Freight Facts and Figures 2015

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This 11th edition of *Freight Facts and Figures* was developed by the Bureau of Transportation Statistics. It provides a snapshot of the volume and value of freight flows in the United States; the extent, condition, and performance of 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 to the economy. An electronic version of this publication is available at www.bts.gov and freight.dot.gov.

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 highlights international trade. Chapter 3 describes the extent and condition of the freight transportation system; volumes of freight moving over the system; and the amount of highway, air, rail, port, and pipeline activities required to move that freight. Chapter 4 presents information on transportation system performance and its effect on freight movement. Chapter 5 focuses on the economic characteristics of the transportation industry that operates the system. Chapter 6 covers the safety aspects, energy consumption, and environmental implications of freight transportation.

Several of the tables and figures in this report are based on the Economic Census, which is conducted once every 5 years, except for data tables requiring distance estimation, which are collectively underway for the last Commodity Flow Survey (CFS). The most recently published Census data are for 2012, except for the Vehicle Inventory and Use Survey, which was last conducted in 2002.

Many of the tables and figures are based on the Freight Analysis Framework (FAF), version 3, which builds on the CFS to estimate all freight flows to, from, and within the United States, except shipments that are transported through the United States in trade between foreign countries. Shipments to and from Puerto Rico are included with Latin America data.

The 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. The multiple modes and mail category 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. The multiple modes and mail category also includes small shipments sent via postal and courier services. The other and unknown category primarily comprises unidentified modes but includes miscellaneous categories, such as aircraft delivered to customers and shipments through foreign trade zones. Please visit www.ops.fhwa.dot.gov/freight/freight_analysis/faf for FAF data and documentation.

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I. The Nation Served by Freight

The Nation's 122.5 million households, 7.5 million business establishments, and more than 90,000 governmental units are part of an economy that relies on the efficient movement of freight. Transportation-related purchases and investments accounted for 8.6 percent, or $1.4 trillion, of U.S. GDP in 2013. Foreign trade grew faster than the overall economy, doubling in real value over the same period, reflecting growth in global interconnectivity. Long-term economic growth will require an even greater demand for freight transportation.

Table 1-1 Economic and Social Characteristics of the United States: 1990, 2000, 2010, 2012, and 2013

	1990	2000	2010	2012	2013	Percent change, 1990 to 2013
Resident population (thousands)	248,791	282,172	(R) 309,347	314,112	[1]318,857	28.2
Households (thousands)	**93,347**	**104,705**	**117,538**	**121,084**	**122,459**	**31.2**
Median household income (2013 $)	51,735	56,800	52,646	51,758	51,939	0.4
Civilian labor force (thousands)	125,840	(R) 142,586	(R) 153,885	154,966	155,387	23.5
Employed[2] (thousands)	118,793	(R) 136,901	(R) 139,077	142,467	143,932	21.2
Agriculture, forestry, fishing, and hunting (percent)	1.9	1.8	1.6	1.5	1.5	-22.4
Mining	0.5	0.3	0.5	0.7	0.7	36.5
Construction	6.9	7.3	6.5	6.3	6.4	-6.2
Manufacturing	16.8	14.4	10.1	10.3	10.3	-38.5
Wholesale and retail trade	14.7	14.6	14.2	14.0	13.7	-7.1
Transportation and utilities	5.1	5.4	5.1	5.1	5.2	0.1
Information	2.9	3.0	2.3	2.1	2.1	-29.4
Financial activities	7.1	6.8	6.7	6.7	6.8	-3.4
Professional and business services	9.4	10.0	11.0	11.6	11.7	23.8
Education and health services	17.5	19.1	23.1	22.7	22.6	29.0
Leisure and hospitality	8.0	8.2	9.0	9.3	9.4	17.0
Other services	4.3	4.7	4.9	5.0	5.0	15.0
Public administration	4.7	4.5	5.0	4.7	4.7	-1.7
Business establishments (thousands)	6,176	7,070	7,397	7,432	7,488	31.2
Governments[3]	85,006[4]	87,576[5]	NA	90,056	NA	NA
Gross domestic product (millions of chained 2009 $)	(R) 8,955,000	(R) 12,559,700	(R) 14,783,800	15,369,200	15,710,300	75.4
Foreign trade (millions of chained 2009 $)	(R) 1,366,500	(R) 2,994,600	(R) 4,012,000	4,372,700	4,460,100	226.4
Goods (percent)	NA	(R) 78.7	(R) 75.9	75.9	75.7	NA
Services (percent)	NA	(R) 21.1	(R) 24.1	24.1	24.3	NA

KEY: NA = not available; R = revised.

[1] 2014; 2013 = 316,498 (thousands).

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

[3] Data for governments come from the Census of Governments, which is collected every five years.

[4] 1992.

[5] 2002.

SOURCES: **Population**: U.S. Department of Commerce, Census Bureau, *Population Profile of the United States*, available at www.census.gov/popest/as of September 2015. **Households**: U.S. Department of Commerce, Census Bureau, Families and Living Arrangements, table HH-2, available at www.census.gov/population/www/socdemo/hh-fam.html as of July 2015. **Civilian Labor Force and Employment**: U.S. Department of Labor, Bureau of Labor Statistics, *Labor Force Statistics from the Current Population Survey*, available at www.census.gov/cps/data/ as of July 2015. **Median household income**: U.S. Department of Commerce, Census Bureau, Historical Income Tables, table H-6, available at www.census.gov/hhes/www/income/data/historical/household/index.html as of July 2015. **Business establishments**: U.S. Department of Commerce, Census Bureau, County Business Patterns, available at www.census.gov/econ/cbp/ as of July 2015. **Governmental units**: U.S Department of Commerce, Census Bureau, *Census of Governments*, available at www.census.gov/govs as of July 2015. **Gross domestic product and foreign trade**: U.S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts Table, tables 1.1.6, available at http://www.bea.gov/national/index.htm as of July 2015.

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 13.0 percent between 2000 and 2014, climbing to an estimated 319 million in 2014. The U.S. economy, measured by gross domestic product (GDP), increased by 24.9 percent in real terms (inflation adjusted) between 2000 and 2014.

Table 1-2 Population and Gross Domestic Product (GDP) by Region: 2000, 2010, and 2012–2014

	2000	2010	(R) 2012	2013	2014	Percent change, 2000 to 2014
Resident population (thousands)	282,172	309,347	314,112	316,498	318,857	13.0
Northeast	53,668	55,382	55,832	56,028	56,152	4.6
Midwest	64,494	66,972	67,331	67,568	67,745	5.0
South	100,560	114,871	117,346	118,523	119,772	19.1
West	63,451	72,122	73,602	74,379	75,188	18.5
GDP (millions of chained 2009 $)[1]	12,625,285	14,637,676	15,148,854	15,431,987	15,773,516	24.9
Northeast	3,067,468	3,535,296	3,629,586	3,666,315	3,728,796	21.6
Midwest	2,808,246	3,003,808	3,111,676	3,164,723	3,208,747	14.3
South	4,077,584	4,881,302	5,078,425	5,205,022	5,341,090	31.0
West	2,676,651	3,217,340	3,326,484	3,391,720	3,489,523	30.4
GDP per capita (chained 2009 $)[1]	44,743	47,318	48,228	48,759	49,469	10.6
Northeast	57,157	63,835	65,009	65,437	66,405	16.2
Midwest	43,543	44,851	46,214	46,838	47,365	8.8
South	40,549	42,494	43,277	43,916	44,594	10.0
West	42,185	44,610	45,195	45,601	46,411	10.0

KEY: R = revised.

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

NOTES: Chained dollars are not additive, especially for periods farther away from the base year of 2009. Thus, GDP for all regions is not equal to total GDP. Numbers may not add to totals due to rounding.

SOURCES: **Population**: U.S. Department of Commerce, Census Bureau, Population Division, Annual Population Estimates, table 8, available at www.census.gov/popest/data/index.html as of July 2015. **Gross Domestic Product**: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts, available at www.bea.gov/regional/ as of July 2015.

Although freight moves throughout the United States, the demand for freight transportation is driven primarily by the geographic distribution of population and economic activity. The South has the highest population and the most economic activity. Both population and economic activity have grown faster in the South and West than in the Northeast and Midwest, but the Northeast has the highest economic activity per capita and fastest growth per capita.

II. Freight Moved in Domestic and International Trade

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.

In 2013 the U.S. transportation system moved a daily average of about 55 million tons of freight valued at more than $49.3 billion. After back-to-back declines in 2008 and 2009, the tonnage and value of freight moved in 2013 surpassed prerecession levels by 6.3 percent for tonnage and 6.2 percent for value.

Table 2-1 Weight of Shipments by Transportation Mode: 2007, 2013, and 2040
(millions of tons)

	2007				2013				2040			
	Total	Domestic	Exports[2]	Imports[2]	Total	Domestic	Exports[2]	Imports[2]	Total	Domestic	Exports[2]	Imports[2]
Truck	12,778	12,587	95	97	13,955	13,732	120	103	18,786	18,083	368	335
Rail	1,900	1,745	61	93	1,858	1,681	82	94	2,770	2,182	388	201
Water	950	504	65	381	808	410	89	309	1,070	559	164	347
Air, air & truck	13	3	4	6	15	3	5	7	53	6	20	27
Multiple modes & mail[1]	1,429	433	389	606	1,554	459	559	536	3,575	645	1,546	1,383
Pipeline[1]	1,493	1,314	4	175	1,539	1,391	11	137	1,740	1,257	17	467
Other & unknown	316	266	36	14	333	274	47	13	526	362	130	34
Total	**18,879**	**16,851**	**655**	**1,372**	**20,063**	**17,950**	**914**	**1,199**	**28,520**	**23,095**	**2,632**	**2,794**

[1]2007 total and domestic numbers for the multiple modes & mail and the pipeline categories were revised as a result of Freight Analysis Framework database improvements.

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

NOTES: Numbers may not add to totals due to rounding. The 2013 data are provisional estimates that are based on selected modal and economic trend data. All truck, rail, water, and pipeline movements that involve more than one mode, including exports and imports that change mode at international gateways, are included in multiple modes & mail to avoid double counting. As a consequence, rail and water totals in this table are less than other published sources.

SOURCE: U.S. Department of Transportation (USDOT), Bureau of Transportation Statistics, and USDOT, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.5, 2015.

Table 2-2 Value of Shipments by Transportation Mode: 2007[1], 2013, and 2040
(billions of 2007 dollars)

	2007				2013				2040			
	Total	Domestic	Exports[2]	Imports[2]	Total	Domestic	Exports[2]	Imports[2]	Total	Domestic	Exports[2]	Imports[2]
Truck	10,780	10,225	267	287	11,444	10,841	312	291	21,465	19,315	985	1,166
Rail	512	374	45	93	577	424	54	99	898	555	148	195
Water	340	158	15	167	284	131	20	133	337	138	46	153
Air, air & truck	1,077	151	422	505	1,167	134	425	609	5,043	834	1,997	2,212
Multiple modes & mail[1]	2,884	1,646	394	844	3,065	1,695	500	870	9,925	5,203	1,911	2,811
Pipeline[1]	716	651	4	61	1,083	1,003	15	65	776	605	17	154
Other & unknown	341	252	48	41	363	270	53	40	821	482	199	139
Total	**16,651**	**13,457**	**1,196**	**1,997**	**17,983**	**14,496**	**1,380**	**2,107**	**39,265**	**27,131**	**5,303**	**6,831**

[1]2007 total and domestic numbers for the multiple modes & mail and the pipeline categories were revised as a result of Freight Analysis Framework database improvements.

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

NOTES: Numbers may not add to totals due to rounding. The 2013 data are provisional estimates that are based on selected modal and economic trend data. All truck, rail, water, and pipeline movements that involve more than one mode, including exports and imports that change mode at international gateways, are included in multiple modes & mail to avoid double counting. As a consequence, rail and water totals in this table are less than other published sources.

SOURCE: U.S. Department of Transportation (USDOT), Bureau of Transportation Statistics, and USDOT, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.5, 2015.

The value of freight moved is expected to increase faster than the weight, rising from $882 per ton in 2007 to $1,377 per ton in 2040, when controlling for inflation. Exports at $1,826 per ton and imports at $1,456 per ton are higher than domestic shipments at $799 per ton in 2007. Exports and imports accounted for 10.7 percent of the tons and 19.1 percent of the value in 2007 and are forecast to make up an even greater share of freight moving throughout the United States, reaching 19.0 percent of the tons and 30.9 percent of the value by 2040.

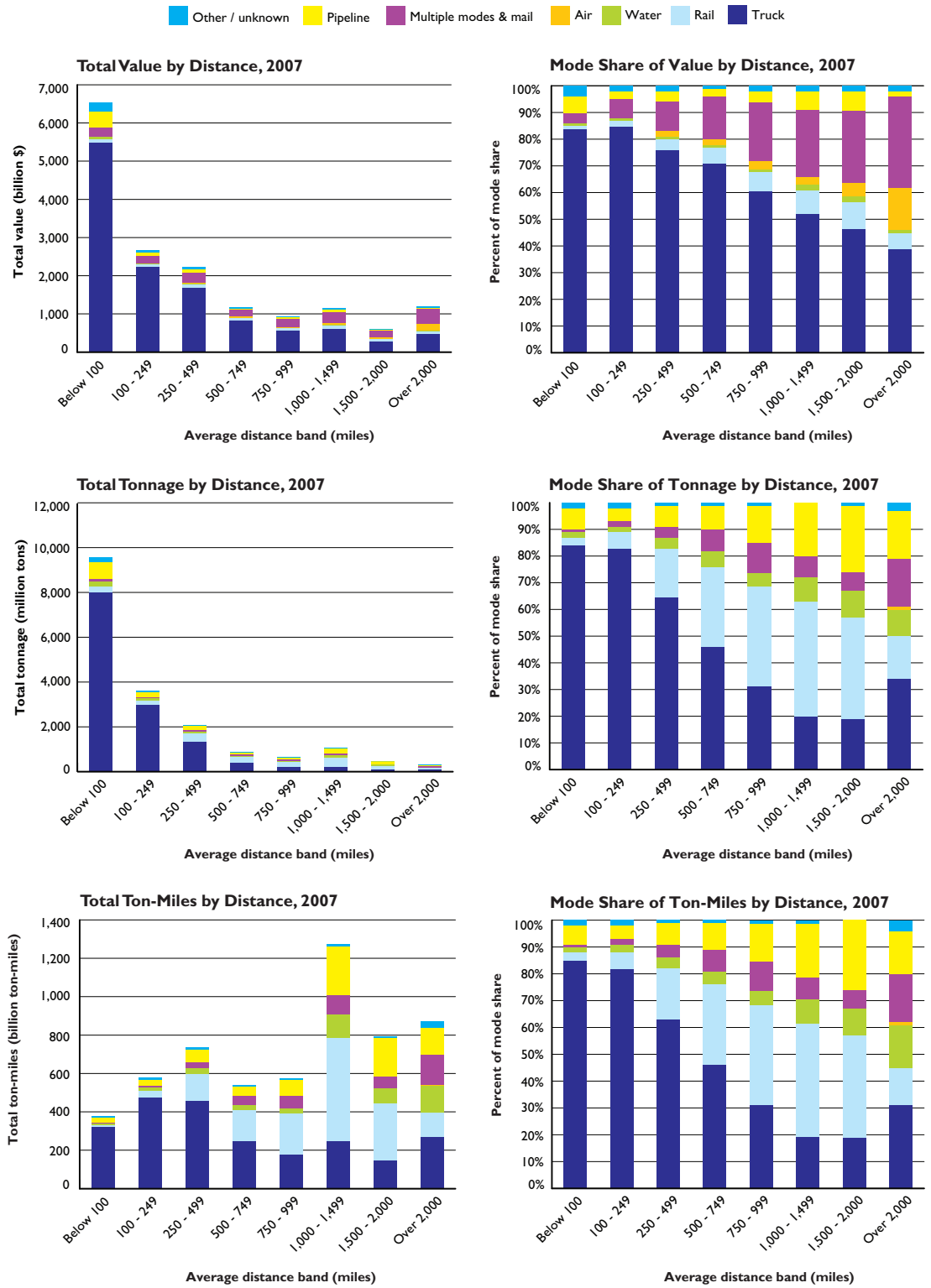
Table 2-3 Total Freight Moved by Distance: 2007

	Value		Weight		Ton-Miles	
Distance band (miles)	Percent	Cumulative percent	Percent	Cumulative percent	Percent	Cumulative percent
Below 100	40	40	51	51	7	7
100 - 249	16	56	19	71	10	17
250 - 499	13	69	11	82	13	29
500 - 749	7	76	5	87	9	39
750 - 999	6	82	4	90	10	49
1,000 - 1,499	7	89	6	96	22	71
1,500 - 2,000	4	93	2	98	14	85
Over 2,000	7	100	2	100	15	100

SOURCE: U.S. Department of Transportation (USDOT), Bureau of Transportation Statistics, and USDOT, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.5, 2015.

The largest percentage of goods movement occurs close to home. Approximately 50 percent of the weight and 40 percent of the value of goods were moved less than 100 miles between origin and destination in 2007. Less than 10 percent of the weight and 18 percent of the value of goods were moved more than 1,000 miles. Distance, as used in this publication, refers to the Great Circle Distance, which is commonly called "as-the-crow-flies."

Figure 2-1 Value, Tons, and Ton-Miles of Freight by Distance: 2007



SOURCE: U.S. Department of Transportation (USDOT), Bureau of Transportation Statistics, and USDOT, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.5, 2015.

Most goods are moved short distances (less than 250 miles), accounting for 55.7 percent of the value, 70.7 percent of the weight, and 16.7 percent of the ton-miles for all shipments within the United States in 2007. Shipments transported more than 250 miles represented less than 30 percent of the tonnage but the vast majority (83.3 percent) of the ton-miles.

Modal shares of freight vary by distance. Trucks carry the largest shares by value, tons, and ton-miles for shipments moving 750 or fewer miles, while rail is the dominant mode by tons and ton-miles for shipments moved from 750 to 2,000 miles. Air, multiple modes and mail, and other/unknown modes accounted for 51.8 percent of the value of shipments moved more than 2,000 miles.

Table 2-4 Top Commodities by Weight and Value: 2013

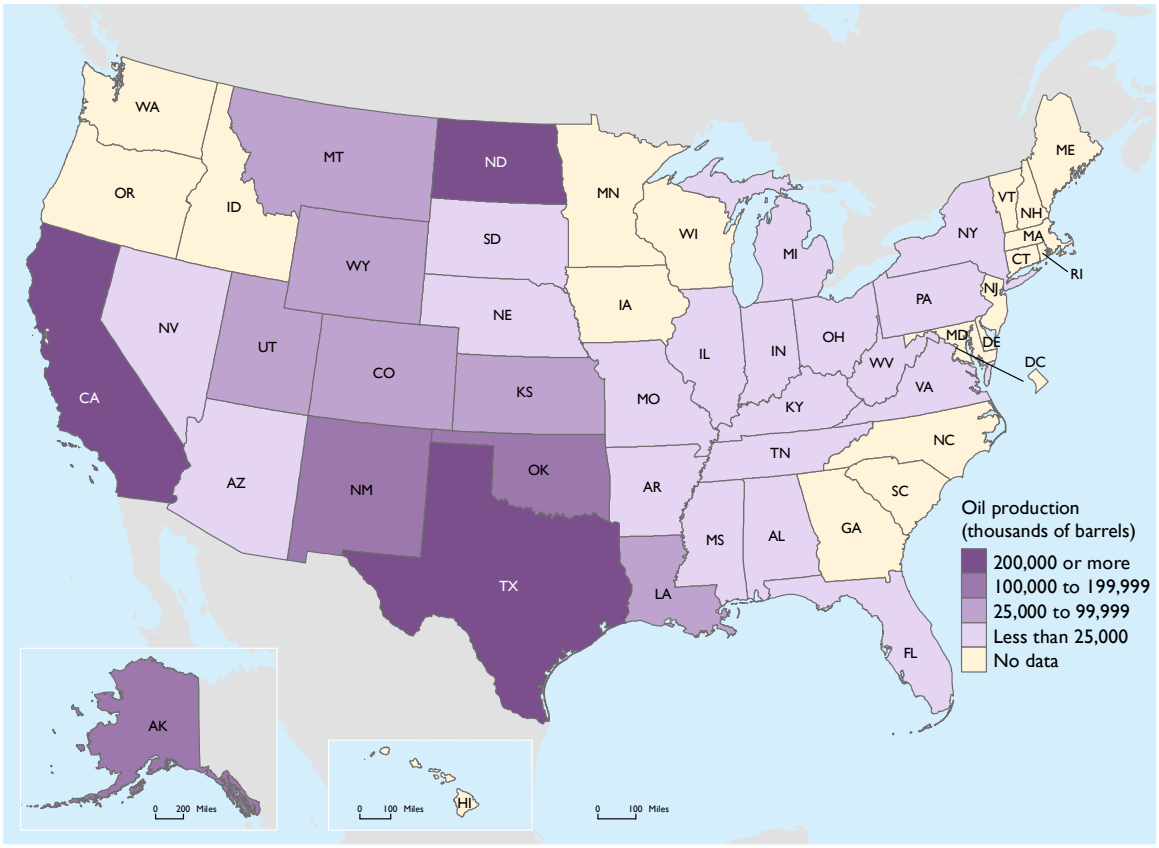
Weight	Millions of tons	Value	Billions of 2007 dollars
Gravel	2,427	Machinery	$1,877
Cereal grains	1,665	Electronics	$1,485
Non-metallic mineral products	1,514	Motorized vehicles	$1,484
Waste/scrap	1,441	Mixed freight	$1,110
Natural gas, coke, asphalt[1]	1,403	Pharmaceuticals	$914
Coal	1,263	Gasoline	$796
Gasoline	1,029	Miscellaneous manufactured products	$740
Crude petroleum	839	Textiles/leather	$736
Fuel oils	757	Natural gas, coke, asphalt[1]	$650
Natural sands	620	Plastics/rubber	$618
Total, all commodities	**20,063**	**Total, all commodities**	**$17,983**

[1]This group includes coal and petroleum products not elsewhere classified such as liquefied natural gas, coke, asphalt, and other products of coal and petroleum refining, excluding gasoline, aviation fuel, and fuel oil.

SOURCE: U.S. Department of Transportation (USDOT), Bureau of Transportation Statistics, and USDOT, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.5, 2015.

The top 10 commodities by weight are comprised entirely of bulk products and accounted for 64.6 percent of total tons but only 16 percent of the value of goods moved in 2013. The top 10 commodities by value accounted for 58.0 percent of total value and 18.8 percent of all tons. The leading commodities by weight are bulk goods including gravel, cereal grains, and non-metallic mineral products. The leading commodities by value are high value-per-ton goods requiring more rapid delivery, including machinery, electronics, and motorized vehicles.

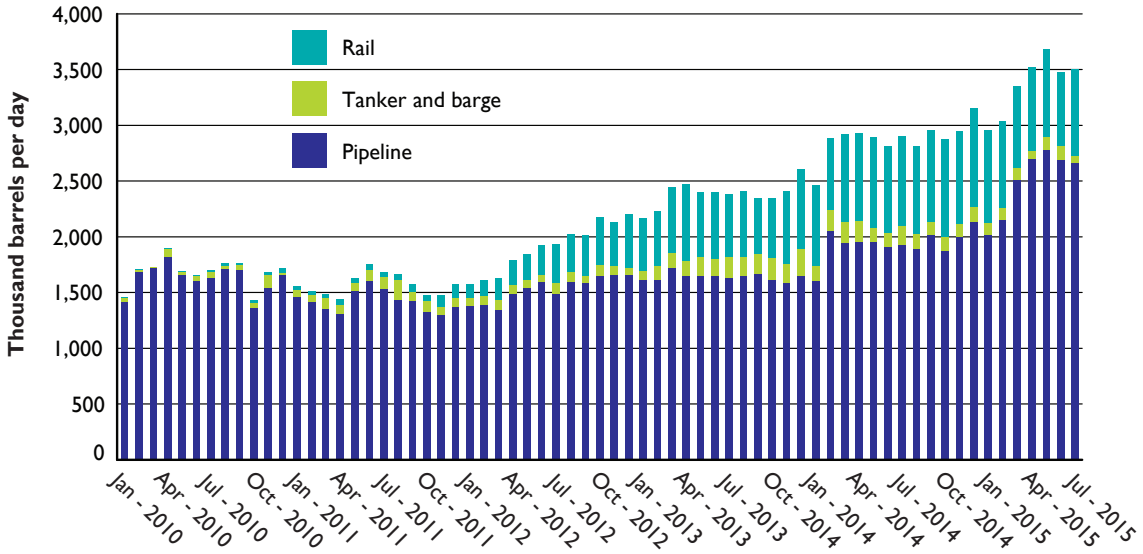
Figure 2-2 Crude Oil Production by State: 2014



SOURCE: U.S. Energy Information Administration, available at www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbbl_a.htm as of October 2015.

A handful of states are responsible for the bulk of domestic oil production. Texas was the largest oil producing state, accounting for 48.9 percent of total U.S. oil production in 2014, while North Dakota is the fastest growing oil producer. North Dakota produced 396.9 million barrels, or 12.5 percent of total U.S. oil production in 2014. California and Alaska are also major oil producing states.

Figure 2-3 Shipments of Crude Oil Moved by Pipeline, Tanker and Barge, and Rail: January 2010–July 2015



SOURCE: U.S. Energy Information Administration based on data from the Surface Transportation Board and other information, October 2015.

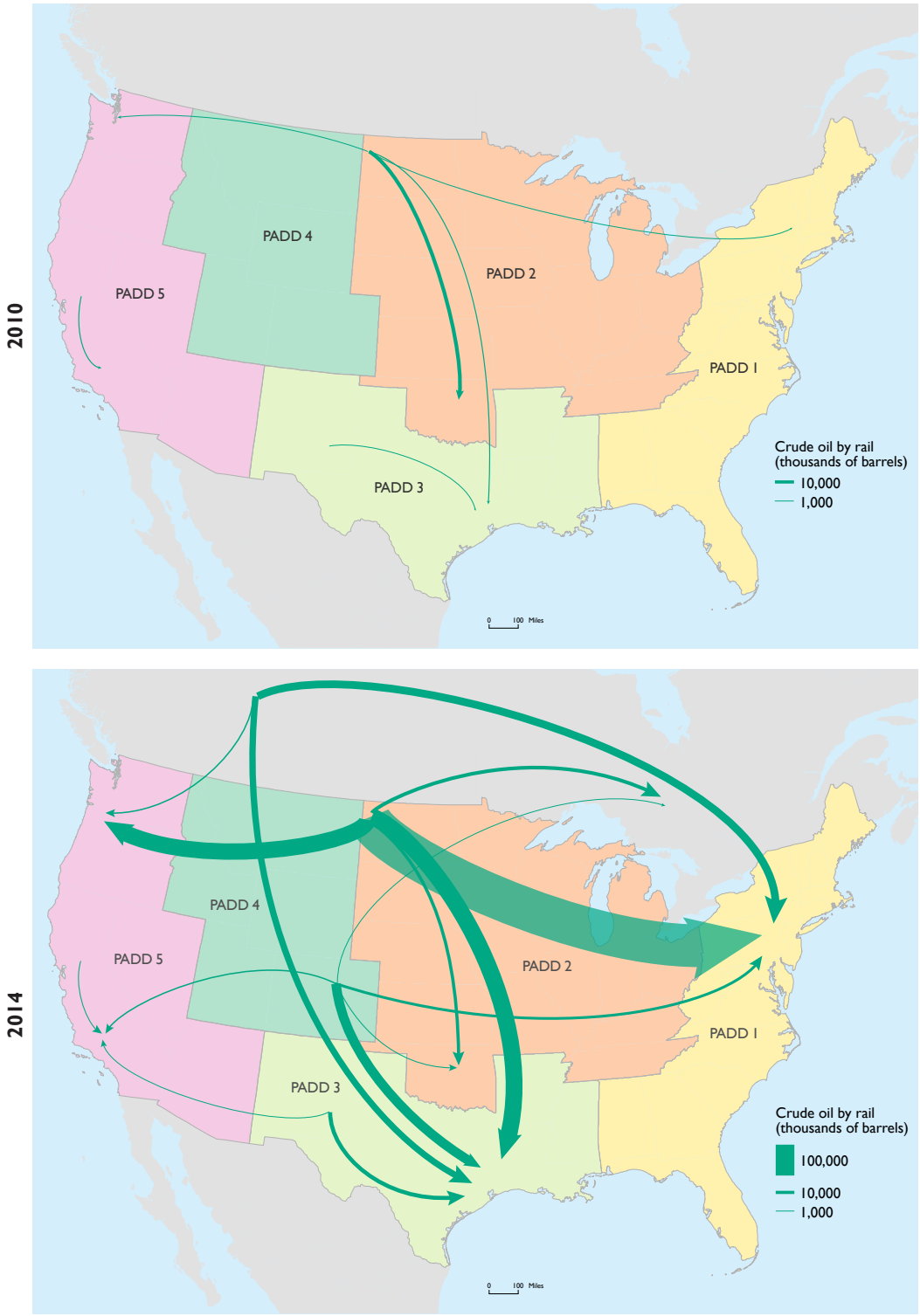
Expanded U.S. oil production and changes in where oil is produced have increased the use of rail and barges to move oil from the wellhead to refineries and terminals for distribution to the final consumer. Although pipelines continue to be the predominant mode for moving oil, rail shipments have increased substantially in recent years. Regional oil shipments by rail increased from less than 1 percent in the first 6 months of 2010 to 22.6 percent in the first 6 months of 2015. Tankers and barges move crude oil on U.S. inland waterways, from port to port along the coast, or on the Great Lakes. The use of tankers and barges for oil transport has risen as well, from 2.1 percent in the first 6 months of 2010 to 3.2 percent in the first 6 months of 2015.

According to the Energy Information Administration, total oil shipments by rail, increased from 20.3 million barrels in 2010 to 383.2 million barrels, or more than 1 million barrels/day, in 2014. Rising oil production in the Bakken formation, located in North Dakota, has accounted for the majority of new rail shipments to refineries or uploading terminals. Albany, NY, is a major hub for oil shipments by rail from North Dakota because of its close proximity to east coast refineries and its links to the Midwest via rail.

Establishment of PADD

During World War II, the United States was divided into five districts to organize the rationing of gasoline and other petroleum products. Today those same regions are called Petroleum Administration for Defense Districts (PADDs). PADDs are used to analyze patterns of crude oil and petroleum product movements throughout the nation.

Figure 2-4 Crude Oil Shipments by Rail: 2010 and 2014 (PADD to PADD)



NOTE: Crude-by-rail movements greater than 1,000 barrels per day are represented on the map and the arrows are illustrative; PADD denotes Petroleum Administration for Defense District.

SOURCE: U.S. Energy Information Administration Petroleum Administration for Defense Districts based on data from the Surface Transportation Board and other information, October 2015.

As measured by the Bureau of Transportation Statistics (BTS), the Commodity Flow Survey indicates that trucks moved 59.4 percent of the tonnage and 62.8 percent of the value of all hazardous materials shipped from within the United States in 2012. However, truck ton-miles of hazardous materials shipments accounted for a much smaller share, about one-third of all ton-miles, because such shipments travel relatively short distances. By contrast, rail accounted for only 4.3 percent of hazardous materials shipments by weight but 27.6 percent of ton-miles.

Table 2-5 Hazardous Materials Shipments by Transportation Mode: 2012

	Value		Tons		Ton-miles[1]		Miles
Transportation mode	$ Billions	Percent	Millions	Percent	Billions	Percent	Average distance per shipment
All modes, total	**2,334.4**	**100.0**	**2,580.2**	**100.0**	**307.5**	**100.0**	**114**
Single modes, total	**2,304.7**	**98.7**	**2,552.9**	**98.9**	**275.6**	**89.6**	**68**
Truck[2]	1,466.0	62.8	1,531.4	59.4	96.6	31.4	56
For-hire	870.9	37.3	882.3	34.2	62.0	20.2	150
Private	595.1	25.5	649.1	25.2	34.5	11.2	33
Rail	79.2	3.4	111.0	4.3	84.9	27.6	808
Water	217.8	9.3	283.6	11.0	54.9	17.9	212
Air	4.4	0.2	0.3	Z	0.3	0.1	1,120
Pipeline[3]	537.3	23.0	626.7	24.3	S	S	S
Multiple modes, total	**29.7**	**1.3**	**27.3**	**1.1**	**31.9**	**10.4**	**654**
Truck and rail	13.3	0.6	17.0	0.7	16.6	5.4	954
Truck and water	S	S	S	S	S	S	1,181
Rail and water	2.5	0.1	4.6	0.2	1.4	0.4	S
Parcel, U.S. Postal Service, or Courier	10.3	0.4	0.3	Z	0.2	0.1	650
Other multiple modes	0.0	0.0	0.0	0.0	0.0	0.0	0
Other modes	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0**

KEY: S = data are not published because estimate did not meet publication standards; Z = rounds to zero.

[1] Ton-miles estimates are based on estimated distances traveled along a modeled transportation network.

[2] Truck as a single mode includes shipments that went by private truck only or by for-hire truck only.

[3] Excludes crude petroleum shipments.

NOTES: Value-of-shipment estimates have not been adjusted for price changes. Numbers and percents may not add to totals due to rounding.

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, *2012 Commodity Flow Survey*, Hazardous Materials (Washington, DC: February 2015), table 1a, available at www.census.gov/econ/cfs/2012/ec12tcf-us-hm.pdf as of July 2015.

Table 2-6 Hazardous Materials Shipments by Hazard Class: 2012

		Value		Tons		Ton-miles[1]		Miles
Hazard class	Description	$ Billions	Percent	Millions	Percent	Billions	Percent	Average distance per shipment
Class 1	Explosives	18.4	0.8	4.0	0.2	1.0	0.3	840
Class 2	Gases	125.1	5.4	164.8	6.4	33.2	10.8	57
Class 3	Flammable liquids	2,016.7	86.4	2,203.5	85.4	204.6	66.5	93
Class 4	Flammable solids	5.4	0.2	11.3	0.4	5.8	1.9	565
Class 5	Oxidizers and organic peroxides	7.6	0.3	12.0	0.5	5.5	1.8	437
Class 6	Toxic (poison)	15.2	0.7	7.6	0.3	3.6	1.2	513
Class 7	Radioactive materials	12.3	0.5	S	S	0.4	Z	34
Class 8	Corrosive materials	75.9	3.2	125.3	4.9	37.8	12.3	264
Class 9	Miscellaneous dangerous goods	58.0	2.5	51.0	2.0	16.1	5.2	530
Total		**2,334.4**	**100.0**	**2,580.2**	**100.0**	**307.5**	**100.0**	**114**

KEY: S = data are not published because of high sampling variability or other reasons; Z = rounds to zero.

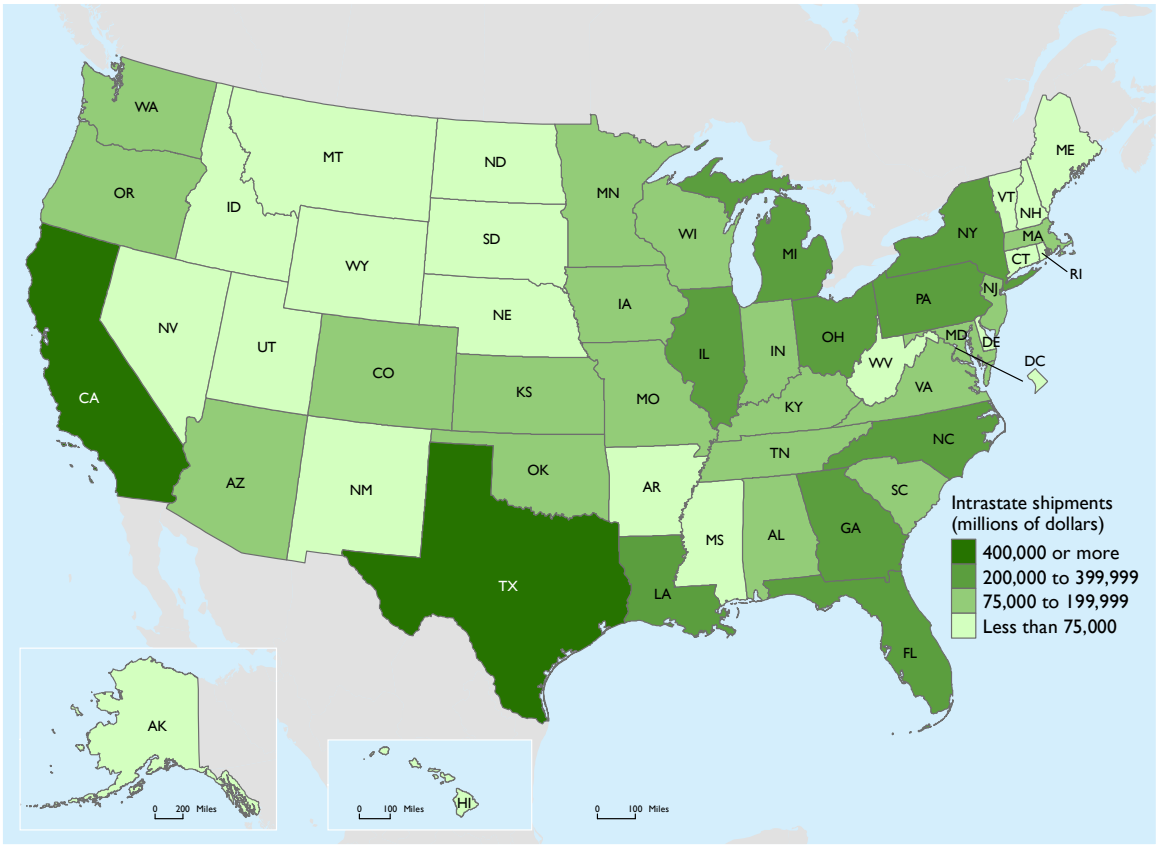
[1] Ton-miles estimates are based on estimated distances traveled along a modeled transportation network.

NOTES: Value-of-shipments estimates have not been adjusted for price changes. Numbers and percents may not add to totals due to rounding.

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, *2012 Commodity Flow Survey*, Hazardous Materials (Washington, DC: February 2015), table 2a, available at www.census.gov/econ/cfs/2012/ec12tcf-us-hm.pdf as of July 2015.

Flammable liquids, especially gasoline, are the predominant hazardous materials transported in the United States in 2012. In terms of ton-miles, flammable liquids account for about 66.5 percent of hazardous materials shipments. The next largest class of hazardous materials, in terms of ton-miles, is corrosive material at 12.3 percent, followed by gases at about 10.8 percent.

Figure 2-5 Value of Shipments Within a State: 2013

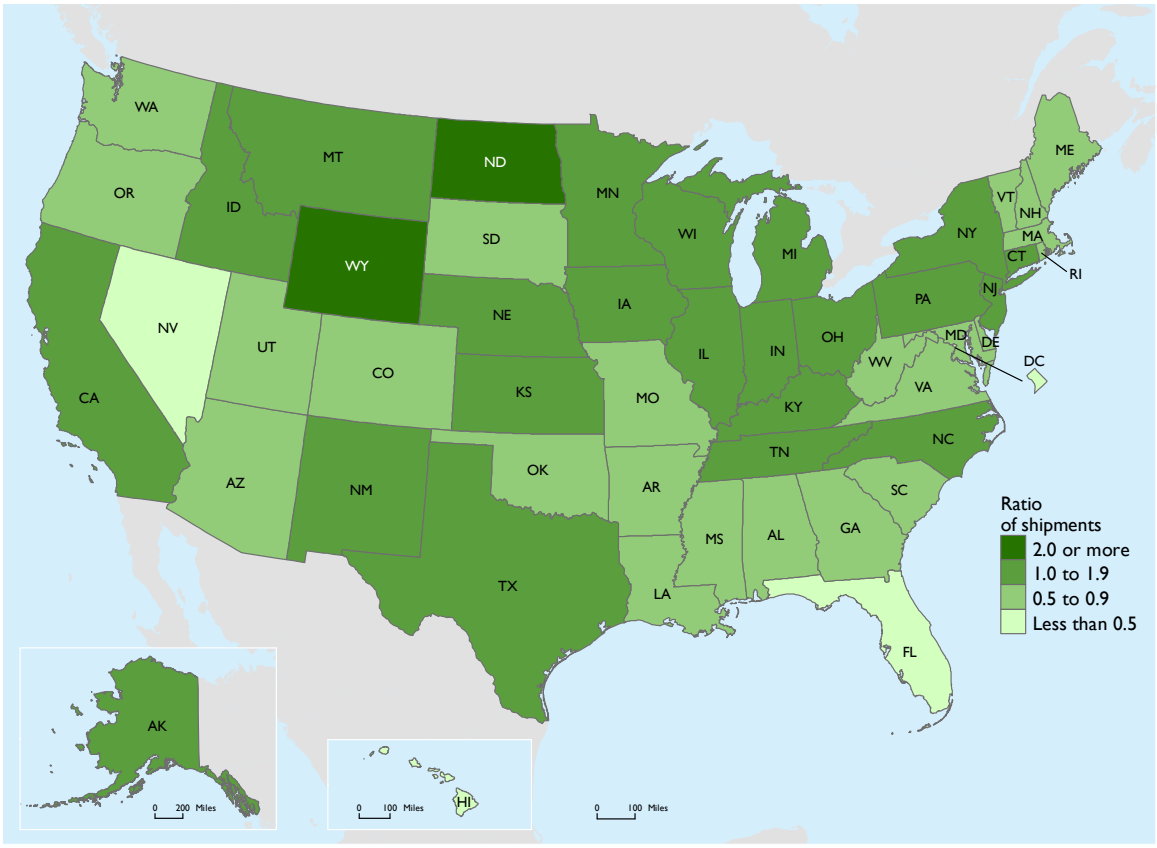


NOTE: Foreign imports and exports are not considered within state shipments.

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics and Federal Highway Administration, Freight Analysis Framework, version 3.6, available at http://faf.ornl.gov/fafweb/FUT.aspx as of September 2015.

Local transportation is important to state commerce. Its importance is especially evident in Texas and California. In 2013, 66.8 percent of the value of domestic shipments originating in Texas was shipped to destinations within the state. In California, intrastate shipments accounted for 69.9 percent of the value. Trucks moved 58.2 percent and 78.0 percent of intrastate shipments by value in Texas and California, respectively. For all 50 states and the District of Columbia, an average of 52.8 percent of shipments stayed in-state.

Figure 2-6 Ratio of Outbound to Inbound Shipments by Value: 2013



NOTE: Foreign imports and exports are not considered within state shipments.

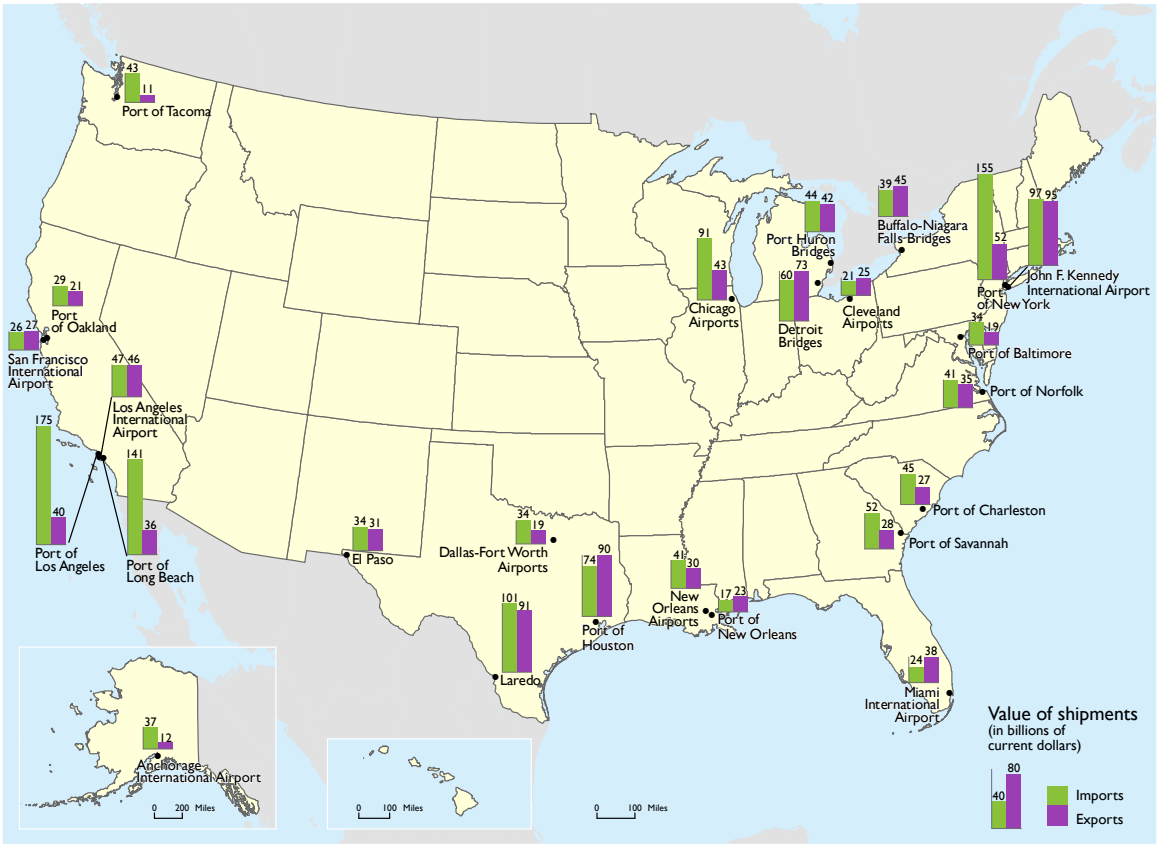
SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics and Federal Highway Administration, Freight Analysis Framework, version 3.6, available at http://faf.ornl.gov/fafweb/FUT.aspx as of September 2015.

The picture changes when looking at the ratio of the value of shipments destined for markets within or outside a state. A ratio greater than 1.0 indicates that a state has positive net exports of domestic trade, whereas a ratio less than 1.0 indicates that a state imports more goods from other states than it ships. North Dakota and Wyoming have the highest ratio of 2.0 or more. Both North Dakota and Wyoming have relatively small populations and are major producers of energy commodities: oil in North Dakota and coal in Wyoming. In 2013 intrastate shipments in North Dakota and Wyoming accounted for 29.7 and 26.2 percent, respectively, of total shipments originating in those states. Hawaii has the lowest ratio of interstate outbound-to-inbound shipments at 0.09 due to its unique isolated geography, while Florida and Nevada's low ratios are partly due to demographics.

Trade

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. In 2014 the top 25 foreign-trade gateways as measured by value of shipments consist of 11 water ports, 5 land-border crossings, and 9 air gateways.

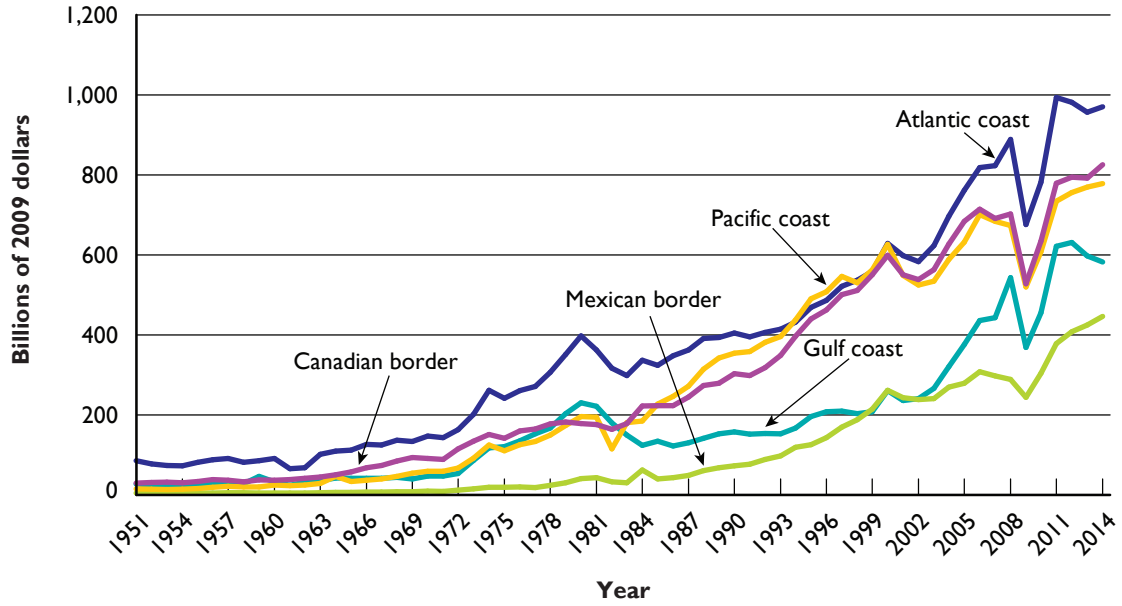
Figure 2-7 Top 25 U.S.-International Trade Freight Gateways by Value of Shipments: 2014



NOTES: All data: Trade levels reflect the mode of transportation as a shipment enters or exits at a border port. Flows through individual ports are based on reported data collected from U.S. trade documents. Trade does not include low-value shipments. (In general, these are imports valued at less than $1,250 and exports that are valued at less than $2,500). Air: 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. In addition, due to U.S. Census Bureau confidentiality regulations, data for courier operations are included in the airport totals for JFK International Airport, Cleveland, New Orleans, Los Angeles, Chicago, Miami, and Anchorage. To further protect data for individual couriers, data for Memphis is included with New Orleans and data for Louisville is included with Cleveland.

SOURCES: **Air**: U.S. Department of Commerce, U.S. Census Bureau, Foreign Trade Division, USA Trade Online, October 2015; Water: U.S. Army Corps of Engineers, Navigation Data Center, special tabulation, October 2015; **Land**: U.S. Department of Transportation, Bureau of Transportation Statistics, North American TransBorder Freight Data, available at www.bts.gov/programs/international/transborder/ as of October 2015.

Figure 2-8 Value of U.S. International Merchandise Trade by Coasts and Borders 1951–2014

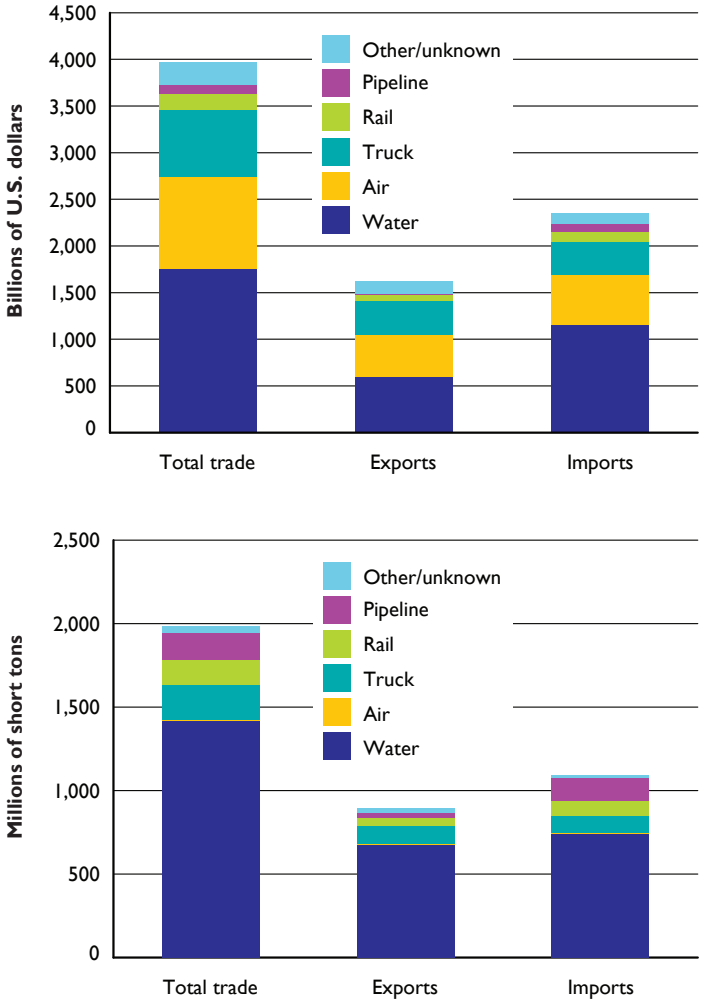


NOTES: The value of coal shipments through Mobile, AL; Charleston, SC; and Norfolk, VA are considered proprietary information and are consolidated. The total value of coal exports for the above three cities are included under the Atlantic Coast Customs District.

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); **1971-1999**: U.S. Department of Commerce, Census Bureau, *Statistical Abstract of the United States* (Washington, DC: annual issues); **2000-2015**: 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 June 2015.

Foreign trade has had a major impact on all U.S. borders and coasts. Since 1951 the value of merchandise trade has grown by twenty-fold in inflation-adjusted terms. In 2014 ports and airports on the Atlantic coast accounted for the largest share (27.0 percent) in terms of the value of trade.

Figure 2-9 U.S. International Merchandise Trade Value by Transportation Mode: 2014



NOTES: 1 short ton = 2,000 pounds. The U.S. Department of Transportation (USDOT), Bureau of Transportation Statistics estimated 2012 weight data for truck, rail, pipeline, and other and unknown 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.

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: February 2015). **Truck, rail, pipeline, and other and unknown data**: U.S. Department of Transportation, Bureau of Transporation Statistics, North American Transborder Freight Data, available at www.bts.gov/transborder as of June 2015.

Waterborne transportation carried nearly half (44.2 percent) of U.S. foreign trade as measured by value in 2014. Air moved 24.8 percent and truck moved 18.0 percent. By weight, 71.6 percent of tonnage was moved by water, followed by truck (10.4%), pipeline (8.0%), and rail (7.5%).

Table 2-7 Domestic Mode of Exports and Imports by Weight and Value: 2007, 2013, and 2040

	Millions of tons			Billions of 2007 dollars		
	2007	2013	2040	2007	2013	2040
Total	**2,027**	**2,113**	**5,426**	**3,193**	**3,487**	**12,134**
Truck[1]	749	815	2,365	1,968	2,104	7,852
Rail	279	334	957	200	221	573
Water	151	159	268	54	49	94
Air, air & truck[2]	2	2	10	206	198	892
Multiple modes & mail[3]	149	198	509	278	376	1,250
Pipeline	346	301	899	137	138	350
Other & unknown	51	61	168	220	293	1,016
No domestic mode[4]	300	242	250	130	106	108

[1]Excludes truck moves to and from airports.
[2]Includes truck moves to and from airports.
[3]Multiple modes & mail includes U.S. Postal Service, courier shipments, and all intermodal combinations, except air and truck. In this table, ocean-going export and import shipments that move between ports and domestic locations by single modes are classified by the domestic mode rather than by multiple modes & mail.
[4]No 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.

SOURCE: U.S. Department of Transportation (USDOT), Bureau of Transportation Statistics, and USDOT, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.5, 2015.

The movement of international trade goods within the United States 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. This trend is expected to continue with tonnage of international trade forecast to grow at a rate of 3.4 percent per year between 2007 and 2040.

Table 2-8 Top 25 Trading Partners of the United States in Merchandise Trade: 2000, 2010, 2013, and 2014
(billions of 2009 U.S. dollars)

Partner	2014 rank	2000	2010	2013	2014
Canada	1	495	520	594	608
China	2	142	451	527	545
Mexico	3	302	389	475	494
Japan	4	259	179	191	186
Germany	5	107	129	152	159
South Korea	6	83	87	98	105
United Kingdom	7	104	97	94	100
France	8	61	65	73	72
Brazil	9	36	59	67	67
Taiwan	10	79	61	59	62
India	11	18	48	60	62
Saudi Arabia	12	25	42	66	61
Netherlands	13	39	53	58	60
Italy	14	44	42	52	55
Belgium	15	29	41	48	51
Switzerland	16	25	39	52	50
Singapore	17	45	46	45	43
Hong Kong	18	32	30	45	43
Malaysia	19	45	39	38	40
Ireland	20	29	41	36	39
Venezuela	21	30	43	42	38
Thailand	22	28	31	36	36
Colombia	23	13	27	37	36
Israel	24	25	32	34	35
Australia	25	23	30	33	34
Top 25 total[1]		**2,133**	**2,630**	**3,013**	**3,081**
U.S. total trade		**2,439**	**3,153**	**3,605**	**3,665**
Top 25 as % of total		**87.5**	**83.4**	**83.6**	**84.1**

[1]Top 25 trading partners change each year. Totals represent the top 25 trading partners for each year, not necessarily the top 25 trading partners listed here for 2014.

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

SOURCE: U.S. Department of Commerce, International Trade Administration, TradeStats Express, available at www.trade.gov/mas/ian/tradestatistics/ as of July 2015. **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 July 2015.

Canada is the top U.S. trading partner followed by China and Mexico. China's share of U.S. foreign trade more than doubled between 2000 and 2014, from about 5.8 percent in 2000 to 14.9 percent in 2014.

Table 2-9 Value and Weight of U.S. Merchandise Trade with Canada and Mexico: 2000, 2010, 2013, and 2014

(billions of current U.S. dollars and millions of short tons)

	2000		2010		2013		2014	
Mode	**Value**	**Weight**	**Value**	**Weight**	**Value**	**Weight**	**Value**	**Weight**
Truck[1]	429	NA	560	176	684	196	715	206
Rail[1]	94	NA	131	114	175	143	178	150
Air	45	<1	45	<1	43	<1	44	<1
Water	33	194	81	210	103	198	104	212
Pipeline[1]	24	NA	65	107	84	140	94	160
Other[1]	29	NA	37	8	51	33	58	40
Total[1]	**653**	**NA**	**920**	**614**	**1,140**	**709**	**1,193**	**767**

KEY: NA = not available.

[1] The U.S. Department of Transportation, 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.

NOTES: 1 short ton = 2,000 pounds. "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.

SOURCES: **Truck, Rail, Pipeline, and Other**: U.S. Department of Transportation, Bureau of Transportation Statistics, North American Transborder Freight Data, available at www.bts.gov/transborder as of June 2015; **Air and Water**: U.S. Department of Commerce, Census Bureau, Foreign Trade Division, *FT920 - U.S. Merchandise Trade: Selected Highlights* (Washington, DC: annual issues).

U.S. trade with both Canada and Mexico has grown rapidly since 2000. By weight water was the most utilized mode, carrying 27.6 percent of goods, followed by truck, which carried 26.8 percent.

Table 2-10 Value of U.S. Exports to and Imports from Canada and Mexico by Land Transportation Mode: 2000, 2010, 2013, and 2014

(millions of 2009 U.S. dollars)

	2000	2010	2013	2014
Exports to Canada, total	**189,097**	**222,875**	**253,806**	**256,256**
Truck	158,541	174,443	194,705	189,176
Rail	15,810	25,767	31,845	32,135
Pipeline	197	3,847	7,137	9,501
Other[1]	14,549	18,767	20,064	25,400
Mail	<1	52	56	44
Exports to Mexico, total	**118,649**	**137,562**	**179,175**	**188,905**
Truck	100,613	109,992	140,892	148,721
Rail	12,817	19,423	26,026	27,314
Pipeline	369	2,074	3,469	4,415
Other[1]	4,851	6,072	8,788	8,454
Mail	<1	1	<1	<1
Imports from Canada, total	**256,780**	**244,443**	**279,190**	**289,776**
Truck	156,088	121,823	131,653	137,686
Rail	60,692	56,231	66,915	64,047
Pipeline	28,230	58,053	67,553	72,813
Other[1]	11,688	7,183	7,773	9,298
Mail	5	<1	<1	<1
FTZ[2]	77	1,153	5,297	5,932
Imports from Mexico, total	**138,527**	**179,214**	**218,308**	**230,005**
Truck	108,281	147,196	173,303	184,340
Rail	25,714	28,141	39,419	40,735
Pipeline	14	179	227	190
Other[1]	1,922	1,856	1,788	1,764
Mail	<1	<1	<1	<1
FTZ[2]	2,596	1,841	3,571	2,976

[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.

[2]Foreign Trade Zones (FTZs) were added as a mode of transport for land import shipments beginning in April 1995. Although FTZs are treated as a mode of transportation in the North American 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.

SOURCES: 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 2015. **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 June 2015.

Trucks transport the largest share of total trade value with Canada and Mexico, followed by rail as the second largest mover of freight moving across both U.S. land borders. Pipelines also carry a large volume of imports from Canada.

Table 2-11 Number of Incoming Trucks, Trains, and Loaded Containers Crossing the U.S.-Mexico and U.S.-Canada Borders: 2000, 2005, and 2010–2014

(thousands)

	2000	2005	2010	2011	2012	2013	2014
Canadian border							
Trucks	7,048	6,784	5,444	5,490	5,624	5,649	5,802
Loaded truck containers	5,335	5,819	4,171	4,049	4,069	4,083	4,145
Trains	33	33	26	27	29	29	29
Loaded rail containers	1,215	1,458	1,209	1,288	1,432	1,534	1,575
Mexican border							
Trucks	4,526	4,676	4,743	4,868	5,104	5,195	5,415
Loaded truck containers	2,350	3,031	3,174	3,277	3,460	3,499	3,779
Trains	7	9	8	8	9	9	10
Loaded rail containers	266	336	318	359	400	442	474

NOTE: Trains include both passenger and freight trains.

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, based on data from the Department of Homeland Security, U.S. Customs and Border Protection, Office of Field Operations, available at http://transborder.bts.gov/programs/international/transborder/TBDR_BC/TBDR_BC_Index.html as of July 2015.

In 2014, 5.4 million trucks hauled nearly 3.8 million loaded containers into the United States from Mexico, an increase of 19.6 and 60.8 percent, respectively, over 2000 levels. This traffic growth reflects a substantial rise in U.S.-Mexico trade, as shown in tables 2-9 and 2-10. In contrast, the number of incoming trucks and loaded containers from Canada declined by 17.7 and 22.3 percent, respectively, while incoming loaded rail containers increased by 29.6 percent between 2000 and 2014.

III. The Freight Transportation System

Freight travels over an extensive network 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 the system as more segments of the network approach or reach capacity, increasing maintenance requirements and affecting performance.

Extent

Road infrastructure increased slightly despite a 28.2 percent increase in population over the 1990 to 2013 period (see table 1-1). The number of Class 1 rail miles declined by 28.6 percent while gas pipeline mileage increased by 24.0 percent over the same period.

Table 3-1 Miles of Infrastructure by Transportation Mode: 1990, 2000, and 2010–2013

	1990	2000	2010	2011	2012	2013
Public roads, route miles	**3,866,926**	**3,951,101**	**NA**	**3,929,425**	**4,092,730**	**4,115,462**
National Highway System (NHS)	N	161,189	NA	163,741	222,946	227,224
Interstates	45,074	46,673	NA	46,960	47,432	47,575
Other NHS	N	114,516	NA	116,781	175,514	179,650
Other	N	3,789,912	NA	3,765,684	3,869,784	3,888,238
Strategic Highway Corridor Network (STRAHNET)[1]	**N**	**62,066**	**NA**	**63,887**	**64,627**	**62,595**
Interstate	N	46,675	NA	46,960	47,432	47,574
Non-Interstate	N	15,389	NA	16,927	17,195	15,021
Railroad[2]	**175,909**	**170,512**	**138,576**	**138,518**	**138,477**	**NA**
Class I	133,189	120,597	95,573	95,387	95,264	95,134
Regional	18,375	20,978	10,407	10,355	10,355	NA
Local	24,337	28,937	32,596	32,776	32,858	NA
Inland waterways						
Navigable channels	11,000	11,000	11,000	11,000	11,000	11,000
Great Lakes-St. Lawrence Seaway	2,342	2,342	2,342	2,342	2,342	2,342
Pipelines						
Oil	208,752	176,996	(R) 177,398	(R) 178,816	181,353	187,203
Gas	1,270,295	1,377,320	(R) 1,554,141	(R) 1,563,340	1,567,000	1,575,087

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

[1]The Strategic Highway Corridor Network (STRAHNET) is the total minimum public highway network necessary to support deployment needs of the U.S. Department of Defense.

[2]Class I railroads have annual carrier operating revenue in 2013 of $467.1 million or more. Regional (Class II) railroads have annual carrier operating revenue in 2013 greater than $37.4 million and less than $433.2 million. Local (Class III) railroads have annual carrier operating revenue in 2013 below $37.4 million.

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/2013/ as of July 2015. **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 July 2015. **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 July 2015. **Pipelines: 1980**: Eno Transportation Foundation, *Transportation in America*, 2002 (Washington, DC: 2002). **1990-2013**: 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 July 2015.

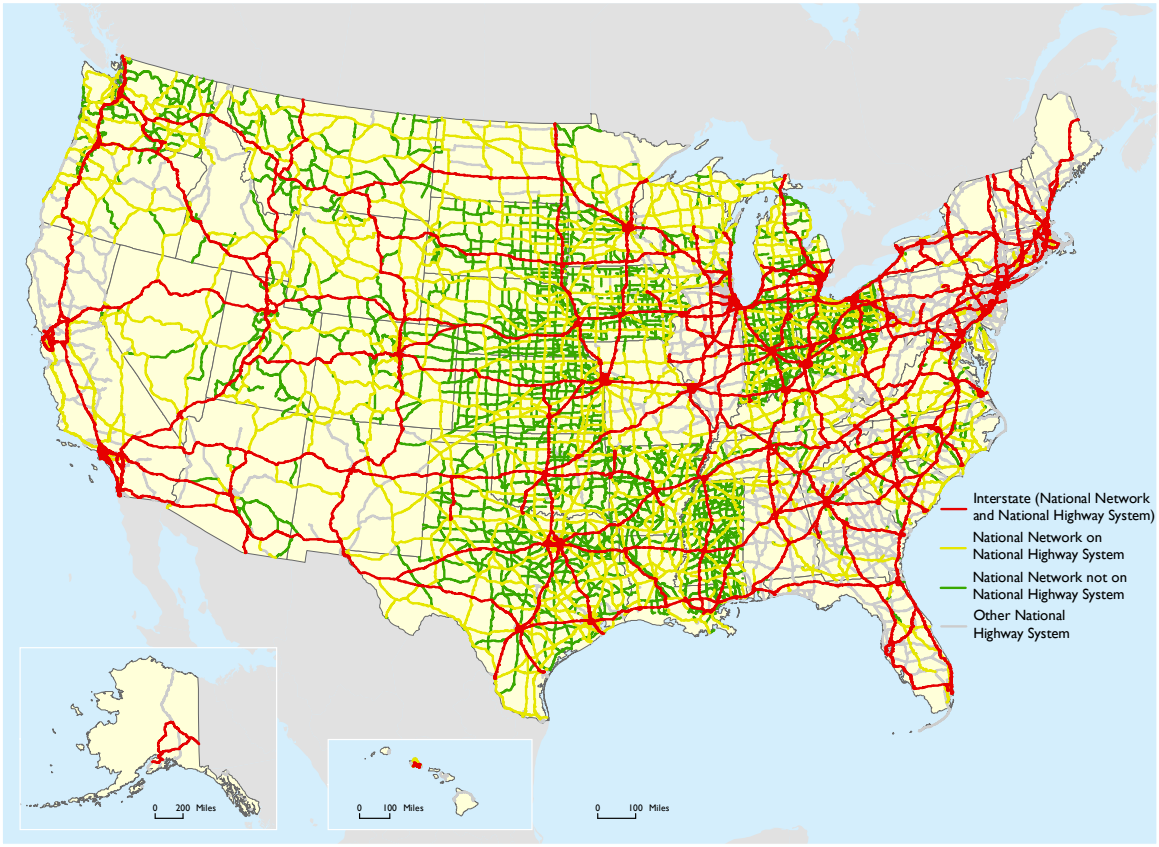
Table 3-2 Freight Intermodal Connectors on the National Highway System by State: 2014

State	Port terminal	Truck/ rail facility	Airport	Truck/ pipeline terminal
Total	**329**	**269**	**268**	**68**
Alabama	5	4	4	1
Alaska	8	0	7	0
Arizona	0	2	4	0
Arkansas	3	7	3	3
California	17	15	14	3
Colorado	0	5	6	4
Connecticut	3	0	1	0
Delaware	1	0	1	0
Florida	14	12	25	0
Georgia	5	13	4	7
Hawaii	10	0	5	0
Idaho	1	0	2	1
Illinois	9	43	4	0
Indiana	8	2	5	0
Iowa	6	1	3	3
Kansas	0	4	1	2
Kentucky	4	7	3	3
Louisiana	9	9	8	0
Maine	3	4	5	0
Maryland	8	3	1	3
Massachusetts	5	10	12	0
Michigan	15	8	11	0
Minnesota	1	1	3	0
Mississippi	22	2	3	0
Missouri	4	8	4	0
Montana	0	0	1	0
Nebraska	0	2	1	1
Nevada	0	0	2	0
New Hampshire	1	0	4	0
New Jersey	5	5	2	0
New Mexico	0	0	1	0
New York	8	16	16	0
North Carolina	2	4	9	5
North Dakota	0	0	2	0
Ohio	29	19	8	4
Oklahoma	3	1	2	1
Oregon	15	5	6	1
Pennsylvania	8	8	5	4
Puerto Rico	5	0	4	0
Rhode Island	2	0	1	0
South Carolina	4	2	4	0
South Dakota	0	2	3	0
Tennessee	5	8	4	2
Texas	43	20	23	18
Utah	0	2	1	2
Vermont	0	2	2	0
Virginia	6	3	7	0
Washington	11	6	14	0
West Virginia	2	0	2	0
Wisconsin	19	4	5	0
Wyoming	0	0	0	0

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Office of Planning, Environment, and Realty, Intermodal Connectors, available at www.fhwa.dot.gov/planning/national_highway_system/intermodal_connectors/ as of July 2015.

Intermodal connectors provide access between major intermodal facilities, such as ports and truck/pipeline terminals, and the National Highway System (NHS). Although intermodal connectors account for about one-half of one percent of total NHS mileage (1,222 miles), they handle a large volume of trucks.

Figure 3-1 National Network for Conventional Combination Trucks: 2014

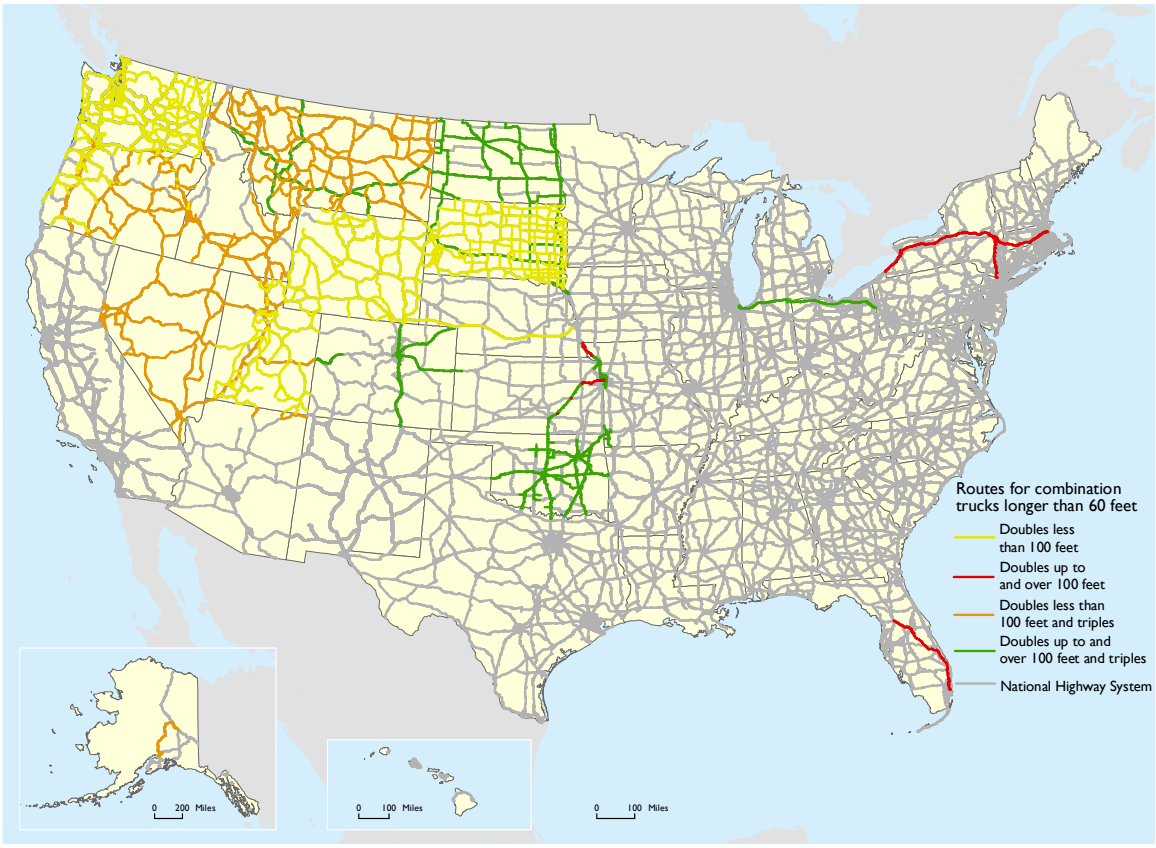


NOTES: This map should not be interpreted as the official National Network and should not be used for truck size and weight enforcement purposes. "Other NHS" refers to NHS mileage that is not included on the National Network. Conventional combination trucks are tractors with one semitrailer up to 48 feet in length or with one 28-foot semitrailer and one 28-foot trailer. Conventional combination trucks can be up to 102 inches wide.

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, 2015.

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 180,000 miles in length, has not changed significantly in three decades.

Figure 3-2 Permitted Longer Combination Vehicles on the National Highway System: 2014



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

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, 2015.

Longer combination vehicles (LCVs) include truck tractors pulling a long semi-trailer and a short trailer (often called a Rocky Mountain Double), a long semi-trailer and a long trailer (often called a Turnpike Double) or a short semi-trailer and two trailers (called a Triple). Although all states allow conventional combinations consisting of a 28-foot semi-trailer 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.

Table 3-3 Number of Trucks, Locomotives, Rail Cars, and Vessels:1990, 2000, and 2010–2013

	1990	2000	2010	2011	2012	2013
Highway (all vehicles)[1]	**NA**	**NA**	**250,070,048**	**253,108,389**	**253,639,386**	**255,876,822**
Truck, single-unit 2-axle 6-tire or more	NA	NA	8,217,189	7,819,055	8,190,286	8,126,007
Truck, combination	NA	NA	2,552,865	2,451,638	2,469,094	2,471,349
Truck, total	NA	NA	10,770,054	10,270,693	10,659,380	10,597,356
Trucks as percent of all highway vehicles	NA	NA	4.3	4.1	4.2	4.1
Rail						
Class I, locomotive[2]	18,835	20,028	23,893	24,250	24,707	25,033
Class I, freight cars[2]	658,902	560,154	397,730	380,699	380,641	373,838
Nonclass I, freight cars[2]	103,527	132,448	101,755	95,972	92,742	88,122
Car companies and shippers freight cars[2]	449,832	688,194	809,544	806,554	842,802	873,679
Water	**39,445**	**41,354**	**40,512**	**40,521**	**40,530**	**39,999**
Nonself-propelled vessels[3]	31,209	33,152	31,412	31,498	31,550	31,081
Self-propelled vessels[4]	8,236	8,202	9,100	9,023	8,980	8,918

KEY: NA = not available.

[1]Based on a new methodology, FHWA revised its annual vehicle-miles traveled, number of vehicles, and fuel economy data beginning with 2007. Information on the new methodology is available at www.fhwa.dot.gov/policyinformation/statistics.cfm. Data in this table should not be compared to those in pre-2011 editions of *Freight Facts and Figures*.

[2]Beginning with 2001 data, Canadian-owned U.S. railroads are excluded. Canadian-owned U.S. railroads accounted for over 46,000 freight cars in 2000. Class I railroads include those having revenues of at least $467.1 million in 2013.

[3]Nonself-propelled vessels include dry-cargo barges, tank barges, and railroad-car floats.

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

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/2013/ as of July 2015. **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**: U.S. Army Corps of Engineers, Institute for Water Resources, *Waterborne Transportation Lines of the United States, Volume 1, National Summaries* (New Orleans, LA: annual issues), available at www.navigationdatacenter.us/veslchar/veslchar.htm as of July 2015.

Nearly 12 million trucks, locomotives, rail cars, and vessels move goods over the transportation network. The number of highway vehicles and vessels has remained relatively stable in recent years, while the number of rail cars has continued to decline with improved utilization and the deployment of larger cars.

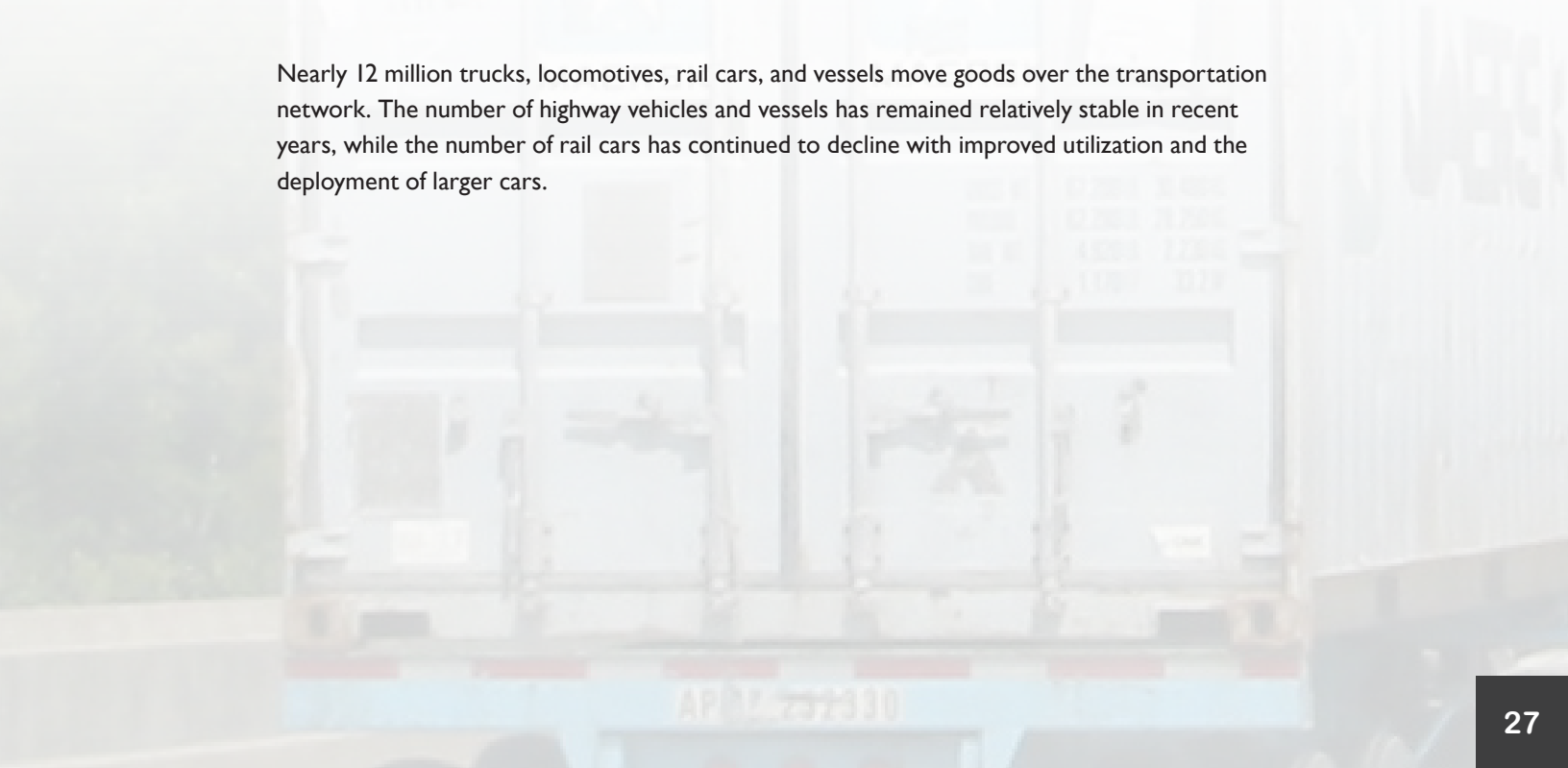


Table 3-4 Condition of U.S. Roadways by Functional System: 2000, 2005, and 2011–2013

(percent of mileage with an International Roughness Index over 170)

	2000	2005	2011	2012	2013	Percent change, 2000 to 2013
Rural						
Interstates	2.1	1.7	1.8	1.8	2.4	9.9
Other principal arterials	4.0	3.6	3.2	3.5	4.9	24.0
Minor arterials	7.0	5.4	6.6	6.2	7.2	3.7
Major collectors	22.1	16.1	18.6	19.1	19.7	-10.7
Urban						
Interstates	6.5	6.0	5.2	5.0	5.1	-22.3
Other freeways and expressway	10.9	7.8	7.8	7.4	7.2	-34.3
Other principal arterials	30.0	27.4	28.1	26.6	25.8	-14.0
Minor arterials	33.7	33.6	37.3	37.6	38.2	13.6
Collectors	52.3	49.7	53.7	52.1	53.7	2.7

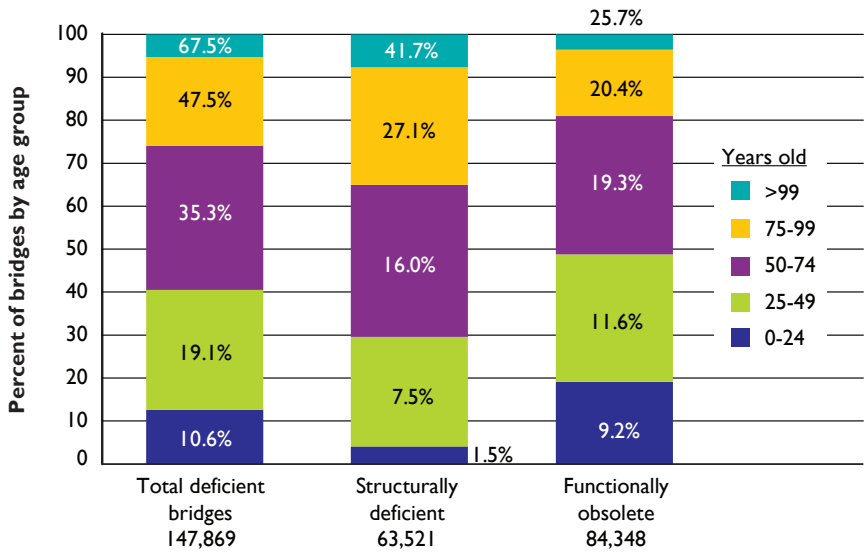
NOTES: Numbers may not add to totals due to rounding. Data are reported as the International Roughness Index (IRI) in inches per mile. Lower IRI represents smoother riding roadways. For more information on the rating system, refer to National Cooperative Highway Research Program (NCHRP) report 20-24(37)G, *Technical Guidance for Deploying National Level Performance Measurements*, available at http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP20-24(37)G_FR.pdf as of June 2015.

SOURCE: U.S. Department of Transportation (USDOT), Federal Highway Administration, as cited in USDOT, Bureau of Transportation Statistics, *National Transportation Statistics*, Table 1-27, available at http://www.bts.gov/ as of July 2015.

Condition

The U.S. Department of Transportation, Federal Highway Administration uses the International Roughness Index to measure the smoothness of pavement. In urban areas, interstates and other expressways and principal arterials showed large improvements in pavement smoothness in the 2000 to 2013 period. In rural areas, major collectors showed the greatest improvement (10.7 percent) in pavement smoothness while other principal arterials had the greatest increase (24.0 percent) in road roughness. Rural interstates and minor arterials also had increases in road roughness.

Figure 3-3 Condition of U.S. Bridges by Age Group: 2013



	Years Old (as of 12/31/2013)					
	0–24	25–49	50–74	75–99	>99	All years
Total bridges	**175,702**	**215,605**	**140,696**	**64,083**	**11,663**	**607,749**
Total deficient bridges						
Number	18,680	41,231	49,646	30,445	7,867	147,869
Percent	10.6	19.1	35.3	47.5	67.5	24.3%
Structurally deficient						
Number	2,576	16,200	22,491	17,388	4,866	63,521
Percent	1.5	7.5	16.0	27.1	41.7	10.5%
Functionally obsolete						
Number	16,104	25,031	27,155	13,057	3,001	84,348
Percent	9.2	11.6	19.3	20.4	25.7	13.9%

NOTES: Excludes 39 bridges with no recorded age. Bridges with a Year Built or Year Reconstructed within the past 10 years will not be assigned a deficient status. Therefore, when referring to the deficiency being calculated not using the 10-year rule, the status will be calculated without taking into consideration the year built or the year reconstructed. U.S. totals include the 50 states, the District of Columbia, and Puerto Rico. Table includes: Rural–Interstate, principal arterial, minor arterial, major collector, minor collector and local roads; Urban–Interstate, other freeways or expressways, other principal arterial, minor arterial, collector, and local roads. Percents may not add to 100 due to rounding. Structurally deficient and functionally obsolete are defined in http://www.fhwa.dot.gov/bridge/0650dsup.cfm. A text definition of structurally deficient and functionally obsolete can be found in the Bridge Conditions section of Chapter 3 of the latest "Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance, Report to Congress" http://www.fhwa.dot.gov/policy/2010cpr.

SOURCE: U.S. Department of Transportation, Federal Highway Administration, *National Bridge Inventory*. Available at https://www.fhwa.dot.gov/bridge/nbi.cfm as of June 2015.

The overall condition of bridges has improved slowly over time. In 2000, 15.2 percent (89,415) of bridges were considered structurally deficient compared to 10.5 percent (63,521) in 2013. Structurally deficient bridges are characterized by the deteriorated condition of bridge elements and reduced load-bearing capacity. In some cases, weight restrictions are placed on structurally deficient bridges, which may impact freight movement.

Table 3-5 Class I Railroad Locomotive Fleet by Year Built (locomotive units): 2000, 2010, and 2013

Year Built [a]	2000	2010	2013
Before 1990	12,727	8,420	7,901
1990-1994	2,648	2,384	2,363
1995-1999	4,018	4,467	4,382
2000-2004	635	4,265	4,258
2004-2009	N/A	4,098	4,039
After 2009	N/A	259	2,090
Total	**20,028**	**23,893**	**25,033**
Median Age Range, years	16-20	11-15	9-13

[a] Disregards year of rebuilding.

KEY: N/A = Not applicable.

SOURCE: Association of American Railroads, *Railroad Facts* (Washington, DC: Annual Issues) p. 52 and similar pages in earlier editions.

The median age of the Class I railroad locomotive fleet ranged from 9 to 13 years in 2013, compared to 16 to 20 years in 2000. Class I railroads added 9,788 new locomotives between 2000 and 2013. On average, about 3 percent of all locomotives are new in any given year.

Table 3-6 Automated Track Inspection Program (ATIP) Exceptions[1] per 100 Miles: 2007–2014

	2007	2008	2009	2010	2011	2012	2013[2]	2014	Average
Profile	3.2	2.4	1.9	2.1	2.4	1.4	17.4	9.9	5.1
Alignment	1.7	1.4	1.8	2.0	2.0	1.5	18.4	10.6	4.9
Gage	5.1	12.2	7.2	3.1	2.1	4.4	5.9	2.1	5.3
Cross-level	2.0	2.0	2.2	1.2	1.3	1.1	6.9	4.0	2.6
Warp	4.7	3.7	4.0	2.8	1.8	1.7	10.9	4.6	4.3
Runoff	0.4	0.6	0.7	0.6	0.8	0.4	10.0	8.4	2.7
Twist	1.8	1.7	1.5	1.3	1.0	0.8	5.6	3.0	2.1
Limited Speed	9.9	9.7	8.7	11.8	3.1	2.6	2.5	1.4	6.2
Total per 100 Miles	**28.7**	**33.7**	**27.9**	**24.8**	**14.5**	**14.1**	**77.6**	**44.0**	**33.1**
Miles Inspected	59,165	52,997	74,715	83,013	74,541	70,049	62,882	74,202	68,945

[1] *Exceptions* mean track did not meet normal operation standards.

[2] The FRA implemented upgrades to the inspection and collection technology in the ATIP fleet in 2013 which allowed for increased sensitivity of exception detection.

NOTES: The ATIP program does not provide a comprehensive evaluation of the national rail network on an annual basis due to the limited number of surveying cars. Inspection locations vary by year and are prioritized by factors such as safety risk analysis and operation types. Defects are briefly defined as variations from design values for the following track geometry properties:

Profile - rail surface elevations
Alignment - track direction (tangent or curvature)
Gage - distance between rails
Cross-level - elevation difference between the rails
Warp - maximum change in cross-level over a specified distance
Runoff - elevation (ramp) difference of a line along the top of the rail is used for the projection
Twist - rate of introduction and removal of cross-level on transitions from straight to curved track alignment
Limited Speed - reduced operating speed due to track geometry constraints

Detailed definitions and standards may be found in U.S. Department of Transportation, Federal Railroad Administration, *Track and Rail and Infrastructure Integrity Compliance Manual*, July 2012.

SOURCE: U.S. Department of Transportation, Federal Railroad Administration, Office of Safety, ATIP Statistics (December 31, 2011). Available at http://www.fra.dot.gov/ as of October 2015.

The U.S. freight rail system owns and operates more than 138,000 rail miles, including 95,000 miles owned by Class I railroads (those having revenues of at least $467.1 million in 2013). The remaining mileage is owned and operated by regional and local railroads. Of the eight track characteristics monitored, the incidence of two—gage and limited speeds—are lower since 2010, while other results are more varied.

Table 3-7 U.S. Flag Vessels by Type and Age: 2000, 2010, and 2013

(percent)

	Vessel type							
Age[1]	**Dry cargo**	**Tanker**	**Towboat**	**Passenger**	**Crewboat**	**Dry barge**	**Liquid barge**	**Total**
2000, total vessels	**737**	**135**	**4,995**	**918**	**1,414**	**29,141**	**4,011**	**41,354**
Age (%): <6	9.0	8.1	6.5	14.6	17.4	23.1	14.5	19.6
6–10	6.8	3.0	2.9	12.9	7.5	10.5	8.2	9.2
11–15	15.3	5.9	2.8	19.4	4.1	5.4	1.2	5.1
16–20	18.5	25.2	18.6	13.5	32.1	20.1	15.0	19.6
21–25	14.2	22.2	19.1	9.8	23.5	18.4	17.8	18.3
>25	35.7	35.6	50.0	29.5	15.1	22.2	42.7	27.7
2010, total vessels	**875**	**77**	**5,466**	**843**	**1,817**	**26,848**	**4,564**	**40,512**
Age (%): <6	7.0	22.1	10.5	3.2	14.9	20.1	25.6	18.5
6–10	12.6	9.1	5.5	7.0	11.7	12.7	12.0	11.5
11–15	12.7	11.7	6.0	10.9	12.7	20.8	11.2	17.0
16–20	7.2	3.9	2.7	13.5	5.6	10.3	7.2	8.7
21–25	12.5	3.9	2.7	18.4	2.8	4.5	0.8	4.2
>25	48.1	49.4	72.5	46.9	52.2	30.5	43.1	39.3
2013, total vessels	**844**	**65**	**5,473**	**833**	**1,645**	**26,387**	**4,694**	**39,999**
Age (%): <6	6.9	25.4	11.3	4.1	13.2	20.4	30.3	19.4
6–10	10.7	22.2	6.4	5.9	12.3	12.9	15.7	12.2
11–15	12.6	12.7	6.6	7.8	14.8	17.0	10.4	14.4
16–20	10.2	3.2	4.0	11.3	6.7	17.3	8.2	13.6
21–25	8.9	3.2	2.8	17.2	4.7	9.1	5.2	7.7
>25	50.7	33.3	68.9	53.7	48.3	23.3	30.2	32.7
>25 Change from 2000	15.0	-2.2	18.9	24.2	33.1	1.1	-12.6	5.0
Median age range, years								
2000	16-20	21-25	21-25	16-20	16-20	16-20	21-25	16-20
2010	21-25	21-25	>25	21-25	>25	11-15	16-20	16-20
2013	21-25	11-15	>25	>25	21-25	11-15	11-15	16-20

[1] Age is based on the year the vessel was built or rebuilt.

NOTES: Figures include vessels available for operation. Totals may be greater than sum because of unclassified vessels and vessels of unknown age, hence percentages may not add to 100, and also due to rounding.

SOURCE: U.S. Army Corps of Engineers, *Waterborne Transportation Lines of the United States, Volume 1: National Summaries* (Washington, D.C.: 2014), available at www.navigation-datacenter.us/veslchar/veslchar.htm as of July 2015.

U.S. flag vessels operate on both shallow and deep draft waterways and include a wide range of vessel types. The age of the fleet decreased over the 2000 to 2013 period: vessels age 15 years and younger decreased from 46.0 percent to 33.9 percent. Inland waterway barges accounted for the largest share (77.7 percent) of U.S. vessels. Towboats are the oldest vessels in the fleet with 68.9 percent older than 25 years. In contrast, barges are among the youngest vessels due to a combination of retirement and replacement of older dry cargo barges and acquisition of new tank barges.

Table 3-8 Lock Characteristics and Delays in Rivers with 5,000 or More Lockages: 2000, 2010, and 2014

	Total lockages (2014)	Percent commercial of all vessels (2014)	Average age of locks (2014)	Average delay in minutes			Percent of vessels delayed		
				2000	2010	2014	2000	2010	2014
All waterways	611,125	61	59	64	80	121	35	36	49
Ohio River	111,734	88	52	52	97	95	31	34	43
Mississippi River	91,622	52	73	90	81	163	20	19	45
Gulf Intracoastal Waterway	39,015	99	52	58	65	110	78	84	90
Illinois Waterway	25,854	88	80	127	53	166	41	29	62
Monongahela River	23,079	78	70	12	11	24	16	18	27
Arkansas River	22,830	81	46	11	13	13	35	23	23
Tennessee River	20,719	67	68	209	122	277	24	24	43
Tennessee Tombigbee Waterway	18,636	46	32	9	3	11	38	10	14
Chicago River	10,959	34	77	5	5	13	1	1	83
Allegheny River	8,380	24	84	8	4	47	7	3	11
Columbia River	8,075	92	47	32	30	22	85	90	84
Red River	6,570	36	25	8	1	18	49	23	24
St. Mary's River	6,051	88	79	27	16	31	26	19	41
Cumberland River	5,536	59	54	16	18	113	13	12	30

NOTES: A lockage is the movement through the lock by a vessel or other matter. Commercial vessels include all vessels operated for purposes of profit and include freight and passenger vessels.

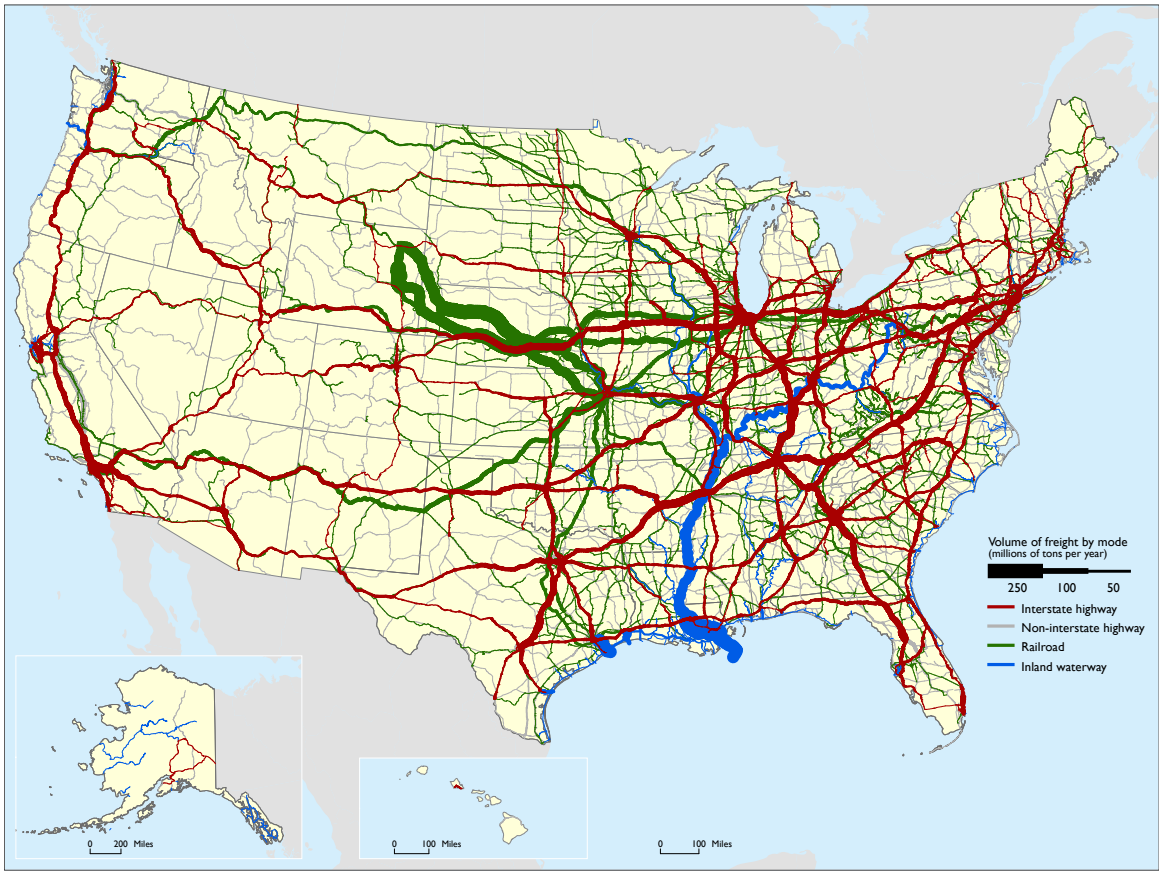
SOURCE: United States Army Corps of Engineers, Navigation Data Center, *Lock Use, Performance, and Characteristics*, (Alexandria, VA: annual issues), available at www.navigationdatacenter.us/ as of October 2015.

Locks make it easier for vessels to navigate the uneven water levels of U.S. rivers. Because of increasing traffic and aging locks, vessels may be delayed for hours while locks are shut down for maintenance and repair. The U.S. Army Corps of Engineers reports that the average age of all locks in 2014 was 59 years. Between 2000 and 2014, average delay per lockage nearly doubled from 64 minutes to 121 minutes. In 2014 the highest average lockage delay was on the Tennessee River at 277 minutes, while the Gulf Intracoastal Waterway had the highest percent of vessels delayed at 90.

Freight Flows

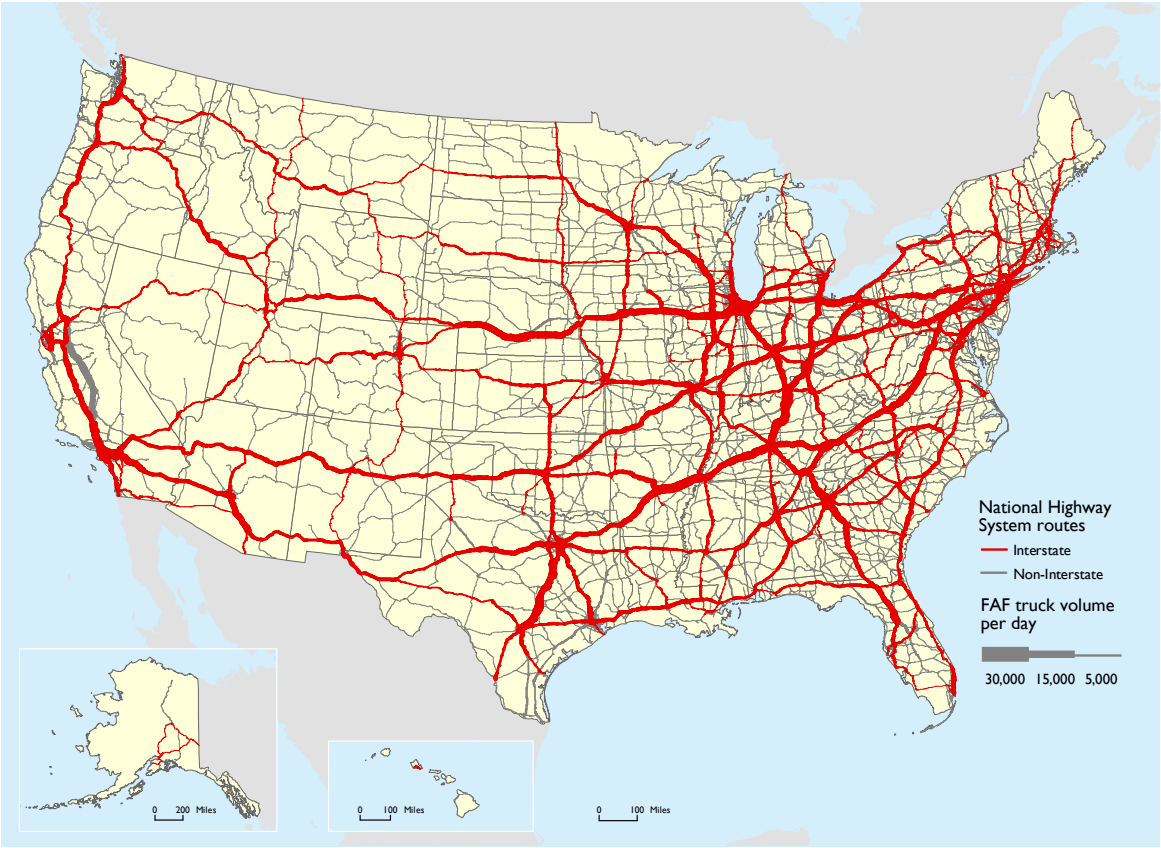
Trucks carry most of the weight and value of freight in the United States, but railroads and waterways carry significant volumes over long distances. Rail moves a large volume of coal between the Powder River Basin in Wyoming and the Midwest, while the principal inland waterways movement, by freight volume, occurs along the Lower Mississippi River.

Figure 3-4 Freight Flows by Highway, Railroad, and Waterway: 2011



SOURCE: Highways: U.S. Department of Transportation, Federal Highway Administration, *Freight Analysis Framework*, Version 3.5, 2015; 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, Institute or Water Resources, Annual Vessel Operating Activity and Lock Performance Monitoring System data, September 2015.

Figure 3-5 Average Daily Long-Haul Truck Traffic on the National Highway System: 2011

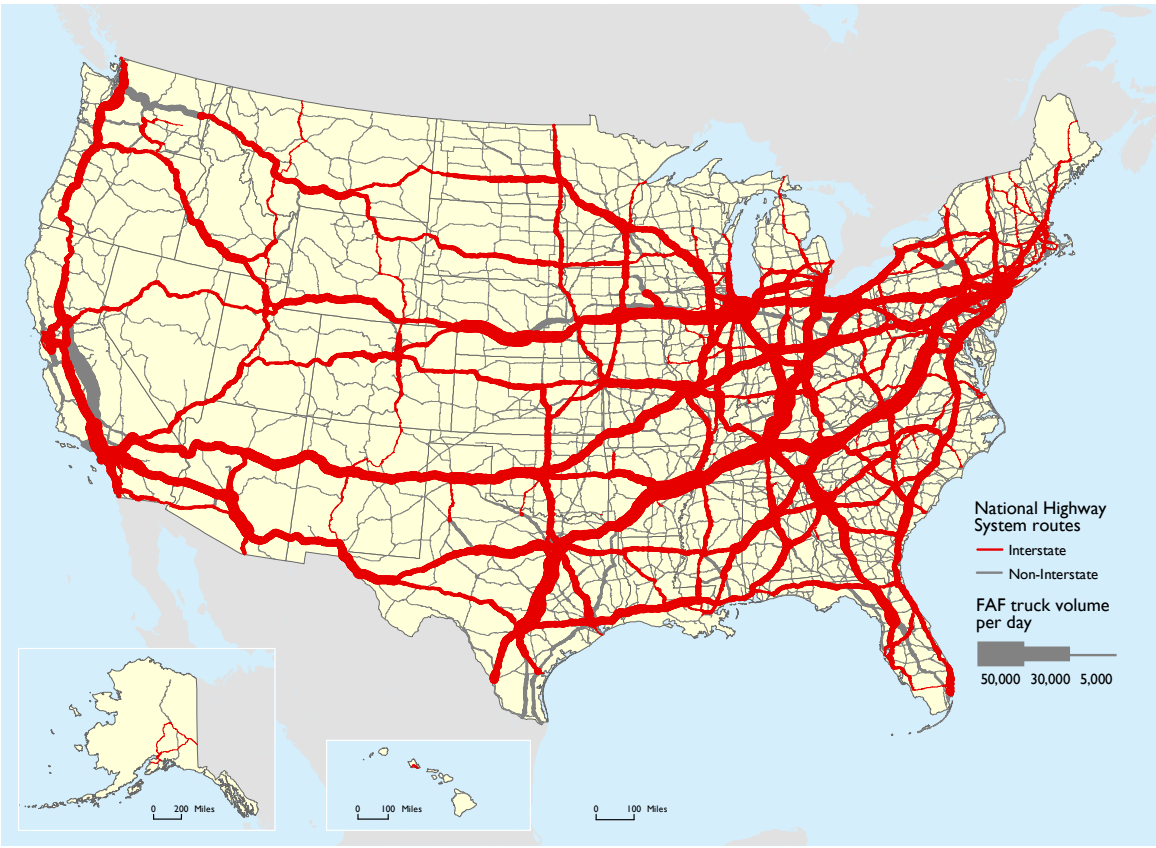


NOTE: Long-haul freight trucks typically serve locations at least 50 miles apart, excluding trucks that are used in movements by multiple modes and mail.

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, *Freight Analysis Framework*, version 3.5, 2015.

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 3-6 Average Daily Long-Haul Truck Traffic on the National Highway System: 2040

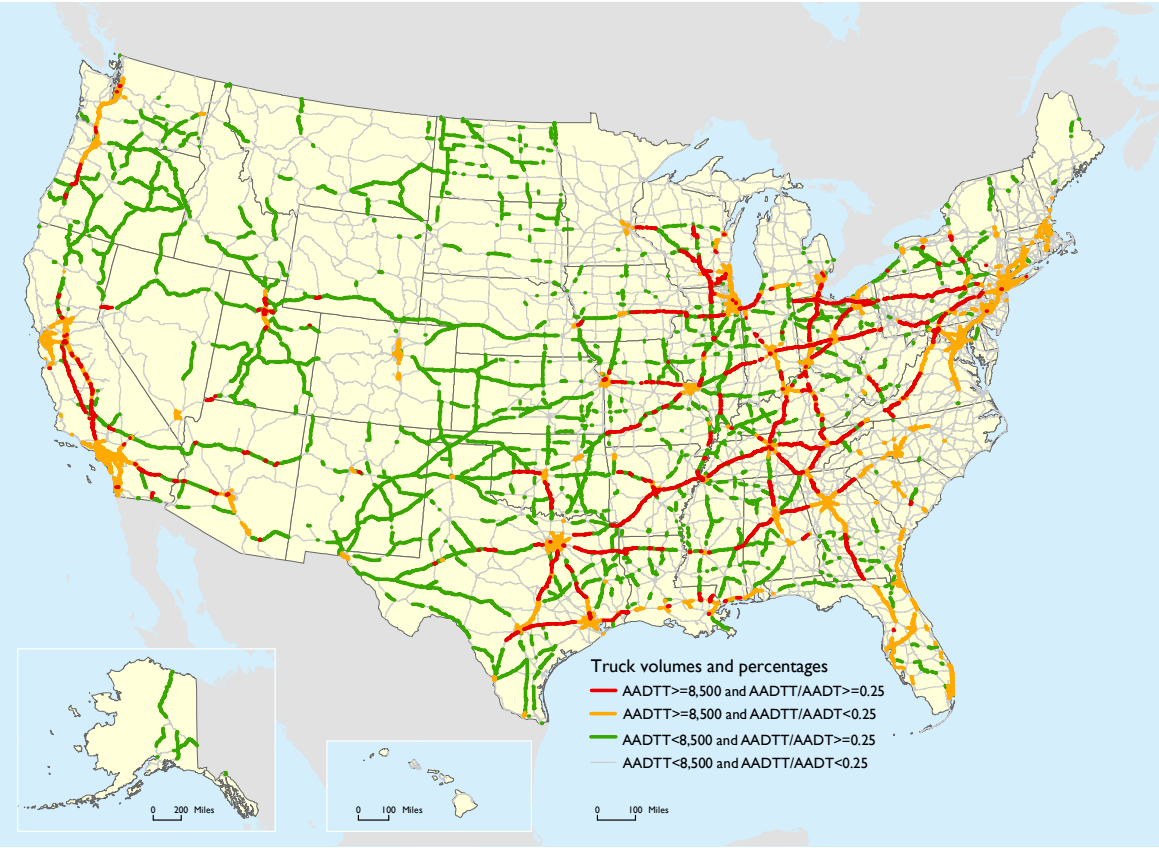


NOTE: Long-haul freight trucks typically serve locations at least 50 miles apart, excluding trucks that are used in movements by multiple modes and mail.

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, *Freight Analysis Framework*, version 3.5, 2015.

By 2040 long-haul freight truck traffic in the United States is expected to increase dramatically on the National Highway System.

Figure 3-7 Major Truck Routes on the National Highway System: 2011

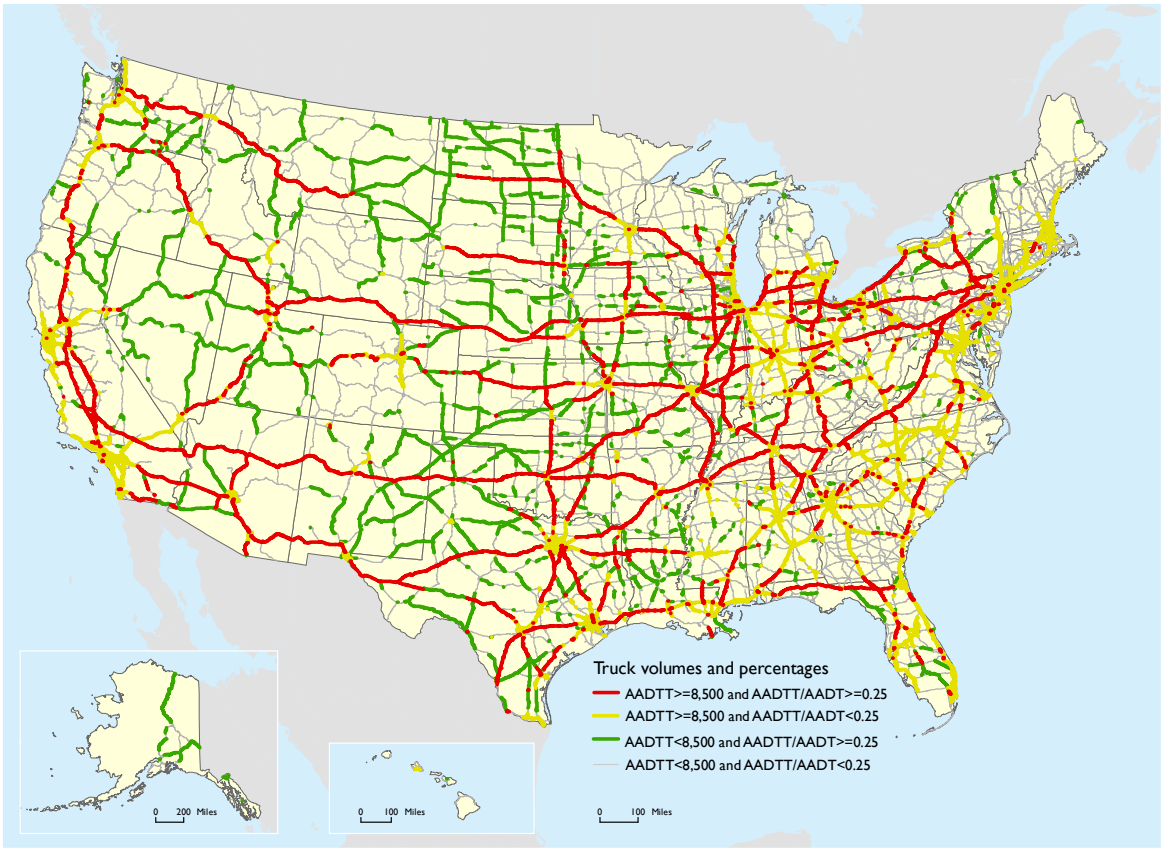


NOTES: Average annual daily truck traffic (AADTT) includes all freight-hauling and other trucks with six or more tires and includes all motor vehicles.

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, *Freight Analysis Framework*, version 3.5, 2015.

Several routes carry a significant concentration of trucks, either as an absolute number or as a percentage of the traffic stream. In 2011 nearly 14,530 miles of the NHS carry more than 8,500 trucks per day on sections where at least every fourth vehicle was a truck. With each truck carrying an average of 16 tons of cargo, 8,500 trucks per day haul approximately 50 million tons per year.

Figure 3-8 Major Truck Routes on the National Highway System: 2040



NOTES: Average annual daily truck traffic (AADTT) includes all freight-hauling and other trucks with six or more tires and includes all motor vehicles.

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, *Freight Analysis Framework*, version 3.5, 2015.

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 reach 42,000 miles, an increase of more than 175 percent from 2011.

Table 3-9 Annual Vehicle Distance Traveled by Highway Category and Vehicle Type: 2013

	Combination trucks	Single-unit trucks[1]	Other[2]	Light-duty vehicles[3]	Total, all motor vehicles
Interstate vehicle-miles (millions)	87,484	24,764	7,447	619,916	739,612
Interstate percent	51.9	23.2	21.0	23.2	24.8
Non-interstate vehicle-miles (millions)	80,952	81,818	28,086	2,057,855	2,248,711
Non-interstate percent	48.1	76.8	79.0	76.8	75.2
Total vehicle-miles, all roadways	**168,436**	**106,582**	**35,534**	**2,677,771**	**2,988,323**

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

[2] Includes buses and motorcycles.

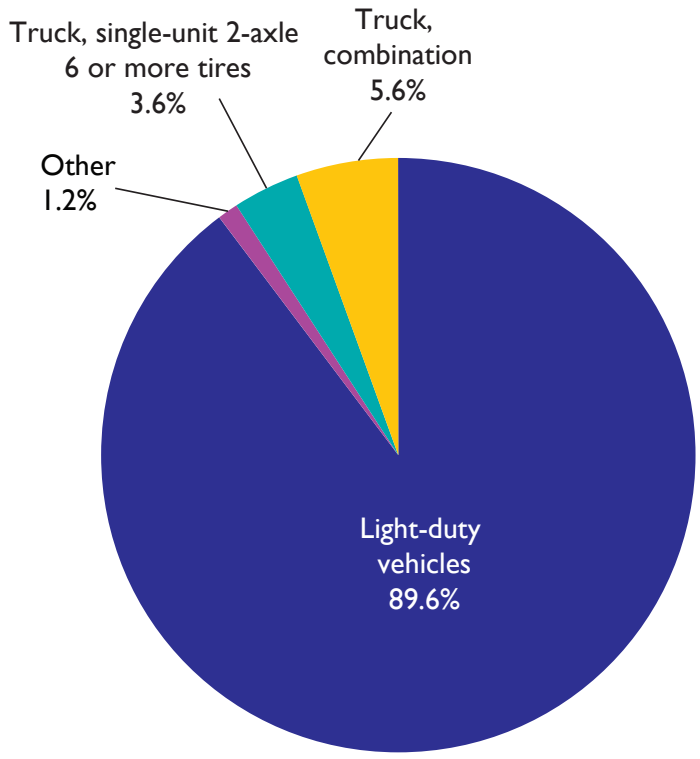
[3] Includes passenger cars, light trucks, vans and sport utility vehicles with a wheelbase equal to or less than 121 inches and large passenger cars, vans, light trucks, and sport utility vehicles with a wheelbase larger than 121 inches.

NOTES: Based on a new methodology, FHWA revised its annual vehicle-miles traveled, number of vehicles, and fuel economy data beginning with 2007. Information on the new methodology is available at www.fhwa.dot.gov/policyinformation/statistics.cfm. Data in this table should not be compared to those in pre-2011 editions of *Freight Facts and Figures*. Numbers may not add to totals due to rounding.

SOURCE: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, Table VM-1, available at www.fhwa.dot.gov/policyinformation/statistics/2013/ as of July 2015.

Freight moving in combination trucks depends heavily on the Interstate System. While less than one-fourth of the distance traveled by light-duty vehicles is on the Interstate System, over one-half of combination-truck vehicle-miles of travel are on Interstate highways.

Figure 3-9 Share of Highway Vehicle-Miles Traveled by Vehicle Type: 2013



NOTES: "Other" comprises bus and motorcycle. "Light-duty vehicles" includes passenger cars, light trucks, vans, and sport utility vehicles. Based on a new methodology, FHWA revised its annual vehicle miles traveled, number of vehicles, and fuel economy data beginning with 2007. Information on the new methodology is available at www.fhwa.dot.gov/policyinformation/statistics.cfm. Data in this figure should not be compared to those in pre-2011 editions of *Freight Facts and Figures*.

Despite doubling over the past two decades, truck traffic remains a relatively small share of highway traffic as a whole. In 2013 commercial trucks accounted for approximately 9.1 percent of highway vehicle-miles traveled. Of that 9.1 percent, combination trucks accounted for approximately 61.2 percent, while single-unit trucks with six or more tires accounted for the remainder.

Table 3-10 Trucks, Truck Miles, and Average Distance by Range of Operations and Jurisdictions: 2002

	Number of trucks (thousands)	Truck-miles (millions)	Miles per truck (thousands)
Total	**5,521**	**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 vans, and sport utility vehicles. Numbers may not add to totals due to rounding.

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 last released in December 2004.

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Vehicle Inventory and Use Survey—in Retrospect

Tables 3-10 and 3-11 illustrate the data once provided by the Vehicle Inventory and Use Survey (VIUS), which was discontinued in 2002 due to budget constraints. VIUS had been the principal source of data on the physical and operating characteristics of the nation's truck population. Based on a sample of registered trucks, VIUS was conducted as a mail-out-mail-back survey every 5 years from 1967 through 2002. The sample supported national and state-level estimates for freight carrying trucks and trucks used in other businesses and personal travel. Stakeholders across the federal government, state DOTs, Metropolitan Planning Office's, and others who use VIUS estimates have had to rely on aging data since the survey was last conducted.

In 2014 the U.S. Department of Transportation formed a working group with the U.S. Department of Energy, U.S. Environmental Protection Agency, and U.S. Department of Agriculture to co-fund research on approaches to restore the survey. Advances in technology since 2002 have created opportunities to incorporate in-vehicle electronic data collection to augment traditional survey methods. New VIUS data would significantly improve the ability to estimate the number of trucks on the highway network, study future transportation growth, evaluate safety risks to highway travelers, and assess the energy efficiency and environmental impact of the Nation's truck fleet.

Table 3-11 Truck Miles by Products Carried: 2002

Products carried	Millions of miles
No product carried	28,977
Mixed freight	14,659
Tools, nonpowered	7,759
All other packaged foodstuffs	7,428
Tools, powered	6,478
Products not specified	6,358
Mail and courier parcels	4,760
Miscellaneous manufactured products	4,008
Vehicles, including parts	3,844
Wood products	3,561
Bakery and milled grain products	3,553
Articles of base metal	3,294
Machinery	3,225
Paper or paperboard articles	3,140
Meat, seafood, and their preparations	3,056
Nometallic mineral products	3,049
Electronic and other electrical equipment	3,024
Base metal in primary or semifinished forms	2,881
Gravel or crushed stone	2,790
All other agricultural products	2,661
All other waste and scrape (non-EPA manifest)	2,647
Plastic and rubber	2,393
Animal feed and products of animal origin	2,088
Furniture, mattresses, lamps, etc.	2,043
Pulp, newsprint, paper, paperboard	1,936
Fertilizers and fertilizer materials	1,666
Textile, leather, and related articles	1,538
Grains, cereal	1,368
All other chemical products and preparations	1,351
Fuel oils	1,232
All other coal and refined petroleum products	1,172
Logs and other wood in the rough	1,149
Alcoholic beverages	1,124
Natural sands	1,089
Recyclable products	922
Basic chemicals	876
Gasoline and aviation turbine fuel	849
Empty shipping containers	794
Printed products	765
Animals and fish, live	735
Precision instruments and apparatus	734
All other transportation equipment	636
All other nonmetallic minerals	499
Monumental or building stone	462
Tobacco products	445
Pharmaceutical products	305
Coal	301
Passengers	274
Products, equipment, or materials not elsewhere classified	265
Hazardous waste (EPA manifest)	190
Not applicable[2]	150
Crude petroleum	132
Metallic ores and concentrates	45
Total[1]	**145,173**

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

[2]Vehicles 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.

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

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 last released in December 2004.

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, more than 201 million weighs were made in 2013, about 65.8 percent of which were weigh-in-motion. Approximately 2.0 percent of commercial vehicle weighs discover violations. Despite the 2008–2012 drop in weigh-in-motion, 2013 has seen a slight increase over the 2007 level.

Table 3-12 Commercial Vehicle Weight Enforcement Activities: 2007–2013

	2007	2008	2009	2010	2011	2012	2013
All Weighs	**217,444,117**	**200,419,382**	**182,256,996**	**198,564,690**	**185,498,220**	**189,743,150**	**201,496,351**
Weigh-in-motion	132,257,618	119,826,305	116,176,399	118,025,789	119,718,032	116,640,351	132,649,414
Static weighs[1]	85,186,499	80,593,077	66,080,597	80,538,901	65,780,188	73,102,799	68,846,937
Violations[2]	**530,350**	**555,168**	**489,975**	**478,576**	**415,545**	**408,492**	**398,826**
Axle weight violations	233,563	248,813	220,631	216,735	178,209	179,774	176,898
Gross weight violations	126,761	120,384	116,291	114,171	84,490	91,006	87,714
Bridge weight violations	170,026	185,971	153,053	147,670	152,846	137,712	134,214
Permits[3]	**4,827,668**	**5,215,724**	**4,528,654**	**4,838,663**	**4,944,334**	**4,918,118**	**5,376,723**

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

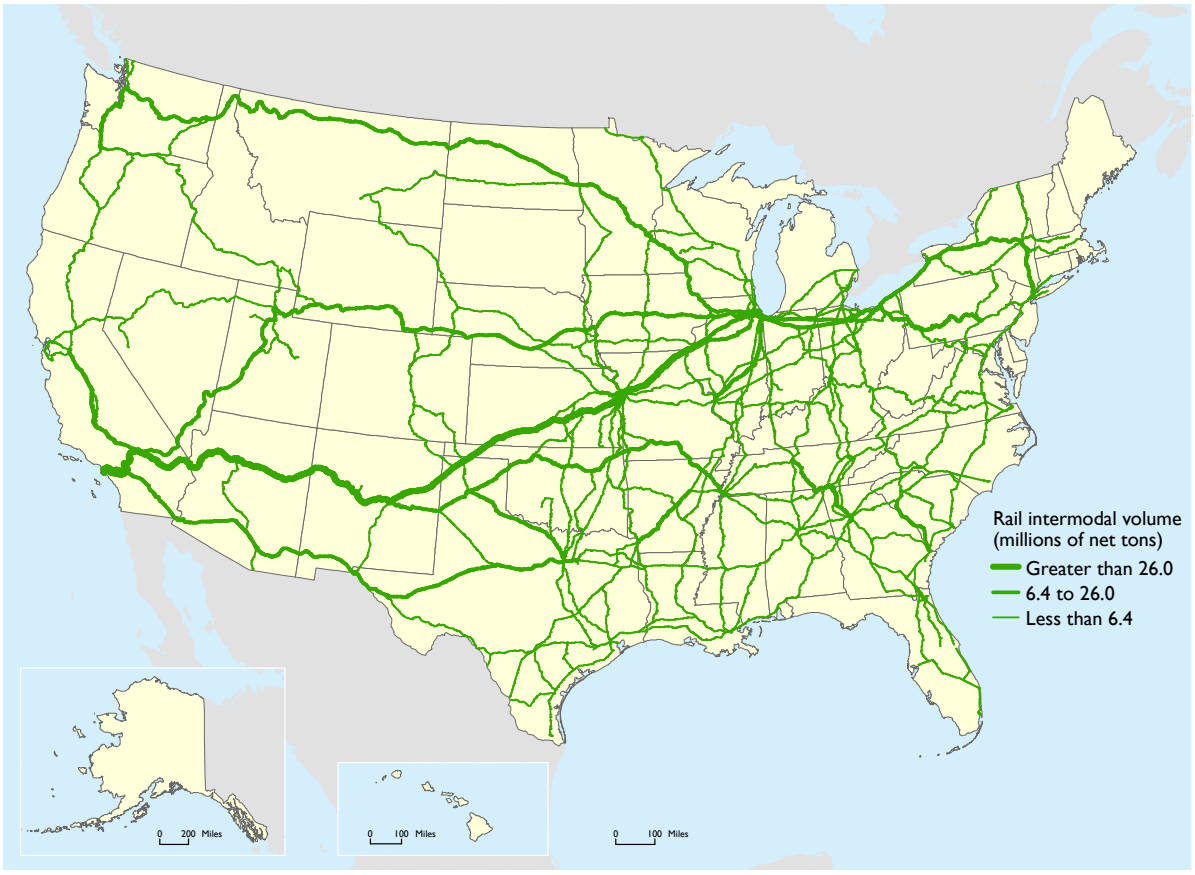
[2] Violations include those from axle, gross, and bridge formula weight limits.

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

NOTE: Incomplete data from District of Columbia (2008), Hawaii (2008, 2009, 2010, and 2011), Massachusetts (2010), New Hampshire (2011), South Dakota (2007), and Vermont (2011).

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, July 2015.

Figure 3-10 Tonnage of Trailer-on-Flatcar and Container-on-Flatcar Rail Intermodal Moves: 2013



SOURCE: U.S. Department of Transportation, Federal Railroad Administration, special tabulation, September 2015.

Different modes of transportation frequently work together to move high-value, time-sensitive cargo. The classic forms of rail intermodal transportation are trailer-on-flatcar and container-on-flatcar, and these services are spread throughout the United States. The largest concentrations are on routes between Pacific Coast ports and Chicago, southern California and Texas, and Chicago and New York.

Table 3-13 Top 25 Airports by Landed Weight of All-Cargo Operations: 2000, 2010, and 2012–2014[1]

Airport	2014 Rank	Landed weight (thousands of short tons)				
		2000	2010	2012	2013	2014
Memphis, TN	1	6,318	9,772	10,263	10,946	11,880
Anchorage, AK (Ted Stevens)[2]	2	8,084	9,732	8,261	7,991	8,136
Louisville, KY (Standiford Field)	3	3,987	5,319	5,462	5,632	5,784
Chicago, IL (O'Hare)	4	2,062	2,448	2,278	3,432	3,771
Miami, FL	5	2,929	3,453	3,574	3,424	3,596
Indianapolis, IN	6	2,884	2,359	2,470	2,634	2,678
Los Angeles, CA	7	2,892	1,977	2,102	2,100	2,149
Cincinnati, OH[3]	8	912	1,216	1,594	1,711	1,822
New York, NY (John F. Kennedy)	9	2,793	1,962	1,747	1,686	1,585
Dallas/Fort Worth, TX	10	1,691	1,516	1,544	1,531	1,570
Oakland, CA	11	1,811	1,324	1,323	1,362	1,477
Newark, NJ (Newark Liberty)	12	1,961	1,489	1,427	1,267	1,250
Ontario, CA	13	1,220	1,121	1,181	1,186	1,180
Atlanta, GA (Hartsfield-Jackson)	14	1,090	1,314	1,014	1,094	1,131
Honolulu, HI	15	692	1,062	988	1,058	1,095
Philadelphia, PA	16	1,454	994	947	942	942
Houston, TX (George Bush)	17	480	763	784	852	867
Seattle, WA (Seattle-Tacoma)	18	1,060	697	645	693	787
Phoenix, AZ (Sky Harbor)	19	920	607	650	688	718
Denver, CO	20	900	619	602	630	657
San Francisco, CA	21	1,267	652	599	596	623
Portland, OR	22	882	531	581	569	563
Minneapolis, MN (Minneapolis-St Paul/Wold-Chamberlain)	23	622	512	438	366	486
Salt Lake City, UT	24	751	424	438	467	481
Boston, MA (Logan)	25	703	409	390	433	457
Top 25 airports[3]		**52,381**	**52,350**	**51,338**	**53,348**	**55,688**
United States, all airports[4]		**74,743**	**67,530**	**67,448**	**68,655**	**71,329**
Top 25 as percent of U.S. total		**70.1**	**77.5**	**76.1**	**77.7**	**78.1**

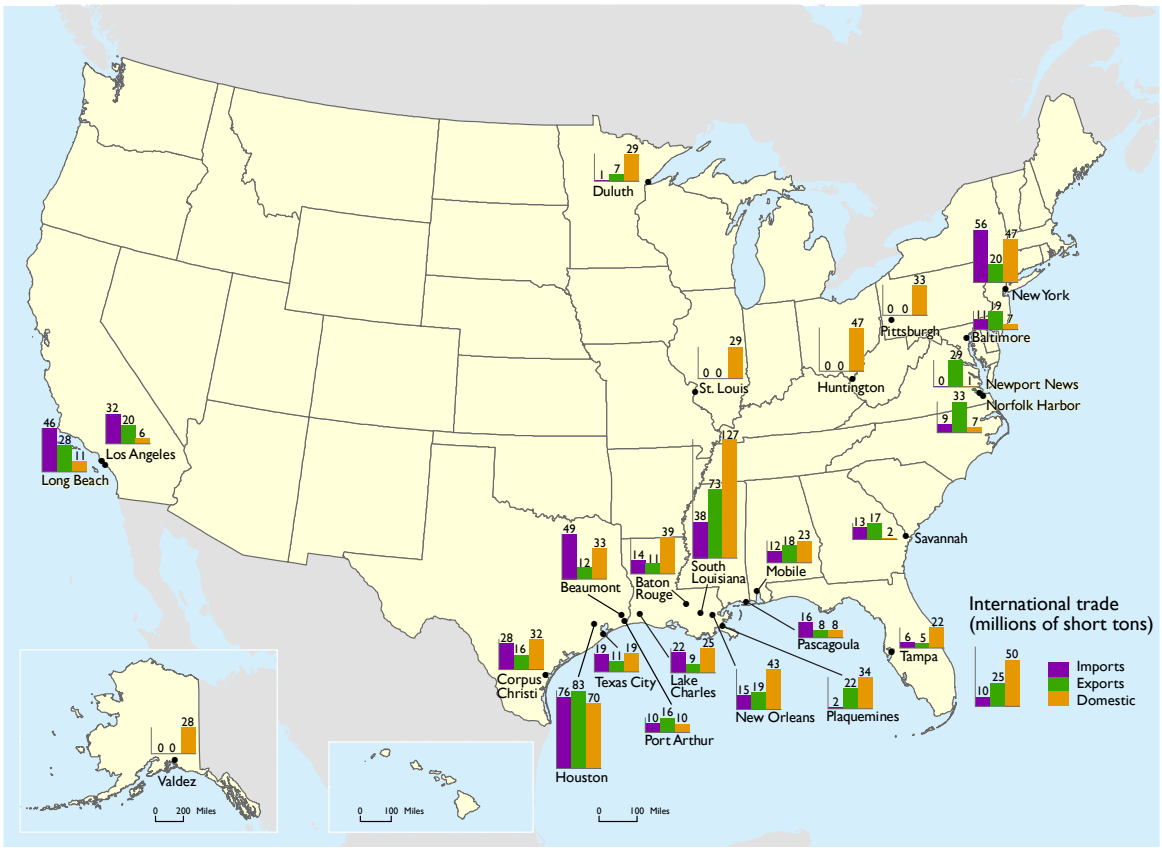
[1]Dedicated to the exclusive transportation of cargo, all-cargo operations do not include aircraft carrying passengers that also may be carrying cargo. Aircraft landed weight is the certificated maximum gross landed weight of the aircraft as specified by the aircraft manufacturers.
[2]Anchorage includes a large share of all-cargo operations in-transit.
[3]Airport rankings change each year. Totals represent the top 25 airports for each year, not necessarily the top 25 airports listed here for 2014.
[4]Limited to airports with an aggregate landed weight in excess of 100 million pounds (50,000 short tons) annually.

NOTE: 1 short ton = 2,000 pounds.

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/planning_capacity/passenger_allcargo_stats/ as of July 2015.

The three most important U.S. airports that handle all-cargo aircraft are Memphis, Anchorage, and Louisville. Memphis and Louisville are major hubs for FedEx and the United Parcel Service, respectively. Anchorage is a major international gateway for trade with Asia.

Figure 3-11 Top 25 Ports by Tonnage: 2013

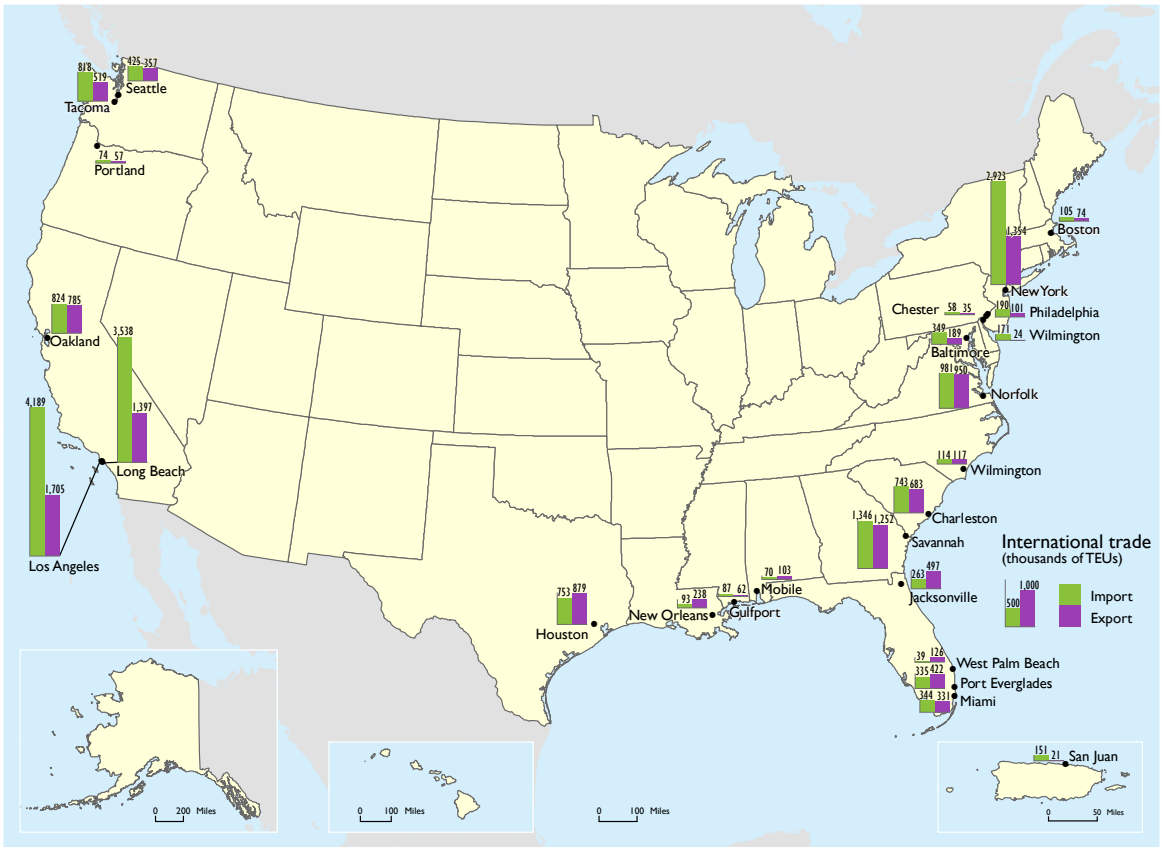


NOTES: 1 short ton = 2,000 pounds.

SOURCE: U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center, *Tonnage for Selected U.S. Ports in 2013*, available at www.navigationdatacenter.us/wcsc/porttons13.html as of July 2015.

Although the top ports for containerized cargo are primarily on the Pacific and Atlantic Coasts, most bulk cargo, such as coal, crude petroleum, and grain moves through ports on the Gulf Coast and inland waterway system. The top 25 water ports by tonnage handled 68.5 percent of the weight of all domestic and foreign goods moved by water. Port of Houston has the highest import trade at 76 million short tons, and Port of South Louisiana has the highest domestic tonnage movement at 127 million short tons.

Figure 3-12 Top 25 Water Ports by Containerized Cargo: 2014



NOTES: The data 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.

SOURCE: U.S. Department of Transportation, Maritime Administration, U.S. Waterborne Container Trade by U.S. Custom Ports, available at www.marad.dot.gov/resources/data-statistics/ as of June 2015.

Containerized cargo has grown rapidly in recent years and is concentrated at a few large water ports. The Ports of Los Angeles and Long Beach together handle 34.2 percent of all container traffic at water ports in the United States. Container trade at these two ports increased by nearly 68 percent between 2000 and 2014 while container trade for the entire United States grew by 77 percent.

Table 3-14 Containership Calls at U.S. Ports by Vessel Size and Number of Vessels: 2006–2011

Vessel size (TEUs)	2006	2007	2008	2009	2010	2011
Calls						
< 2,000	4,143	3,900	3,492	3,287	3,707	4,547
2,000-2,999	3,985	4,099	3,344	2,676	2,760	2,856
3,000-3,999	3,333	2,866	2,460	2,499	2,052	2,327
4,000-4,999	4,782	5,033	5,120	5,303	5,876	6,400
> 4,999	3,344	3,961	4,313	4,434	5,126	5,959
Total calls	**19,587**	**19,859**	**18,729**	**18,199**	**19,521**	**22,089**
Vessels						
< 2,000	212	195	196	179	178	180
2,000-2,999	257	230	219	220	206	183
3,000-3,999	177	166	141	147	130	131
4,000-4,999	258	271	284	306	315	306
> 4,999	260	277	326	366	396	417
Total vessels	**1,164**	**1,140**	**1,166**	**1,218**	**1,225**	**1,217**

KEY: TEU = twenty-foot equivalent unit

SOURCES: Lloyd's Marine Intelligence Unit, Vessel Movements Data Files, 2005-2011 (London: Lloyd's Marine Intelligence Unit, 2007-2012); Lloyd's Marine Intelligence Unit, Seasearcher (London: Lloyd's Marine Intelligence Unit, 2012); and Clarkson Research Studies, Clarkson's Vessel Registers (London: Clarkson Research Studies, January 2012); as reported in U.S. Department of Transportation, Maritime Administration, *Vessel Calls Snapshot, 2011* (Washington, DC: 2013), available at www.marad.dot.gov/documents/Vessel_Calls_at_US_Ports_Snapshot.pdf.

Last reported by the USDOT Maritime Administration, from 2006 to 2011 the number of calls by containership with capacities of 5,000 TEUs or greater increased by 78.2 percent. These large container ships accounted for 27.0 percent of total containership calls at U.S. ports in 2011, up from 17.1 percent in 2006.

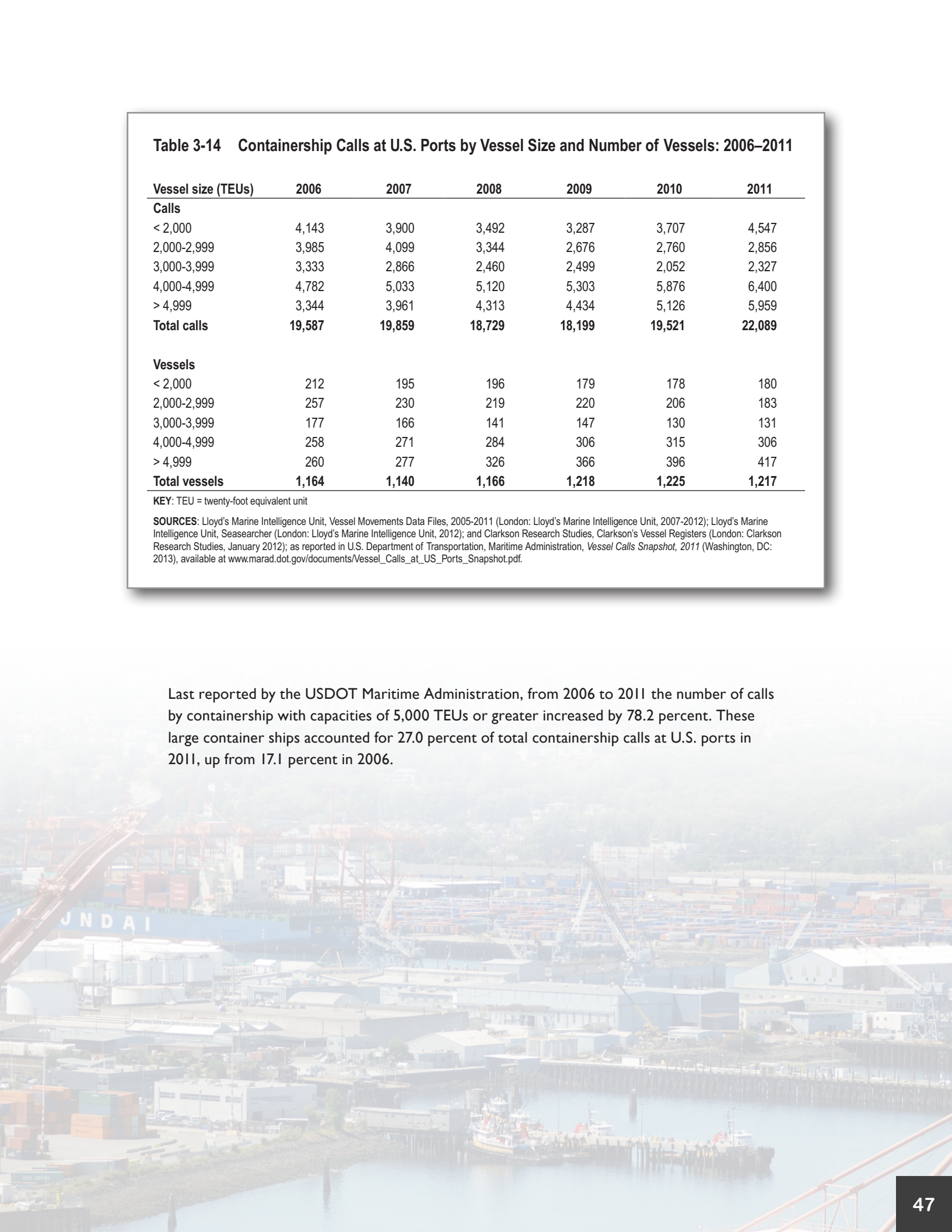


Table 3-15 Number of Vessel Calls at U.S. Ports: 2006–2011

(vessels weighing 10,000 deadweight tons or more)

Type	2006	2007	2008	2009	2010	2011	Percent change, 2006–2011
Tanker	20,391	20,699	20,096	18,991	20,832	23,812	16.8
Double hull	17,070	18,158	18,315	18,035	20,199	23,347	36.8
Product	12,746	12,671	12,182	11,413	12,537	14,827	16.3
Double hull	9,869	10,350	10,561	10,534	11,947	14,365	45.6
Crude	7,645	8,028	7,914	7,578	8,295	8,985	17.5
Double hull	7,201	7,808	7,754	7,501	8,252	8,982	24.7
Container	19,587	19,859	18,729	18,199	19,521	22,089	12.8
Dry bulk	11,579	10,081	9,513	7,884	9,227	10,947	-5.5
Roll on/Roll off	6,315	6,074	5,962	4,947	5,842	6,182	-2.1
Vehicle	4,181	4,084	4,101	3,336	4,100	4,343	3.9
Gas	879	824	698	659	738	857	-2.5
Liquefied Natural Gas	213	202	171	201	202	157	-26.3
Combo	319	222	169	127	158	120	-62.4
General	3,983	3,844	3,584	3,274	3,553	4,029	1.2
All types	**63,053**	**61,603**	**58,751**	**54,081**	**59,871**	**68,036**	**7.9**

SOURCES: Lloyd's Marine Intelligence Unit, Vessel Movements Data Files, 2005-2011 (London: Lloyd's Marine Intelligence Unit, 2007-2012); Lloyd's Marine Intelligence Unit, Seasearcher (London: Lloyd's Marine Intelligence Unit, 2012); and Clarkson Research Studies, Clarkson's Vessel Registers (London: Clarkson Research Studies, January 2012); as reported in U.S. Department of Transportation, Maritime Administration, *Vessel Calls Snapshot, 2011* (Washington, DC: 2013), available at www.marad.dot.gov/documents/Vessel_Calls_at_US_Ports_Snapshot.pdf.

In 2011, 7,836 oceangoing vessels made 68,036 calls at U.S. ports, a 13.5 percent increase from the previous year. Tankers accounted for 34.9 percent of total calls, followed by containerships (32.7 percent) and dry bulk vessels (16.0 percent). Approximately 98.0 percent of all tankers calling at U.S. ports are double-hull vessels, a 14.3 percent increase from 5 years earlier.

Table 3-16 Average Vessel Size per Call at U.S. Ports: 2006–2011

(deadweight tons)

Type	2006	2007	2008	2009	2010	2011	Percent change, 2006-2011
Tanker	72,340	72,741	72,660	72,483	71,748	70,381	-2.7
Double hull	76,306	76,898	75,358	74,012	72,689	70,996	-7.0
Product	37,765	36,766	36,672	37,363	37,373	37,505	-0.7
Double hull	37,972	37,048	36,909	37,305	37,291	37,448	-1.4
Crude	129,984	129,521	128,056	125,377	123,703	124,634	-4.1
Double hull	128,844	129,723	127,725	125,561	123,937	124,650	-3.3
Container	46,602	47,726	49,214	50,207	51,266	51,204	9.9
TEU	3,503	3,598	3,744	3,849	3,932	3,969	13.3
Dry bulk	44,578	45,145	47,276	48,126	50,439	53,652	20.4
Roll on/Roll off	19,750	19,634	20,146	20,631	20,574	20,819	5.4
Vehicle	18,801	18,585	18,886	19,203	19,261	19,741	5.0
Gas	41,287	41,262	41,388	45,078	44,154	40,523	-1.9
Cubic meters	61,739	61,486	61,921	68,722	66,980	59,247	-4.0
Liquefied Natural Gas	70,962	73,703	70,097	74,465	74,445	81,363	14.7
Cubic meters	130,006	134,832	128,834	135,895	137,028	151,719	16.7
Combo	86,338	94,837	98,709	102,115	106,559	109,331	26.6
General	25,408	25,540	24,596	23,641	23,595	22,756	-10.4
All types	**50,653**	**51,638**	**52,518**	**53,472**	**53,687**	**53,832**	**6.3**

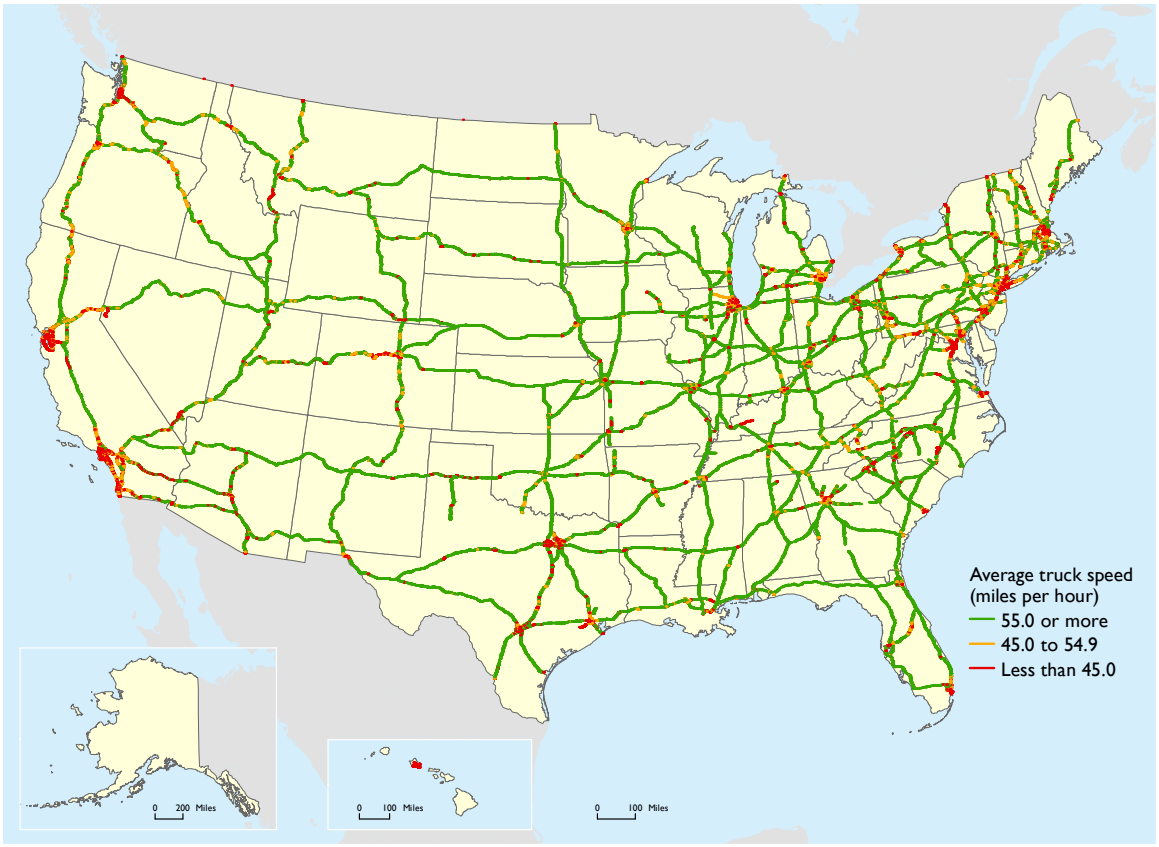
SOURCES: Lloyd's Marine Intelligence Unit, Vessel Movements Data Files, 2005-2011 (London: Lloyd's Marine Intelligence Unit, 2007-2012); Lloyd's Marine Intelligence Unit, Seasearcher (London: Lloyd's Marine Intelligence Unit, 2012); and Clarkson Research Studies, Clarkson's Vessel Registers (London: Clarkson Research Studies, January 2012); as reported in U.S. Department of Transportation, Maritime Administration, *Vessel Calls Snapshot, 2011* (Washington, DC: 2013), available at www.marad.dot.gov/documents/Vessel_Calls_at_US_Ports_Snapshot.pdf.

The average vessel size per call at U.S. ports increased from 50,653 deadweight tons (dwt) in 2006 to 53,832 dwt in 2011, an increase of 6.3 percent. The average size of containerships increased by 13 percent in terms of TEU capacity (9.9 percent in terms of dwt) as carriers expanded the deployment of post-panamax container ships in U.S. trades. Post-Panamax refers to vessels that are larger than the width and length of the lock chambers in the Panama Canal.

IV. Freight Transportation System Performance

The efficient and reliable movement of goods is important to the U.S. economy. Truck travel time and speed are two indicators of transportation system performance. Slower speeds and unreliable travel times caused by congestion and inclement weather conditions increase fuel cost and affect operations efficiency and productivity.

Figure 4-1 Average Truck Speeds on Select Interstate Highways: 2014



SOURCE: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Performance Measurement Program, September 2015.

The U.S. Department of Transportation, Federal Highway Administration, in cooperation with private industry, measures the speed and travel-time reliability of more than 500,000 trucks on 25 freight-significant corridors on an annual basis. Average truck speeds drop below 55 miles per hour (mph) near major urban areas, border crossings and gateways, and in mountainous terrain.

Table 4-1 Maximum Posted Speed Limits on Rural Interstates: 2015

(miles per hour)

State	Truck	Car
Alabama	70	70
Alaska	65	65
Arizona	75	75
Arkansas	70	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	70	75
Illinois	70	70
Indiana	65	70
Iowa	70	70
Kansas	75	75
Kentucky	65	65
Louisiana	75	75
Maine	75	75
Maryland	70	70
Massachusetts	65	65
Michigan	60	70
Minnesota	70	70
Mississippi	70	70
Missouri	70	70
Montana	65	80
Nebraska	75	75
Nevada	80	80
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	70	70
Oklahoma	75	75
Oregon	55	65
Pennsylvania	70	70
Rhode Island	65	65
South Carolina	70	70
South Dakota	80	80
Tennessee	70	70
Texas	75	75
Utah	75	75
Vermont	65	65
Virginia	70	70
Washington	60	70
West Virginia	70	70
Wisconsin	70	70
Wyoming	75	75

[1]Urban interstate.

NOTE: Many states permit speeds higher than those listed above on specified segments of roads.

SOURCE: Insurance Institute for Highway Safety, Maximum Posted Speed Limits for Passenger Vehicles, available at www.iihs.org/iihs/topics/t/speed/topicoverview as of July 2015.

Delay, reliability, and similar performance measures are typically based on the difference between speed limits and actual speeds. Speed limits for trucks (table 4-1) vary from state to state and are lower than limits set for passenger vehicles in seven states.

Table 4-2 Average Truck Speeds on Selected Metropolitan Area Interstates: 2012–2015

(miles per hour)

Metropolitan Area	2012	2013	2014	2015
Atlanta, GA	60.51	60.16	59.01	58.83
Boston, MA	56.84	56.62	55.11	54.55
Chicago, IL	55.41	54.40	52.61	53.18
Dallas, TX	60.16	59.64	59.33	59.31
Detroit, MI	57.44	57.35	56.21	56.39
Houston, TX	59.15	58.73	57.87	57.96
Los Angeles, CA	49.29	48.95	48.29	47.93
Miami, FL	60.35	60.20	59.17	59.02
New York, NY	55.55	55.64	53.65	53.64
Philadelphia, PA	56.29	56.02	53.86	53.57
Phoenix, AZ	60.16	60.03	58.99	60.29
San Francisco, CA	47.01	47.82	47.22	47.56
Seattle, WA	54.41	54.42	54.03	54.09
Washington, DC	56.31	55.78	54.94	56.12

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Performance Measurement Program, special tabulation, 2015.

The Federal Highway Administration uses Freight Performance Measurement Program data to measure truck speeds within 14 very large Census Metropolitan Statistical Areas. In 2015, 7 of the 14 metropolitan areas had average truck speeds of less than 55 mph on their roadways.

Table 4-3 Performance Measurements for Selected Corridors on Weekdays: 2014

Corridor	Average Speed	Peak Period Average Speed	Non-Peak Period Average Speed	Non-Peak/ Peak Ratio	Buffer Index
I-5: Medford, OR to Seattle, WA	55.90	54.79	56.53	1.03	34.32
I-5/CA 99: Sacramento, CA to Los Angeles, CA	56.19	55.89	56.39	1.01	26.23
I-10: Los Angeles, CA to Tucson, AZ	59.44	58.53	59.85	1.02	24.02
I-10: San Antonio, TX to New Orleans, LA	61.67	60.78	62.18	1.02	24.98
I-10: Pensacola, FL to I-75 (FL)	64.02	64.02	64.03	1.00	5.39
I-30: Little Rock, AR to Dallas, TX	62.60	62.20	62.81	1.01	12.57
I-35: Laredo, TX to Oklahoma City, OK	60.72	59.72	61.21	1.02	22.81
I-40: Oklahoma City, OK to Flagstaff, NM	64.36	64.27	64.40	1.00	9.58
I-40: Knoxville, TN to Little Rock, AR	61.78	61.58	61.91	1.01	18.76
I-40: Raleigh, NC to Asheville, NC	62.02	61.56	62.24	1.01	11.36
I-55/I-39/I-94: Saint Louis, MO to Minneapolis, MN	62.35	62.16	62.48	1.01	10.74
I-57/I-74: I-24 (IL) to I-55 (IL)	62.92	62.92	62.92	1.00	10.97
I-70: Kansas City, KS to Columbus, OH	61.77	61.51	61.91	1.01	15.96
I-65/I-24: Chattanooga, TN to Nashville, TN to Chicago, IL	60.05	59.45	60.37	1.02	28.15
I-75: Tampa, FL to Knoxville, TN	62.25	61.70	62.58	1.01	16.23
I-75: Lexington, KY to Detroit, MI	59.82	59.30	60.15	1.01	24.56
I-78/I-76: New York, NY to Pittsburgh, PA	59.77	59.32	60.01	1.01	14.62
I-80: New York, NY to Cleveland, OH	61.10	60.71	61.30	1.01	15.80
I-80: Cleveland, OH to Chicago, IL	61.80	61.73	61.83	1.00	15.29
I-80: Chicago, IL to I-76 (CO/NE border)	63.46	63.40	63.48	1.00	10.33
I-81: Harrisburg, PA to I-40 (Knoxville, TN)	62.60	62.58	62.62	1.00	9.19
I-84: Boise, ID to I-86 (ID)	62.62	62.35	62.72	1.01	12.33
I-94: Chicago, IL to Detroit, MI	59.27	58.88	59.56	1.01	11.35
I-95: Miami, FL to I-26 (SC)	62.35	61.76	62.69	1.02	18.52
I-95: Richmond (VA) to New Haven (CT)	53.90	51.88	55.06	1.06	63.89

NOTES: For this table, reliability is expressed as a Buffer Index. The Buffer Index represents the extra buffer time (minutes) that most drivers add to their average travel time when planning trips to ensure on-time arrival. This extra time is added to account for any unexpected delay. The buffer index is expressed as a percentage and its value increases as reliability gets worse. This formulation of the buffer index uses a 95th percentile travel time to represent a near-worst case travel time. It represents the extra time a traveler should allow to arrive on-time for 95 percent of all trips. A simple analogy is that a driver who uses a 95 percent reliability indicator would be late only one weekday per month. The reliability measure is most meaningful when applied to an actual trip or segment. As it is applied to entire corridors in this table, the reliability calculation is applied to segments and then averaged for the corridor. The Buffer Index derived is not so much an actual percent that one would apply to determine reliability at any point on the corridor. Instead, it should be used in this case as an overall indicator of performance. The non-peak period/peak period ratio is calculated by dividing average speed during the non-peak period by average speed during the peark period. Higher ratios indicate corridors where the non-peak period average speed exceeds peak period average speed.

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Performance Measurement Program, special tabulation, 2015.

The Federal Highway Administration Freight Performance Measurement Program monitors performance on corridors that have the heaviest freight volumes. Measuring average speed during peak and nonpeak periods of travel is beneficial in understanding freight performance on these corridors and identifying areas in need of operational and capital improvements.

Table 4-4 Top 25 Congested Freight-Significant Locations: 2013

Location	Congestion ranking	Average speed (mph)	Peak period average speed (mph)	Non-peak period average speed (mph)	Non-peak/ peak ratio
Fort Lee, NJ: I-95 at SR-4	1	35.72	30.30	37.81	1.25
Chicago, IL: I-290 at I-90/I-94	2	30.02	22.89	32.61	1.42
Atlanta, GA: I-285 at I-85 (North)	3	42.34	30.32	48.68	1.61
Cincinnati, OH: I-71 at I-75	4	47.13	39.43	50.03	1.27
Houston, TX: I-45 at US-59	5	39.01	28.80	43.80	1.52
Houston, TX: I-610 at US 290	6	41.99	34.10	45.70	1.34
St. Louis, MO: I-70 at I-64 (West)	7	43.16	39.14	44.80	1.14
Los Angeles, CA: SR-60 at SR-57	8	46.52	39.04	49.72	1.27
Louisville, KY: I-65 at I-64/I-71	9	46.81	40.87	49.35	1.21
Austin , TX: I-35	10	35.58	22.23	42.82	1.93
Chicago, IL: I-90 at I-94 (North)	11	35.04	21.31	41.42	1.94
Dallas, TX: I-45 at I-30	12	42.37	33.33	46.18	1.39
Houston, TX: I-10 at I-45	13	45.63	36.21	50.02	1.38
Atlanta, GA: I-75 at I-285 (North)	14	47.60	37.43	52.08	1.39
Denver, CO: I-70 at I-25	15	43.34	36.78	46.26	1.26
Houston, TX: I-10 at US 59	16	46.65	35.77	52.26	1.46
Los Angeles, CA: I-710 at I-105	17	45.43	36.03	49.41	1.37
Baton Rouge, LA: I-10 at I-110	18	43.90	35.92	47.68	1.33
Minneapolis - St. Paul, MN: I-35W at I-494	19	45.55	35.88	50.37	1.40
Seattle, WA: I-5 at I-90	20	37.54	28.60	42.07	1.47
Hartford, CT: I-84 at I-91	21	46.75	37.29	50.75	1.36
Houston, TX: I-45 at I-610 north	22	47.51	38.21	51.99	1.36
Atlanta, GA: I-20 at I-285 (East)	23	48.84	43.51	51.16	1.18
Auburn, WA: SR 18 at SR 167	24	47.92	41.50	51.04	1.23
Atlanta, GA: I-20 at I-285 (West)	25	50.11	45.20	52.00	1.15

KEY: mph = miles per hour.

NOTES: The American Transportation Research Institute (ATRI) monitors 250 freight-significant highway infrastructure locations on an annual basis. These locations were identified over several years through reviews of past research, available highway speed and volume datasets, and surveys of private- and public-sector stakeholders. FHWA developed a freight congestion index to rank congestion's impact on freight. The index factors in the number of trucks using a particular highway facility and the impact that congestion has on average commercial vehicle speed in each of the 250 study areas. These data represent truck travel during weekdays at all hours of the day in 2013. Average speeds below a free flow of 55 miles per hour indicate congestion.

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Performance Measurement Program, special tabulation, 2015.

Truck speed and travel time reliability data can be used to identify and quantify major freight truck chokepoints and bottlenecks along highways critical to the Nation's freight transportation system. The Federal Highway Administration developed a freight congestion index that ranks congestion's impact on freight movement. The index factors in both the number of trucks using a particular highway facility and the impact that congestion has on the average speed of those vehicles.

On weekdays, average speeds during peak periods (between 6:00 a.m. and 9:00 a.m. and between 4:00 p.m. and 7:00 p.m.) are typically less than those recorded during nonpeak periods. Freight traveling across urban interstate interchanges is affected to the greatest degree by peak-period congestion. At several locations, congestion affects freight mobility during all hours of the day.

Table 4-5 Largest Improvement in Average Speed for Congested Freight Highway Locations: 2012 and 2013

	Overall average speed (mph)			Peak period average speed (mph)			Non-peak period average speed (mph)		
Location	2012	2013	Percent change, 2012 to 2013	2012	2013	Percent change, 2012 to 2013	2012	2013	Percent change, 2012 to 2013
Fort Lee, NJ: I-95 at SR-4	28.98	35.72	23.3	22.67	30.30	33.7	31.84	37.81	18.7
New Castle, DE: I-95 at US-301	47.78	54.94	15.0	49.01	54.78	11.8	47.39	55.00	16.1
Chicago, IL: I-290 at I-355	47.66	53.35	11.9	43.17	49.79	15.3	49.48	54.88	10.9
Washington , DC: I-495 at I-66	43.75	48.95	11.9	38.51	41.00	6.5	45.45	51.89	14.2
Las Cruces, NM: I-10 at I-25	51.48	55.00	6.8	50.03	55.00	9.9	52.01	55.00	5.7
Reno, NV: I-80 at US 395	50.64	53.97	6.6	48.59	51.67	6.3	51.55	54.94	6.6
Montgomery, AL: I-85 at I-65	51.92	55.00	5.9	50.31	55.00	9.3	52.53	55.00	4.7
Rye, NY: I-95 at I-287	51.65	53.87	4.3	49.77	51.54	3.6	52.14	54.49	4.5
Louisville, KY: I-65 at I-64/I-71	44.93	46.81	4.2	39.34	40.87	3.9	47.35	49.35	4.2
Charleston, SC: I-26 at I-526	47.49	49.37	4.0	40.76	43.83	7.5	51.07	52.16	2.1

KEY: mph = miles per hour.

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Performance Measurement Program, special tabulation, 2015.

Several monitored locations have recorded noticeable improvements in performance from 2012 to 2013 when considering average speed over a 24-hour period. Locations along I-95 in New Jersey and Delaware have seen the greatest improvement in overall and nonpeak period average speeds.

Table 4-6 Truck Trip Reliability as Indicated by Minimum and Maximum Travel Times Between Selected City Pairs: 2014

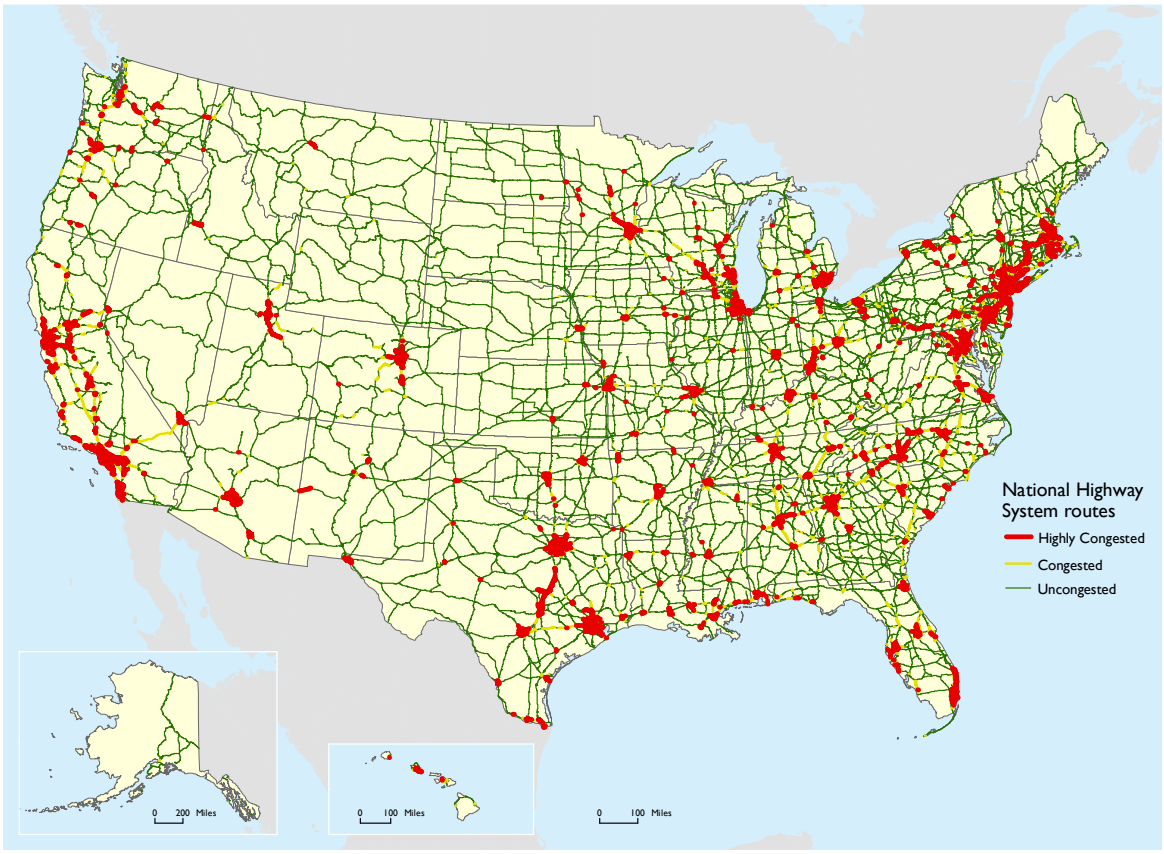
Location	Northbound/ eastbound minimum	Northbound/ eastbound maximum	Maximum/ minimum percent difference	Southbound/ westbound minimum	Southbound/ westbound maximum	Maximum/ minimum percent difference
Atlanta, GA - Savannah, GA	4:05:57	4:39:50	13.8	4:06:03	4:38:03	13.0
Chicago, IL - Milwaukee, WI	1:34:25	2:21:27	49.8	1:34:38	2:44:47	74.1
Chicago, IL - Nashville, TN	8:03:45	8:44:41	8.5	8:06:19	8:43:13	7.6
Detroit, MI - Chicago, IL	4:58:12	5:30:55	11.0	5:01:49	5:39:21	12.4
Detroit, MI - Grand Rapids, MI	2:51:36	3:51:24	34.8	3:19:23	4:24:47	32.8
Houston, TX - Beaumont, TX	1:26:11	1:56:10	34.8	1:26:20	1:45:57	22.7
Houston, TX - Dallas, TX	3:53:22	4:33:35	17.2	3:54:13	4:29:25	15.0
Houston, TX - San Antonio, TX	3:21:20	4:06:46	22.6	3:23:46	4:24:09	29.6
Indianapolis, IN - Chicago, IL	3:11:15	3:46:25	18.4	3:10:45	3:40:10	15.4
Las Vegas, NV - Los Angeles, CA	4:21:57	5:46:45	32.4	4:31:05	5:26:29	20.4
Los Angeles, CA - San Francisco, CA	7:11:33	8:32:51	18.8	7:19:05	8:50:44	20.9
Miami, FL - Tampa, FL	4:56:24	5:53:18	19.2	4:55:16	5:55:22	20.4
Nashville, TN - Indianapolis, IN	4:50:53	5:24:11	11.4	4:52:33	5:21:53	10.0
New York, NY - Albany, NY	2:47:25	3:32:11	26.7	2:45:20	3:34:32	29.7
New York, NY - Buffalo, NY	7:37:35	8:32:09	11.9	7:41:21	8:36:26	11.9
New York, NY - Hartford, CT	2:05:38	3:26:31	64.4	2:02:43	3:16:49	60.4
Philadelphia, PA - New York, NY	1:55:20	3:34:25	85.9	1:49:33	3:14:18	77.4
Phoenix, AZ - Los Angeles, CA	6:23:57	7:38:54	19.5	6:32:50	7:26:12	13.6
Phoenix, AZ - Tucson, AZ	1:52:46	2:16:42	21.2	1:53:18	2:17:46	21.6
San Antonio, TX - Austin, TX	1:26:57	2:08:23	47.6	1:27:15	2:11:34	50.8
San Diego, CA - Los Angeles, CA	2:20:58	4:14:01	80.2	2:17:35	3:56:22	71.8
San Francisco, CA - Sacramento, CA	1:38:39	3:03:27	85.9	1:35:22	2:41:24	69.2
Seattle, WA - Portland, OR	2:58:58	4:04:42	36.7	2:59:11	3:52:02	29.5
Tampa, FL - Orlando, FL	1:22:12	1:58:46	44.5	1:24:17	1:57:47	39.8
Washington, DC - Baltimore, MD	0:58:18	1:35:54	64.5	0:56:60	1:28:44	55.7

NOTE: Travel times are shown in hours, minutes, and seconds. The trip times were calculated between city centers using interstate average travel speed data from the Freight Performance Measurement Program.

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Performance Measurement Program, special tabulation, 2015.

Intercity travel-time reliability is a key freight performance measure. It influences logistics, operational strategies, and load optimization. The Federal Highway Administration analyzed the truck trip reliability of key city-pair origins and destinations. Travel time between Philadelphia and New York City and between San Francisco and Sacramento showed the greatest change. Drivers in all city pairs shown in table 4-6 experienced increases in travel time.

Figure 4-2 Peak-Period Congestion on the National Highway System: 2011

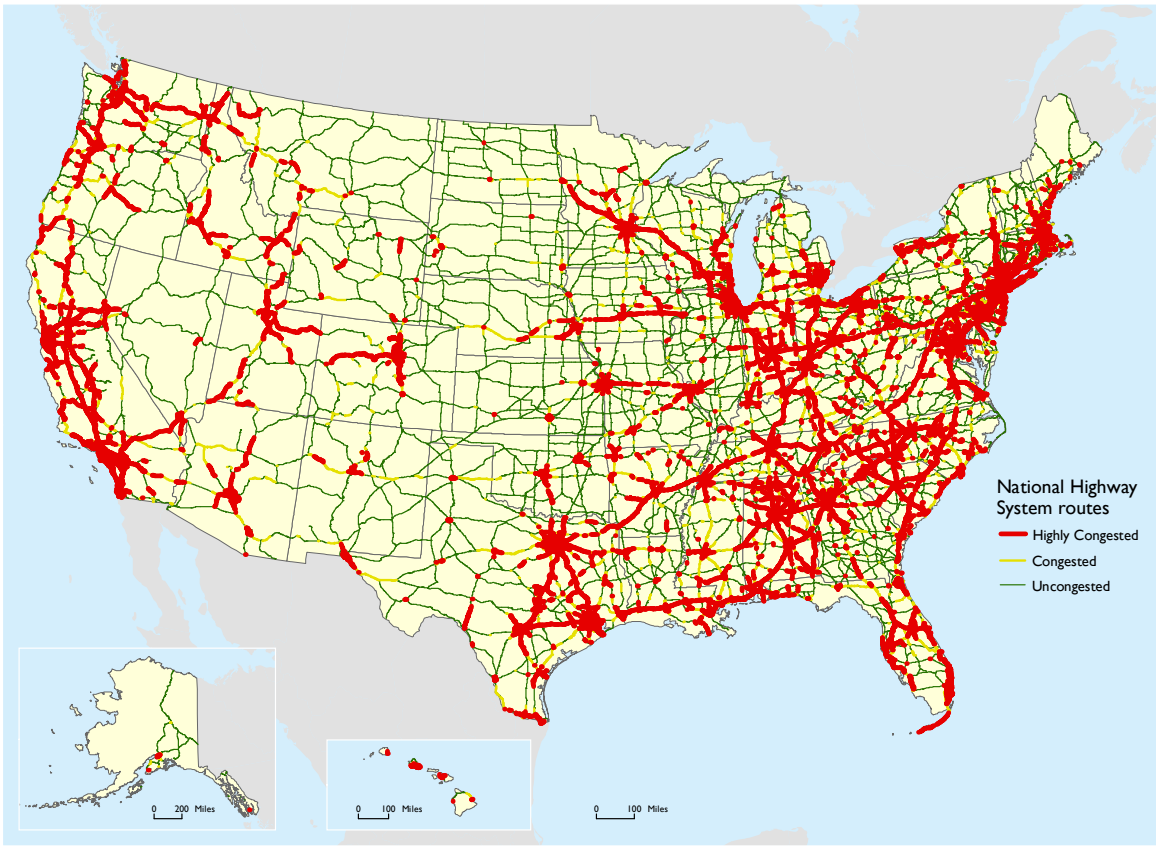


NOTES: Highly congested segments have stop-and-go conditions with volume/service flow ratios greater than 0.95. Congested segments have reduced traffic speeds with volume/service flow ratios between 0.75 and 0.95. The volume/service flow ratio is estimated using the procedures outlined in the *Highway Performance Monitoring System Field Manual*, Appendix N.

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, *Freight Analysis Framework*, version 3.5, 2015.

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 2011 peak-period congestion resulted in traffic slowing below posted speed limits on 13,500 miles of the National Highway System and created stop-and-go conditions on an additional 8,700 miles.

Figure 4-3 Peak-Period Congestion on the National Highway System: 2040

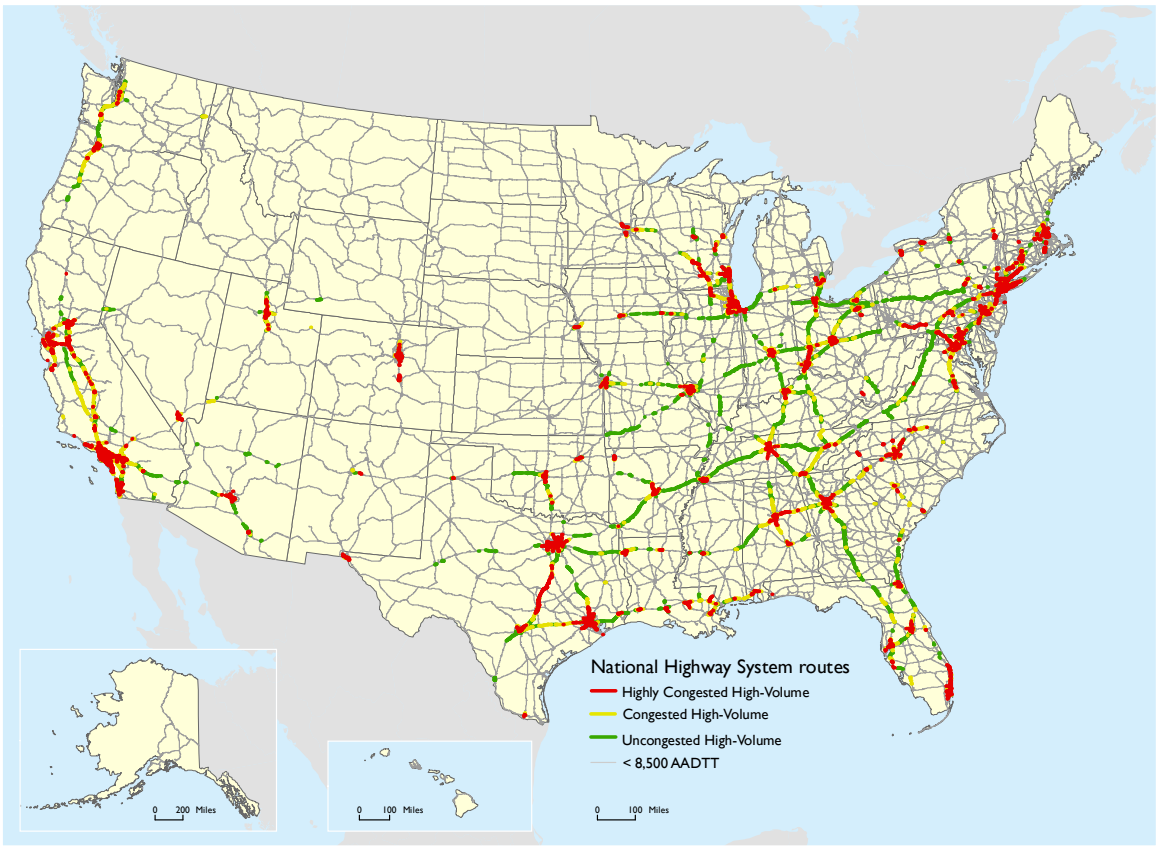


NOTES: Highly congested segments are stop-and-go conditions with volume/service flow ratios greater than 0.95. Congested segment have reduced traffic speeds with volume/service flow ratios between 0.75 and 0.95. The volume/service flow ratio is estimated using the procedures outlined in the *Highway Performance Monitoring System Field Manual*, Appendix N.

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, *Freight Analysis Framework*, version 3.5, 2015.

Assuming no changes in network capacity, increases in truck and passenger vehicle traffic are forecast to expand areas of recurring peak-period congestion to 34 percent of the National Highway System (NHS) in 2040, compared with 10 percent in 2011. This would slow traffic on 28,000 miles of the NHS and create stop-and-go conditions on an additional 46,000 miles.

Figure 4-4 Peak-Period Congestion on High-Volume Truck Portions of the National Highway System: 2011

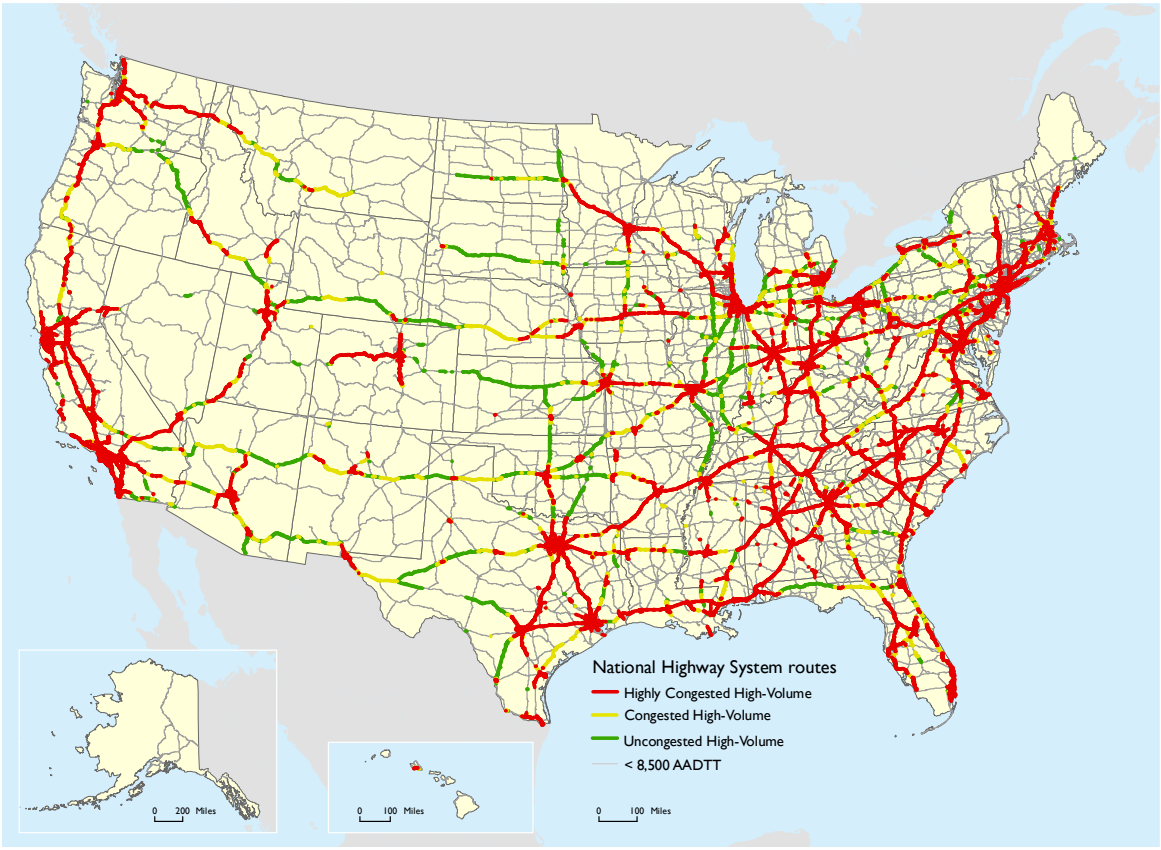


NOTES: High-volume truck portions of the National Highway System carry more than 8,500 trucks per day, including freight-hauling long-distance trucks, freight hauling local trucks, and other trucks with six or more tires. Highly congested segments are stop-and-go conditions with volume/service flow ratios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

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, *Freight Analysis Framework*, version 3.5, 2015.

Large numbers of trucks on congested highways substantially impede interstate commerce. Recurring congestion slows traffic on 5,800 miles and creates stop-and-go conditions on 4,500 miles of the National Highway System, which carries more than 8,500 trucks per day.

Figure 4-5 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 flow ratios between 0.75 and 0.95. The volume/service flow ratio is estimated using the procedures outlined in the *Highway Performance Monitoring System Field Manual*, Appendix N.

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, *Freight Analysis Framework*, version 3.5, 2015.

Assuming no change in network capacity, the number of NHS miles with recurring congestion and the number of large trucks is forecast to increase significantly between 2011 and 2040. On highways carrying more than 8,500 trucks per day, recurring congestion will slow traffic on close to 7,400 miles and create stop-and-go conditions on an additional 22,000 miles.

Table 4-7 Average Time for Commercial Vehicles to Travel One Mile at Selected U.S.-Canada Border Crossings: 2014

Location	Direction	Average minutes per mile
Ambassador Bridge - Detroit, MI	Inbound	5.7
	Outbound	4.5
Port Huron, MI	Inbound	4.6
	Outbound	4.1
Peace Bridge - Buffalo, NY	Inbound	4.6
	Outbound	4.9
Lewiston-Queenston Bridge - Lewiston, NY	Inbound	4.9
	Outbound	4.2
Champlain, NY	Inbound	4.8
	Outbound	3.8
Blaine, WA	Inbound	6.7
	Outbound	4.5
Alexandria Bay, NY	Inbound	4.6
	Outbound	3.4
Pembina, ND	Inbound	5.6
	Outbound	3.4
Derby, VT	Inbound	3.0
	Outbound	2.4
Calais, ME	Inbound	2.7
	Outbound	2.7
Sumas, WA	Inbound	3.8
	Outbound	3.7
Highgate, VT	Inbound	3.0
	Outbound	2.4
Houlton, ME	Inbound	3.9
	Outbound	3.0
Sweetgrass, MT	Inbound	5.9
	Outbound	4.7
Jackman, ME	Inbound	2.6
	Outbound	2.1

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, special tabulation, 2015.

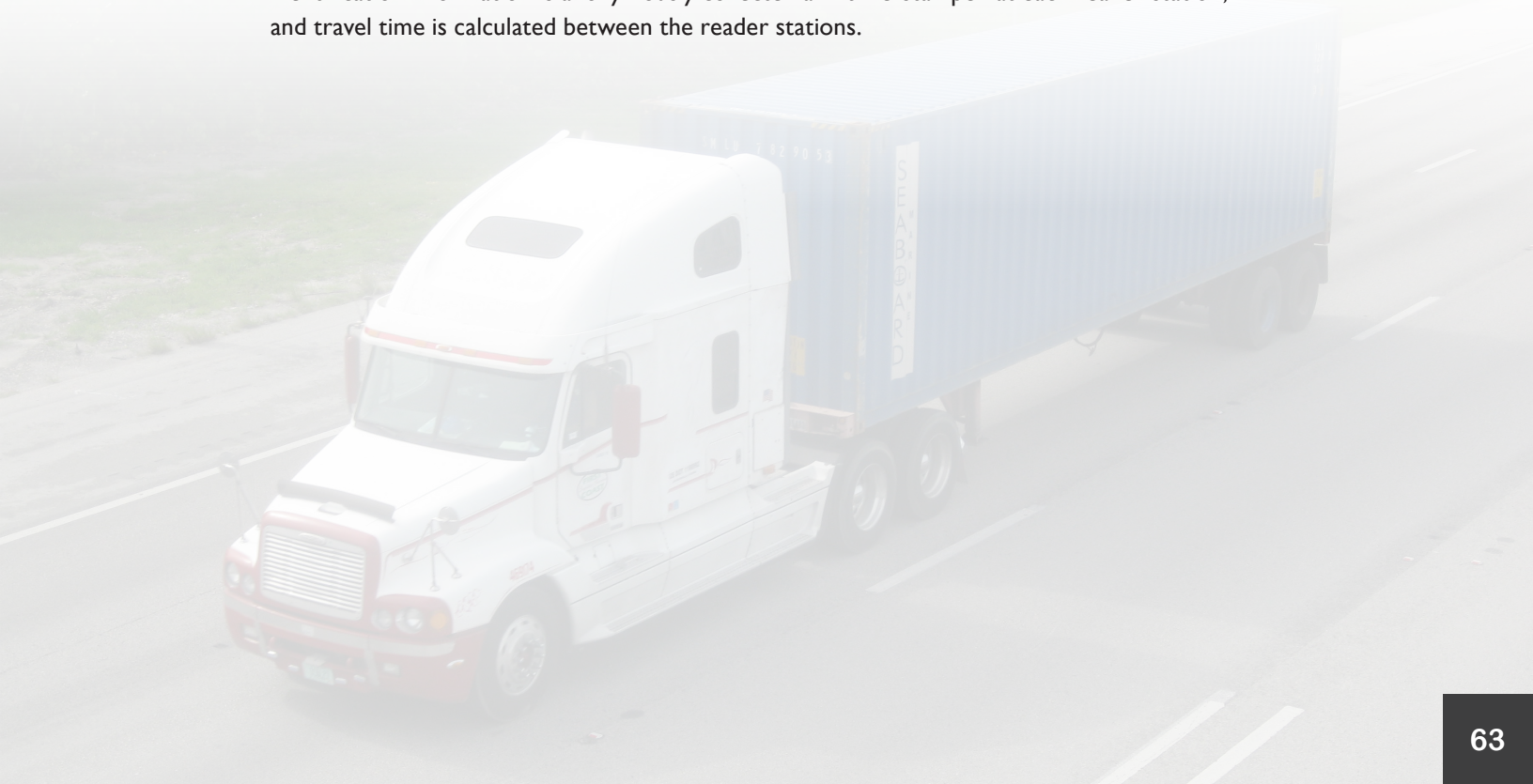
Border crossings are potential bottlenecks in the freight transportation network. The Federal Highway Administration monitors truck crossing times at 15 U.S.-Canada border crossings. At all but two borders, transit times were longer for inbound U.S. traffic than for travel to Canada.

Table 4-8 Average Inbound Truck Transit Time at Two U.S.-Mexico Border Crossings: 2014

Month	Bridge of the Americas - El Paso, Texas (minutes)	Pharr-Reynosa International Bridge - Pharr, Texas (minutes)
January	38	64
February	37	73
March	36	82
April	39	71
May	48	73
June	45	66
July	53	56
August	54	55
September	51	56
October	47	50
November	46	63
December	43	55

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations; U.S. Department of Transportation, Intelligent Transportation Systems Joint Program Office; and Texas Department of Transportation, 2015.

The U.S. Department of Transportation in partnership with the Texas Department of Transportation also measures transit times from Mexico to the United States at the Bridge of the Americas and the Pharr-Reynosa International Bridge. The data are collected using radio frequency identification technology installed at the start of the crossing (typically the end of the queue) and at the vehicle safety inspection station exit (the end of the crossing trip). Vehicle identification information is anonymously collected and time-stamped at each reader station, and travel time is calculated between the reader stations.



V. Economic Characteristics of the Freight Transportation Industry

The freight transportation industry employed 4.6 million people in 2014 (table 5-4) and comprised 9.5 percent of the Nation's economic activity as measured by gross domestic product (GDP).

Table 5-1 Transportation Fixed Assets: 2000, 2005, and 2010–2013
(billions of current dollars)

	2000	2005	2010	2011	2012	2013	Percent change, 2000 to 2013
Total Transportation Fixed Assets	**2,957**	**3,981**	**5,163**	**5,497**	**5,753**	**5,941**	**100.9**
Private Sector (R)							
Transportation Equipment[1]	820	959	985	1,040	1,106	1,173	43.1
Transportation Structures[2]	453	561	657	694	718	739	63.0
Public Sector (R)							
Highways	1,430	2,054	2,936	3,132	3,267	3,343	133.8
Transportation Structures[2]	254	408	586	631	663	686	170.0
Federal	5	8	12	13	13	13	171.4
State and Local	249	400	574	619	650	673	170.1

KEY: R = revised.

[1]Includes trucks, truck trailers, buses, automobiles, aircraft, ships, boats, and railroad equipment.

[2]Includes physical structures for all modes of transportation.

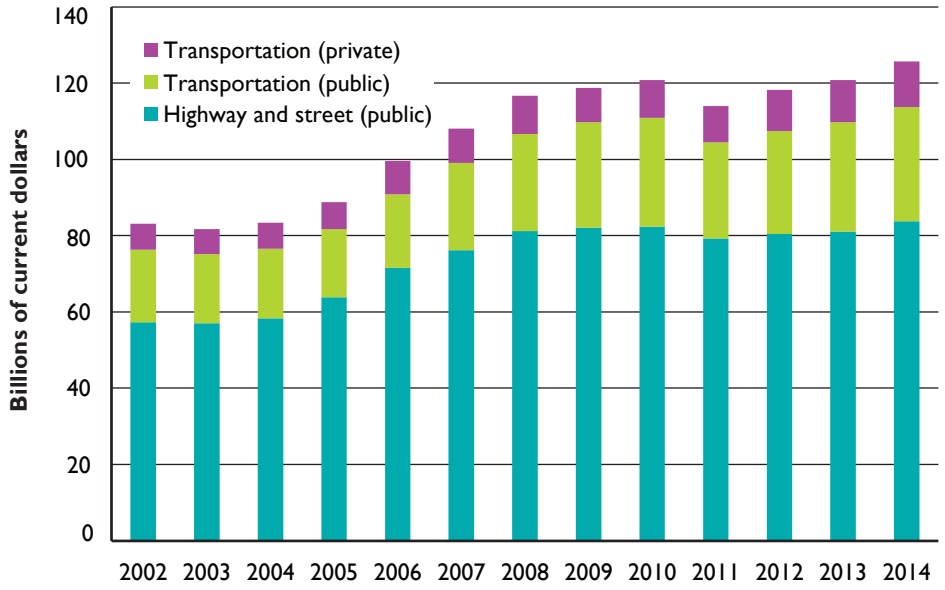
SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, National Economic Accounts, Fixed Assests Tables, tables 2.1, 3.1s, and 7.1b, available at www.bea.gov/iTable/index_FA.cfm as of July 2015.

Fixed transportation assets can be privately owned (32.2 percent) or publicly owned (67.8 percent). Freight railroad facilities and services are almost entirely private, while private-sector trucks 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 travel public waterways and serve both public and private port facilities. Pipelines are mostly privately owned, although significantly controlled by public regulation. In the public sector, virtually all truck routes are owned and maintained by state or local governments. Airports and harbors are typically owned by public authorities, although terminals are usually owned or managed by private operators. Air and water navigation is mostly controlled by the Federal Government, and safety is regulated by all levels of government.

Total private and public fixed assets grew from about $29.6 trillion in 2000 to $50.9 trillion in 2013 (current U.S. dollars). Transportation equipment and structures (private and public) accounted for 43.7 percent of total U.S. assets in 2013. The components of transportation fixed assets and their 2013 values are private transportation equipment ($1.17 trillion), private transportation structures ($739 billion), and government highways and transportation structures ($4.03 trillion).[1]

[1] See the U.S. Department of Commerce, Bureau of Economic Analysis, Fixed Assets tables 1.1, 2.1, 3.1s, and 7.1b for total and transportation fixed assets data (www.bea.gov/national/FA2004/index.asp). Transportation fixed assets include both passenger and freight modes.

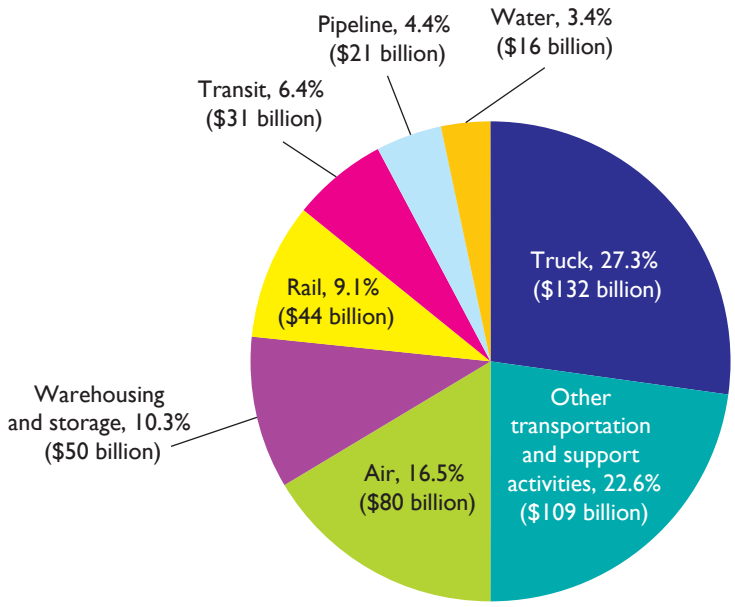
Figure 5-1 Value of Annual Transportation Infrastructure Put in Place: 2002-2014



SOURCE: U.S. Department of Commerce, Census Bureau, Value of Construction Put in Place, Not Seasonally Adjusted (2002-2014), available at http://www.census.gov/ as of April 2015.

Federal, state, and local governments are a major source of funding for transportation infrastructure construction. In 2014 the value of government-funded transportation construction put in place was $113.7 billion of the total $125.7 billion, which accounted for 90 percent of total spending on transportation construction. Approximately two-thirds of public sector funding went to highways and streets, the remainder supported the construction of airport terminals and runways, transit and water transportation facilities, and pedestrian and bicycle infrastructure.

Figure 5-2 For-Hire Transportation Services Contribution to U.S. Gross Domestic Product by Mode: 2013



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

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, *Industry Economic Accounts*, Interactive tables, available at http://www.bea.gov/industry/index.htm as of July 2015.

In 2013 for-hire transportation contributed $481 billion (current dollars) to U.S. GDP. Of that total, the for-hire trucking mode contributed the largest share (27 percent), followed by air (17 percent). The Bureau of Transportation Statistics Transportation Satellite Accounts show that transportation services provided by nontransportation industries for their own use, referred to as the in-house transportation sector, are almost as large as that for the for-hire sector.

Table 5-2 Economic Characteristics of Transportation and Warehousing Establishments in Freight-Dominated Modes: 2007 and 2012

	Establishments		Revenue (millions of current $)		Payroll (millions of current $)		Paid Employees	
NAICS	2007	2012	2007	2012	2007	2012	2007	2012
Transportation and warehousing, Total	**219,706**	**213,805**	**639,916**	**732,975**	**173,183**	**183,875**	**4,454,383**	**4,316,392**
Rail transportation	NA	NA	NA	NA	NA	NA	NA	NA
Water transportation	1,721	1,467	34,447	39,528	4,544	4,681	75,997	65,549
Truck transportation	120,390	111,734	217,833	239,779	58,266	57,964	1,507,923	1,362,709
Pipeline transportation	2,529	3,451	25,718	37,237	3,219	5,111	36,964	48,354
Support activities for transportation	42,130	42,498	86,596	104,195	24,579	28,395	608,385	616,048
Couriers and messengers	13,004	13,667	77,877	71,081	20,431	21,138	557,195	534,234
Warehousing and storage	13,938	14,444	21,921	28,969	25,526	28,103	720,451	714,358

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 or for governmental organizations even when their primary activity would be classified in industries covered by the Economic Census. For example, data are not collected for publicly operated buses and subway systems.

SOURCES: **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 as of July 2015; **2012**: U.S. Department of Commerce, Census Bureau, *2012 Economic Census, Transportation and Warehousing, United States* (Washington, DC: 2014), available at www.census.gov/econ as of July 2015.

All told there were nearly 214,000 transportation and warehousing establishments (excluding rail) in 2012, with more than one-half of those primarily engaged in trucking. Revenue generated by trucking accounted for 32.7 percent of transportation and warehousing sector revenue, while warehousing accounted for a small percentage of the total.

Table 5-3 Economic Characteristics of Freight Railroads: 2000 and 2012

	Class I		Non-Class I		Total	
	2000	2012	2000	2012	2000	2012
Number of railroads	8	7	552	568	560	575
Freight revenue (billions of current dollars)	33.1	67.6	3.2	4.0	36.3	71.6
Operating revenue (billions of current dollars)	34.1	69.9	NA	NA	NA	NA
Employees	168,360	163,464	23,448	17,800	191,808	181,264

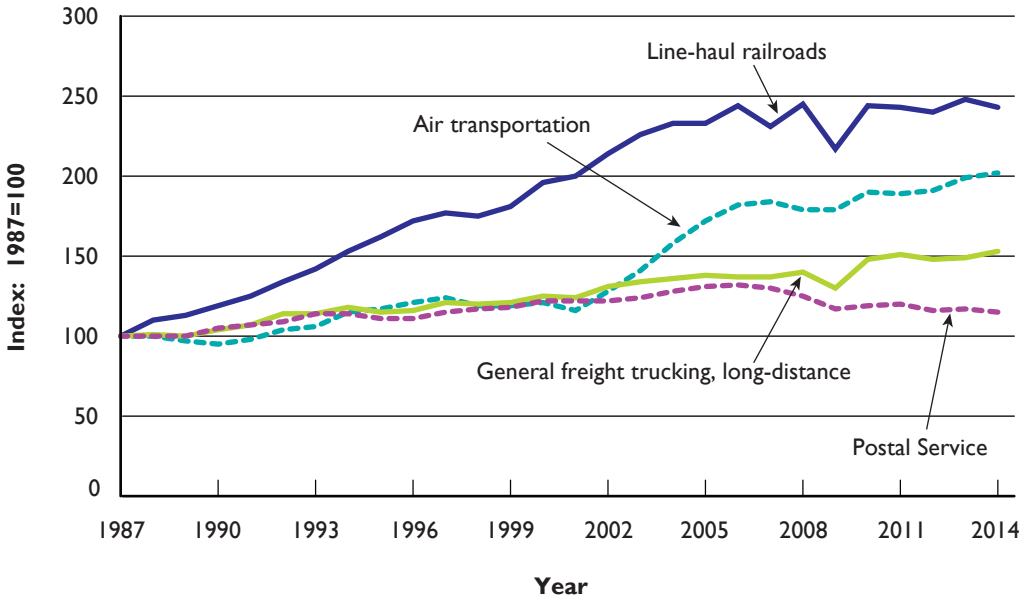
KEY: NA = not available.

NOTES: Class I railroads have annual carrier operating revenue of $467.1 million or more. Numbers may not add to totals due to rounding.

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

Railroads include Class I (national), Class II (regional), and Class III (local) carriers. In all three classes of railroads, revenue grew while employment declined between 2000 and 2011.

Figure 5-3 Productivity in Select Transportation Industries: 1987–2014



NOTES: In 2009, the Bureau of Labor Statistics (BLS) revised its data for air transportation output per hour worked to include both full-time and part-time workers. Prior to 2009, BLS assumed all air transportation workers were full-time employees.

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, Industry Productivity, available at www.bls.gov/lpc/ as of July 2015.

Between 1987 and 2014, output-per-hour worked more than doubled in line-haul railroading and the air transport industry. (Line-haul railroads do not include switching and terminal operations or short-distance/local railroads.) Long-distance, general-freight trucking grew by 53 percent over the same period. (Long-distance, general-freight trucking establishments exclude local trucking and truck operators that require specialized equipment, such as flatbeds, tankers, or refrigerated trailers.)

Table 5-4 Employment in For-Hire Transportation Establishments in Freight-Dominated Modes: 2000, 2010, and 2012–2014[1]

(thousands)

	2000	(R) 2010	(R) 2012	2013	2014
Total U.S. labor force[2] (R)	**132,019**	**130,275**	**134,104**	**136,393**	**139,042**
Transportation and warehousing	**4,410**	**4,191**	**4,416**	**4,498**	**4,640**
Rail transportation	232	216	231	231	235
Water transportation	56	62	64	65	67
Truck transportation	1,406	1,250	1,349	1,382	1,416
Air transportation[3] (R)	614	458	459	444	442
Pipeline transportation	46	42	44	45	47
Support activities for transportation[4]	537	543	580	598	625
Couriers and messengers	605	528	534	544	574
Warehousing and storage	514	633	687	711	738

KEY: R = revised.

[1]Annual averages.

[2]Excludes farm employment.

[3]Data for air transportation includes passenger and freight transportation employment.

[4]Industries in the support activities for transportation subsector provide services 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.

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, Current Employment Statistics survey, available at www.bls.gov/ces as of July 2015.

Employment in the truck, rail, water, and pipeline industries has grown since 2000, while air transport has experienced a decline in the number of employees. Between 2000 and 2014, air transport declined by 28.2 percent. Trucking in 2014 accounted for nearly 30.5 percent of total transportation and warehousing sector employment.

Table 5-5 Employment in Select Freight Transportation-Related Occupations: 2000, 2010, 2013, and 2014

Occupation (SOC code)	2000	2010	2013	2014
Vehicle operators, pipeline operators, and primary support				
Driver/sales worker (53-3031)	373,660	371,670	396,470	405,810
Truck drivers, heavy and tractor-trailer (53-3032)	1,577,070	1,466,740	1,585,300	1,625,290
Truck drivers, light or delivery services (53-3033)	1,033,220	780,260	776,930	797,010
Locomotive engineers (53-4011)	29,390	40,750	36,860	38,470
Rail yard engineers, dinkey operators, and hostlers (53-4013)	4,020	5,600	5,140	3,900
Railroad brake, signal, and switch operators (53-4021)	16,830	22,760	23,950	21,060
Railroad conductors and yardmasters (53-4031)	40,380	42,700	43,100	42,900
Sailors and marine oilers (53-5011)	30,090	31,690	28,810	27,640
Captains, mates, and pilots of water vessels (53-5021)	21,080	29,280	30,290	30,690
Ship engineers (53-5031)	7,370	9,470	9,930	10,060
Bridge and lock tenders (53-6011)	4,790	3,250	3,170	3,280
Gas compressor and gas pumping station operators (53-7071)	6,510	4,040	4,520	4,700
Pump operators, except wellhead pumpers (53-7072)	13,730	9,440	13,170	12,170
Transportation equipment manufacturing and maintenance occupations				
Bus and truck mechanics and diesel engine specialists (49-3031)	258,800	222,770	238,150	243,080
Rail car repairers (49-3043)	10,620	19,280	19,290	20,080
Transportation Infrastructure construction and maintenance occupations				
Rail-track laying and maintenance equipment operators (47-4061)	9,940	15,520	15,590	14,820
Signal and track switch repairers (49-9097)	5,540	7,400	7,960	7,880
Dredge operators (53-7031)	3,100	1,720	1,750	1,900
Secondary support service occupations				
Dispatchers, except police, fire, and ambulance (43-5032)	167,180	180,540	185,270	190,330
Postal service mail carriers (43-5052)	354,980	324,990	307,490	307,490
Shipping, receiving, and traffic clerks (43-5071)	864,530	687,850	677,450	661,530
Transportation inspectors (53-6051)	26,520	24,280	23,970	24,350
Tank car, truck, and ship loaders (53-7121)	17,480	10,390	12,560	12,490

KEY: SOC = Standard Occupational Classification.

NOTE: Data are for May of each year.

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, *National Occupational Employment and Wages*, available at www.bls.gov/oes as of July 2015.

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 (i.e., in-house transportation). There were approximately 2.83 million truck drivers in 2014; about 57.5 percent of these professionals drive heavy/tractor trailer trucks, 28.2 percent drive light/delivery service trucks, and about 14.3 percent are driver/sales workers.

Table 5-6 Average Hourly Wages in Select Freight Transportation-Related Occupations: 2000, 2010, 2013, and 2014

(current dollars)

Occupation (SOC code)	2000	2010	2013	2014
Vehicle operators, pipeline operators, and primary support				
Driver/sales worker (53-3031)	11.08	13.02	13.41	13.33
Truck drivers, heavy and tractor-trailer (53-3032)	15.78	18.97	19.68	20.16
Truck drivers, light or delivery services (53-3033)	11.84	15.45	16.10	16.28
Locomotive engineers (53-4011)	21.20	24.46	26.76	27.41
Rail yard engineers, dinkey operators, and hostlers (53-4013)	19.22	18.18	21.28	21.54
Railroad brake, signal, and switch operators (53-4021)	20.16	23.47	24.00	25.14
Railroad conductors and yardmasters (53-4031)	20.11	25.18	27.90	26.84
Sailors and marine oilers (53-5011)	13.94	18.28	19.56	19.70
Captains, mates, and pilots of water vessels (53-5021)	23.30	33.89	36.34	38.07
Ship engineers (53-5031)	23.12	34.09	36.37	35.87
Bridge and lock tenders (53-6011)	14.60	20.72	21.17	22.22
Gas compressor and gas pumping station operators (53-7071)	20.05	24.48	25.84	26.65
Pump operators, except wellhead pumpers (53-7072)	18.00	22.14	22.00	22.45
Transportation equipment manufacturing and maintenance occupations				
Bus and truck mechanics and diesel engine specialists (49-3031)	15.97	20.31	21.21	21.71
Rail car repairers (49-3043)	15.85	22.31	23.89	25.27
Transportation Infrastructure construction and maintenance occupations				
Rail-track laying and maintenance equipment operators (47-4061)	14.84	22.23	22.24	24.39
Signal and track switch repairers (49-9097)	18.94	24.80	26.83	28.81
Dredge operators (53-7031)	14.32	17.59	21.91	21.94
Secondary support service occupations				
Dispatchers, except police, fire, and ambulance (43-5032)	14.62	18.00	18.80	19.09
Postal service mail carriers (43-5052)	17.71	24.16	24.47	24.90
Shipping, receiving, and traffic clerks (43-5071)	11.22	14.46	14.93	15.27
Transportation inspectors (53-6051)	21.25	30.31	32.83	34.05
Tank car, truck, and ship loaders (53-7121)	15.62	21.40	21.80	21.41

KEY: SOC = Standard Occupational Classification.

NOTE: Data are for May of each year.

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, *National Occupational Employment and Wages*, available at www.bls.gov/oes as of September 2015.

Average hourly wages for different freight-related occupations vary widely. In 2014 ship engineers and captains and pilots of water vessels are among the highest paid freight transportation occupations. The highest wage occupations employ relatively few workers, while lower-wage occupations account for millions of workers.

Table 5-7 Producer Price Indices for Select Transportation Services: 1990, 2000, 2003, and 2010–2014

	1990	2000	2003	2010	2011	2012	2013	2014
Air Transportation (NAICS 481)[1]	**NA**	**147.7**	**162.1**	**202.9**	**218.3**	**227.6**	**226.0**	**230.0**
Scheduled Air Transportation (NAICS 4811)[2]	110.2	180.1	198.5	247.7	267.9	280.1	278.3	283.8
Scheduled Freight Air Transportation (NAICS 481112)	NA	NA	100.0	130.2	145.9	155.8	156.7	157.0
Nonscheduled Air Transportation (NAICS 4812)[3]	NA	107.3	117.8	165.4	168.1	169.5	167.6	166.8
Rail Transportation (NAICS 482)[3]	**NA**	**102.6**	**108.8**	**156.2**	**169.8**	**177.4**	**183.1**	**186.5**
Line -Haul Railroads (NAICS 482111)[4]	107.5	114.5	121.4	174.3	189.4	197.9	204.2	208.0
Water Transportation (NAICS 483)	**NA**	**NA**	**100.0**	**125.5**	**133.4**	**136.4**	**135.1**	**138.4**
Deep Sea Freight Transportation (NAICS 483111)[5]	113.1	155.8	219.9	244.8	253.8	249.9	249.2	262.5
Coastal and Great Lakes Freight Transportation (NAICS 483113)	NA	NA	100.0	146.7	158.5	166.7	165.6	167.7
Inland Water Freight Transportation (NAICS 483211)	100.0	117.9	124.7	217.4	235.9	245.7	237.5	234.7
Truck Transportation (NAICS 484)	**NA**	**NA**	**100.0**	**119.4**	**126.4**	**130.8**	**132.7**	**134.9**
General Freight Trucking (NAICS 4841)	NA	NA	100.0	119.3	126.8	132.4	134.7	137.5
General Freight Trucking, Local (NAICS 48411)	NA	NA	100.0	127.2	130.5	132.8	135.0	135.2
General Freight Trucking, Long Distance (NAICS 48412)	NA	NA	100.0	117.5	126.1	132.4	134.7	138.1
Specialized Freight Trucking (NAICS 4842)	NA	NA	100.0	119.9	125.7	127.5	128.5	129.2
Used Household and Office Goods Moving (NAICS 48421)	NA	NA	100.0	114.7	122.9	124.4	124.9	126.7
Specialized Freight (except Used Goods) Trucking, Local (NAICS 48422)	NA	NA	100.0	126.5	131.3	133.4	135.1	135.6
Specialized Freight (except Used Goods) Trucking, Long Distance (NAICS 48423)	NA	NA	100.0	115.8	121.4	122.9	123.4	123.9
Pipeline Transportation (NAICS 486)	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
Pipeline Transportation of Crude Oil (NAICS 4861)	NA	NA	100.0	183.4	184.7	195.5	211.1	222.6
Other Pipeline Transportation (NAICS 4869)[6]	NA	NA	100.0	133.8	137.3	144.7	150.7	160.4
Support Activities for Transportation (NAICS 488)	**NA**	**NA**	**100.0**	**110.7**	**114**	**115.7**	**117.5**	**118.7**
Support Activities for Water Transportation (NAICS 4883)[7]	NA	NA	100.0	120.2	123.9	128	130.4	131.7
Navigational Services to Shipping (NAICS 48833)	NA	NA	100.0	122.9	129.3	133.4	132.2	130.8
Freight Transportation Arrangement (NAICS 4885)[3]	NA	98.3	97.9	95.2	98.7	99.9	101.6	102.8
Postal Service (NAICS 491)	**100.0**	**135.2**		**187.7**	**190.6**	**195.7**	**202.4**	**213.2**
Couriers and Messengers (NAICS 492)	**NA**	**NA**	**100.0**	**153.4**	**168.8**	**179.7**	**189.4**	**198.3**

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

[1]Base year = 1992.

[2]Base year = 1989.

[3]Base year = 1996.

[4]Base year = 1984.

[5]Base year = 1988.

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

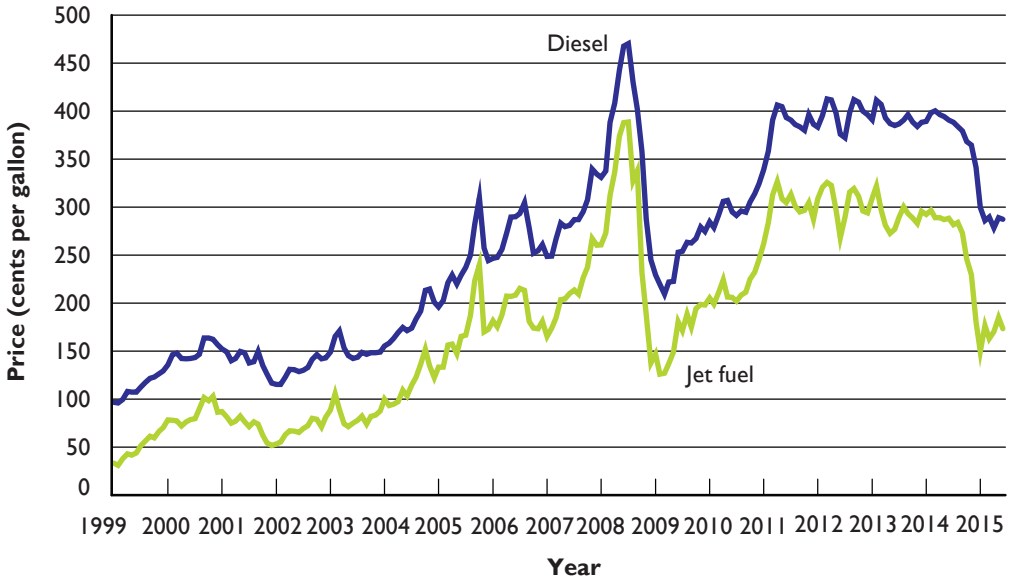
[7]Support activities for water transportation include port and harbor operations (NAICS 48831), marine cargo handling (NAICS 48832), and navigational services to shipping (NAICS 48833).

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.

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 July 2015.

From 2010 to 2014, the prices charged for transportation purchased from carriers and support activities have gone up in all industries shown in table 5-7. Rail transportation prices increased by 19.4 percent and air prices by 13.4 percent.

Figure 5-4 Monthly Diesel and Jet Fuel Prices: January 1999–June 2015



SOURCES: **Diesel price**: U.S. Department of Energy, Energy Information Agency, U.S. Petroleum Prices, available at www.eia.doe.gov as of July 2015. **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 July 2015.

Both diesel and jet fuel prices began a sharp decline in late 2014 that continued into the fall of 2015. The decline followed a 3-year period of price stability. Fuel prices had peaked in June 2008 but declined during the economic recession. They then climbed back to the levels that were maintained between 2011 and 2014 before declining again.

VI. Safety, Energy, and Environmental Implications of Freight Transportation

Growing demand for freight transportation heightens concerns about its safety, energy consumption, and environmental impacts. While safety in all freight modes continues to be monitored actively, the availability of energy consumption data has declined with the discontinuation of the Vehicle Inventory and Use Survey.

Safety

While the amount of freight transportation activity has increased, the total number of freight related transportation fatalities declined by 30.2 percent from 1990 to 2013. The truck, rail, and waterborne freight modes substantially reduced fatalities over that period. Large trucks accounted for 88.0 percent of all freight transportation fatalities. The vast majority of truck-related highway fatalities involved passenger vehicles.

Table 6-1 Fatalities by Freight Transportation Mode: 1990, 2000, and 2010–2013

	1990	2000	2010	2011	2012	2013
Total transportation fatalities	**47,297**	**44,276**	**35,034**	**34,568**	**35,699**	**34,509**
Total highway fatalities	**44,599**	**41,945**	**32,999**	**32,479**	**33,782**	**32,719**
Total freight transportation fatalities	**6,461**	**6,079**	**4,286**	**4,340**	**4,462**	**4,507**
Freight as a share of total fatalities	13.7%	13.7%	12.2%	12.6%	12.5%	13.1%
Large truck[1]	5,272	5,282	3,686	3,781	3,944	3,964
Large truck occupants	705	754	530	640	697	691
Others killed in crashes involving large trucks	4,567	4,528	3,156	3,141	3,247	3,273
Freight railroad	1,095	717	519	497	478	509
Train accidents	10	8	4	6	9	6
Highway-rail grade crossing[2]	624	353	187	189	169	156
Trespassers	426	328	309	280	286	322
Other incidents	35	28	19	22	14	25
Waterborne[3]	85	42	62	50	30	25
Freight	NA	NA	22	18	14	8
Industrial/Other	NA	NA	40	32	16	17
Pipeline	9	38	19	12	10	9
Hazardous liquid pipeline	3	1	1	1	3	1
Gas pipeline	6	37	18	11	7	8

KEY: NA = not available.

[1] Large trucks have a gross vehicle weight rating at or above 10,000 pounds and include single-unit and combination trucks.

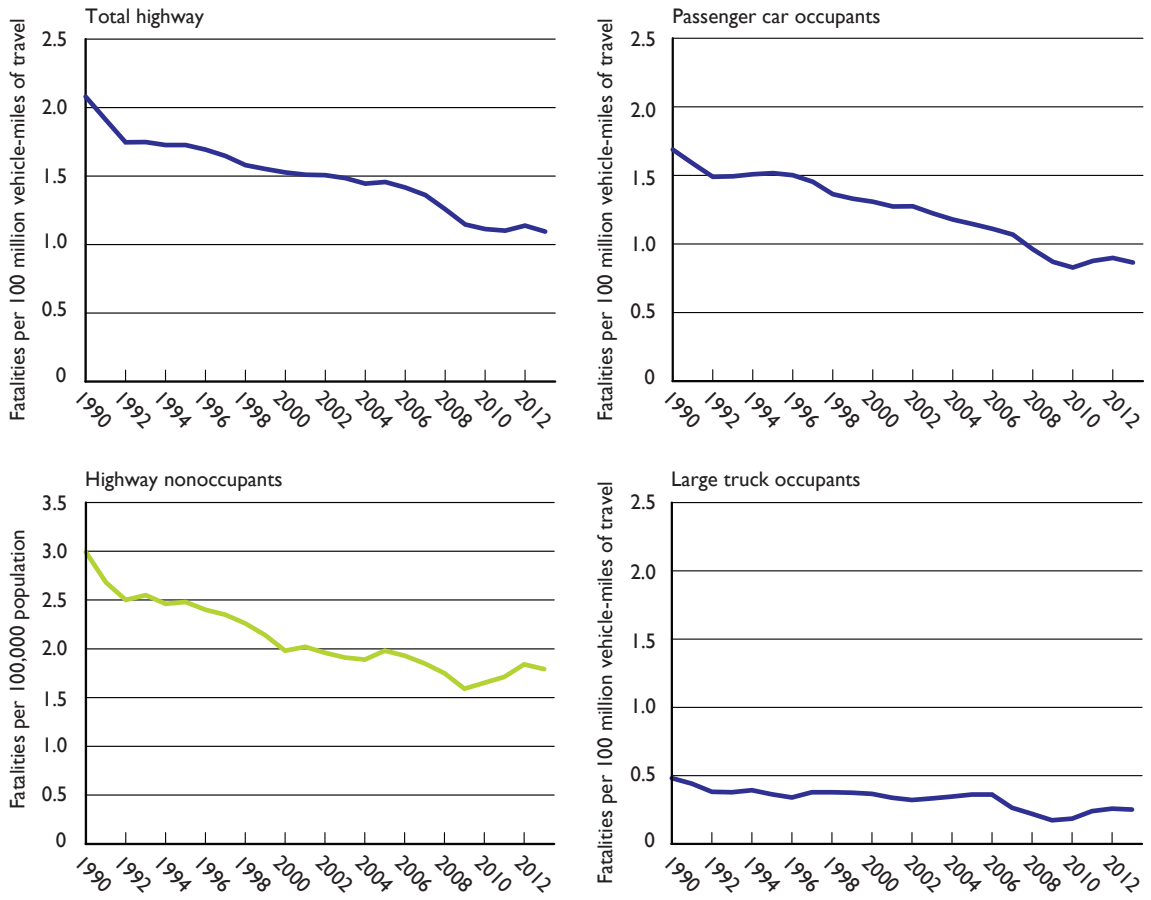
[2] *Highway-rail grade crossing* fatalities include freight train collisions with vehicles and people at all public and private highway-rail grade crossings.

[3] *Freight* includes barges, bulk carriers, general dry cargo ships, refrigerated cargo ships, roll-on/roll-off ships, tank ships, and towing ships. *Industrial/Other* includes fishing vessels, miscellaneous vessels, and offshore. Waterborne fatalities include only closed cases where vessels were involved in a marine casualty as of April 6, 2015. Open cases by year not included above: 2010 = 36, 2011 = 120, 2012 = 644, and 2013 = 727. Data prior to 2002 were tabulated using a different reporting system and are not directly comparable with later years.

NOTE: There are differences in definitions and reporting periods across modes due to regulatory and legal requirements.

SOURCES: **Total**: U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics*, Table 2-1, available at http://rita.dot.gov/bts as of October 2015.**Highway**: U.S. Department of Transportation, National Highway Transportation Safety Administration, National Center for Statistics and Analysis, *Traffic Safety Facts, Large Trucks and Highlights* (annual issues). **Railroad**: U.S. Department of Transportation, Federal Railroad Administration, Office of Safety Analysis, available at http://safetydata.fra.dot.gov/officeofsafety/default.asp as of July 2015. **Waterborne**: U.S. Department of Homeland Security, U.S. Coast Guard, Data Administration Division, *Marine Casualty and Pollution Data for Researchers* (April 6, 2015), available at homeport.uscg.gov as of July 2015. **Pipeline**: U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Office of Pipeline Safety, Accident and Incident Summary Statistics by Year, available at http://phmsa.dot.gov/pipeline as of July 2015.

Figure 6-1 Fatality Rates for Select Highway Modes of Transportation: 1990–2013



NOTES: Graphs with same color trend lines have identical scales. *Air carrier* fatalities resulting from the Sept. 11, 2001 terrorist acts include only onboard fatalities. *Light-duty vehicles* includes passenger car and light truck occupants. *Large truck occupants* have the lowest fatality rate among these modes.

SOURCE: Calculated by U.S. Department of Transportation (USDOT), Bureau of Transportation Statistics (BTS) based upon multiple sources as cited in USDOT, BTS, *National Transportation Statistics*. Tables 2-9, 2-14, 2-17, 2-19, 2-21, and 2-23. Available at www.bts.gov as of June 2014.

From 1990 through 2013, the overall rate of highway fatalities per vehicle-miles of travel (vmt) declined by 47.4 percent as the highway modes, except for motorcycles, showed across-the-board reductions. Fatalities per vmt for large-truck occupants decreased by 47.9 percent.

Table 6-2 Injuries by Freight Transportation Mode: 1990, 2000, and 2010–2013

	1990	2000	2010	2011	2012	2013
Total transportation injuries	**3,271,903**	**3,218,900**	**2,259,131**	**2,236,659**	**2,381,422**	**2,332,760**
Total freight transportation injuries	**170,332**	**147,802**	**84,608**	**93,396**	**108,234**	**99,122**
Freight as a share of total injuries	**5.2%**	**4.6%**	**3.7%**	**4.2%**	**4.5%**	**4.2%**
Large truck[1]	149,822	139,832	80,000	89,000	104,000	95,000
Large truck occupants	41,822	30,832	20,000	23,000	25,000	24,000
Others injured in crashes involving large trucks	108,000	109,000	60,000	66,000	79,000	71,000
Freight railroad	20,271	7,834	4,098	3,955	4,030	3,977
Train accidents	210	128	53	61	429	69
Highway-rail grade crossing[2]	2,276	1,099	667	693	698	752
Trespassers	490	362	310	326	332	353
Other incidents	17,295	6,245	3,068	2,875	2,571	2,803
Waterborne[3]	163	55	407	390	150	100
Freight	NA	NA	254	232	58	20
Industrial/Other	NA	NA	153	158	92	80
Pipeline	76	81	103	51	54	45
Hazardous liquid pipeline	7	4	3	2	4	6
Gas pipeline	69	77	100	49	50	39

KEY: NA = not available.

[1] Large trucks have a gross vehicle weight rating at or above 10,000 pounds and include single-unit and combination trucks.

[2] *Highway-rail grade crossing injuries* include freight train collisions with vehicles and people at all public and private highway-rail grade crossings.

[3] *Freight* includes barges, bulk carriers, general dry cargo ships, refrigerated cargo ships, roll-on/roll-off ships, tank ships, and towing ships. *Industrial/Other* includes fishing vessels, miscellaneous vessels, and offshore. *Water injuries* include only closed cases where vessels were involved in a marine casualty as of April 6, 2015. Open cases by year not included above: 2010 = 36, 2011 = 120, 2012 = 644, and 2013 = 727. Data prior to 2002 were tabulated using a different reporting system and are not directly comparable with later years.

NOTES: There are differences in definitions and reporting periods across modes due to regulatory and legal requirements.

SOURCES: **Total**: U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics*, Table 2-1, available at http://rita.dot.gov/bts as of July 2015. **Highway**: U.S. Department of Transportation, National Highway Transportation Safety Administration, National Center for Statistics and Analysis, *Traffic Safety Facts, Large Trucks and Highlights* (annual issues). **Railroad**: U.S. Department of Transportation, Federal Railroad Administration, Office of Safety Analysis, available at http://safetydata.fra.dot.gov/officeofsafety/default.asp as of July 2015. **Waterborne**: U.S. Department of Homeland Security, U.S. Coast Guard, Data Administration Division, *Marine Casualty and Pollution Data for Researchers* (April 6, 2015), available at homeport.uscg.gov as of July 2015. **Pipeline**: U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Office of Pipeline Safety, Accident and Incident Summary Statistics by Year, available at http://phmsa.dot.gov/pipeline as of July 2015.

Large trucks have accounted for nearly all (95.8 percent) freight transportation-related injuries, but the number of injuries has dropped by 41.8 percent since 1990.

Table 6-3 Hazardous Materials Transportation Incidents: 1990, 2000, and 2010–2014

	1990	2000	2010	2011	2012	2013	2014
Total	**8,879**	**17,557**	**(R) 14,795**	**(R) 15,029**	**(R) 15,446**	**16,053**	**17,372**
Accident-related	297	394	(R) 358	(R) 377	(R) 398	367	343
Air	297	1,419	(R) 1,295	(R) 1,401	1,460	1,441	1,327
Accident-related	0	3	2	2	2	3	3
Highway	7,296	15,063	(R) 12,648	(R) 12,812	(R) 13,255	13,882	15,284
Accident-related	249	329	(R) 320	(R) 335	(R) 363	333	322
Rail	1,279	1,058	(R) 747	745	(R) 661	667	714
Accident-related	48	62	35	40	33	31	18
Water[1]	7	17	105	71	70	63	47
Accident-related	0	0	1	0	0	0	0
Other[2]	0	0	NA	NA	NA	NA	NA
Accident-related	0	0	NA	NA	NA	NA	NA

KEY: NA = not available; R = revised.

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

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

NOTES: Hazardous materials transportation incidents required to be reported are defined in the Code of Federal Regulations (CFR), 49 CFR 171.15, 171.16 (Form F 5800.1). Hazardous materials deaths and injuries are caused by the hazardous material in commerce. Accident related means vehicular accident or derailment. Each modal total also includes 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.

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 2015.

Because most hazardous materials are transported by truck, the majority of incidents related to the movement of hazardous materials occur on highways or in truck terminals. A very small share of hazardous materials transportation incidents are the result of a vehicular crash or derailment (referred to as "accident related"). Approximately 2.0 percent of incidents were accident related in 2014, but they accounted for 80.9 percent of all property damage. Most hazardous materials incidents occur because of human error or package failure, particularly during loading and unloading.

Table 6-4a Commercial Motor Carrier Compliance Reviews by Safety Rating: 2013 and 2014

	2013			2014		
Safety rating	Federal	State	Total	Federal	State	Total
Satisfactory	1,495	1,167	2,662	1,482	1,158	2,640
Conditional	1,876	938	2,814	1,650	1,076	2,726
Unsatisfactory	234	132	366	305	129	434
Not rated	197	1,636	1,833	197	1,669	1,866
Total	**3,802**	**3,873**	**7,675**	**3,634**	**4,032**	**7,666**

NOTES: These data include any review that resulted in a safety rating, including Motor Carrier Safety Compliance Reviews or CSA2010 reviews. As a result, the total number of reviews in this table differs from the total in Table 5-5b because that table includes reviews that did not result in a formal safety rating. 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.

SOURCE: U.S. Department of Transportation, Federal Motor Carrier Administration, Motor Carrier Management Information System (MCMIS), Compliance Review Activity by Safety Rating for Fiscal Years, available at www.fmcsa.dot.gov as of July 2015.

Federal and state governments conducted 7,666 safety compliance reviews that resulted in a formal safety rating in 2014. Of that total, only about 5.7 percent of motor carriers received an unsatisfactory rating.

Table 6-4b Commercial Motor Carrier Compliance Reviews by Type: 2011–2014

	2011			2012			2013			2014		
Review type	Federal	State	Total	Federal	State	Total	Federal	State	Total	Federal	State	Total
Total reviews	(R) 11,095	7,336	(R) 18,431	12,373	(R) 7,850	(R) 20,223	10,727	7,814	18,541	7,583	7,351	14,934
Motor Carrier Safety Compliance Reviews[1]	(R) 4,612	3,650	(R) 8,262	0	0	0	0	0	0	0	0	0
Cargo Tank Facility Reviews	78	19	97	77	15	92	60	20	80	53	17	70
Shipper Reviews	256	59	315	234	81	315	207	78	285	107	68	175
Non-Rated Reviews (excludes SCR & CSA2010)	951	531	1,482	(R) 1,140	(R) 555	(R) 1,695	1,823	602	2,425	589	480	1,069
CSA Offsite	318	301	619	(R) 236	(R) 345	(R) 581	211	229	440	142	191	333
CSA Onsite Focused/ Focused CR	(R) 4,345	1,911	(R) 6,256	(R) 7,289	(R) 3,208	(R) 10,497	5,957	3,565	9,522	4,242	3,142	7,384
CSA Onsite Comprehensive	(R) 535	865	(R) 1,400	(R) 3,397	3,646	(R) 7,043	2,470	3,321	5,791	2,451	3,453	5,904
Total security contact reviews	(R) 604	302	(R) 906	505	216	721	529	241	770	326	217	543

KEY: R = revised; SCR = Security Contact Reviews; CSA = Compliance, Safety, Accountability; CR = Compliance Review.

[1]Beginning in 2012, all reviews that were previously considered Motor Carrier Safety Compliance Reviews are now included in the CSA Onsite Comprehensive Investigations total.

NOTES: These data include all compliance reviews conducted in the specified years. As a result, the total number of reviews in this table differs from the total in Table 5-5a because that table only includes reviews that resulted in a formal safety rating. 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.

SOURCE: U.S. Department of Transportation, Federal Motor Carrier Administration, Motor Carrier Management Information System (MCMIS), Compliance Review Activity by Safety Rating for Fiscal Years, available at www.fmcsa.dot.gov as of July 2015.

Federal and state governments also conduct shipper, cargo tank facility, and onsite comprehensive safety analysis reviews. More than 14,900 reviews were conducted in 2014.

Table 6-5 Roadside Safety Inspection Activity Summary by Inspection Type: 2000, 2010, 2013, and 2014

	2000		2010		2013		2014	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
All inspections								
Number of inspections	2,453,776	100.0	3,569,373	100.0	3,507,858	100.0	3,413,367	100.0
With no violations	639,593	26.1	1,225,324	34.3	1,386,018	39.5	1,363,261	39.9
With violations	1,814,183	73.9	2,344,049	65.7	2,121,840	60.5	2,050,106	60.1
Driver inspections								
Number of driver inspections	2,396,688	100.0	3,470,871	100.0	3,395,336	100.0	3,293,802	100.0
With no driver violations	1,459,538	60.9	2,316,960	66.8	2,418,699	71.2	2,347,837	71.3
With driver violations	937,150	39.1	1,153,911	33.2	976,637	28.8	945,965	28.7
With driver OOS violations	191,031	8.0	183,350	5.3	165,073	4.9	166,275	5.0
Vehicle inspections								
Number of vehicle inspections	1,908,300	100.0	2,413,094	100.0	2,402,152	100.0	2,341,480	100.0
With no vehicle violations	584,389	30.6	834,551	34.6	930,798	38.7	922,803	39.4
With vehicle violations	1,323,911	69.4	1,578,543	65.4	1,471,354	61.3	1,418,677	60.6
With vehicle OOS violations	452,850	23.7	480,416	19.9	478,032	19.9	476,873	20.4
Hazardous materials inspections								
Number of Hazmat inspections	133,486	100.0	211,154	100.0	203,311	100.0	196,177	100.0
With no Hazmat violations	101,098	75.7	180,522	85.5	177,534	87.3	171,992	87.7
With Hazmat violations	32,388	24.3	30,632	14.5	25,777	12.7	24,185	12.3
With Hazmat OOS violations	9,964	7.5	9,210	4.4	7,915	3.9	7,791	4.0

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. Serious violations include operating a vehicle in a hazardous condition, hazardous materials onboard, or lack of required operating authority. 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.

SOURCE: U.S. Department of Transportation, Federal Motor Carrier Safety Administration, Motor Carrier Management Information System (MCMIS), Roadside Inspection Activity Summary for Fiscal Years, special tabulation, August 28, 2015.

About one-fifth of all roadside inspections of commercial vehicles resulted in a vehicle being placed out of service (OOS) for a serious violation. A lower share of driver and hazardous materials inspections resulted in OOS orders. In 2014, 5.0 percent of driver inspections and 4.0 percent of hazardous materials inspections resulted in an OOS orders.

Energy

From 2007 to 2013, increases in fuel costs, a slight decrease in the number of trucks on the road, and improved energy efficiency affected the number of gallons of fuel burned by commercial trucks. Truck fuel consumption declined by 8.3 percent, from 47.2 to 43.3 billion gallons. Fuel use in Class I freight railroads declined by 9.2 percent, from 4.1 billion gallons in 2007 to 3.7 billion gallons in 2013.

Table 6-6 Fuel Consumption by Transportation Mode: 2007–2013

	2007	2008	2009	2010	2011	2012	2013
Highway[1]							
Gasoline, diesel and other fuels (million gallons)	176,203	170,765	168,140	170,411	168,597	168,621	169,651
Truck, total	47,219	47,704	44,303	45,023	42,377	42,352	43,297
Single-unit 2-axle 6-tire or more truck	16,314	17,144	16,253	15,097	14,183	14,376	14,502
Combination truck	30,904	30,561	28,050	29,927	28,193	27,975	28,795
Truck (percent of total)	26.8	27.9	26.3	26.4	25.1	25.1	25.5
Rail, Class I (in freight service)							
Distillate / diesel fuel (million gallons)	4,087	3,911	3,220	3,519	3,710	3,634	3,713
Water							
Residual fuel oil (million gallons)	6,327	5,258	4,589	5,143	4,560	4,820	4,212
Distillate / diesel fuel oil (million gallons)	1,924	1,983	1,913	2,003	2,133	1,768	1,676
Gasoline (million gallons)	1,222	1,136	1,130	1,167	1,104	1,093	1,123
Pipeline							
Natural gas (million cubic feet)	621,364	647,956	670,174	674,124	(R) 687,784	730,790	861,583

KEY: R = revised.

[1]Based on a new methodology, FHWA revised its annual vehicle-miles traveled, number of vehicles, and fuel economy data beginning with 2007. Information on the new methodology is available at www.fhwa.dot.gov/policyinformation/statistics.cfm. Data in this table should not be compared to those in pre-2011 editions of *Freight Facts and Figures*.

SOURCES: **Highway**: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues), table VM-1. **Rail**: Association of American Railroads, *Railroad Facts 2014* (Washington, DC: 2014), p. 63. **Water**: U.S. Department of Energy, Energy Information Administration, Fuel Oil and Kerosene Sales 2013 (Washington, DC: 2014), 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/2013/ as of July 2015. **Pipeline**: U.S. Department of Energy, *Natural Gas Annual 2013*, (Washington, DC: October 2014), table 15 and similar tables in earlier editions.

Table 6-7 Energy Consumption by Selected Freight Transportation Mode: 2007–2013

(trillions of BTUs)

	2007	2008	2009	2010	2011	2012	2013
Truck	(R) 6,549	(R) 6,617	(R) 6,145	(R) 6,245	(R) 5,878	(R) 5,874	6,005
Class I Rail	567	542	447	488	515	504	515
Water	1,367	1,204	1,094	1,194	1,117	1,103	1,003
Pipeline (natural gas only)	642	668	691	695	(R) 709	753	888

KEY: R = revised; BTU = British Thermal Unit.

NOTES: Class I railroads have annual carrier operating revenue of $467.1 million or more. Based on a new methodology, FHWA revised its annual vehicle-miles traveled, number of vehicles, and fuel economy data beginning with 2007. Information on the new methodology is available at www.fhwa.dot.gov/policyinformation/statistics.cfm. Data in this figure should not be compared to those in pre-2011 editions of *Freight Facts and Figures*. Data do not include energy consumed by oil pipelines (crude petroleum and petroleum products) or coal slurry/water slurry pipelines.

SOURCES: **Highway**: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues), table VM-1. **Rail**: Association of American Railroads, *Railroad Facts 2014* (Washington, DC: 2014), p. 63. **Water**: U.S. Department of Energy, Energy Information Administration, *Fuel Oil and Kerosene Sales 2013* (Washington, DC: 2014), 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/2013/ as of July 2015. **Pipeline**: U.S. Department of Energy, *Natural Gas Annual 2013*, (Washington, DC: October 2014), table 15 and similar tables in earlier editions.

In 2013 trucking accounted for a large majority of freight transportation energy consumption, followed by water, a distant second.

Table 6-8 Single-Unit Truck Fuel Consumption and Travel: 2007–2013

	2007	2008	2009	2010	2011	2012	2013
Number registered (thousands)	8,117	8,288	8,356	8,217	7,819	8,190	8,126
Vehicle-miles traveled (millions)	119,979	126,855	120,207	110,738	103,515	105,605	106,582
Fuel consumed (million gallons)	16,314	17,144	16,253	15,097	14,183	14,376	14,502
Average miles traveled per vehicle	14,782	15,306	14,386	13,476	13,239	12,894	13,116
Average miles traveled per gallon	7.4	7.4	7.4	7.3	7.3	7.3	7.3
Average fuel consumed per vehicle (gallons)	2,010	2,068	1,945	1,837	1,814	1,755	1,785

NOTES: Based on a new methodology, FHWA revised its annual vehicle-miles traveled, number of vehicles, and fuel economy data beginning with 2007. Information on the new methodology is available at www.fhwa.dot.gov/policyinformation/statistics.cfm. Data in this table should not be compared to those in pre-2011 editions of *Freight Facts and Figures*.

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/2013/ as of July 2015.

Miles per gallon for single-unit trucks (based on total travel and fuel consumption) remained relatively stable over the 2007 to 2013 period. From 2007 through 2012, single-unit trucks traveled fewer miles overall and averaged fewer miles per vehicle, resulting in reduced fuel consumption. In 2013, these trends were reversed as single-unit trucks traveled more miles overall and more miles per vehicle than the previous year, resulting in more fuel consumed.

Miles per gallon for combination trucks (based on total travel and fuel consumption) also declined slightly between 2007 and 2013. From 2007 through 2012, vehicle-miles traveled by combination trucks declined by about 20.6 billion (about 11.2 percent). In 2013, this trend was reversed as combination trucks traveled more miles overall than the previous year, resulting in more fuel consumed.

Table 6-9 Combination Truck Fuel Consumption and Travel: 2007–2013

	2007	2008	2009	2010	2011	2012	2013
Number registered (thousands)	2,635	2,585	2,617	2,553	2,452	2,469	2,471
Vehicle-miles traveled (millions)	184,199	183,826	168,100	175,789	163,692	163,602	168,436
Fuel consumed (million gallons)	30,904	30,561	28,050	29,927	28,193	27,975	28,795
Average miles traveled per vehicle	69,896	71,106	64,231	68,859	66,768	68,260	68,155
Average miles traveled per gallon	6.0	6.0	6.0	5.9	5.8	5.8	5.8
Average fuel consumed per vehicle (gallons)	11,727	11,821	10,718	11,723	11,500	11,330	11,651

NOTES: Based on a new methodology, FHWA revised its annual vehicle-miles traveled, number of vehicles, and fuel economy data beginning with 2007. Information on the new methodology is available at www.fhwa.dot.gov/policyinformation/statistics.cfm. Data in this table should not be compared to those in pre-2011 editions of *Freight Facts and Figures*.

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/2013/ as of July 2015.

Energy intensity is the amount of energy used to produce a given level of output or activity, in this case vehicle-miles and ton-miles. In recent years the energy intensity of trucking has remained relatively stable, while rail and water have improved slightly.

Table 6-10 Energy Intensities of Domestic Freight Transportation Modes: 2007–2013

	2007	2008	2009	2010	2011	2012	2013
Highway[1] (Btu per vehicle-mile)	21,238	21,008	21,024	21,499	21,677	21,525	21,540
Railroad (Class I) (Btu per freight-car-mile)	14,846	14,573	13,907	13,733	14,043	13,800	14,607
Railroad (Class I) (Btu per ton-mile)	320	305	291	289	298	294	296
Domestic waterborne commerce (Btu per ton-mile)	225	252	225	217	211	210	NA

KEY: Btu = British thermal unit; NA = not available.

[1]Includes heavy single-unit and combination trucks. Heavy single-unit trucks are trucks that have two axles and at least six tires or a gross vehicle weight rating exceeding 10,000 pounds. Based on a new methodology, FHWA revised its annual vehicle-miles traveled, number of vehicles, and fuel economy data beginning with 2007. Energy intensity data are based on the new FHWA methodology. Information on the new methodology is available at www.fhwa.dot.gov/policyinformation/statistics.cfm. Data in this table should not be compared to those in pre-2011 editions of *Freight Facts and Figures*.

SOURCE: Oak Ridge National Laboratory, *Transportation Energy Data Book: Edition 34* (Oak Ridge, TN: annual issues), table 2.15, available at http://cta.ornl.gov/data/index.shtml as of October 2015.

Environment

Air quality is affected by vehicle emissions. Compared with gasoline-fueled cars and trucks, diesel-fueled heavy trucks emit small amounts of carbon monoxide (CO) but larger amounts of nitrogen oxides (NO_x). However, since 2000 the rate of NO_x emissions from diesel-fueled heavy-duty trucks declined by 63.1 percent.

Table 6-11 Estimated National Average Vehicle Emissions Rates: 2000, 2010, 2014, and 2015
(grams per mile)

	2000	2010	2014	2015
			Gasoline	
Cars				
Exhaust HC	0.93	0.41	0.28	0.25
Nonexhaust HC	0.37	0.21	0.16	0.15
Total HC	**1.30**	**0.62**	**0.44**	**0.40**
Exhaust CO	13.06	5.54	4.14	3.82
Exhaust NO_x	1.64	0.87	0.57	0.50
Light trucks[1]				
Exhaust HC	0.86	0.62	0.45	0.39
Nonexhaust HC	0.20	0.14	0.12	0.11
Total HC	**1.06**	**0.77**	**0.56**	**0.50**
Exhaust CO	14.10	9.06	6.76	6.10
Exhaust NO_x	2.22	1.39	0.97	0.84
Heavy trucks[2]				
Exhaust HC	1.96	1.29	0.95	0.85
Nonexhaust HC	0.41	0.34	0.30	0.29
Total HC	**2.37**	**1.62**	**1.25**	**1.14**
Exhaust CO	53.97	36.70	28.28	25.78
Exhaust NO_x	6.27	4.30	3.08	2.76
			Diesel	
Cars				
Exhaust HC	2.80	0.89	0.24	0.20
Exhaust CO	42.42	12.11	3.25	2.75
Exhaust NO_x	2.82	0.97	0.31	0.24
Light trucks[1]				
Exhaust HC	0.75	0.70	0.46	0.41
Exhaust CO	8.72	5.74	3.68	3.22
Exhaust NO_x	4.16	2.81	1.93	1.72
Heavy trucks[2]				
Exhaust HC	1.13	1.02	0.78	0.73
Exhaust CO	4.77	3.84	2.80	2.57
Exhaust NO_x	24.83	12.84	10.04	9.15

KEY: CO = carbon monoxide; HC = hydrocarbon; NO_x = nitrogen oxides.

[1]Includes pick-up trucks, sport-utility vehicles, and minivans with a gross vehicle weight rating up to 8,500 pounds.

[2]Includes trucks with a gross vehicle weight rating over 8,500 pounds.

NOTES: This table is based on MOVES2013, the latest highway vehicle emissions factor model from the U.S. Environmental Protection Agency. Similar tables in previous editions of *Freight Facts and Figures* were based on earlier models. Thus, the data in this table should not be compared to those in previous editions.

SOURCE: U.S. Environmental Protection Agency, National Vehicle and Fuel Emissions Laboratory, special tabulation, August 2015.

Table 6-12 Nitrogen Oxides (NO_x) and Particulate Matter (PM-10) Emissions from Single-Unit and Combination Trucks: 2000, 2010, 2015, 2020, and 2030

(thousands of short tons)

Mode	2000	2010	2015	2020	2030
NO_x emissions	6,241	3,622	2,389	1,634	961
Total PM-10 emissions	**319**	**204**	**133**	**96**	**67**
Exhaust emissions	284	166	95	54	18
Brake emissions	28	30	30	34	39
Tire emissions	7	7	7	8	10

NOTE: Single-unit trucks have 2-axles and at least 6 tires or a gross vehicle weight rating exceeding 10,000 lbs.

SOURCE: U.S. Environmental Protection Agency, MOVES (Motor Vehicle Emission Simulator) model 2013, special tabulation, August 2015.

Trucks are the largest contributor to freight emissions nationally. The U.S. Environmental Protection Agency estimated that trucks will produce nearly 2.4 million tons of NO_x in 2015. Substantial reductions in freight-related NO_x emissions have been made 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. Between 2000 and 2015, NO_x emissions from single-unit and combination trucks decreased by 61.7 percent. PM-10 emissions declined by 66.5 percent over the same period. Truck-related NO_x and PM-10 emissions are projected to further decline by 87.5 and 49.6 percent, respectively, from 2015 to 2030.

Table 6-13 U.S. Greenhouse Gas Emissions by Economic End-Use Sector: 1990, 2005, and 2010–2013 (electricity-related emissions distributed among sectors)[1]

(millions of metric tonnes of CO_2 equivalent)

Sector	(R)1990	(R)2005	(R)2010	(R)2011	2012	2013
Industry[2]	2,229.7	2,148.5	1,937.7	1,923.9	1,880.9	1,922.6
Transportation[3]	1,554.4	2,022.5	1,848.1	1,819.7	1,799.8	1,810.3
Commercial	953.6	1,244.4	1219,5	1,166.0	1,060.6	1,129.1
Residential	975.8	1,247.5	1,183.8	1,152.6	1,088.0	1,126.7
Agriculture	553.9	629.1	659.2	670.9	673.7	649.4
U.S. Territories[4]	33.7	58.2	50.6	43.5	42.1	34.8
Total	**6,301.1**	**7,350.2**	**6,810.3**	**6,776.6**	**6,545.10**	**6,673.0**

KEY: CO_2 = carbon dioxide; R = revised.

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

[2]Industry includes manufacturing, construction, and mining. Six manufacturing industries--petroleum refinieries, chemicals, primary metals, paper, food, and nonmetallic mineral products—represent the vast majority of energy use and thus GHG emissions in the industrial sector.

[3]Includes emissions from military aircraft (11.0 million metric tonnes in 2013) and "other" transportation, primarily lubricants (8.8 million metric tonnes in 2013). Emissions from international bunker fuels are not included.

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

SOURCE: U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2013*, EPA 430-R-15-004 (Washington, DC: April 15, 2015, table ES-7, available at http://epa.gov/climatechange/ghgemissions/usinventoryreport.html as of August 2015.

In addition to CO, NO_x, and particulate matter emissions, the transportation sector releases large quantities of greenhouse gases (GHGs), such as carbon dioxide (CO_2), methane, nitrous oxide, and hydrofluorocarbons. When emissions from electricity are distributed among end-use sectors, transportation is responsible for about 27 percent of all greenhouse gases emitted in the United States in 2013. The industrial sector produces the largest amount of GHG emissions (28.8 percent).

Table 6-14 U.S. Transportation Sector CO_2 Emissions from Fossil Fuel Combustion by Fuel Type: 1990, 2005, and 2010–2013

(millions of metric tonnes of CO_2 equivalent)

Fuel	1990	2005	2010	2011	2012	2013
Petroleum	1,457.7	(R)1,854.7	(R)1,693.9	(R)1,672.7	1,659.50	1,669.60
Motor gasoline	983.5	(R)1,183.9	(R)1,092.7	(R)1,069.0	1,064.90	1,065.80
Distillate fuel oil	262.9	458.1	(R)425.5	(R)433.7	431.3	437.6
Jet fuel	184.2	189.3	151.5	(R)146.6	143.4	147.1
Residual fuel	22.6	19.3	(R)20.4	(R)19.4	15.8	15.0
Aviation gasoline	3.1	2.4	1.9	(R)2.1	1.7	1.5
Liquefied petroleum gas	1.4	1.7	1.8	1.9	2.3	2.5
Natural gas	36.0	33.1	38.1	(R)38.9	41.3	48.8
Transportation CO_2 total[1]	**(R)1,493.8**	**(R)1,887.8**	**(R)1,732.0**	**(R)1,711.5**	**1,700.8**	**1,718.4**
U.S. total[1]	**(R)4,740.7**	**(R)5,747.7**	**(R)5,367.1**	**(R)5,231.3**	**5,026.0**	**5,157.7**
Transportation sector as % of U.S. total	**31.5**	**(R)32.8**	**(R)32.3**	**(R)32.7**	**33.8**	**33.3**

KEY: CO_2 = carbon dioxide; R = revised.

[1]Electricity-related emissions are not included in the transportation sector and U.S. totals for CO_2 emissions from fossil fuel combustion.

NOTES: CO_2 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 CO_2 by weight. Numbers may not add to totals due to rounding. Electricity-related emissions are not included in this table.

SOURCE: U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2013*, EPA 430-R-15-004 (Washington, DC: April 15, 2015), tables ES-3 and 3-1; and Annex 2, tables A-11, A-12, A-13, A-14, A-19, and A-34, available at http://epa.gov/climatechange/ghgemissions/usinventoryreport.html as of August 2015.

Carbon dioxide accounted for nearly all of the transportation sector's GHG emissions in 2013, 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 were responsible for about 59.7 percent of transportation sector CO_2 emissions, while the combustion of diesel fuel in medium- and heavy-duty trucks and jet fuel in aircraft produced much of the rest.

From 1990 to 2013, the transportation sectors share of CO_2 emissions as a percent of the U.S. total was between 31.5 and 33.3 percent.

Table 6-15 U.S. Greenhouse Gas Emissions from Domestic Freight Transportation: 1990, 2005, and 2010–2013

(millions of metric tonnes of CO_2 equivalent)

Mode	1990	2005	2010	(R)2011	2012	2013	Percent change, 1990 to 2013
Trucking	231.1	(R)409.8	(R)403.0	401.3	401.4	407.7	76.4
Freight rail	34.5	(R)47.0	(R)40.3	42.1	41.2	41.8	21.2
Ships and other boats[1]	30.6	(R)27.8	(R)28.6	30.3	24.1	15.7	-48.7
Pipelines[2]	36.0	32.2	37.1	37.8	40.3	47.7	32.5
Commercial aircraft	19.2	21.4	16.3	16.0	15.8	15.9	-17.2
Freight total	**351.5**	**(R)538.2**	**(R)525.2**	**527.6**	**522.6**	**528.8**	**50.4**
Passenger total	**(R)1,155.7**	**(R)1,454.5**	**(R)1,299.6**	**1,271.4**	**1,256.6**	**1,250.2**	**8.2**
Transportation total[3]	**(R)1,554.4**	**(R)2,022.5**	**(R)1,848.1**	**1,819.7**	**1,799.8**	**1,810.3**	**16.5**
Freight as % of transportation total	**22.6**	**26.6**	**(R)28.4**	**29.0**	**29.0**	**29.2**	**29.2**

KEY: CO_2 = carbon dioxide; R = revised.

[1]Fluctuations in emissions estimates may reflect issues with data sources.

[2]Includes only CO_2 emissions from natural gas used to power pipelines.

[3]Includes greenhouse gas emissions from military aircraft (11.0 million metric tonnes in 2013); "other" transportation, primarily lubricants (8.8 million metric tonnes in 2013); 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, Bureau of Transportation Statistics data on freight shipped by commercial aircraft and the total number of passengers enplaned to split commercial aircraft emissionsbetween passenger and freight transportation. Each passenger was estimated to weigh an average of 150 pounds and luggage was estimated to weigh 50 pounds. Previous Inventories included commercial aircraft emissions under passenger travel. CO_2 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 CO_2 by weight. Numbers may not add to totals due to rounding.

SOURCE: U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2013*, EPA 430-R-15-004 (Washington, DC: April 15, 2015), table ES-7 and Annex 3, tables A-116 and A-117, available at www.epa.gov/climatechange/ghgemissions/usinventoryreport.html as of June 3, 2015.

Since 1990 the rate of growth of greenhouse gas emissions from freight sources has been more than six times as fast as that for passenger travel. Trucking accounted for 77.1 percent of freight emissions followed by freight rail, a distant second.

Table 6-16 Medium- and Heavy-Duty Truck Greenhouse Gas Emissions: 1990, 2005, and 2010–2013

(millions of metric tonnes of CO_2 equivalent)

	1990	2005	2010	2011	2012	2013
Carbon dioxide	230.1	(R)395.9	(R)388.4	(R)386.8	386.8	393.2
Methane	(R)0.3	0.1	0.1	0.1	0.1	0.1
Nitrous oxide	(R)0.7	1.1	(R)1.2	(R)1.1	1.1	1.1
Hydrofluorocarbons	≤0.05	(R)12.7	(R)13.2	(R)13.3	13.3	13.3
Total truck	231.1	(R)409.8	(R)403.0	(R)401.3	401.4	407.7
Total U.S. transportation[1]	(R)1,554.4	(R)2,022.5	(R)1,848.1	(R)1819.7	1,799.8	1,810.3
Total U.S.[1]	(R)6,301.1	(R)7,350.2	(R)6,898.8	(R)6,776.6	6,545.1	6,673.0
Truck share of transportation total (percent)	(R)14.9	(R)20.3	(R)21.7	(R)22.1	22.3	22.5
Truck share of U.S. total (percent)	3.7	(R)5.6	5.9	(R)5.9	5.9	6.1

KEY: CO_2 = carbon dioxide; R = revised.

[1]Transportation and U.S. totals include greenhouse gas emissions from military aircraft (11.0 million metric tonnes in 2013); "other" transportation, primarily lubricants (8.8 million metric tonnes in 2013); and electricity-related emissions. Emissions from international bunker fuels are not included.

NOTES: CO_2 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 CO_2 by weight. Medium- and heavy-duty trucks weigh 8,501 pounds and above. Numbers may not add to totals due to rounding.

SOURCE: U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2013*, EPA 430-R-15-004 (Washington, DC: April 15, 2015), tables 2-13 and ES-7, available at http://epa.gov/climatechange/ghgemissions/usinventoryreport.html as of August 2015.

Between 1990 and 2013, medium- and heavy-duty truck greenhouse gas emissions rose by 76.4 percent, the largest percentage increase of any major transportation mode. An increase in truck freight movement is largely responsible for the rise in emissions over the last two decades.

Table 6-17 Number and Volume of Oil Spills In and Around U.S. Waterways: 1990, 2000, and 2012–2014

	1990		2000		2012		2013		2014	
Source	Incidents	Gallons spilled	Incidents	Gallons spilled	Incidents	Gallons spilled	Incidents	Gallons spilled	Incidents	Gallons spilled
Total, all spills	**8,177**	**7,915,007**	**8,354**	**1,431,370**	**3,266**	**196,183**	**3,223**	**497,710**	**3,077**	**668,363**
Vessel sources, total	**2,485**	**6,387,158**	**5,560**	**1,033,643**	**1,824**	**131,986**	**1,721**	**207,106**	**1,716**	**273,432**
Tankship	249	4,977,251	111	608,176	27	3,864	20	711	18	146
Tank barge	457	992,025	229	133,540	93	33,268	100	19,568	89	199,667
Other vessels[1]	1,779	417,882	5,220	291,927	1,704	94,854	1,601	186,827	1,609	73,619
Nonvessel sources, total	**2,584**	**1,408,472**	**1,645**	**373,761**	**1,048**	**51,040**	**1,048**	**284,513**	**963**	**386,350**
Facilities[2]	73	46,228	4	17	16	251	35	6,028	41	5,267
Pipelines	76	270,700	21	17,004	0	0	0	0	0	0
All other non-vessels[3]	2,435	1,091,544	1,620	356,740	1,032	50,789	1,013	278,485	922	381,083
Mystery	**3,108**	**119,377**	**1,149**	**23,966**	**394**	**13,157**	**454**	**6,091**	**398**	**8,581**

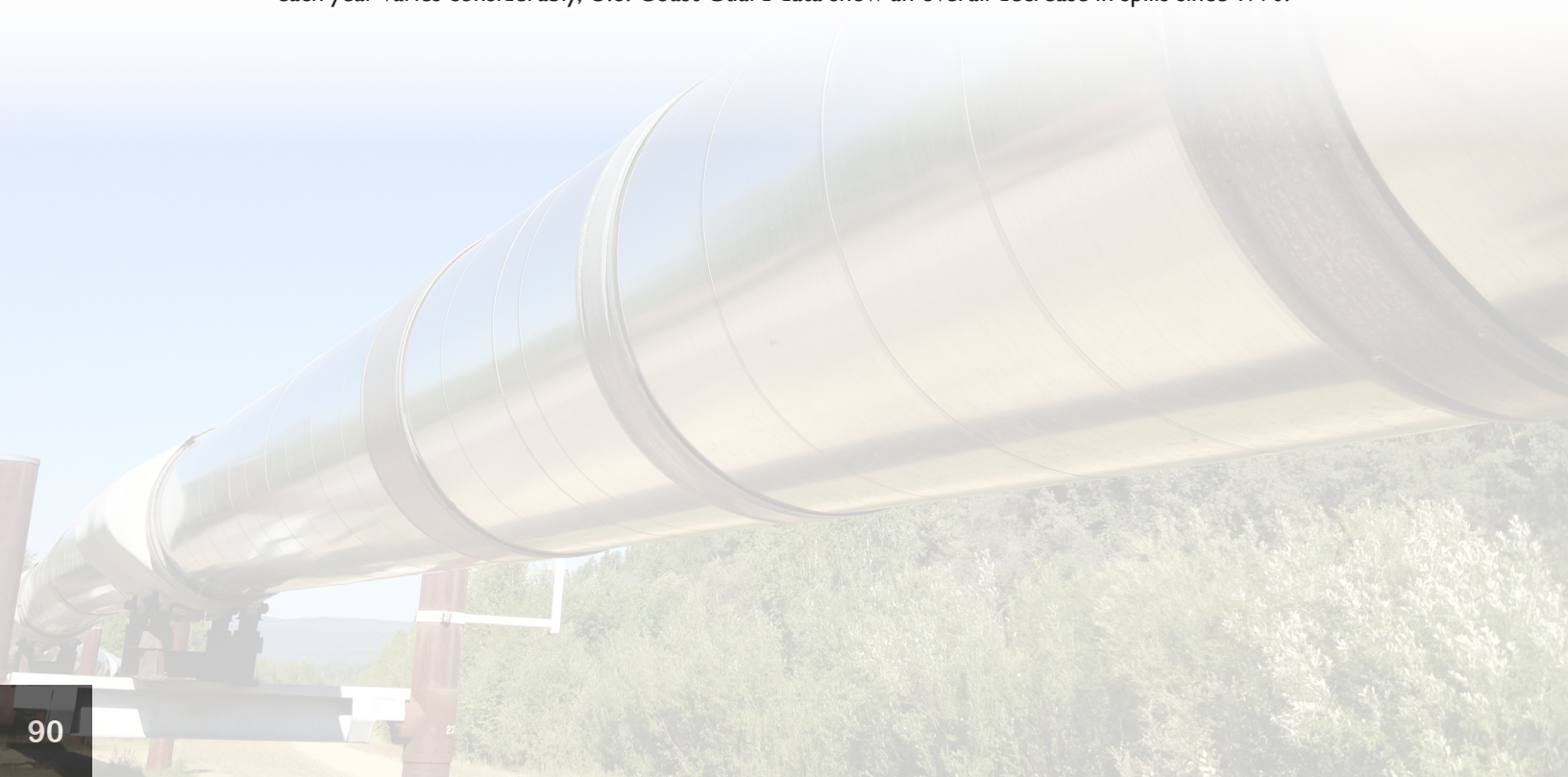
[1]Other vessels include commercial vessels, fishing boats, freight barges, freight ships, industrial vessels, oil recovery vessels, passenger vessels, unclassified public vessels, recreational boats, research vessels, school ships, tow and tug boats, mobile offshore drilling units, offshore supply vessels, publicly owned tank and freight ships, as well as vessels not fitting any particular class (unclassified).

[2]Facilities include mobile offshore drilling units, offshore supply vessels, offshore platforms, designated waterfront facilities, fixed platforms, mobile facilities, and municipal facilities.

[3]All other non-vessels include aircraft, land vehicles, railroad equipment, bridges, factories, fleeting areas, industrial facilities, marinas, common carriers, sewer drainage, shipyard/repair facilities, and shorelines.

SOURCES: **1990 and 2000**: U.S. Coast Guard, *Polluting Incidents In and Around U.S. Waters, A Spill/Release Compendium: 1969-2011* (Washington, DC: January 2013), tables *Number of Spills by Source, Volume of Spills by Source (Gallons) and Oil Spills In U.S. Waters Calendar Year*, available at http://homeport.uscg.mil/ as of August 2015. **2012-2014**: derived from Pollution Incident Investigation records from the Marine Information for Safety and Law Enforcement System (MISLE) as of August 2015. The Polluting Incidents In and Around U.S. Waters, A Spill/Release Compendium is not currently being published. U.S. Coast Guard, Office of Investigations and Analysis, CG-INV JGLaw.

Water quality is affected by oil spills from vessels and pipelines transporting crude oil and petroleum products and by facilities, such as offshore drilling units and platforms. In 2014 vessel-related spills accounted for 40.9 percent of total gallons spilled. While the amount of oil spilled each year varies considerably, U.S. Coast Guard data show an overall decrease in spills since 1990.



APPENDIX A. SELECT METRIC DATA

Table 2-1M Weight of Shipments by Transportation Mode: 2007, 2013, and 2040

(millions of metric tonnes)

	2007				2013				2040			
	Total	Domestic	Exports[2]	Imports[2]	Total	Domestic	Exports[2]	Imports[2]	Total	Domestic	Exports[2]	Imports[2]
Truck	11,592	11,418	86	88	12,660	12,457	109	94	17,042	16,405	334	304
Rail	1,723	1,583	56	84	1,686	1,525	75	86	2,513	1,979	352	182
Water	862	457	59	346	733	372	81	280	971	507	149	315
Air, air & truck	12	2	4	5	13	2	5	6	48	6	18	25
Multiple modes & mail[1]	1,296	393	353	550	1,410	417	507	486	3,243	586	1,403	1,255
Pipeline[1]	1,354	1,192	4	159	1,397	1,262	10	124	1,579	1,140	15	424
Other & unknown	287	241	33	13	302	248	43	11	477	329	118	31
Total	**17,127**	**15,288**	**594**	**1,245**	**18,201**	**16,284**	**829**	**1,088**	**25,874**	**20,951**	**2,388**	**2,535**

[1]2007 total and domestic numbers for the multiple modes & mail and the pipeline categories were revised as a result of Freight Analysis Framework database improvements.

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

NOTES: 1 metric tonne = 1.1023 short tons. Numbers may not add to totals due to rounding. The 2012 data are provisional estimates that are based on selected modal and economic trend data. All truck, rail, water, and pipeline movements that involve more than one mode, including exports and imports that change mode at international gateways, are included in multiple modes & mail to avoid double counting. As a consequence, rail and water totals in this table are less than other published sources.

SOURCE: U.S. Department of Transportation (USDOT), Bureau of Transportation Statistics, and USDOT, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.5, 2015.

Table 2-4M Top Commodities by Weight and Value: 2013

Weight	Millions of metric tonnes	Value	Billions of 2007 dollars
Gravel	2,202	Machinery	$1,877
Cereal grains	1,511	Electronics	$1,485
Non-metallic mineral products	1,374	Motorized vehicles	$1,484
Waste/scrap	1,308	Mixed freight	$1,110
Natural gas, coke, asphalt[1]	1,273	Pharmaceuticals	$914
Coal	1,145	Gasoline	$796
Gasoline	934	Miscellaneous manufactured products	$740
Crude petroleum	761	Textiles/leather	$736
Fuel oils	687	Natural gas, coke, asphalt[1]	$650
Natural sands	562	Plastics/rubber	$618
Total, all commodities	**18,201**	**Total, all commodities**	**$17,983**

[1]This group includes coal and petroleum products not elsewhere classified such as liquefied natural gas, coke, asphalt, and other products of coal and petroleum refining, excluding gasoline, aviation fuel, and fuel oil.

NOTE: 1 metric tonne = 1.1023 short tons.

SOURCE: U.S. Department of Transportation (USDOT), Bureau of Transportation Statistics, and USDOT, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.5, 2015.

Table 2-5M Hazardous Materials Shipments by Transportation Mode: 2012

Transportation mode	Value		Tonnes		Tonne-kilometers[1]		Kilometers
	$ Billions	Percent	Millions	Percent	Billions	Percent	Average distance per shipment
All modes, total	**2,334.4**	**100.0**	**2,340.7**	**100.0**	**449.0**	**100.0**	**183.5**
Single modes, total	**2,304.7**	**98.7**	**2,316.0**	**98.9**	**402.4**	**89.6**	**109.4**
Truck[2]	1466.0	62.8	1,389.3	59.4	141.0	31.4	90.1
For-hire	870.9	37.3	800.4	34.2	90.5	20.2	241.4
Private	595.1	25.5	588.9	25.2	50.4	11.2	53.1
Rail	79.2	3.4	100.7	4.3	1,233.6	27.6	1300.3
Water	217.8	9.3	257.3	11.0	80.2	17.9	341.2
Air	4.4	0.2	0.3	Z	0.4	0.1	1802.4
Pipeline[3]	537.3	23.0	568.5	24.3	S	S	S
Multiple modes, total	**29.7**	**1.3**	**24.8**	**1.1**	**46.6**	**10.4**	**1052.5**
Truck and rail	13.3	0.6	15.4	0.7	24.2	5.4	1535.2
Truck and water	S	S	S	S	S	S	1900.5
Rail and water	2.5	0.1	4.2	0.2	2.0	0.4	S
Parcel, U.S. Postal Service, or Courier	10.3	0.4	0.3	Z	0.3	0.1	1046.0
Other multiple modes	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other modes	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

KEY: S = data are not published because estimate did not meet publication standards; Z = rounds to zero.

[1] Ton-miles estimates are based on estimated distances traveled along a modeled transportation network.

[2] Truck as a single mode includes shipments that went by private truck only or by for-hire truck only.

[3] Excludes crude petroleum shipments.

NOTES: 1 metric tonne = 1.1023 short tons. 1 tonne-kilometer = .6849 ton-miles. 1 kilometer = .6214 miles. Value-of-shipment estimates have not been adjusted for price changes. Numbers and percents may not add to totals due to rounding.

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, *2012 Commodity Flow Survey*, Hazardous Materials (Washington, DC: February 2015), table 1a, available at www.census.gov/econ/cfs/2012/ec12tcf-us-hm.pdf as of July 2015.

Table 2-6M Hazardous Materials Shipments by Hazard Class: 2012

Hazard class	Description	Value		Metric tonnes		Tonne-kilometers[1]		Kilometers
		$ Billions	Percent	Millions	Percent	Billions	Percent	Average distance per shipment
Class 1	Explosives	18.4	0.8	3.6	0.2	1.5	0.3	1,351.8
Class 2	Gases	125.1	5.4	149.5	6.4	48.5	10.8	91.7
Class 3	Flammable liquids	2,016.7	86.4	1,999.0	85.4	298.7	66.5	149.7
Class 4	Flammable solids	5.4	0.2	10.3	0.4	8.5	1.9	909.2
Class 5	Oxidizers and organic peroxides	7.6	0.3	10.9	0.5	8.0	1.8	703.3
Class 6	Toxic (poison)	15.2	0.7	6.9	0.3	5.3	1.2	825.6
Class 7	Radioactive materials	12.3	0.5	S	S	0.6	Z	54.7
Class 8	Corrosive materials	75.9	3.2	113.7	4.9	55.2	12.3	424.8
Class 9	Miscellaneous dangerous goods	58.0	2.5	46.3	2.0	23.5	5.2	852.9
Total		**2,334.4**	**100.0**	**2,340.7**	**100.0**	**449.0**	**100.0**	**183.5**

KEY: S = data are not published because of high sampling variability or other reasons; Z = rounds to zero.

[1] Ton-miles estimates are based on estimated distances traveled along a modeled transportation network.

NOTES: 1 metric tonne = 1.1023 short tons. 1 tonne-kilometer = .6849 ton-miles. 1 kilometer = .6214 miles. Value-of-shipments estimates have not been adjusted for price changes. Numbers and percents may not add to totals due to rounding.

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, *2012 Commodity Flow Survey*, Hazardous Materials (Washington, DC: February 2015), table 2a, available at www.census.gov/econ/cfs/2012/ec12tcf-us-hm.pdf as of July 2015.

Table 2-7M Domestic Mode of Exports and Imports by Tonnage and Value: 2007, 2013, and 2040

	Millions of metric tonnes			Billions of 2007 dollars		
	2007	2013	2040	2007	2013	2040
Total	1,839	1,917	4,922	3,193	3,487	12,134
Truck[1]	680	739	2,145	1,968	2,104	7,852
Rail	253	303	868	200	221	573
Water	137	144	243	54	49	94
Air, air & truck[2]	2	2	9	206	198	892
Multiple modes & mail[3]	135	180	462	278	376	1,250
Pipeline	314	273	816	137	138	350
Other & unknown	47	55	152	220	293	1,016
No domestic mode[4]	272	220	227	130	106	108

[1]Excludes truck moves to and from airports.

[2]Includes truck moves to and from airports.

[3]Multiple modes & mail includes 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 by multiple modes & mail.

[4]No 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.

SOURCE: U.S. Department of Transportation (USDOT), Bureau of Transportation Statistics, and USDOT, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.5, 2015.

Table 2-9M Value and Tonnage of U.S. Merchandise Trade with Canada and Mexico: 2000, 2010, 2013, and 2014

(Billions of current U.S. dollars and millions of metric tonnes)

	2000		2010		2013		2014	
Mode	**Value**	**Weight**	**Value**	**Weight**	**Value**	**Weight**	**Value**	**Weight**
Truck[1]	429	NA	560	160	684	178	715	187
Rail[1]	94	NA	131	103	175	130	178	136
Air	45	<1	45	<1	43	<1	44	<1
Water	33	176	81	190	103	179	104	192
Pipeline[1]	24	NA	65	97	84	127	94	145
Other[1]	29	NA	37	7	51	30	58	37
Total[1]	**653**	**NA**	**920**	**506**	**1,140**	**583**	**1,193**	**631**

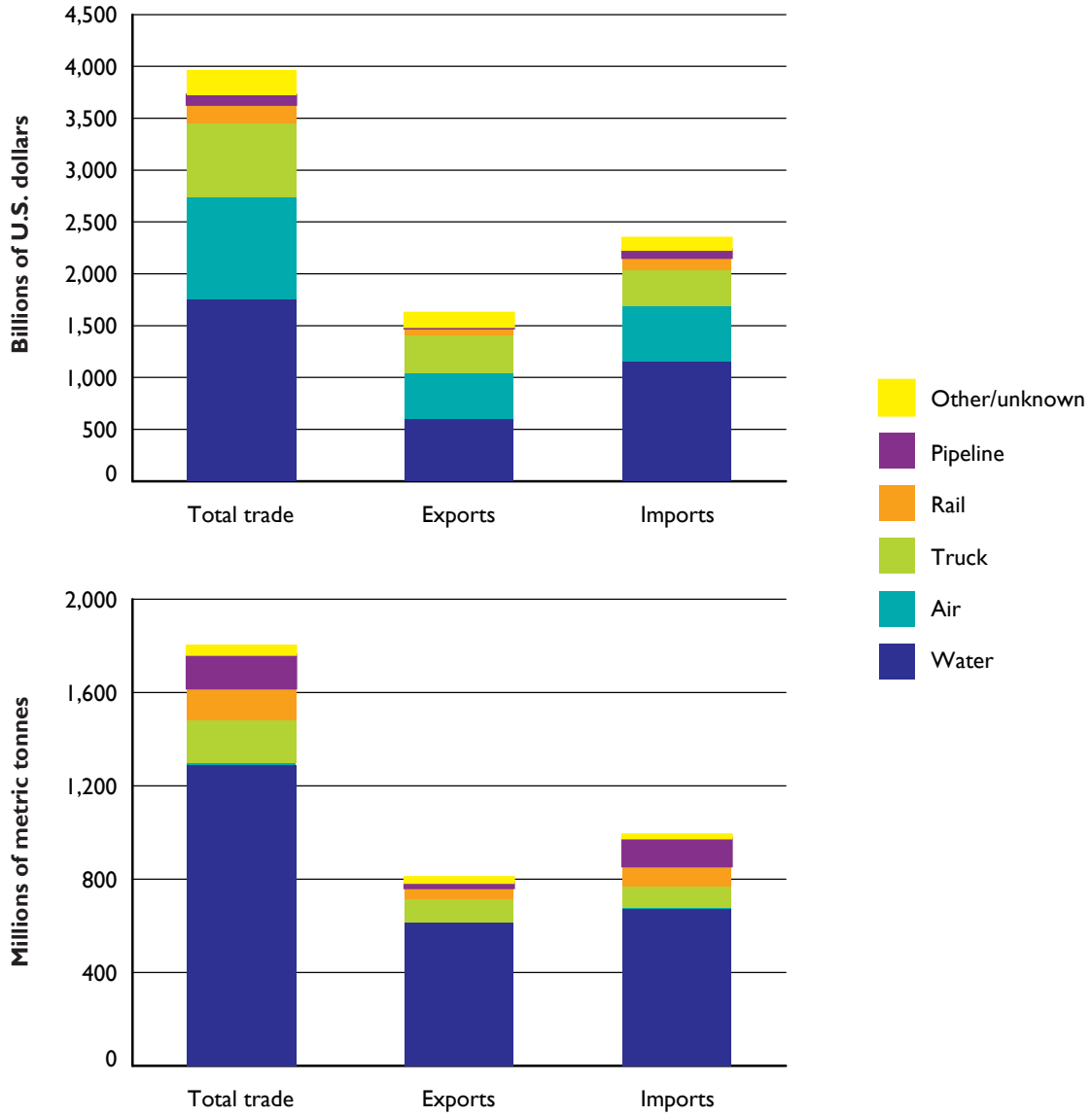
KEY: NA = not available.

[1] The U.S. Department of Transportation, 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.

NOTES: 1 metric tonne = 1.1023 short tons. "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.

SOURCES: **Truck, Rail, Pipeline, and Other**: U.S. Department of Transportation, Bureau of Transportation Statistics, North American Transborder Freight Data, available at www.bts.gov/transborder as of June 2015; **Air and Water:** U.S. Department of Commerce, Census Bureau, Foreign Trade Division, *FT920 - U.S. Merchandise Trade: Selected Highlights* (Washington, DC: annual issues).

Figure 2-9M U.S. International Merchandise Trade Value by Transportation Mode: 2014



NOTES: 1 metric tonne = 1.1023 short tons. The U.S. Department of Transportation (USDOT), Bureau of Transportation Statistics estimated 2012 weight data for truck, rail, pipeline, and other and unknown 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.

SOURCE: **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: February 2015). **Truck, rail, pipeline, and other and unknown data**: U.S. Department of Transportation, Bureau of Transporation Statistics, North American Transborder Freight Data, available at www.bts.gov/transborder as of June 2015.

Table 3-1M Kilometers of Infrastructure by Transportation Mode: 1990, 2000, and 2010–2013

	1990	2000	2010	2011	2012	2013
Public roads, route miles	**6,222,926**	**6,358,386**	**NA**	**6,323,503**	**6,586,305**	**6,622,887**
National Highway System (NHS)	N	259,397	NA	263,503	358,780	365,665
Interstates	72,536	75,109	NA	75,571	76,331	76,561
Other NHS	N	184,287	NA	187,932	282,449	289,105
Other	N	6,098,989	NA	6,060,000	6,227,525	6,257,222
Strategic Highway Corridor Network (STRAHNET)[1]	**N**	**99,881**	**NA**	**102,811**	**104,002**	**100,732**
Interstate	N	75,113	NA	75,571	76,331	76,559
Non-Interstate	N	24,765	NA	27,240	27,671	24,173
Railroad[2]	**283,085**	**274,400**	**223,006**	**222,913**	**222,847**	**NA**
Class I	214,337	194,073	153,803	153,503	153,305	153,096
Regional	29,570	33,759	16,748	16,664	16,664	NA
Local	39,165	46,567	52,456	52,745	52,877	NA
Inland waterways						
Navigable channels	17,702	17,702	17,702	17,702	17,702	17,702
Great Lakes-St. Lawrence Seaway	3,769	3,769	3,769	3,769	3,769	3,769
Pipelines						
Oil	335,938	284,834	(R) 285,481	(R) 287,763	291,846	301,260
Gas	2,044,247	2,216,479	(R) 2,501,032	(R) 2,515,835	2,521,725	2,534,739

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

[1]The Strategic Highway Corridor Network (STRAHNET) is the total minimum public highway network necessary to support deployment needs of the U.S. Department of Defense.

[2]Class I railroads have annual carrier operating revenue in 2013 of $467.1 million or more. Regional (Class II) railroads have annual carrier operating revenue in 2013 greater than $37.4 million and less than $433.2 million. Local (Class III) railroads have annual carrier operating revenue in 2013 below $37.4 million.

NOTE: 1 kilometer = .6214 miles.

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/2013/ as of July 2015. **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 July 2015. **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 July 2015. **Pipelines: 1980**: Eno Transportation Foundation, *Transportation in America*, 2002 (Washington, DC: 2002). **1990-2013**: 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 July 2015.

Table 3-10M 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 individuals in the United States except pickups, minivans, other light vans, and sport utility vehicles. Numbers may not add to totals due to rounding.

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 December 2004.

Table 3-11M Truck Kilometers by Products Carried: 2002

Products carried	Millions of kilometers
No product carried	46,632
Mixed freight	23,590
Tools, nonpowered	12,487
All other prepared foodstuffs	11,953
Tools, powered	10,424
Products not specified	10,232
Mail and courier parcels	7,660
Miscellaneous manufactured products	6,449
Vehicles, including parts	6,186
Wood products	5,730
Bakery and milled grain products	5,717
Articles of base metal	5,301
Machinery	5,190
Paper or paperboard articles	5,052
Meat, seafood, and their preparations	4,918
Nometallic mineral products	4,906
Electronic and other electrical equipment	4,866
Base metal in primary or semifinished forms	4,637
Gravel or crushed stone	4,490
All other agricultural products	4,282
All other waste and scrape (non-EPA manifest)	4,260
Plastic and rubber	3,850
Animal feed and products of animal origin	3,360
Furniture, mattresses, lamps, etc.	3,288
Pulp, newsprint, paper, paperboard	3,115
Fertilizers and fertilizer materials	2,681
Textile, leather, and related articles	2,475
Grains, cereal	2,201
All other chemical products and preparations	2,174
Fuel oils	1,983
All other coal and refined petroleum products	1,886
Logs and other wood in the rough	1,849
Alcoholic beverages	1,808
Natural sands	1,753
Recyclable products	1,484
Basic chemicals	1,410
Gasoline and aviation turbine fuel	1,365
Empty shipping containers	1,278
Printed products	1,231
Animals and fish, live	1,182
Precision instruments and apparatus	1,181
All other transportation equipment	1,024
All other nonmetallic minerals	802
Monumental or building stone	744
Tobacco products	717
Pharmaceutical products	491
Coal	484
Passengers	440
Products, equipment, or materials not elsewhere classified	426
Hazardous waste (EPA manifest)	306
Not applicable[2]	241
Crude petroleum	212
Metallic ores and concentrates	73
Total[1]	**233,622**

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

[2]Vehicles 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.

NOTES: 1 kilometer = 0.6214 miles. Includes trucks registered to companies and individuals in the United States except pickups, minivans, other light vans, and sport utility vehicles.

SOURCE: U.S. Department of Commerce, Census Bureau, *2002 Vehicle Inventory and Use Survey: United States*, EC02TV-US (Washington, DC: 2004), available at http://www.census.gov/prod/ec02/ec02tv-us.pdf as of July 2015.

Table 6-6M Fuel Consumption by Transportation Mode: 2007–2013

	2007	2008	2009	2010	2011	2012	2013
Highway[1]							
Gasoline, diesel and other fuels (million liters)	666,929	646,349	636,412	645,006	638,143	638,231	642,131
Truck, total	178,724	180,562	167,686	170,413	160,396	160,302	163,879
Single-unit 2-axle 6-tire or more truck	61,750	64,888	61,516	57,141	53,684	54,415	54,890
Combination truck	116,973	115,673	106,170	113,273	106,712	105,887	108,989
Truck (percent of total)	26.8	27.9	26.3	26.4	25.1	25.1	25.5
Rail, Class I (in freight service)							
Distillate / diesel fuel (million liters)	15,471	14,804	12,188	13,320	14,044	13,755	14,052
Water							
Residual fuel oil (million liters)	23,948	19,901	17,370	19,465	17,260	18,242	15,941
Distillate / diesel fuel oil (million liters)	7,282	7,507	7,241	7,581	8,075	6,693	6,342
Gasoline (million liters)	4,625	4,301	4,278	4,417	4,179	4,138	4,249
Pipeline							
Natural gas (million cubic meters)	17,595	18,348	18,977	19,089	(R) 19,476	20,694	24,397

KEY: R = revised.

[1]Based on a new methodology, FHWA revised its annual vehicle-miles traveled, number of vehicles, and fuel economy data beginning with 2007. Information on the new methodology is available at www.fhwa.dot.gov/policyinformation/statistics.cfm. Data in this table should not be compared to those in pre-2011 editions of *Freight Facts and Figures*.

NOTES: 1 liter = .2642 gallons. 1 cubic meter = 35.3147 cubic feet.

SOURCES: **Highway**: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues), table VM-1. **Rail**: Association of American Railroads, *Railroad Facts 2014* (Washington, DC: 2014), p. 63. **Water**: U.S. Department of Energy, Energy Information Administration, *Fuel Oil and Kerosene Sales 2013* (Washington, DC: 2014), 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/2013/ as of July 2015. **Pipeline**: U.S. Department of Energy, *Natural Gas Annual 2013*, (Washington, DC: October 2014), table 15 and similar tables in earlier editions.

Table 6-8M Single-Unit Truck Fuel Consumption and Travel: 2007–2013

	2007	2008	2009	2010	2011	2012	2013
Number registered (thousands)	8,117	8,288	8,356	8,217	7,819	8,190	8,126
Vehicle-kiometers traveled (millions)	193,079	204,144	193,445	178,207	166,584	169,947	171,519
Fuel consumed (million liters)	61,750	64,888	61,516	57,141	53,684	54,415	54,890
Average kilometers traveled per vehicle	23,788	24,631	23,151	21,687	21,305	20,750	21,107
Average kilometers traveled per gallon	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Average fuel consumed per vehicle (liters)	7,608	7,827	7,362	6,953	6,866	6,643	6,756

NOTES: Based on a new methodology, FHWA revised its annual vehicle-miles traveled, number of vehicles, and fuel economy data beginning with 2007. Information on the new methodology is available at www.fhwa.dot.gov/policyinformation/statistics.cfm. Data in this table should not be compared to those in pre-2011 editions of *Freight Facts and Figures*.

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/2013/ as of July 2015.

Table 6-9M Combination Truck Fuel Consumption and Travel: 2007–2013

	2007	2008	2009	2010	2011	2012	2013
Number registered (thousands)	2,635	2,585	2,617	2,553	2,452	2,469	2,471
Vehicle-kiometers traveled (millions)	296,426	295,826	270,518	282,892	263,425	263,280	271,059
Fuel consumed (million liters)	116,973	115,673	106,170	113,273	106,712	105,887	108,989
Average kilometers traveled per vehicle	112,481	114,429	103,365	110,813	107,448	109,849	109,680
Average kilometers traveled per gallon	2.5	2.6	2.5	2.5	2.5	2.5	2.5
Average fuel consumed per vehicle (liters)	44,387	44,743	40,568	44,372	43,528	42,884	44,099

NOTES: Based on a new methodology, FHWA revised its annual vehicle-miles traveled, number of vehicles, and fuel economy data beginning with 2007. Information on the new methodology is available at www.fhwa.dot.gov/policyinformation/statistics.cfm. Data in this table should not be compared to those in pre-2011 editions of *Freight Facts and Figures*.

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/2013/ as of July 2015.

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