

# FREIGHT FACTS AND FIGURES 2 0 0 9





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## QUALITY ASSURANCE STATEMENT

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**F**reight Facts and Figures 2009 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 at [www.ops.fhwa.dot.gov/freight](http://www.ops.fhwa.dot.gov/freight).

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 activities 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 in this report are based on the Economic Census, which is conducted once every five years. While results of the 2007 Economic Census are being released, the most recently published complete set of data is for 2002.

Several of the tables and maps in this report are based on the Freight Analysis Framework (FAF), version 2, which builds on the Economic Census, to estimate all freight flows to, from, and within the United States except shipments between foreign countries that are transported through the United States. Shipments to and from Puerto Rico are counted with Latin America. FAF forecasts to 2035 were made prior to the recent economic downturn and will be revised as part of FAF, version 3, in 2010.

FAF covers all modes of transportation. The truck, rail, and water categories include shipments transported by only one mode. Air includes shipments weighing more than 100 pounds moved by air or by air and truck. Intermodal includes all other shipments transported by more than one mode, such as bulk products moved by water and pipeline and mixed cargo hauled by truck and rail. Intermodal also includes shipments weighing less than 100 pounds sent via postal and courier services. Pipeline includes a small quantity of shipments moved by unknown modes. Visit [www.ops.fhwa.dot.gov/freight/freight\\_analysis/faf](http://www.ops.fhwa.dot.gov/freight/freight_analysis/faf) for more information.

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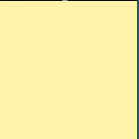
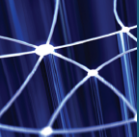
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FREIGHT FACTS AND FIGURES 2009





# I. THE NATION SERVED BY FREIGHT



The Nation's 116 million households, 7.7 million business establishments, and 89,500 government units are part of an enormous economy that demands the efficient movement of freight. While the U.S. economy has been affected by the recent global recession, it is expected to fully recover and continue to grow. Long-term economic growth will result in even greater demand for freight transportation.

Freight transportation has grown over time 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 33 percent between 1980 and

**Table 1-1. Economic and Social Characteristics of the United States: 1980-2007**

	1980	1990	2000	2006	2007	Percent change, 1980 to 2007
Resident population (thousands)	226,546	248,791	281,425	(R) 298,362	301,290	33.0
Households (thousands)	80,776	93,347	104,705	114,384	116,011	43.6
Median household income (2000 \$)	35,057	38,257	41,990	41,168	41,454	18.2
Civilian labor force (thousands)	106,940	125,840	142,583	152,677	153,836	0.0
Employed <sup>1</sup> (thousands)	99,303	118,793	136,891	144,427	146,047	47.1
Agriculture, forestry, fishing, and hunting (percent)	NA	1.9	1.8	1.5	1.4	NA
Mining	NA	0.5	0.3	0.5	0.5	NA
Construction	NA	6.9	7.3	8.1	8.1	NA
Manufacturing	NA	16.8	14.4	11.3	11.2	NA
Wholesale and retail trade	NA	14.7	14.6	14.8	14.3	NA
Transportation and utilities	NA	5.1	5.4	5.2	5.2	NA
Information	NA	2.9	3.0	2.5	2.4	NA
Financial activities	NA	7.1	6.8	7.3	7.2	NA
Professional and business services	NA	9.4	10.0	10.3	10.7	NA
Education and health services	NA	17.5	19.1	20.7	21.0	NA
Leisure and hospitality	NA	8.0	8.2	8.4	8.5	NA
Other services	NA	4.3	4.7	4.9	4.8	NA
Public administration	NA	4.7	4.5	4.5	4.6	NA
Business establishments (thousands)	NA	6,176	7,070	7,601	7,705	NA
Governments <sup>2</sup>	<sup>3</sup> 81,831	<sup>4</sup> 85,006	<sup>5</sup> 87,576	NA	89,527	NA
Gross domestic product (millions of 2000 \$)	5,161,700	7,112,500	9,817,000	(R) 11,294,800	11,523,900	123.3
Foreign trade (millions of 2000 \$)	631,335	1,168,168	2,572,000	(R) 3,246,608	3,399,774	438.5
Goods (percent)	74.0	71.6	78.8	79.2	78.7	6.3
Services (percent)	26.0	28.4	21.2	20.8	21.3	-18.1

**Key:** NA = not available; R = revised.

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

<sup>2</sup>Data for governments come from the Census of Governments, which is collected every five years.

<sup>3</sup>1982

<sup>4</sup>1992

<sup>5</sup>2002

**TABLE 1-1. ECONOMIC AND SOCIAL CHARACTERISTICS OF THE UNITED STATES: 1980-2007**

**Sources: Population:** U.S. Department of Commerce, Census Bureau, Population Profile of the United States, available at [www.census.gov/population/www/pop-profile/profile.html](http://www.census.gov/population/www/pop-profile/profile.html) as of September 17, 2009. **Households:** U.S. Department of Commerce, Census Bureau, Families and Living Arrangements, table HH-1, available at [www.census.gov/population/www/socdemo/hh-fam.html](http://www.census.gov/population/www/socdemo/hh-fam.html) as of September 17, 2009. **Civilian Labor Force:** U.S. Department of Labor, Bureau of Labor Statistics, Labor Force Statistics from the Current Population Survey, available at [www.bls.gov/data](http://www.bls.gov/data) as of September 17, 2009. **Employment:** U.S. Department of Labor, Bureau of Labor Statistics, Current Employment Statistics, available at [www.bls.gov/ces](http://www.bls.gov/ces) as of September 17, 2009. **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](http://www.census.gov/hhes/income/histinc/h06ar.html) as of July 30, 2009. **Business establishments:** U.S. Department of Commerce, Census Bureau, County Business Patterns, available at [www.census.gov/epcd/cbp/view/cbpview.html](http://www.census.gov/epcd/cbp/view/cbpview.html) as of August 5, 2009. **Governments:** U.S. Department of Commerce, Census Bureau, Census of Governments, available at [www.census.gov/govs](http://www.census.gov/govs) as of September 17, 2009. **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, and 4.2.4, available at [www.bea.gov/national/FA2004/index.asp](http://www.bea.gov/national/FA2004/index.asp) as of July 30, 2009.



2007 while the economy, measured by Gross Domestic Product (GDP), more than doubled in real terms. Household income, another indicator of economic growth, also has risen by 18 percent. Foreign trade grew faster than the overall economy, quadrupling in real value between 1980 and 2007, reflecting unprecedented global interconnectivity.

**Table 1-2. Population and Gross Domestic Product (GDP) by Region: 1980-2008**

	1980	1990	2000	2007	2008	Percent change, 1980 to 2008
<b>Resident Population (thousands)</b>	<b>226,549</b>	<b>248,789</b>	<b>(R) 282,172</b>	<b>(R) 301,290</b>	<b>304,060</b>	<b>34</b>
Northeast	49,136	50,828	(R) 53,667	(R) 54,762	54,925	12
Midwest	58,868	59,670	(R) 64,493	(R) 66,313	66,561	13
South	75,372	85,454	(R) 100,558	(R) 110,335	111,719	48
West	43,173	52,837	(R) 63,454	(R) 69,881	70,855	64
<b>GDP (millions of 2000 \$)<sup>1</sup></b>	<b>5,054,549</b>	<b>6,994,329</b>	<b>(R) 9,749,103</b>	<b>(R) 11,439,232</b>	<b>11,523,637</b>	<b>128</b>
Northeast	1,107,283	1,604,121	2,077,436	(R) 2,410,543	2,439,675	120
Midwest	1,262,917	1,566,939	2,174,719	(R) 2,367,972	2,376,526	88
South	1,608,531	2,220,755	3,212,076	(R) 3,883,705	3,907,737	143
West	1,075,817	1,602,514	2,284,873	(R) 2,776,103	2,797,637	160
<b>GDP per capita (millions of 2000 \$)<sup>1</sup></b>	<b>22,311</b>	<b>28,113</b>	<b>(R) 34,550</b>	<b>(R) 37,967</b>	<b>37,899</b>	<b>70</b>
Northeast	22,535	31,560	(R) 38,710	(R) 44,019	44,418	97
Midwest	21,453	26,260	(R) 33,720	(R) 35,709	35,704	66
South	21,341	25,988	(R) 31,942	(R) 35,199	34,978	64
West	24,919	30,329	(R) 36,008	(R) 39,726	39,484	58

**Key:** R = revised.

<sup>1</sup>As of October 26, 2006, the Bureau of Economic Analysis renamed the gross state product (GSP) series to gross domestic product (GDP) by state.

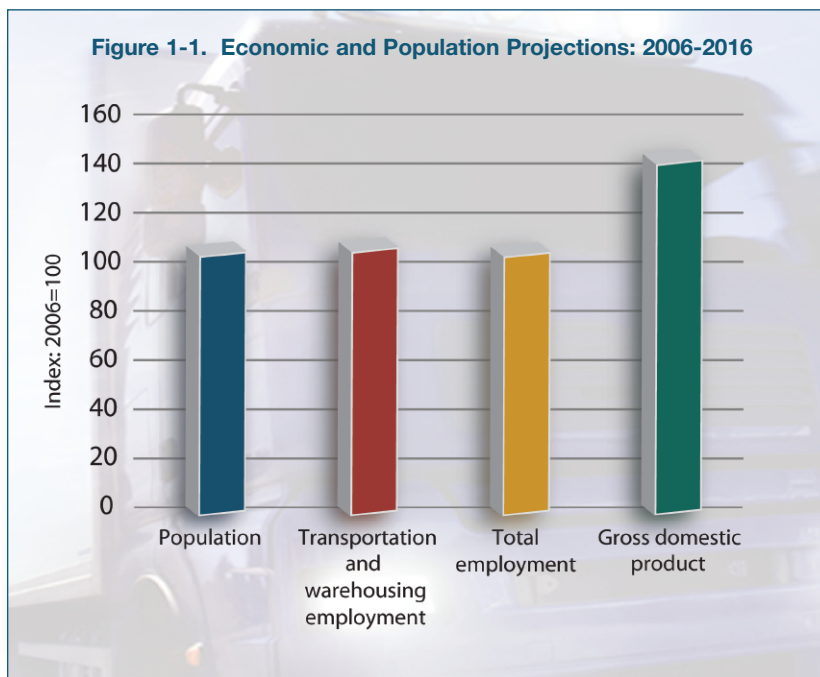
**Notes:** Numbers may not add to totals due to rounding. Chained dollars are not additive, especially for periods farther away from the base year of 2000. Because of this, GDP for all regions is not equal to total GDP.

Although freight moves throughout the United States, the demand for freight transportation is driven primarily by the geographic distribution of population and economic activity. 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 DOMESTIC PRODUCT (GDP) BY REGION: 1980-2008**

**Sources: Population: 1980-1990:** U.S. Department of Commerce, Census Bureau, *Statistical Abstract of the United States: 2004-2005* (Washington, DC: 2005); **2000-2008:** U.S. Department of Commerce, Census Bureau, Population Division, Annual Population Estimates, table 8, available at [www.census.gov/popest/states/NST-ann-est.html](http://www.census.gov/popest/states/NST-ann-est.html) as of June 15, 2009. **Gross Domestic Product: 1980-1990:** U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts, available at [www.bea.gov/regional/](http://www.bea.gov/regional/) as of June 11, 2004; **2000-2008:** U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts, available at [www.bea.gov/regional/](http://www.bea.gov/regional/) as of June 15, 2009.

The U.S. economy, as measured by GDP, is projected to increase by 44 percent and the U.S. population by 10 percent between 2006 and 2016. Transportation and warehousing employment is expected to increase by 11 percent over this period,

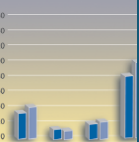
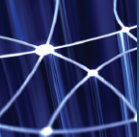


about the same as employment as a whole. These projections are based on long-term U.S. economic stability and growth.

**FIGURE 1-1. ECONOMIC AND POPULATION PROJECTIONS: 2006-2016**

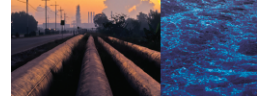
**Sources:** **Population:** U.S. Department of Commerce, Census Bureau, National Population Projections, available at [www.census.gov/population/www/projections/summarytables.html](http://www.census.gov/population/www/projections/summarytables.html) as of September 17, 2009. **Employment:** U.S. Department of Labor, Bureau of Labor Statistics, Employment by Major Industry Division, 1996, 2006, and projected 2016, available at [www.bls.gov](http://www.bls.gov) as of April 15, 2009. **GDP:** Congressional Budget Office, *The Budget and Economic Outlook: Fiscal Years 2007 to 2016*, available at [www.cbo.gov](http://www.cbo.gov) as of September 17, 2009.





## II. FREIGHT TO BE MOVED AND TRADING PARTNERS

The American economy stretches across a continent with links to the world, drawing on 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 Transportation Mode: 2002, 2008, and 2035 (millions of tons)**

	2002				2008				2035			
	Total	Domestic	Exports <sup>3</sup>	Imports <sup>3</sup>	Total	Domestic	Exports <sup>3</sup>	Imports <sup>3</sup>	Total	Domestic	Exports <sup>3</sup>	Imports <sup>3</sup>
<b>Total</b>	19,328	17,670	525	1,133	21,496	19,387	868	1,242	37,211	33,667	1,112	2,432
<b>Truck</b>	11,539	11,336	106	97	13,243	13,040	114	88	22,813	22,230	262	320
<b>Rail</b>	1,879	1,769	32	78	2,007	1,861	61	85	3,525	3,292	57	176
<b>Water</b>	701	595	62	44	632	520	62	50	1,041	874	114	54
<b>Air, air &amp; truck</b>	11	3	3	5	13	3	5	5	61	10	13	38
<b>Intermodal<sup>1</sup></b>	1,292	196	317	780	1,661	175	618	869	2,598	334	660	1,604
<b>Pipeline &amp; unknown<sup>2</sup></b>	3,905	3,772	4	130	3,940	3,787	8	145	7,172	6,926	5	240

<sup>1</sup>Intermodal includes U.S. Postal Service and courier shipments and all intermodal combinations, except air and truck. Intermodal also includes oceangoing exports and imports that move between ports and interior domestic locations by modes other than water.

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

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

**Notes:** The 2008 data are provisional estimates, which are based on selected modal and economic trend data. Methods used to develop these estimates have improved over time, and as a consequence, previously released annual provisional estimates are superseded by the 2008 estimates in this table. Numbers may not add to totals due to rounding.

The U.S. transportation system moved, on average, 53 million tons worth \$36 billion each day in 2002. The Freight Analysis Framework (FAF) estimates that tonnage increased by 11.2 percent by 2008, reaching 58.9 million tons per day. Nearly 10 percent of this tonnage is imports and exports. Growth between 2002 and the FAF provisional estimate for 2008 is slightly lower than the forecasted growth rates through 2035.



**TABLE 2-1. WEIGHT OF SHIPMENTS BY TRANSPORTATION MODE: 2002, 2008, AND 2035**

**Source: 2002 and 2035:** U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 2.2, 2007; **2008:** U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, 2008 provisional estimates, 2009.

**Table 2-2. Value of Shipments by Transportation Mode: 2002, 2008, and 2035 (billions of 2002 dollars)**

	2002				2008				2035			
	Total	Domestic	Exports <sup>3</sup>	Imports <sup>3</sup>	Total	Domestic	Exports <sup>3</sup>	Imports <sup>3</sup>	Total	Domestic	Exports <sup>3</sup>	Imports <sup>3</sup>
<b>Total</b>	13,228	11,083	778	1,367	16,767	14,217	1,011	1,539	41,867	29,590	3,392	8,884
<b>Truck</b>	8,856	8,447	201	208	11,193	10,719	233	241	23,767	21,654	806	1,306
<b>Rail</b>	382	288	26	68	466	352	42	73	702	483	63	156
<b>Water</b>	103	76	13	13	44	27	7	10	151	103	31	18
<b>Air, air &amp; truck</b>	771	162	269	340	1,022	206	387	428	5,925	721	1,548	3,655
<b>Intermodal<sup>1</sup></b>	1,967	983	268	716	1,881	779	340	762	8,966	4,315	943	3,708
<b>Pipeline and unknown<sup>2</sup></b>	1,149	1,127	1	22	2,161	2,134	2	25	2,357	2,315	1	41

<sup>1</sup>Intermodal includes U.S. Postal Service and courier shipments and all intermodal combinations, except air and truck. Intermodal also includes oceangoing exports and imports that move between ports and interior domestic locations by modes other than water.

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

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

**Notes:** The 2008 data are provisional estimates, which are based on selected modal and economic trend data. Methods used to develop these estimates have improved over time, and as a consequence, previously released annual provisional estimates are superseded by the 2008 estimates in this table. 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. Growth in value between 2002 and 2008 is 26.8 percent, compared to 11.2 percent in tons. Imports and exports also account for a larger share of value than tons, accounting for 15.2 percent of the value in 2008.

**Table 2-3. Top Commodities: 2002**

Millions of Tons		Billions of Dollars	
<b>Total, all commodities</b>	<b>19,328</b>	<b>Total, all commodities</b>	<b>13,228</b>
Natural gas & related <sup>1</sup>	2,687	Machinery	(R) 2,015
Gravel	2,048	Electronics	(R) 1,112
Cereal grains	1,330	Mixed freight	(R) 968
Crude petroleum	1,284	Motorized vehicles	(R) 859
Coal	1,261	Natural gas & related <sup>1</sup>	729
Nonmetallic mineral products	1,138	Textiles/leather	(R) 570
Gasoline	1,090	Pharmaceuticals	(R) 549
Waste/scrap	926	Miscellaneous manufactured products	(R) 471
Fuel oils	560	Chemical products	(R) 455
Natural sands	557	Other prepared foodstuffs	(R) 391

**Key:** R = revised.

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

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 TRANSPORTATION MODE: 2002, 2008, AND 2035**

**Source: 2002 and 2035:** U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 2.2, 2007; **2008:** U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, 2008 provisional estimates, 2009.

**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		Miles
	\$ Billions	Percent	Millions	Percent	Billions	Percent	Average distance per shipment
<b>All modes, total</b>	<b>660</b>	<b>100.0</b>	<b>2,192</b>	<b>100.0</b>	<b>327</b>	<b>100.0</b>	<b>136</b>
<b>Single modes, total</b>	<b>644</b>	<b>97.6</b>	<b>2,159</b>	<b>98.5</b>	<b>312</b>	<b>95.5</b>	<b>105</b>
Truck <sup>1</sup>	420	63.6	1,160	52.9	110	33.7	86
For-hire	190	28.8	450	20.5	65	19.9	285
Private <sup>2</sup>	227	34.3	702	32.0	44	13.5	38
Rail	31	4.7	109	5.0	72	22.1	695
Water	47	7.1	228	10.4	71	21.6	5
Air	2	0.2	<1	<.1	<1	<.1	2,080
Pipeline <sup>3</sup>	145	22.0	661	30.2	5	5	5
<b>Multiple modes, total</b>	<b>10</b>	<b>1.5</b>	<b>19</b>	<b>0.9</b>	<b>12</b>	<b>3.8</b>	<b>849</b>
Parcel, U.S. Postal Service, or Courier	4	0.6	<1	<.1	<1	<.1	837
Other multiple modes	5	0.8	19	0.8	12	3.8	1,371
<b>Unknown and other modes, total</b>	<b>6</b>	<b>0.9</b>	<b>14</b>	<b>0.6</b>	<b>2</b>	<b>0.7</b>	<b>57</b>

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

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

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

<sup>3</sup>Excludes most shipments of crude oil.

**Note:** Numbers and percents may not add to totals due to rounding.

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	8	1.2	5	0.2	2	0.5
Class 2	Gases	74	11.2	213	9.7	37	11.4
Class 3	Flammable liquids	490	74.3	1,789	81.6	219	66.9
Class 4	Flammable solids	7	1.0	11	0.5	4	1.3
Class 5	Oxidizers and organic peroxides	5	0.8	13	0.6	4	1.3
Class 6	Toxic (poison)	8	1.3	8	0.4	4	1.3
Class 7	Radioactive materials	6	0.9	<1	<.1	<1	<.1
Class 8	Corrosive materials	38	5.8	91	4.1	36	11.1
Class 9	Miscellaneous dangerous goods	24	3.6	61	2.8	20	6.2
<b>Total</b>		<b>660</b>	<b>100.0</b>	<b>2,191</b>	<b>100.0</b>	<b>326</b>	<b>100.0</b>

**Note:** Numbers and percents may not add to totals due to rounding.

**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 and U.S. Department of Commerce, Census Bureau, *2002 Commodity Flow Survey, Hazardous Materials* (Washington, DC: December 2004), table 1a, available at [www.bts.gov/publications/commodity\\_flow\\_survey/2002/united\\_states/](http://www.bts.gov/publications/commodity_flow_survey/2002/united_states/) as of March 30, 2009.

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

**Source:** U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, *2002 Commodity Flow Survey, Hazardous Materials* (Washington, DC: December 2004), table 2a, available at [www.bts.gov/publications/commodity\\_flow\\_survey/2002/united\\_states/](http://www.bts.gov/publications/commodity_flow_survey/2002/united_states/) as of March 30, 2009.

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. Domestic Mode of Exports and Imports by Tonnage and Value: 2002 and 2035**

	Millions of Tons		Billions of 2002 Dollars	
	2002	2035	2002	2035
<b>Total</b>	1,658	3,544	2,145	12,277
<b>Truck<sup>1</sup></b>	797	2,116	1,198	6,193
<b>Rail</b>	200	397	114	275
<b>Water</b>	106	168	26	49
<b>Air, air &amp; truck<sup>2</sup></b>	9	54	614	5,242
<b>Intermodal<sup>3</sup></b>	22	50	52	281
<b>Pipeline &amp; unknown<sup>4</sup></b>	524	760	141	238

<sup>1</sup>Excludes truck moves to and from airports.

<sup>2</sup>Includes truck moves to and from airports.

<sup>3</sup>Intermodal includes U.S. Postal Service and courier shipments and all intermodal combinations, except air and truck. In this table, oceangoing exports and imports that move between ports and domestic locations by single modes are classified by the domestic mode rather than intermodal.

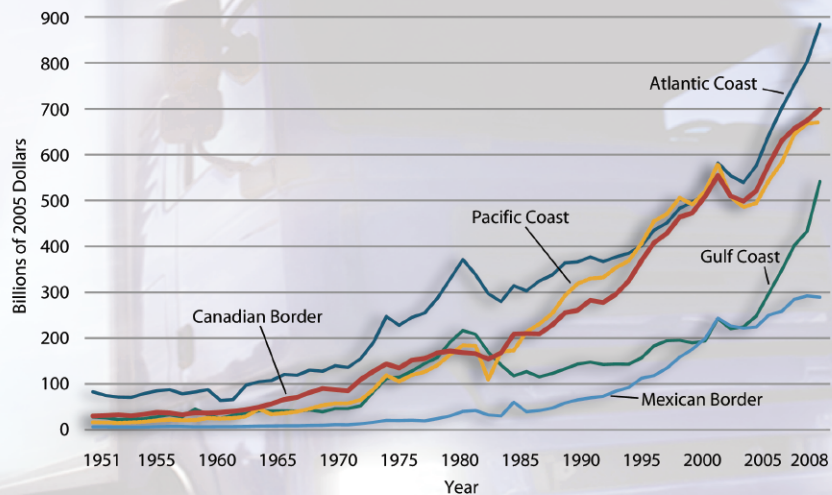
<sup>4</sup>Pipeline and unknown shipments are combined because data on region-to-region flows by pipeline are statistically uncertain.

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

International trade has grown rapidly and is placing pressure 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 1951, the value of merchandise trade has grown by nineteen-fold in inflation-adjusted terms. However, overall growth has been affected by short-term downturns, such as between 1981 and 1985.

**Figure 2-1. Value of Merchandise Trade by Coasts and Borders: 1951-2008**



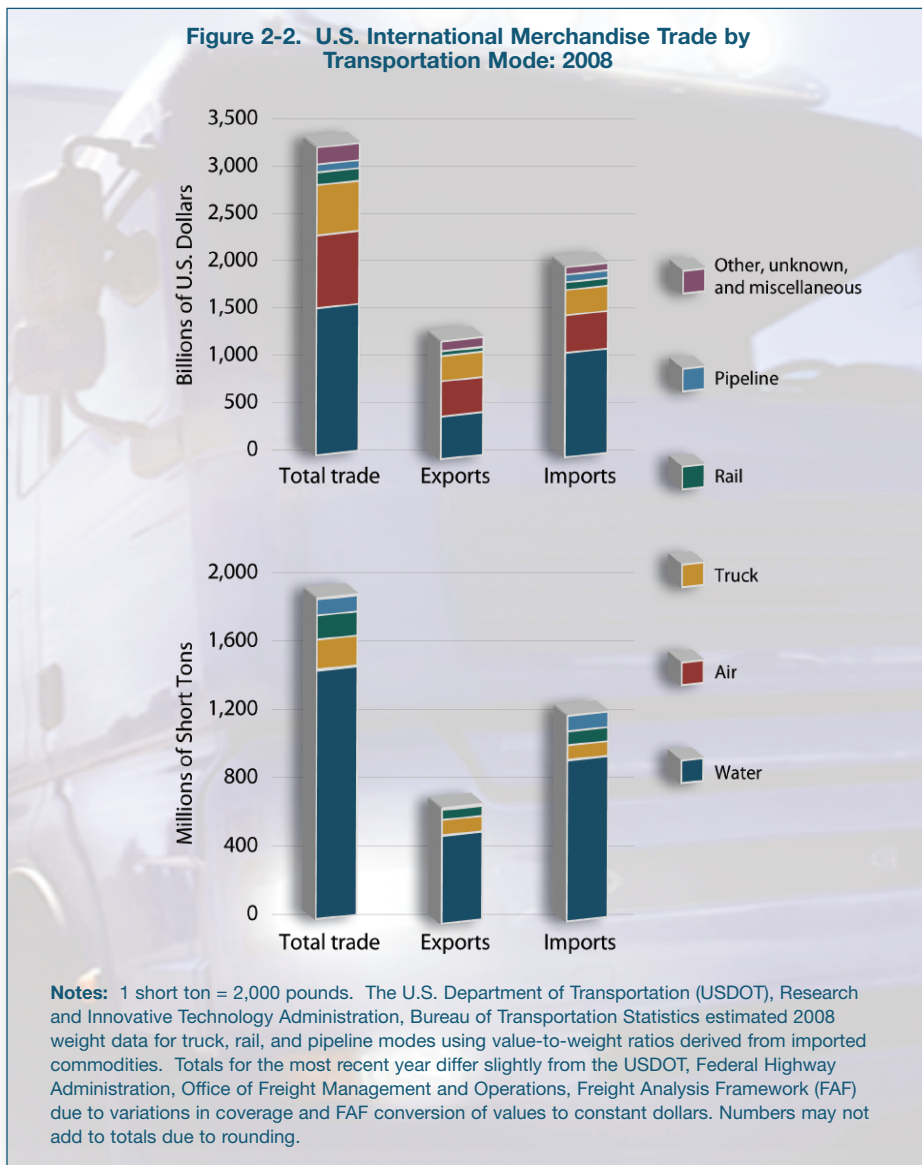
**Notes:** The value of 2008 coal exports (\$5.03 billion) from Mobile, AL, Charleston, SC, and Norfolk, VA, are considered proprietary information and are consolidated. In this figure, the total value of coal exports for the above three cities are included under the Atlantic Coast Customs District.

**TABLE 2-6. DOMESTIC MODE OF EXPORTS AND IMPORTS BY TONNAGE 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, 2007.

**FIGURE 2-1. VALUE OF MERCHANDISE TRADE BY COASTS AND BORDERS: 1951-2008**

**Sources:** 1951-1970: U.S. Department of Commerce, Census Bureau, *Historical Statistics of the United States, Colonial Times to 1970, Bicentennial Edition* (Washington, DC: 1975); 1970-2000: U.S. Department of Commerce, Census Bureau, *Statistical Abstract of the United States* (Washington, DC: annual issues); 2000-2008: U.S. Department of Commerce, Census Bureau, Foreign Trade Division, FT920 - U.S. Merchandise Trade: Selected Highlights (Washington, DC: annual issues). **Implicit GDP Deflator:** U.S. Department of Commerce, Bureau of Economic Analysis, Current-Dollar and "Real" Gross Domestic Product, available at [www.bea.gov](http://www.bea.gov) as of August 15, 2009.



In 2008, ports and airports on the Atlantic Coast remain the most important, but the land borders and other coasts are catching up. While the recent economic downturn started in 2007, the value of trade continued to grow in part due to short-term increases in the price of imported oil.

Nearly 80 percent of freight tonnage in U.S. foreign trade moves by water, but air and truck transportation are nearly as important when freight value is considered. By value, the water share drops to 48 percent, with air and truck accounting for 24 percent and 16 percent respectively. Rail and pipeline account for the balance.

**FIGURE 2-2. U.S. INTERNATIONAL MERCHANDISE TRADE BY TRANSPORTATION MODE: 2008**  
**Sources:** **Total, water and air data:** U.S. Department of Commerce, U.S. Census Bureau, Foreign Trade Division, U.S. Imports of Merchandise and U.S Exports of Merchandise DVD's, December 2008. **Truck, rail, and pipeline data:** U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, Transborder Freight Data, available at [www.bts.gov/transborder](http://www.bts.gov/transborder) as of August 20, 2009. **Other, unknown and miscellaneous data:** special tabulation, August 2009.







**Table 2-7. Top 25 Trading Partners of the United States in Merchandise Trade: 1998-2008 (billions of current U.S. dollars)**

Partner	2008						
	Rank	1998	2000	2002	2004	2006	2008
Canada	1	330	410	370	446	534	596
China	2	85	116	147	231	343	409
Mexico	3	173	247	232	267	332	367
Japan	4	180	211	173	184	208	206
Germany	5	76	88	89	109	130	152
United Kingdom	6	74	85	74	82	99	112
South Korea	7	40	68	58	73	78	83
France	8	42	50	47	53	61	73
Saudi Arabia	9	17	21	18	26	39	67
Venezuela	10	16	24	20	30	46	64
Brazil	11	25	29	28	35	46	63
Taiwan	12	51	65	51	56	61	62
Netherlands	13	27	32	28	37	48	61
Italy	14	30	36	34	39	45	52
Belgium	15	22	24	23	29	36	46
Singapore	16	34	37	31	35	42	45
India	17	12	14	16	22	32	44
Malaysia	18	28	37	34	39	49	44
Nigeria	19	5	11	7	18	30	42
Ireland	20	14	24	29	36	37	40
Switzerland	21	16	20	17	21	29	40
Israel	22	16	21	19	24	30	37
Russian Federation	23	9	10	9	15	25	36
Australia	24	17	19	20	22	26	33
Thailand	25	19	23	20	24	31	33
<b>Top 25 total<sup>1</sup></b>		<b>1,386</b>	<b>1,747</b>	<b>1,621</b>	<b>1,960</b>	<b>2,438</b>	<b>2,809</b>
<b>U.S. total trade</b>		<b>1,594</b>	<b>2,000</b>	<b>1,854</b>	<b>2,288</b>	<b>2,892</b>	<b>3,400</b>
<b>Top 25 as % of total</b>		<b>87.0</b>	<b>87.3</b>	<b>87.4</b>	<b>85.7</b>	<b>84.3</b>	<b>82.6</b>

<sup>1</sup>Top 25 trading partners change each year. Totals represent the top 25 trading partners for each year, not necessarily the top 25 trading partners listed here for 2008.  
**Note:** Numbers may not add to totals due to rounding.

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 2008, from 5 percent of total merchandise trade to 12 percent.

Trade with Canada and Mexico has grown rapidly over the past decade. Trucks carry about 58 percent of the value of goods traded

**Table 2-8. Value and Tonnage of U.S. Merchandise Trade with Canada and Mexico by Transportation Mode: 1998-2008 (billions of current U.S. dollars and millions of short tons)**

Mode	1998		2000		2007		2008	
	Value	Weight	Value	Weight	Value	Weight	Value	Weight
Truck <sup>1</sup>	350	NA	429	NA	555	192	554	182
Rail <sup>1</sup>	68	NA	94	NA	138	154	140	148
Air	30	<1	45	<1	38	<1	41	<1
Water	21	183	33	194	74	241	93	232
Pipeline <sup>1</sup>	11	NA	24	NA	59	95	88	99
Other <sup>1</sup>	23	NA	29	NA	45	7	47	7
<b>Total<sup>1</sup></b>	<b>503</b>	<b>NA</b>	<b>653</b>	<b>NA</b>	<b>909</b>	<b>691</b>	<b>964</b>	<b>668</b>

**Key:** NA = not available.

<sup>1</sup>The Bureau of Transportation Statistics estimated the weight of exports for truck, rail, pipeline, and other modes using weight-to-value ratios derived from imported commodities that vary by country, mode, and commodity.

**Notes:** 1 short ton = 2,000 pounds. Mode "Other" includes shipments transported by mail, other and unknown modes, and shipments through Foreign Trade Zones. Totals for the most recent year differ slightly from the Freight Analysis Framework due to variations in coverage and FAF conversion of values to constant dollars. Numbers may not add to totals due to rounding.

**TABLE 2-7. TOP 25 TRADING PARTNERS OF THE UNITED STATES IN MERCHANDISE TRADE: 1998-2008**

**Source:** U.S. Department of Commerce, International Trade Administration, TradeStats Express, available at [www.ita.doc.gov/](http://www.ita.doc.gov/) as of June 15, 2009.

**TABLE 2-8. VALUE AND TONNAGE OF U.S. MERCHANDISE TRADE WITH CANADA AND MEXICO BY TRANSPORTATION MODE: 1998-2008**

**Source:** U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, Transborder Freight Data, available at [www.bts.gov/transborder](http://www.bts.gov/transborder) as of September 2009.

with these countries. Rail is the second largest mover of freight for the United States with Canada and Mexico.

**Table 2-9. Value of U.S. Exports to and Imports from Canada and Mexico by Land Mode of Transportation: 1998-2008 (millions of current U.S. dollars)**

	1998	2000	2007	2008
<b>Exports to Canada, total</b>	<b>137,745</b>	<b>154,847</b>	<b>226,058</b>	<b>235,681</b>
Truck	114,806	129,825	174,343	178,593
Rail	12,280	12,947	25,497	29,438
Pipeline	93	162	3,334	4,313
Other <sup>1</sup>	10,560	11,913	22,834	23,294
Mail	7	<1	50	43
<b>Exports to Mexico, total</b>	<b>70,174</b>	<b>97,159</b>	<b>118,758</b>	<b>129,587</b>
Truck	60,432	82,389	93,047	100,264
Rail	6,189	10,496	19,340	21,965
Pipeline	73	302	787	1,250
Other <sup>1</sup>	3,470	3,972	5,581	6,107
Mail	<1	<1	3	<1
<b>Imports from Canada, total</b>	<b>162,106</b>	<b>210,270</b>	<b>284,773</b>	<b>301,128</b>
Truck	108,857	127,816	150,404	141,353
Rail	37,374	49,699	65,962	63,757
Pipeline	11,120	23,117	55,016	82,018
Other <sup>1</sup>	4,575	9,571	12,957	13,555
Mail	1.74	4.05	<1	<1
FTZ <sup>2</sup>	178	63	434	445
<b>Imports from Mexico, total</b>	<b>84,103</b>	<b>113,437</b>	<b>167,713</b>	<b>163,478</b>
Truck	65,884	88,669	137,037	134,224
Rail	12,030	21,056	27,060	25,265
Pipeline	2	12	169	193
Other <sup>1</sup>	918	1,574	2,696	2,717
Mail	<1	<1	0	<1
FTZ <sup>2</sup>	2,887	2,126	751	1,079

<sup>1</sup>"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.

<sup>2</sup>Foreign Trade Zones (FTZs) were added as a mode of transport for land import shipments beginning in April 1995. Although FTZs are treated as a mode of transportation in the Transborder 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.

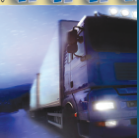
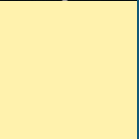
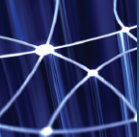
**Note:** Numbers may not add to totals due to rounding.

In addition to total trade with Canada and Mexico, trucks and railroads carry most of the trade in each direction across both borders. Pipelines also carry a significant volume of imports from Canada.

**TABLE 2-9. VALUE OF U.S. EXPORTS TO AND IMPORTS FROM CANADA AND MEXICO BY LAND MODE OF TRANSPORTATION: 1998-2008**

**Source:** U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, Transborder Freight Data, available at [www.bts.gov/transborder](http://www.bts.gov/transborder) as of June 8, 2009.





### III. THE FREIGHT TRANSPORTATION SYSTEM

Freight in America travels over one of the world’s largest and best 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, increasing maintenance requirements, and threatening system performance.



**Table 3-1. Miles of Infrastructure by Transportation Mode: 1980-2007**

	1980	1990	2000	2007	Percent change, 1980 to 2007
<b>Public roads, route miles</b>	3,859,837	3,866,926	3,951,101	4,048,523	4.9
National Highway System (NHS)	N	N	161,189	163,746	N
Interstates	41,120	45,074	46,673	46,934	14.1
Other NHS	N	N	114,516	116,812	N
Other	N	N	3,789,912	3,884,775	N
<b>Strategic Highway Corridor Network (STRAHNET)</b>	N	N	62,066	62,698	N
Interstate	N	N	46,675	46,937	N
Non-Interstate	N	N	15,389	16,031	N
<b>Railroad</b>	183,077 <sup>1</sup>	175,909	170,512	140,134	-23.5
Class I	NA	133,189	120,597	94,313	N
Regional	NA	18,375	20,978	16,930	N
Local	NA	24,337	28,937	28,891	N
<b>Inland waterways</b>					
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
<b>Pipelines</b>					
Oil	218,393	208,752	176,996	166,133	-23.9
Gas	1,051,774	1,189,200	1,369,300	1,520,200	44.5

**Key:** N = not applicable; NA = not available.  
<sup>1</sup>Excludes Class III railroads.

Road infrastructure increased slowly over the past 27 years despite a large increase in the volume of traffic. Between 1980 and 2007, route miles of public roads increased by about 5 percent compared with a 98 percent increase in vehicle miles traveled.

**TABLE 3-1. MILES OF INFRASTRUCTURE BY TRANSPORTATION MODE: 1980-2007**

**Sources:** **Public Roads:** U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues), tables HM-16 and HM-49, available at [www.fhwa.dot.gov/policyinformation/statistics/2007/](http://www.fhwa.dot.gov/policyinformation/statistics/2007/) as of April 1, 2009. **Rail:** Association of American Railroads, *Railroad Facts* (Washington, DC: annual issues). **Navigable channels:** U.S. Army Corps of Engineers, USACE Education, available at [www.ndc.iwr.usace.army.mil](http://www.ndc.iwr.usace.army.mil) as of April 13, 2009. **Great Lakes-St. Lawrence Seaway:** The St. Lawrence Seaway Management Corporation, “The Seaway,” available at [www.greatlakes-seaway.com/en/seaway/facts/index.html](http://www.greatlakes-seaway.com/en/seaway/facts/index.html) as of April 13, 2009. **Oil pipelines: 1980-2000:** Eno Transportation Foundation, *Transportation in America, 2002* (Washington, DC: 2002); **2007:** U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Office of Pipeline Safety, *Pipeline Statistics*, available at [www.phmsa.dot.gov/pipeline/library/data-stats](http://www.phmsa.dot.gov/pipeline/library/data-stats) as of April 13, 2009. **Gas pipelines:** American Gas Association, *Gas Facts* (Arlington, VA: annual issues).

**Table 3-2. Number of U.S. Vehicles, Vessels, and Other Conveyances: 1980-2007**

	1980	1990	2000	2007
<b>Highway</b>	<b>161,490,159</b>	<b>193,057,376</b>	<b>225,821,241</b>	<b>254,403,081</b>
Truck, single-unit 2-axle 6-tire or more	4,373,784	4,486,981	5,926,030	6,806,630
Truck, combination	1,416,869	1,708,895	2,096,619	2,220,995
Truck, total	5,790,653	6,195,876	8,022,649	9,027,625
Trucks as percent of all highway vehicles	3.6	3.2	3.6	3.5
<b>Rail</b>				
Class I, locomotive	28,094	18,835	20,028	24,143
Class I, freight cars <sup>1</sup>	1,168,114	658,902	560,154	460,172
Nonclass I, freight cars <sup>1</sup>	102,161	103,527	132,448	120,463
Car companies and shippers freight cars <sup>1</sup>	440,552	449,832	688,194	805,074
<b>Water</b>	<b>38,788</b>	<b>39,445</b>	<b>41,354</b>	<b>40,695</b>
Nonself-propelled vessels <sup>2</sup>	31,662	31,209	33,152	31,654
Self-propelled vessels <sup>3</sup>	7,126	8,236	8,202	9,041
Oceangoing steam and motor ships <sup>4</sup>	864	636	454	216
U.S. Flag fleet as percent of world fleet <sup>4</sup>	3.5	2.7	1.6	0.7

<sup>1</sup>Beginning with 2001 data, Canadian-owned U.S. railroads are excluded. Canadian-owned U.S. railroads accounted for approximately 176,275 freight cars in 2009.

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

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

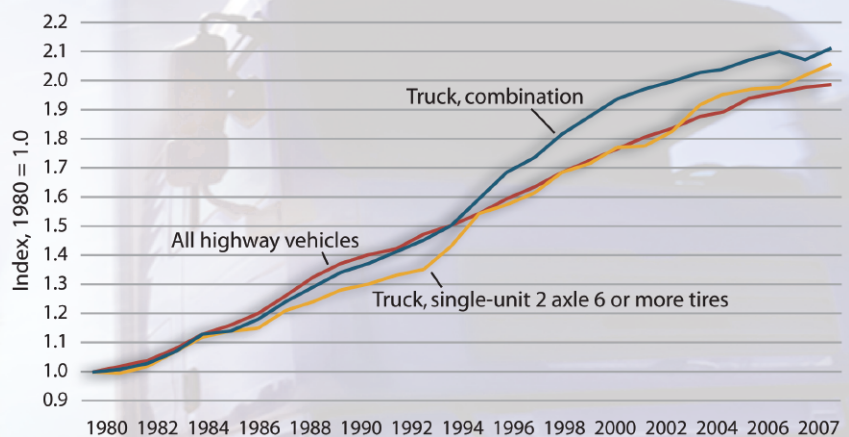
<sup>4</sup>1,000 gross tons and over.

A vast number of vehicles and vessels move goods over the transportation network. The number of commercial trucks climbed 56 percent between 1980 and 2007. 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 decreased by 75 percent over the same period while the world fleet expanded by 33 percent.

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: 1980-2007**



**TABLE 3-2. NUMBER OF U.S. VEHICLES, VESSELS, AND OTHER CONVEYANCES: 1980-2007**

**Sources:** **Highway:** U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues), table VM-1, available at [www.fhwa.dot.gov/policyinformation/statistics/2007/](http://www.fhwa.dot.gov/policyinformation/statistics/2007/) as of April 20, 2009. **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 U.S. Flag fleet:** U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics*, table 1-23, available at [www.bts.gov/publications/national\\_transportation\\_statistics/html/table\\_01\\_23.html](http://www.bts.gov/publications/national_transportation_statistics/html/table_01_23.html) as of April 20, 2009.

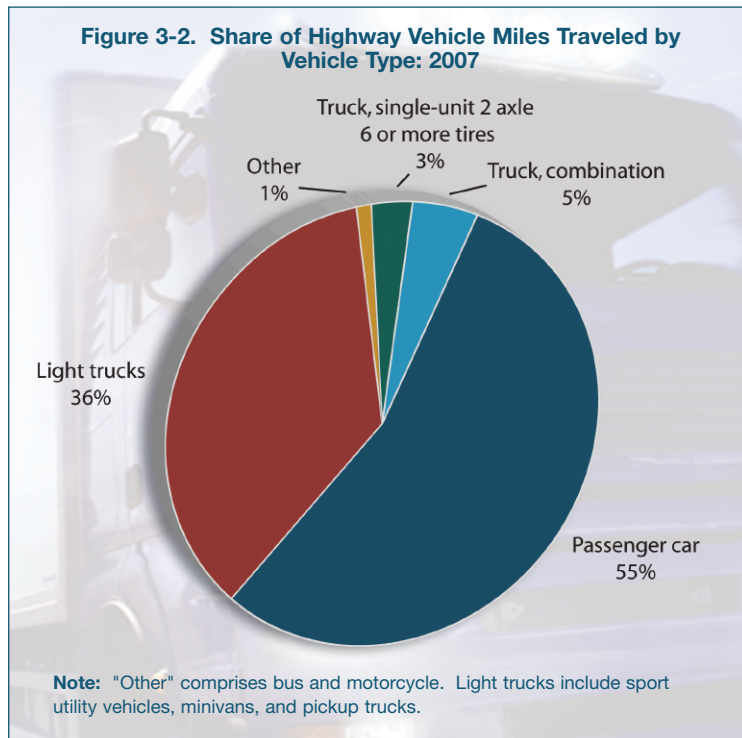
**FIGURE 3-1. HIGHWAY VEHICLE MILES TRAVELED BY TRUCKS AND ALL VEHICLES: 1980-2007**

**Source:** U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues), table VM-1, available at [www.fhwa.dot.gov/policyinformation/statistics/2007/](http://www.fhwa.dot.gov/policyinformation/statistics/2007/) as of April 1, 2009.



Despite doubling over the past two decades, truck traffic remains a relatively small share of highway traffic as a whole. In 2007, commercial trucks accounted for about 8 percent of highway vehicle miles traveled. Approximately two-thirds of commercial truck travel is by truck tractors hauling semitrailers and by other combinations, while the remaining one-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 more



**Table 3-3. Trucks and Truck Miles by Average Weight 1987-2002<sup>1</sup>**

Average weight (pounds)	1987		1992		1997		2002		Percent Change, 1987 to 2002	
	Number (thousands)	VMT (millions)	Number (thousands)	VMT (millions)	Number (thousands)	VMT (millions)	Number (thousands)	VMT (millions)	Number	VMT
<b>Total</b>	<b>3,624</b>	<b>89,972</b>	<b>4,008</b>	<b>104,987</b>	<b>4,701</b>	<b>147,876</b>	<b>5,415</b>	<b>145,624</b>	<b>49</b>	<b>62</b>
<b>Light-heavy</b>	<b>1,030</b>	<b>10,768</b>	<b>1,259</b>	<b>14,012</b>	<b>1,436</b>	<b>19,815</b>	<b>1,914</b>	<b>26,256</b>	<b>86</b>	<b>144</b>
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
<b>Medium-heavy</b>	<b>766</b>	<b>7,581</b>	<b>732</b>	<b>8,143</b>	<b>729</b>	<b>10,129</b>	<b>910</b>	<b>11,766</b>	<b>19</b>	<b>55</b>
19,501 to 26,000	766	7,581	732	8,143	729	10,129	910	11,766	19	55
<b>Heavy-heavy</b>	<b>1,829</b>	<b>71,623</b>	<b>2,017</b>	<b>82,832</b>	<b>2,536</b>	<b>117,931</b>	<b>2,591</b>	<b>107,602</b>	<b>42</b>	<b>50</b>
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.

<sup>1</sup>Excludes trucks with an average weight of 10,000 pounds or less.

**Notes:** Weight includes the empty weight of the vehicle plus the average weight of the load carried. Numbers may not add to totals due to rounding.

**FIGURE 3-2. SHARE OF HIGHWAY VEHICLE MILES TRAVELED BY VEHICLE TYPE: 2007**

**Source:** U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues), table VM-1, available at [www.fhwa.dot.gov/policyinformation/statistics/2007/](http://www.fhwa.dot.gov/policyinformation/statistics/2007/) of April 1, 2009.

**TABLE 3-3. TRUCKS AND TRUCK MILES BY AVERAGE WEIGHT 1987-2002<sup>1</sup>**

**Sources:** U.S. Department of Commerce, Census Bureau, *2002 Vehicle Inventory and Use Survey: United States*, EC02TV-US (Washington, DC: 2004), available at [www.census.gov/prod/ec02/ec02tv-us.pdf](http://www.census.gov/prod/ec02/ec02tv-us.pdf) as of April 13, 2009; U.S. Department of Commerce, Census Bureau, *1992 Truck Inventory and Use Survey: United States*, TC92-T-52 (Washington, DC: 1995), available at [www.census.gov/prod/ec97/97tv-us.pdf](http://www.census.gov/prod/ec97/97tv-us.pdf) as of April 13, 2009.

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 vehicle miles traveled because in most cases 80,000 pounds is the maximum weight allowed on the highway system without special permits.

Federal and state governments are concerned about truck weight because of the damage that heavy trucks can do to roads and bridges. To monitor truck weight, approximately 200 million weighs were made in

2008, about 60 percent were weigh-in motion and 40 percent were static. Less than 1 percent of weighs discover violations.

**Table 3-4. Commercial Vehicle Weight Enforcement Activities: 2005-2008 (thousands)**

	2005	2006	2007	2008
All weighs	230,465	(R) 229,451	217,444	200,419
Weigh-in-motion	136,381	(R) 142,599	132,258	119,826
Static weighs <sup>1</sup>	94,084	(R) 86,852	85,186	80,593
Semiportable scales	494	423	426	358
Fixed scales	93,038	(R) 85,900	84,214	79,645
Portable scales	552	(R) 529	547	591
Violations <sup>2</sup>	568	(R) 621	530	555
Axle weight violations	275	(R) 270	234	249
Gross weight violations	118	(R) 150	127	120
Bridge weight violations	174	(R) 202	170	186
Permits <sup>3</sup>	3,626	4,598	4,828	5,216
Non-divisible trip permits	2,712	3,399	3,743	3,693
Non-divisible annual permits	233	251	332	322
Divisible trip permits	288	426	398	490
Divisible annual permits	393	522	354	710

**Key:** R = revised.

<sup>1</sup>Static weighs include the total number of vehicles weighed from semi portable, portable, and fixed scales.

<sup>2</sup>Violations include those from axle, gross, and bridge formula weight limits.

<sup>3</sup>Permits issued are for divisible and non-divisible loads on a trip or on an annual basis, as well as the over width movement of a divisible load.

**Note:** Incomplete data from D.C. (2008), Hawaii (2008), Indiana (2005), Michigan (2008), Pennsylvania (2005 and 2006), and South Dakota (2006 and 2007).

**TABLE 3-4. COMMERCIAL VEHICLE WEIGHT ENFORCEMENT ACTIVITIES: 2005-2008**

**Source:** U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Annual State Certifications of Size and Weight Enforcement on Federal-aid Highways, as prescribed under CFR Part 657, personal communication, July 15, 2009.



Most freight moving by truck uses the Interstate System. Although all vehicle miles of travel are divided about equally among Interstate highways, the balance of the National Highway System (NHS), and other public roads, the Interstate System carries about one-half of truck travel and three-fourths of travel by freight-hauling trucks serving places at least 50 miles apart.

**Table 3-5. Share of Vehicle Miles of Travel by Highway System (percent)**

	<b>Interstate Highway</b>	<b>Balance of National Highway System</b>	<b>Other Highways</b>
All vehicles	35	30	35
All trucks	49	26	25
Freight-hauling trucks serving places at least 50 miles apart	75	20	6

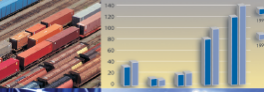
**Notes:** Percentages are based on the Interstate Highway, Balance of NHS, and Other Highways mileage included in the FAF network. Shares by vehicle type may differ from other FHWA publications. Numbers may not add to totals due to rounding.



**TABLE 3-5. SHARE OF VEHICLE MILES OF TRAVEL BY HIGHWAY SYSTEM**

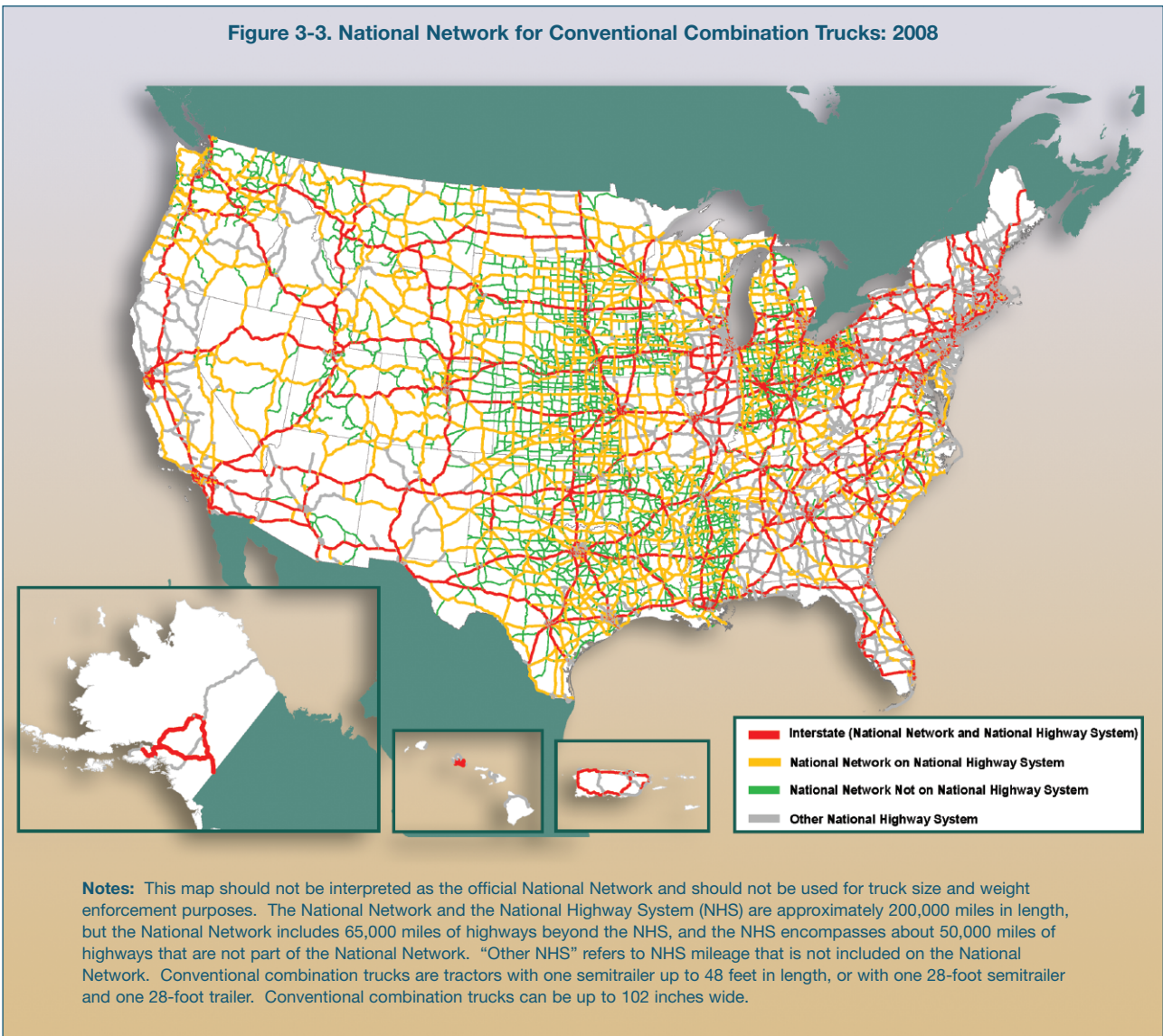
**Source:** U.S. Department of Transportation, Federal Highway Administration, Freight Analysis Framework, version 2.2, 2007.





The National Network was established by Congress in 1982 to facilitate interstate commerce and encourage regional and national economic growth by requiring states to allow conventional combination trucks on the Interstate System and portions of the Federal-aid Primary System of highways. The National Network, which is approximately 200,000 miles in length, has not changed significantly in 27 years.

**Figure 3-3. National Network for Conventional Combination Trucks: 2008**

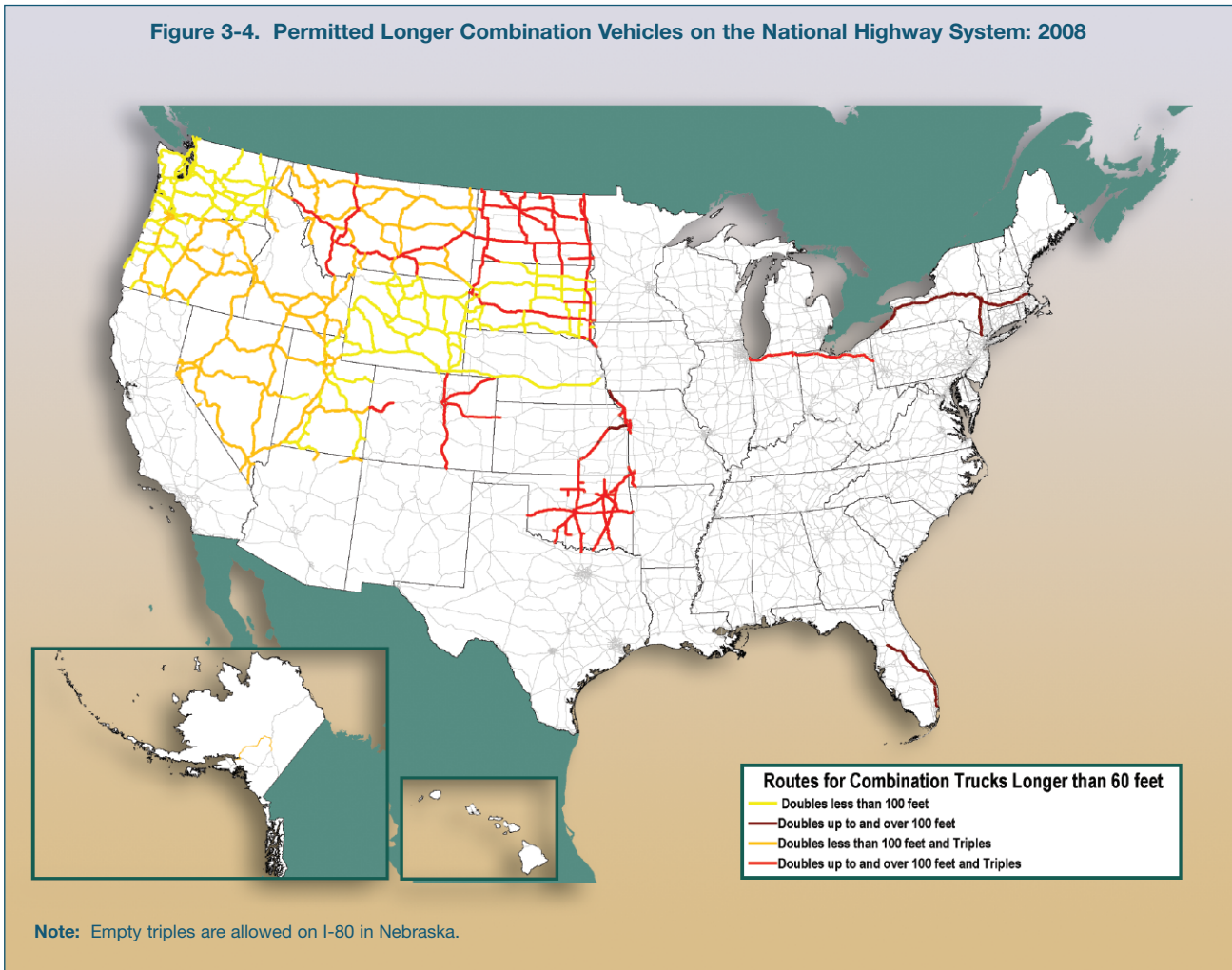


**FIGURE 3-3. NATIONAL NETWORK FOR CONVENTIONAL COMBINATION TRUCKS: 2008**

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



Figure 3-4. Permitted Longer Combination Vehicles on the National Highway System: 2008



Longer Combination Vehicles (LCVs) are tractors pulling a semitrailer longer than 28 feet and a trailer longer than 28 feet, a semitrailer longer than 28 feet and a trailer no more than 28 feet long, or a 28-foot semitrailer and two 28-foot trailers. Although all states allow conventional combinations consisting of a 28-foot semitrailer and a 28-foot trailer, only fourteen states and six state turnpike authorities allow LCVs on at least some parts of their road networks. Allowable routes for LCVs have been frozen since 1991.



**FIGURE 3-4. PERMITTED LONGER COMBINATION VEHICLES ON THE NATIONAL HIGHWAY SYSTEM: 2008**  
**Source:** U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, special compilation by the Freight Operations and Technology Team, 2008.



**Table 3-6. Trucks, Truck Miles, and Average Distance by Range of Operations and Jurisdictions: 2002**

	<b>Number of Trucks (thousands)</b>	<b>Truck Miles (millions)</b>	<b>Miles per Truck (thousands)</b>
<b>Total</b>	<b>5,521</b>	<b>145,173</b>	<b>26</b>
Off the road	183	2,263	12
50 miles or less	2,942	42,531	15
51 to 100 miles	685	19,162	28
101 to 200 miles	244	11,780	48
201 to 500 miles	232	17,520	76
501 miles or more	293	26,706	91
Not reported	716	25,061	35
Not applicable	226	150	1
Operated in Canada	2	72	43
Operated in Mexico	2	29	19
Operated within the home base state	4,196	84,974	20
Operated in states other than the home base state	496	40,901	83
Not reported	599	19,046	32
Not applicable	226	150	1

**Notes:** Includes trucks registered to companies and individuals in the United States except pickups, minivans, other light vans, and sport utility vehicles. Numbers may not add to totals due to rounding.

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 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 30 percent of the mileage.

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

**Source:** U.S. Department of Commerce, Census Bureau, *2002 Vehicle Inventory and Use Survey: United States*, EC02TV-US, table 3a (Washington, DC: 2004), available at [www.census.gov/prod/ec02/ec02tv-us.pdf](http://www.census.gov/prod/ec02/ec02tv-us.pdf) as of March 30, 2009.

Three-fourths of the miles traveled by trucks larger than panels, pickups, minivans, other light vans, and government-owned vehicles are for the movement of products from electronics to sand and gravel. Most of the remaining mileage is for empty backhauls and empty shipping containers.

**Table 3-7. Truck Miles by Products Carried: 2002<sup>1</sup>**

<b>Products carried</b>	<b>Millions of miles</b>
<b>Total<sup>2</sup></b>	<b>145,173</b>
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 prepared foodstuffs	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 <sup>3</sup>	150
No product carried	28,977

<sup>1</sup>Excludes pickups, panels, minivans, sport utilities, and station wagons.

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

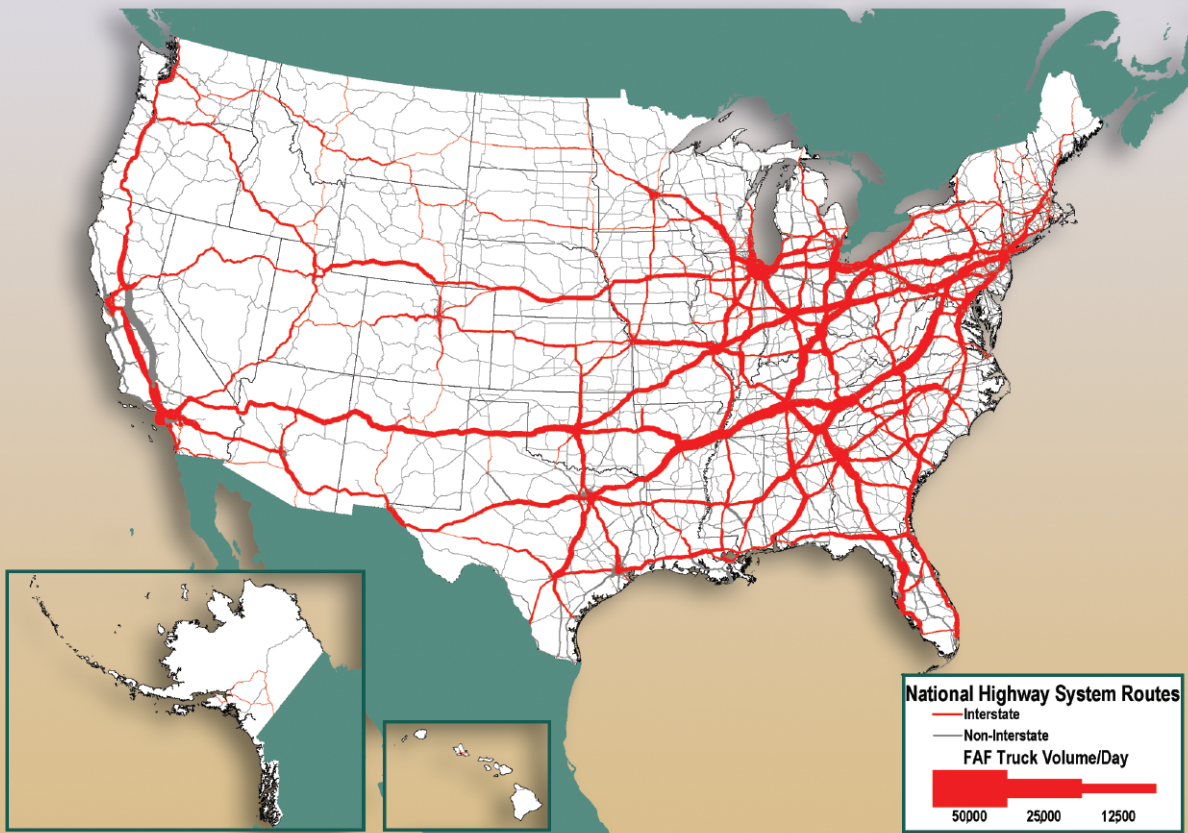
<sup>3</sup>Vehicles not in use. When the respondent had partial-year ownership of the vehicle, annual miles were adjusted to reflect miles traveled when not owned by the respondent.

**TABLE 3-7. TRUCK MILES BY PRODUCTS CARRIED: 2002**

**Source:** U.S. Department of Commerce, Census Bureau, 2002 Vehicle Inventory and Use Survey: United States, EC02TV-US (Washington, DC: 2004), available at [www.census.gov/prod/ec02/ec02tv-us.pdf](http://www.census.gov/prod/ec02/ec02tv-us.pdf) as of March 30, 2009.



Figure 3-5. Average Daily Long-Haul Truck Traffic on the National Highway System: 2002



**Note:** Long-haul freight trucks serve locations at least 50 miles apart, excluding trucks that are used in intermodal movements.

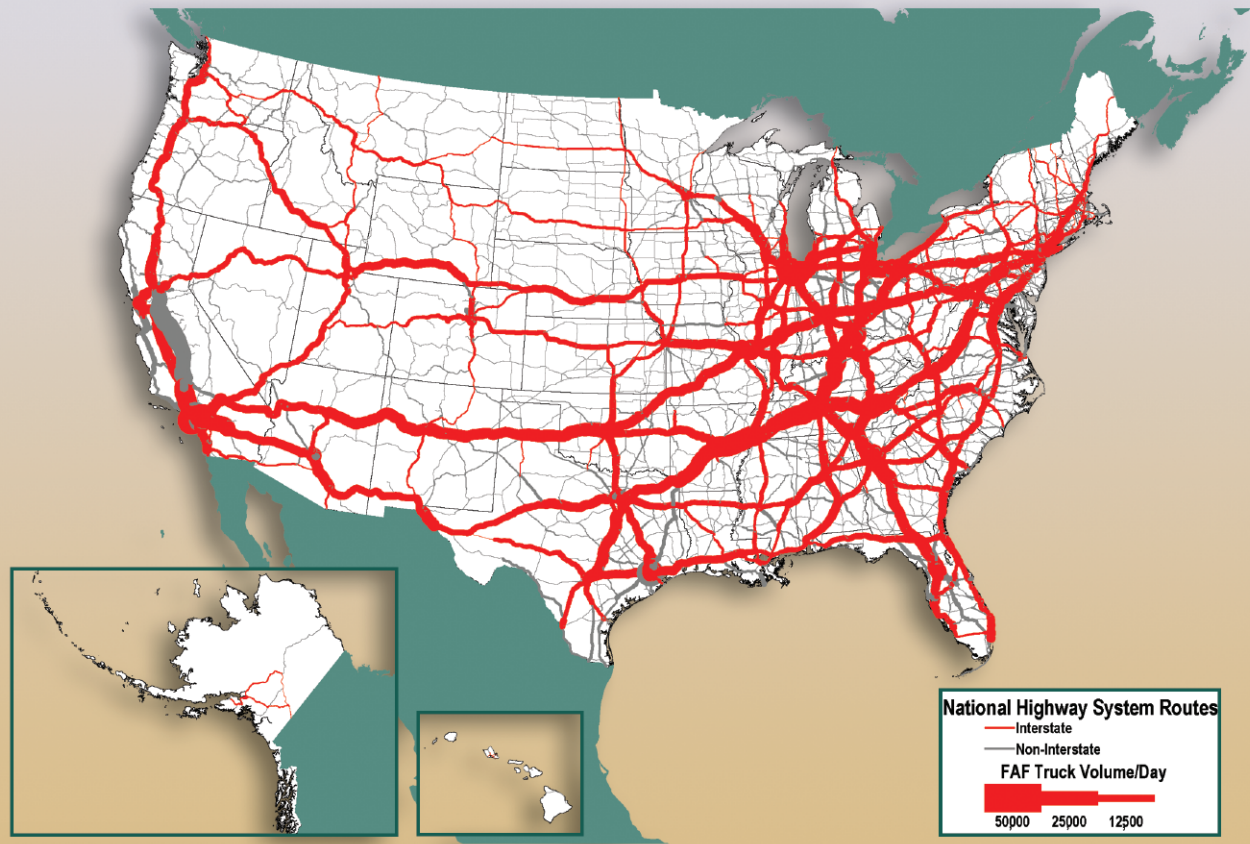
Long-haul truck traffic carrying commodities between places at least 50 miles apart is concentrated on major routes connecting population centers, ports, border crossings, and other major hubs of activity. Except for Route 99 in California, most of the heaviest traveled routes are on the Interstate System.

FIGURE 3-5. 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.



Figure 3-6. Average Daily Long-Haul Truck Traffic on the National Highway System: 2035



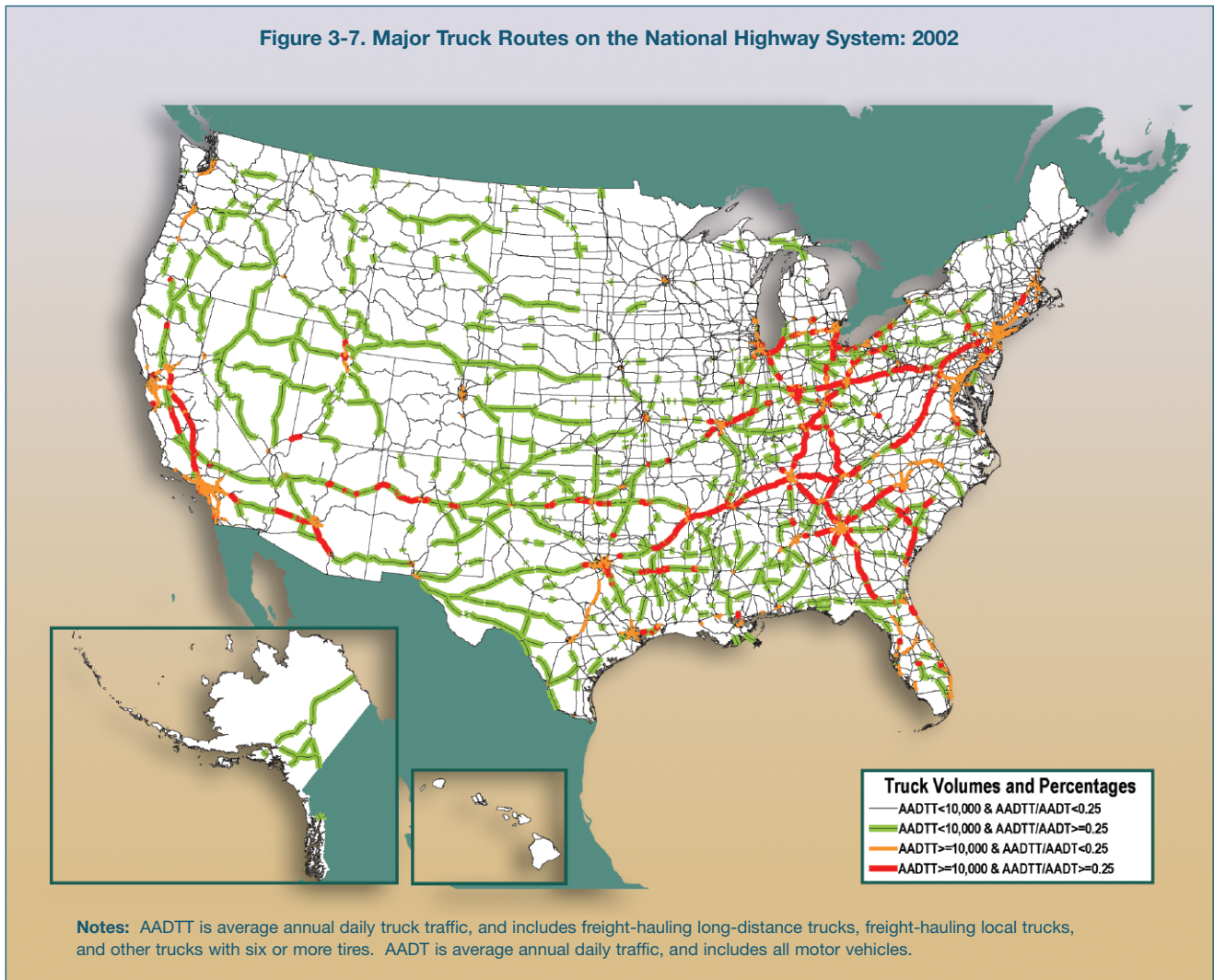
**Note:** Long-haul freight trucks serve locations at least 50 miles apart, excluding trucks that are used in intermodal movements.

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. Forecast data indicate that truck travel may reach 600 million miles per day.

FIGURE 3-6. 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 3-7. 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 NHS carry more than 10,000 trucks per day on sections where at least every fourth vehicle is a truck.

FIGURE 3-7. 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.

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 3-8. Major Truck Routes on the National Highway System: 2035

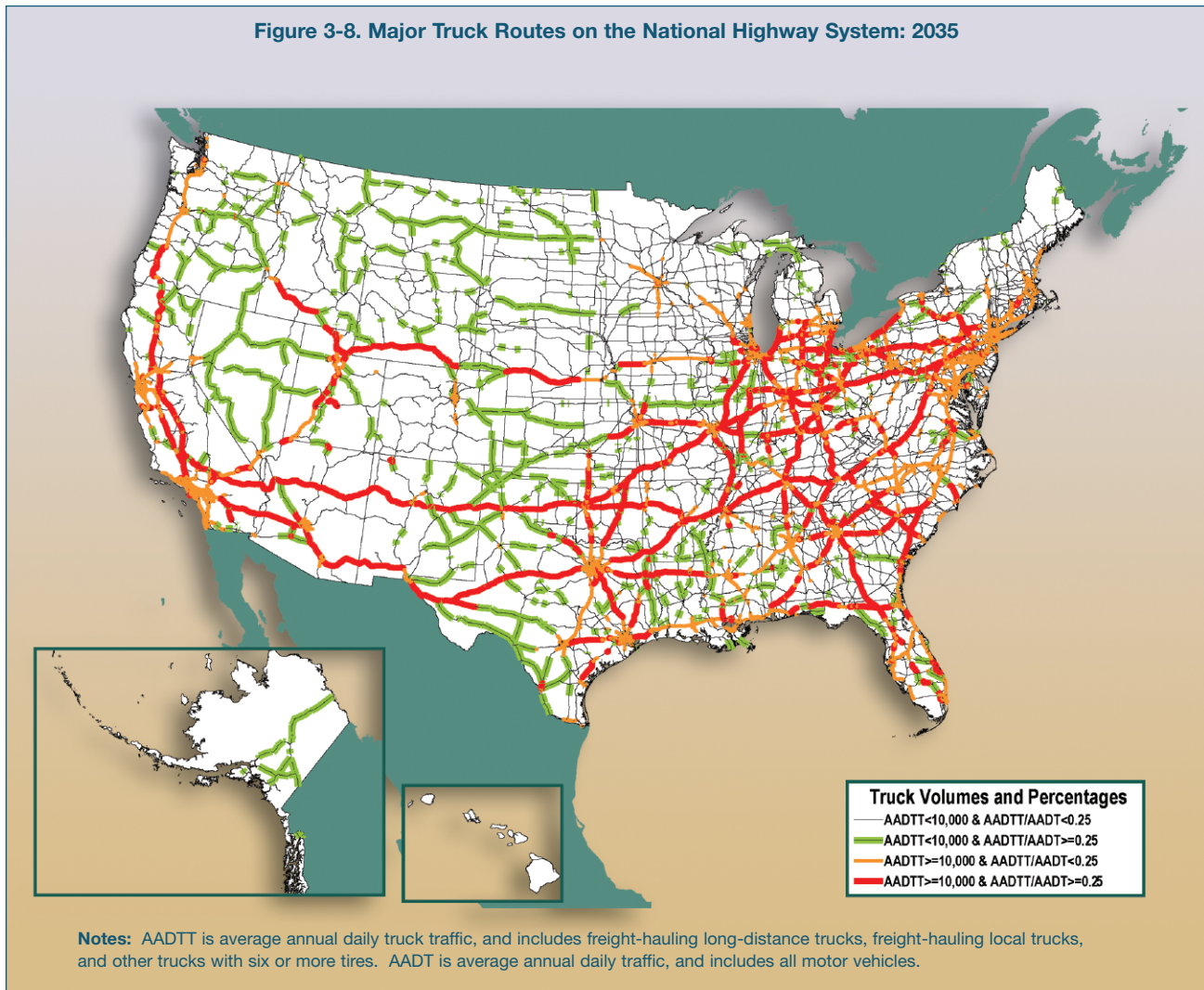
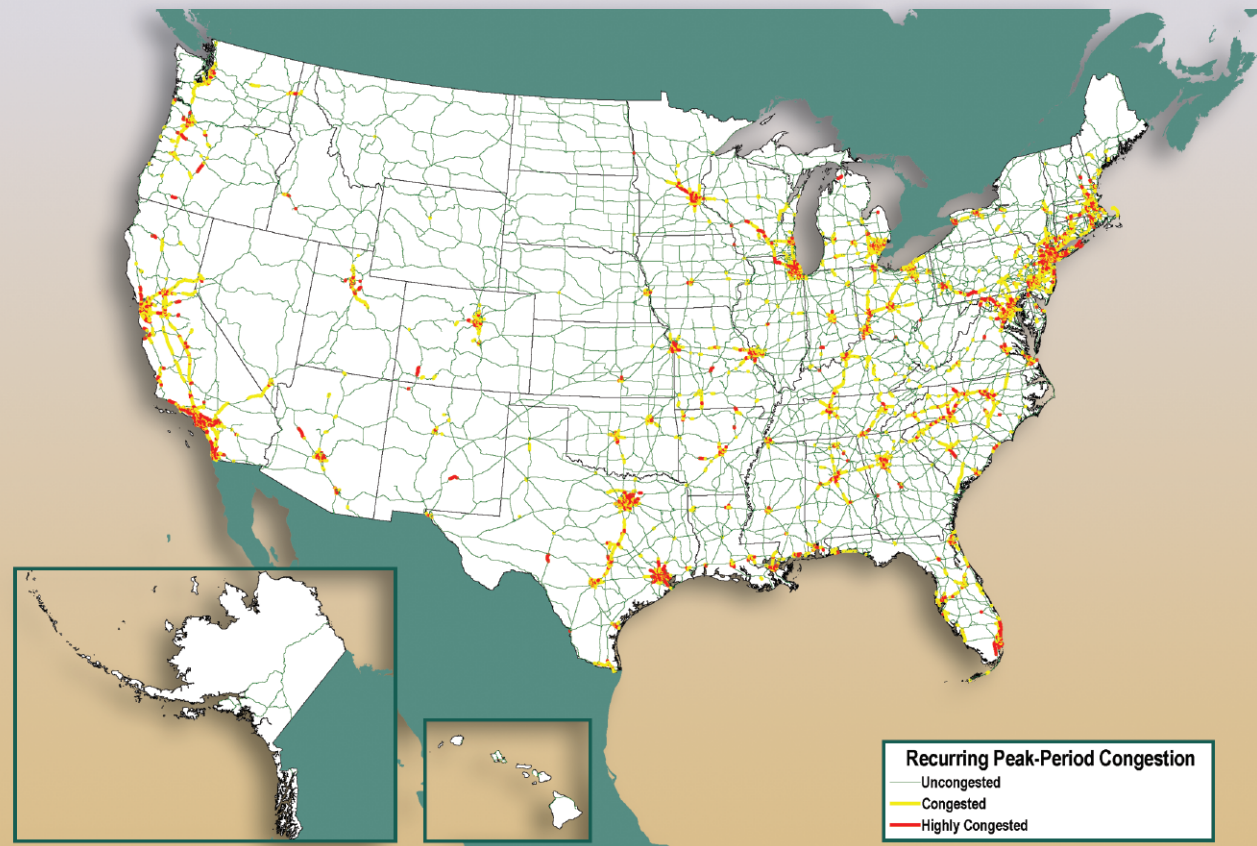


FIGURE 3-8. MAJOR TRUCK ROUTES ON THE NATIONAL HIGHWAY SYSTEM: 2035

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



Figure 3-9. Peak-Period Congestion on the National Highway System: 2002



**Notes:** Highly congested segments are stop-and-go conditions with volume/service flow ratios greater than 0.95. Congested segments reduce traffic speeds with volume/service flow ratios between 0.75 and 0.95.

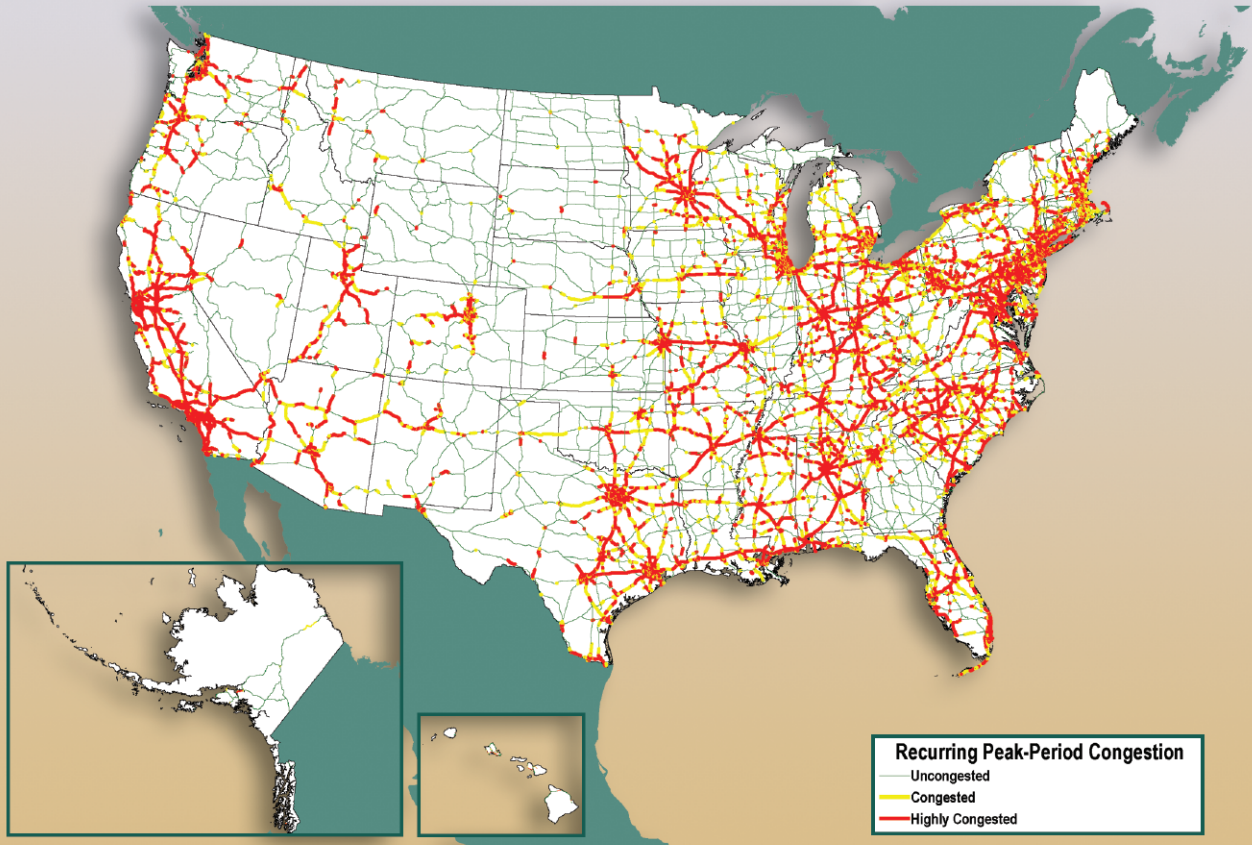
Recurring congestion caused by volumes of passenger vehicles and trucks that exceed capacity on roadways during peak periods is concentrated primarily in major metropolitan areas. In 2002, peak-period congestion resulted in traffic slowing below posted speed limits on more than 10,600 miles of the NHS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

FIGURE 3-9. 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.

Assuming no changes in network capacity, 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 3-10. Peak-Period Congestion on the National Highway System: 2035**



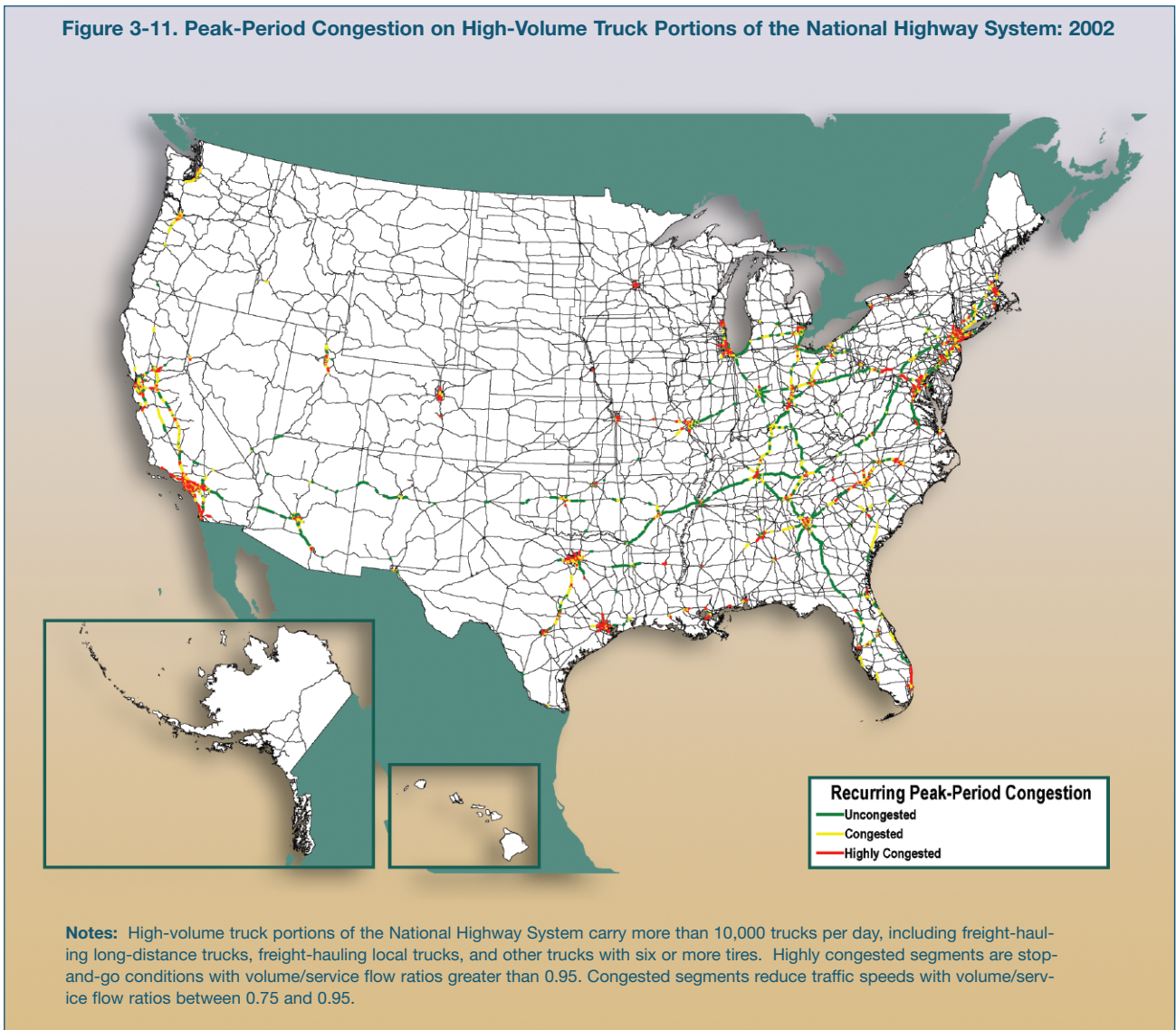
**Notes:** Highly congested segments are stop-and-go conditions with volume/service flow ratios greater than 0.95. Congested segments reduce traffic speeds with volume/service flow ratios between 0.75 and 0.95.

**FIGURE 3-10. PEAK-PERIOD CONGESTION ON THE NATIONAL HIGHWAY SYSTEM: 2035**

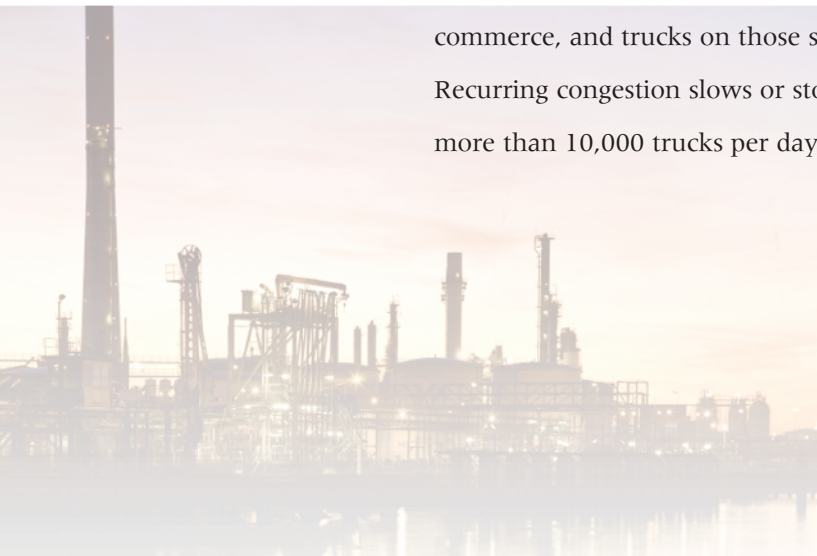
**Source:** U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 2.2, 2007.



Figure 3-11. Peak-Period Congestion on High-Volume Truck Portions of the National Highway System: 2002



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.

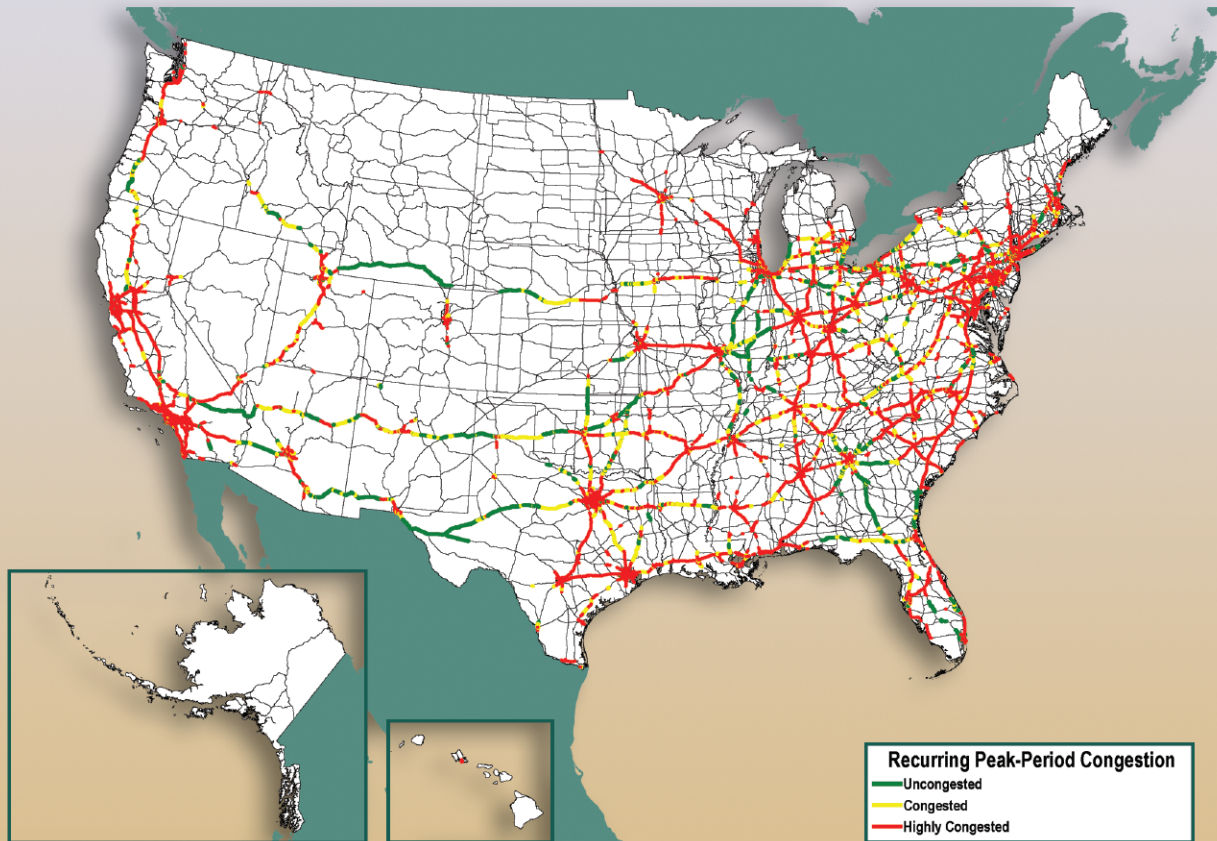


**FIGURE 3-10. PEAK-PERIOD CONGESTION ON HIGH-VOLUME TRUCK PORTIONS OF THE NATIONAL HIGHWAY SYSTEM: 2002**  
**Source:** U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 2.2, 2007.



Assuming no change in network capacity, 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 3-12. Peak-Period Congestion on High-Volume Truck Portions of the National Highway System: 2035**



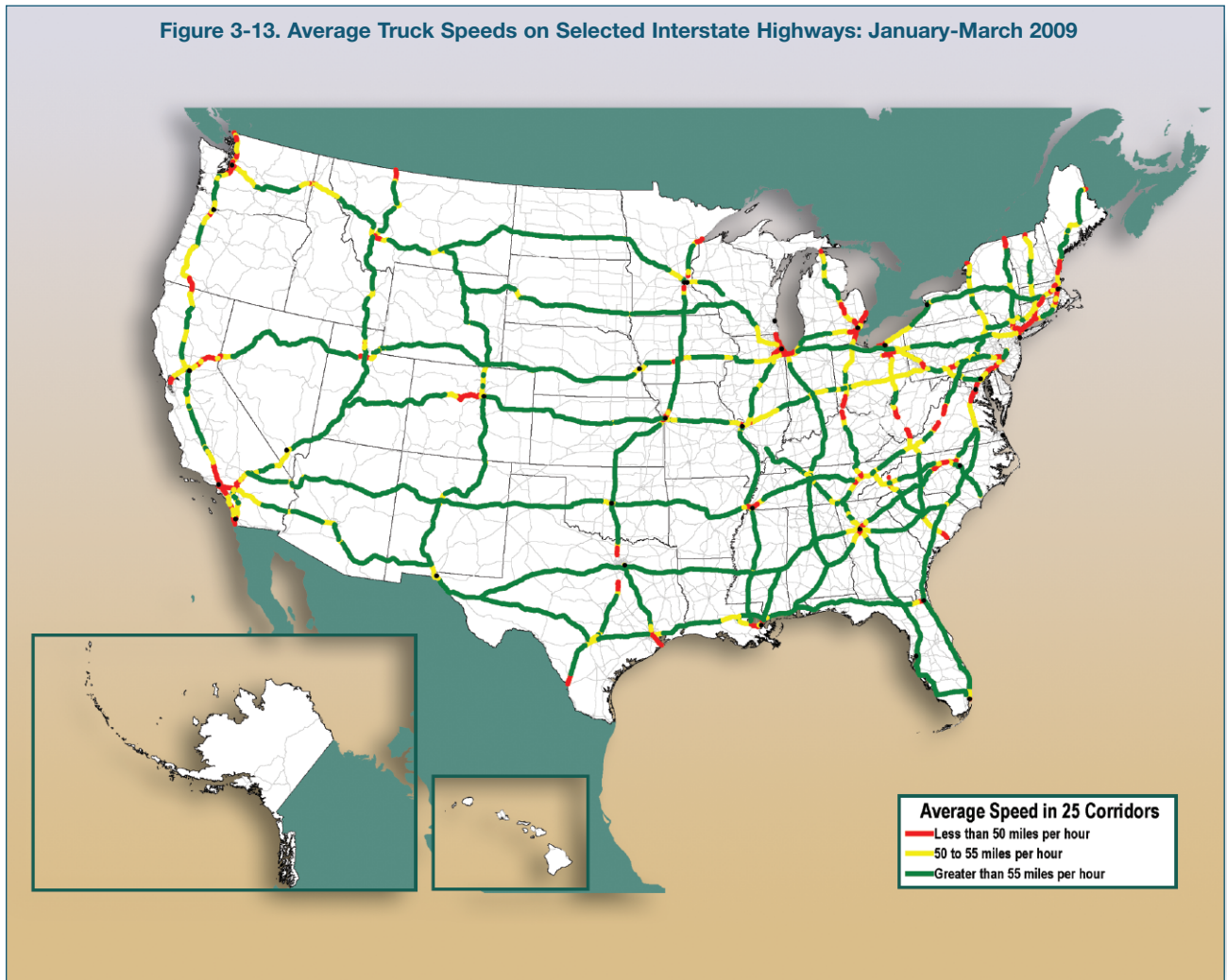
**Notes:** High-volume truck portions of the National Highway System carry more than 10,000 trucks per day, including freight-hauling long-distance trucks, freight-hauling local trucks, and other trucks with six or more tires. Highly congested segments are stop-and-go conditions with volume/service flow ratios greater than 0.95. Congested segments reduce traffic speeds with volume/service flow ratios between 0.75 and 0.95.

**FIGURE 3-12. PEAK-PERIOD CONGESTION ON HIGH-VOLUME TRUCK PORTIONS OF 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 3-13. Average Truck Speeds on Selected Interstate Highways: January-March 2009



In addition to calculating peak-period congestion from traffic volumes, as shown in Figures 3-9 through 3-12, the Federal Highway Administration (FHWA) directly measures operating speeds and reliability on major truck routes by tracking more than 500,000 trucks. Average truck speeds drop below 55 miles per hour near major urban areas, border crossings and gateways, and in mountainous terrain.



FIGURE 3-13. AVERAGE TRUCK SPEEDS ON SELECTED INTERSTATE HIGHWAYS: JANUARY-MARCH 2009

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Performance Measurement Program, 2009.

Truck speed and travel time reliability statistics from the cooperative research initiative between private industry and FHWA can be summarized by location, date, and time of day. As expected, average speeds in the peak period between 6 a.m. and 9 a.m. and between 4 p.m. and 7 p.m. are less than those recorded in the non-peak period between 10 a.m. and 2 p.m. on all routes.

**Table 3-8. Average Truck Speeds on Selected Interstate Highways: January-March 2009**

Interstate Route	Average Operating Speed	Peak Period Average Speed	Non-Peak Period Average Speed
5	52.8	51.8	53.1
10	57.4	56.7	57.6
12	56.1	54.2	56.6
15	56.6	56.0	56.7
20	59.2	58.7	59.2
24	56.5	55.7	56.5
25	58.8	58.2	59.0
26	54.2	53.7	54.4
35	56.5	55.7	56.8
40	58.5	58.1	58.6
45	55.0	54.0	55.6
55	56.9	56.6	56.9
59	60.3	60.1	60.4
65	57.8	57.1	57.9
70	56.0	55.5	56.1
75	55.8	55.1	56.1
76	50.2	49.8	50.3
77	52.2	51.6	52.2
80	57.2	56.8	57.3
81	54.8	54.6	54.9
84	53.6	52.6	53.8
85	55.4	54.6	55.5
87	53.9	53.6	54.1
90	56.3	55.7	56.3
91	53.1	52.4	53.0
94	56.4	55.7	58.4
95	55.6	54.6	55.8

**TABLE 3-8. AVERAGE TRUCK SPEEDS ON SELECTED INTERSTATE HIGHWAYS: JANUARY-MARCH 2009**

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Performance Measurement Program, 2009.





**Table 3-9. Maximum Posted Speed Limits on Rural Interstates: 2009 (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 <sup>1</sup>	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	<sup>2</sup> 65	<sup>2</sup> 65
Louisiana	70	70
Maine	65	65
Maryland	65	65
Massachusetts	65	65
Michigan	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	65	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	<sup>3</sup> 70	<sup>3</sup> 75
Utah	<sup>4</sup> 75	<sup>4</sup> 75
Vermont	65	65
Virginia	<sup>5</sup> 65	<sup>5</sup> 65
Washington	60	70
West Virginia	70	70
Wisconsin	65	65
Wyoming	75	75

<sup>1</sup>Urban Interstate.

<sup>2</sup>Effective July 10, 2007, the posted speed limit is 70 miles per hour (mph) in designated areas on I-75 and I-71.

<sup>3</sup>In sections of I-10 and I-20 in rural West Texas, the speed limit for passenger cars and light trucks is 80 mph. For large trucks, the speed limit is 70 mph in the daytime and 65 mph at night. For cars, it is also 65 mph at night.

<sup>4</sup>Based on 2008 Utah House Bill 406, which became effective on May 5, 2008, portions of I-15 have a posted limit of 80 mph.

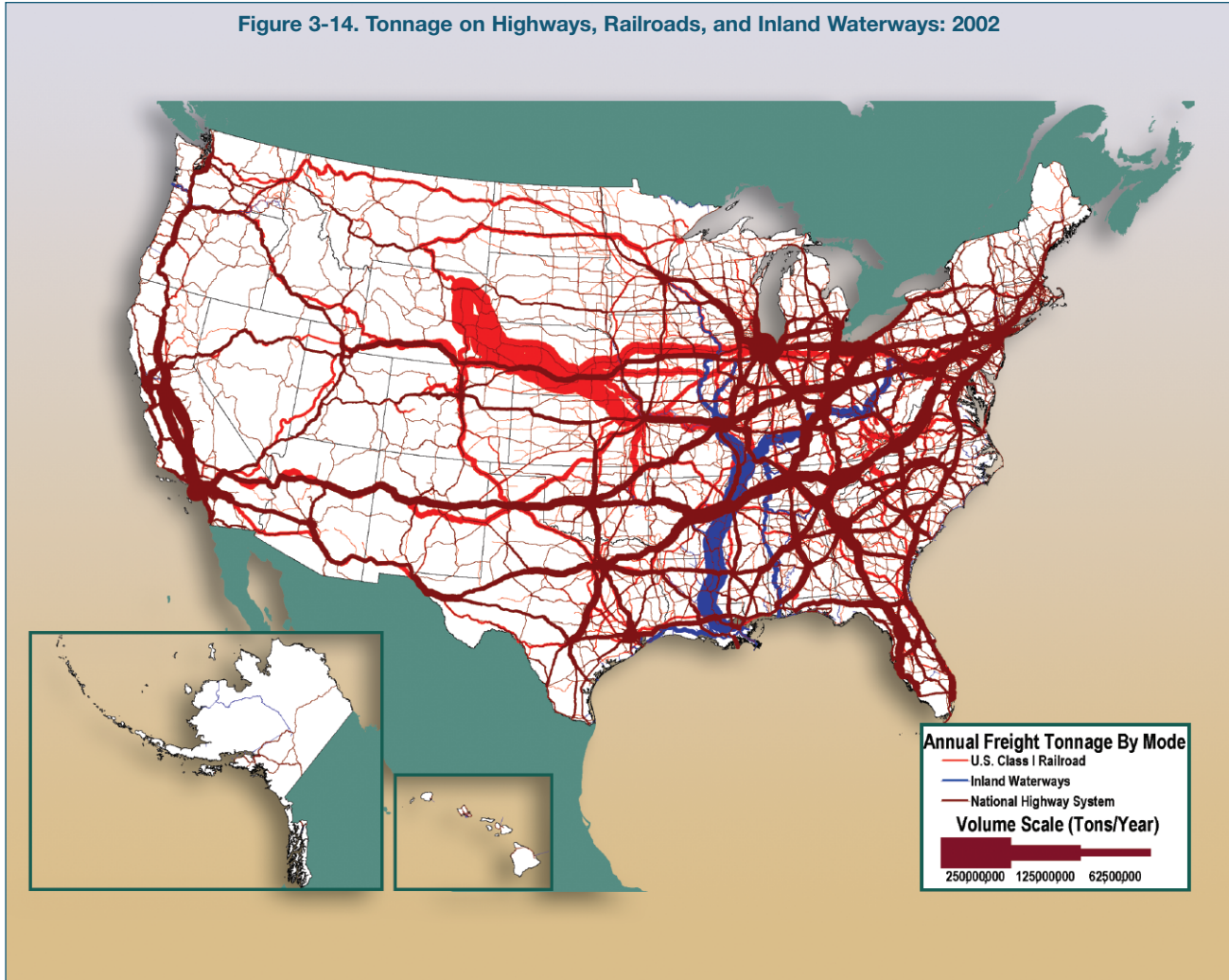
<sup>5</sup>Effective July 1, 2006, the posted speed limit on I-85 may be as high as 70 mph.

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 3-9. MAXIMUM POSTED SPEED LIMITS ON RURAL INTERSTATES: 2009**

**Source:** Insurance Institute for Highway Safety, Maximum Posted Speed Limits for Passenger Vehicles, available at [www.iihs.org/laws/speedlimits.aspx](http://www.iihs.org/laws/speedlimits.aspx) as of June 12, 2009.

Trucks carry most of the tonnage and value of freight, but railroads and waterways carry significant volumes over long distances. The biggest rail volume movement is coal between the Powder River Basin and the Midwest, and the largest inland waterways volume movement is along the Lower Mississippi River.

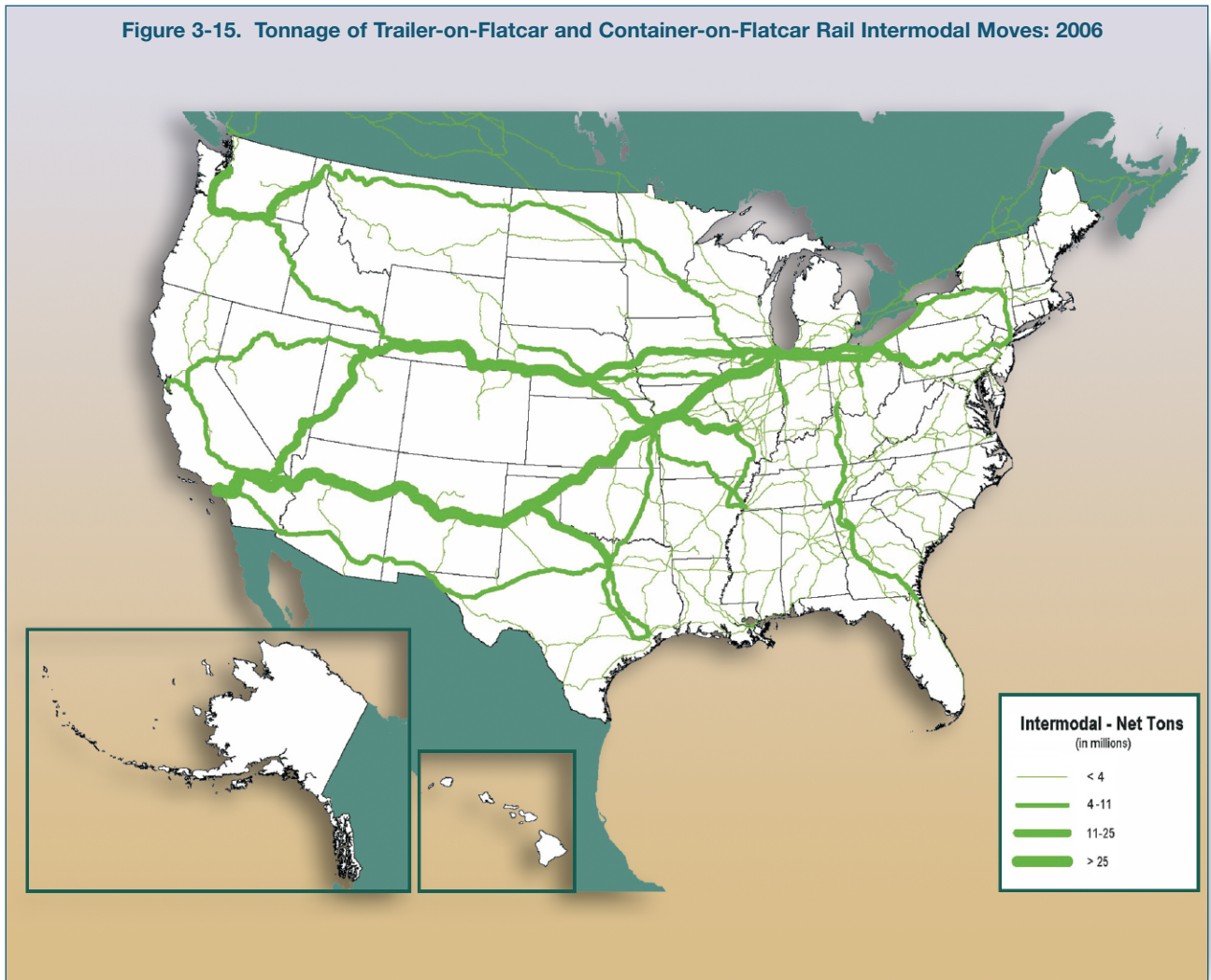


**FIGURE 3-14. TONNAGE ON HIGHWAYS, RAILROADS, AND INLAND WATERWAYS: 2002**

**Sources:** **Highways:** U.S. Department of Transportation, Federal Highway Administration, Freight Analysis Framework, version 2.2, 2007. **Rail:** Based on Surface Transportation Board, Annual Carload Waybill Sample and rail freight flow assignments done by Oak Ridge National Laboratory. **Inland Waterways:** 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. Water flow assignments done by Oak Ridge National Laboratory.



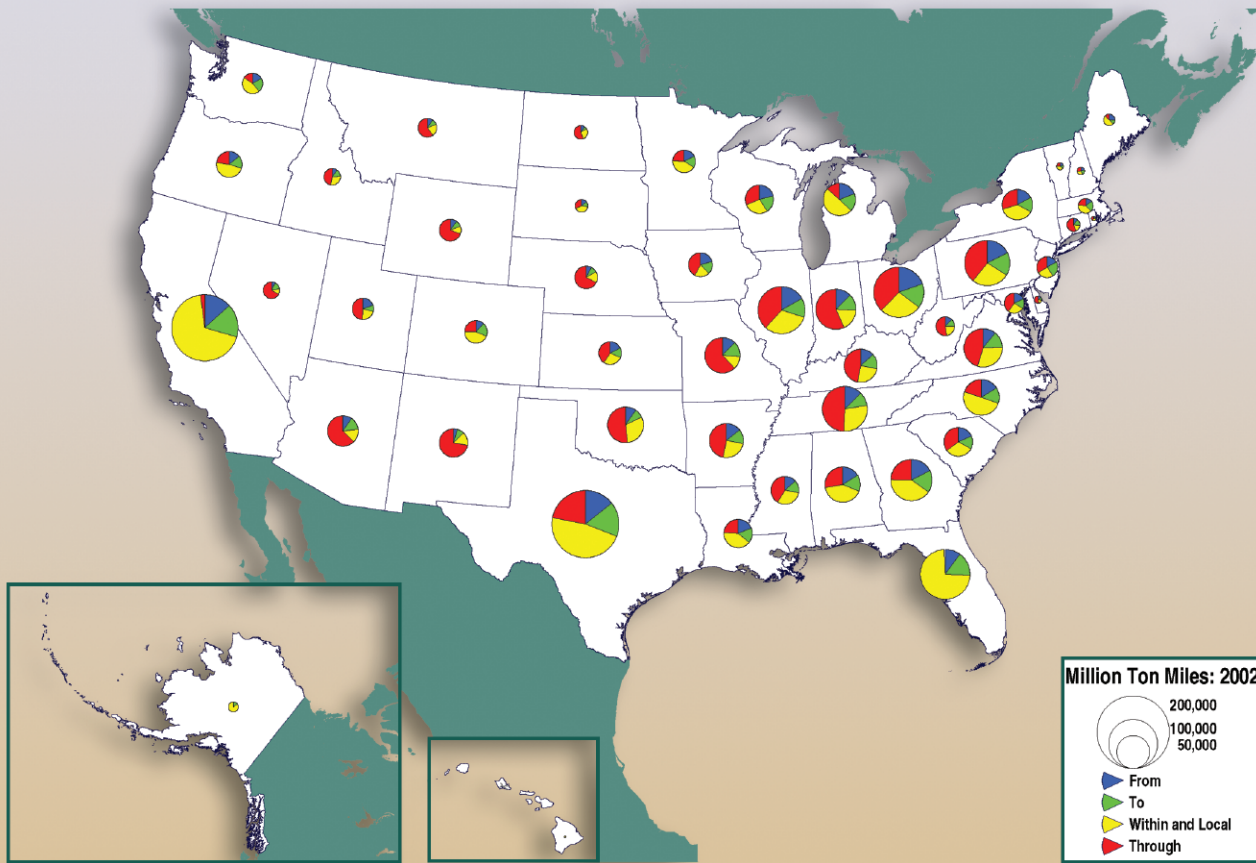
Figure 3-15. Tonnage of Trailer-on-Flatcar and Container-on-Flatcar Rail Intermodal Moves: 2006



The classic forms of rail intermodal transportation are trailer-on-flatcar and container-on-flatcar, and these are spread throughout the United States. The largest concentrations are on routes between the Pacific Coast ports and Chicago and between Chicago and New York.

FIGURE 3-15. TONNAGE OF TRAILER-ON-FLATCAR AND CONTAINER-ON-FLATCAR RAIL INTERMODAL MOVES: 2006  
Source: U.S. Department of Transportation, Federal Railroad Administration, November 2008.

Figure 3-16. Ton Miles of Truck Shipments by State: 2002



**Notes:** Ton miles include domestic flows by truck, domestic portions of international trade by truck to and from maritime ports, and domestic portions of international flows by truck to and from Canada and Mexico. See Table 3-10 for values and Technical Notes for method of calculation.

Trucks moved 2.1 trillion ton miles of commodities in 2002, one-third of which was for portions of commodity flows passing through states, one-third split roughly evenly between portions of long-distance flows entering and leaving states, and one-third for intrastate and local flows. Long-distance interstate commerce accounts for a majority of ton miles in all but five states, and through movements account for a majority of ton miles in 17 states.

FIGURE 3-16. TON MILES OF TRUCK SHIPMENTS BY STATE: 2002

**Sources:** **Ton miles between places over 50 miles apart:** U.S. Department of Transportation, Federal Highway Administration, Office of Freight management and Operations, Freight Analysis Framework, version 2.3, August 2009. **Ton miles between places less than 50 miles apart (Local):** Ibid., and U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, 2002 Commodity Flow Survey, July 2009.

**Table 3-10. Ton Miles of Truck Shipments by State: 2002  
(millions)**

State	Leaving	Entering	Within	Local	Through	Total
Alabama	9,021	8,491	22,871	227	15,612	56,221
Alaska	70	1,165	6,706	53	0	7,994
Arizona	4,297	6,084	5,798	470	27,495	44,144
Arkansas	7,567	7,039	13,191	77	24,661	52,535
California	22,584	27,560	114,709	1,847	3,545	170,246
Colorado	3,118	5,088	11,234	200	6,471	26,111
Connecticut	1,082	1,493	1,494	172	5,509	9,751
Delaware	441	564	589	94	1,915	3,603
District of Columbia	9	36	2	5	116	168
Florida	10,371	15,835	74,428	936	905	102,475
Georgia	13,054	13,045	30,039	242	18,433	74,814
Hawaii	0	0	0	17	0	17
Idaho	1,539	2,034	2,933	1,389	6,992	14,887
Illinois	15,828	12,298	29,653	262	35,928	93,969
Indiana	9,104	9,129	12,598	17	40,183	71,031
Iowa	6,062	4,930	5,652	201	12,278	29,122
Kansas	4,665	3,761	7,182	152	10,824	26,585
Kentucky	6,831	7,417	12,634	188	23,849	50,919
Louisiana	7,386	6,620	15,381	91	9,312	38,791
Maine	2,119	956	3,647	280	1,025	8,026
Maryland	3,897	3,450	5,337	151	8,557	21,392
Massachusetts	1,838	2,839	4,452	353	2,885	12,367
Michigan	9,447	8,797	23,751	432	6,507	48,934
Minnesota	4,579	4,250	10,915	40	6,261	26,046
Mississippi	5,129	5,329	11,470	358	15,528	37,815
Missouri	7,148	7,887	6,770	18	35,474	57,297
Montana	1,859	1,741	3,832	36	11,049	18,517
Nebraska	2,045	2,356	3,709	408	17,549	26,067
Nevada	1,137	2,210	1,707	57	10,205	15,315
New Hampshire	857	873	917	297	1,149	4,093
New Jersey	3,822	5,319	5,674	60	7,567	22,442
New Mexico	1,710	3,098	5,390	376	27,881	38,455
New York	7,527	6,938	16,164	380	12,990	43,999
North Carolina	9,468	8,354	29,062	23	11,675	58,582
North Dakota	1,063	615	2,518	544	5,791	10,531
Ohio	20,485	16,249	27,478	618	39,260	104,089
Oklahoma	5,701	4,815	17,247	353	30,210	58,326
Oregon	4,734	5,156	15,432	224	7,525	33,070
Pennsylvania	15,360	14,528	23,501	62	34,332	87,783
Rhode Island	264	195	232	270	700	1,662
South Carolina	7,309	5,642	12,524	26	13,833	39,335
South Dakota	1,361	1,208	3,416	431	2,917	9,332
Tennessee	10,875	8,480	23,140	1,064	42,170	85,729
Texas	25,061	29,114	82,239	181	38,349	174,944
Utah	4,560	2,247	4,894	62	11,475	23,238
Vermont	706	462	1,184	296	859	3,507
Virginia	7,273	8,833	19,649	347	29,789	65,890
Washington	3,691	4,934	10,078	25	3,285	22,013
West Virginia	2,341	2,400	3,835	252	9,842	18,671
Wisconsin	8,230	7,661	10,787	13	12,102	38,793
Wyoming	2,522	2,195	2,530	312	16,915	24,474

**Notes:** Ton miles include domestic flows by truck, domestic portions of international trade by truck to and from maritime ports, and domestic portions of international flows by truck to and from Canada and Mexico.

**TABLE 3-10. TON MILES OF TRUCK SHIPMENTS BY STATE: 2002**

**Sources:** **Ton miles between places over 50 miles apart:** U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 2.3, August 2009. **Ton miles between places less than 50 miles apart (Local):** Ibid., and U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, 2002 Commodity Flow Survey, July 2009.



## Technical Notes on Calculating Truck Shipments by State

Ton miles for shipments by truck among places at least 50 miles apart are estimated by assigning flows in the Freight Analysis Framework (FAF) to the highway network as described in the report on Freight Traffic Analysis at [www.ops.fhwa.dot.gov/freight/freight\\_analysis/faf/faf2\\_reports/reports7/index.htm](http://www.ops.fhwa.dot.gov/freight/freight_analysis/faf/faf2_reports/reports7/index.htm). Truck movements carrying international trade to and from maritime ports are counted as originating or terminating at the port, while truck movements across land borders are counted as originating or ending in Canada or Mexico. If the origins and destinations of international trade by truck through maritime ports were treated the same as by truck across land borders, ton miles for each state would remain the same, but the shares entering, leaving, within, and passing through coastal states would change slightly.

Local ton miles for shipments by truck among places less than 50 miles are estimated by multiplying the FAF tonnage originating in the state that was not assigned to the network by the ratio of ton miles to tons for shipments less than 50 miles in the 2002 Commodity Flow Survey. The ratio of ton miles to tons is the average distance traveled weighted by the weight of the shipments. The average for the United States was substituted for Minnesota, which has suppressed values in the 2002 Commodity Flow Survey. Local ton miles are counted with the state of origin. While some local traffic crosses state lines, the ton miles are very small and nationwide data to allocate that local traffic to flows entering and leaving each state are not available.

Except for truck moves of foreign trade to and from maritime ports, estimates of long-distance and local ton miles do not include truck portions of shipments using more than one mode. Inclusion of the truck portions of intermodal shipments would only increase national ton miles between one-half and two percent, depending on the trucking share of postal, parcel, and courier shipments. This estimated increase is based on the difference between total truck ton miles and truck-only ton miles plus the ton miles for postal, parcel, and courier shipments in the Commodity Flow Survey.<sup>1</sup>

<sup>1</sup>U.S. Department of Commerce, Census Bureau, 2002 Commodity Flow Survey, EC02TCF-US, December 2004, tables 1a and 2a.

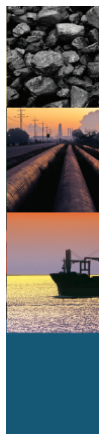
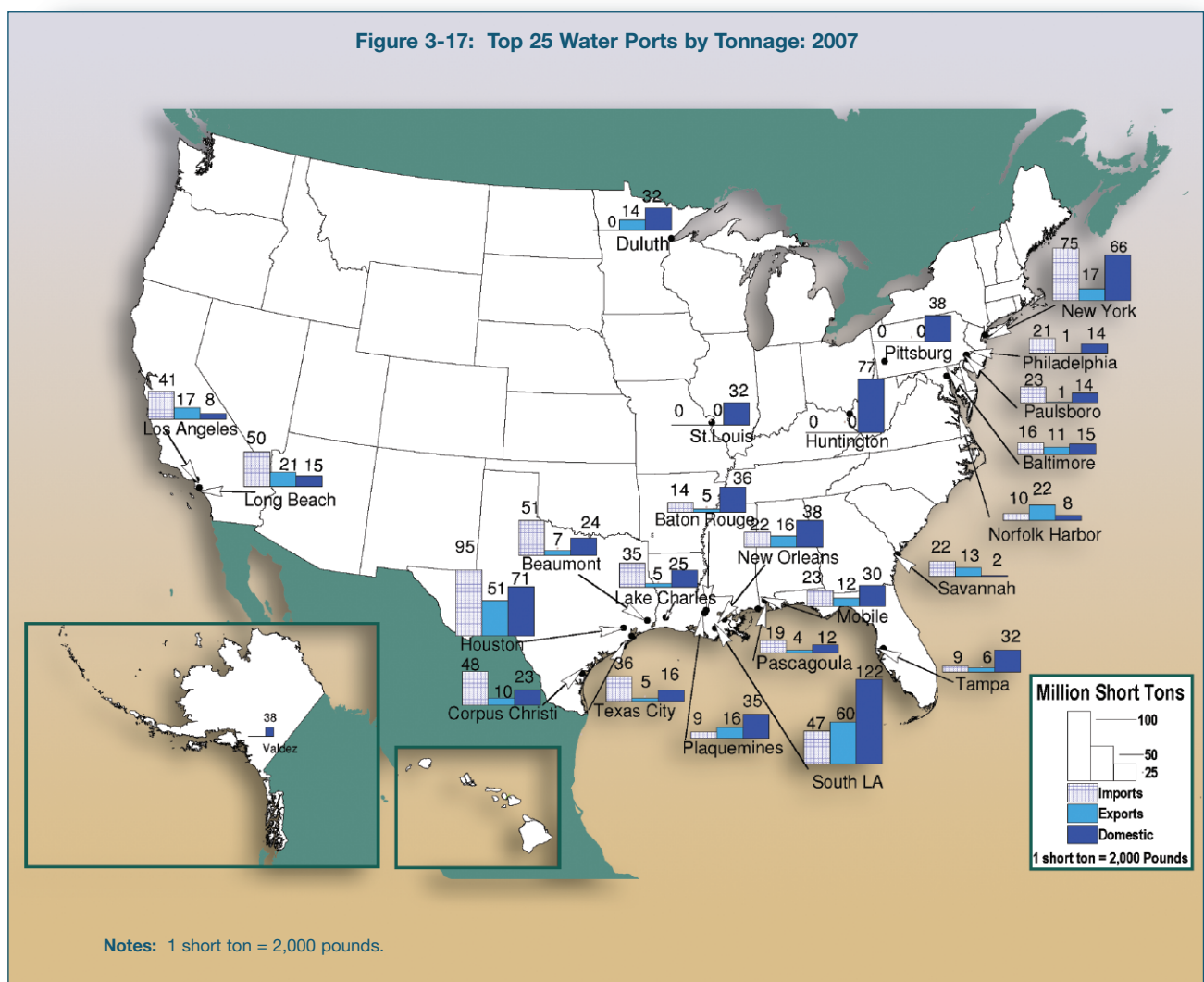




Figure 3-17: Top 25 Water Ports by Tonnage: 2007



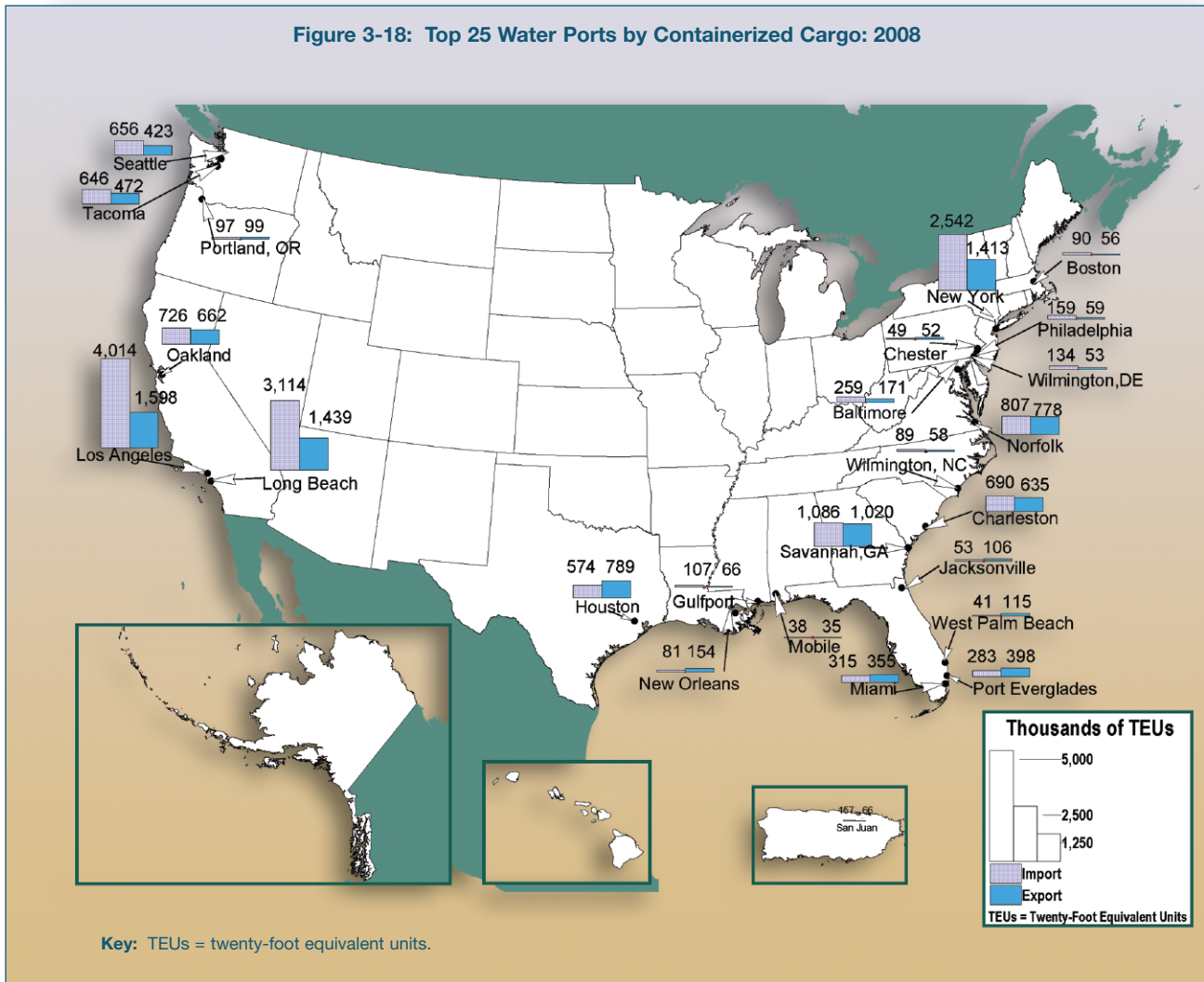
The top 25 water ports handle about two-thirds of the weight of all foreign and domestic goods moved by water. These goods are primarily bulk commodities such as coal, crude petroleum, and grain.



FIGURE 3-17: TOP 25 WATER PORTS BY TONNAGE: 2007

Source: U.S. Army Corps of Engineers, 2007 *Waterborne Commerce of the United States, Part 5, National Summaries* (New Orleans, LA: 2007), table 5-2.

Figure 3-18: Top 25 Water Ports by Containerized Cargo: 2008



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 32 percent of all container traffic at water ports in the United States. Container trade at these two ports nearly doubled between 1998 and 2008, slightly higher than the growth rate reported for container cargo overall.

FIGURE 3-18: TOP 25 WATER PORTS BY CONTAINERIZED CARGO: 2008

Source: U.S. Department of Transportation, Maritime Administration, U.S. Waterborne Container Trade by U.S. Custom Ports, 1997-2008, based on data provided by Port Import/Export Reporting Service, available at [www.marad.dot.gov/library\\_landing\\_page/data\\_and\\_statistics/Data\\_and\\_Statistics.htm](http://www.marad.dot.gov/library_landing_page/data_and_statistics/Data_and_Statistics.htm) as of June 12, 2009.



**Table 3-11. Top 25 Airports by Landed Weight of All-Cargo Operations: 2000-2007<sup>1</sup>**

Airport	2007 Rank	Landed weight (thousands of short tons)				
		2000	2004	2005	2006	2007
Anchorage, AK (Ted Stevens Anchorage International) <sup>2</sup>	1	8,084	9,844	10,364	10,588	10,562
Memphis, TN (Memphis International)	2	6,318	8,885	9,343	9,425	9,772
Louisville, KY (Louisville International-Standiford Field)	3	3,987	4,388	4,591	5,015	5,216
Miami, FL (Miami International)	4	2,929	3,423	3,550	3,591	3,715
Los Angeles, CA (Los Angeles International)	5	2,892	3,062	2,927	3,627	3,431
Indianapolis, IN (Indianapolis International)	6	2,884	2,314	2,545	2,627	2,652
New York, NY (John F. Kennedy International)	7	2,793	2,898	2,811	2,615	2,557
Chicago, IL (O'Hare International)	8	2,062	2,359	2,412	2,208	2,201
Newark, NJ (Newark Liberty International)	9	1,961	1,765	1,870	1,867	1,873
Oakland, CA (Metropolitan Oakland International)	10	1,811	1,703	1,797	1,798	1,811
Fort Worth, TX (Dallas/Fort Worth International)	11	1,691	1,431	1,655	1,722	1,753
Ontario, CA (Ontario International)	12	1,220	1,326	1,344	1,401	1,394
Philadelphia, PA (Philadelphia International)	13	1,454	1,371	1,401	1,366	1,375
Atlanta, GA (William B. Hartsfield International)	14	1,090	1,162	1,014	1,180	1,261
Honolulu, HI (Honolulu International)	15	692	970	828	979	1,134
San Francisco, CA (San Francisco International)	16	1,267	740	797	829	1,039
Houston, TX (George Bush Intercontinental)	17	480	697	710	696	769
Chicago/Rockford, IL (Chicago/Rockford International)	18	654	677	696	696	737
Portland, OR (Portland International)	19	882	718	747	730	713
Phoenix, AZ (Sky Harbor International)	20	920	801	778	726	711
Seattle, WA (Seattle-Tacoma International)	21	1,060	531	709	709	691
Denver, CO (Denver International)	22	900	763	763	711	642
Minneapolis, MN (Minneapolis-St Paul International/Wold-Chamberlain)	23	622	678	702	620	612
Fort Worth, TX (Fort Worth Alliance)	24	508	374	501	644	557
Salt Lake City, UT (Salt Lake City International)	25	751	621	590	548	535
<b>Top 25 airports<sup>3</sup></b>		<b>52,381</b>	<b>54,526</b>	<b>55,955</b>	<b>56,973</b>	<b>57,715</b>
<b>United States, all airports<sup>4</sup></b>		<b>74,753</b>	<b>74,297</b>	<b>76,091 (R)</b>	<b>76,362</b>	<b>76,583</b>
<b>Top 25 as % of U.S. total</b>		<b>70.1</b>	<b>73.4</b>	<b>73.5</b>	<b>(R) 74.6</b>	<b>75.4</b>

**Key:** R = revised.

<sup>1</sup>Dedicated to the exclusive transportation of cargo, all-cargo operations do not include aircraft carrying passengers that also may be carrying cargo. Aircraft landed weight is the certificated maximum gross landed weight of the aircraft as specified by the aircraft manufacturers.

<sup>2</sup>Anchorage includes a large proportion of all-cargo operations in-transit.

<sup>3</sup>Airport rankings change each year. Totals represent the top 25 airports for each year, not necessarily the top 25 airports listed here for 2007.

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

**Note:** 1 short ton = 2,000 pounds.

The Federal Aviation Administration reports that Anchorage International and Memphis International are two of the most important U.S. airports that handle all-cargo aircraft. All-cargo aircraft do not include aircraft carrying passengers as well as cargo.

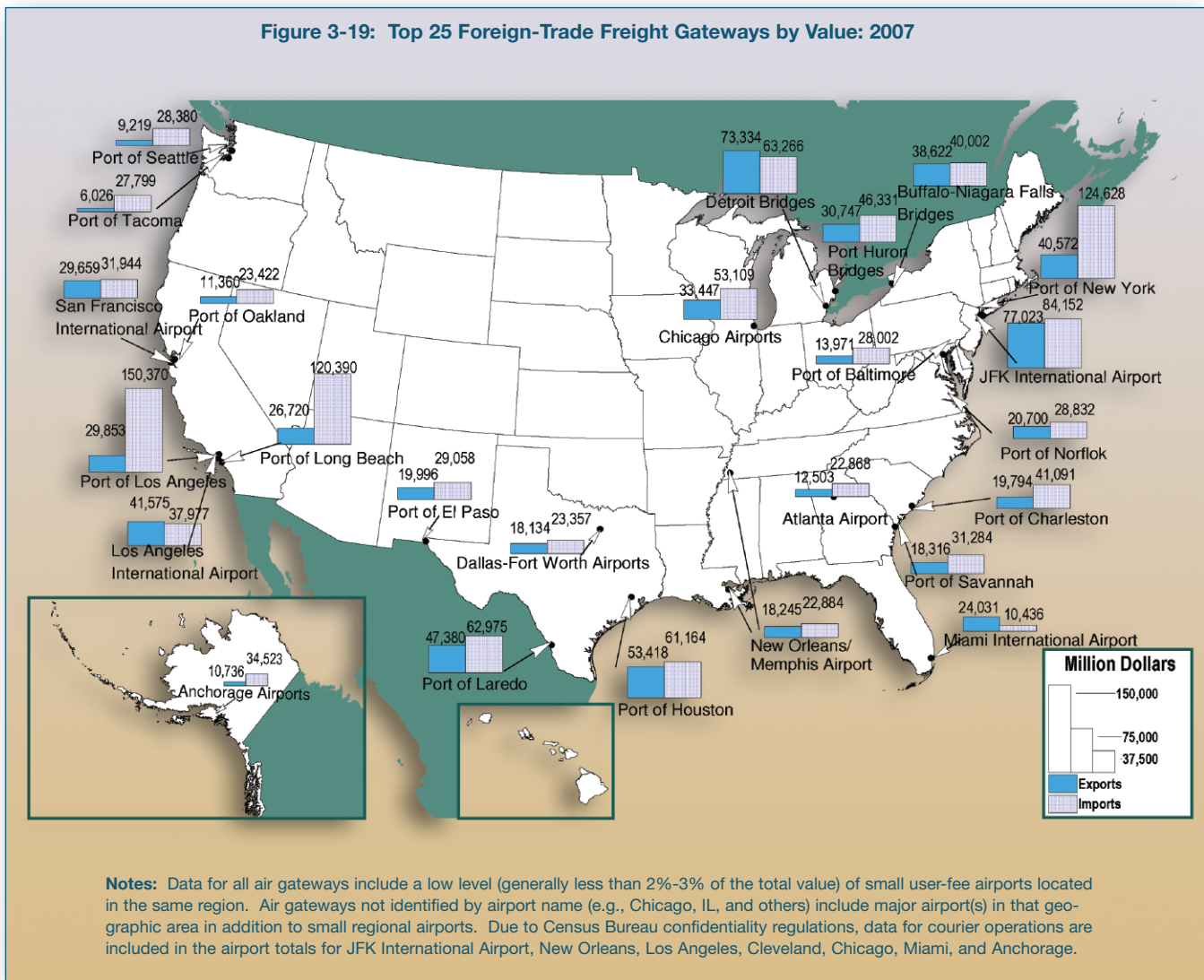


**TABLE 3-11. TOP 25 AIRPORTS BY LANDED WEIGHT OF ALL-CARGO OPERATIONS: 2000-2007<sup>1</sup>**

**Source:** U.S. Department of Transportation, Federal Aviation Administration, Air Carrier Activity Information System (ACAIS) database, All-Cargo Data, available at

[www.faa.gov/airports\\_airtraffic/airports/planning\\_capacity/passenger\\_allcargo\\_stats/passenger/media/cy07\\_cargo.pdf](http://www.faa.gov/airports_airtraffic/airports/planning_capacity/passenger_allcargo_stats/passenger/media/cy07_cargo.pdf) as of April 13, 2009.

Figure 3-19: Top 25 Foreign-Trade Freight Gateways by Value: 2007

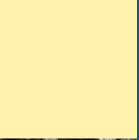


Transportation facilities that move international trade into and out of the United States demonstrate the importance of all modes and intermodal combinations to global connectivity. The top 25 foreign-trade gateways measured by value of shipments are comprised of 11 water ports, 5 land-border crossings, and 9 air gateways that include multiple airports, e.g. Dallas-Fort Worth, Chicago, Anchorage, New Orleans, and Atlanta.

FIGURE 3-19: TOP 25 FOREIGN-TRADE FREIGHT GATEWAYS BY VALUE: 2007

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *National Transportation Statistics 2008*, available at [www.bts.gov](http://www.bts.gov) as of June 16, 2009.





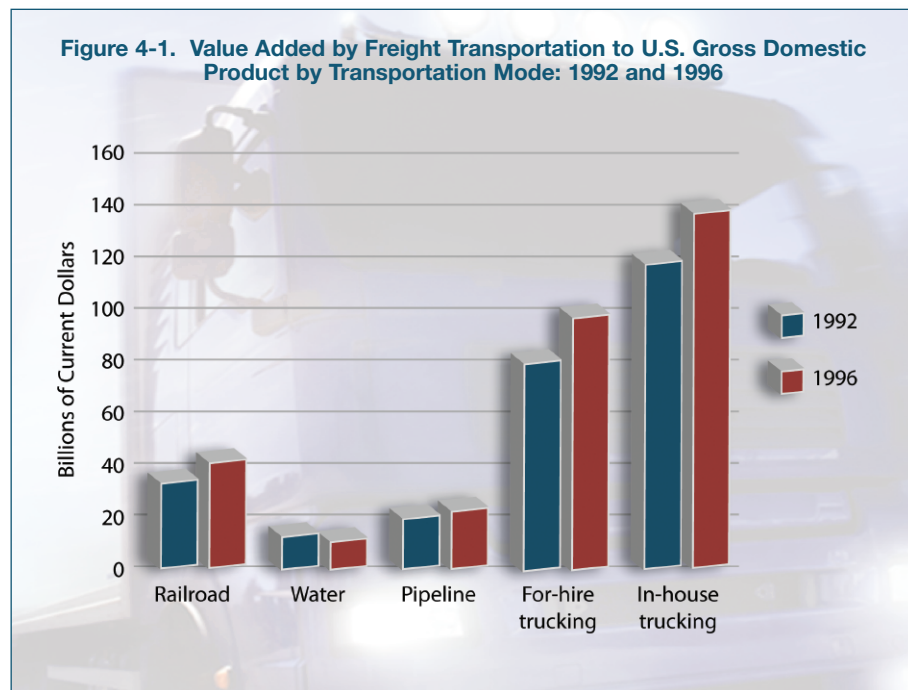
## IV. THE FREIGHT TRANSPORTATION INDUSTRY

The private sector owns a significant share of assets in the transportation industry: \$1.02 trillion in equipment plus \$582.2 billion in private structures, compared to \$532.4 billion in transportation structures plus \$2.63 trillion in highways owned by public agencies.<sup>1</sup> 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 typical-

ly 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. Of this 5 percent, three-fifths is generated by for-hire transportation services, and the rest is generated by in-house transportation (transportation provided by businesses for their own use). Most in-house transportation is in-house trucking, which contributed 40 percent more value to GDP than for-hire trucking in 1996 (the latest year for which data are available).



<sup>1</sup>Fixed assets are for 2007 and include both passenger and freight transportation. See the Bureau of Economic Analysis at [www.bea.gov/national/FA2004/index.asp](http://www.bea.gov/national/FA2004/index.asp), tables 2.1, 3.1s, and 7.1b. In previous years, information on transportation structures owned by public agencies was reported as transportation equipment.

**FIGURE 4-1. VALUE ADDED BY FREIGHT TRANSPORTATION TO U.S. GROSS DOMESTIC PRODUCT 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 one-half of those primarily engaged in trucking. Revenue generated by trucking accounts for about 40 percent of transportation and warehousing sector revenue while warehousing accounts for a small percentage of the total.

**Table 4-1. Economic Characteristics of Transportation and Warehousing Establishments in Freight-Dominated Modes: 1997 and 2002**

NAICS	Establishments		Revenue (millions of current \$)		Payroll (millions of current \$)		Paid Employees	
	1997	2002	1997	2002	1997	2002	1997	2002
<b>Transportation and warehousing<sup>1</sup></b>	<b>178,025</b>	<b>199,618</b>	<b>318,245</b>	<b>382,152</b>	<b>82,346</b>	<b>115,989</b>	<b>2,920,777</b>	<b>3,650,859</b>
Rail transportation	NA	NA	NA	NA	NA	NA	NA	NA
Water transportation	1,921	1,890	24,019	23,331	2,834	3,194	72,857	66,153
Truck transportation <sup>1</sup>	103,798	112,642	141,225	164,219	38,471	47,750	1,293,790	1,435,210
Pipeline transportation	2,311	2,188	26,837	22,031	2,661	2,477	49,280	36,790
Support activities for transportation	30,675	33,942	39,758	57,414	12,592	16,202	411,640	465,616
Couriers and messengers	10,887	12,655	39,812	58,165	14,072	17,175	530,839	561,514
Warehousing and storage <sup>1</sup>	6,497	12,671	10,658	16,548	2,926	17,183	109,760	565,533

**Key:** NA = not available; NAICS = North American Industry Classification System.

<sup>1</sup>Enterprise support establishments are included in 2002 but not 1997, thus the two years are not comparable.

**Notes:** Total includes air transportation, transit and ground passenger transportation, and scenic and sightseeing transportation. Data are for establishments in which transportation is the primary business. Data exclude transportation provided privately, such as trucking organized "in-house" by a grocery company. Data are not collected for rail transportation nor for governmental organizations even when their primary activity would be classified in industries covered by the census. For example, data are not collected for publicly operated buses and subway systems.

**Table 4-2. Economic Characteristics of Freight Railroads: 2000 and 2007**

	Class I		Non-Class I		Total	
	2000	2007	2000	2007	2000	2007
Number of railroads	8	7	552	556	560	563
Freight revenue (billions of current dollars)	33	53	3	4	36	57
Operating revenue (billions of current dollars)	34	55	NA	NA	NA	NA
Employees	168,360	167,216	23,448	19,596	191,808	186,812

**Key:** NA = not available.

Revenue grew while employment declined in both the national (Class I) railroads and the regional and local railroads between 2000 and 2007.

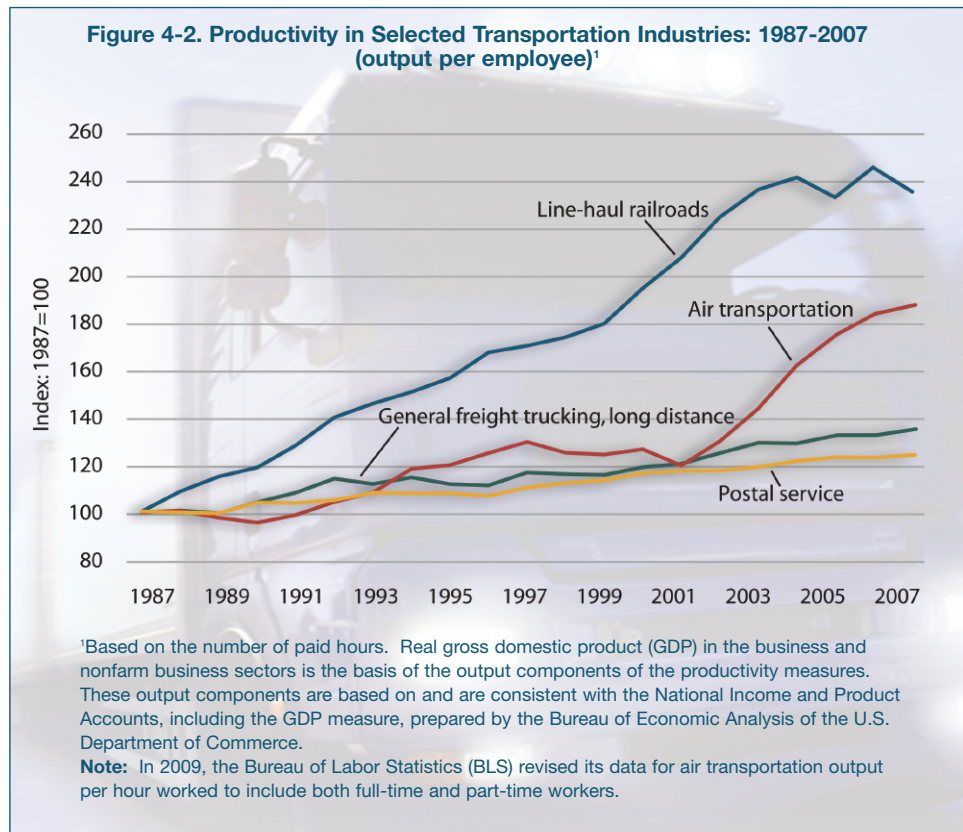
**TABLE 4-1. ECONOMIC CHARACTERISTICS OF TRANSPORTATION AND WAREHOUSING ESTABLISHMENTS IN FREIGHT-DOMINATED MODES: 1997 AND 2002**

**Sources:** U.S. Department of Commerce, Census Bureau, *2002 Economic Census, Transportation and Warehousing, United States*, available at [www.census.gov/econ/census02/data/us/US000\\_48.HTM](http://www.census.gov/econ/census02/data/us/US000_48.HTM) as of March 30, 2009; U.S. Department of Commerce, Census Bureau, *1997 Economic Census, Transportation and Warehousing, United States*, available at [www.census.gov/epcd/ec97/us/US000\\_48.HTM](http://www.census.gov/epcd/ec97/us/US000_48.HTM) as of March 30, 2009.

**TABLE 4-2. ECONOMIC CHARACTERISTICS OF FREIGHT RAILROADS: 2000 AND 2007**

**Source:** Association of American Railroads, *Railroad Facts* (Washington, DC: annual issues), p. 3.

Productivity has improved in all modes, particularly railroads. Between 1987 and 2007, output-per-hour worked more than doubled in line-haul railroading but grew only 35 percent in long-distance, general-freight trucking. Line-haul railroads do not include switching and terminal operations or short-distance (or local) railroads. Long-distance, general-freight trucking establishments exclude local trucking and truck operators that require specialized equipment, such as flatbeds, tankers, or refrigerated trailers.



**FIGURE 4-2. PRODUCTIVITY IN SELECTED TRANSPORTATION INDUSTRIES: 1987-2007**  
**Source:** U.S. Department of Labor, Bureau of Labor Statistics, Industry Productivity, available at [www.bls.gov/lpc/](http://www.bls.gov/lpc/) as of June 9, 2009.



Employment in many transportation industries has remained steady or has grown over the past two decades with the notable exception of railroads, which has declined by 56 percent between 1980 and 2008. Consequently, in 2008 rail transportation employed only 5 percent of those working in the transportation and warehousing industry compared with 18 percent in 1980. By comparison, employment in trucking in 2008 accounted for about 31 percent employment in transportation and warehousing.

**Table 4-3. Employment in For-Hire Transportation Establishments Primarily Serving Freight: 1980-2008<sup>1</sup> (thousands)**

	1980	1990	2000	2007	2008
<b>Total U.S. labor force<sup>2</sup></b>	<b>90,528</b>	<b>109,487</b>	<b>131,785</b>	<b>(R) 137,598</b>	<b>137,066</b>
<b>Transportation and warehousing</b>	<b>2,961</b>	<b>3,476</b>	<b>4,410</b>	<b>(R) 4,541</b>	<b>4,505</b>
Rail transportation	518	272	232	234	230
Water transportation	NA	57	56	(R) 66	65
Truck transportation	NA	1,122	1,406	(R) 1,439	1,391
Pipeline transportation	NA	60	46	40	42
Support activities for transportation <sup>3</sup>	NA	364	537	(R) 584	590
Couriers and messengers	NA	375	605	(R) 581	576
Warehousing and storage	NA	407	514	(R) 665	673

**Key:** NA = not available; R = revised.

<sup>1</sup>Annual averages.

<sup>2</sup>Excludes farm employment.

<sup>3</sup>Industries 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.

**Notes:** 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: 1980-2008**

**Source:** U.S. Department of Labor, Bureau of Labor Statistics, Current Employment Statistics survey, available at [www.bls.gov](http://www.bls.gov) as of June 11, 2009.



**Table 4-4. Employment in Selected Freight Transportation and Freight Transportation-Related Occupations: 2000-2008**

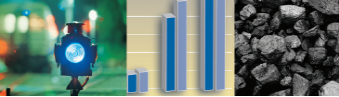
<b>Occupation (SOC code)</b>	<b>2000</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
<b>Vehicle operators, pipeline operators, and primary support</b>				
Driver/sales worker (53-3031)	373,660	396,680	382,360	372,720
Truck drivers, heavy and tractor-trailer (53-3032)	1,577,070	1,673,950	1,693,590	1,672,580
Truck drivers, light or delivery services (53-3033)	1,033,220	941,590	922,900	908,960
Locomotive engineers (53-4011)	29,390	36,870	41,760	42,760
Rail yard engineers, dinkey operators, and hostlers (53-4013)	4,020	5,820	4,950	5,480
Railroad brake, signal, and switch operators (53-4021)	16,830	22,810	23,120	24,610
Railroad conductors and yardmasters (53-4031)	40,380	37,110	37,540	39,580
Sailors and marine oilers (53-5011)	30,090	31,690	32,520	32,420
Captains, mates, and pilots of water vessels (53-5021)	21,080	29,170	30,540	30,600
Ship engineers (53-5031)	7,370	14,190	13,710	11,190
Bridge and lock tenders (53-6011)	4,790	3,700	4,750	4,490
Gas compressor and gas pumping station operators (53-7071)	6,510	3,900	4,230	4,050
Pump operators, except wellhead pumpers (53-7072)	13,730	10,030	10,400	9,280
<b>Transportation equipment manufacturing and maintenance occupations</b>				
Bus and truck mechanics and diesel engine specialists (49-3031)	258,800	254,850	250,370	248,620
Rail car repairers (49-3043)	10,620	23,810	23,190	20,780
<b>Transportation Infrastructure construction and maintenance occupations</b>				
Rail-track laying and maintenance equipment operators (47-4061)	9,940	13,680	14,050	15,020
Signal and track switch repairers (49-9097)	5,540	5,980	6,090	6,570
Dredge operators (53-7031)	3,100	1,780	1,910	1,910
<b>Secondary support service occupations</b>				
Dispatchers, except police, fire, and ambulance (43-5032)	167,180	185,410	190,190	193,210
Postal service mail carriers (43-5052)	354,980	346,990	348,070	354,570
Shipping, receiving, and traffic clerks (43-5071)	864,530	763,350	755,790	760,950
Transportation inspectors (53-6051)	26,520	23,790	24,130	24,940
Tank car, truck, and ship loaders (53-7121)	17,480	15,360	14,870	12,330

**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 nearly 3 million truck drivers in 2008; 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 driver shortages will worsen in the future.

**TABLE 4-4. EMPLOYMENT IN SELECTED FREIGHT TRANSPORTATION AND FREIGHT TRANSPORTATION-RELATED OCCUPATIONS: 2000-2008**

**Source:** U.S. Department of Labor, Bureau of Labor Statistics, *National Occupational Employment and Wages, 2008* (Washington, DC: May 2008), available at [www.bls.gov/oes](http://www.bls.gov/oes) as of May 13, 2009.



**Table 4-5: Producer Price Indices for Selected Transportation Services: 1990-2007**

	1990	2000	2002	2003	2004	2005	2006	2007
<b>Air Transportation (NAICS 481)<sup>1</sup></b>	<b>NA</b>	<b>147.7</b>	<b>157.8</b>	<b>162.1</b>	<b>162.3</b>	<b>171.0</b>	<b>180.4</b>	<b>183.7</b>
Scheduled Air Transportation (NAICS 4811) <sup>2</sup>	110.2	180.1	193.3	198.5	198.6	209.3	220.5	224.5
Scheduled Freight Air Transportation (NAICS 481112)	NA	NA	NA	100.0	100.2	104.9	108.4	109.0
Nonscheduled Air Transportation (NAICS 4812) <sup>3</sup>	NA	107.3	114.7	117.8	119.9	126.7	136.8	148.5
<b>Rail Transportation (NAICS 482)<sup>3</sup></b>	<b>NA</b>	<b>102.6</b>	<b>106.6</b>	<b>108.8</b>	<b>113.4</b>	<b>125.2</b>	<b>135.9</b>	<b>140.9</b>
Line-Haul Railroads (NAICS 482111) <sup>4</sup>	107.5	114.5	118.9	121.4	126.5	139.6	151.2	157.2
<b>Water Transportation (NAICS 483)</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>100.0</b>	<b>101.3</b>	<b>106.4</b>	<b>111.1</b>	<b>113.5</b>
Deep Sea Freight Transportation (NAICS 483111) <sup>5</sup>	113.1	155.8	185.8	219.9	225.9	231.9	233.3	230.0
Coastal and Great Lakes Freight Transportation (NAICS 483113)	NA	NA	NA	100.0	101.7	109.9	119.9	130.2
Inland Water Freight Transportation (NAICS 483211)	100.0	117.9	120.6	124.7	131.0	151.4	182.9	186.1
<b>Truck Transportation (NAICS 484)</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>100.0</b>	<b>103.1</b>	<b>109.0</b>	<b>113.2</b>	<b>115.4</b>
General Freight Trucking (NAICS 4841)	NA	NA	NA	100.0	103.5	110.0	114.1	116.5
General Freight Trucking, Local (NAICS 48411)	NA	NA	NA	100.0	105.2	111.5	115.3	119.6
General Freight Trucking, Long Distance (NAICS 48412)	NA	NA	NA	100.0	103.2	109.7	113.8	115.9
Specialized Freight Trucking (NAICS 4842)	NA	NA	NA	100.0	102.3	107.0	111.4	113.1
Used Household and Office Goods Moving (NAICS 48421)	NA	NA	NA	100.0	102.6	106.0	107.8	108.8
Specialized Freight (except Used Goods) Trucking, Local (NAICS 48422)	NA	NA	NA	100.0	102.7	107.1	112.3	114.2
Specialized Freight (except Used Goods) Trucking, Long Distance (NAICS 48423)	NA	NA	NA	100.0	101.7	107.5	112.8	114.8
<b>Pipeline Transportation (NAICS 486)</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
Pipeline Transportation of Crude Oil (NAICS 4861)	NA	NA	NA	100.0	103.9	113.3	112.0	125.4
Other Pipeline Transportation (NAICS 4869) <sup>6</sup>	NA	NA	NA	100.0	101.4	105.2	108.2	115.0
<b>Support Activities for Transportation (NAICS 488)</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>100.0</b>	<b>101.1</b>	<b>104.1</b>	<b>106.5</b>	<b>108.5</b>
Support Activities for Water Transportation (NAICS 4883) <sup>7</sup>	NA	NA	NA	100.0	101.0	103.5	107.7	112.7
Navigational Services to Shipping (NAICS 48833)	NA	NA	NA	100.0	101.5	105.7	113.9	120.6
Freight Transportation Arrangement (NAICS 4885) <sup>3</sup>	NA	98.3	97.5	97.9	98.9	99.1	98.8	100.2
<b>Postal Service (NAICS 491)</b>	<b>100.0</b>	<b>135.2</b>	<b>150.2</b>	<b>155.0</b>	<b>155.0</b>	<b>155.0</b>	<b>164.7</b>	<b>171.9</b>
<b>Couriers and Messengers (NAICS 492)</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>100.0</b>	<b>106.1</b>	<b>113.8</b>	<b>121.5</b>	<b>131.5</b>

**Key:** NA = not available; NAICS = North American Industry Classification System.

**Notes:** Index values start at 100.0 in 1990 unless another year is specified. This table shows annual data, which are calculated by the Bureau of Labor Statistics by averaging monthly indices. Data are reported monthly from January to December. The monthly indices, however, are available for fewer than 12 months for some years. In both cases, a simple average of the available monthly indices is reported for each year. Data are not seasonally adjusted.

<sup>1</sup>Base year = 1992.

<sup>2</sup>Base year = 1989.

<sup>3</sup>Base year = 1996.

<sup>4</sup>Base year = 1984.

<sup>5</sup>Base year = 1988.

<sup>6</sup>Other pipeline transportation includes pipeline transportation of refined petroleum products (NAICS 48691).

<sup>7</sup>Support activities for water transportation includes port and harbor operations (NAICS 48831), marine cargo handling (NAICS 48832), and navigational services to shipping (NAICS 48833).

The prices charged for transportation purchased from carriers and support activities has gone up in most industries. Rail prices increased by about 4 percent from 2006 to 2007, while trucking and air increased by about 2 percent each.



**TABLE 4-5: PRODUCER PRICE INDICES FOR SELECTED TRANSPORTATION SERVICES: 1990-2007**

**Source:** U.S. Department of Labor, Bureau of Labor Statistics, Producer Price Index Industry Data, available at [www.bls.gov/data/sa.htm](http://www.bls.gov/data/sa.htm) as of June 9, 2009.

## 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 environmental implications of freight transportation only recently have been considered separately from passenger travel. At the same time, the availability of energy consumption data has declined with the demise of the Vehicle Inventory and Use Survey.

**Table 5-1. Fatalities by Freight Transportation Mode: 1980-2008**

	1980	1990	2000	2007	2008
<b>Total transportation fatalities (passenger and freight)</b>	NA	<b>47,350</b>	<b>44,384</b>	(R) <b>43,032</b>	NA
<b>Highway (passenger and freight)</b>	<b>51,091</b>	<b>44,599</b>	<b>41,945</b>	(R) <b>41,259</b>	<b>37,261</b>
Large truck occupants <sup>1</sup>	1,262	705	754	(R) 805	677
Others killed in crashes involving large trucks	4,709	4,567	4,528	(R) 4,017	3,552
Large truck occupants <sup>1</sup> (percent)	2.5	1.6	1.8	2.0	1.8
Others killed in crashes involving large trucks (percent)	9.2	10.2	10.8	(R) 9.7	9.5
<b>Railroad (passenger and freight)</b>	<b>1,417</b>	<b>1,297</b>	<b>937</b>	(R) <b>849</b>	<b>800</b>
Highway-rail crossing <sup>2</sup>	833	698	425	(R) 336	287
Railroad <sup>2,3</sup>	584	599	512	513	513
<b>Waterborne (passenger and freight)</b>	<b>487</b>	<b>186</b>	<b>111</b>	(R) <b>107</b>	<b>109</b>
Vessel-related <sup>4</sup>	206	85	42	(R) 61	56
Freight ship	8	0	0	3	0
Tank ship	4	5	0	1	0
Tug/towboat	14	13	1	(R) 6	5
Offshore supply	NA	2	0	1	0
Fishing vessel	60	47	26	19	25
Mobile offshore drilling units	NA	0	0	1	4
Platform	NA	1	0	0	0
Freight barge	NA	0	0	3	1
Tank barge	NA	0	0	(R) 1	0
Miscellaneous <sup>5</sup>	56	11	15	(R) 26	21
Not vessel-related <sup>4</sup>	281	101	69	(R) 46	53
<b>Pipeline</b>	<b>19</b>	<b>9</b>	<b>38</b>	(R) <b>15</b>	<b>9</b>
Hazardous liquid pipeline	4	3	1	4	2
Gas pipeline	15	6	37	(R) 11	7

**Key:** NA = not available; R = revised.

<sup>1</sup>Large trucks are defined as trucks over the 10,000 pound gross vehicle weight rating, including single-unit trucks and truck tractors.

<sup>2</sup>Includes Amtrak.

<sup>3</sup>Includes train accidents and other incidents. Most fatalities involve trespassers who are included under other incidents (457 in 2008).

<sup>4</sup>Vessel-related casualties include those involving damage to vessels such as collisions or groundings. Fatalities not related to vessel casualties include deaths from falling overboard or from accidents involving onboard equipment.

<sup>5</sup>Includes industrial vessel, passenger (inspected), passenger (uninspected), recreational, research vessel, unclassified, and unknown data.

**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. The vast majority of fatalities involve passenger travel on highways.

**TABLE 5-1. FATALITIES BY FREIGHT TRANSPORTATION MODE: 1980-2008**

**Sources: Total and Pipeline:** U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *National Transportation Statistics*, available at [www.bts.gov/](http://www.bts.gov/) as of August 13, 2009.

**Highway:** National Center for Transportation Analysis, National Highway Transportation Safety Administration, *Traffic Safety Facts, Large Trucks* (annual issues); **2007-2008:** National Center for Transportation Analysis, National Highway Transportation Safety Administration, *Traffic Safety Facts* (June 2009). **Highway-Rail Grade Crossings:** U.S. Department of Transportation, Federal Railroad Administration, Office of Safety Analysis, available at <http://safetydata.fra.dot.gov/officeofsafety/default.aspx> as of August 13, 2009. **Waterborne:** U.S. Department of Homeland Security, U.S. Coast Guard, Data Administration Division, personal communication, August 1, 2009.



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 28 years.

**Table 5-2. Injured Persons by Freight Transportation Mode: 1980-2008**

	1980	1990	2000	2007	2008
<b>Total injured persons (passenger and freight)</b>	NA	NA	<b>3,259,673</b>	NA	NA
<b>Highway (passenger and freight)</b>	NA	<b>3,230,666</b>	<b>3,188,750</b>	<b>2,491,000</b>	<b>2,346,000</b>
Large truck occupants <sup>1</sup>	NA	41,822	30,832	23,000	23,000
Others injured in crashes involving large trucks	NA	108,000	109,000	(R) 77,000	NA
Large truck occupants <sup>1</sup> (percent)	NA	1.3	1.0	0.9	1.0
Others injured in crashes involving large trucks (percent)	NA	3.3	3.4	(R) 3.1	NA
<b>Railroad (passenger and freight)</b>	<b>62,246</b>	<b>25,143</b>	<b>11,643</b>	<b>(R) 9,539</b>	<b>8,641</b>
Highway-rail grade crossing <sup>2</sup>	3,550	2,407	1,219	(R) 1,053	941
Railroad <sup>2,3</sup>	58,696	22,736	10,424	(R) 8,486	7,700
<b>Waterborne (passenger and freight)</b>	NA	NA	<b>665</b>	<b>(R) 757</b>	<b>628</b>
Vessel-related <sup>4</sup>	180	175	151	(R) 191	159
Freight ship	8	10	5	(R) 9	11
Tank ship	9	13	3	3	3
Tug/towboat	27	19	18	(R) 19	20
Offshore supply	NA	9	6	6	2
Fishing vessel	28	31	21	(R) 30	17
Mobile offshore drilling units	NA	13	0	5	2
Platform	NA	9	0	(R) 0	0
Freight barge	NA	3	2	7	1
Tank barge	NA	3	0	(R) 1	7
Miscellaneous <sup>5</sup>	98	12	96	(R) 111	96
Not related to vessel casualties <sup>4</sup>	NA	NA	514	(R) 566	469
<b>Pipeline</b>	<b>192</b>	<b>76</b>	<b>81</b>	<b>(R) 53</b>	<b>68</b>
Hazardous liquid pipeline	15	7	4	(R) 10	2
Gas pipeline	177	69	77	(R) 43	66

**Key:** NA = not available; R = revised.

<sup>1</sup>Large trucks are defined as trucks over the 10,000 pound gross vehicle weight rating, including single-unit trucks and truck tractors.

<sup>2</sup>Includes Amtrak.

<sup>3</sup>Includes train accidents and other incidents. Most injuries involve workers on duty (4,890 in 2008).

<sup>4</sup>Vessel-related injuries include those involving damage to vessels, such as collisions or groundings. Injuries not related to vessel casualties include those from falls overboard or from accidents involving onboard equipment.

<sup>5</sup>Includes industrial vessel, passenger (inspected), passenger (uninspected), recreational, research vessel, unclassified, and unknown data.

**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: 1980-2008**

**Sources: Total and Pipeline:** U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *National Transportation Statistics*, available at [www.bts.gov/](http://www.bts.gov/) as of August 14, 2009.

**Highway:** National Center for Transportation Analysis, National Highway Transportation Safety Administration, *Traffic Safety Facts, Large Trucks* (annual issues); **2007-2008:** National Center for Transportation Analysis, National Highway Transportation Safety Administration, *Traffic Safety Facts* (July 2009). **Highway-Rail Grade Crossings:** U.S. Department of Transportation, Federal Railroad Administration, Office of Safety Analysis, available at <http://safetydata.fra.dot.gov/officeofsafety/default.aspx> as of August 14, 2009. **Waterborne:** U.S. Department of Homeland Security, U.S. Coast Guard, Data Administration Division, personal communication, August 14, 2009.



**Table 5-3. Accidents by Freight Transportation Mode: 1980-2008**

	1980	1990	2000	2007	2008
<b>Highway (passenger and freight)</b>	NA	6,471,000	6,394,000	6,024,000	NA
Large truck <sup>1</sup>	NA	371,801	437,861	413,000	NA
Large truck <sup>1</sup> (percent of total)	NA	5.7	6.8	6.9	NA
<b>Rail (passenger and freight)</b>					
Highway-rail grade crossing <sup>2,3</sup>	10,612	5,715	3,502	(R) 2,767	2,398
Railroad <sup>2,4</sup>	8,205	2,879	2,983	(R) 2,681	2,428
<b>Waterborne (passenger and freight)</b>					
Vessel-related	4,624	3,613	5,403	(R) 5,582	5,599
<b>Pipeline</b>					
Hazardous liquid pipeline	246	180	146	106	111
Gas pipeline	1,524	198	234	(R) 284	291

**Key:** NA = not available; R = revised.

<sup>1</sup>Large trucks are defined as trucks over the 10,000 pound gross vehicle weight rating, including single-unit trucks and truck tractors.

<sup>2</sup>Includes Amtrak.

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

<sup>4</sup>Train accidents only.

The number of crashes and other accidents in freight transportation has declined in all modes, except for water, since 1980 in spite of an increase in freight activity.

Because most hazardous materials are transported by truck, most incidents related to the 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

**Table 5-4. Hazardous Materials Transportation Incidents: 1980-2008**

	1980	1990	2000	2007	2008
<b>Total</b>	15,719	8,879	17,557	(R) 19,265	16,869
Accident-related	486	297	394	(R) 362	306
<b>Air</b>	223	297	1,419	(R) 1,555	1,274
Accident-related	0	0	3	7	8
<b>Highway</b>	14,161	7,296	15,063	(R) 16,900	14,752
Accident-related	347	249	329	(R) 303	272
<b>Rail</b>	1,271	1,279	1,058	(R) 749	745
Accident-related	134	48	62	52	26
<b>Water<sup>1</sup></b>	34	7	17	61	98
Accident-related	2	0	0	0	0
<b>Other<sup>2</sup></b>	30	0	0	NA	NA
Accident-related	3	0	0	NA	NA

**Key:** NA = not available; R = revised.

<sup>1</sup>Water category only includes packaged (nonbulk) marine. Non-packaged (bulk) marine hazardous materials incidents are reported to the U.S. Coast Guard and are not included.

<sup>2</sup>Other category includes freight forwarders and modes not otherwise specified.

**Notes:** Hazardous materials transportation incidents required to be reported are defined in the Code of Federal Regulations (CFR), 49 CFR 171.15, 171.16 (Form F 5800.1). Hazardous materials deaths and injuries are caused by the hazardous material in commerce. Accident related means vehicular accident or derailment. Each modal total also includes fatalities caused by human error, package failure, and causes not elsewhere classified. As of 2005, the "other" data is no longer included in the hazardous materials information system report.

**TABLE 5-3. ACCIDENTS BY FREIGHT TRANSPORTATION MODE: 1980-2008**

**Sources:** **Highway:** National Center for Transportation Analysis, National Highway Transit Safety Administration, *Traffic Safety Facts, Large Trucks* (annual issues); **2006-2008:** U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *National Transportation Statistics*, available at [www.bts.gov/](http://www.bts.gov/) as of August 15, 2009. **Highway-Rail Grade Crossings:** U.S. Department of Transportation, Federal Railroad Administration, Office of Safety Analysis, available at <http://safetydata.fra.dot.gov/officeofsafety/default.asp> as of August 15, 2008. **Waterborne:** U.S. Department of Homeland Security, U.S. Coast Guard, Data Administration Division, personal communication, August 7, 2009. **Pipeline:** U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *National Transportation Statistics*, available at [www.bts.gov/](http://www.bts.gov/) as of August 15, 2009.

**TABLE 5-4. HAZARDOUS MATERIALS TRANSPORTATION INCIDENTS: 1980-2008**

**Source:** U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Office of Hazardous Materials Safety, Hazardous Materials Information System Database, available at [www.phmsa.dot.gov/hazmat/library](http://www.phmsa.dot.gov/hazmat/library) as of May 13, 2009.



(referred to as “accident-related”). In 2008, 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 2008, they accounted for 80 percent of all property damage.

**Table 5-5. Commercial Motor Carrier Compliance Review Activity by Safety Rating: 2000-2008**

Safety rating	2000		2007		2008	
	Number	Percent	Number	Percent	Number	Percent
Satisfactory	5,309	51.1	(R) 6,419	65.0	6,190	64.3
Conditional	3,354	32.3	(R) 2,600	22.4	2,262	23.5
Unsatisfactory	1,481	14.3	(R) 540	4.4	372	3.9
Not rated	245	2.4	(R) 234	8.3	807	8.4
<b>Total</b>	<b>10,389</b>	<b>100.0</b>	<b>(R) 9,793</b>	<b>100.0</b>	<b>9,631</b>	<b>100.0</b>

**Key:** R = revised.

**Notes:** 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; and motor vehicle crashes and hazardous materials incidents. Numbers and percents may not add to totals due to rounding.

The safety fitness of motor carriers has improved markedly over the past few years. In 2008, the share of motor carriers rated satisfactory was 65 percent, up from 51 percent in 2000.

Less than one-fourth of all 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 2008 only about 6 percent of driver inspections and 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 27 years. Between 1980 and 2007, the fuel consumed in highway freight transportation increased from 20 billion to nearly 39 billion gallons annually. This is due to a substantial increase in the number of trucks on the road, an increase in the average number of miles traveled per truck, and a doubling of truck miles traveled.

**TABLE 5-5. COMMERCIAL MOTOR CARRIER COMPLIANCE REVIEW ACTIVITY BY SAFETY RATING: 2000-2008**

**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 [www.fmcsa.dot.gov](http://www.fmcsa.dot.gov) as of May 13, 2009.

**Table 5-6. Roadside Safety Inspection Activity Summary by Inspection Type: 2000-2008**

	2000		2006		2007		2008	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
<b>All inspections</b>								
Number of inspections	2,453,776	100.0	(R) 3,334,974	100.0	(R) 3,416,942	100.0	3,317,187	100.0
With no violations	639,593	26.1	(R) 940,360	28.2	(R) 1,034,702	30.1	1,041,262	31.4
With violations	1,814,183	73.9	(R) 2,394,614	71.8	(R) 2,382,240	69.9	2,275,925	68.6
<b>Driver inspections</b>								
Number of inspections	2,396,688	100.0	(R) 3,192,470	100.0	(R) 3,267,279	100.0	3,176,813	100.0
With no violations	1,459,538	60.9	(R) 2,015,278	63.1	(R) 2,068,417	63.2	2,012,241	63.3
With violations	937,150	39.1	(R) 177,192	36.9	(R) 1,198,862	36.8	1,164,572	36.7
With OOS violations	191,031	8.0	(R) 225,660	7.1	(R) 223,099	6.9	204,542	6.4
<b>Vehicle inspections</b>								
Number of inspections	1,908,300	100.0	(R) 2,414,915	100.0	(R) 2,388,451	100.0	2,278,230	100.0
With no violations	584,389	30.6	(R) 789,509	32.7	(R) 810,192	33.8	746,362	33.6
With violations	1,323,911	69.4	(R) 1,625,406	67.3	(R) 1,578,259	66.2	1,513,868	66.5
With OOS violations	452,850	23.7	(R) 552,495	22.9	(R) 532,265	22.4	509,800	22.4
<b>Hazardous materials inspections</b>								
Number of inspections	133,486	100.0	(R) 194,142	100.0	(R) 199,732	100.0	192,516	100.0
With no violations	101,098	75.7	(R) 158,559	81.6	(R) 164,252	82.0	159,799	83.0
With violations	32,388	24.3	(R) 35,583	18.4	(R) 35,480	18.0	32,717	17.0
With OOS violations	9,964	7.5	(R) 10,194	5.3	(R) 10,195	5.2	9,648	5.0

**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 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: 1980-2007**

	1980	1990	2000	2006	2007
<b>Highway</b>					
Gasoline, diesel and other fuels (million gallons)	114,960	130,755	162,555	(R) 175,023	176,106
Truck, total	19,960	24,490	35,229	(R) 37,959	38,550
Single-unit 2-axle 6-tire or more truck	6,923	8,357	9,563	(R) 9,852	10,035
Combination truck	13,037	16,133	25,666	(R) 28,107	28,515
Truck (percent of total)	17.4	18.7	21.7	21.7	21.9
<b>Rail, Class I (in freight service)</b>					
Distillate / diesel fuel (million gallons)	3,904	3,115	3,700	4,192	4,062
<b>Water</b>					
Residual fuel oil (million gallons)	8,952	6,326	6,410	5,754	6,327
Distillate / diesel fuel oil (million gallons)	1,478	2,065	2,261	1,903	1,924
Gasoline (million gallons)	1,052	1,300	1,124	1,237	1,222
<b>Pipeline</b>					
Natural gas (million cubic feet)	634,622	659,816	642,210	(R) 584,213	622,893

**Key:** R = revised.

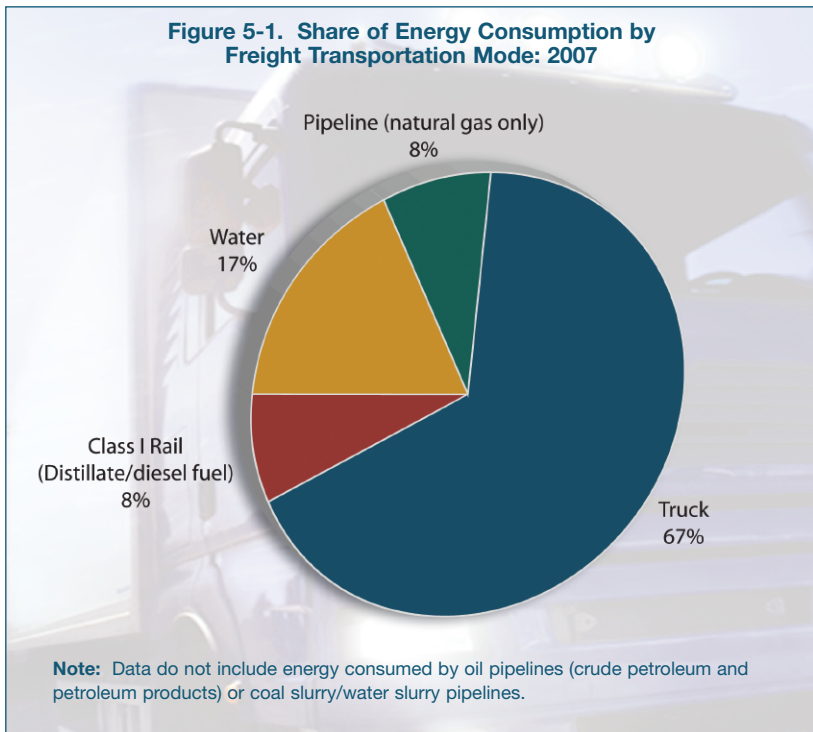
**TABLE 5-6. ROADSIDE SAFETY INSPECTION ACTIVITY SUMMARY BY INSPECTION TYPE: 2000-2008**

**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](http://www.fmcsa.dot.gov) as of May 13, 2009.

**TABLE 5-7. FUEL CONSUMPTION BY TRANSPORTATION MODE: 1980-2007**

**Sources:** **Highway:** U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues), table VM-1, available at [www.fhwa.dot.gov/policyinformation/statistics/2007/](http://www.fhwa.dot.gov/policyinformation/statistics/2007/) as of April 20, 2009. **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 2007* (Washington, DC: 2008), tables 2, 4, and similar tables in earlier editions. **Pipeline:** U.S. Department of Energy, *Natural Gas Annual 2006*, DOE/EIA-0131(07) (Washington, DC: January 2009), table 15 and similar tables in earlier editions.

**Figure 5-1. Share of Energy Consumption by Freight Transportation Mode: 2007**



Over the same period, fuel use in Class I freight railroads increased slightly from 3.9 billion gallons to 4.1 billion gallons.

In 2007, trucking accounted for two-thirds of freight transportation energy consumption. Water was a distant second with roughly one-sixth of freight energy consumption.

Since 1980, miles per gallon by single-unit trucks (based on total travel and fuel consumption)

increased by more than 40 percent. Total fuel consumed increased 45 percent whereas miles traveled more than doubled, indicating that miles per gallon increased from 5.8 to 8.2 between 1980 and 2007.

**Table 5-8. Single-Unit Truck Fuel Consumption and Travel: 1980-2007**

	1980	1990	2000	2006	2007
Number registered (thousands)	4,374	4,487	5,926	6,649	6,807
Vehicle miles (millions)	39,813	51,901	70,500	(R) 80,344	81,954
Fuel consumed (million gallons)	6,923	8,357	9,563	(R) 9,852	10,035
Average miles traveled per vehicle	9,103	11,567	11,897	(R) 12,083	12,040
Average miles traveled per gallon	5.8	6.2	7.4	8.2	8.2
Average fuel consumed per vehicle (gallons)	1,583	1,862	1,614	(R) 1,482	1,474

**Key:** R = revised.

**FIGURE 5-1. SHARE OF ENERGY CONSUMPTION BY FREIGHT TRANSPORTATION MODE: 2007**

**Sources:** **Highway:** U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues), table VM-1, available at [www.fhwa.dot.gov/policyinformation/statistics/2007/](http://www.fhwa.dot.gov/policyinformation/statistics/2007/) as of April 20, 2009. **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 2007* (Washington, DC: 2008), tables 2, 4, and similar tables in earlier editions; U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues), table MF-24, available at [www.fhwa.dot.gov/policyinformation/statistics/2007/](http://www.fhwa.dot.gov/policyinformation/statistics/2007/) as of April 20, 2009. **Pipeline:** U.S. Department of Energy, *Natural Gas Annual 2007*, DOE/EIA-0131(07) (Washington, DC: January 2009), table 15 and similar tables in earlier editions.

**TABLE 5-8. SINGLE-UNIT TRUCK FUEL CONSUMPTION AND TRAVEL: 1980-2007**

**Source:** U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues), table VM-1 and similar tables in earlier editions, available at [www.fhwa.dot.gov/policyinformation/statistics/2007/](http://www.fhwa.dot.gov/policyinformation/statistics/2007/) as of April 1, 2009.

In contrast to single-unit trucks, miles per gallon by combination trucks (based on total travel and fuel consumption) decreased about 4 percent over the past 27 years. During the same period, vehicle miles traveled more than doubled, resulting in a doubling of gallons of fuel consumed.

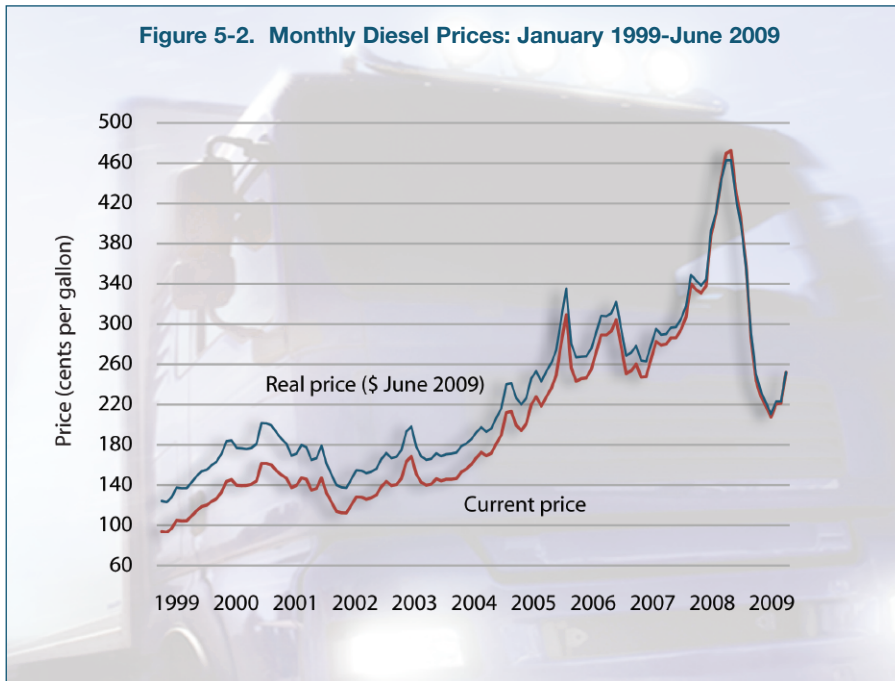
**Table 5-9. Combination Truck Fuel Consumption and Travel: 1980-2007**

	1980	1990	2000	2006	2007
Number registered (thousands)	1,417	1,709	2,097	2,170	2,221
Vehicle miles traveled (millions)	68,678	94,341	135,020	(R) 142,169	145,008
Fuel consumed (million gallons)	13,037	16,133	25,666	(R) 28,107	28,515
Average miles traveled per vehicle	48,472	55,206	64,399	(R) 65,526	65,290
Average miles traveled per gallon	5.3	5.8	5.3	5.1	5.1
Average fuel consumed per vehicle (gallons)	9,201	9,441	12,241	(R) 12,954	12,839

Key: R = revised.

Diesel prices were about 81 percent higher in June 2009 than 10 years earlier (in inflation-adjusted terms).

**Figure 5-2. Monthly Diesel Prices: January 1999-June 2009**



**TABLE 5-9. COMBINATION TRUCK FUEL CONSUMPTION AND TRAVEL: 1980-2007**

**Source:** U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues), table VM-1 and similar tables in earlier editions, available at [www.fhwa.dot.gov/policyinformation/statistics/2007/](http://www.fhwa.dot.gov/policyinformation/statistics/2007/) as of April 1, 2009.

**FIGURE 5-2. MONTHLY DIESEL PRICES: JANUARY 1999-JUNE 2009**

**Sources:** **Diesel price:** U.S. Department of Energy, Energy Information Agency, U.S. Petroleum Prices, available at [www.eia.doe.gov](http://www.eia.doe.gov) as of August 5, 2009. **Consumer price index:** U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index – All Urban Consumers, Monthly, available at [www.bls.gov](http://www.bls.gov) as of August 5, 2009.



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. Compared with 1980, the energy intensity of both trucking and freight rail has improved. 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: 1980-2007**

	1980	1990	2000	2006	2007
Highway (Btu per vehicle mile)	24,757	22,795	23,448	(R) 23,340	23,238
Railroad (Class I) (Btu per freight car mile)	18,742	16,619	14,917	14,990	14,846
Railroad (Class I) (Btu per ton mile)	597	420	352	330	320
Domestic water (Btu per ton mile)	358	387	473	571	NA

**Key:** Btu = British thermal unit; R = revised; NA = not available.



**TABLE 5-10. ENERGY INTENSITIES OF DOMESTIC FREIGHT TRANSPORTATION MODES: 1980-2007**

**Source:** Oak Ridge National Laboratory, *Transportation Energy Data Book: Edition 28* (Oak Ridge, TN: annual issues), table 2.16, available at <http://cta.ornl.gov/data/index.shtml> as of August 20, 2009.



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<sub>2</sub>) but large amounts of nitrogen oxides (NO<sub>x</sub>). However, since 1990 heavy-duty truck emissions of NO<sub>x</sub> have declined by 63 percent.

Freight transportation is a major source of NO<sub>x</sub> emissions, accounting for 27 percent of all NO<sub>x</sub> 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: 1990-2008**

	1990	2000	2007	2008
<b>Gasoline (assuming zero RFG)</b>				
<b>Cars</b>				
Exhaust HC	2.79	0.97	0.42	0.39
Nonexhaust HC	1.21	0.92	0.62	0.57
<b>Total HC</b>	<b>3.99</b>	<b>1.89</b>	<b>1.04</b>	<b>0.95</b>
Exhaust CO	42.89	18.53	10.28	9.68
Exhaust NO <sub>x</sub>	2.70	1.29	0.73	0.67
<b>Light trucks</b>				
Exhaust HC	3.68	1.45	0.64	0.55
Nonexhaust HC	1.36	0.97	0.66	0.62
<b>Total HC</b>	<b>5.04</b>	<b>2.42</b>	<b>1.31</b>	<b>1.17</b>
Exhaust CO	56.23	26.81	13.52	12.49
Exhaust NO <sub>x</sub>	2.62	1.54	1.02	0.94
<b>Heavy trucks</b>				
Exhaust HC	3.66	1.22	0.48	0.42
Nonexhaust HC	2.74	1.62	1.07	0.99
<b>Total HC</b>	<b>6.40</b>	<b>2.84</b>	<b>1.54</b>	<b>1.41</b>
Exhaust CO	85.61	31.08	13.55	12.38
Exhaust NO <sub>x</sub>	7.19	5.26	3.33	2.94
<b>Diesel</b>				
<b>Cars</b>				
Exhaust HC	0.68	0.80	0.36	0.29
Exhaust CO	1.49	1.78	1.21	1.09
Exhaust NO <sub>x</sub>	1.83	1.81	0.85	0.69
<b>Light trucks</b>				
Exhaust HC	1.59	1.02	0.63	0.55
Exhaust CO	2.67	1.77	1.06	0.93
Exhaust NO <sub>x</sub>	2.71	1.76	1.09	0.94
<b>Heavy trucks</b>				
Exhaust HC	2.21	0.79	0.48	0.45
Exhaust CO	10.06	4.10	2.66	2.31
Exhaust NO <sub>x</sub>	23.34	18.05	9.60	8.61

**Key:** CO = carbon monoxide; HC = hydrocarbon; NO<sub>x</sub> = nitrogen oxides; RFG = reformulated gasoline.

**Table 5-12. Freight Nitrogen Oxides (NO<sub>x</sub>) and Particulate Matter (PM-10) Emissions by Freight Transportation Mode: 2002**

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

**Note:** Numbers and percents may not add to totals due to rounding.

**TABLE 5-11. ESTIMATED NATIONAL AVERAGE VEHICLE EMISSIONS RATES OF HEAVY-DUTY AND LIGHT-DUTY VEHICLES: 1990-2008**

**Source:** U.S. Environmental Protection Agency, National Vehicle and Fuel Emissions Laboratory, MOBILE6.2.3 model, personal communication, July 6, 2009.

**TABLE 5-12. FREIGHT NITROGEN OXIDES (NO<sub>x</sub>) 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* (Washington, DC: 2005), available at [www.fhwa.dot.gov/environment/freightaq/](http://www.fhwa.dot.gov/environment/freightaq/) as of April 1, 2009.





**Table 5-13. Current and Projected Nitrogen Oxides (NO<sub>x</sub>) Emissions by Freight Transportation Mode: 2002, 2010, and 2020**

	Tons			Percent change, 2002 to 2010	Percent change, 2002 to 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
<b>Total freight</b>	<b>5,658,400</b>	<b>3,747,299</b>	<b>2,099,999</b>	<b>-34</b>	<b>-63</b>

Trucks are by far the largest contributor to freight emissions nationally, producing two-thirds of NO<sub>x</sub> from the freight sector. However, freight emissions of NO<sub>x</sub> are forecast to decline by almost two-thirds over the next two decades. Beginning in June 2006, the U.S. Environmental Protection Agency required the use of ultra low sulfur diesel (ULSD) fuel in heavy-duty trucks and other diesel-powered highway vehicles. ULSD will reduce emissions of NO<sub>x</sub> and enable the use of advanced pollution control technologies to meet emissions standards.

Trucks produce two-thirds of PM-10 emissions from the freight sector. Freight emissions of PM-10 are forecast to decline by one-half over the next two decades. The required use of ULSD fuel in heavy-duty trucks and other diesel-powered highway vehicles will reduce PM emissions and enable the use of advanced pollution control technologies to meet emissions standards.



**Table 5-14. Current and Projected Particulate Matter (PM-10) Emissions by Freight Transportation Mode: 2002, 2010, and 2020**

	Tons			Percent change, 2002 to 2010	Percent change, 2002 to 2020
	2002	2010	2020		
Heavy-duty trucks	120,000	65,380	34,760	-46	-71
Freight rail	21,300	15,730	12,990	-26	-39
Commercial marine	44,000	42,930	44,080	-2	0
Air freight	300	290	270	-3	-10
<b>Total freight</b>	<b>185,600</b>	<b>124,329</b>	<b>92,099</b>	<b>-33</b>	<b>-50</b>

**TABLE 5-13. CURRENT AND PROJECTED NITROGEN OXIDES (NO<sub>x</sub>) EMISSIONS BY FREIGHT TRANSPORTATION MODE: 2002, 2010, AND 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* (Washington, DC: 2005), available at [www.fhwa.dot.gov/environment/freightaq/](http://www.fhwa.dot.gov/environment/freightaq/) as of April 1, 2009.

**TABLE 5-14. CURRENT AND PROJECTED PARTICULATE MATTER (PM-10) EMISSIONS BY FREIGHT TRANSPORTATION MODE: 2002, 2010, AND 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* (Washington, DC: 2005), available at [www.fhwa.dot.gov/environment/freightaq/](http://www.fhwa.dot.gov/environment/freightaq/) as of April 1, 2009.



In addition to CO, NO<sub>x</sub>, and particulate matter emissions, the transportation sector releases large quantities of greenhouse gases (GHGs), such as carbon dioxide (CO<sub>2</sub>), methane, nitrous oxide, and hydrofluorocarbons. These gases trap heat in the atmosphere, affecting the earth's temperature. Some greenhouse gases occur naturally while others are produced by human activities, such as the burning of fossil fuels.

**Table 5-15. U.S. Greenhouse Gas Emissions by Economic End-Use Sector: 1990-2007**  
(electricity-related emissions distributed among sectors)<sup>1</sup>  
(millions of metric tonnes of CO<sub>2</sub> equivalent)

Sector	1990	1995	2000	2005	2006	2007
Industry <sup>2</sup>	2,166.5	2,219.8	2,235.5	2,081.2	2,082.3	2,081.2
Transportation <sup>3</sup>	1,546.7	1,688.3	1,923.2	2,003.6	1,999.0	2,000.1
Commercial	942.2	1,000.2	1,140.0	1,214.6	1,201.5	1,251.2
Residential	950.0	1,024.2	1,159.2	1,237.0	1,176.1	1,229.8
Agriculture	459.2	489.7	503.2	511.7	530.0	530.1
U.S. Territories <sup>4</sup>	34.1	41.1	47.3	60.5	62.3	57.7
<b>Total</b>	<b>6,098.7</b>	<b>6,463.3</b>	<b>7,008.2</b>	<b>7,108.6</b>	<b>7,051.1</b>	<b>7,150.1</b>

**Key:** CO<sub>2</sub> = carbon dioxide.

<sup>1</sup>Emissions from electricity generation are allocated to each economic end-use sector on the basis of each sector's share of aggregate electricity consumption. This method assumes each sector consumes electricity that is generated from the national average mix of fuels according to their carbon intensity.

<sup>2</sup>Industry includes manufacturing, construction, and mining. Six manufacturing industries--petroleum refineries, chemicals, primary metals, paper, food, and nonmetallic mineral products--represent the vast majority of energy use and thus GHG emissions in the industrial sector.

<sup>3</sup>Includes emissions from military aircraft (16.0 millions of metric tonnes) and "other" transportation, primarily lubricants (10.2 millions of metric tonnes). Emissions from international bunker fuels are not included.

<sup>4</sup>Electricity-related emissions were not distributed to U.S. Territories.

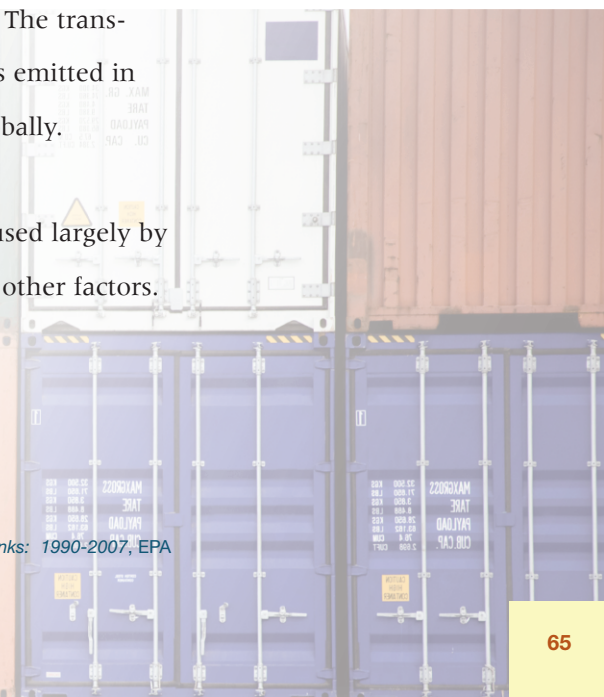
**Notes:** Greenhouse gas (GHG) emissions include CO<sub>2</sub>, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. CO<sub>2</sub> equivalent is computed by multiplying the weight of the gas being measured by its estimated Global Warming Potential (GWP). The Intergovernmental Panel on Climate Change developed the GWP concept to compare the ability of one GHG to trap heat in the atmosphere with another gas. Carbon comprises 12/44 of CO<sub>2</sub> by weight. Numbers may not add to totals due to rounding.

When emissions from electricity generation are allocated among end-use sectors (on the basis of each sector's share of electricity consumption), the industrial sector produces the largest amount of GHG emissions, followed closely by transportation. The transportation sector is responsible for about 28 percent of all greenhouse gases emitted in the United States and nearly 7 percent of all greenhouse gases emitted globally.

From 1990 to 2007, transportation GHG emissions rose by 29 percent, caused largely by increases in travel demand and a leveling of vehicle fuel economy among other factors. Over this period, truck vehicle miles increased by 55 percent.

**TABLE 5-15. U.S. GREENHOUSE GAS EMISSIONS BY ECONOMIC END-USE SECTOR: 1990-2007**

**Source:** U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2007*, EPA 430-R-09-004 (Washington, DC: 2009), table ES-8, available at [www.epa.gov/climatechange/emissions/usinventoryreport.html](http://www.epa.gov/climatechange/emissions/usinventoryreport.html) as of July 13, 2009.





CO<sub>2</sub> accounts for nearly all of the transportation sector's GHG emissions, primarily from the combustion of fossil fuels. Almost all of the energy consumed by the sector is petroleum-based and includes motor gasoline, diesel fuel, jet fuel, and residual oil. Gasoline-fueled passenger cars and light-duty trucks are responsible for about 60 percent of CO<sub>2</sub> emissions in the transportation sector while the combustion of diesel fuel in heavy-duty trucks and jet fuel in aircraft produced much of the rest.

**Table 5-16. U.S. Transportation Sector Carbon Dioxide (CO<sub>2</sub>) Emissions from Fossil Fuel Combustion by Fuel Type: 1990-2007**  
(millions of metric tones of CO<sub>2</sub> equivalent)

Fuel	1990	2000	2005	2006	2007
<b>Petroleum</b>	<b>1,448.8</b>	<b>1,764.7</b>	<b>1,848.2</b>	<b>1,847.4</b>	<b>1,852.0</b>
Motor gasoline	982.7	1,135.7	1,181.1	1,169.7	1,166.7
Distillate fuel oil	261.2	394.7	453.0	464.7	470.6
Jet fuel	176.2	196.1	189.9	185.0	185.3
Residual fuel <sup>1</sup>	23.7	34.9	20.2	24.1	25.6
Aviation gasoline	3.1	2.5	2.4	2.3	2.2
Liquefied petroleum gas	1.4	0.7	1.7	1.6	1.6
<b>Natural Gas</b>	<b>36.2</b>	<b>35.6</b>	<b>33.2</b>	<b>33.5</b>	<b>35.4</b>
<b>Transportation Total<sup>2</sup></b>	<b>1,484.5</b>	<b>1,800.3</b>	<b>1,881.5</b>	<b>1,880.9</b>	<b>1,887.4</b>
<b>U.S. Total<sup>2</sup></b>	<b>4,708.9</b>	<b>5,561.5</b>	<b>5,723.5</b>	<b>5,635.4</b>	<b>5,735.8</b>
<b>Transportation Sector as Percent of Total</b>	<b>31.5</b>	<b>32.4</b>	<b>32.9</b>	<b>33.4</b>	<b>32.9</b>

<sup>1</sup>Fluctuations in emissions estimates reflect data collection problems.

<sup>2</sup>Electricity-related emissions are not included in the transportation sector and U.S. totals.

**Notes:** CO<sub>2</sub> equivalent is computed by multiplying the weight of the gas being measured by its estimated Global Warming Potential (GWP). The Intergovernmental Panel on Climate Change developed the GWP concept to compare the ability of one GHG to trap heat in the atmosphere with another gas. Carbon comprises 12/44 of CO<sub>2</sub> by weight. Numbers may not add to totals due to rounding.



**TABLE 5-16. U.S. TRANSPORTATION SECTOR CARBON DIOXIDE (CO<sub>2</sub>) EMISSIONS FROM FOSSIL FUEL COMBUSTION BY FUEL TYPE: 1990-2007**

**Source:** U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2007*, EPA 430-R-09-004 (Washington, DC: 2009), Annex 2, tables A-11, A-12, A-13, A-18, and A-28 available at [www.epa.gov/climatechange/emissions/usinventoryreport.html](http://www.epa.gov/climatechange/emissions/usinventoryreport.html) as of July 13, 2009.



**Table 5-17. U.S. Greenhouse Gas Emissions from Domestic Freight Transportation: 1990-2007**  
(millions of metric tonnes of CO<sub>2</sub> equivalent)

Mode	1990	1995	2000	2005	2006	2007	Percent change, 1990 to 2007
Trucking	228.8	272.7	344.2	395.1	404.5	410.8	80.0
Freight Rail	34.1	39.6	44.9	50.4	52.8	51.6	51.0
Ships and Other Boats <sup>1</sup>	32.8	40.1	50.6	33.2	36.8	39.1	19.0
Pipelines <sup>2</sup>	36.2	38.5	35.2	32.4	32.4	34.6	-5.0
Commercial Aircraft	23.7	24.8	29.0	25.5	24.5	22.6	-5.0
<b>Freight Total</b>	<b>355.7</b>	<b>415.6</b>	<b>504.0</b>	<b>536.6</b>	<b>551.2</b>	<b>558.7</b>	<b>57.0</b>
<b>Passenger Total</b>	<b>1,144.3</b>	<b>1,237.2</b>	<b>1,386.1</b>	<b>1,438.8</b>	<b>1,421.6</b>	<b>1,415.1</b>	<b>24.0</b>
<b>Transportation Total<sup>3</sup></b>	<b>1,546.7</b>	<b>1,688.3</b>	<b>1,923.2</b>	<b>2,003.6</b>	<b>1,999.0</b>	<b>2,000.1</b>	<b>29.0</b>
<b>Freight as % of Transportation Total</b>	<b>23.0</b>	<b>24.6</b>	<b>26.2</b>	<b>26.8</b>	<b>27.6</b>	<b>27.9</b>	<b>19.0</b>

**Key:** CO<sub>2</sub> = carbon dioxide.

<sup>1</sup>Fluctuations in emissions estimates reflect data collection problems.

<sup>2</sup>Includes only carbon dioxide emissions from natural gas used to power pipelines.

<sup>3</sup>Includes greenhouse gas emissions from military aircraft and lubricants from "other" transportation, as well as electricity-related emissions. The transportation total does not include emissions from international bunker fuels.

**Notes:** U.S. Environmental Protection Agency (EPA) used U.S. Department of Energy fuel consumption data to allocate freight and passenger rail emissions. EPA used U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics data on freight shipped by commercial aircraft and the total number of passengers enplaned to split commercial aircraft emissions. Each passenger was estimated to weigh an average of 150 pounds and luggage was estimated to weigh 50 pounds. Previous *Inventories* included commercial aircraft emissions under passenger travel. CO<sub>2</sub> equivalent is computed by multiplying the weight of the gas being measured by its estimated Global Warming Potential (GWP). The Intergovernmental Panel on Climate Change developed the GWP concept to compare the ability of one GHG to trap heat in the atmosphere with another gas. Carbon comprises 12/44 of CO<sub>2</sub> by weight. Numbers may not add to totals due to rounding.

Since 1990, the rate of growth of GHG emissions from freight sources has been more than twice as fast as that for passenger travel (57 percent vs. 24 percent). Trucking accounts for the lion's share of freight emissions followed by freight rail, a distant second.

**TABLE 5-17. U.S. GREENHOUSE GAS EMISSIONS FROM DOMESTIC FREIGHT TRANSPORTATION: 1990-2007**

**Source:** U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2007*, EPA 430-R-09-004 (Washington, DC: 2009), Annex 3, tables A-98 through A-101, available at

[www.epa.gov/climatechange/emissions/usinventoryreport.html](http://www.epa.gov/climatechange/emissions/usinventoryreport.html) as of July 13, 2009.



Between 1990 and 2007, medium- and heavy-duty truck emissions rose by 80 percent, the largest percentage increase of any major transportation mode. An increase in truck freight movement is largely responsible for the rise in emissions.

**Table 5-18. Medium- and Heavy-Duty Truck Greenhouse Gas Emissions: 1990-2007**  
(millions of metric tonnes of CO<sub>2</sub> equivalent)

	1990	1995	2000	2005	2006	2007
Carbon dioxide (CO <sub>2</sub> )	227.8	271.2	341.3	391.6	401.1	407.4
Methane	0.2	0.2	0.1	0.1	0.1	0.1
Nitrous Oxide	0.8	1.0	1.2	1.2	1.1	1.1
Hydrofluorocarbons	Z	0.3	1.6	2.1	2.2	2.2
<b>Total Truck</b>	<b>228.8</b>	<b>272.7</b>	<b>344.2</b>	<b>395.1</b>	<b>404.5</b>	<b>410.8</b>
<b>Total U.S. Transportation<sup>1</sup></b>	<b>1,546.7</b>	<b>1,688.3</b>	<b>1,923.2</b>	<b>2,003.6</b>	<b>1,999.0</b>	<b>2,000.1</b>
<b>Total U.S.<sup>1</sup></b>	<b>6,098.7</b>	<b>6,463.3</b>	<b>7,008.2</b>	<b>7,108.6</b>	<b>7,051.1</b>	<b>7,150.1</b>
<b>Truck share of transportation total (percent)</b>	<b>14.8</b>	<b>16.2</b>	<b>17.9</b>	<b>19.7</b>	<b>20.2</b>	<b>20.5</b>
<b>Truck share of U.S. total (percent)</b>	<b>3.8</b>	<b>4.2</b>	<b>4.9</b>	<b>5.6</b>	<b>5.7</b>	<b>5.7</b>

<sup>1</sup>Total transportation and total U.S. data include emissions from jet fuel and aviation gasoline used by general aviation and military aircraft, fluorine-containing halogenated substances such as per fluorocarbons, sulfur hexafluoride (SF<sub>6</sub>) and electricity-related emissions. Emissions from international bunker fuels are not included.

**Notes:** Greenhouse gas (GHG) emissions include CO<sub>2</sub>, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. CO<sub>2</sub> equivalent is computed by multiplying the weight of the gas being measured by its estimated Global Warming Potential (GWP). The Intergovernmental Panel on Climate Change developed the GWP concept to compare the ability of one GHG to trap heat in the atmosphere with another gas. Carbon comprises 12/44 of CO<sub>2</sub> by weight. Medium- and heavy-duty trucks weigh 8,501 pounds and above. Numbers may not add to totals due to rounding.



**TABLE 5-18. MEDIUM- AND HEAVY-DUTY TRUCK GREENHOUSE GAS EMISSIONS: 1990-2007**

**Source:** U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2007*, EPA 430-R-09-004 (Washington, DC: 2009), tables 2-15 and ES-2, available at [www.epa.gov/climatechange/emissions/usinventoryreport.html](http://www.epa.gov/climatechange/emissions/usinventoryreport.html) as of July 13, 2009.

# APPENDIX A. SELECTED METRIC DATA

**Table 2-1M. Weight of Shipments by Transportation Mode: 2002, 2008, and 2035 (millions of metric tonnes)**

	2002				2008				2035			
	Total	Domestic	Exports <sup>3</sup>	Imports <sup>3</sup>	Total	Domestic	Exports <sup>3</sup>	Imports <sup>3</sup>	Total	Domestic	Exports <sup>3</sup>	Imports <sup>3</sup>
<b>Total</b>	17,534	16,030	476	1,028	19,501	17,587	787	1,127	33,758	30,543	1,009	2,206
<b>Truck</b>	10,468	10,284	96	88	12,014	11,830	104	80	20,696	20,167	238	291
<b>Rail</b>	1,704	1,605	29	71	1,821	1,689	56	77	3,198	2,987	52	160
<b>Water</b>	636	539	57	40	573	472	56	45	945	793	103	49
<b>Air, air &amp; truck</b>	10	3	3	5	12	3	4	5	56	9	12	35
<b>Intermodal<sup>1</sup></b>	1,172	178	287	707	1,507	159	560	788	2,357	303	599	1,455
<b>Pipeline &amp; unknown<sup>2</sup></b>	3,543	3,422	4	118	3,574	3,436	7	132	6,506	6,284	5	218

<sup>1</sup>Intermodal includes U.S. Postal Service and courier shipments and all intermodal combinations, except air and truck. Intermodal also includes oceangoing exports and imports that move between ports and interior domestic locations by modes other than water.

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

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

**Notes:** 1 metric tonne = 1.1023 short tons. The 2008 data are provisional estimates, which are based on selected modal and economic trend data. Methods used to develop these estimates have improved over time, and as a consequence, previously released annual provisional estimates are superseded by the 2008 estimates in this table. Numbers may not add to totals due to rounding.

**Table 2-3M. Top Commodities: 2002**

Millions of Metric Tonnes		Billions of Dollars	
<b>Total</b>	<b>17,534</b>	<b>Total</b>	<b>13,228</b>
Natural gas & related <sup>1</sup>	2,438	Machinery	(R) 2,015
Gravel	1,858	Electronics	(R) 1,112
Cereal grains	1,207	Mixed freight	(R) 968
Crude petroleum	1,165	Motorized vehicles	(R) 859
Coal	1,144	Natural gas & related <sup>1</sup>	729
Nonmetal mineral products	1,032	Textiles/leather	(R) 570
Gasoline	989	Pharmaceuticals	(R) 549
Waste/scrap	840	Miscellaneous manufactured products	(R) 471
Fuel oils	508	Chemical products	(R) 455
Natural sands	505	Other prepared foodstuffs	(R) 391

**Key:** R = revised.

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

**Note:** 1 metric tonne = 1.1023 short tons.

**TABLE 2-1M. WEIGHT OF SHIPMENTS BY TRANSPORTATION MODE: 2002, 2008, AND 2035**

**Source:** 2002 and 2035: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 2.2, 2007. 2008: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, 2008 provisional estimates, 2009.

**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, 2007.

**Table 2-4M. Hazardous Materials Shipments by Transportation Mode: 2002**

Transportation mode	Value		Metric Tonnes		Tonne kilometers		Kilometers
	\$ Billions	Percent	Millions	Percent	Billions	Percent	Average distance per shipment
<b>All modes, total</b>	<b>660</b>	<b>100.0</b>	<b>1,988</b>	<b>100.0</b>	<b>477</b>	<b>100.0</b>	<b>219</b>
<b>Single modes, total</b>	<b>644</b>	<b>97.6</b>	<b>1,958</b>	<b>98.5</b>	<b>455</b>	<b>95.5</b>	<b>169</b>
Truck <sup>1</sup>	420	63.6	1,052	52.9	161	33.7	138
For-hire	190	28.8	408	20.5	95	19.9	459
Private <sup>2</sup>	227	34.3	637	32.0	64	13.5	61
Rail	31	4.7	99	5.0	105	22.1	1,118
Water	47	7.1	207	10.4	103	21.6	S
Air	2	0.2	<1	<.1	<1	<.1	3,347
Pipeline <sup>3</sup>	145	22.0	600	30.2	S	S	S
<b>Multiple modes, total</b>	<b>10</b>	<b>1.5</b>	<b>17</b>	<b>0.9</b>	<b>18</b>	<b>3.8</b>	<b>1,366</b>
Parcel, U.S. Postal Service, or courier	4	0.6	<1	<.1	<1	<.1	1,347
Other multiple modes	5	0.8	17	0.8	18	3.8	2,206
<b>Unknown and other modes, total</b>	<b>6</b>	<b>0.9</b>	<b>13</b>	<b>0.6</b>	<b>3</b>	<b>0.7</b>	<b>92</b>

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

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

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

<sup>3</sup>Excludes most shipments of crude oil.

**Note:** 1 metric tonne = 1.1023 short tons; 1 tonne kilometer = .6849 ton miles. Numbers and percents may not add to totals due to rounding.

**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	8	1.2	5	0.3	2	0.5
Class 2	Gases	74	11.2	194	10.7	54	11.4
Class 3	Flammable liquids	490	74.3	1,623	90.0	319	66.9
Class 4	Flammable solids	7	1.0	10	0.6	6	1.3
Class 5	Oxidizers and organic peroxides	5	0.8	11	0.6	6	1.3
Class 6	Toxics (poison)	8	1.3	8	0.4	6	1.3
Class 7	Radioactive materials	6	0.9	0	<.1	<.1	<.1
Class 8	Corrosive materials	38	5.8	82	4.6	53	11.1
Class 9	Miscellaneous dangerous goods	24	3.6	55	3.1	29	6.2
<b>Total</b>		<b>660</b>	<b>100.0</b>	<b>1,804</b>	<b>100.0</b>	<b>477</b>	<b>100.0</b>

**Note:** 1 metric tonne = 1.1023 short tons; 1 tonne kilometer = .6849 ton miles. Numbers and percents may not add to totals due to rounding.

**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 and U.S. Department of Commerce, Census Bureau, *2002 Commodity Flow Survey, Hazardous Materials* (Washington, DC: December 2004), table 1a, available at [www.bts.gov/publications/commodity\\_flow\\_survey/2002/united\\_states/](http://www.bts.gov/publications/commodity_flow_survey/2002/united_states/) as of March 30, 2009.

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

**Source:** U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, *2002 Commodity Flow Survey, Hazardous Materials* (Washington, DC: December 2004), table 2a, available at [www.bts.gov/publications/commodity\\_flow\\_survey/2002/united\\_states/](http://www.bts.gov/publications/commodity_flow_survey/2002/united_states/) as of March 30, 2009.



**Table 2-6M. Domestic Mode of Exports and Imports by Tonnage and Value: 2002 and 2035**

	Millions of Metric Tonnes		Billions of 2002 Dollars	
	2002	2035	2002	2035
<b>Total</b>	1,504	3,215	2,145	12,277
<b>Truck<sup>1</sup></b>	723	1,920	1,198	6,193
<b>Rail</b>	181	360	114	275
<b>Water</b>	97	152	26	49
<b>Air, air &amp; truck<sup>2</sup></b>	8	49	614	5,242
<b>Intermodal<sup>3</sup></b>	20	45	52	281
<b>Pipeline &amp; unknown<sup>4</sup></b>	475	689	141	238

<sup>1</sup>Excludes truck moves to and from airports.

<sup>2</sup>Includes truck moves to and from airports.

<sup>3</sup>Intermodal includes U.S. Postal Service and courier shipments and all intermodal combinations, except air and truck. In this table, oceangoing exports and imports that move between ports and domestic locations by single modes are classified by the domestic mode rather than intermodal.

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

**Notes:** 1 metric tonne = 1.1023 short tons. Numbers may not add to totals due to rounding.

**Table 2-8M. Value and Tonnage of U.S. Merchandise Trade with Canada and Mexico by Transportation Mode: 1998-2008 (billions of current U.S. dollars and millions of metric tonnes)**

Mode	1998		2000		2007		2008	
	Value	Weight	Value	Weight	Value	Weight	Value	Weight
Truck <sup>1</sup>	350	NA	429	NA	555	174	554	165
Rail <sup>1</sup>	68	NA	94	NA	138	140	140	134
Air	30	<1	45	<1	38	<1	41	<1
Water	21	166	33	176	74	219	93	211
Pipeline <sup>1</sup>	11	NA	24	NA	59	86	88	89
Other <sup>1</sup>	23	NA	29	NA	45	7	47	6
<b>Total<sup>1</sup></b>	<b>503</b>	<b>NA</b>	<b>653</b>	<b>NA</b>	<b>909</b>	<b>627</b>	<b>964</b>	<b>606</b>

**Key:** NA = not available.

<sup>1</sup>The Bureau of Transportation Statistics (BTS) estimated the weight of exports for truck, rail, pipeline, and other modes using weight-to-value ratios derived from imported commodities that vary by country, mode, and commodity.

**Notes:** 1 metric tonne = 1.1023 short tons. 1 short ton = 2,000 pounds. Mode "Other" includes shipments transported by mail, other and unknown modes, and shipments through Foreign Trade Zones. Totals for the most recent year differ slightly from the Freight Analysis Framework due to rounding.

**TABLE 2-6M. DOMESTIC MODE OF EXPORTS AND IMPORTS BY TONNAGE 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, 2007.

**TABLE 2-8M. VALUE AND TONNAGE OF U.S. MERCHANDISE TRADE WITH CANADA AND MEXICO BY TRANSPORTATION MODE: 1998-2008**

**Source:** U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, Transborder Freight Data, available at [www.bts.gov/transborder](http://www.bts.gov/transborder) as of September 2009.



**Table 3-1M. Kilometers of Infrastructure by Transportation Mode: 1980-2007**

	1980	1990	2000	2007	Percent change, 1980 to 2007
<b>Public roads, route miles</b>	6,211,518	6,222,926	6,358,386	6,515,164	4.9
National Highway System (NHS)	N	N	417,439	263,511	N
Interstates	66,173	72,536	75,109	75,529	14.1
Other NHS	N	N	184,287	187,982	N
Other	N	N	6,098,989	6,251,650	N
<b>Strategic Highway Corridor Network (STRAHNET)</b>	N	N	99,881	100,898	N
Interstate	N	N	75,113	75,534	N
Non-Interstate	N	N	24,765	25,798	N
<b>Railroad</b>	<sup>1</sup> 294,620	283,085	274,400	225,513	-23.5
Class I	NA	214,337	194,073	151,775	N
Regional	NA	29,570	33,759	27,245	N
Local	NA	39,165	46,567	46,493	N
<b>Inland waterways</b>					
Navigable channels	17,702	17,702	17,702	17,702	0.0
Great Lakes-St. Lawrence Seaway	3,769	3,769	3,769	3,769	0.0
<b>Pipelines</b>					
Oil	351,453	335,938	284,834	267,353	-23.9
Gas	1,692,588	1,913,743	2,203,573	2,446,411	44.5

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

<sup>1</sup>Excludes Class III railroads.

**Note:** 1 kilometer = .6214 miles.

**TABLE 3-1M. KILOMETERS OF INFRASTRUCTURE BY TRANSPORTATION MODE: 1980-2007**

**Sources:** **Public roads:** U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues), tables HM-16 and HM-49, available at [www.fhwa.dot.gov/policyinformation/statistics/2007/](http://www.fhwa.dot.gov/policyinformation/statistics/2007/) as of April 1, 2009. **Rail:** Association of American Railroads, *Railroad Facts* (Washington, DC: annual issues). **Navigable channels:** U.S. Army Corps of Engineers, USACE Education, available at [www.ndc.iwr.usace.army.mil](http://www.ndc.iwr.usace.army.mil) as of April 13, 2009. **Great Lakes-St. Lawrence Seaway:** The St. Lawrence Seaway Management Corporation, "The Seaway," available at [www.greatlakes-seaway.com/en/seaway/facts/index.html](http://www.greatlakes-seaway.com/en/seaway/facts/index.html) as of April 13, 2009. **Oil pipelines: 1980-2000:** Eno Transportation Foundation, *Transportation in America, 2002* (Washington, DC: 2002); **2007:** U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Office of Pipeline Safety, *Pipeline Statistics*, available at [www.phmsa.dot.gov/pipeline/library/data-stats](http://www.phmsa.dot.gov/pipeline/library/data-stats) as of April 13, 2009. **Gas pipelines:** American Gas Association, *Gas Facts* (Arlington, VA: annual issues).



**Table 3-3M. Trucks and Truck Kilometers by Average Weight: 1987-2002<sup>1</sup>**

Average weight (kilograms)	1987		1992		1997		2002		Percent Change, 1987 to 2002	
	Number (thousands)	VKT (millions)	Number (thousands)	VKT (millions)	Number (thousands)	VKT (millions)	Number (thousands)	VKT (millions)	Number	VKT
<b>Total</b>	<b>3,624</b>	<b>144,789</b>	<b>4,008</b>	<b>168,952</b>	<b>4,701</b>	<b>237,972</b>	<b>5,415</b>	<b>234,348</b>	<b>49</b>	<b>62</b>
<b>Light-heavy</b>	<b>1,030</b>	<b>17,328</b>	<b>1,259</b>	<b>22,550</b>	<b>1,436</b>	<b>31,888</b>	<b>1,914</b>	<b>42,252</b>	<b>86</b>	<b>144</b>
4,536 to 6,350	525	8,754	694	12,874	819	18,509	1,142	24,439	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	4,884	301	7,020	376	8,306	43	99
<b>Medium-heavy</b>	<b>766</b>	<b>12,200</b>	<b>732</b>	<b>13,103</b>	<b>729</b>	<b>16,301</b>	<b>910</b>	<b>18,934</b>	<b>19</b>	<b>55</b>
8,846 to 11,793	766	12,200	732	13,103	729	16,301	910	18,934	19	55
<b>Heavy-heavy</b>	<b>1,829</b>	<b>115,261</b>	<b>2,017</b>	<b>133,299</b>	<b>2,536</b>	<b>189,782</b>	<b>2,591</b>	<b>173,161</b>	<b>42</b>	<b>50</b>
11,794 to 14,969	377	8,707	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	6,066	10	-8
18,144 to 22,680	292	12,271	339	15,484	400	21,046	318	10,778	9	-12
22,680 to 27,216	188	11,517	227	13,998	311	20,361	327	14,404	74	25
27,216 to 36,287	723	73,123	781	82,143	1,070	120,250	1,179	124,701	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.

<sup>1</sup>Excludes trucks with an average weight of 4,536 kilograms (10,000 pounds) or less.

**Notes:** 1 kilometer = .6214 miles; 1 kilogram = 2.2046 pounds. Weight includes the empty weight of the vehicle plus the average weight of the load carried. Numbers may not add to totals due to rounding.

**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*,

EC02TV-US (Washington, DC: 2004), available at [www.census.gov/prod/ec02/ec02tv-us.pdf](http://www.census.gov/prod/ec02/ec02tv-us.pdf) as of April 13, 2009; U.S.

Department of Commerce, Census Bureau, *1992 Truck Inventory and Use Survey: United States, TC92-T-52* (Washington, DC:

1995), available at [www.census.gov/prod/ec97/97tv-us.pdf](http://www.census.gov/prod/ec97/97tv-us.pdf) as of April 13, 2009.



**Table 3-6M. Truck, Truck Kilometers, and Average Distance by Range of Operations and Jurisdiction: 2002**

	<b>Number of Trucks (thousands)</b>	<b>Truck Kilometers (millions)</b>	<b>Kilometers per Truck (thousands)</b>
<b>Total</b>	<b>5,521</b>	<b>233,622</b>	<b>42</b>
Off the road	183	3,641	20
50 miles or less	2,942	68,444	23
51 to 100 miles	685	30,836	45
101 to 200 miles	244	18,957	78
201 to 500 miles	232	28,194	122
501 miles or more	293	42,978	147
Not reported	716	40,330	56
Not applicable	226	241	1
Operated in Canada	2	116	69
Operated in Mexico	2	47	30
Operated within the home base state	4,196	136,746	33
Operated in states other than the home base state	496	65,821	133
Not reported	599	30,650	51
Not applicable	226	241	1

**Notes:** 1 kilometer = 0.6214 miles. Includes trucks registered to companies and individuals in the United States except pickups, minivans, other light cars, and sport utility vehicles. Numbers may not add to totals due to rounding.

**TABLE 3-6M. TRUCK, TRUCK KILOMETERS, AND AVERAGE DISTANCE BY RANGE OF OPERATIONS AND JURISDICTION: 2002**

**Source:** U.S. Department of Commerce, Census Bureau, *2002 Vehicle Inventory and Use Survey: United States*, EC02TV-US (Washington, DC: 2004), available at [www.census.gov/prod/ec02/ec02tv-us.pdf](http://www.census.gov/prod/ec02/ec02tv-us.pdf) as of March 30, 2009.

**Table 3-7M. Truck Kilometers by Products Carried: 2002<sup>1</sup>**

<b>Products carried</b>	<b>Millions of kilometers</b>
<b>Total<sup>2</sup></b>	<b>233,622</b>
Animals and fish, live	1,182
Animal feed and products of animal origin	3,360
Grains, cereal	2,201
All other agricultural products	4,282
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 prepared foodstuffs	11,953
Logs and other wood in the rough	1,849
Paper or paperboard articles	5,052
Printed products	1,231
Pulp, newsprint, paper, paperboard	3,115
Wood products	5,730
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	10,424
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	1,365
Plastic and rubber	3,850
All other coal and refined petroleum products	1,886
Hazardous waste (EPA manifest)	306
All other waste and scrape (non-EPA manifest)	4,260
Recyclable products	1,484
Mail and courier parcels	7,660
Empty shipping containers	1,278
Passengers	440
Mixed freight	23,590
Products, equipment, or materials not elsewhere classified	426
Products not specified	10,232
Not applicable <sup>3</sup>	241
No product carried	46,632

<sup>1</sup>Excludes pickups, panels, minivans, sport utilities, and station wagons.

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

<sup>3</sup>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 kilometer = .6214 miles.

**TABLE 3-7M. TRUCK KILOMETERS BY PRODUCTS CARRIED: 2002**

**Source:** U.S. Department of Commerce, Census Bureau, *2002 Vehicle Inventory and Use Survey: United States, EC02TV-US*, Table 3a (Washington, DC: 2004), available at [www.census.gov/prod/ec02/ec02tv-us.pdf](http://www.census.gov/prod/ec02/ec02tv-us.pdf) as of

March 30, 2009.



**Table 3-11M. Top 25 Airports by Landed Weight of All-Cargo Operations: 2000-2007<sup>1</sup>**

Airport	2007 Rank	Landed weight (thousands of metric tonnes)				
		2000	2004	2005	2006	2007
Anchorage, AK (Ted Stevens Anchorage International) <sup>2</sup>	1	7,333	8,931	9,402	9,605	9,582
Memphis, TN (Memphis International)	2	5,732	8,061	8,476	8,550	8,865
Louisville, KY (Louisville International-Standiford Field)	3	3,617	3,981	4,165	4,550	4,732
Miami, FL (Miami International)	4	2,657	3,106	3,221	3,258	3,370
Los Angeles, CA (Los Angeles International)	5	2,624	2,778	2,655	3,290	3,112
Indianapolis, IN (Indianapolis International)	6	2,616	2,099	2,309	2,383	2,406
New York, NY (John F. Kennedy International)	7	2,534	2,629	2,550	2,372	2,320
Chicago, IL (O'Hare International)	8	1,870	2,140	2,188	2,003	1,996
Newark, NJ (Newark Liberty International)	9	1,779	1,601	1,697	1,694	1,700
Oakland, CA (Metropolitan Oakland International)	10	1,643	1,545	1,631	1,631	1,643
Fort Worth, TX (Dallas/Fort Worth International)	11	1,534	1,298	1,502	1,562	1,591
Ontario, CA (Ontario International)	12	1,107	1,203	1,219	1,271	1,265
Philadelphia, PA (Philadelphia International)	13	1,319	1,244	1,271	1,239	1,248
Atlanta, GA (William B. Hartsfield International)	14	989	1,055	920	1,070	1,144
Honolulu, HI (Honolulu International)	15	628	880	751	888	1,028
San Francisco, CA (San Francisco International)	16	1,149	671	723	752	943
Houston, TX (George Bush Intercontinental)	17	435	632	644	631	698
Chicago/Rockford, IL (Chicago/Rockford International)	18	593	614	632	631	669
Portland, OR (Portland International)	19	800	651	677	662	647
Phoenix, AZ (Sky Harbor International)	20	835	727	706	659	645
Seattle, WA (Seattle-Tacoma International)	21	961	482	643	643	627
Denver, CO (Denver International)	22	817	692	692	645	583
Minneapolis, MN (Minneapolis-St Paul International/Wold-Chamberlain)	23	564	615	637	562	555
Fort Worth, TX (Fort Worth Alliance)	24	461	339	455	584	505
Salt Lake City, UT (Salt Lake City International)	25	681	563	535	497	486
<b>Top 25 airports<sup>3</sup></b>		<b>47,520</b>	<b>49,466</b>	<b>50,762</b>	<b>51,686</b>	<b>52,359</b>
<b>United States, all airports<sup>4</sup></b>		<b>67,807</b>	<b>67,402</b>	<b>69,029</b>	<b>(R) 69,275</b>	<b>69,476</b>
<b>Top 25 as % of U.S. total</b>		<b>70.1</b>	<b>73.4</b>	<b>73.5</b>	<b>(R) 74.6</b>	<b>75.4</b>

**Key:** R = revised.

<sup>1</sup>Dedicated to the exclusive transportation of cargo, all-cargo operations do not include aircraft carrying passengers that also may be carrying cargo. Aircraft landed weight is the certificated maximum gross landed weight of the aircraft as specified by the aircraft manufacturers.

<sup>2</sup>Anchorage includes a large proportion of all-cargo operations in-transit.

<sup>3</sup>Airport rankings change each year. Totals represent the top 25 airports for each year, not necessarily the top 25 airports listed here for 2007.

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

**Note:** 1 metric tonne = 1.1023 short tons.

**TABLE 3-11M. TOP 25 AIRPORTS BY LANDED WEIGHT OF ALL-CARGO OPERATIONS: 2000-2007**

**Source:** U.S. Department of Transportation, Federal Aviation Administration, Air Carrier Activity Information System (ACAIS) database, All-Cargo Data, available at [www.faa.gov/airports\\_airtraffic/airports/planning\\_capacity/passenger\\_allcargo\\_stats/passenger/media/cy07\\_cargo.pdf](http://www.faa.gov/airports_airtraffic/airports/planning_capacity/passenger_allcargo_stats/passenger/media/cy07_cargo.pdf) as of April 13, 2009.



**Table 5-7M. Fuel Consumption by Transportation Mode: 1980-2007**

	1980	1990	2000	2006	2007
<b>Highway</b>					
Gasoline, diesel and other fuels (million liters)	435,125	494,909	615,273	(R) 662,462	666,564
Truck, total	75,549	92,695	133,342	(R) 143,675	145,912
Single-unit 2-axle 6-tire or more truck	26,204	31,631	36,196	(R) 37,291	37,983
Combination truck	49,345	61,064	97,146	(R) 106,384	107,929
Truck (percent of total)	17.4	18.7	21.7	21.7	21.9
<b>Rail, Class I (in freight service)</b>					
Distillate / diesel fuel (million liters)	14,777	11,790	14,005	15,867	15,375
<b>Water</b>					
Residual fuel oil (million liters)	33,883	23,944	24,262	21,779	23,948
Distillate / diesel fuel oil (million liters)	5,594	7,816	8,558	7,203	7,282
Gasoline (million liters)	3,982	4,921	4,254	4,682	4,624
<b>Pipeline</b>					
Natural gas (million cubic meters)	17,970	18,684	18,185	(R) 16,543	17,638

**Key:** R = revised.

**Note:** 1 liter = .2642 gallons; 1 cubic meter = 35.3147 cubic feet.

**Table 5-8M. Single-Unit Truck Fuel Consumption and Travel: 1980-2007**

	1980	1990	2000	2006	2007
Number registered (thousands)	4,374	4,487	5,926	6,649	6,807
Vehicle Kilometers (millions)	64,073	83,527	113,459	(R) 129,295	131,886
Fuel consumed (million liters)	26,206	31,635	36,200	(R) 37,291	37,983
Average kilometers traveled per vehicle	14,649	18,615	19,146	(R) 19,445	19,376
Average kilometers traveled per liter	2.4	2.6	3.1	3.5	3.5
Average fuel consumed per vehicle (liters)	5,992	7,050	6,109	(R) 5,608	5,580

**Key:** R = revised.

**Notes:** 1 kilometer = .6214 miles; 1 liter = .2642 gallons.

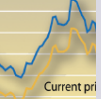


**TABLE 5-7M. FUEL CONSUMPTION BY TRANSPORTATION MODE: 1980-2007**

**Sources:** **Highway:** U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues), table VM-1, available at [www.fhwa.dot.gov/policyinformation/statistics/2007/](http://www.fhwa.dot.gov/policyinformation/statistics/2007/) as of April 20, 2009. **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 2007* (Washington, DC: 2008), tables 2, 4, and similar tables in earlier editions. **Pipeline:** U.S. Department of Energy, *Natural Gas Annual 2006*, DOE/EIA-0131(07) (Washington, DC: January 2009), table 15 and similar tables in earlier editions.

**TABLE 5-8M. SINGLE-UNIT TRUCK FUEL CONSUMPTION AND TRAVEL: 1980-2007**

**Source:** U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues), table VM-1 and similar tables in earlier editions, available at [www.fhwa.dot.gov/policyinformation/statistics/2007/](http://www.fhwa.dot.gov/policyinformation/statistics/2007/) as of April 1, 2009.



**Table 5-9M. Combination Truck Fuel Consumption and Travel: 1980-2007**

	1980	1990	2000	2006	2007
Number registered (thousands)	1,417	1,709	2,097	2,170	2,221
Vehicle kilometers traveled (millions)	110,527	151,827	217,294	(R) 228,788	233,357
Fuel consumed (million liters)	49,350	61,070	97,155	(R) 106,384	107,929
Average kilometers traveled per vehicle	78,008	88,845	103,640	(R) 105,449	105,069
Average kilometers traveled per liter	2.2	2.5	2.2	2.2	2.2
Average fuel consumed per vehicle (liters)	34,831	35,737	46,339	(R) 49,032	48,595

**Key:** R = revised.

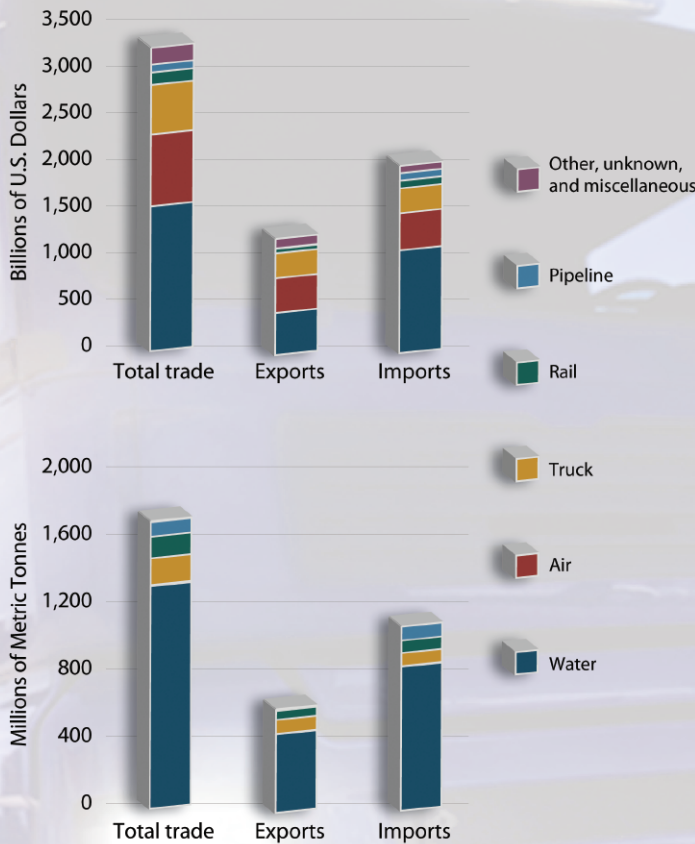
**Notes:** 1 kilometer = .6214 miles; 1 liter = .2642 gallons.



**TABLE 5-9M. COMBINATION TRUCK FUEL CONSUMPTION AND TRAVEL: 1980-2007**

**Source:** U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues), table VM-1 and similar tables in earlier editions, available at [www.fhwa.dot.gov/policyinformation/statistics/2007/](http://www.fhwa.dot.gov/policyinformation/statistics/2007/) as of April 1, 2009.

**Figure 2-2M. U.S. International Merchandise Trade by Transportation Mode: 2008**



**Notes:** 1 metric tonne = 1.1023 short tons. The U.S. Department of Transportation (USDOT), Research and Innovative Technology Administration, Bureau of Transportation Statistics estimated 2008 weight data for truck, rail, and pipeline modes using value-to-weight ratios derived from imported commodities. Totals for the most recent year differ slightly from the USDOT, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework (FAF) due to variations in coverage and FAF conversion of values to constant dollars. Numbers may not add to totals due to rounding.

**FIGURE 2-2M. U.S. INTERNATIONAL MERCHANDISE TRADE BY MODE OF TRANSPORTATION: 2008**

**Sources:** **Total, water and air data:** U.S. Department of Commerce, U.S. Census Bureau, Foreign Trade Division, U.S. Imports of Merchandise and U.S Exports of Merchandise DVD's, December 2008. **Truck, rail, and pipeline data:** U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of transportation Statistics, Transborder Freight Data, available at [www.bts.gov/transborder](http://www.bts.gov/transborder) as of August 20, 2009. **Other, unknown and miscellaneous data:** special tabulation, August 2009.



### Technical Report Documentation Page

1. Report No. FHWA-HOP-10-007		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Freight Facts and Figures 2009				5. Report Date November 2009	
				6. Performing Organization Code	
7. Author(s) Rolf Schmitt and Michael Sprung, FHWA Sharon Kim, Christopher Rick, and Joanne Sedor, Battelle				8. Performing Organization Report No.	
9. Performing Organization Name and Address Battelle 100 M St., SE, Washington, DC 20003				10. Work Unit No. (TRAIS)	
				11. Contract or Grant No.	
12. Sponsoring Agency Name and Address U.S. Department of Transportation Federal Highway Administration Office of Freight Management and Operations 1200 New Jersey Avenue, SE Washington, DC 20590				13. Type of Report and Period Covered	
				14. Sponsoring Agency Code	
15. Supplementary Notes					
16. Abstract This report provides an overview of freight transportation, focusing on the volume and value of freight shipments, the extent of the freight network, industry employment and productivity patterns, and related safety, energy use, and environment effects. Economic and social characteristics of the United States also are provided as background information. Metric data are available for several tables as well.					
17. Key Word Freight transportation, freight network, freight mobility, congestion, productivity, trade, economy, safety, energy use, emissions, employment, shipments, port, gateway, hazardous materials				18. Distribution Statement	
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 68 + Covers	22. Price



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**November 2009**

**FHWA-HOP-10-007**