

FREIGHT FACTS AND FIGURES 2 0 1 0



O F F I C E O F
F R E I G H T
M A N A G E M E N T
A N D O P E R A T I O N S



U.S. Department of Transportation
Federal Highway Administration



QUALITY ASSURANCE STATEMENT

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

NOTICE

This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.



Freight Facts and Figures 2010 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.

Chapter 1 summarizes the 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 highway, rail, and port 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. The most recently published data are for 2007 (except for the Vehicle Inventory and Use Survey, which was last conducted in 2002).

Several of the tables and maps are based on the Freight Analysis Framework (FAF), version 3, 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 covers all modes of transportation. The truck, rail, water, and pipeline categories include shipments transported by only one mode. Air includes shipments weighing more than 100 pounds moved by air or by air and truck. Multiple modes and mail includes all other shipments transported by more than one mode, such as bulk products moved by rail and water and mixed cargo hauled by truck and rail. Multiple modes and mail also includes shipments weighing less than 100 pounds sent via postal and courier services. Other and unknown includes a small quantity of shipments moved by any mode not included within the other mode definitions and unknown modes. Visit www.ops.fhwa.dot.gov/freight/freight_analysis/faf for more information.





TABLE OF CONTENTS

CHAPTER I. THE NATION SERVED BY FREIGHT

Tables

1-1. Economic and Social Characteristics of the United States: 1980-2008	7
1-2. Population and Gross Domestic Product (GDP) by Region: 1980-2008	8

Figures

1-1. Economic and Population Projections: 2008-2018	9
---	---

CHAPTER II. FREIGHT TO BE MOVED AND TRADING PARTNERS

Tables

2-1. Weight of Shipments by Transportation Mode: 2007, 2009, and 2040	11
2-2. Value of Shipments by Transportation Mode: 2007, 2009, and 2040	12
2-3. Top Commodities: 2007	12
2-4. Hazardous Materials Shipments by Transportation Mode: 2007	13
2-5. Hazardous Materials Shipments by Hazard Class: 2007	13
2-6. Domestic Mode of Exports and Imports by Tonnage and Value: 2007 and 2040 ..	14
2-7. Top 25 Trading Partners of the United States in Merchandise Trade: 1999-2009 ..	16
2-8. Value and Tonnage of U.S. Merchandise Trade with Canada and Mexico by Transportation Mode: 1999-2009	16
2-9. Value of U.S. Exports to and Imports from Canada and Mexico by Land Transportation Mode: 1999-2009	17

Figures

2-1. Value of Merchandise Trade by Coasts and Borders: 1951-2009	14
2-2. U.S. International Merchandise Trade by Transportation Mode: 2009	15

CHAPTER III. THE FREIGHT TRANSPORTATION SYSTEM

Tables

3-1. Miles of Infrastructure by Transportation Mode: 1980-2008	19
3-2. Number of U.S. Vehicles, Vessels, and Other Conveyances: 1980-2008	20
3-3. Trucks and Truck Miles by Average Weight: 1987-2002	21
3-4. Commercial Vehicle Weight Enforcement Activities: 2005-2009	22
3-5. Annual Vehicle Distance Traveled by Highway Category and Vehicle Type: 2008	23
3-6. Trucks, Truck Miles, and Average Distance by Range of Operations and Jurisdiction: 2002	26
3-7. Truck Miles by Products Carried: 2002	27
3-8. Average Truck Speeds on Selected Interstate Highways: 2009	37
3-9. Maximum Posted Speed Limits on Rural Interstates: 2010	38
3-10. Top 25 Airports by Landed Weight of All-Cargo Operations: 2000-2008	43

Figures

3-1. Highway Vehicle Miles Traveled by Trucks and All Vehicles: 1980-2008	20
3-2. Share of Highway Vehicle Miles Traveled by Vehicle Type: 2008	21
3-3. National Network for Conventional Combination Trucks: 2009	24
3-4. Permitted Longer Combination Vehicles on the National Highway System: 2009 ..	25
3-5. Average Daily Long-Haul Freight Traffic on the National Highway System: 2007 ..	28
3-6. Average Daily Long-Haul Freight Traffic on the National Highway System: 2040 ..	29
3-7. Major Truck Routes on the National Highway System: 2007	30

CHAPTER III. THE FREIGHT TRANSPORTATION SYSTEM (Figures continued)

3-8. Major Truck Routes on the National Highway System: 2040	31
3-9. Peak-Period Congestion on the National Highway System: 2007	32
3-10. Peak-Period Congestion on the National Highway System: 2040	33
3-11. Peak-Period Congestion on High-Volume Truck Portions of the National Highway System: 2007	34
3-12. Peak-Period Congestion on High-Volume Truck Portions of the National Highway System: 2040	35
3-13. Average Truck Speeds on Selected Interstate Highways: 2009	36
3-14. Tonnage on Highways, Railroad, and Inland Waterways: 2007	39
3-15. Tonnage of Trailer-on-Flatcar and Container-on-Flatcar Rail Intermodal Moves: 2008	40
3-16. Top 25 Water Ports by Tonnage: 2008	41
3-17. Top 25 Water Ports by Containerized Cargo: 2009	42
3-18. Top 25 Foreign-Trade Freight Gateways by Value: 2008	44

CHAPTER IV. THE FREIGHT TRANSPORTATION INDUSTRY**Tables**

4-1. Economic Characteristics of Transportation and Warehousing Establishments in Freight-Dominated Modes: 2002 and 2007	46
4-2. Economic Characteristics of Freight Railroads: 2000 and 2008	46
4-3. Employment in For-Hire Transportation Establishments Primarily Serving Freight: 1980-2009	48
4-4. Employment in Selected Freight Transportation and Freight Transportation-Related Occupations: 2000-2009	49
4-5. Producer Price Indices for Selected Transportation Services: 1990-2008	50

Figures

4-1. Value Added by Freight Transportation to U.S. Gross Domestic Product by Transportation Mode: 1992 and 1996	45
4-2. Productivity in Selected Transportation Industries: 1987-2008	47

CHAPTER V. SAFETY, ENERGY, AND ENVIRONMENTAL IMPLICATIONS OF FREIGHT TRANSPORTATION**Tables**

5-1. Fatalities by Freight Transportation Mode: 1980-2009	51
5-2. Injured Persons by Freight Transportation Mode: 1980-2009	52
5-3. Accidents by Freight Transportation Mode: 1980-2009	53
5-4. Hazardous Materials Transportation Incidents: 1980-2009	53
5-5. Commercial Motor Carrier Compliance Review Activity by Safety Rating: 2000-2009	54
5-6. Roadside Safety Inspection Activity Summary by Inspection Type: 2000-2009	55
5-7. Fuel Consumption by Transportation Mode: 1980-2008	55
5-8. Single-Unit Truck Fuel Consumption and Travel: 1980-2008	56
5-9. Combination Truck Fuel Consumption and Travel: 1980-2008	57
5-10. Energy Intensities of Domestic Freight Transportation Modes: 1980-2008	58
5-11. Estimated National Average Vehicle Emissions Rates of Heavy-Duty and Light-Duty Vehicles: 1990-2009	59

CHAPTER V. SAFETY, ENERGY, AND ENVIRONMENTAL IMPLICATIONS OF FREIGHT TRANSPORTATION**(Tables continued)**

5-12. Freight Nitrogen Oxides (NO _x) and Particulate Matter (PM-10) Emissions by Freight Transportation Mode: 2002	59
5-13. Current and Projected Nitrogen Oxides (NO _x) Emissions by Freight Transportation Mode: 2002, 2010, and 2020	60
5-14. Current and Projected Particulate Matter (PM-10) Emissions by Freight Transportation Mode: 2002, 2010, and 2020	60
5-15. U.S. Greenhouse Gas Emissions by Economic End-Use Sector: 1990-2008	61
5-16. U.S. Transportation Sector Carbon Dioxide (CO ₂) Emissions from Fossil Fuel Combustion by Fuel Type: 1990-2008	62
5-17. U.S. Greenhouse Gas Emissions from Domestic Freight Transportation: 1990-2008	63
5-18. Medium- and Heavy-Duty Truck Greenhouse Gas Emissions: 1990-2008	64

Figures

5-1. Share of Energy Consumption by Freight Transportation Mode: 2008	56
5-2. Monthly Diesel Prices: January 1999-June 2010	57

APPENDIX A. SELECTED METRIC DATA**Tables**

2-1M. Weight of Shipments by Transportation Mode: 2007, 2009, and 2040	65
2-3M. Top Commodities: 2007	65
2-4M. Hazardous Materials Shipments by Transportation Mode: 2007	66
2-5M. Hazardous Materials Shipments by Hazard Class: 2007	66
2-6M. Domestic Mode of Exports and Imports by Tonnage and Value: 2007 and 2040	67
2-8M. Value and Tonnage of U.S. Merchandise Trade with Canada and Mexico by Transportation Mode: 1999-2009	67
3-1M. Kilometers of Infrastructure by Transportation Mode: 1980-2008	68
3-3M. Trucks and Truck Kilometers by Average Weight: 1987-2002	69
3-6M. Trucks, Truck Kilometers, and Average Distance by Range of Operations and Jurisdiction: 2002	70
3-7M. Truck Kilometers by Products Carried: 2002	71
3-10M. Top 25 Airports by Landed Weight of All-Cargo Operations: 2000-2008	72
5-7M. Fuel Consumption by Transportation Mode: 1980-2008	73
5-8M. Single-Unit Truck Fuel Consumption and Travel: 1980-2008	73
5-9M. Combination Truck Fuel Consumption and Travel: 1980-2008	74

Figure

2-2M. U.S. International Merchandise Trade by Transportation Mode: 2009	75
---	----



I. THE NATION SERVED BY FREIGHT

The Nation's 117 million households, 7.6 million business establishments, and 89,500 governmental 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 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 34 percent between 1980 and

Table 1-1. Economic and Social Characteristics of the United States: 1980-2008

	1980	1990	2000	2007	2008	Percent change, 1980 to 2008
Resident population (thousands)	226,546	248,791	281,425	(R) 301,580	304,375	34.4
Households (thousands)	80,776	93,347	104,705	116,011	116,783	44.6
Median household income (2000 \$)	35,057	38,257	41,990	41,454	40,233	14.8
Civilian labor force (thousands)	106,940	125,840	142,583	153,836	154,287	44.3
Employed ¹ (thousands)	99,303	118,793	136,891	146,047	145,362	46.4
Agriculture, forestry, fishing, and hunting (percent)	NA	1.9	1.8	1.4	1.5	NA
Mining	NA	0.5	0.3	0.5	0.6	NA
Construction	NA	6.9	7.3	8.1	7.5	NA
Manufacturing	NA	16.8	14.4	11.2	10.9	NA
Wholesale and retail trade	NA	14.7	14.6	14.3	14.2	NA
Transportation and utilities	NA	5.1	5.4	5.2	5.3	NA
Information	NA	2.9	3.0	2.4	2.4	NA
Financial activities	NA	7.1	6.8	7.2	7.0	NA
Professional and business services	NA	9.4	10.0	10.7	10.7	NA
Education and health services	NA	17.5	19.1	21.0	21.6	NA
Leisure and hospitality	NA	8.0	8.2	8.5	8.8	NA
Other services	NA	4.3	4.7	4.8	4.8	NA
Public administration	NA	4.7	4.5	4.6	4.7	NA
Business establishments (thousands)	NA	6,176	7,070	7,705	7,601	NA
Governmental units ²	³ 81,831	⁴ 85,006	⁵ 87,576	89,527	NA	NA
Gross domestic product (millions of 2000 \$)	(R) 5,839,000	(R) 8,033,900	(R) 11,226,000	(R) 13,254,100	13,312,200	128.0
Foreign trade (millions of 2000 \$)	631,335	1,168,168	2,572,000	3,399,774	3,776,712	522.5
Goods (percent)	74.0	71.6	78.8	78.7	77.0	4.0
Services (percent)	26.0	28.4	21.2	21.3	23.0	-11.4

Key: NA = not available; R = revised.

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

²Data for governmental units come from the Census of Governments, which is collected every five years.

³1982

⁴1992

⁵2002

TABLE 1-1. ECONOMIC AND SOCIAL CHARACTERISTICS OF THE UNITED STATES: 1980-2008

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 as of August 9, 2010. **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 as of August 9, 2010. **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 as of August 9, 2010. **Employment:** U.S. Department of Labor, Bureau of Labor Statistics, *Current Employment Statistics*, available at www.bls.gov/ces as of August 9, 2010. **Median household income:** U.S. Department of Commerce, Census Bureau, *Historical Income Tables*, table H-6, available at www.census.gov/hhes/income/histinc/h06ar.html as of August 9, 2010. **Business establishments:** U.S. Department of Commerce, Census Bureau, *County Business Patterns*, available at www.census.gov/epcd/cbp/view/cbpview.html as of August 9, 2010. **Governmental units:** U.S. Department of Commerce, Census Bureau, *Census of Governments*, available at www.census.gov/govs as of August 9, 2010. **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 as of August 9, 2010.

2008 while the economy, measured by Gross Domestic Product (GDP), more than doubled in real terms. Household income, another indicator of economic growth, also rose by 15 percent. Foreign trade grew faster than the overall economy, quintupling in real value between 1980 and 2008, 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
Resident Population (thousands)	226,549	248,789	282,172	(R) 304,375	(R) 304,375	34
Northeast	49,136	50,828	(R) 53,930	(R) 55,060	(R) 55,060	12
Midwest	58,868	59,670	(R) 64,815	(R) 66,596	(R) 66,596	13
South	75,372	85,454	(R) 101,869	(R) 112,021	(R) 112,021	(R) 49
West	43,173	52,837	(R) 64,467	(R) 70,698	(R) 70,698	64
GDP (millions of 2000 \$)¹	5,054,549	6,994,329	9,749,103	11,439,232	11,523,637	128
Northeast	1,107,283	1,604,121	2,077,436	2,410,543	2,439,675	120
Midwest	1,262,917	1,566,939	2,174,719	2,367,972	2,376,526	88
South	1,608,531	2,220,755	3,212,076	3,883,705	3,907,737	143
West	1,075,817	1,602,514	2,284,873	2,776,103	2,797,637	160
GDP per capita (millions of 2000 \$)¹	22,311	28,113	34,550	(R) 37,583	(R) 37,860	70
Northeast	22,535	31,560	(R) 38,521	(R) 43,780	(R) 44,309	97
Midwest	21,453	26,260	(R) 33,552	(R) 35,557	(R) 35,686	66
South	21,341	25,988	(R) 31,532	(R) 34,669	(R) 34,884	(R) 63
West	24,919	30,329	(R) 35,442	(R) 39,267	(R) 39,572	(R) 59

Key: R = revised.

¹As 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 as of July 2, 2010. **Gross Domestic Product: 1980-1990:** U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts, available at 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/ as of July 2, 2010.

The U.S. economy, as measured by GDP, is projected to increase by 46 per cent and the U.S population by 10 percent between 2008 and 2018. Employment in transportation and material-moving is expected to increase by 4 per cent over this peri-

od, which is less than employment as a whole. These projections are based on long-term U.S. economic trends.

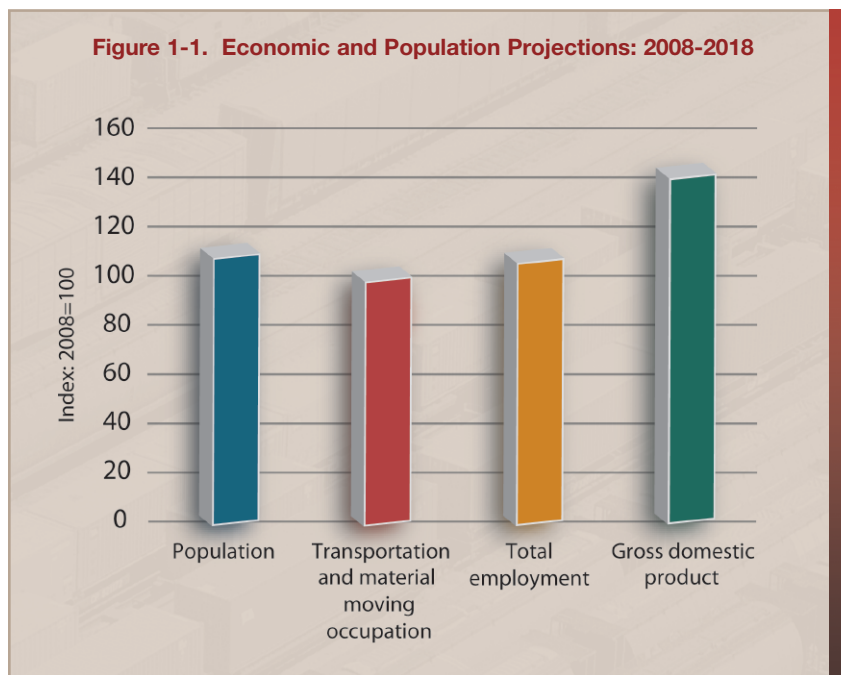


FIGURE 1-1. ECONOMIC AND POPULATION PROJECTIONS: 2008-2018

Sources: **Population:** U.S. Department of Commerce, Census Bureau, *National Population Projections*, available at www.census.gov/population/www/projections/summarytables.html as of April 25, 2010. **Employment:** U.S. Department of Labor, Bureau of Labor Statistics, *Employment by Major Industry Division, 1998, 2008, and projected 2018*, available at www.bls.gov as of April 25, 2010. **GDP:** Congressional Budget Office, *The Budget and Economic Outlook: Fiscal Years 2009 to 2020*, available at www.cbo.gov as of April 25, 2010.



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: 2007, 2009, and 2040 (millions of tons)

	2007				2009				2040			
	Total	Domestic	Exports ²	Imports ²	Total	Domestic	Exports ²	Imports ²	Total	Domestic	Exports ²	Imports ²
Total	18,581	16,576	656	1,349	16,122	14,397	651	1,073	27,104	22,772	1,811	2,521
Truck	12,766	12,580	95	91	10,868	10,713	86	69	18,445	17,963	274	208
Rail	1,894	1,745	61	87	1,689	1,575	57	57	2,408	2,109	155	144
Water	794	360	52	382	734	351	51	332	1,143	482	105	556
Air, air & truck	13	3	4	6	11	3	4	5	41	5	16	19
Multiple modes & mail¹	1,531	519	409	603	1,336	458	423	455	3,119	724	1,179	1,216
Pipeline	1,270	1,100	4	166	1,220	1,069	5	147	1,509	1,158	9	342
Other & unknown	313	269	29	15	265	229	27	9	440	331	73	35

¹In this table, multiple modes & mail includes export and import shipments that move domestically by a different mode than the mode used between the port and foreign location.

²Data do not include imports and exports that pass through the United States from a foreign origin to a foreign destination by any mode.

Notes: Numbers may not add to totals due to rounding. The 2009 data are provisional estimates, which are based on selected modal and economic trend data.

The U.S. transportation system moved, on average, 51 million tons worth \$45 billion each day in 2007. Preliminary estimates from the Freight Analysis Framework (FAF) show that tonnage decreased 2.4 percent in 2008 and an additional 11.1 percent in 2009 after years of growth. Early indications suggest that tonnage is starting to rebound in 2010, increasing 4.6 percent since 2009 and reaching 91 percent of 2007 tonnage. Between 2010 and 2040, tonnage is forecast to increase at 1.6 percent per year. Annual tons per capita are forecast to increase 27 percent from 55 in 2010 to 70 in 2040.

Version 3 of the FAF and the 2007 Commodity Flow Survey (CFS) include significant improvements and corrections to version 2 of the FAF and the 2002 CFS. Tables in this chapter should not be compared to those in previous editions of *Freight Facts and Figures*. Revised estimates of tonnage and value for 2002 and 1997 will be published in future editions of *Freight Facts and Figures* in order to provide consistent trend statistics.

TABLE 2-1. WEIGHT OF SHIPMENTS BY TRANSPORTATION MODE: 2007, 2009, AND 2040

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.1, 2010.

Table 2-2. Value of Shipments by Transportation Mode: 2007, 2009, and 2040 (billions of 2007 dollars)

	2007				2009				2040			
	Total	Domestic	Exports ²	Imports ²	Total	Domestic	Exports ²	Imports ²	Total	Domestic	Exports ²	Imports ²
Total	16,536	13,338	1,196	2,002	14,647	12,078	1,053	1,516	39,294	29,444	4,178	5,672
Truck	10,783	10,223	271	289	9,511	9,087	211	213	21,656	20,114	738	804
Rail	511	374	45	92	421	323	46	52	733	477	118	138
Water	286	99	13	173	263	99	14	150	412	128	31	254
Air, air & truck	1,079	152	422	505	884	147	349	388	4,347	740	1,670	1,937
Multiple modes & mail¹	2,923	1,680	397	846	2,639	1,618	391	630	10,520	6,728	1,476	2,317
Pipeline	623	552	4	67	595	532	4	60	728	585	9	134
Other & unknown	331	257	44	30	334	273	39	22	898	672	138	88

¹In this table, multiple modes & mail includes export and import shipments that move domestically by a different mode than the mode used between the port and foreign location.

²Data do not include imports and exports that pass through the United States from a foreign origin to a foreign destination by any mode.

Notes: Numbers may not add to totals due to rounding. The 2009 data are provisional estimates, which are based on selected modal and economic trend data.

The value of freight moved is expected to increase faster than the weight, rising from \$890 per ton in 2007 to \$2,145 per ton in 2040 when controlling for inflation. Exports at \$1,825 per ton and imports at \$1,484 per ton are significantly higher than domestic shipments at \$805 per ton in 2007, but the relative differences are expected to be much less in 2040 when exports reach \$2,831 per ton, imports reach \$2,793 per ton, and domestic shipments reach \$2,019 per ton in 2007 dollars. Exports and imports accounted for 11 percent of the tons and 19 percent of the value in 2007 and are forecast to reach 16 percent of the tons and 21 percent of the value in 2040.

Table 2-3. Top Commodities: 2007

Millions of Tons		Billions of Dollars	
Total, all commodities	18,581	Total, all commodities	16,536
Gravel	2,263	Machinery	1,762
Cereal grains	1,475	Electronics	1,432
Coal	1,444	Motorized vehicles	1,269
Non-metal mineral products	1,392	Mixed freight	1,058
Waste/scrap	1,323	Pharmaceuticals	880
Natural gas & related ¹	1,277	Textiles/leather	696
Gasoline	1,005	Gasoline	691
Fuel oils	744	Miscellaneous manufactured products	689
Natural sands	570	Plastics/rubber	579
Crude petroleum	558	Articles of base metal	573

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

Bulk shipments account for about 85 percent of the tonnage but only 30 percent of the value of goods moved in 2007. Top commodities include gravel, cereal grains, and coal. Higher value, time-sensitive shipments account for two-thirds of the value of all commodity movements but only one-eighth of the tonnage. Top commodities include machinery, electronics, and motorized vehicles.

TABLE 2-2. VALUE OF SHIPMENTS BY TRANSPORTATION MODE: 2007, 2009, AND 2040

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.1, 2010.

TABLE 2-3. TOP COMMODITIES: 2007

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.1, 2010.

Table 2-4. Hazardous Materials Shipments by Transportation Mode: 2007

Transportation mode	Value		Tons		Ton miles		Miles
	\$ Billion	Percent	Millions	Percent	Billions	Percent	Average distance per shipment
All modes, total	1,448	100.0	2,231	100.0	323	100.0	96
Single modes, total	1,371	94.6	2,112	94.6	279	86.3	65
Truck ¹	837	57.8	1203	53.9	104	32.2	59
For-hire	359	24.8	495	22.2	63	19.6	214
Private ²	478	33.0	708	31.7	41	12.6	32
Rail	69	4.8	130	5.8	92	28.5	578
Water	69	4.8	150	6.7	37	11.5	383
Air	2	0.1	S	S	S	S	1,095
Pipeline ³	393	27.2	629	28.2	S	S	S
Multiple modes, total	71	4.9	111	5.0	43	13.3	834
Parcel, U.S. Postal Service, or Courier	8	0.5	<1	<0.1	<1	<0.1	836
Other multiple modes	28	1.9	57	2.5	17	5.3	233
Unknown and other modes, total	7	0.5	8	0.4	1	0.5	58

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

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

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

³Excludes crude oil shipments.

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 hazardous shipments by weight but nearly 29 percent of ton miles.

Table 2-5. Hazardous Materials Shipments by Hazard Class: 2007

Hazard class	Description	Value		Tons		Ton miles	
		\$ Billions	Percent	Millions	Percent	Billions	Percent
Class 1	Explosives	12	0.8	3	0.1	<1	<0.1
Class 2	Gases	132	9.1	251	11.2	55	17.1
Class 3	Flammable liquids	1,170	80.8	1,753	78.6	182	56.1
Class 4	Flammable solids	4	0.3	20	0.9	6	1.7
Class 5	Oxidizers and organic peroxides	7	0.5	15	0.7	7	2.2
Class 6	Toxic (poison)	21	1.5	11	0.5	6	1.8
Class 7	Radioactive materials	21	1.4	<1	<0.1	<1	<0.1
Class 8	Corrosive materials	51	3.6	114	5.1	44	13.7
Class 9	Miscellaneous dangerous goods	30	2.1	63	2.8	23	7.1
Total		1,448	100.0	2,231	100.0	323	100.0

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

TABLE 2-4. HAZARDOUS MATERIALS SHIPMENTS BY TRANSPORTATION MODE: 2007

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, *2007 Commodity Flow Survey, Hazardous Materials* (Washington, DC: February 2010), table 1a, available at www.bts.gov/publications/commodity_flow_survey/ as of May 25, 2010.

TABLE 2-5. HAZARDOUS MATERIALS SHIPMENTS BY HAZARD CLASS: 2007

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, *2007 Commodity Flow Survey, Hazardous Materials* (Washington, DC: February 2010), table 1a, available at www.bts.gov/publications/commodity_flow_survey/ as of May 25, 2010.



Flammable liquids, especially gasoline, are the predominant hazardous material transported in the United States. In terms of ton miles, flammable liquids account for about 56 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 17 percent.

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 fourteen-fold in inflation-adjusted terms. However, overall growth has been affected by short-term

Table 2-6. Domestic Mode of Exports and Imports by Tonnage and Value: 2007 and 2040

	Millions of Tons		Billions of 2007 Dollars	
	2007	2040	2007	2040
Total	2,005	4,332	3,198	9,850
Truck¹	763	1,911	1,343	3,880
Rail	259	543	197	419
Water	137	235	52	92
Air, air & truck²	10	35	927	3,606
Multiple modes & mail³	152	426	287	929
Pipeline	344	653	147	274
Other & unknown	41	102	112	457
No domestic mode⁴	298	426	134	193

¹Excludes truck moves to and from airports.

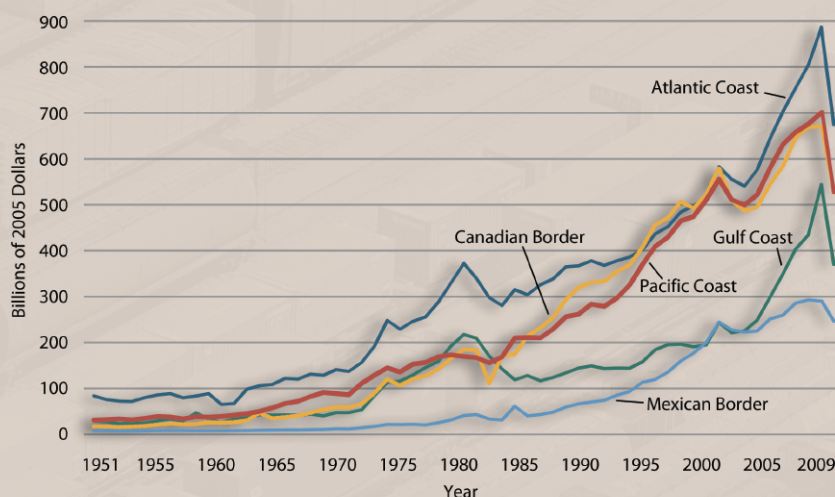
²Includes truck moves to and from airports.

³Multiple modes & mail include U.S. Postal Service, courier shipments, and all intermodal combinations, except air and truck. In this table, oceangoing export and import shipments that move between ports and domestic locations by single modes are classified by the domestic mode rather than multiple modes & mail.

⁴No domestic mode includes waterborne import shipments of crude petroleum off-loaded directly at the domestic destination (refineries) with no domestic mode of transportation.

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

Figure 2-1. Value of Merchandise Trade by Coasts and Borders: 1951-2009



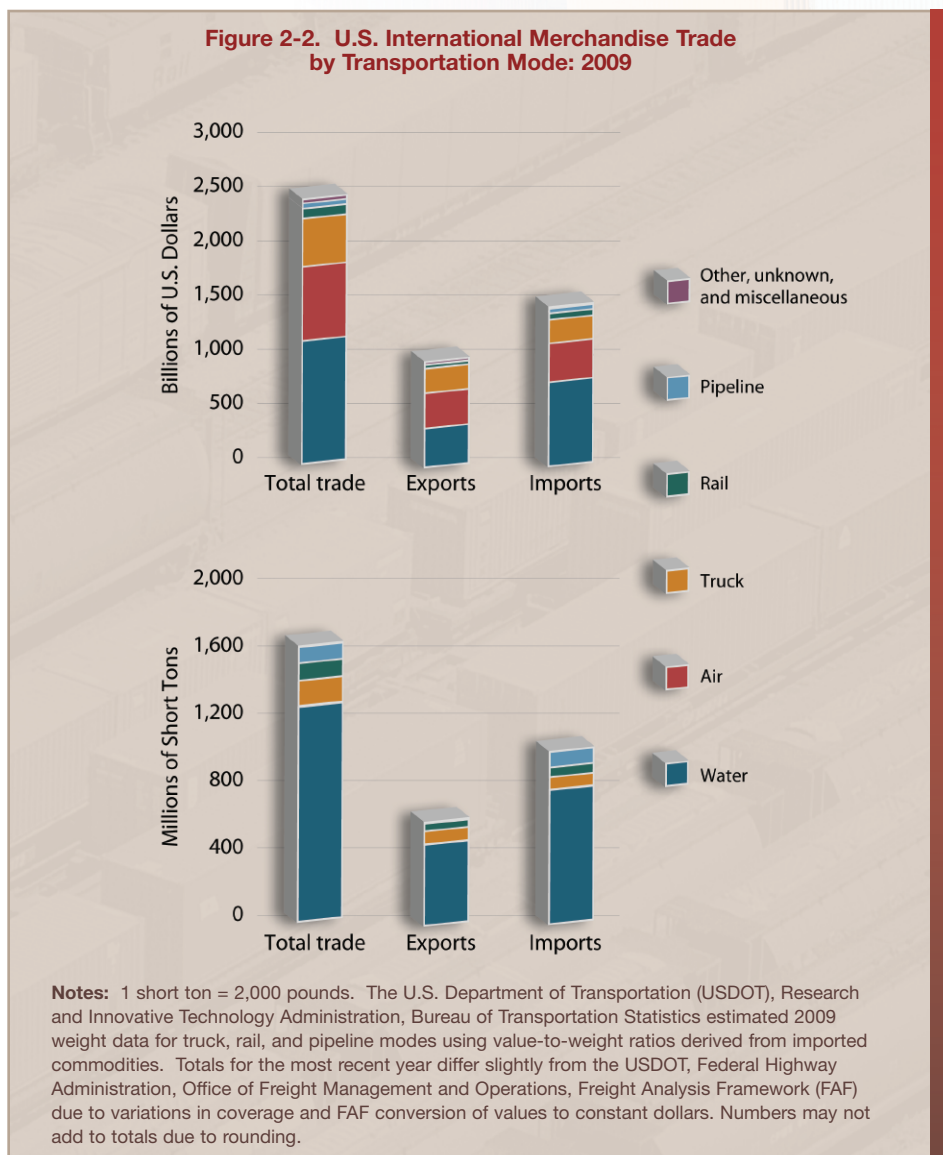
Notes: The value of 2009 coal exports (\$4.24) from Mobile, AL, Charleston, SC, and Norfolk, VA, are considered proprietary information and are consolidated. In this figure, the total value of coal exports for the above three cities are included under the Atlantic Coast Customs District.

TABLE 2-6. DOMESTIC MODE OF EXPORTS AND IMPORTS BY TONNAGE AND VALUE: 2007 AND 2040

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.1, 2010.

FIGURE 2-1. VALUE OF MERCHANDISE TRADE BY COASTS AND BORDERS: 1951-2009

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); **2000-2009:** 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 as of August 10, 2010.



downturns, such as between 1981 and 1986 and in 2009. In 2009, ports and airports on the Atlantic Coast remain the most significant in terms of value, but Gulf Coast ports also have experienced rapid growth in recent years.

Nearly 80 percent of freight tonnage in U.S. foreign trade moves by water, but air and truck transportation are also important when freight value is considered. By value, the water share drops to 47 percent, with air and truck accounting for 28 percent and 18 percent respectively. Rail and pipeline account for the balance.

FIGURE 2-2. U.S. INTERNATIONAL MERCHANDISE TRADE BY TRANSPORTATION MODE: 2009

Sources: **Total, water and air data:** U.S. Department of Commerce, U.S. Census Bureau, Foreign Trade Division, FT920 - U.S. Merchandise Trade: Selected Highlights (Washington, DC: January 2010). **Truck, rail, and pipeline data:** U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, North American Transborder Freight Data, available at www.bts.gov/transborder as of August 15, 2010. **Other, unknown and miscellaneous data:** special tabulation, August 2010.



Table 2-7. Top 25 Trading Partners of the United States in Merchandise Trade: 1999-2009 (billions of current U.S. dollars)

Partner	2009				
	Rank	1999	2004	(R) 2008	2009
Canada	1	362	445	601	431
China	2	95	231	408	366
Mexico	3	197	267	367	306
Japan	4	189	184	204	147
Germany	5	82	109	152	115
United Kingdom	6	78	82	112	93
South Korea	7	54	72	83	68
France	8	45	53	73	61
Netherlands	9	28	37	61	48
Taiwan	10	54	56	61	47
Brazil	11	25	35	63	46
Italy	12	33	39	52	39
Singapore	13	34	35	44	38
India	14	13	22	43	38
Venezuela	15	17	30	64	37
Ireland	16	17	36	39	36
Belgium	17	22	29	46	35
Malaysia	18	31	39	44	34
Switzerland	19	18	21	40	34
Saudi Arabia	20	16	26	67	33
Israel	21	18	24	37	28
Australia	22	17	22	33	28
Thailand	23	19	24	33	26
Hong Kong	24	23	25	28	25
Russian Federation	25	8	15	36	24
Top 25 total¹		1,504.7	1,960.5	2,789.4	2,179.9
U.S. total trade		1,717.6	2,287.6	3,611.0	2,615.7
Top 25 as % of total		87.6	85.7	77.0	83.3

Key: R = revised.

¹Top 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 2009.

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

Canada is this country's top trading partner followed by China and Mexico. China's share of trade with the United States almost tripled between 1999 and 2009, from 5 percent of total merchandise trade to 14 percent.

Trade with Canada and Mexico has grown rapidly over the past decade. Trucks carry about 62 percent of the value of goods traded with these countries.

Table 2-8. Value and Tonnage of U.S. Merchandise Trade with Canada and Mexico by Transportation Mode: 1999-2009 (billions of current U.S. dollars and millions of short tons)

Mode	1999		2004		2008		2009	
	Value	Weight	Value	Weight	Value	Weight	Value	Weight
Truck ¹	385	NA	453	NA	554	182	455	155
Rail ¹	78	NA	108	NA	140	148	96	108
Air	34	1	32	<1	41	<1	39	<1
Water	23	183	46	244	93	232	59	189
Pipeline ¹	12	NA	39	NA	88	99	49	99
Other ¹	25	NA	34	NA	47	7	37	6
Total¹	559	NA	712	NA	964	668	735	557

Key: NA = not available.

¹The U.S. Department of Transportation, Research and Innovative Technology Administration, 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 (FAF) 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: 1999-2009

Source: U.S. Department of Commerce, International Trade Administration, TradeStats Express, available at www.ita.doc.gov/ as of August 9, 2010.

TABLE 2-8. VALUE AND TONNAGE OF U.S. MERCHANDISE TRADE WITH CANADA AND MEXICO BY TRANSPORTATION MODE: 1999-2009

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, North American Transborder Freight Data, available at www.bts.gov/transborder as of July 27, 2010; U.S. Department of Commerce, Census Bureau, Foreign Trade Division, *FT920 - U.S. Merchandise Trade: Selected Highlights* (Washington, DC: annual issues).

Table 2-9. Value of U.S. Exports to and Imports from Canada and Mexico by Land Transportation Mode: 1999-2009 (millions of current U.S. dollars)

	1999	2004	2008	2009
Exports to Canada, total	146,374	171,878	235,681	184,653
Truck	123,140	135,897	178,593	142,545
Rail	11,755	16,597	29,438	19,973
Pipeline	114	1,584	4,313	2,632
Other ¹	11,360	17,777	23,294	19,456
Mail	6	23	43	48
Exports to Mexico, total	76,129	97,304	129,587	110,378
Truck	66,924	79,349	100,264	89,417
Rail	5,711	13,633	21,965	15,291
Pipeline	144	87	1,250	788
Other ¹	3,350	4,216	6,107	4,882
Mail	<1	2	<1	<1
Imports from Canada, total	183,724	236,735	301,128	201,089
Truck	118,901	132,762	141,353	105,079
Rail	46,255	57,947	63,757	41,058
Pipeline	12,056	36,828	82,018	45,630
Other ¹	6,387	8,994	13,555	9,098
Mail	13	<1	<1	<1
FTZ ²	111	203	445	223
Imports from Mexico, total	95,023	127,646	163,478	140,576
Truck	76,448	104,944	134,224	117,787
Rail	14,693	20,183	25,265	19,303
Pipeline	2	<1	193	155
Other ¹	1,256	1,839	2,717	2,175
Mail	<1	<1	<1	<1
FTZ ²	2,624	680	1,079	1,156

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

²Foreign Trade Zones (FTZs) were added as a mode of transport for land import shipments beginning in April 1995. Although FTZs are treated as a mode of transportation in the Transborder 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 carry most of the trade in each direction across both borders, and rail is the second largest mover of bidirectional freight. 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 TRANSPORTATION MODE: 1999-2009

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, North American Transborder Freight Data, available at www.bts.gov/transborder as of August 10, 2010.



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: 1980-2008

	1980	1990	2000	2008	Percent change, 1980 to 2008
Public roads, route miles	3,859,837	3,866,926	3,951,101	4,059,343	5.2
National Highway System (NHS)	N	N	161,189	164,096	N
Interstates	41,120	45,074	46,673	47,013	14.3
Other NHS	N	N	114,516	117,083	N
Other	N	N	3,789,912	3,895,246	N
Strategic Highway Corridor Network (STRAHNET)	N	N	62,066	62,253	N
Interstate	N	N	46,675	47,013	N
Non-Interstate	N	N	15,389	15,240	N
Railroad	183,077 ¹	175,909	170,512	139,326	-23.9
Class I	NA	133,189	120,597	94,082	N
Regional	NA	18,375	20,978	16,690	N
Local	NA	24,337	28,937	28,554	N
Inland waterways					
Navigable channels	11,000	11,000	11,000	11,000	0.0
Great Lakes-St. Lawrence Seaway	2,342	2,342	2,342	2,342	0.0
Pipelines					
Oil	218,393	208,752	176,996	173,000	-20.8
Gas	1,051,774	1,189,200	1,369,300	1,525,000	45.0

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

¹Excludes Class III railroads.

Road infrastructure increased slowly over the past 28 years despite a large increase in the volume of traffic. Between 1980 and 2008, route miles of public roads increased by about 5 percent compared with a 95 percent increase in vehicle miles traveled.

TABLE 3-1. MILES OF INFRASTRUCTURE BY TRANSPORTATION MODE: 1980-2008

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/2008/ as of April 20, 2010. **Rail:** Association of American Railroads, *Railroad Facts* (Washington, DC: annual issues). **Navigable channels:** U.S. Army Corps of Engineers, *A Citizen's Guide to the USACE*, available at www.corpsreform.org/sitepages/downloads/CitzGuideChptr1.pdf as of April 25, 2010. **Great Lakes-St. Lawrence Seaway:** The St. Lawrence Seaway Development Corporation, "The Seaway," available at www.greatlakesseaway.com/en/seaway/facts/index.html as of April 25, 2010. **Oil pipelines: 1980-2000:** Eno Transportation Foundation, *Transportation in America*, 2002 (Washington, DC: 2002). **2001-2008:** 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 as of April 25, 2010. **Gas pipelines:** American Gas Association, *Gas Facts* (Arlington, VA: annual issues).



Table 3-2. Number of U.S. Vehicles, Vessels, and Other Conveyances: 1980-2008

	1980	1990	2000	2008
Highway	161,490,159	193,057,376	225,821,241	255,917,664
Truck, single-unit 2-axle 6-tire or more	4,373,784	4,486,981	5,926,030	6,790,882
Truck, combination	1,416,869	1,708,895	2,096,619	2,215,856
Truck, total	5,790,653	6,195,876	8,022,649	9,006,738
Trucks as percent of all highway vehicles	3.6	3.2	3.6	3.5
Rail				
Class I, locomotive	28,094	18,835	20,028	24,003
Class I, freight cars ¹	1,168,114	658,902	560,154	450,297
Nonclass I, freight cars ¹	102,161	103,527	132,448	109,487
Car companies and shippers freight cars ¹	440,552	449,832	688,194	833,188
Water	38,788	39,445	41,354	40,301
Nonself-propelled vessels ²	31,662	31,209	33,152	31,238
Self-propelled vessels ³	7,126	8,236	8,202	9,063
Oceangoing steam and motor ships ⁴	864	636	454	272
US Flag fleet as percent of world fleet ⁴	3.5	2.7	1.6	0.8

¹Beginning with 2001 data, Canadian-owned U.S. railroads are excluded. Canadian-owned U.S. railroads accounted for over 46,000 freight cars in 2000.

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

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

⁴1,000 gross tons and over.

A vast number of vehicles and vessels move goods over the transportation network. The number of commercial trucks climbed 56 percent between 1980 and 2008. In comparison, the number of

rail freight cars declined with improved utilization and the deployment of larger cars. The number of U.S.-flag water vessels decreased by 69 percent over the same period while the world fleet expanded by 41 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: 1980-2008

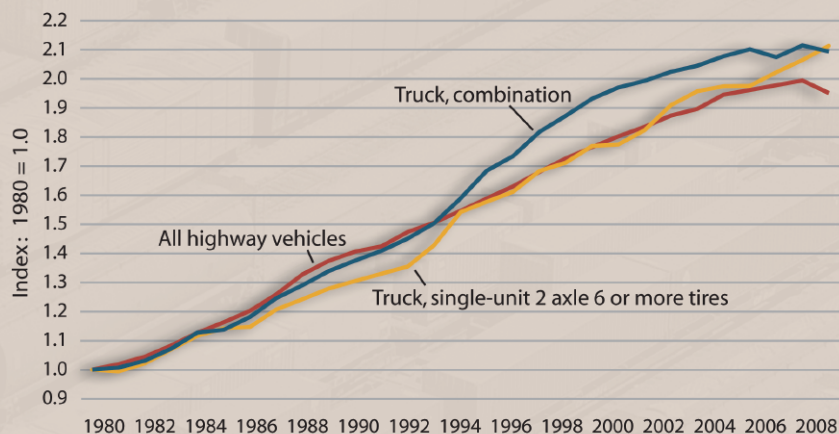


TABLE 3-2. NUMBER OF U.S. VEHICLES, VESSELS, AND OTHER CONVEYANCES: 1980-2008

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/ as of July 7, 2010. **Rail: Locomotive:** Association of American Railroads, *Railroad Facts* (Washington, DC: annual issues). **Freight cars:** Association of American Railroads, *Railroad Equipment Report* (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 as of July 7, 2010.

FIGURE 3-1. HIGHWAY VEHICLE MILES TRAVELED BY TRUCKS AND ALL VEHICLES: 1980-2008

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/2008/ as of April 25, 2010.

Despite doubling over the past two decades, truck traffic remains a relatively small share of highway traffic as a whole. In 2008, commercial trucks accounted for about 8 percent of highway vehicle miles traveled. Truck tractors hauling semitrailers and other truck combinations account for approximately two-thirds of commercial truck travel, while single-unit trucks with six or more tires account for the remainder.

The nation's truck fleet has grown significantly in number and dis-

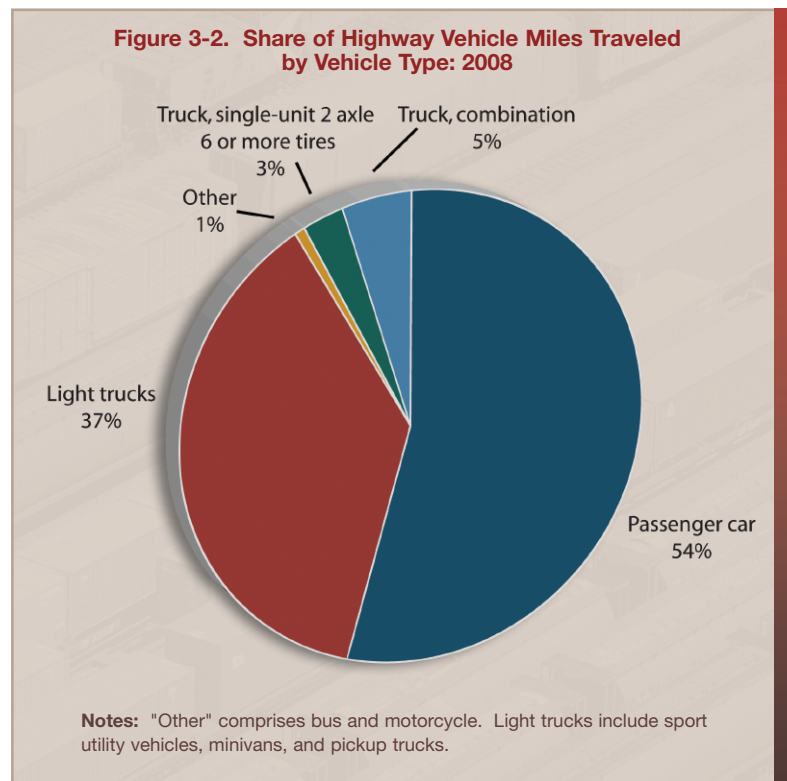


Table 3-3. Trucks and Truck Miles by Average Weight: 1987-2002¹

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
Total	3,624	89,972	4,008	104,987	4,701	147,876	5,415	145,624	49	62
Light-heavy	1,030	10,768	1,259	14,012	1,436	19,815	1,914	26,256	86	144
10,001 to 14,000	525	5,440	694	8,000	819	11,502	1,142	15,186	118	179
14,001 to 16,000	242	2,738	282	2,977	316	3,951	396	5,908	64	116
16,001 to 19,500	263	2,590	282	3,035	301	4,362	376	5,161	43	99
Medium-heavy	766	7,581	732	8,143	729	10,129	910	11,766	19	55
19,501 to 26,000	766	7,581	732	8,143	729	10,129	910	11,766	19	55
Heavy-heavy	1,829	71,623	2,017	82,832	2,536	117,931	2,591	107,602	42	50
26,001 to 33,000	377	5,411	387	5,694	428	7,093	437	5,845	16	8
33,001 to 40,000	209	4,113	233	5,285	257	6,594	229	3,770	10	-8
40,001 to 50,000	292	7,625	339	9,622	400	13,078	318	6,698	9	-12
50,001 to 60,000	188	7,157	227	8,699	311	12,653	327	8,950	74	25
60,001 to 80,000	723	45,439	781	51,044	1,070	74,724	1,179	77,489	63	71
80,001 to 100,000	28	1,254	33	1,529	46	2,427	69	2,950	144	135
100,001 to 130,000	8	440	12	734	18	1,051	26	1,571	238	257
130,001 or more	4	185	5	227	6	312	6	329	43	78

Key: VMT = vehicle miles traveled.

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

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: 2008

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/2008/ of April 25, 2010.

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

Sources: U.S. Department of Commerce, Census Bureau, *2002 Vehicle Inventory and Use Survey: United States*, EC02TV-US (Washington, DC: 2004), available at 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 as of June 2, 2010.

tance driven. Of trucks weighing more than 10,000 pounds registered to businesses, individuals, and organizations other than government, most growth has occurred at either end of the weight spectrum. Distance traveled has more than doubled in 15 years for trucks weighing between 10,000 pounds and 26,000 pounds and for trucks weighing over 80,000 pounds. Trucks between 60,000 pounds and 80,000 pounds form the largest category in both number of trucks and 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 182 million weighs were made in

Table 3-4. Commercial Vehicle Weight Enforcement Activities: 2005-2009 (thousands)

	2005	2006	2007	2008	2009
All weighs	230,465	229,451	217,444	200,419	182,257
Weigh-in-motion	136,381	142,599	132,258	119,826	116,176
Static weighs ¹	94,084	86,852	85,186	80,593	66,081
Semiportable scales	494	423	426	358	373
Fixed scales	93,038	85,900	84,214	79,645	65,182
Portable scales	552	529	547	591	525
Violations ²	568	621	530	555	490
Axle weight violations	275	270	234	249	221
Gross weight violations	118	150	127	120	116
Bridge weight violations	174	202	170	186	153
Permits ³	3,626	4,598	4,828	5,216	4,529
Non-divisible trip permits	2,712	3,399	3,743	3,693	3,286
Non-divisible annual permits	233	251	332	322	299
Divisible trip permits	288	426	398	490	370
Divisible annual permits	393	522	354	710	574

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

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

³Permits issued are for divisible and non-divisible loads on a trip or 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).

2009, about 64 percent were weigh-in motion and 36 percent were static. Less than 1 percent of weighs discover violations.

TABLE 3-4. COMMERCIAL VEHICLE WEIGHT ENFORCEMENT ACTIVITIES: 2005-2009

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, September 23, 2010.

Freight moving in combination trucks depends heavily on the Interstate System.

Although only one-fourth of the distance traveled by all traffic is on the Interstate

System, one-half of combination-truck vehicle miles of travel is on the Interstate System.

Table 3-5. Annual Vehicle Distance Traveled by Highway Category and Vehicle Type: 2008

	Combination Trucks	Single-Unit Trucks¹	Other Trucks and Vans²	All Passenger Vehicles³	Total, All Motor Vehicles
Interstate vehicle miles (millions)	70,465	17,427	247,447	384,042	719,381
Interstate percent	49	21	22	23	24
Non-Interstate vehicle miles (millions)	73,043	66,524	861,156	1,253,406	2,254,128
Non-Interstate percent	51	79	78	77	76
Total vehicle miles, all roadways (millions)	143,507	83,951	1,108,603	1,637,448	2,973,509

¹Trucks on a single frame with at least two axles and six tires.

²Other 2-axle 4-tire vehicles which are not passenger cars; including vans, pickup trucks, and sport/utility vehicles.

³Passenger cars, motorcycles, and buses.

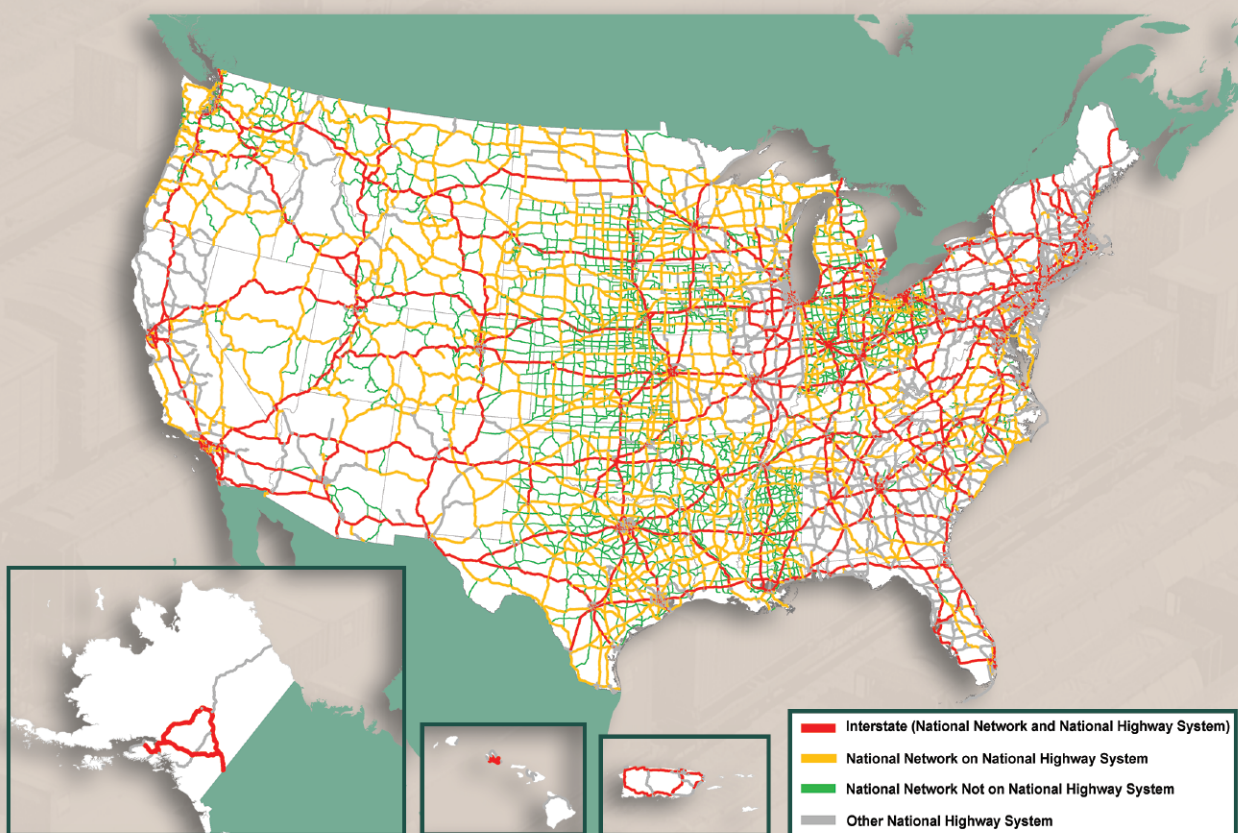
TABLE 3-5. ANNUAL VEHICLE DISTANCE TRAVELED BY HIGHWAY CATEGORY AND VEHICLE TYPE: 2008

Source: U.S. Department of Transportation, Federal Highway Administration, Highway Statistics, Table VM-1, available at www.fhwa.dot.gov/policyinformation/statistics/2008/ as of October 10, 2010.



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 28 years.

Figure 3-3. National Network for Conventional Combination Trucks: 2009

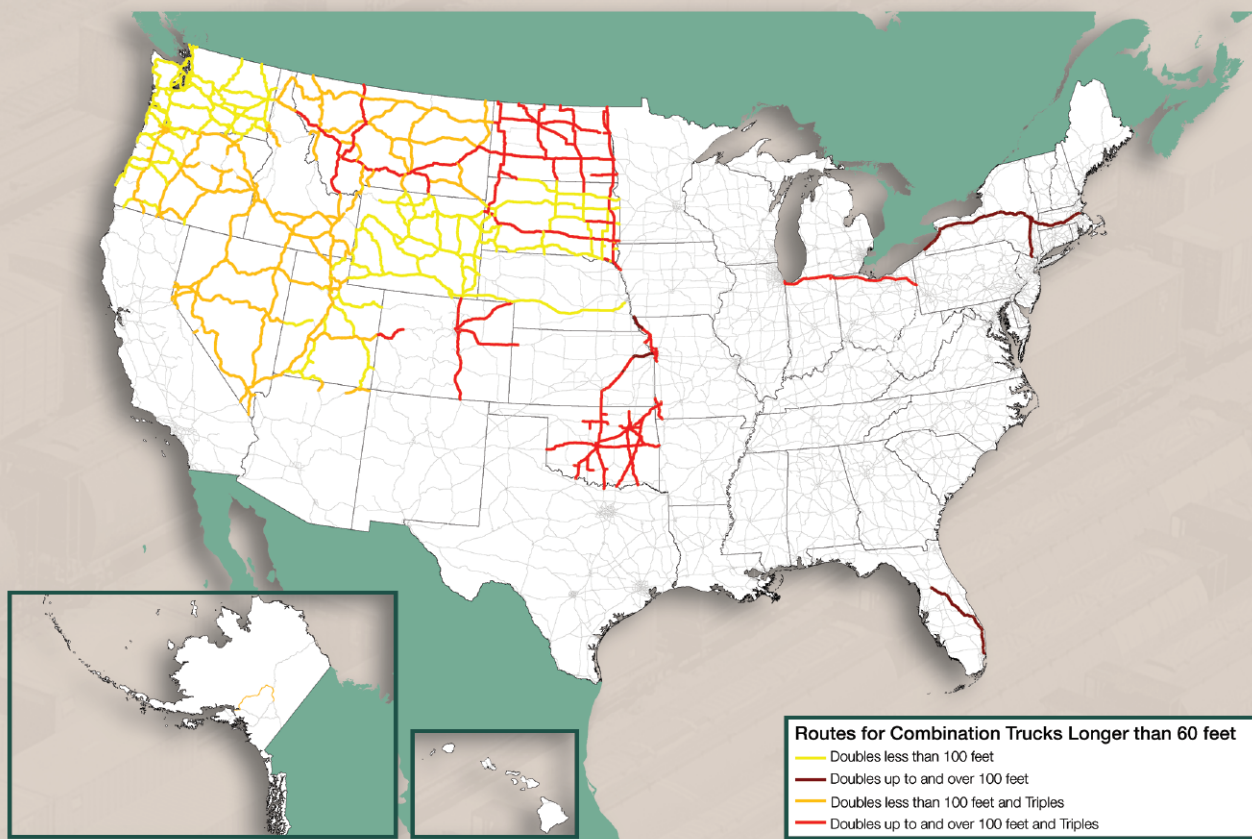


Notes: This map should not be interpreted as the official National Network and should not be used for truck size and weight enforcement purposes. The National Network and the National Highway System (NHS) are approximately 200,000 miles in length, but the National Network includes 65,000 miles of highways beyond the NHS, and the NHS encompasses about 50,000 miles of highways that are not part of the National Network. "Other NHS" refers to NHS mileage that is not included on the National Network. Conventional combination trucks are tractors with one semitrailer up to 48 feet in length or with one 28-foot semitrailer and one 28-foot trailer. Conventional combination trucks can be up to 102 inches wide.

FIGURE 3-3. NATIONAL NETWORK FOR CONVENTIONAL COMBINATION TRUCKS: 2009

Source: U.S. Code of Federal Regulations, title 23, part 658, appendix A, as of November 2010.

Figure 3-4. Permitted Longer Combination Vehicles on the National Highway System: 2009



Note: Empty triples are allowed on I-80 in Nebraska.

Longer combination vehicles (LCVs) are tractors pulling 1) a semitrailer longer than 28 feet and a trailer longer than 28 feet, 2) a semitrailer longer than 28 feet and a trailer no more than 28 feet long, or 3) 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 14 states and 6 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: 2009

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, special compilation by the Freight Operations and Technology Team, 2010.



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

	Number of Trucks (thousands)	Truck Miles (millions)	Miles per Truck (thousands)
Total	5,521	145,173	26
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 cars, 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 usually 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.

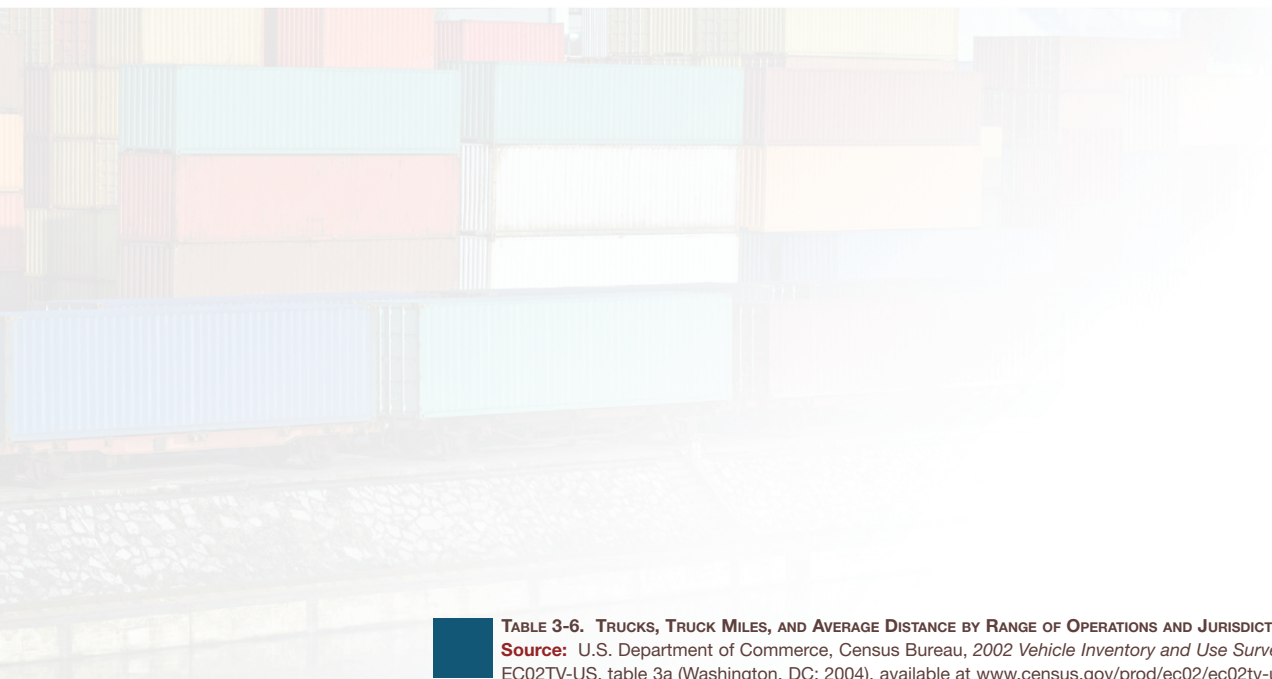


TABLE 3-6. TRUCKS, TRUCK MILES, AND AVERAGE DISTANCE BY RANGE OF OPERATIONS AND JURISDICTION: 2002

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 as of June 2, 2010.

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 that range 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: 2002¹

Products carried	Millions of miles
Total²	145,173
Animals and fish, live	735
Animal feed and products of animal origin	2,088
Grains, cereal	1,368
All other agricultural products	2,661
Basic chemicals	876
Fertilizers and fertilizer materials	1,666
Pharmaceutical products	305
All other chemical products and preparations	1,351
Alcoholic beverages	1,124
Bakery and milled grain products	3,553
Meat, seafood, and their preparations	3,056
Tobacco products	445
All other packaged 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 ³	150
No product carried	28,977

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

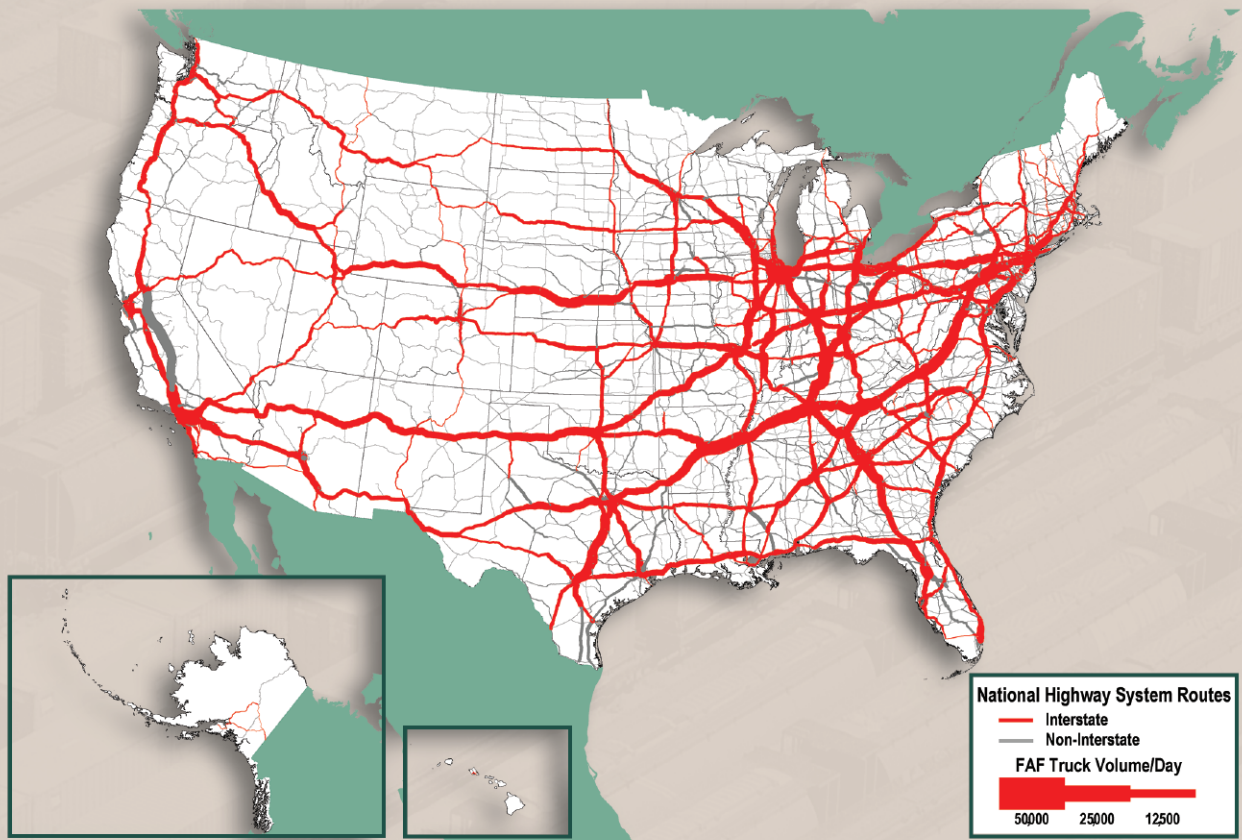
²Detail lines may not add to total because multiple products/hazardous materials may be carried at the same time.

³Vehicles not in use. When the survey 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 as of June 2, 2010.

Figure 3-5. Average Daily Long-Haul Freight Traffic on the National Highway System: 2007



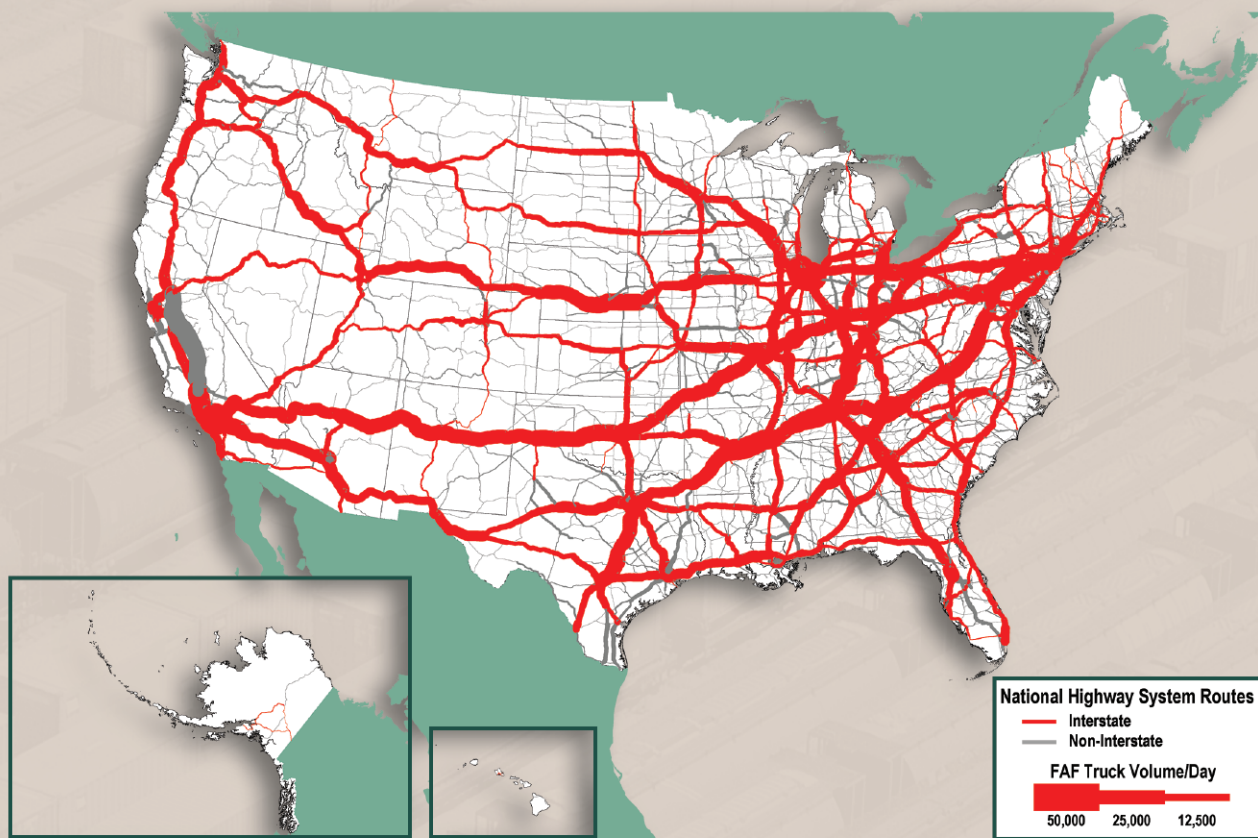
Note: Long-haul freight trucks typically serve locations at least 50 miles apart, excluding trucks that are used in movements by multiple modes and mail.

Long-haul freight truck traffic in the United States is concentrated on major routes connecting population centers, ports, border crossings, and other major hubs of activity. Except for Route 99 in California and a few toll roads and border connections, most of the heaviest traveled routes are on the Interstate System.

FIGURE 3-5. AVERAGE DAILY LONG-HAUL FREIGHT TRAFFIC ON THE NATIONAL HIGHWAY SYSTEM: 2007

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.1, 2010.

Figure 3-6. Average Daily Long-Haul Freight Traffic on the National Highway System: 2040



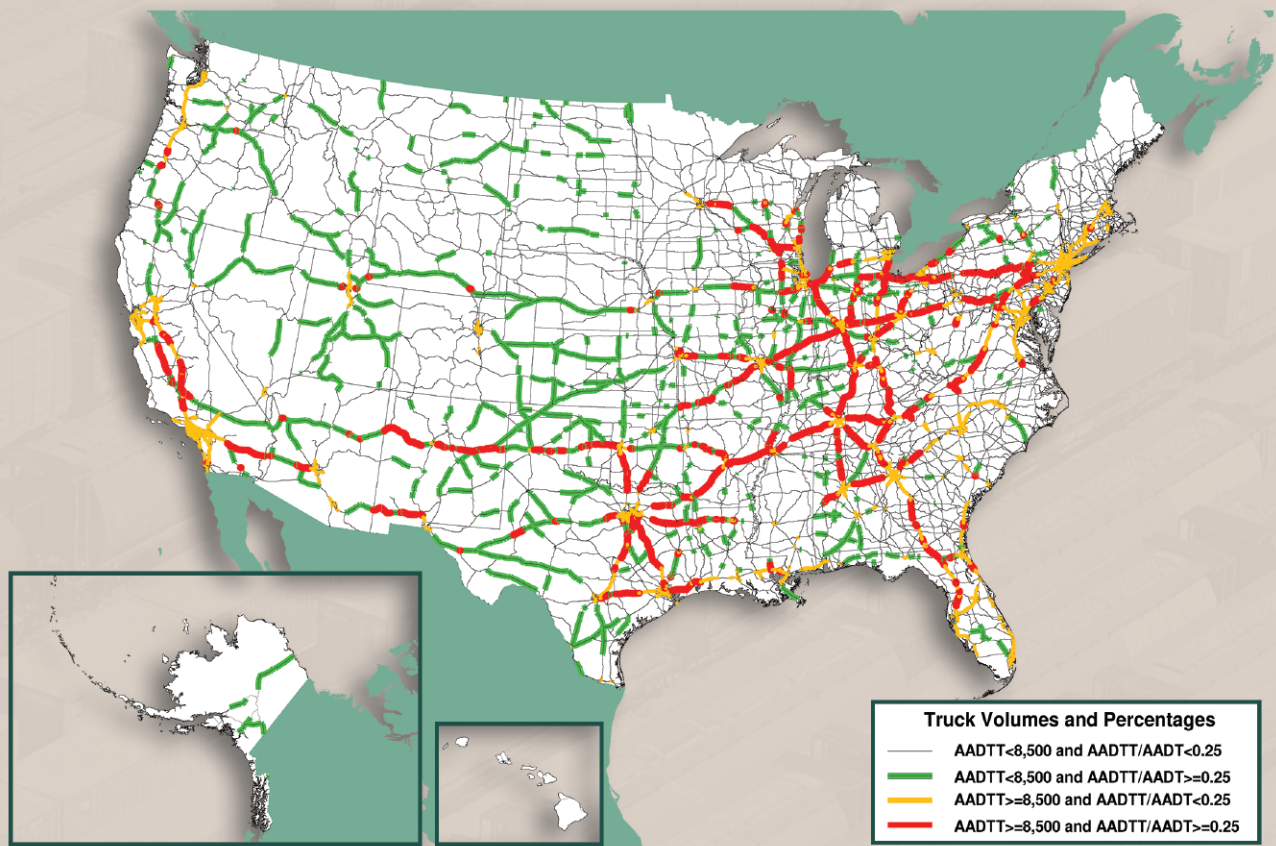
Note: Long-haul freight trucks typically serve locations at least 50 miles apart, excluding trucks that are used in movements by multiple modes and mail.

By 2040, long-haul freight truck traffic in the United States is expected to increase dramatically on Interstate highways and other arterials throughout the nation. Forecast data indicate that truck travel may reach 662 million miles per day.

FIGURE 3-6. AVERAGE DAILY LONG-HAUL FREIGHT TRAFFIC ON THE NATIONAL HIGHWAY SYSTEM: 2040

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.1, 2010.

Figure 3-7. Major Truck Routes on the National Highway System: 2007



Selected routes carry a significant concentration of trucks, either as an absolute number or as a percentage of the traffic stream. Nearly 6,000 miles of the NHS carry more than 8,500 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: 2007

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.1, 2010.

The number of NHS miles carrying large volumes and high percentages of trucks is forecast to increase dramatically by 2040. Segments with more than 8,500 trucks per day and where at least every fourth vehicle is a truck are forecast to approach 21,000 miles, an increase of almost 250 percent from 2007.

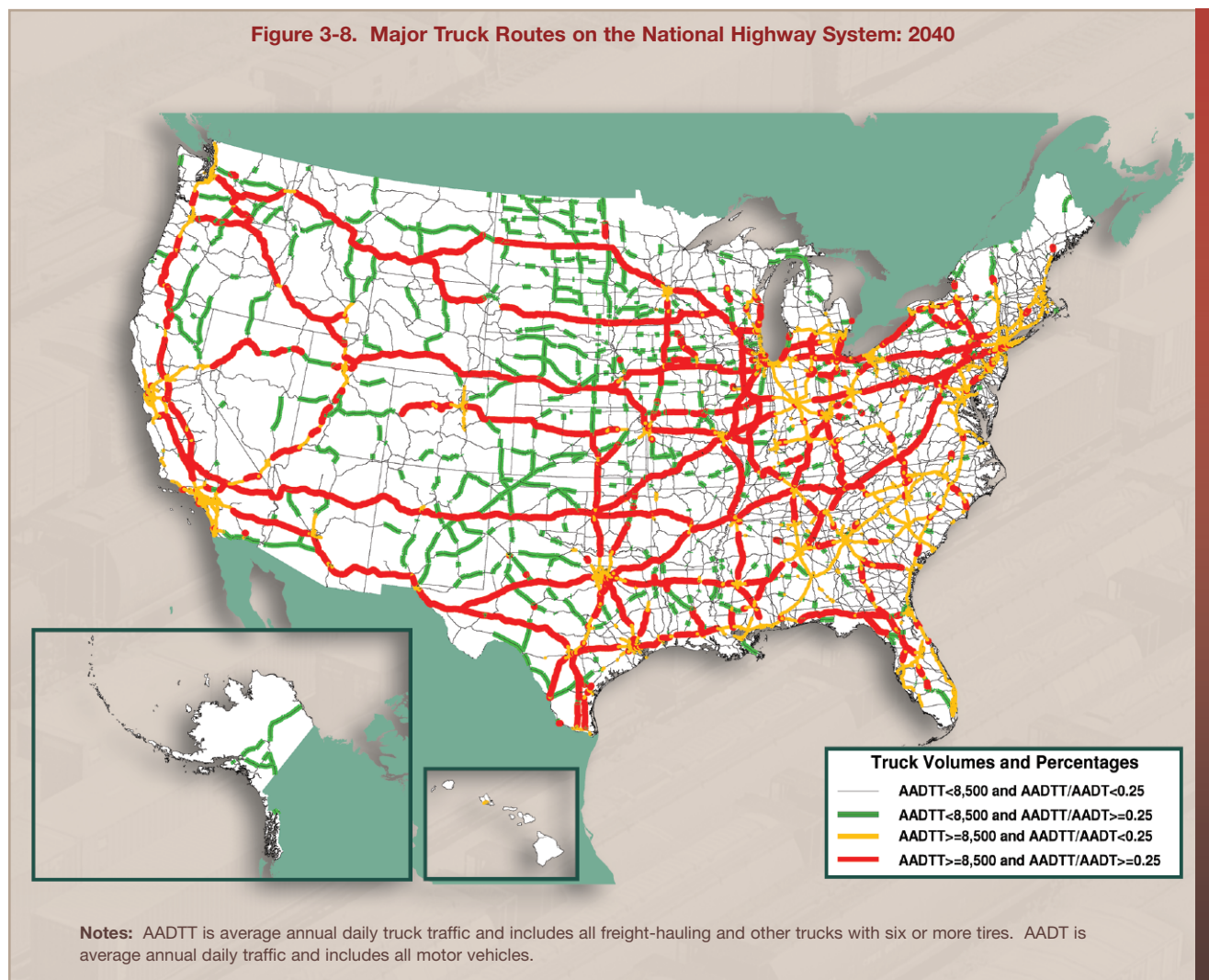
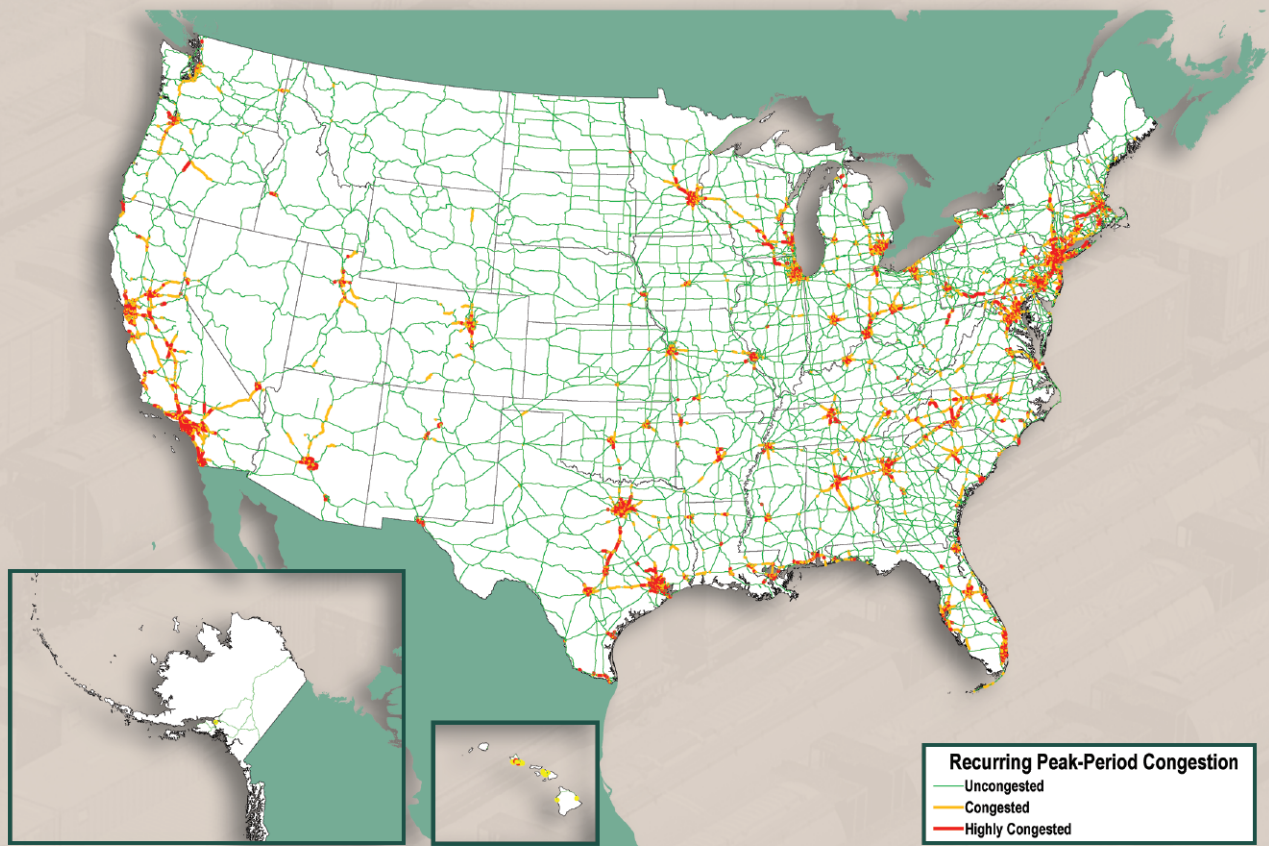


FIGURE 3-8. MAJOR TRUCK ROUTES ON THE NATIONAL HIGHWAY SYSTEM: 2040

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.1, 2010.

Figure 3-9. Peak-Period Congestion on the National Highway System: 2007



Notes: Highly congested segments are stop-and-go conditions with volume/service flow ratios greater than 0.95. Congested segments have reduced 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 2007, peak-period congestion resulted in traffic slowing below posted speed limits on 11,700 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: 2007

Sources: U.S. Department of Transportation, Federal Highway Administration, Office of Highway Policy Information, Highway Performance Monitoring System; and Office of Freight Management and Operations, Freight Analysis Framework, version 3.1, 2010.

Assuming no changes in network capacity, increases in truck and passenger vehicle traffic are forecast to expand areas of recurring peak-period congestion to 36 percent of the NHS in 2040 compared with 11 percent in 2007. This will slow traffic on 20,300 miles of the NHS and create stop-and-go conditions on an additional 39,000 miles.

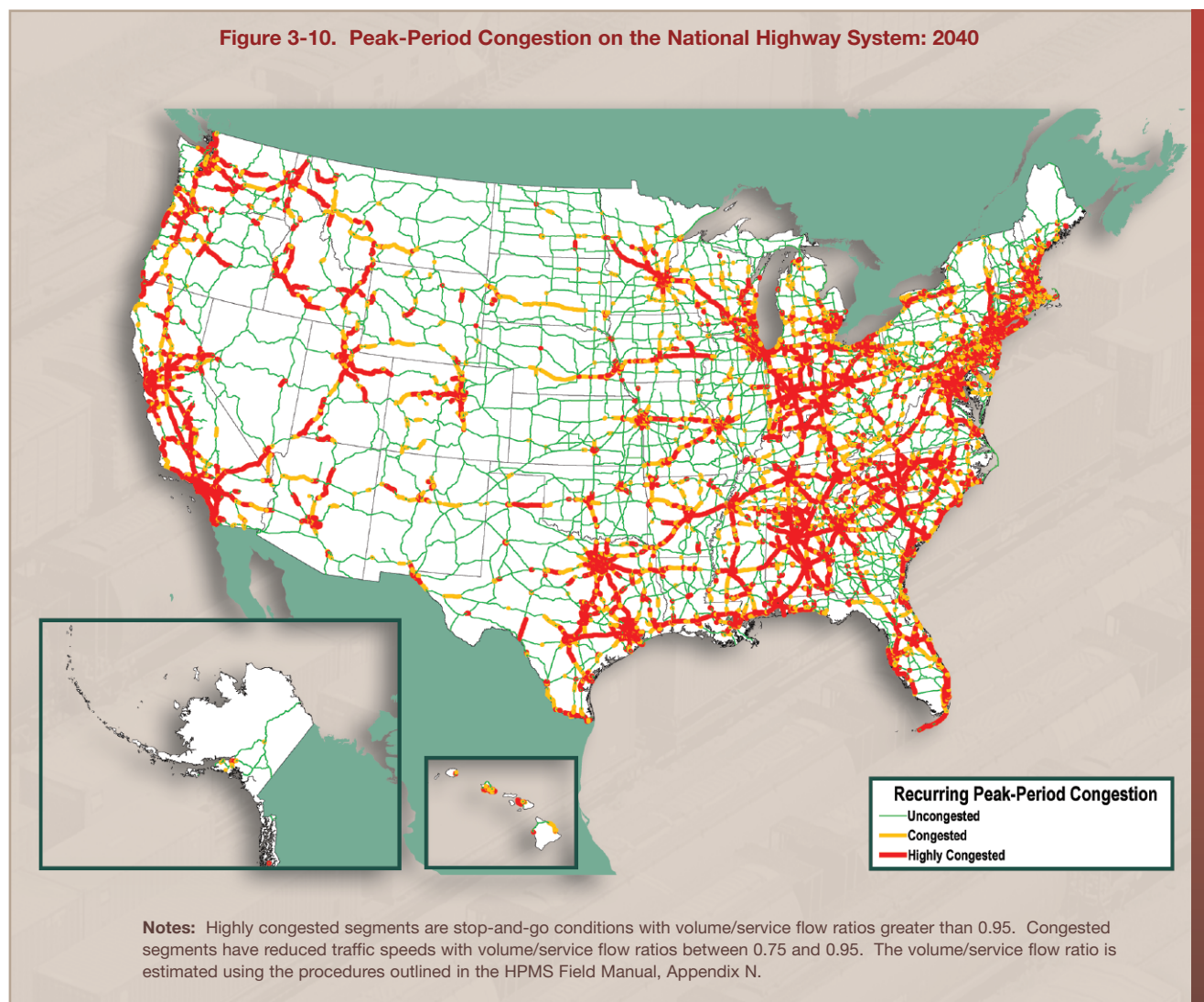
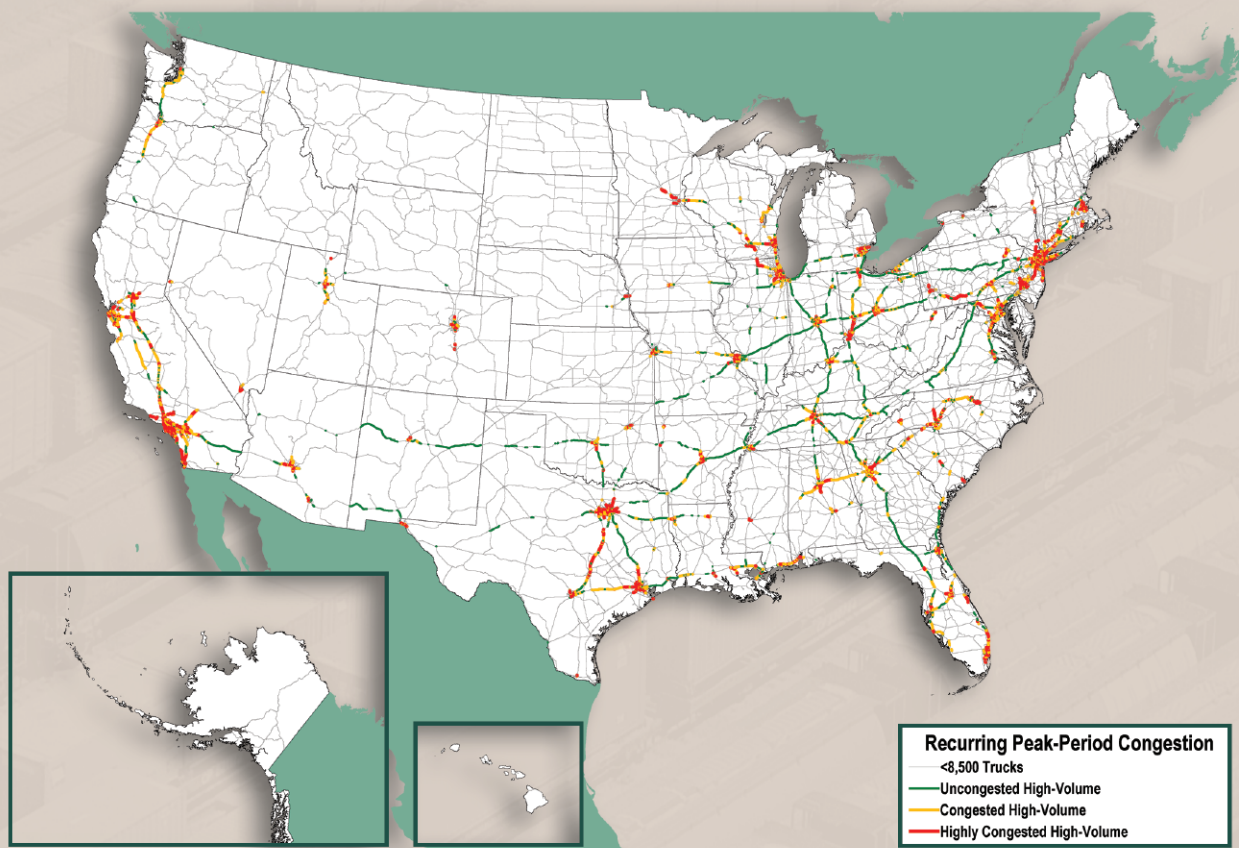


FIGURE 3-10. PEAK-PERIOD CONGESTION ON THE NATIONAL HIGHWAY SYSTEM: 2040

Sources: U.S. Department of Transportation, Federal Highway Administration, Office of Highway Policy Information, Highway Performance Monitoring System; and Office of Freight Management and Operations, Freight Analysis Framework, version 3.1, 2010.

Figure 3-11. Peak-Period Congestion on High-Volume Truck Portions of the National Highway System: 2007



Notes: High-volume truck portions of the National Highway System carry more than 8,500 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 have reduced traffic speeds with volume/service ratios between 0.75 and 0.95.

Congested highways carrying a large number of trucks substantially impede interstate commerce, and trucks on those segments contribute significantly to congestion.

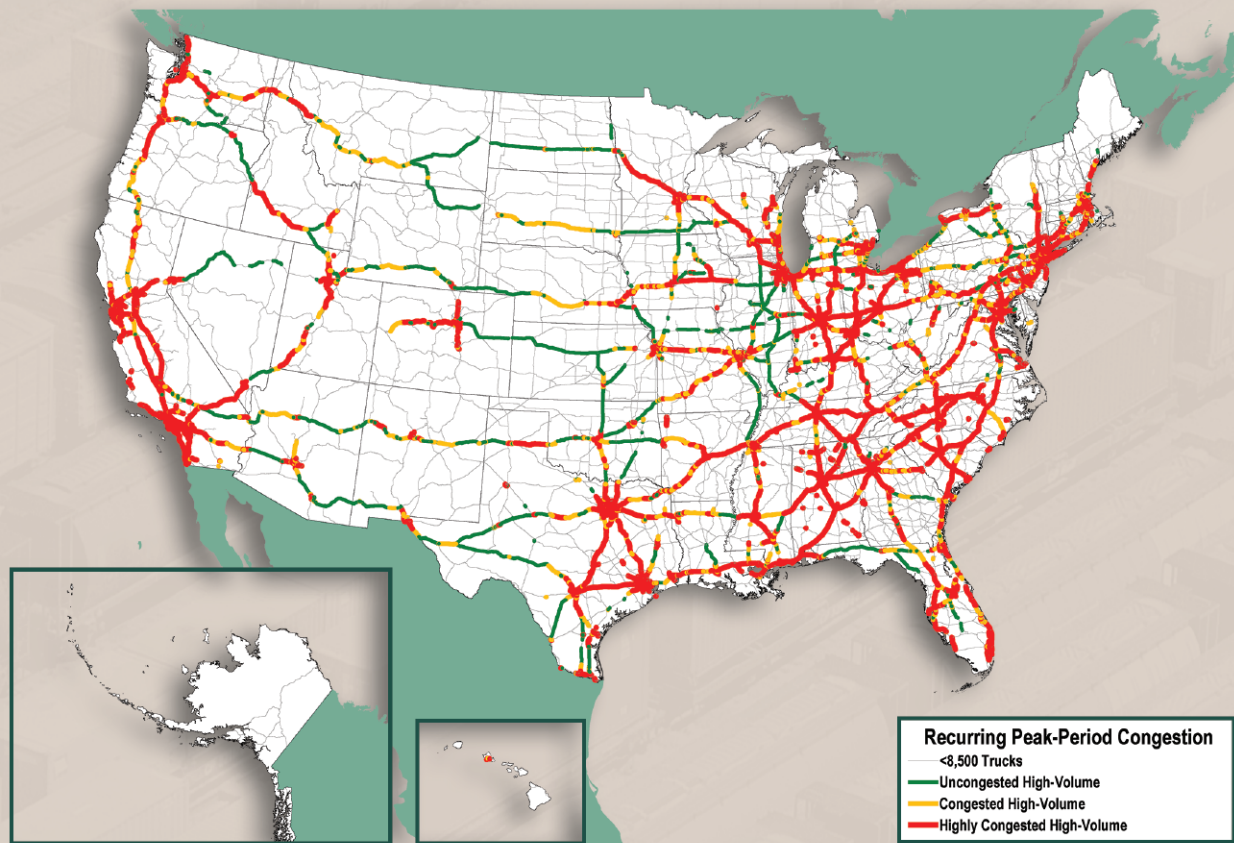
Recurring congestion slows traffic on 4,700 miles and creates stop-and-go conditions on 3,700 miles of the NHS that carry more than 8,500 trucks per day.

FIGURE 3-11. PEAK-PERIOD CONGESTION ON HIGH-VOLUME TRUCK PORTIONS OF THE NATIONAL HIGHWAY SYSTEM: 2007

Sources: U.S. Department of Transportation, Federal Highway Administration, Office of Highway Policy Information, Highway Performance Monitoring System; and Office of Freight Management and Operations, Freight Analysis Framework, version 3.1, 2010.

Assuming no change in network capacity, the number of NHS miles with recurring congestion and a large number of trucks is forecast to increase nearly four-fold between 2007 and 2040. On highways carrying more than 8,500 trucks per day, recurring congestion will slow traffic on close to 7,200 miles and create stop-and-go conditions on an additional 23,500 miles.

Figure 3-12. Peak-Period Congestion on High-Volume Truck Portions of the National Highway System: 2040

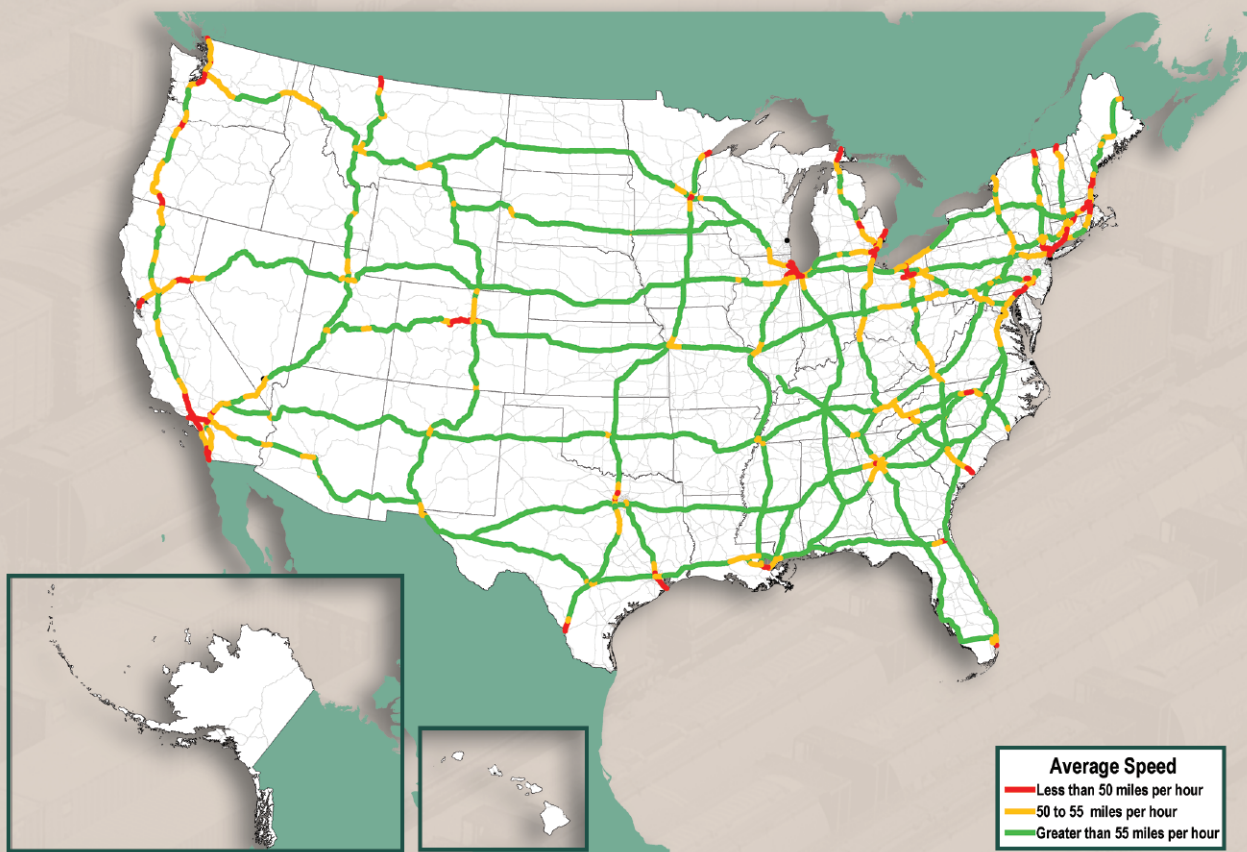


Notes: High-volume truck portions of the National Highway System carry more than 8,500 trucks per day, including freight-hauling long-distance trucks, freight-hauling local trucks, and other trucks with six or more tires. Highly congested segments are stop-and-go conditions with volume/service flow ratios greater than 0.95. Congested segments have reduced traffic speeds with volume/service ratios between 0.75 and 0.95. The volume/service flow ratio is estimated using the procedures outlined in the HPMS Field Manual, Appendix N.

FIGURE 3-12. PEAK-PERIOD CONGESTION ON HIGH-VOLUME TRUCK PORTIONS OF THE NATIONAL HIGHWAY SYSTEM: 2040

Sources: U.S. Department of Transportation, Federal Highway Administration, Office of Highway Policy Information, Highway Performance Monitoring System; and Office of Freight Management and Operations, Freight Analysis Framework, version 3.1, 2010.

Figure 3-13. Average Truck Speeds on Selected Interstate Highways: 2009



In addition to calculating peak-period congestion from traffic volumes, as shown in other figures, the Federal Highway Administration (FHWA) directly measures operating speeds and travel-time 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: 2009

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Performance Measurement Program, 2010.

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: 2009

Interstate Route	Average Operating Speed	Peak Period Average Speed	Non-Peak Period Average Speed
5	52.8	52.0	53.1
10	57.4	56.7	57.6
15	56.7	56.2	56.9
20	59.2	58.8	59.3
24	57.2	56.6	57.4
25	58.9	58.5	59.3
26	53.7	53.3	54.6
35	56.8	55.9	57.0
40	58.6	58.3	58.8
45	54.9	53.9	55.4
55	57.0	56.8	57.2
65	57.9	57.3	58.2
70	56.8	56.5	57.1
75	56.7	56.1	57.0
76	54.5	54.5	54.8
77	54.7	54.3	55.1
80	57.7	57.4	57.9
81	56.6	56.6	56.8
84	54.2	53.3	54.8
85	57.3	56.5	57.4
87	54.1	53.8	54.5
90	57.1	56.8	57.4
91	53.4	52.9	54.2
94	56.7	56.2	56.8
95	56.2	55.2	56.3

Note: Includes trucks registered to companies and individuals in the United States except pickups, mini-vans, other light cars, and sport utility vehicles.

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

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Performance Measurement Program, 2010.



Table 3-9. Maximum Posted Speed Limits on Rural Interstates: 2010 (miles per hour)

State	Truck	Car
Alabama	70	70
Alaska	65	65
Arizona	75	75
Arkansas	65	70
California	55	70
Colorado	75	75
Connecticut	65	65
Delaware	65	65
District of Columbia ¹	55	55
Florida	70	70
Georgia	70	70
Hawaii	60	60
Idaho	65	75
Illinois	65	65
Indiana	65	70
Iowa	70	70
Kansas	70	70
Kentucky	² 65	² 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	³ 70	³ 75
Utah	⁴ 75	⁴ 75
Vermont	65	65
Virginia	⁵ 70	⁵ 70
Washington	60	70
West Virginia	70	70
Wisconsin	65	65
Wyoming	75	75

¹Urban Interstate.

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

³In 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.

⁴Portions of I-15 have a posted limit of 80 mph.

⁵Effective July 1, 2010, the posted speed limit may be as high as 70 mph where indicated by lawfully placed signs, erected subsequent to a traffic engineering study.

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 differ from limits set for passenger vehicles in nine states.

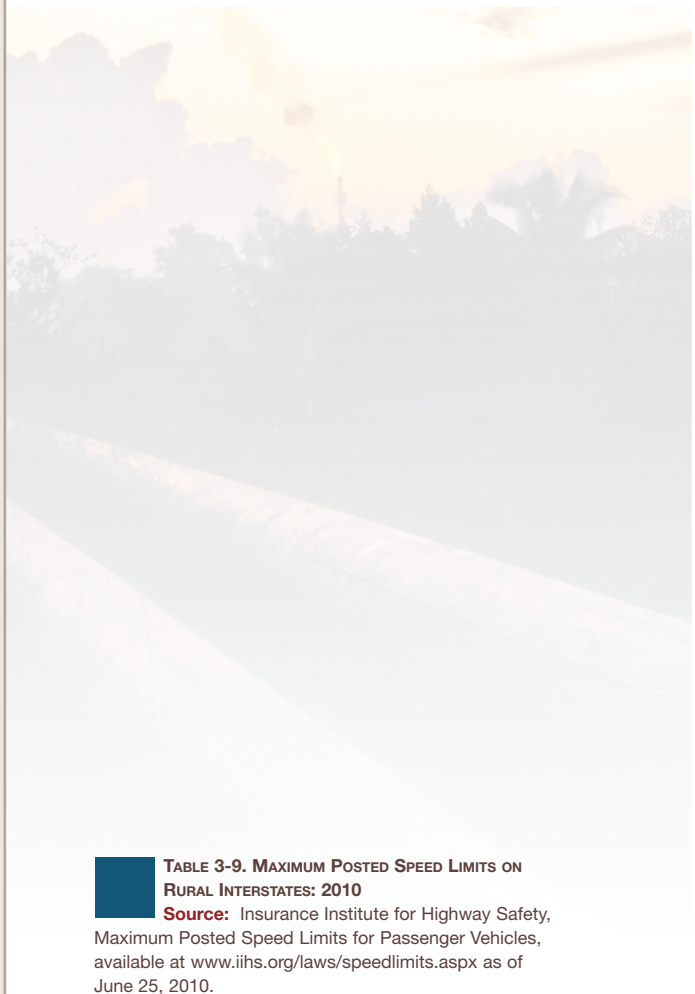


TABLE 3-9. MAXIMUM POSTED SPEED LIMITS ON RURAL INTERSTATES: 2010

Source: Insurance Institute for Highway Safety, Maximum Posted Speed Limits for Passenger Vehicles, available at www.iihs.org/laws/speedlimits.aspx as of June 25, 2010.

Trucks carry most of the tonnage and value of freight in the United States, but railroads and waterways carry significant volumes over long distances. The largest volume of freight transported by rail is coal moving between the Powder River Basin in Wyoming and the Midwest, while the principal inland waterways volume movement is along the Lower Mississippi River.

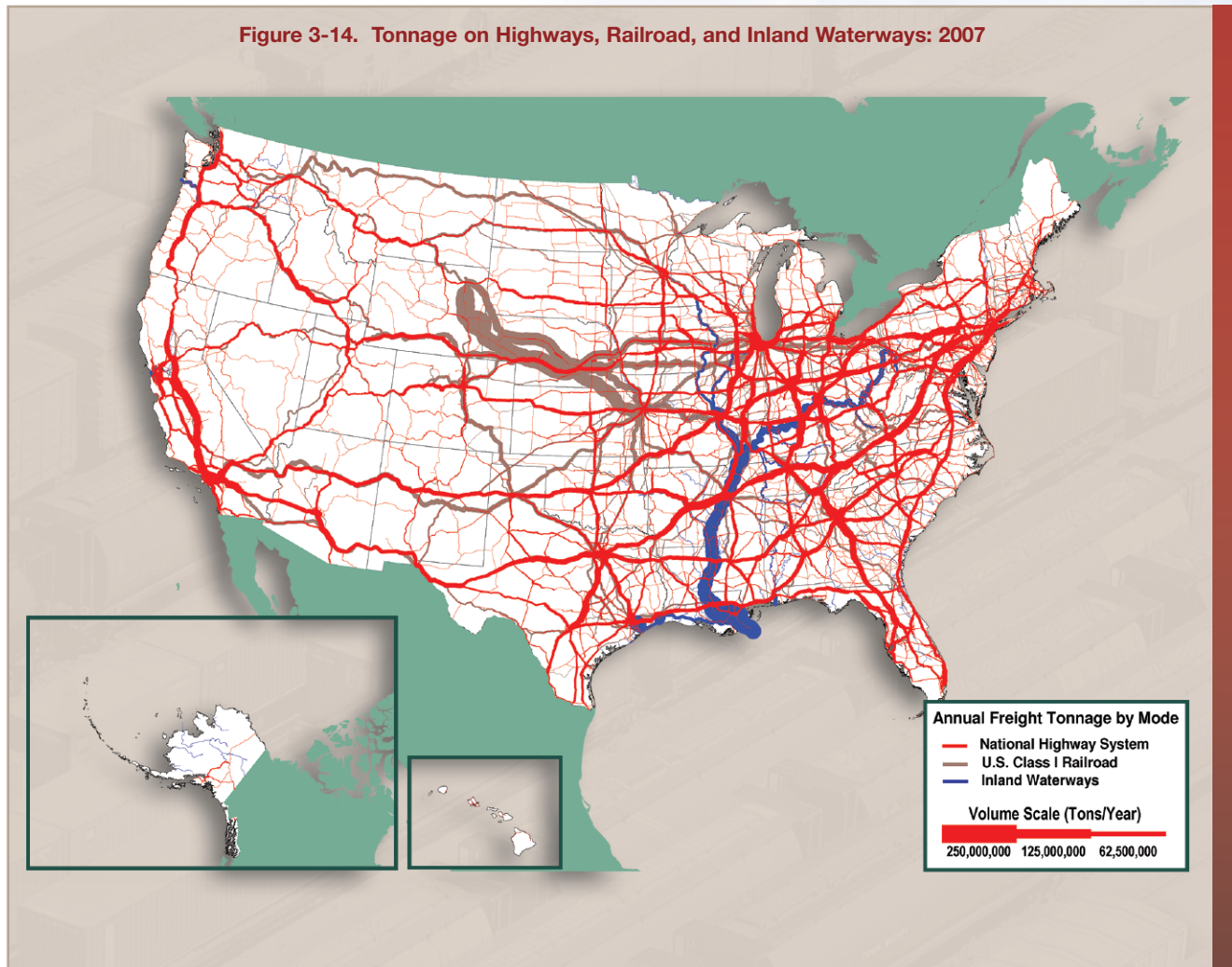
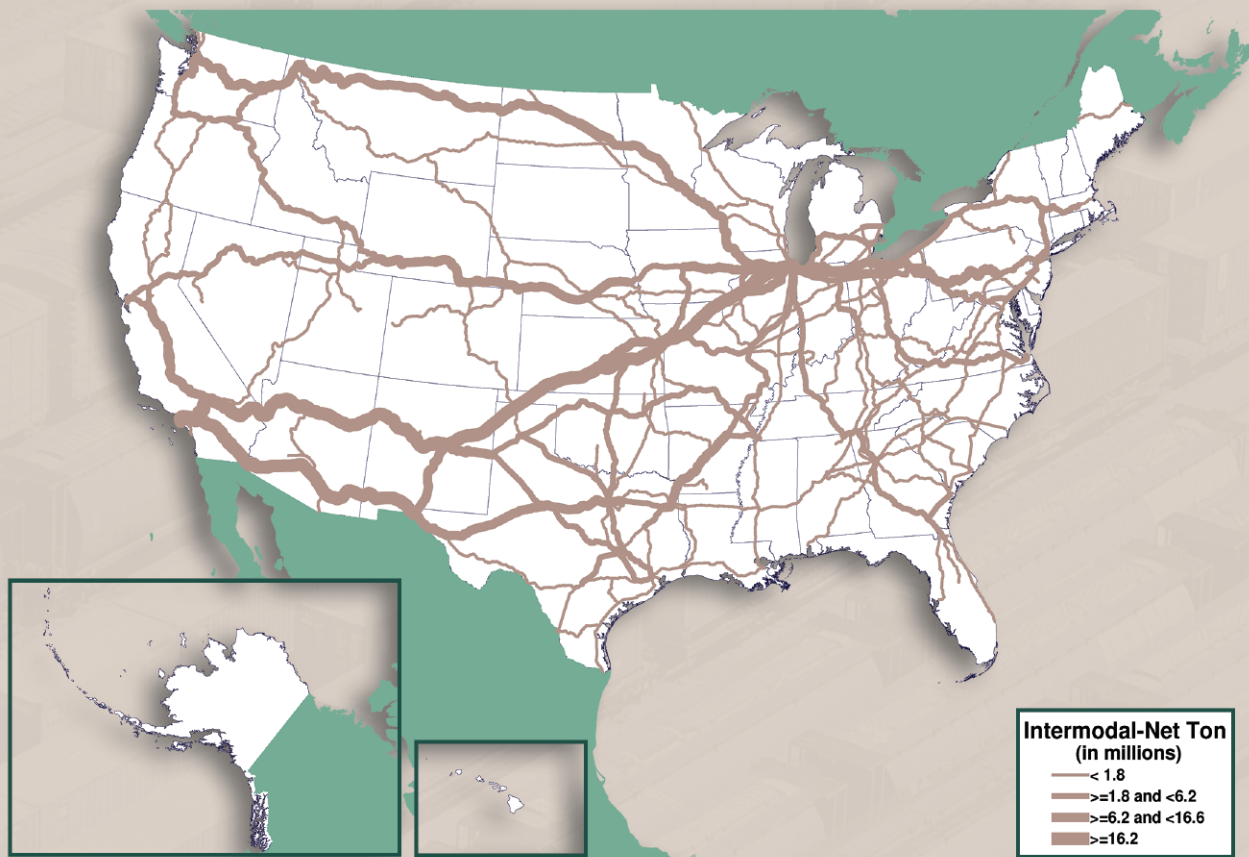


FIGURE 3-14. TONNAGE ON HIGHWAYS, RAILROAD, AND INLAND WATERWAYS: 2007

Sources: **Highways:** U.S. Department of Transportation, Federal Highway Administration, Freight Analysis Framework, version 3.1, 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 were done by Oak Ridge National Laboratory.

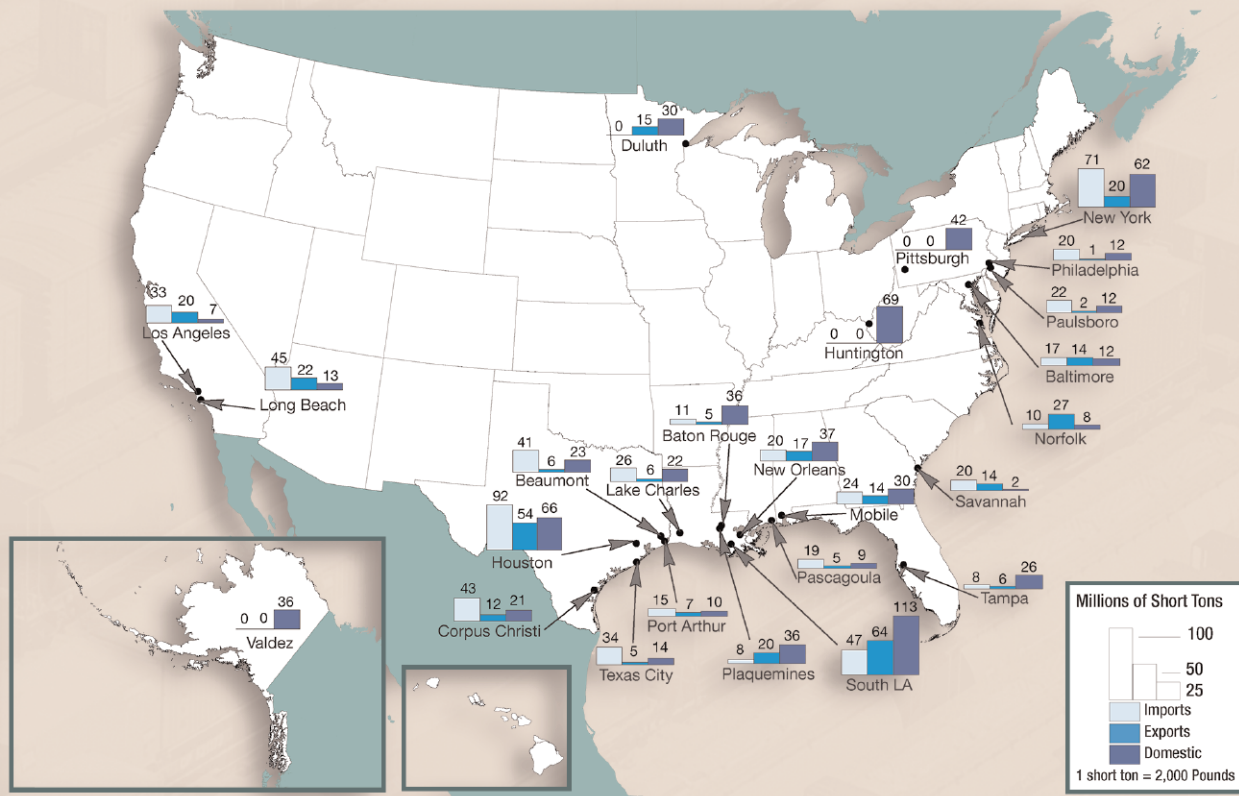
Figure 3-15. Tonnage of Trailer-on-Flatcar and Container-on-Flatcar Rail Intermodal Moves: 2008



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: 2008
Source: U.S. Department of Transportation, Federal Railroad Administration, November 2010.

Figure 3-16. Top 25 Water Ports by Tonnage: 2008



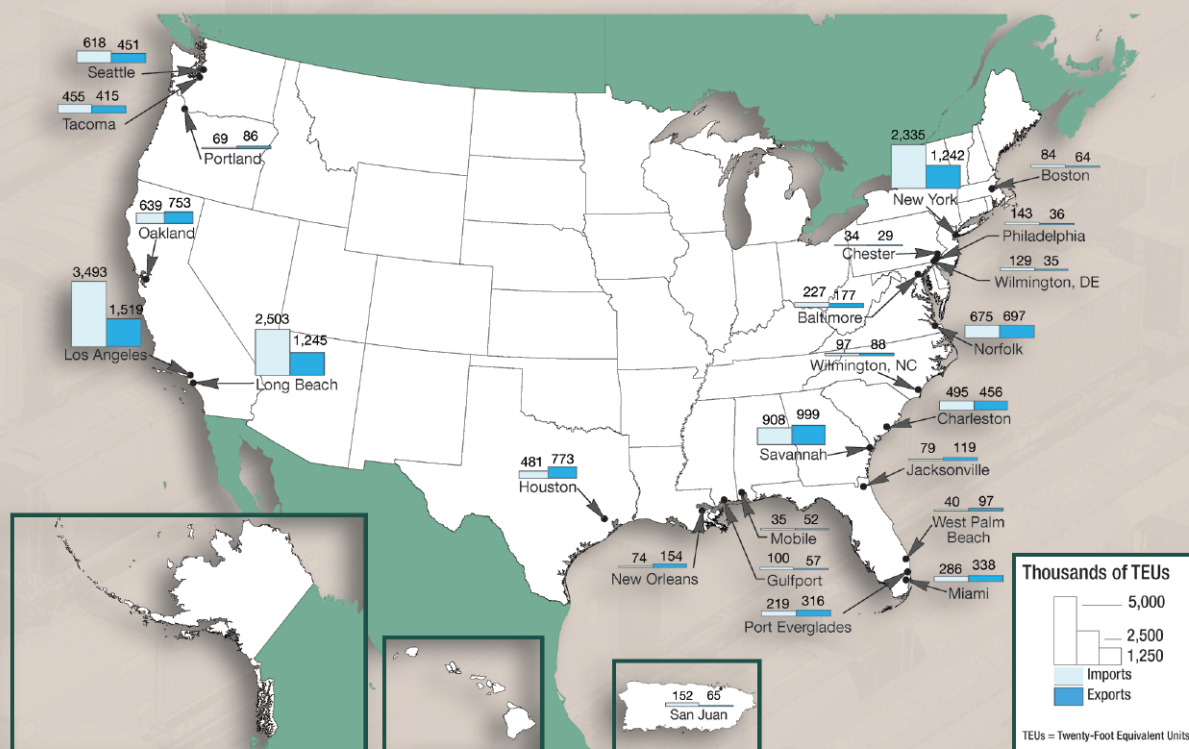
Note: 1 short ton = 2,000 pounds.

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 3-16. TOP 25 WATER PORTS BY TONNAGE: 2008

Source: U.S. Army Corps of Engineers, 2008 *Waterborne Commerce of the United States, Part 5, National Summaries* (New Orleans, LA: 2009), table 5-2.

Figure 3-17. Top 25 Water Ports by Containerized Cargo: 2009



Note: The statistics include both government and non-government shipments by vessel into and out of U.S. foreign trade zones, the 50 states, District of Columbia, and Puerto Rico.

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 35 percent of all container traffic at water ports in the United States. Container trade at these two ports increased by 70 percent between 1998 and 2009, slightly higher than the growth rate reported for container cargo overall.

FIGURE 3-17. TOP 25 WATER PORTS BY CONTAINERIZED CARGO: 2009

Source: U.S. Department of Transportation, Maritime Administration, *U.S. Waterborne Container Trade by U.S. Custom Ports, 1997-2009*, 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 as of July 6, 2010.

Table 3-10. Top 25 Airports by Landed Weight of All-Cargo Operations: 2000-2008¹

Airport	2008 Rank	Landed weight (thousands of short tons)				
		2000	2005	2006	2007	2008
Memphis, TN (Memphis International)	1	6,318	9,343	9,425	9,772	9,750
Anchorage, AK (Ted Stevens Anchorage International) ²	2	8,084	10,364	10,588	10,562	8,976
Louisville, KY (Louisville International-Standiford Field)	3	3,987	4,591	5,015	5,216	5,223
Miami, FL (Miami International)	4	2,929	3,550	3,591	3,715	3,494
Los Angeles, CA (Los Angeles International)	5	2,892	2,927	3,627	3,431	2,876
Indianapolis, IN (Indianapolis International)	6	2,884	2,545	2,627	2,652	2,564
New York, NY (John F. Kennedy International)	7	2,793	2,811	2,615	2,557	2,222
Chicago, IL (O'Hare International)	8	2,062	2,412	2,208	2,201	2,103
Oakland, CA (Metropolitan Oakland International)	9	1,811	1,797	1,798	1,811	1,742
Newark, NJ (Newark Liberty International)	10	1,961	1,870	1,867	1,873	1,727
Fort Worth, TX (Dallas/Fort Worth International)	11	1,691	1,655	1,722	1,753	1,614
Ontario, CA (Ontario International)	12	1,220	1,344	1,401	1,394	1,350
Philadelphia, PA (Philadelphia International)	13	1,454	1,401	1,366	1,375	1,264
Atlanta, GA (William B. Hartsfield International)	14	1,090	1,014	1,180	1,261	1,167
Honolulu, HI (Honolulu International)	15	692	828	979	1,134	1,032
San Francisco, CA (San Francisco International)	16	1,267	797	829	1,039	775
Houston, TX (George Bush Intercontinental)	17	480	710	696	769	754
Seattle, WA (Seattle-Tacoma International)	18	1,060	709	709	691	747
Chicago/Rockford, IL (Chicago/Rockford International)	19	654	696	696	737	710
Phoenix, AZ (Sky Harbor International)	20	920	778	726	711	675
Portland, OR (Portland International)	21	882	747	730	713	656
Denver, CO (Denver International)	22	900	763	711	642	625
Minneapolis, MN (Minneapolis-St Paul International/Wold-Chamberlain)	23	622	702	620	612	562
Salt Lake City, UT (Salt Lake City International)	24	751	590	548	535	521
Boston, MA (General Edward Lawrence Logan International)	25	703	574	550	530	492
Top 25 airports³		52,381	55,955	56,973	57,715	53,621
United States, all airports⁴		74,743	76,091	76,362	76,583	71,281
Top 25 as % of U.S. total		70.1	73.5	74.6	75.4	75.2

¹Dedicated 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.

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

³Airport rankings change each year. Totals represent the top 25 airports for each year, not necessarily the top 25 airports listed here for 2008.

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

Note: 1 short ton = 2,000 pounds.

The Federal Aviation Administration reports that Memphis International and Anchorage 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.

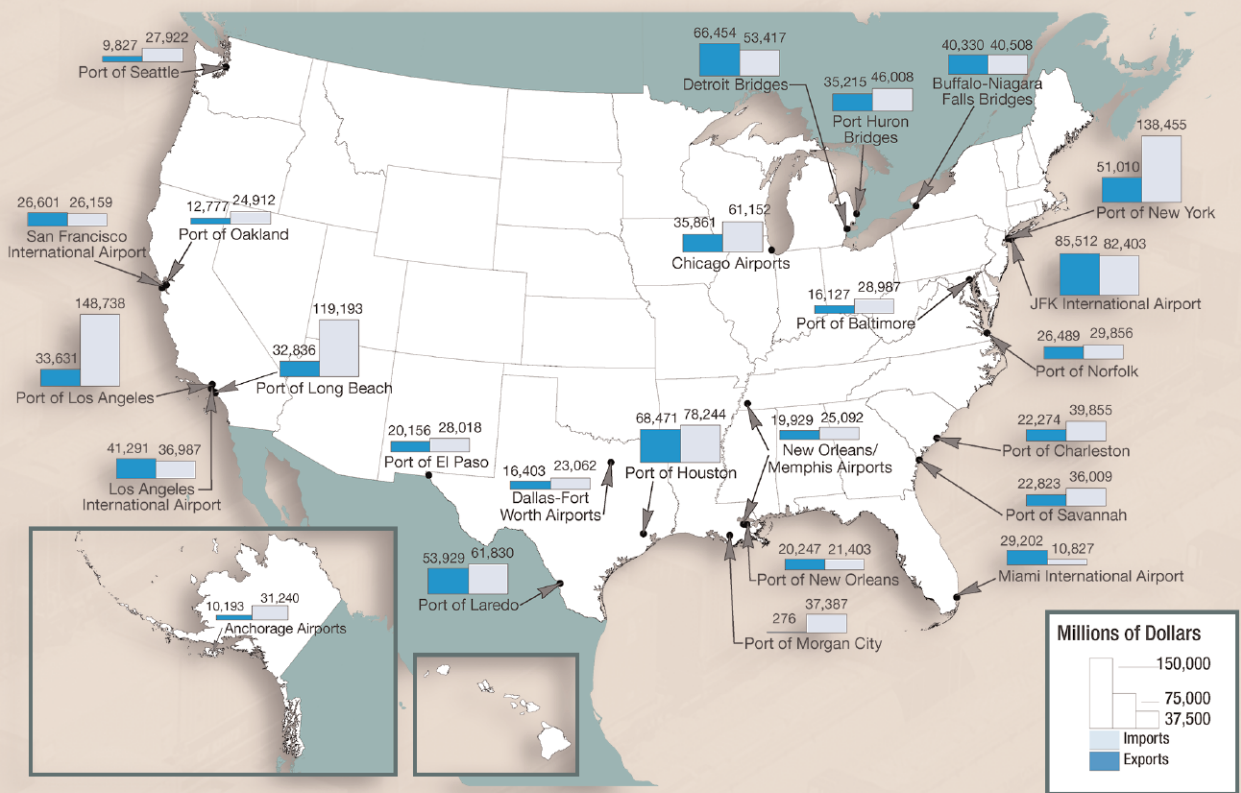
TABLE 3-10. TOP 25 AIRPORTS BY LANDED WEIGHT OF ALL-CARGO OPERATIONS: 2000-2008¹

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 as of July 7, 2010.



Figure 3-18. Top 25 Foreign-Trade Freight Gateways by Value: 2008



Notes: Data for all air gateways include a low level (generally less than 2%-3% of the total value) of small user-fee airports located in the same region. Air gateways not identified by airport name (e.g., Chicago, IL, and others) include major airport(s) in that geographic area in addition to small regional airports. Due to Census Bureau confidentiality regulations, data for courier operations are included in the airport totals for JFK International Airport, New Orleans, Los Angeles, Cleveland, Chicago, Miami, and Anchorage.

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 12 water ports, 5 land-border crossings, and 8 air gateways.

FIGURE 3-18. TOP 25 FOREIGN-TRADE FREIGHT GATEWAYS BY VALUE: 2008

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *National Transportation Statistics 2009*, available at www.bts.gov as of April 25, 2010.

IV. THE FREIGHT TRANSPORTATION INDUSTRY

The private sector owns a significant share of assets in the transportation industry:

\$1.07 trillion in equipment plus \$681.2 billion in private structures, compared to \$502 billion in transportation structures plus \$2.47 trillion in highways owned by public agencies.¹ Freight railroad facilities and services are almost entirely private, while trucks in the private sector operate over public highways, air-cargo services in the private sector operate in public airways and mostly public airports, and ships in the private sector serve public waterways and both public and private port facilities. Pipelines are mostly in the private sector, although significantly controlled by public regulation. In the public sector, virtually all truck routes are owned by state or local governments. Airports and harbors are typical-

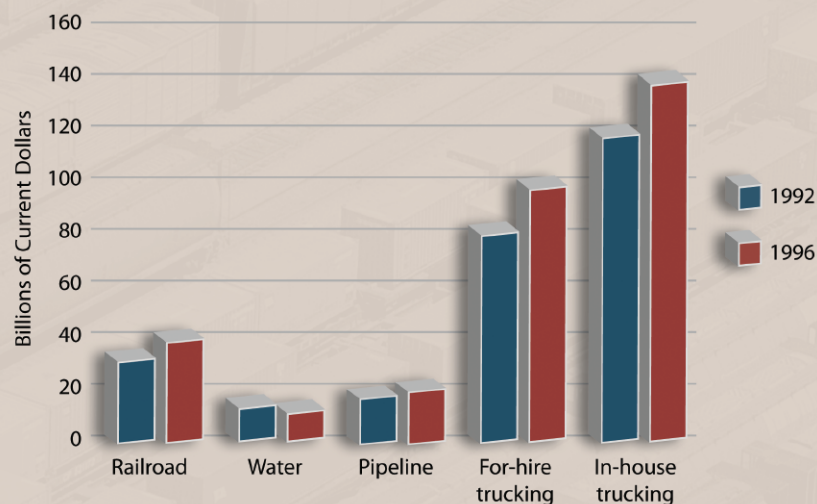
ly owned by public authorities (although terminals are usually owned or managed by private operators). Air and water navigation is mostly federal, and safety is regulated by all levels of government.

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 five percent of GDP. Of this five 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).

Figure 4-1. Value Added by Freight Transportation to U.S. Gross Domestic Product by Transportation Mode: 1992 and 1996



¹Fixed assets are for 2008 and include both passenger and freight transportation. See the Bureau of Economic Analysis at www.bea.gov/national/FA2004/index.asp, tables 2.1, 3.1s, and 7.1b.



The freight industry has many components, encompassing companies large and small. All told there were nearly 220,000 transportation and warehousing establishments in 2007, with more than one-half of those primarily engaged in trucking. Revenue generated by trucking accounts for about 34 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: 2002 and 2007

NAICS	Establishments		Revenue (millions of current \$)		Payroll (millions of current \$)		Paid Employees	
	2002	2007	2002	2007	2002	2007	2002	2007
Transportation and warehousing	199,618	219,706	382,152	639,916	115,989	173,183	3,650,859	4,454,383
Rail transportation	NA	NA	NA	NA	NA	NA	NA	NA
Water transportation	1,890	1,721	23,331	34,447	3,194	4,544	66,153	75,997
Truck transportation	112,642	120,390	164,219	217,833	47,750	58,266	1,435,210	1,507,923
Pipeline transportation	2,188	2,529	22,031	25,718	2,477	3,219	36,790	36,964
Support activities for transportation	33,942	42,130	57,414	86,596	16,202	24,579	465,616	608,385
Couriers and messengers	12,655	13,004	58,165	77,877	17,175	20,431	561,514	557,195
Warehousing and storage	12,671	13,938	16,548	21,921	17,183	25,526	565,533	720,451

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

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 2008

	Class I		Non-Class I		Total	
	2000	2008	2000	2008	2000	2008
Number of railroads	8	7	552	558	560	565
Freight revenue (billions of current dollars)	33.1	59.4	3.2	4.0	36.3	63.4
Operating revenue (billions of current dollars)	34.1	61.2	NA	NA	NA	NA
Employees	168,360	164,439	23,448	19,304	191,808	183,743

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 2008.



TABLE 4-1. ECONOMIC CHARACTERISTICS OF TRANSPORTATION AND WAREHOUSING ESTABLISHMENTS IN FREIGHT-DOMINATED MODES: 2002 AND 2007

Sources: **2002:** U.S. Department of Commerce, Census Bureau, *2007 Economic Census, Transportation and Warehousing, United States* (Washington, DC: 2004), available at www.census.gov/econ/census02/data/us/US000_48.HTM as of June 25, 2010; **2007:** U.S. Department of Commerce, Census Bureau, *2007 Economic Census, Transportation and Warehousing, United States* (Washington, DC: 2010), available at www.census.gov/econ/census07 as of August 10, 2010.

TABLE 4-2. ECONOMIC CHARACTERISTICS OF FREIGHT RAILROADS: 2000 AND 2008

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



Productivity has improved in all modes, particularly railroads. Between 1987 and 2008, output-per-hour worked more than doubled in line-haul railroading but grew only 30 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.

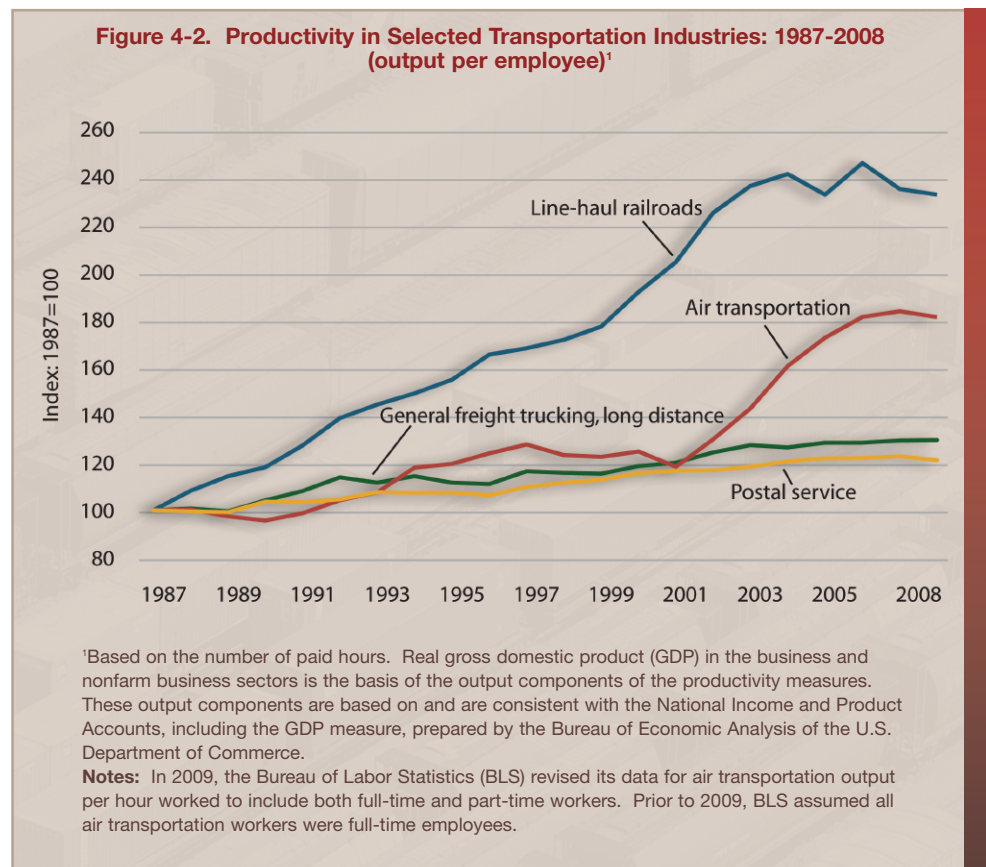


FIGURE 4-2. PRODUCTIVITY IN SELECTED TRANSPORTATION INDUSTRIES: 1987-2008

Source: U.S. Department of Labor, Bureau of Labor Statistics, Industry Productivity, available at www.bls.gov/lpc/ as of August 9, 2010.



Employment in many transportation industries has remained steady or has grown over the past two decades with the notable exception of railroads and pipelines, which have declined by 58 percent and 30 percent, respectively, between 1980 and 2009. Consequently, in 2008 rail transportation employed only 5 percent of those working in the transportation and warehousing industry compared with about 18 percent in 1980. By comparison, employment in trucking in 2009 accounted for 30 percent of total transportation and warehousing sector employment.

Table 4-3. Employment in For-Hire Transportation Establishments Primarily Serving Freight: 1980-2009¹ (thousands)

	1980	1990	2000	2008	2009
Total U.S. labor force²	90,528	109,487	131,785	(R) 136,790	130,920
Transportation and warehousing	2,961	3,476	4,410	(R) 4,508	4,235
Rail transportation	518	272	232	(R) 231	219
Water transportation	NA	57	56	(R) 67	64
Truck transportation	NA	1,122	1,406	(R) 1,389	1,266
Pipeline transportation	NA	60	46	42	42
Support activities for transportation ³	NA	364	537	(R) 592	549
Couriers and messengers	NA	375	605	(R) 573	547
Warehousing and storage	NA	407	514	(R) 672	642

Key: NA = not available; R = revised.

¹Annual averages.

²Excludes farm employment.

³Industries in the support activities for transportation subsector provide services that 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: 1980-2009

Source: U.S. Department of Labor, Bureau of Labor Statistics, Current Employment Statistics survey, available at www.bls.gov/ces as of August 10, 2010.

Table 4-4. Employment in Selected Freight Transportation and Freight Transportation-Related Occupations: 2000-2009

Occupation (SOC code)	2000	2007	2008	2009
Vehicle operators, pipeline operators, and primary support				
Driver/sales worker (53-3031)	373,660	382,360	372,720	363,050
Truck drivers, heavy and tractor-trailer (53-3032)	1,577,070	1,693,590	1,672,580	1,550,930
Truck drivers, light or delivery services (53-3033)	1,033,220	922,900	908,960	834,780
Locomotive engineers (53-4011)	29,390	41,760	42,760	43,560
Rail yard engineers, dinkey operators, and hostlers (53-4013)	4,020	4,950	5,480	5,360
Railroad brake, signal, and switch operators (53-4021)	16,830	23,120	24,610	24,270
Railroad conductors and yardmasters (53-4031)	40,380	37,540	39,580	41,540
Sailors and marine oilers (53-5011)	30,090	32,520	32,420	31,950
Captains, mates, and pilots of water vessels (53-5021)	21,080	30,540	30,600	30,450
Ship engineers (53-5031)	7,370	13,710	11,190	10,850
Bridge and lock tenders (53-6011)	4,790	4,750	4,490	4,290
Gas compressor and gas pumping station operators (53-7071)	6,510	4,230	4,050	4,160
Pump operators, except wellhead pumpers (53-7072)	13,730	10,400	9,280	10,310
Transportation equipment manufacturing and maintenance occupations				
Bus and truck mechanics and diesel engine specialists (49-3031)	258,800	250,370	248,620	232,810
Rail car repairers (49-3043)	10,620	23,190	20,780	20,910
Transportation Infrastructure construction and maintenance occupations				
Rail-track laying and maintenance equipment operators (47-4061)	9,940	14,050	15,020	14,880
Signal and track switch repairers (49-9097)	5,540	6,090	6,570	6,450
Dredge operators (53-7031)	3,100	1,910	1,910	1,990
Secondary support service occupations				
Dispatchers, except police, fire, and ambulance (43-5032)	167,180	190,190	193,210	185,100
Postal service mail carriers (43-5052)	354,980	348,070	354,570	339,030
Shipping, receiving, and traffic clerks (43-5071)	864,530	755,790	760,950	715,130
Transportation inspectors (53-6051)	26,520	24,130	24,940	24,250
Tank car, truck, and ship loaders (53-7121)	17,480	14,870	12,330	11,560

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 2.75 million truck drivers in 2009; about 57 percent of these professionals drive heavy/tractor trailer trucks, 30 percent drive light/delivery service trucks, and about 13 percent are driver/sales workers. Several 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: 2000-2009

Source: U.S. Department of Labor, Bureau of Labor Statistics, *National Occupational Employment and Wages, 2009* (Washington, DC: May 2009), available at www.bls.gov/oes as of August 10, 2010.

Table 4-5: Producer Price Indices for Selected Transportation Services: 1990-2008

	1990	2000	2003	2004	2005	2006	2007	2008
Air Transportation (NAICS 481)¹	NA	147.7	162.1	162.3	171.0	180.4	183.7	203.8
Scheduled Air Transportation (NAICS 4811) ²	110.2	180.1	198.5	198.6	209.3	220.5	224.5	248.9
Scheduled Freight Air Transportation (NAICS 481112)	NA	NA	100.0	100.2	104.9	108.4	109.0	127.8
Nonscheduled Air Transportation (NAICS 4812) ³	NA	107.3	117.8	119.9	126.7	136.8	148.5	165.8
Rail Transportation (NAICS 482)³	NA	102.6	108.8	113.4	125.2	135.9	140.9	157.3
Line-Haul Railroads (NAICS 482111) ⁴	107.5	114.5	121.4	126.5	139.6	151.2	157.2	175.5
Water Transportation (NAICS 483)	NA	NA	100.0	101.3	106.4	111.1	113.5	127.0
Deep Sea Freight Transportation (NAICS 483111) ⁵	113.1	155.8	219.9	225.9	231.9	233.3	230.0	258.3
Coastal and Great Lakes Freight Transportation (NAICS 483113)	NA	NA	100.0	101.7	109.9	119.9	130.2	141.8
Inland Water Freight Transportation (NAICS 483211)	100.0	117.9	124.7	131.0	151.4	182.9	186.1	218.3
Truck Transportation (NAICS 484)	NA	NA	100.0	103.1	109.0	113.2	115.4	123.0
General Freight Trucking (NAICS 4841)	NA	NA	100.0	103.5	110.0	114.1	116.5	123.6
General Freight Trucking, Local (NAICS 48411)	NA	NA	100.0	105.2	111.5	115.3	119.6	130.2
General Freight Trucking, Long Distance (NAICS 48412)	NA	NA	100.0	103.2	109.7	113.8	115.9	122.2
Specialized Freight Trucking (NAICS 4842)	NA	NA	100.0	102.3	107.0	111.4	113.1	122.1
Used Household and Office Goods Moving (NAICS 48421)	NA	NA	100.0	102.6	106.0	107.8	108.8	112.2
Specialized Freight (except Used Goods) Trucking, Local (NAICS 48422)	NA	NA	100.0	102.7	107.1	112.3	114.2	126.7
Specialized Freight (except Used Goods) Trucking, Long Distance (NAICS 48423)	NA	NA	100.0	101.7	107.5	112.8	114.8	123.6
Pipeline Transportation (NAICS 486)	NA	NA	NA	NA	NA	NA	NA	NA
Pipeline Transportation of Crude Oil (NAICS 4861)	NA	NA	100.0	103.9	113.3	112.0	125.4	137.1
Other Pipeline Transportation (NAICS 4869) ⁶	NA	NA	100.0	101.4	105.2	108.2	115.0	121.6
Support Activities for Transportation (NAICS 488)	NA	NA	100.0	101.1	104.1	106.5	108.5	111.7
Support Activities for Water Transportation (NAICS 4883) ⁷	NA	NA	100.0	101.0	103.5	107.7	112.7	117.3
Navigational Services to Shipping (NAICS 48833)	NA	NA	100.0	101.5	105.7	113.9	120.6	133.8
Freight Transportation Arrangement (NAICS 4885) ³	NA	98.3	97.9	98.9	99.1	98.8	100.2	102.5
Postal Service (NAICS 491)	100.0	135.2	155.0	155.0	155.0	164.7	171.9	178.9
Couriers and Messengers (NAICS 492)	NA	NA	100.0	106.1	113.8	121.5	131.5	142.0

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

¹Base year = 1992.

²Base year = 1989.

³Base year = 1996.

⁴Base year = 1984.

⁵Base year = 1988.

⁶Other pipeline transportation includes pipeline transportation of refined petroleum products (NAICS 48691).

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

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.

The prices charged for transportation purchased from carriers and support activities has gone up in most industries. Rail prices increased by about 12 percent from 2007 to 2008, while air and trucking increased by 11 percent and 7 percent respectively.

TABLE 4-5: PRODUCER PRICE INDICES FOR SELECTED TRANSPORTATION SERVICES: 1990-2008

Source: U.S. Department of Labor, Bureau of Labor Statistics, Producer Price Index Industry Data, available at www.bls.gov/data/sa.htm as of August 9, 2010.

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: 1980-2009

	1980	1990	2000	2008	2009
Total transportation fatalities (passenger and freight)	NA	47,350	44,384	NA	NA
Highway (passenger and freight)	51,091	44,599	41,945	(R) 37,423	33,808
Large truck occupants ¹	1,262	705	754	(R) 682	503
Others killed in crashes involving large trucks	4,709	4,567	4,528	(R) 3,563	2,877
Large truck occupants ¹ (percent)	2.5	1.6	1.8	1.8	1.5
Others killed in crashes involving large trucks (percent)	9.2	10.2	10.8	9.5	8.5
Railroad (passenger and freight)	1,417	1,297	937	800	703
Highway-rail crossing ²	833	698	425	(R) 289	245
Railroad ^{2,3}	584	599	512	(R) 511	458
Waterborne (passenger and freight)	487	186	111	109	185
Vessel-related ⁴	206	85	42	56	54
Freight ship	8	0	0	0	1
Tank ship	4	5	0	0	1
Tug/towboat	14	13	1	5	3
Offshore supply	NA	2	0	0	0
Fishing vessel	60	47	26	25	25
Mobile offshore drilling units	NA	0	0	4	1
Platform	NA	1	0	0	0
Freight barge	NA	0	0	1	0
Tank barge	NA	0	0	0	0
Miscellaneous ⁵	56	11	15	21	23
Not vessel-related ⁴	281	101	69	53	131
Pipeline	19	9	38	(R) 8	14
Hazardous liquid pipeline	4	3	1	2	4
Gas pipeline	15	6	37	(R) 6	10

Key: NA = not available; R = revised.

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

²Includes Amtrak.

³Includes train accidents and other incidents. Most fatalities involve trespassers who are included under other incidents (428 in 2009).

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

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

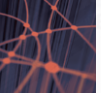
Note: Caution must be exercised in comparing fatalities across modes because significantly different definitions are used.

While the amount of freight transportation activity has increased in recent decades, the number of fatalities has declined or remained stable in each mode, with the exception of

TABLE 5-1. FATALITIES BY FREIGHT TRANSPORTATION MODE: 1980-2009

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 as of August 13, 2010.

Highway: U.S. Department of Transportation, National Highway Transportation Safety Administration, National Center for Statistics and Analysis, *Traffic Safety Facts, Large Trucks* (annual issues). **2008-2009:** U.S. Department of Transportation, National Highway Transportation Safety Administration, National Center for Statistics and Analysis, *Traffic Safety Facts—Highlights* (August 2010). **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 13, 2010. **Waterborne:** U.S. Department of Homeland Security, U.S. Coast Guard, Data Administration Division, personal communication, October 15, 2010.



not vessel-related waterborne casualties. Trucks account for approximately 10 percent of all highway fatalities. The vast majority of fatalities involve passenger travel on highways.

The highway and railroad modes account for almost all of the injuries in freight transportation, but the number of injuries has dropped substantially since 2000.

Table 5-2. Injured Persons by Freight Transportation Mode: 1980-2009

	1980	1990	2000	2008	2009
Total injured persons (passenger and freight)	NA	NA	3,259,673	NA	NA
Highway (passenger and freight)	NA	3,230,666	3,188,750	2,346,000	2,217,000
Large truck occupants ¹	NA	41,822	30,832	23,000	17,000
Others injured in crashes involving large trucks	NA	108,000	109,000	NA	NA
Large truck occupants ¹ (percent)	NA	1.3	1.0	1.0	0.8
Others injured in crashes involving large trucks (percent)	NA	3.3	3.4	NA	NA
Railroad (passenger and freight)	62,246	25,143	11,643	(R) 8,949	7,738
Highway-rail grade crossing ²	3,550	2,407	1,219	(R) 969	712
Railroad ^{2,3}	58,696	22,736	10,424	(R) 7,942	7,177
Waterborne (passenger and freight)	NA	NA	665	628	722
Vessel-related ⁴	180	175	151	159	186
Freight ship	8	10	5	11	8
Tank ship	9	13	3	3	4
Tug/towboat	27	19	18	20	39
Offshore supply	NA	9	6	2	0
Fishing vessel	28	31	21	17	35
Mobile offshore drilling units	NA	13	0	2	1
Platform	NA	9	0	0	0
Freight barge	NA	3	2	1	0
Tank barge	NA	3	0	7	1
Miscellaneous ⁵	98	12	96	96	98
Not related to vessel casualties ⁴	NA	NA	514	469	536
Pipeline	192	76	81	(R) 61	63
Hazardous liquid pipeline	15	7	4	2	4
Gas pipeline	177	69	77	(R) 59	59

Key: NA = not available; R = revised.

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

²Includes Amtrak.

³Includes train accidents and other incidents. Most injuries involve workers on duty (4,180 in 2009).

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

⁵Includes 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: 1980-2009

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/ as of August 13, 2010.

Highway: U.S. Department of Transportation, National Highway Transportation Safety Administration, National Center for Statistics and Analysis, *Traffic Safety Facts, Large Trucks* (annual issues). **2008-2009:** U.S. Department of Transportation, National Highway Transportation Safety Administration, National Center for Statistics and Analysis, *Traffic Safety Facts—Highlights* (August 2010). **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 13, 2010. **Waterborne:** U.S. Department of Homeland Security, U.S. Coast Guard, Data Administration Division, personal communication, October 15, 2010.



Table 5-3. Accidents by Freight Transportation Mode: 1980-2009

	1980	1990	2000	2008	2009
Highway (passenger and freight)	NA	6,471,000	6,394,000	5,811,000	NA
Large truck ¹	NA	371,801	437,861	380,000	NA
Large truck ¹ (percent of total)	NA	5.7	6.8	6.5	NA
Rail (passenger and freight)					
Highway-rail grade crossing ^{2,3}	10,612	5,715	3,502	(R) 2,410	1,909
Railroad ^{2,4}	8,205	2,879	2,983	(R) 2,461	1,878
Waterborne (passenger and freight)					
Vessel-related	4,624	3,613	5,403	5,599	5,475
Pipeline					
Hazardous liquid pipeline	246	180	146	(R) 120	102
Gas pipeline	1,524	198	234	(R) 274	265

Key: NA = not available; R = revised.

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

²Includes Amtrak.

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

⁴Train accidents only.

The number of crashes and other freight transportation accidents have declined in all modes except water in recent years, despite an increase in freight transportation 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

Table 5-4. Hazardous Materials Transportation Incidents: 1980-2009

	1980	1990	2000	2008	2009
Total	15,719	8,879	17,557	(R) 16,906	14,777
Accident-related	486	297	394	(R) 320	266
Air	223	297	1,419	(R) 1,278	1,357
Accident-related	0	0	3	8	2
Highway	14,161	7,296	15,063	(R) 14,781	12,691
Accident-related	347	249	329	(R) 286	227
Rail	1,271	1,279	1,058	(R) 749	641
Accident-related	134	48	62	26	37
Water¹	34	7	17	98	88
Accident-related	2	0	0	0	0
Other²	30	0	0	NA	NA
Accident-related	3	0	0	NA	NA

Key: NA = not available; R = revised.

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

²Other category includes freight forwarders and modes not otherwise specified.

Notes: Hazardous materials transportation incidents required to be reported are defined in the Code of Federal Regulations (CFR), 49 CFR 171.15, 171.16 (Form F 5800.1). Hazardous materials deaths and injuries are caused by the hazardous material in commerce. Accident related means vehicular accident or derailment. Each modal total also includes fatalities caused by human error, package failure, and causes not elsewhere classified. 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: 1980-2009

Sources: **Highway:** U.S. Department of Transportation, National Highway Transportation Safety Administration, National Center for Statistics and Analysis, *Traffic Safety Facts, Large Trucks* (annual issues). **2008-2009:** U.S. Department of Transportation, National Highway Transportation Safety Administration, National Center for Statistics and Analysis, *Traffic Safety Facts—Highlights* (August 2010). **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 13, 2010. **Waterborne:** U.S. Department of Homeland Security, U.S. Coast Guard, Data Administration Division, personal communication, October 15, 2010. **Pipeline:** U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, National Transportation Statistics, available at www.bts.gov as of August 13, 2010.

TABLE 5-4. HAZARDOUS MATERIALS TRANSPORTATION INCIDENTS: 1980-2009

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/data-stats as of July 8, 2010.



vehicular crash or derailment (referred to as “accident related”). Less than 2 percent of incidents were accident related in 2009, but they accounted for 83 percent of all property damage. Most incidents occur because of human error or package failure, particularly during loading and unloading.

Table 5-5. Commercial Motor Carrier Compliance Review Activity by Safety Rating: 2000-2009

Safety rating	2000		2008		2009	
	Number	Percent	Number	Percent	Number	Percent
Satisfactory	5,309	51.1	(R) 6,517	(R) 65.7	6,859	68.0
Conditional	3,354	32.3	(R) 2,755	(R) 27.8	2,778	27.5
Unsatisfactory	1,481	14.3	(R) 438	(R) 4.4	301	3.0
Not rated	245	2.4	(R) 216	(R) 2.2	152	1.5
Total	10,389	100.0	(R) 9,926	100.0	10,090	100.0

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 2009, the share of motor carriers rated satisfactory was 68 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 2009, about 6 percent of driver inspections and 5 percent of hazardous materials inspections result in an OOS order.

The number of gallons of fuel burned by commercial trucks increased significantly over the past 28 years. Between 1980 and 2008, the fuel consumed in highway freight transportation increased from 20 billion to nearly 37 billion gallons annually. This is due to a substantial increase in the number of trucks on the road, an increase in the average number of miles traveled per truck, and a doubling of truck miles traveled. Over the same period, fuel use in Class I freight railroads hovered around 3.9 billion gallons.

TABLE 5-5. COMMERCIAL MOTOR CARRIER COMPLIANCE REVIEW ACTIVITY BY SAFETY RATING: 2000-2009

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 as of July 8, 2010.

Table 5-6. Roadside Safety Inspection Activity Summary by Inspection Type: 2000-2009

	2000		2007		2008		2009	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
All inspections								
Number of inspections	2,453,776	100.0	3,416,942	100.0	3,317,187	100.0	3,530,382	100.0
With no violations	639,593	26.1	1,034,702	30.1	1,041,262	31.4	1,176,351	33.3
With violations	1,814,183	73.9	2,382,240	69.9	2,275,925	68.6	2,354,031	66.7
Driver inspections								
Number of inspections	2,396,688	100.0	3,267,279	100.0	3,176,813	100.0	3,429,882	100.0
With no violations	1,459,538	60.9	2,068,417	63.2	2,012,241	63.3	2,100,760	61.2
With violations	937,150	39.1	1,198,862	36.8	1,164,572	36.7	1,329,122	38.8
With OOS violations	191,031	8.0	223,099	6.9	204,542	6.4	196,625	5.7
Vehicle inspections								
Number of inspections	1,908,300	100.0	2,388,451	100.0	2,278,230	100.0	2,349,072	100.0
With no violations	584,389	30.6	810,192	33.8	746,362	33.6	779,891	33.2
With violations	1,323,911	69.4	1,578,259	66.2	1,513,868	66.5	1,569,181	66.8
With OOS violations	452,850	23.7	532,265	22.4	509,800	22.4	506,878	21.6
Hazardous materials inspections								
Number of inspections	133,486	100.0	199,732	100.0	192,516	100.0	222,587	100.0
With no violations	101,098	75.7	164,252	82.0	159,799	83.0	153,219	68.8
With violations	32,388	24.3	35,480	18.0	32,717	17.0	69,368	31.2
With OOS violations	9,964	7.5	10,195	5.2	9,648	5.0	10,323	4.6

Key: OOS = out of service.

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: 1980-2008

	1980	1990	2000	2007	2008
Highway					
Gasoline, diesel and other fuels (million gallons)	114,960	130,755	162,555	(R) 176,190	170,765
Truck, total	19,960	24,490	35,229	(R) 38,589	36,703
Single-unit 2-axle 6-tire or more truck	6,923	8,357	9,563	(R) 10,044	9,889
Combination truck	13,037	16,133	25,666	(R) 28,545	26,814
Truck (percent of total)	17.4	18.7	21.7	(R) 21.9	21.5
Rail, Class I (in freight service)					
Distillate / diesel fuel (million gallons)	3,904	3,115	3,700	4,062	3,886
Water					
Residual fuel oil (million gallons)	8,952	6,326	6,410	6,327	5,066
Distillate / diesel fuel oil (million gallons)	1,478	2,065	2,261	1,924	1,187
Gasoline (million gallons)	1,052	1,300	1,124	1,222	1,136
Pipeline					
Natural gas (million cubic feet)	634,622	659,816	642,210	(R) 621,364	647,958

Key: R = revised.

TABLE 5-6. ROADSIDE SAFETY INSPECTION ACTIVITY SUMMARY BY INSPECTION TYPE: 2000-2009

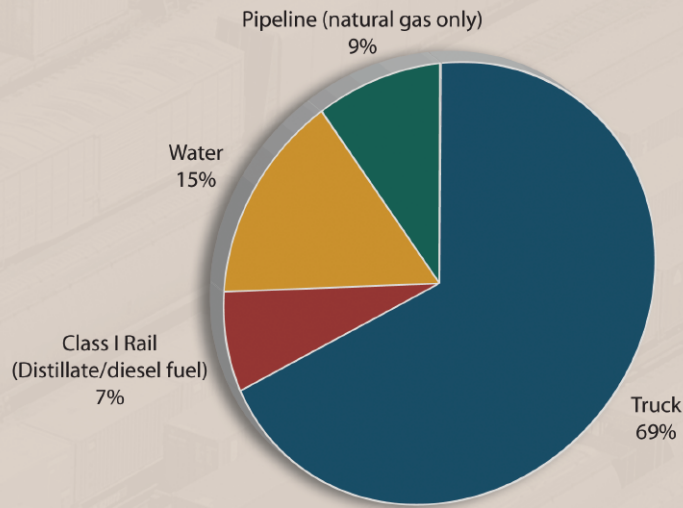
Source: U.S. Department of Transportation, Federal Motor Carrier Administration, Motor Carrier Management Information System (MCMIS), Roadside Inspection Activity Summary for Calendar Years, available at www.ai.volpe.dot.gov/ as of September 25, 2010.

TABLE 5-7. FUEL CONSUMPTION BY TRANSPORTATION MODE: 1980-2008

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/2008/ as of April 20, 2010. **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 2008* (Washington, DC: 2009), tables 2, 4, and similar tables in earlier editions. **Pipeline:** U.S. Department of Energy, *Natural Gas Annual 2008* (Washington, DC: January 2010), table 15 and similar tables in earlier editions.



Figure 5-1. Share of Energy Consumption by Freight Transportation Mode: 2008



Note: Data do not include energy consumed by oil pipelines (crude petroleum and petroleum products) or coal slurry/water slurry pipelines.

In 2008, trucking accounted for more than 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 45 percent. Total fuel consumed increased by about 43 percent whereas miles traveled more than doubled, indicating that miles per gallon increased from 5.8 to 8.5 between 1980 and 2008.

Table 5-8. Single-Unit Truck Fuel Consumption and Travel: 1980-2008

	1980	1990	2000	2007	2008
Number registered (thousands)	4,374	4,487	5,926	6,807	6,791
Vehicle miles (millions)	39,813	51,901	70,500	(R) 82,014	83,951
Fuel consumed (million gallons)	6,923	8,357	9,563	(R) 10,044	9,889
Average miles traveled per vehicle	9,103	11,567	11,897	(R) 12,049	12,362
Average miles traveled per gallon	5.8	6.2	7.4	8.2	8.5
Average fuel consumed per vehicle (gallons)	1,583	1,862	1,614	(R) 1,476	1,456

Key: R = revised.

FIGURE 5-1. SHARE OF ENERGY CONSUMPTION BY FREIGHT TRANSPORTATION MODE: 2008

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/2008/ as of April 25, 2010. **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 2008* (Washington, DC: 2009), 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/2008/ as of April 25, 2010. **Pipeline:** U.S. Department of Energy, *Natural Gas Annual 2008*, (Washington, DC: January 2010), table 15 and similar tables in earlier editions.

TABLE 5-8. SINGLE-UNIT TRUCK FUEL CONSUMPTION AND TRAVEL: 1980-2008

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/2008/ as of April 25, 2010.



In contrast to single-unit trucks, miles per gallon by combination trucks (based on total travel and fuel consumption) increased by only 2 percent over the past 28 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: 1980-2008

	1980	1990	2000	2007	2008
Number registered (thousands)	1,417	1,709	2,097	2,221	2,216
Vehicle miles traveled (millions)	68,678	94,341	135,020	(R) 145,046	143,507
Fuel consumed (million gallons)	13,037	16,133	25,666	(R) 28,545	26,814
Average miles traveled per vehicle	48,472	55,206	64,399	65,307	64,764
Average miles traveled per gallon	5.3	5.8	5.3	5.1	5.4
Average fuel consumed per vehicle (gallons)	9,201	9,441	12,241	(R) 12,853	12,101

Key: R =revised.

Diesel prices were about 64 percent higher in June 2010 than 10 years earlier (in inflation-adjusted terms).

Figure 5-2. Monthly Diesel Prices: January 1999-June 2010

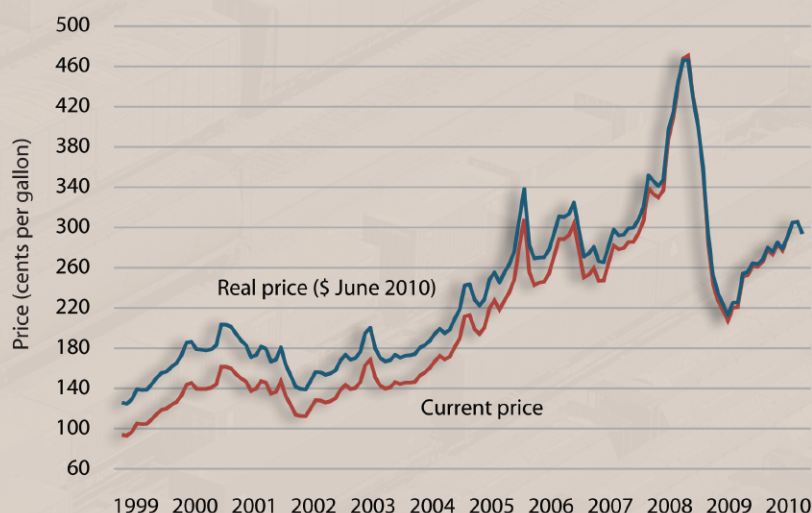


TABLE 5-9. COMBINATION TRUCK FUEL CONSUMPTION AND TRAVEL: 1980-2008

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/2008/ as of April 25, 2010.

FIGURE 5-2. MONTHLY DIESEL PRICES: JANUARY 1999-JUNE 2010

Sources: **Diesel price:** U.S. Department of Energy, Energy Information Agency, U.S. Petroleum Prices, available at www.eia.doe.gov as of August 9, 2010. **Consumer price index:** U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index – All Urban Consumers, Monthly, available at www.bls.gov as of August 9, 2010.



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: 1980-2008

	1980	1990	2000	2007	2008
Highway (Btu per vehicle mile)	24,758	22,795	23,449	(R) 23,252	22,077
Railroad (Class I) (Btu per freight car mile)	18,742	16,619	14,917	14,846	14,573
Railroad (Class I) (Btu per ton mile)	597	420	352	320	305
Domestic water (Btu per ton mile)	358	387	473	590	418

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



TABLE 5-10. ENERGY INTENSITIES OF DOMESTIC FREIGHT TRANSPORTATION MODES: 1980-2008

Source: Oak Ridge National Laboratory, *Transportation Energy Data Book: Edition 29* (Oak Ridge, TN: annual issues), table 2.16, available at <http://cta.ornl.gov/data/index.shtml> as of August 10, 2010.

Air quality is affected by freight vehicle emissions. Compared with gasoline-fueled cars and trucks, diesel-fueled heavy trucks emit small amounts of carbon monoxide (CO₂) but large amounts of nitrogen oxides (NO_x). However, since 1990 heavy-duty truck emissions of NO_x have declined by 67 percent.

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: 1990-2009 (grams per mile)

	1990	2000	2008	2009
Gasoline (assuming zero RFG)				
Cars				
Exhaust HC	2.79	0.97	0.39	0.36
Nonexhaust HC	1.21	0.91	0.57	0.51
Total HC	4.00	1.88	0.95	0.87
Exhaust CO	42.89	18.53	9.68	9.20
Exhaust NO _x	2.70	1.29	0.67	0.61
Light trucks				
Exhaust HC	3.68	1.45	0.55	0.51
Nonexhaust HC	1.37	0.98	0.62	0.58
Total HC	5.05	2.43	1.17	1.09
Exhaust CO	56.23	26.81	12.49	11.76
Exhaust NO _x	2.62	1.54	0.94	0.88
Heavy trucks				
Exhaust HC	3.66	1.22	0.42	0.32
Nonexhaust HC	2.74	1.62	0.99	0.92
Total HC	6.40	2.84	1.41	1.24
Exhaust CO	85.61	31.08	12.38	9.96
Exhaust NO _x	7.19	5.26	2.94	2.58
Diesel				
Cars				
Exhaust HC	0.68	0.80	0.29	0.23
Exhaust CO	1.49	1.78	1.09	0.99
Exhaust NO _x	1.83	1.81	0.69	0.53
Light trucks				
Exhaust HC	1.59	1.02	0.55	0.48
Exhaust CO	2.67	1.77	0.93	0.82
Exhaust NO _x	2.71	1.76	0.94	0.82
Heavy trucks				
Exhaust HC	2.21	0.79	0.45	0.42
Exhaust CO	10.06	4.10	2.31	2.01
Exhaust NO _x	23.34	18.05	8.61	7.77

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

Table 5-12. Freight Nitrogen Oxides (NO_x) and Particulate Matter (PM-10) Emissions by Freight Transportation Mode: 2002

Mode	NO _x Emissions				PM-10 Emissions			
	Tons (thousands)	Percent	As a percent of:		Tons (thousands)	Percent	As a percent of:	
			All mobile sources	All sources			All mobile sources	All sources
Heavy-duty vehicles	3,782.0	66.8	33.0	17.9	120.0	64.7	23.3	0.5
Freight railroads	857.2	15.1	7.5	4.1	21.3	11.5	4.1	0.1
Marine vessels	1,011.0	17.9	8.8	4.8	44.0	23.7	8.5	0.2
Air freight	8.2	0.1	0.1	0.0	0.3	0.2	0.1	0.0
Total	5,658.4	100.0	49.4	26.8	185.6	100.0	36.0	0.8

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: 1990-2009

Source: U.S. Environmental Protection Agency, National Vehicle and Fuel Emissions Laboratory, MOBILE6.2.3 model, personal communication, September 25, 2010.

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

Source: U.S. Department of Transportation, Federal Highway Administration, *Assessing the Effects of Freight Movement on Air Quality at the National and Regional Level, Final Report* (Washington, DC: 2005), available at www.fhwa.dot.gov/environment/freightaq/ as of June 2, 2010.

Table 5-13. Current and Projected Nitrogen Oxides (NO_x) Emissions by Freight Transportation Mode: 2002, 2010, and 2020

	Tons (thousands)			Percent change, 2002 to 2010	Percent change, 2002 to 2020
	2002	2010	2020		
Heavy-duty trucks	3,782.0	2,186.9	662.6	-42	-82
Freight rail	857.2	563.2	486.4	-34	-43
Commercial marine	1,011.0	987.2	938.6	-2	-7
Air freight	8.2	10.0	12.4	22	51
Total freight	5,658.4	3,747.3	2,100.0	-34	-63

Trucks are by far the largest contributor to freight emissions nationally, producing two-thirds of NO_x from the freight sector. However, as noted earlier, freight emissions of NO_x have declined significantly since the U.S. Environmental Protection Agency required the use of ultra low sulfur diesel fuel in heavy-duty trucks and other diesel-powered highway vehicles beginning in 2006.

Trucks produced two-thirds of PM-10 emissions from the freight sector. Freight emissions of PM-10 are forecast to decline by one-quarter over the next decade, primarily from a reduction in heavy-duty truck emissions. 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 (thousands)			Percent change, 2002 to 2010	Percent change, 2002 to 2020
	2002	2010	2020		
Heavy-duty trucks	120.0	65.4	34.8	-46	-71
Freight rail	21.3	15.7	13.0	-26	-39
Commercial marine	44.0	42.9	44.1	-2	0
Air freight	0.3	0.3	0.3	-3	-10
Total freight	185.6	124.3	92.1	-33	-50

TABLE 5-13. CURRENT AND PROJECTED NITROGEN OXIDES (NO_x) 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/ as of June 2, 2010.

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/ as of June 2, 2010.

In addition to CO, NO_x, and particulate matter emissions, the transportation sector releases large quantities of greenhouse gases (GHGs), such as carbon dioxide (CO₂), 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: 1990-2008
(electricity-related emissions distributed among sectors)¹
(millions of metric tonnes of CO₂ equivalent)

Sector	(R)1990	(R)1995	(R)2000	(R)2005	(R)2007	2008
Industry ²	2,179.8	2,228.0	2,239.2	2,071.1	2,084.2	2,018.4
Transportation ³	1,548.2	1,698.3	1,935.8	2,020.9	2,008.6	1,890.8
Commercial	946.8	1,000.2	1,141.5	1,216.5	1,240.1	1,250.6
Residential	954.0	1,024.5	1,162.4	1,242.2	1,226.9	1,215.6
Agriculture	464.2	497.1	518.7	523.5	550.5	531.6
U.S. Territories ⁴	33.7	40.7	46.9	58.9	57.8	49.9
Total	6,126.8	6,488.8	7,044.5	7,133.2	7,168.1	6,956.8

Key: R = revised.

¹Emissions 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.

²Industry 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.

³Includes emissions from military aircraft (16.3 million of metric tonnes) and "other" transportation, primarily lubricants (9.5 million of metric tonnes). Emissions from international bunker fuels are not included.

⁴Electricity-related emissions were not distributed to U.S. Territories.

Notes: Greenhouse gas (GHG) emissions include CO₂, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. CO₂ 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 to another gas. Carbon comprises 12/44 of CO₂ 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 27 percent of all greenhouse gases emitted in the United States and nearly 7 percent of all greenhouse gases emitted globally.¹

¹Intergovernmental Panel on Climate Change, *Climate Change 2007: Synthesis Report* (Geneva, Switzerland: 2008)

TABLE 5-15. U.S. GREENHOUSE GAS EMISSIONS BY ECONOMIC END-USE SECTOR: 1990-2008

Source: U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2008*, EPA 430-R-10-006 (Washington, DC: 2010), table ES-8, available at

www.epa.gov/climatechange/emissions/usinventoryreport.html.



From 1990 to 2008, transportation GHG emissions rose by 22 percent. However, transportation sector emissions decreased by nearly 6 percent from 2007 to 2008, likely the result of higher fuel prices, which led to a decrease in fuel consumption, and the economic downturn.

CO₂ 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 more than 60 percent of CO₂ 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 (CO₂) Emissions from Fossil Fuel Combustion by Fuel Type: 1990-2008
(millions of metric tonnes of CO₂ equivalent)

Fuel	(R)1990	(R)1995	(R)2000	(R)2005	(R)2007	2008
Petroleum	1,449.7	1,569.6	1,773.9	1,862.2	1,858.4	1,749.4
Motor gasoline	983.6	1,041.7	1,135.7	1,187.3	1,180.4	1,129.4
Distillate fuel oil	262.9	324.2	402.5	458.1	476.3	441.9
Jet fuel	176.2	170.9	199.8	193.5	169.3	153.6
Residual fuel ¹	22.6	29.1	33.3	19.3	29.0	21.4
Aviation gasoline	3.1	2.7	2.5	2.4	2.2	2.0
Liquefied petroleum gas	1.3	1.0	0.7	1.6	1.3	1.2
Natural Gas	36.0	38.4	35.6	33.1	35.3	35.8
Transportation Total²	1,485.8	1,608.0	1,809.5	1,895.3	1,893.7	1,785.3
U.S. Total²	4,735.7	5,029.5	5,593.4	5,753.3	5,757.0	5,572.8
Transportation Sector as % of Total	31.4	32.0	32.4	32.9	32.9	32.0

Key: R = revised.

¹Fluctuations in emissions estimates reflect data collection problems.

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

Notes: CO₂ 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 to another gas. Carbon comprises 12/44 of CO₂ by weight. Numbers may not add to totals due to rounding. Electricity-related emissions are not included in this table.

TABLE 5-16. U.S. TRANSPORTATION SECTOR CARBON DIOXIDE (CO₂) EMISSIONS FROM FOSSIL FUEL COMBUSTION BY FUEL TYPE: 1990-2008

Source: U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2008*, EPA 430-R-10-006 (Washington, DC: 2009), Annex 2, tables A-11, A-12, A-14, A-19, A-22, A-24, and A-29, available at www.epa.gov/climatechange/emissions/usinventoryreport.html as of April 30, 2010.

Table 5-17. U.S. Greenhouse Gas Emissions from Domestic Freight Transportation: 1990-2008
(millions of metric tonnes of CO₂ equivalent)

Mode	(R)1990	(R)1995	(R)2000	(R)2005	(R)2007	2008	Percent change, 1990 to 2008
Trucking	231.1	277.7	354.5	408.3	425.2	401.2	73.6
Freight Rail	34.5	39.1	42.8	46.7	47.8	44.4	28.7
Ships and Other Boats ¹	30.6	42.2	48.3	27.9	37.9	24.1	-21.2
Pipelines ²	36.1	38.3	35.2	32.3	34.4	34.9	-3.3
Commercial Aircraft	23.7	24.8	29.6	26.0	20.3	18.0	-24.1
Freight Total	356.0	422.1	510.5	541.2	565.5	522.6	47.0
Passenger Total	1,145.6	1,240.8	1,391.8	1,451.1	1,416.5	1,342.2	17.0
Transportation Total³	1,548.2	1,698.3	1,935.8	2,020.9	2,008.6	1,890.8	22.1
Freight as % of Transportation Total	23.0	24.9	26.4	26.8	28.2	27.6	20.0

Key: CO₂ = carbon dioxide; R = revised.

¹Fluctuations in emissions estimates reflect data collection problems.

²Includes only CO₂ emissions from natural gas used to power pipelines.

³Includes greenhouse gas emissions from military aircraft (16.3 million metric tonnes); "other" transportation, primarily lubricants (9.5 million metric tonnes); and electricity-related emissions. Emissions from international bunker fuels are not included.

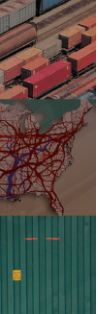
Notes: U.S. Environmental Protection Agency (EPA) used U.S. Department of Energy fuel consumption data to allocate freight and passenger rail emissions. EPA used U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics data on freight shipped 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. CO₂ 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 to another gas. Carbon comprises 12/44 of CO₂ 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 (47 percent vs. 17 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: 1990-2008

Source: U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2008*, EPA 430-R-10-006 (Washington, DC: 2010), Annex 3, table A-109 and A-110, available at

www.epa.gov/climatechange/emissions/usinventoryreport.html as of April 30, 2010.



Between 1990 and 2008, medium- and heavy-duty truck emissions rose by more than 70 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: 1990-2008
(millions of metric tonnes of CO₂ equivalent)

	1990	1995	2000	2005	2007	2008
Carbon dioxide (CO ₂)(R)	230.1	274.8	345.8	396.0	412.5	388.6
Methane	0.2	0.2	0.1	0.1	0.1	0.1
Nitrous Oxide	0.8	1.0	1.2	(R) ¹	1.1	1.0
Hydrofluorocarbons(R)	<0.05	1.7	7.4	11.1	11.5	11.6
Total Truck (R)	231.1	277.7	354.5	408.3	425.2	401.2
Total U.S. Transportation¹(R)	1,548.2	1,698.3	1,935.8	2,020.9	2,008.6	1,890.8
Total U.S.¹(R)	6,126.8	6,488.8	7,044.5	7,133.2	7,168.1	6,956.8
Truck share of transportation total (percent)(R)	14.9	16.4	18.3	20.2	21.2	21.2
Truck share of U.S. total (percent)(R)	3.8	4.3	5.0	5.7	5.9	5.8

Key: CO₂ = carbon dioxide; R = revised.

¹Transportation and U.S. totals include greenhouse gas emissions from military aircraft (16.3 million metric tonnes in 2008); "other" transportation, primarily lubricants (9.5 million metric tonnes in 2008); and electricity-related emissions. Emissions from international bunker fuels are not included.

Notes: CO₂ 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 to another gas. Carbon comprises 12/44 of CO₂ 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: 1990-2008

Source: U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2008*, EPA 430-R-10-006 (Washington, DC: 2010), tables 2-15 and ES-8, available at www.epa.gov/climatechange/emissions/usinventoryreport.html as of April 30, 2010.

APPENDIX A. SELECTED METRIC DATA

Table 2-1M. Weight of Shipments by Transportation Mode: 2007, 2009, and 2040 (millions of metric tonnes)

	2007				2009				2040			
	Total	Domestic	Exports ²	Imports ²	Total	Domestic	Exports ²	Imports ²	Total	Domestic	Exports ²	Imports ²
Total	16,856	15,038	595	1,224	14,626	13,061	591	974	24,589	20,659	1,643	2,287
Truck	11,581	11,413	86	82	9,859	9,719	78	63	16,733	16,296	249	189
Rail	1,718	1,583	56	79	1,532	1,429	52	51	2,185	1,913	141	131
Water	720	326	47	347	666	318	46	301	1,037	437	95	505
Air, air & truck	12	2	4	5	10	2	4	4	37	5	14	18
Multiple modes & mail¹	1,389	471	371	547	1,212	416	384	413	2,829	657	1,069	1,103
Pipeline	1,152	998	4	150	1,107	970	4	133	1,369	1,051	8	310
Other & unknown	284	244	27	14	240	208	24	8	399	301	66	32

¹In this table, multiple modes & mail includes export and import shipments that move domestically by a different mode than the mode used between the port and foreign location.

²Data 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. Numbers may not add to totals due to rounding. The 2009 data are provisional estimates, which are based on selected modal and economic trend data.

Table 2-3M. Top Commodities: 2007

Millions of Metric Tonnes		Billions of Dollars	
Total, all commodities	17,534	Total, all commodities	16,536
Gravel	2,053	Machinery	1,762
Cereal grains	1,338	Electronics	1,432
Coal	1,310	Motorized vehicles	1,269
Non-metal mineral products	1,263	Mixed freight	1,058
Waste/scrap	1,200	Pharmaceuticals	880
Natural gas & related ¹	1,158	Textiles/leather	696
Gasoline	912	Gasoline	691
Fuel oils	675	Miscellaneous manufactured products	689
Natural sands	517	Plastics/rubber	579
Crude petroleum	507	Articles of base metal	573

¹Natural 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: 2007, 2009, AND 2040

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.1, 2010.

TABLE 2-3M. TOP COMMODITIES: 2007

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.1, 2010.

Table 2-4M. Hazardous Materials Shipments by Transportation Mode: 2007

Transportation mode	Value		Metric Tonnes		Tonne kilometers		Kilometers
	\$ Billion	Percent	Millions	Percent	Billions	Percent	Average distance per shipment
All modes, total	1,448	100.0	2,024	100.0	472	100.0	154
Single modes, total	1,371	94.6	1,916	94.6	408	86.3	105
Truck ¹	837	57.8	1,091	53.9	152	32.2	95
For-hire	359	24.8	449	22.2	92	19.6	344
Private ²	478	33.0	642	31.7	59	12.6	51
Rail	69	4.8	118	5.8	135	28.5	930
Water	69	4.8	136	6.7	54	11.5	616
Air	2	0.1	5	0.2	5	1.1	1,762
Pipeline ³	393	27.2	571	28.2	5	1.1	5
Multiple modes, total	71	4.9	101	5.0	63	13.3	1,342
Parcel, U.S. Postal Service, or Courier	8	0.5	<1	<0.1	<1	<0.1	1,345
Other multiple modes	28	1.9	51	2.5	25	5.3	375
Unknown and other modes, total	7	0.5	8	0.4	2	0.5	93

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

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

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

³Excludes crude oil shipments.

Notes: 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: 2007

Hazard class	Description	Value		Metric tonnes		Tonne kilometers	
		\$ Billions	Percent	Millions	Percent	Billions	Percent
Class 1	Explosives	12	0.8	3	0.1	<1	<0.1
Class 2	Gases	132	9.1	206	11.2	118	17.1
Class 3	Flammable liquids	1,170	80.8	1,443	78.6	387	56.3
Class 4	Flammable solids	4	0.3	17	0.9	12	1.7
Class 5	Oxidizers and organic peroxides	7	0.5	12	0.7	15	2.2
Class 6	Toxic (poison)	21	1.5	9	0.5	12	1.8
Class 7	Radioactive materials	21	1.4	<1	<0.1	<1	<0.1
Class 8	Corrosive materials	51	3.6	94	5.1	95	13.8
Class 9	Miscellaneous dangerous goods	30	2.1	52	2.8	49	7.1
Total		1,448	100.0	1,836	100.0	688	100.0

Notes: 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: 2007

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, 2007 *Commodity Flow Survey, Hazardous Materials* (Washington, DC: February 2010), table 1a, available at www.bts.gov/publications/commodity_flow_survey/ as of May 25, 2010.

TABLE 2-5M. HAZARDOUS MATERIALS SHIPMENTS BY HAZARD CLASS: 2007

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, 2007 *Commodity Flow Survey, Hazardous Materials* (Washington, DC: February 2010), table 1a, available at www.bts.gov/publications/commodity_flow_survey/ as of May 25, 2010.

Table 2-6M. Domestic Mode of Exports and Imports by Tonnage and Value: 2007 and 2040

	Millions of Metric Tonnes		Billions of 2007 Dollars	
	2007	2040	2007	2040
Total	1,819	3,930	3,198	9,850
Truck¹	692	1,734	1,343	3,880
Rail	235	493	197	419
Water	124	213	52	92
Air, air & truck²	9	32	927	3,606
Multiple modes & mail³	138	387	287	929
Pipeline	312	592	147	274
Other & unknown	37	93	112	457
No domestic mode⁴	270	387	134	193

¹Excludes truck moves to and from airports.

²Includes truck moves to and from airports.

³Multiple modes & mail include U.S. Postal Service, courier shipments, and all intermodal combinations, except air and truck. In this table, oceangoing export and import shipments that move between ports and domestic locations by single modes are classified by the domestic mode rather than multiple modes & mail.

⁴No domestic mode includes waterborne import shipments of crude petroleum off-loaded directly at the domestic destination (refineries) with no domestic mode of transportation.

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: 1998-2009
(billions of current U.S. dollars and millions of metric tonnes)

Mode	1999		2004		2008		2009	
	Value	Weight	Value	Weight	Value	Weight	Value	Weight
Truck ¹	385	NA	453	NA	554	165	455	141
Rail ¹	78	NA	108	NA	140	134	96	98
Air	34	<1	32	<1	41	<1	39	<1
Water	23	166	46	222	93	211	59	172
Pipeline ¹	12	NA	39	NA	88	89	49	89
Other ¹	25	NA	34	NA	47	6	37	5
Total¹	559	NA	712	NA	964	606	735	506

Key: NA = not available.

¹The U.S. Department of Transportation, Research and Innovative Technology Administration, 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 metric tonne = 1.1023 short tons. 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 2-6M. DOMESTIC MODE OF EXPORTS AND IMPORTS BY TONNAGE AND VALUE: 2007 AND 2040

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.1, 2010.

TABLE 2-8M. VALUE AND TONNAGE OF U.S. MERCHANDISE TRADE WITH CANADA AND MEXICO BY TRANSPORTATION MODE: 1998-2009

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, North American Transborder Freight Data, available at www.bts.gov/transborder as of July 27, 2010; U.S. Department of Commerce, Census Bureau, Foreign Trade Division, *FT920 - U.S. Merchandise Trade: Selected Highlights* (Washington, DC: annual issues).

Table 3-1M. Kilometers of Infrastructure by Transportation Mode: 1980-2008

	1980	1990	2000	2008	Percent change, 1980 to 2008
Public roads, route kilometers	6,211,518	6,222,926	6,358,386	6,532,576	5.2
National Highway System (NHS)	N	N	417,439	264,075	N
Interstates	66,173	72,536	75,109	75,657	14.3
Other NHS	N	N	184,287	188,418	N
Other	N	N	6,098,989	6,268,500	N
Strategic Highway Corridor Network (STRAHNET)	N	N	99,881	100,182	N
Interstate	N	N	75,113	75,657	N
Non-Interstate	N	N	24,765	24,525	N
Railroad	¹ 294,620	283,085	274,400	224,213	-23.9
Class I	NA	214,337	194,073	151,403	N
Regional	NA	29,570	33,759	26,859	N
Local	NA	39,165	46,567	45,951	N
Inland waterways					
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
Pipelines					
Oil	351,453	335,938	284,834	278,404	-20.8
Gas	1,692,588	1,913,743	2,203,573	2,454,136	45.0

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

¹Excludes Class III railroads.

Note: 1 kilometer = .6214 miles.

TABLE 3-1M. KILOMETERS OF INFRASTRUCTURE BY TRANSPORTATION MODE: 1980-2008

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/2008/ as of April 20, 2010. **Rail:** Association of American Railroads, *Railroad Facts*

(Washington, DC: annual issues). **Navigable channels:** U.S. Army Corps of Engineers, *A Citizen's Guide to the USACE*, available

at www.corpsreform.org/sitepages/downloads/CitzGuideChptr1.pdf as of April 25, 2010. **Great Lakes-St. Lawrence Seaway:** The

St. Lawrence Seaway Development Corporation, "The Seaway," available at

www.greatlakes-seaway.com/en/seaway/facts/index.html as of April 25, 2010. **Oil pipelines: 1980-2000:** Eno Transportation

Foundation, *Transportation in America, 2002* (Washington, DC: 2002). **2001-2008:** 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 as of April 25, 2010. **Gas pipelines:** American Gas Association, *Gas Facts*

(Arlington, VA: annual issues).


Table 3-3M. Trucks and Truck Kilometers by Average Weight: 1987-2002

Average weight (kilograms)	1987		1992		1997		2002		Percent Change, 1987 to 2002	
	Number (thousands)	VKT (millions)	Number (thousands)	VKT (millions)	Number (thousands)	VKT (millions)	Number (thousands)	VKT (millions)	Number	VKT
Total	3,624	144,789	4,008	168,952	4,701	237,972	5,415	234,348	49	62
Light-heavy	1,030	17,328	1,259	22,550	1,436	31,888	1,914	42,252	86	144
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
Medium-heavy	766	12,200	732	13,103	729	16,301	910	18,934	19	55
8,846 to 11,793	766	12,200	732	13,103	729	16,301	910	18,934	19	55
Heavy-heavy	1,829	115,261	2,017	133,299	2,536	189,782	2,591	173,161	42	50
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.

¹Excludes 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 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 as of June 2, 2010.



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

	Number of Trucks (thousands)	Truck Kilometers (millions)	Kilometers per Truck (thousands)
Total	5,521	233,622	42
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 vehicles in the United States except pick-ups, minivans, other light cars, and sport utility vehicles. Numbers may not add to totals due to rounding.



TABLE 3-6M. TRUCKS, TRUCK KILOMETERS, 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 as of June 2, 2010.

Table 3-7M. Truck Kilometers by Products Carried: 2002¹

Products carried	Millions of kilometers
Total²	233,622
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 ³	241
No product carried	46,632

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

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

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

Note: 1 kilometer = 0.6214 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 (Washington, DC: 2004), available at www.census.gov/prod/ec02/ec02tv-us.pdf as of June 2, 2010.

Table 3-10M. Top 25 Airports by Landed Weight of All-Cargo Operations: 2000-2008¹

Airport	2008 Rank	Landed weight (thousands of metric tonnes)				
		2000	2005	2006	2007	2008
Memphis, TN (Memphis International)	1	5,732	8,476	8,550	8,865	8,845
Anchorage, AK (Ted Stevens Anchorage International) ²	2	7,333	9,402	9,605	9,582	8,143
Louisville, KY (Louisville International-Standiford Field)	3	3,617	4,165	4,550	4,732	4,738
Miami, FL (Miami International)	4	2,657	3,221	3,258	3,370	3,170
Los Angeles, CA (Los Angeles International)	5	2,624	2,655	3,290	3,112	2,609
Indianapolis, IN (Indianapolis International)	6	2,616	2,309	2,383	2,406	2,326
New York, NY (John F. Kennedy International)	7	2,534	2,550	2,372	2,320	2,016
Chicago, IL (O'Hare International)	8	1,870	2,188	2,003	1,996	1,908
Oakland, CA (Metropolitan Oakland International)	9	1,643	1,631	1,631	1,643	1,580
Newark, NJ (Newark Liberty International)	10	1,779	1,697	1,694	1,700	1,566
Fort Worth, TX (Dallas/Fort Worth International)	11	1,534	1,502	1,562	1,591	1,464
Ontario, CA (Ontario International)	12	1,107	1,219	1,271	1,265	1,225
Philadelphia, PA (Philadelphia International)	13	1,319	1,271	1,239	1,248	1,146
Atlanta, GA (William B. Hartsfield International)	14	989	920	1,070	1,144	1,059
Honolulu, HI (Honolulu International)	15	628	751	888	1,028	936
San Francisco, CA (San Francisco International)	16	1,149	723	752	943	703
Houston, TX (George Bush Intercontinental)	17	435	644	631	698	684
Seattle, WA (Seattle-Tacoma International)	18	961	643	643	627	677
Chicago/Rockford, IL (Chicago/Rockford International)	19	593	632	631	669	644
Phoenix, AZ (Sky Harbor International)	20	835	706	659	645	612
Portland, OR (Portland International)	21	800	677	662	647	595
Denver, CO (Denver International)	22	817	692	645	583	567
Minneapolis, MN (Minneapolis-St Paul International/Wold-Chamberlain)	23	564	637	562	555	510
Salt Lake City, UT (Salt Lake City International)	24	681	535	497	486	473
Boston, MA (General Edward Lawrence Logan International)	25	638	521	499	481	446
Top 25 airports³		47,520	50,762	51,686	52,359	48,645
United States, all airports⁴		67,807	69,029	69,275	69,476	64,666
Top 25 as % of U.S. total		70.1	73.5	74.6	75.4	75.2

¹Dedicated 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.

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

³Airport rankings change each year. Totals represent the top 25 airports for each year, not necessarily the top 25 airports listed here for 2008.

⁴Limited 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 3-10M. TOP 25 AIRPORTS BY LANDED WEIGHT OF ALL-CARGO OPERATIONS: 2000-2008

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
as of July 7, 2010.

Table 5-7M. Fuel Consumption by Transportation Mode: 1980-2008

	1980	1990	2000	2007	2008
Highway					
Gasoline, diesel and other fuels (million liters)	435,125	494,909	615,273	(R) 666,880	646,349
Truck, total	75,549	92,695	133,342	(R) 146,061	138,922
Single-unit 2-axle 6-tire or more truck	26,204	31,631	36,196	(R) 38,016	37,429
Combination truck	49,345	61,064	97,146	(R) 108,045	101,493
Truck (percent of total)	17.4	18.7	21.7	21.9	21.5
Rail, Class I (in freight service)					
Distillate / diesel fuel (million liters)	14,777	11,790	14,005	15,375	14,709
Water					
Residual fuel oil (million liters)	33,883	23,944	24,262	23,948	19,174
Distillate / diesel fuel oil (million liters)	5,594	7,816	8,558	7,282	4,495
Gasoline (million liters)	3,982	4,921	4,254	4,624	4,301
Pipeline					
Natural gas (million cubic meters)	17,970	18,684	18,185	(R) 17,595	18,348

Key: R = revised.

Notes: 1 liter = 0.2642 gallons; 1 cubic meter = 35.3147 cubic feet.

Table 5-8M. Single-Unit Truck Fuel Consumption and Travel: 1980-2008

	1980	1990	2000	2007	2008
Number registered (thousands)	4,374	4,487	5,926	6,807	6,791
Vehicle kilometers (millions)	64,070	83,523	113,453	(R) 131,983	135,100
Fuel consumed (million liters)	26,204	31,631	36,196	(R) 38,017	37,429
Average kilometers traveled per vehicle	14,649	18,614	19,145	(R) 19,390	19,894
Average kilometers traveled per liter	2.4	2.6	3.1	3.5	3.6
Average fuel consumed per vehicle (liter)	5,991	7,050	6,108	(R) 5,585	5,512

Key: R = revised.

Notes: 1 kilometer = 0.6214 miles; 1 liter = 0.2642 gallons.

TABLE 5-7M. FUEL CONSUMPTION BY TRANSPORTATION MODE: 1980-2008

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/2008/ as of April 20, 2010.

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 2008* (Washington, DC: 2009), tables 2, 4, and similar tables in earlier editions. **Pipeline:** U.S. Department of Energy, *Natural Gas Annual 2008* (Washington, DC: January 2010), table 15 and similar tables in earlier editions.

TABLE 5-8M. SINGLE-UNIT TRUCK FUEL CONSUMPTION AND TRAVEL: 1980-2008

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/2008/ as of April 25, 2010.

Table 5-9M. Combination Truck Fuel Consumption and Travel: 1980-2008

	1980	1990	2000	2007	2008
Number registered (thousands)	1,417	1,709	2,097	2,221	2,216
Vehicle kilometers traveled (millions)	110,521	151,820	217,284	(R) 233,418	230,941
Fuel consumed (million liters)	49,345	61,064	97,145	(R) 108,043	101,493
Average kilometers traveled per vehicle	78,004	88,841	103,635	(R) 105,096	104,222
Average kilometers traveled per liter	2.2	2.5	2.2	2.2	2.3
Average fuel consumed per vehicle (liters)	34,827	35,733	46,334	(R) 48,646	45,803

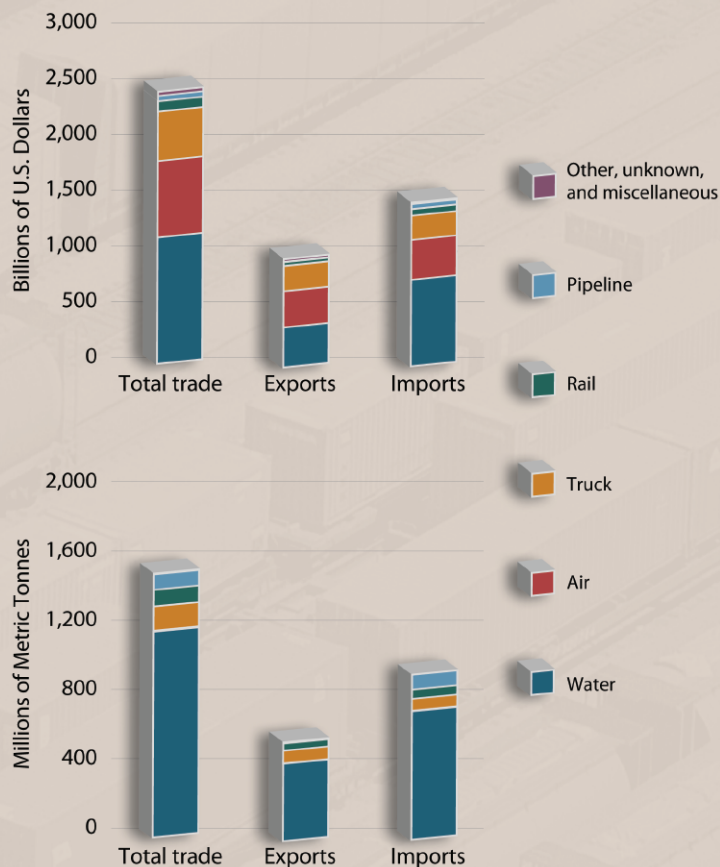
Key: R = revised.

Notes: 1 kilometer = 0.6214 miles; 1 liter = 0.2642 gallons.


TABLE 5-9M. COMBINATION TRUCK FUEL CONSUMPTION AND TRAVEL: 1980-2008

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/2008/ as of April 25, 2010.

Figure 2-2M. U.S. International Merchandise Trade by Transportation Mode: 2009



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 2009 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 TRANSPORTATION MODE: 2009

Sources: Total, water and air data: U.S. Department of Commerce, U.S. Census Bureau, Foreign Trade Division, *FT920*

- *U.S. Merchandise Trade: Selected Highlights* (Washington, DC: January 2010). **Truck, rail, and pipeline data:** U.S.

Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, North American Transborder Freight Data, available at www.bts.gov/transborder as of August 15, 2010. **Other, unknown and miscellaneous data:** special tabulation, August 2010.

Technical Report Documentation Page

1. Report No. FHWA-HOP-10-058	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Freight Facts and Figures 2010		5. Report Date November 2010	
		6. Performing Organization Code	
7. Author(s) Rolf Schmitt and Michael Sprung, FHWA Christopher Rick and Joanne Sedor, Science Applications International Corporation (SAIC)		8. Performing Organization Report No.	
9. Performing Organization Name and Address SAIC 1710 SAIC Drive, McLean, VA 22102		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 environmental 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		18. Distribution Statement	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 76 + Covers	22. Price



Phone: 202-366-9210
Fax: 202-366-3225
Web site: www.ops.fhwa.dot.gov/freight

November 2010

FHWA-HOP-10-058