 80	(R) 87
Vessel-related ⁴	206	85	(R) 42	(R) 45	48
Freight ship	8	0	0	(R) 2	1
Tank ship	4	5	0	(R) 0	0
Tug / towboat	14	13	(R) 1	(R) 10	6
Offshore supply	NA	2	(R) 0	(R) 0	0
Fishing vessel	60	47	(R) 26	(R) 16	19
Mobile offshore drilling units	NA	0	0	(R) 0	1
Platform	NA	1	0	(R) 0	0
Freight barge	NA	0	0	(R) 1	2
Tank barge	NA	0	0	(R) 0	0
Miscellaneous	56	11	(R) 15	(R) 16	19
Not vessel-related ⁴	281	101	(R) 69	(R) 35	39
Pipeline	19	9	38	(R) 16	19
Hazardous liquid pipeline	4	3	1	2	0
Gas pipeline	15	6	37	(R) 14	19

Key: NA = not available; R = revised; P = preliminary.

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.

While the amount of freight transportation activity has increased in recent decades, the number of fatalities has declined or remained stable in each mode. Most fatalities involve people who are not in the freight business, such as trespassers on freight railroads.

TABLE 5-1. FATALITIES BY FREIGHT TRANSPORTATION MODE: 1980-2006

Sources: Total and Pipeline: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *National Transportation Statistics 2007*, available at <http://www.bts.gov/> as of August 2, 2007. **Highway:** National Center for Transportation Analysis, National Highway Transit Safety Administration, *Traffic Safety Facts, Large Trucks* (annual issues). 2006: National Center for Transportation Analysis, National Highway Transit Safety Administration, *Traffic Safety Facts* (July 2007). **Highway-Rail Grade Crossings:** U.S. Department of Transportation, Federal Railroad Administration, Office of Safety Analysis, <http://safetydata.fra.dot.gov/officeofsafety/default.asp> as of August 17, 2007. **Waterborne:** U.S. Department of Homeland Security, U.S. Coast Guard, Data Administration Division, personal communication, August 17, 2007.

Highways and railroads account for almost all of the people injured by freight transportation, and the number of those injuries has dropped substantially over the last quarter century.

TABLE 5-2. INJURED PERSONS BY FREIGHT TRANSPORTATION MODE: 1980-2006

	1980	1990	2000	2005	2006
TOTAL injured persons (passenger and freight)	NA	NA	3,259,673	NA	NA
Highway (passenger and freight)	NA	(R) 3,230,666	(R) 3,188,750	2,699,000	(P) 2,575,000
Large truck occupants ¹	NA	(R) 41,822	(R) 30,832	27,000	23,000
Others injured in crashes involving large trucks	NA	108,000	109,000	86,000	NA
Large truck occupants ¹ (percent)	NA	(R) 1.3	(R) 1.0	(R) 1.0	NA
Others injured in crashes involving large trucks (percent)	NA	3.3	3.4	3.2	NA
Railroad (passenger and freight)	62,246	25,143	11,643	(R) 9,231	7,880
Highway-rail grade crossing ²	(R) 3,550	2,407	1,219	(R) 1,020	1,021
Railroad ^{2,3}	(R) 58,696	22,736	10,424	(R) 8,219	6,881
Waterborne (passenger and freight)	NA	NA	(R) 665	(R) 644	771
Vessel-related ⁴	180	175	(R) 151	(R) 140	177
Freight ship	8	10	5	(R) 12	19
Tank ship	9	13	3	(R) 3	2
Tug / towboat	27	19	(R) 18	(R) 20	22
Offshore supply	NA	9	(R) 6	(R) 1	6
Fishing vessel	28	31	(R) 21	(R) 29	33
Mobile offshore drilling units	NA	13	0	(R) 2	2
Platform	NA	9	0	(R) 1	0
Freight barge	NA	3	2	(R) 0	0
Tank barge	NA	3	0	(R) 1	0
Miscellaneous	98	12	(R) 96	(R) 71	93
Not related to vessel casualties ⁴	NA	NA	(R) 514	(R) 504	594
Pipeline	192	76	81	(R) 47	31
Hazardous liquid pipeline	15	7	4	2	2
Gas pipeline	177	69	77	(R) 45	29

Key: NA = not available; R = revised; P = preliminary.

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 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.

TABLE 5-2. INJURED PERSONS BY FREIGHT TRANSPORTATION MODE: 1980-2006

Sources: **Total and Pipeline:** U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *National Transportation Statistics 2007*, available at <http://www.bts.gov/> as of August 2, 2007. **Highway:** National Center for Transportation Analysis, National Highway Transit Safety Administration, *Traffic Safety Facts, Large Trucks* (annual issues). 2006: National Center for Transportation Analysis, National Highway Transit Safety Administration, *Traffic Safety Facts* (July 2007). **Highway-Rail Grade Crossings:** U.S. Department of Transportation, Federal Railroad Administration, Office of Safety Analysis, <http://safetydata.fra.dot.gov/officeofsafety/default.asp> as of August 17, 2007. **Waterborne:** U.S. Department of Homeland Security, U.S. Coast Guard, Data Administration Division, personal communication, August 17, 2007.

TABLE 5-3. ACCIDENTS BY FREIGHT TRANSPORTATION MODE: 1980-2006

	1980	1990	2000	2005	2006
Highway (passenger and freight)	NA	6,471,000	6,394,000	6,159,000	NA
Large truck ¹	NA	(R) 371,801	(R) 437,861	442,000	NA
Large truck ¹ (percent of total)	NA	(R) 5.7	(R) 6.8	7.2	NA
Rail (passenger and freight)					
Highway-rail grade crossing ^{2,3}	(R) 10,612	5,715	3,502	(R) 3,053	2,920
Railroad ^{2,4}	8,205	2,879	2,983	(R) 3,242	2,876
Waterborne (passenger and freight)					
Vessel-related	4,624	3,613	(R) 13,546	(R) 4,977	5,400
Pipeline					
Hazardous liquid pipeline	246	180	146	(R) 137	108
Gas pipeline	1,524	198	234	(R) 352	274

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.

The number of crashes and other accidents in freight transportation has declined in all modes over the last quarter century in spite of the increase in freight activity.

Because most hazardous materials are transported by truck, most incidents related to movement of hazardous materials occur on highways or in truck terminals. A very small share of hazardous materials transportation incidents are the result of a vehicular crash or derailment (referred to as

TABLE 5-4. HAZARDOUS MATERIALS TRANSPORTATION INCIDENTS: 1980-2006

	1980	1990	2000	2005	2006
Total	15,719	8,879	17,557	(R) 15,917	20,228
Accident-related	486	297	394	(R) 379	340
Air	223	297	1,419	(R) 1,654	2,409
Accident-related	0	0	3	(R) 9	7
Highway	14,161	7,296	15,063	(R) 13,450	17,051
Accident-related	347	249	329	(R) 319	290
Rail	1,271	1,279	1,058	(R) 744	700
Accident-related	134	48	62	(R) 51	43
Water¹	34	7	17	(R) 69	68
Accident-related	2	0	0	0	0
Other²	30	0	0	NA	NA
Accident-related	3	0	0	NA	NA

Key: R = revised; NA = not available.

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. As of 2005, the "Other" data category is no longer included in the hazardous materials information system report.

TABLE 5-3. ACCIDENTS BY FREIGHT TRANSPORTATION MODE: 1980-2006

Sources: **Highway:** National Center for Transportation Analysis, National Highway Transit Safety Administration, *Traffic Safety Facts, Large Trucks* (annual issues). 2006: National Center for Transportation Analysis, National Highway Transit Safety Administration, *Traffic Safety Facts* (July 2007). **Highway-Rail Grade Crossings:** U.S. Department of Transportation, Federal Railroad Administration, Office of Safety Analysis, <http://safetydata.fra.dot.gov/officeofsafety/default.asp> as of August 17, 2007. **Waterborne:** U.S. Department of Homeland Security, U.S. Coast Guard, Data Administration Division, personal communication, August 17, 2007. **Pipeline:** U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, National Transportation Statistics 2007, available at <http://www.bts.gov/> as of August 2, 2007.

TABLE 5-4. HAZARDOUS MATERIALS TRANSPORTATION INCIDENTS: 1980-2006

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 June 4, 2007.



“accident-related”). In 2006, less than 2 percent of incidents were accident-related. Most incidents occur because of human error or package failure, particularly during loading and unloading. While less than 2 percent of incidents were accident-related in 2006, they accounted for nearly 84 percent of all property damage.

TABLE 5-5. COMMERCIAL MOTOR CARRIER COMPLIANCE REVIEW ACTIVITY BY SAFETY RATING: 2000-2006

Safety rating	2000		2004		2005		2006	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Satisfactory	5,309	51.1	(R) 4,432	57.9	(R) 5,258	64.8	6,833	66.0
Conditional	3,354	32.3	(R) 2,302	30.1	(R) 2,116	26.1	2,614	25.3
Unsatisfactory	1,481	14.3	(R) 701	9.2	(R) 529	6.5	659	6.4
Not rated	245	2.4	(R) 216	2.8	(R) 211	2.6	247	2.4
Total	10,389	100.0	(R) 7,651	100.0	(R) 8,114	100.0	10,353	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.

The safety fitness of motor carriers has improved markedly over the past few years. In 2006, the share of motor carriers rated satisfactory was 66 percent, up from 51 percent in 2000.

Less than one-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 results in OOS orders. In 2006, only 7 percent of driver inspections and about 5 percent of hazardous materials inspections resulted in an OOS order.

The number of gallons of fuel burned by commercial trucks increased significantly over the past 25 years while fuel use in the water and pipeline modes declined. Between 1980 and 2005, the fuel consumed in highway freight transportation increased from 20 billion to 33 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,

TABLE 5-5. COMMERCIAL MOTOR CARRIER COMPLIANCE REVIEW ACTIVITY BY SAFETY RATING: 2000-2006
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 June 4, 2007.

TABLE 5-6. ROADSIDE SAFETY INSPECTION ACTIVITY SUMMARY BY INSPECTION TYPE: 2000-2006

	2000		2004		2005		2006	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
All inspections								
Number of inspections	2,453,776	100.0	(R) 3,019,504	100.0	(R) 3,026,094	100.0	3,193,397	100.0
With no violations	639,593	26.1	(R) 810,870	26.9	(R) 821,869	27.2	897,020	28.1
With violations	1,814,183	73.9	(R) 2,208,634	73.1	(R) 2,204,225	72.8	2,296,377	71.9
Driver inspections								
Number of inspections	2,396,688	100.0	(R) 2,962,312	100.0	(R) 2,964,492	100.0	3,056,743	100.0
With no violations	1,459,538	60.9	(R) 1,893,227	63.9	(R) 1,882,527	63.5	1,931,724	63.2
With violations	937,150	39.1	(R) 1,069,085	36.1	(R) 1,081,965	36.5	1,125,019	36.8
With OOS violations	191,031	8.0	(R) 197,347	6.7	(R) 195,832	6.6	216,783	7.1
Vehicle inspections								
Number of inspections	1,908,300	100.0	(R) 2,253,217	100.0	(R) 2,201,740	100.0	2,317,877	100.0
With no violations	584,389	30.6	(R) 698,495	31.0	(R) 688,617	31.3	759,653	32.8
With violations	1,323,911	69.4	(R) 1,554,722	69.0	(R) 1,513,123	68.7	1,558,224	67.2
With OOS violations	452,850	23.7	(R) 531,933	23.6	(R) 514,314	23.4	532,685	23.0
Hazardous materials inspections								
Number of inspections	133,486	100.0	(R) 179,234	100.0	(R) 180,891	100.0	183,925	100.0
With no violations	101,098	75.7	(R) 145,787	81.3	(R) 147,602	81.6	150,068	81.6
With violations	32,388	24.3	(R) 33,447	18.7	(R) 33,289	18.4	33,857	18.4
With OOS violations	9,964	7.5	(R) 9,955	5.6	(R) 9,871	5.5	9,795	5.3

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 5-7. FUEL CONSUMPTION BY TRANSPORTATION MODE: 1980-2005

	1980	1990	2000	2004	2005
Highway					
Gasoline, diesel and other fuels (million gallons)	114,960	130,755	162,555	(R) 173,531	174,287
Truck, total	19,960	24,490	35,229	(R) 33,150	33,453
Single-unit 2-axle 6-tire or more truck	6,923	8,357	9,563	(R) 8,959	9,042
Combination truck	13,037	16,133	25,666	(R) 24,191	24,411
Truck (percent of total)	17.4	18.7	21.7	(R) 19.1	19.2
Rail, Class I (in freight service)					
Distillate / diesel fuel (million gallons)	3,904	3,115	3,700	4,059	4,098
Water					
Residual fuel oil (million gallons)	8,952	6,326	6,410	4,690	5,179
Distillate / diesel fuel oil (million gallons)	1,478	2,065	2,261	2,140	2,006
Gasoline (million gallons)	1,052	1,300	1,124	(R) 1,033	1,261
Pipeline					
Natural gas (million cubic feet)	634,622	659,816	642,210	(R) 566,187	584,779

Key: R = revised.

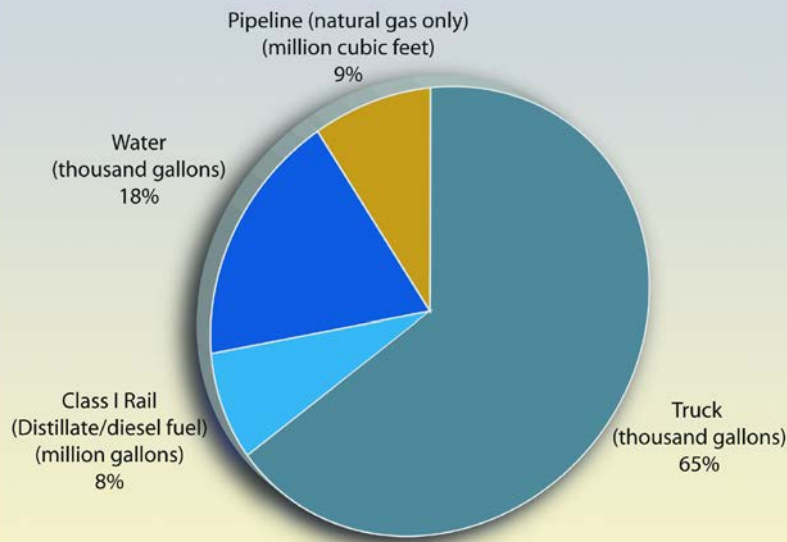
TABLE 5-6. ROADSIDE SAFETY INSPECTION ACTIVITY SUMMARY BY INSPECTION TYPE: 2000-2006

Source: U.S. Department of Transportation, Federal Motor Carrier Administration, Motor Carrier Management Information System (MCMIS), Roadside Inspection Activity Summary for Calendar Years, available at www.fmcsa.dot.gov as of June 4, 2007.

TABLE 5-7. FUEL CONSUMPTION BY TRANSPORTATION MODE: 1980-2005

Sources: **Highway:** U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2005* (Washington, DC: 2005), table VM-1 and similar tables in earlier editions. **Rail:** Association of American Railroads, *Railroad Facts* (Washington, DC: annual issues), p. 40. **Water:** U.S. Department of Energy, Energy Information Administration, *Fuel Oil and Kerosene Sales 2005* (Washington, DC: 2005), tables 2, 4, and similar tables in earlier editions. **Pipeline:** U.S. Department of Energy, *Natural Gas Annual 2005*, 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: 2005



Note: Data do not include energy consumed by oil pipelines (crude petroleum and petroleum products) nor coal slurry/water slurry pipelines.

and a doubling of truck-miles traveled. Over the same period, fuel use in Class I freight railroads increased slightly from 3.9 billion gallons to 4.1 billion gallons.

In 2005, trucking accounted for 65 percent of freight transportation energy consumption. Water transportation accounted for 18 percent, natural gas pipelines for 9 percent, and Class I railroads for 8 percent.

Over the past two decades, miles per gallon by single-unit trucks (based on total travel and fuel consumption)

increased by more than 50 percent. Between 1980 and 2005, the fuel consumed increased 31 percent whereas miles traveled nearly doubled, indicating that miles per gallon increased from 5.8 to 8.8.

TABLE 5-8. SINGLE-UNIT TRUCK FUEL CONSUMPTION AND TRAVEL: 1980-2005

	1980	1990	2000	2004	2005
Number registered (thousands)	4,374	4,487	5,926	6,161	6,395
Vehicle-miles (millions)	39,813	51,901	70,500	(R) 78,441	79,174
Fuel consumed (million gallons)	6,923	8,357	9,563	(R) 8,959	9,042
Average miles traveled per vehicle	9,103	11,567	11,897	(R) 12,732	12,380
Average miles traveled per gallon	5.8	6.2	7.4	8.8	8.8
Average fuel consumed per vehicle (gallons)	1,583	1,862	1,614	(R) 1,454	1,414

Key: R = revised.

FIGURE 5-1. ENERGY CONSUMPTION BY FREIGHT TRANSPORTATION MODE: 2005

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: 2006), 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 2005*, DOE/EIA-0131(04) (Washington, DC: December 2006), table 15.

TABLE 5-8. SINGLE-UNIT TRUCK FUEL CONSUMPTION AND TRAVEL: 1980-2005

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

In contrast to single-unit trucks, miles per gallon by combination trucks (based on total travel and fuel consumption) increased by only 11 percent over the past 25 years. Consequently, the gallons of fuel consumed increased by nearly 87 percent, and miles traveled more than doubled between 1980 and 2005.

TABLE 5-9. COMBINATION-TRUCK FUEL CONSUMPTION AND TRAVEL: 1980-2005

	1980	1990	2000	2004	2005
Number registered (thousands)	1,417	1,709	2,097	2,010	2,087
Vehicle-miles traveled (millions)	68,678	94,341	135,020	(R) 142,370	143,662
Fuel consumed (million gallons)	13,037	16,133	25,666	(R) 24,191	24,411
Average miles traveled per vehicle	48,472	55,206	64,399	(R) 70,819	68,845
Average miles traveled per gallon	5.3	5.8	5.3	5.9	5.9
Average fuel consumed per vehicle (gallons)	9,201	9,441	12,241	(R) 12,033	11,698

Key: R = revised.

Diesel prices were about 80 percent higher in June 2007 than 10 years earlier (in inflation-adjusted terms). Over that period prices bottomed out in February 1999 at \$1.21 a gallon (in \$ July 2007).

FIGURE 5-2. MONTHLY DIESEL PRICES: 1997-2007 (CENTS PER GALLON)



TABLE 5-9. COMBINATION-TRUCK FUEL CONSUMPTION AND TRAVEL: 1980-2005

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

FIGURE 5-2. MONTHLY DIESEL PRICES: 1997-2007 (CENTS PER GALLON)

Sources: Diesel price: U.S. Department of Energy, Energy Information Agency, U.S. Petroleum Prices, available at www.eia.doe.gov as of August 6, 2007. **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 August 6, 2007.



Energy intensity is the amount of energy used in producing a given level of output or activity, in this case vehicle miles and ton miles. Since 1980 the energy intensity of both trucking and freight rail has 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 TRANSPORTATION MODES: 1980-2005

	1980	1990	2000	2004	2005
Highway (Btu per vehicle-mile)	24,757	22,795	23,448	20,540	20,539
Railroad (Class I) (Btu per freight car-mile)	18,742	16,619	14,917	15,274	15,152
Railroad (Class I) (Btu per ton-mile)	597	420	352	341	337
Domestic Water (Btu per ton-mile)	358	387	473	510	514

Key: Btu = British thermal unit.

TABLE 5-10. ENERGY INTENSITIES OF DOMESTIC FREIGHT TRANSPORTATION MODES: 1980-2005

Source: Oak Ridge National Laboratory, *Transportation Energy Data Book: Edition 25* (Oak Ridge, TN: 2007).

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 NO_x emissions in the United States and one-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 fields, wildfires, and fugitive dust. Consequently, freight transportation is a minor factor when considering total PM-10 emissions.

TABLE 5-11. ESTIMATED NATIONAL AVERAGE VEHICLE EMISSIONS RATES OF HEAVY-DUTY AND LIGHT-DUTY VEHICLES: 1990-2005 (GRAMS PER MILE)

	1990	2000	2005	2006
Gasoline (assuming zero RFG)				
Cars				
Exhaust HC	2.79	0.97	0.52	0.46
Nonexhaust HC	1.21	0.92	0.72	0.68
Total HC	3.99	1.89	1.25	1.13
Exhaust CO	42.89	18.53	12.57	10.87
Exhaust NO _x	2.70	1.29	0.92	0.79
Light trucks				
Exhaust HC	3.68	1.45	0.78	0.69
Nonexhaust HC	1.36	0.97	0.76	0.71
Total HC	5.04	2.42	1.54	1.40
Exhaust CO	56.23	26.81	16.23	14.33
Exhaust NO _x	2.62	1.54	1.21	1.09
Heavy trucks				
Exhaust HC	3.66	1.22	0.64	0.53
Nonexhaust HC	2.74	1.62	1.24	1.14
Total HC	6.40	2.84	1.88	1.67
Exhaust CO	85.61	31.08	16.73	14.51
Exhaust NO _x	7.19	5.26	4.28	3.73
Diesel				
Cars				
Exhaust HC	0.68	0.80	0.58	0.48
Exhaust CO	1.49	1.78	1.57	1.41
Exhaust NO _x	1.83	1.81	1.32	1.11
Light trucks				
Exhaust HC	1.59	1.02	0.80	0.79
Exhaust CO	2.67	1.77	1.37	1.34
Exhaust NO _x	2.71	1.76	1.37	1.30
Heavy trucks				
Exhaust HC	2.21	0.79	0.54	0.51
Exhaust CO	10.06	4.10	3.05	2.90
Exhaust NO _x	23.34	18.05	11.45	10.55

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

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 sources	
			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 5-11. ESTIMATED NATIONAL AVERAGE VEHICLE EMISSIONS RATES OF HEAVY-DUTY AND LIGHT-DUTY VEHICLES: 1990-2005 (GRAMS PER MILE)

Source: U.S. Environmental Protection Agency, National Vehicle and Fuel Emissions Laboratory, personal communication, August 8, 2007.

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, *Assessing the Effects of Freight Movement on Air Quality at the National and Regional Level, Final Report*, April 2005, located at: <http://www.fhwa.dot.gov/environment/freightaq/>.

TABLE 5-13. CURRENT AND FUTURE NITROGEN OXIDES (NO_x) EMISSIONS BY FREIGHT TRANSPORTATION MODE: 2002, 2010, 2020

	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

Freight emissions of NO_x are forecast to decline by almost two-thirds over the next two decades. Trucks are by far the largest contributor to freight emissions nationally, producing two-thirds of NO_x 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 enable the use of advanced pollution control technologies to meet 2007 emissions standards.

Freight emissions of PM-10 are forecast to decline by one-half over the next two decades. As in the case of NO_x, trucks are by far the largest contributor to freight emissions nationally, producing two-thirds PM-10 from the freight sector. New rules requiring the use of ultra low sulfur diesel (ULSD) fuel in heavy-duty trucks and other diesel-powered highway vehicles will reduce emissions of PM and enable the use of advanced pollution control technologies to meet 2007 emissions standards.

TABLE 5-14. CURRENT AND FUTURE PARTICULATE MATTER (PM-10) EMISSIONS BY FREIGHT TRANSPORTATION MODE: 2002, 2010, 2020

	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	(R) 15,730	(R) 12,990	(R) -26	(R) -39
Commercial marine	44,000	(R) 42,930	(R) 44,080	(R) -2	(R) 0
Air freight	300	290	270	-3	-10
Freight total	185,600	124,329	(R) 92,099	(R) -33	(R) -50

Key: R = revised.

TABLE 5-13. CURRENT AND FUTURE NITROGEN OXIDES (NO_x) EMISSIONS BY FREIGHT TRANSPORTATION MODE: 2002, 2010, 2020

Source: U.S. Department of Transportation, Federal Highway Administration, *Assessing the Effects of Freight Movement on Air Quality at the National and Regional Level, Final Report*, April 2005, available at: <http://www.fhwa.dot.gov/environment/freightaq/>.

TABLE 5-14. CURRENT AND FUTURE PARTICULATE MATTER (PM-10) EMISSIONS BY FREIGHT TRANSPORTATION MODE: 2002, 2010, 2020

Source: U.S. Department of Transportation, Federal Highway Administration, *Assessing the Effects of Freight Movement on Air Quality at the National and Regional Level, Final Report*, April 2005, located at: <http://www.fhwa.dot.gov/environment/freightaq/>.

APPENDIX A. SELECTED METRIC DATA

TABLE 2-1M. WEIGHT OF SHIPMENTS BY MODE: 2002, 2006, 2035 (MILLIONS OF METRIC TONNES)

	2002				2006				2035			
	Total	Domestic	Exports ³	Imports ³	Total	Domestic	Exports ³	Imports ³	Total	Domestic	Exports ³	Imports ³
Total	(R) 17,588	16,079	(R) 477	1,031	19,086	17,276	564	1,246	(R) 33,863	30,638	(R) 1,012	(R) 2,213
Truck	10,501	10,316	97	88	11,520	11,274	153	92	20,761	20,230	239	291
Rail	1,710	1,610	29	71	1,856	1,733	37	86	3,208	2,996	52	160
Water	638	541	57	40	626	530	44	53	948	795	104	49
Air, air & truck	(R) 10	3	3	(R) 5	14	5	4	5	(R) 56	9	(R) 12	(R) 35
Intermodal¹	1,176	178	288	709	1,368	177	321	870	2,364	304	601	1,460
Pipeline & unknown²	3,554	3,432	4	118	3,702	3,558	5	139	6,526	6,303	5	219

Key: R = revised.

¹Intermodal includes U.S. Postal Service and courier shipments and all intermodal combinations except for rail 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 shipped by international air cargo and shipments that pass through the United States from a foreign origin to a foreign destination by any mode.

Notes: Numbers may not add to totals due to rounding. 1 ton = 0.91 metric tonne.

TABLE 2-3M. TOP COMMODITIES: 2002

Metric Tonnes (millions)		Value (\$ billions)	
Total	17,532	Total	13,120
Natural gas & related	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	Natural gas & related 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

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

²Nonmetallic mineral products.

Note: 1 ton = 0.91 metric tonne.

TABLE 2-1M. WEIGHT OF SHIPMENTS BY MODE: 2002, 2006, 2035 (MILLIONS OF METRIC TONNES)

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, Version 2.2, 2007.

TABLE 2-3M. TOP COMMODITIES: 2002

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, Version 2.2, 2006.



TABLE 2-4M. 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 2-5M. 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 2-4M. 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 2-5M. HAZARDOUS MATERIALS SHIPMENTS BY HAZARD CLASS: 2002

Source: U.S. Department of Transportation, 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 2-6M NEW. DOMESTIC MODE OF EXPORTS AND IMPORTS BY WEIGHT AND VALUE: 2002 AND 2035

	Metric Tonnes (millions)		Value (\$ billions)	
	2002	2035	2002	2035
Total	(R) 1,509	(R) 3,225	2,145	(R) 12,277
Truck¹	725	1,926	1,198	6,193
Rail	182	361	114	275
Water	97	153	26	49
Air & truck²	(R) 8	(R) 49	(R) 614	(R) 5,242
Intermodal³	20	46	52	281
Pipeline & unknown⁴	477	692	141	238

Key: R = revised.

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.

Notes: TABLE 2-6M NEW WAS UPDATED IN FEBRUARY 2008. IT DIFFERS FROM THE PRINT VERSION PUBLISHED IN NOVEMBER 2007. Numbers may not add to totals due to rounding. 1 ton = 0.91 metric tonne.

TABLE 2-8M. VALUE AND WEIGHT OF U.S. MERCHANDISE TRADE WITH CANADA AND MEXICO BY TRANSPORTATION MODE: 1998-2006

Mode	1998		2000		2005 ¹		2006	
	Value (current \$ billions)	Weight (millions of metric tonnes)	Value (current \$ billions)	Weight (millions of metric tonnes)	Value (current \$ billions)	Weight (millions of metric tonnes)	Value (current \$ billions)	Weight (millions of metric tonnes)
Truck	350	NA	429	NA	491	173	534	NA
Rail	68	NA	94	NA	116	128	129	NA
Air	30	<1	45	<1	33	<1	36	<1
Water	21	166	33	176	58	232	70	229
Pipeline	11	NA	24	NA	52	78	57	NA
Other	23	NA	29	NA	39	5	40	NA
Total	503	NA	653	477	790	616	865	NA

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 2-6M NEW. DOMESTIC MODE OF EXPORTS AND IMPORTS 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, Version 2.2, 2008.

TABLE 2-8M. VALUE AND WEIGHT OF U.S. MERCHANDISE TRADE WITH CANADA AND MEXICO BY TRANSPORTATION MODE: 1998-2006

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, Transborder Freight Data, September 2007.

TABLE 3-1M. KILOMETERS OF INFRASTRUCTURE BY TRANSPORTATION MODE: 1980-2005

	1980	1990	2000	2005	Percent change, 1980-2005
Public roads, route kilometers	6,211,806	6,223,214	6,358,681	6,456,095	3.9
National Highway System (NHS)	N	N	259,409	261,314	N
Interstates	66,176	72,540	75,113	75,432	14.0
Other NHS	N	N	184,296	185,882	N
Other	N	N	6,099,272	6,194,779	N
Strategic Highway Corridor Network (STRAHNET)	N	N	99,886	100,504	N
Interstate	N	N	75,116	75,435	N
Non-Interstate	N	N	24,766	25,069	N
Railroad	¹ 294,634	283,098	274,412	226,612	-23.1
Class I	NA	214,347	194,082	226,612	N
Regional	NA	29,572	33,761	24,765	N
Local	NA	39,167	46,570	36,241	N
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	256,710	N
Gas	1,692,666	1,913,832	2,203,675	2,313,432	36.7

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

¹Excludes Class III railroads.

Note: 1 mile = 1.61 kilometers.



TABLE 3-1M. KILOMETERS OF INFRASTRUCTURE BY TRANSPORTATION MODE: 1980-2005

Sources: Public roads: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, (Washington, DC: annual issues), table HM-16. **Rail:** Association of American Railroads, *Railroad Facts* (Washington, DC: various issues). **Navigable channels:** U.S. Army Corps of Engineers. **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 June 6, 2007. **Gas pipelines:** American Gas Association, *Gas Facts* (Arlington, VA: annual issues).



TABLE 3-3M. TRUCKS AND TRUCK KILOMETERS BY AVERAGE WEIGHT: 1987-2002

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

Key: VKT = Vehicle kilometers traveled.

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; 1 mile = 1.61 kilometers; 1 pound = 0.45 kilogram.

TABLE 3-3M. TRUCKS AND TRUCK KILOMETERS BY AVERAGE WEIGHT: 1987-2002

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 3-5M. TRUCK KILOMETERS BY PRODUCTS CARRIED: 2002¹

Products carried	Millions of kilometers
Total²	(R) 233,728
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	46,653

Key: R = revised.

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 3-5M. TRUCK KILOMETERS 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 26, 2007.

TABLE 3-8M. TOP 25 AIRPORTS BY LANDED WEIGHT OF ALL-CARGO OPERATIONS: 2000-2005¹

Airport	2005 Rank	(thousands of metric tonnes)				
		2000	2002	2003	2004	2005
Anchorage, AK (Ted Stevens Anchorage International) ²	1	7,333	8,159	8,171	8,931	9,402
Memphis, TN (Memphis International)	2	5,732	8,007	7,947	8,061	8,476
Louisville, KY (Louisville International-Standiford Field)	3	3,617	3,812	3,785	3,981	4,165
Miami, FL (Miami International)	4	2,657	2,879	2,938	3,106	3,221
Los Angeles, CA (Los Angeles International)	5	2,624	2,756	2,830	2,778	2,655
New York, NY (John F. Kennedy International)	6	2,534	2,642	2,664	2,629	2,550
Indianapolis, IN (Indianapolis International)	7	1,870	2,011	2,133	2,140	2,309
Chicago, IL (O'Hare International)	8	2,616	2,121	2,065	2,099	2,188
Newark, NJ (Newark Liberty International)	9	1,779	1,595	1,664	1,601	1,697
Oakland, CA (Metropolitan Oakland International)	10	1,643	1,584	1,537	1,545	1,631
Fort Worth, TX (Dallas/Fort Worth International)	11	1,534	1,343	1,344	1,298	1,502
Philadelphia, PA (Philadelphia International)	12	1,319	1,330	1,238	1,244	1,271
Ontario, CA (Ontario International)	13	1,107	1,310	1,213	1,203	1,219
Atlanta, GA (William B. Hartsfield International)	14	989	1,058	1,083	1,055	919
Honolulu, HI (Honolulu International)	15	828	946	996	1,035	751
Covington/Cincinnati, OH (Cincinnati/Northern Kentucky International)	16	628	880	923	880	737
San Francisco, CA (San Francisco International)	17	835	787	707	727	723
Dayton, OH (James M. Cox Dayton International)	18	2,026	814	712	714	715
Phoenix, AZ (Sky Harbor International)	19	817	710	678	692	706
Denver, CO (Denver International)	20	1,149	939	1,089	671	692
Portland, OR (Portland International)	21	800	740	679	651	677
Houston, TX (George Bush Intercontinental)	22	435	437	604	632	644
Seattle, WA (Seattle-Tacoma International)	23	564	564	624	615	643
Minneapolis, MN (Minneapolis-St Paul International/Wold-Chamberlain)	24	593	572	567	614	637
Chicago/Rockford, IL (Chicago/Rockford International)	25	682	529	544	563	632
Top 25 airports³		46,709	48,524	48,737	49,465	50,761
United States, all airports⁴		67,806	66,617	66,290	67,401	69,029
Top 25 as % of U.S. total		68.9%	72.8%	73.5%	73.4%	73.5%

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.



TABLE 3-8M. TOP 25 AIRPORTS BY LANDED WEIGHT OF ALL-CARGO OPERATIONS: 2000-2005

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 June 8, 2007.

TABLE 5-7M. FUEL CONSUMPTION BY TRANSPORTATION MODE: 1980-2005

	1980	1990	2000	2004	2005
Highway					
Gasoline, diesel and other fuels (million liters)	435,171	494,962	615,338	(R) 656,887	659,748
Truck, total	75,557	92,705	133,356	(R) 125,485	126,633
Single-unit 2-axle 6-tire or more truck	26,206	31,635	36,200	(R) 33,912	34,229
Combination truck	49,350	61,070	97,156	(R) 91,573	92,404
Truck (percent of total)	17.4	18.7	21.7	(R) 19.1	19.2
Rail, Class I (in freight service)					
Distillate / diesel fuel (million liters)	14,778	11,792	14,006	15,365	15,513
Water					
Residual fuel oil (million liters)	33,887	23,947	24,264	17,754	19,605
Distillate / diesel fuel oil (million liters)	5,595	7,817	8,559	8,101	7,594
Gasoline (million liters)	3,982	4,921	4,255	(R) 3,909	4,773
Pipeline					
Natural gas (million cubic meters)	17,970	18,684	18,185	(R) 16,033	16,559

Key: R = revised.

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

TABLE 5-8M. SINGLE-UNIT TRUCK FUEL CONSUMPTION AND TRAVEL: 1980-2005

	1980	1990	2000	2004	2005
Number registered (thousands)	4,374	4,487	5,926	6,161	6395
Vehicle-Kilometers (millions)	64,073	83,527	113,459	(R) 126,239	127,418
Fuel consumed (million liters)	26,206	31,635	36,200	(R) 33,912	34,229
Average kilometers traveled per vehicle	14,649	18,615	19,146	(R) 20,490	19,924
Average kilometers traveled per liter	2.4	2.6	3.1	3.7	3.7
Average fuel consumed per vehicle (liter)	5,992	7,050	6,109	(R) 5,504	5,352

Key: R = revised.

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

TABLE 5-7M. FUEL CONSUMPTION BY TRANSPORTATION MODE: 1980-2005

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

TABLE 5-8M. SINGLE-UNIT TRUCK FUEL CONSUMPTION AND TRAVEL: 1980-2005

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

TABLE 5-9M. COMBINATION-TRUCK FUEL CONSUMPTION AND TRAVEL: 1980-2005

	1980	1990	2000	2004	2005
Number registered (thousands)	1,417	1,709	2,097	2,010	2,087
Vehicle-kilometers traveled (millions)	110,527	151,827	217,294	(R) 229,122	231,202
Fuel consumed (million liters)	49,350	61,070	97,155	(R) 91,573	92,404
Average kilometers traveled per vehicle	78,008	88,845	103,640	(R) 113,972	110,795
Average kilometers traveled per liter	2.2	2.5	2.2	2.5	2.5
Average fuel consumed per vehicle (liters)	34,831	35,737	46,339	(R) 45,551	44,281

Key: R = revised.

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

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

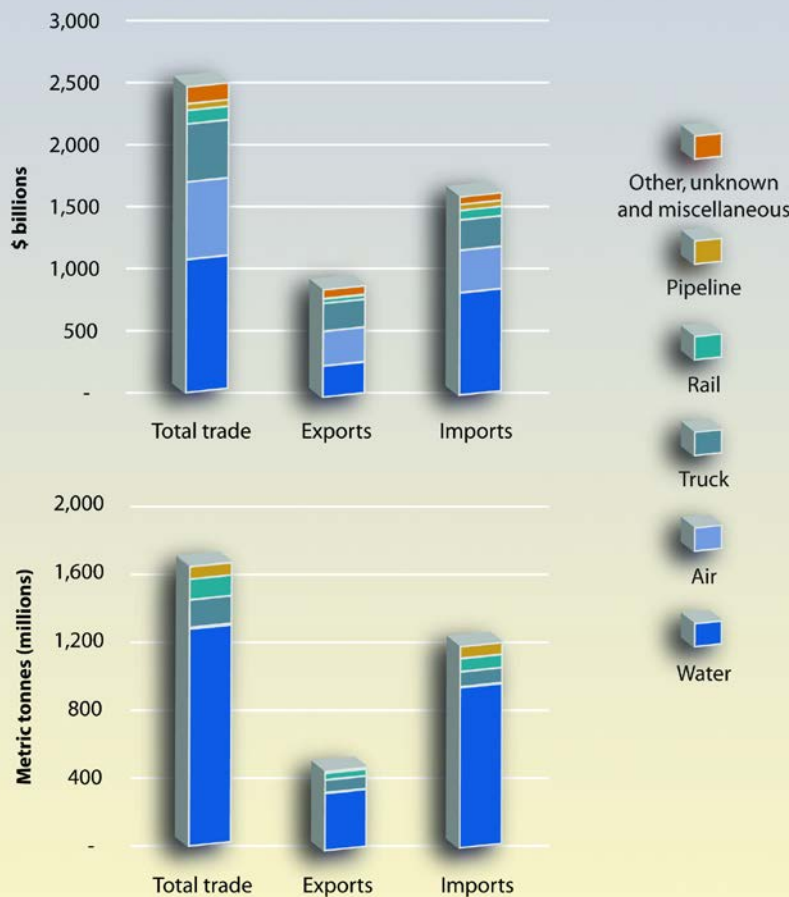


TABLE 5-9M. COMBINATION-TRUCK FUEL CONSUMPTION AND TRAVEL: 1980-2005

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

FIGURE 2-2M. 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.

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