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.

Table 3-1. Miles of Infrastructure by Transportation Mode: 1990, 2000, and 2008-2011

	1990	2000	2008	2009	2010	2011
Public roads, route miles	3,866,926	3,951,101	4,059,343	NA	NA	3,929,425
National Highway System (NHS)	N	161,189	164,096	NA	NA	163,741
Interstates	45,074	46,673	47,013	NA	NA	46,960
Other NHS	N	114,516	117,083	NA	NA	116,781
Other	N	3,789,912	3,895,246	NA	NA	3,765,684
Strategic Highway Corridor Network (STRAHNET)[1]	N	62,066	62,253	NA	NA	63,887
Interstate	N	46,675	47,013	NA	NA	46,960
Non-Interstate	N	15,389	15,240	NA	NA	16,927
Railroad[2]	175,909	170,512	139,326	139,118	138,576	138,518
Class I	133,189	120,597	94,082	93,921	95,573	95,387
Regional	18,375	20,978	16,690	12,804	10,407	10,355
Local	24,337	28,937	28,554	32,393	32,596	32,776
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) 169,586	(R) 171,773	177,509	178,809
Gas	(R) 1,270,295	(R) 1,377,320	(R) 1,532,787	(R) 1,545,320	1,553,580	1,563,527

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 of $433.2 million or more. Regional (Class II) railroads have annual carrier operating revenue greater than $20.5 million and less than $433.2 million. Local (Class III) railroads have annual carrier operating revenue below $20.5 million.

Since 1990, road infrastructure increased slowly despite a large increase in the volume of traffic. Over the same period, rail miles declined by 21 percent while gas pipeline mileage increased by 23 percent.

Table 3-1. Miles of Infrastructure by Transportation Mode: 1990, 2000, and 2008-2011

Source: ***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/2011/* as of October 5, 2013. **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 October 5, 2013. **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 October 5, 2013. **Pipelines:** 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 October 5, 2013.

Table 3-2. Freight Intermodal Connectors on the National Highway System by State: 2013

State	Port Terminal	Truck/ Rail Facility	Airport	Truck/ Pipeline Terminal
Total	323	267	262	67
Alabama	5	4	4	1
Alaska	8	0	9	0
Arizona	0	2	3	0
Arkansas	3	7	4	3
California	17	15	14	3
Colorado	0	5	6	4
Connecticut	3	0	1	0
Delaware	1	0	1	0
District of Columbia	0	0	0	0
Florida	14	12	24	0
Georgia	5	13	4	7
Hawaii	10	0	5	0
Idaho	1	0	2	1
Illinois	9	42	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	14	8	11	0
Minnesota	1	1	3	0
Mississippi	20	2	3	0
Missouri	4	8	3	0
Montana	0	0	1	0
Nebraska	0	2	1	1
Nevada	0	0	2	0
New Hampshire	1	0	3	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	5
Oklahoma	3	1	2	1
Oregon	15	5	6	1
Pennsylvania	8	7	4	2
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	13	6	14	0
West Virginia	2	0	2	0
Wisconsin	19	4	5	0
Wyoming	0	0	0	0

Intermodal connectors are important components of the highway network. They 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.

Table 3-2. Freight Intermodal Connectors on the National Highway System by State: 2013
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 October 3, 2013.

Table 3-3. Number of Trucks, Locomotives, Rail Cars, and Vessels: 1990, 2000, and 2008-2011

	1990	2000	2008	2009	2010	2011
Highway (all vehicles)[1]	NA	NA	255,917,664	254,212,610	250,070,048	253,108,389
Truck, single-unit 2-axle 6-tire or more	NA	NA	8,288,046	8,356,097	8,217,189	7,819,055
Truck, combination	NA	NA	2,585,229	2,617,118	2,552,865	2,451,638
Truck, total	NA	NA	10,873,275	10,973,215	10,770,054	10,270,693
Trucks as percent of all highway vehicles	NA	NA	4.2	4.3	4.3	4.1
Rail						
Class I, locomotive	18,835	20,028	24,003	24,045	23,893	24,250
Class I, freight cars[2]	658,902	560,154	450,297	416,180	397,730	380,699
Nonclass I, freight cars[2]	103,527	132,448	109,487	108,233	101,755	95,972
Car companies and shippers freight cars[2]	449,832	688,194	833,188	839,020	809,544	806,554
Water	39,445	41,354	40,301	40,109	40,512	40,521
Nonself-propelled vessels[3]	31,209	33,152	31,238	31,008	31,412	31,498
Self-propelled vessels[4]	8,236	8,202	9,063	9,101	9,100	9,023

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.

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

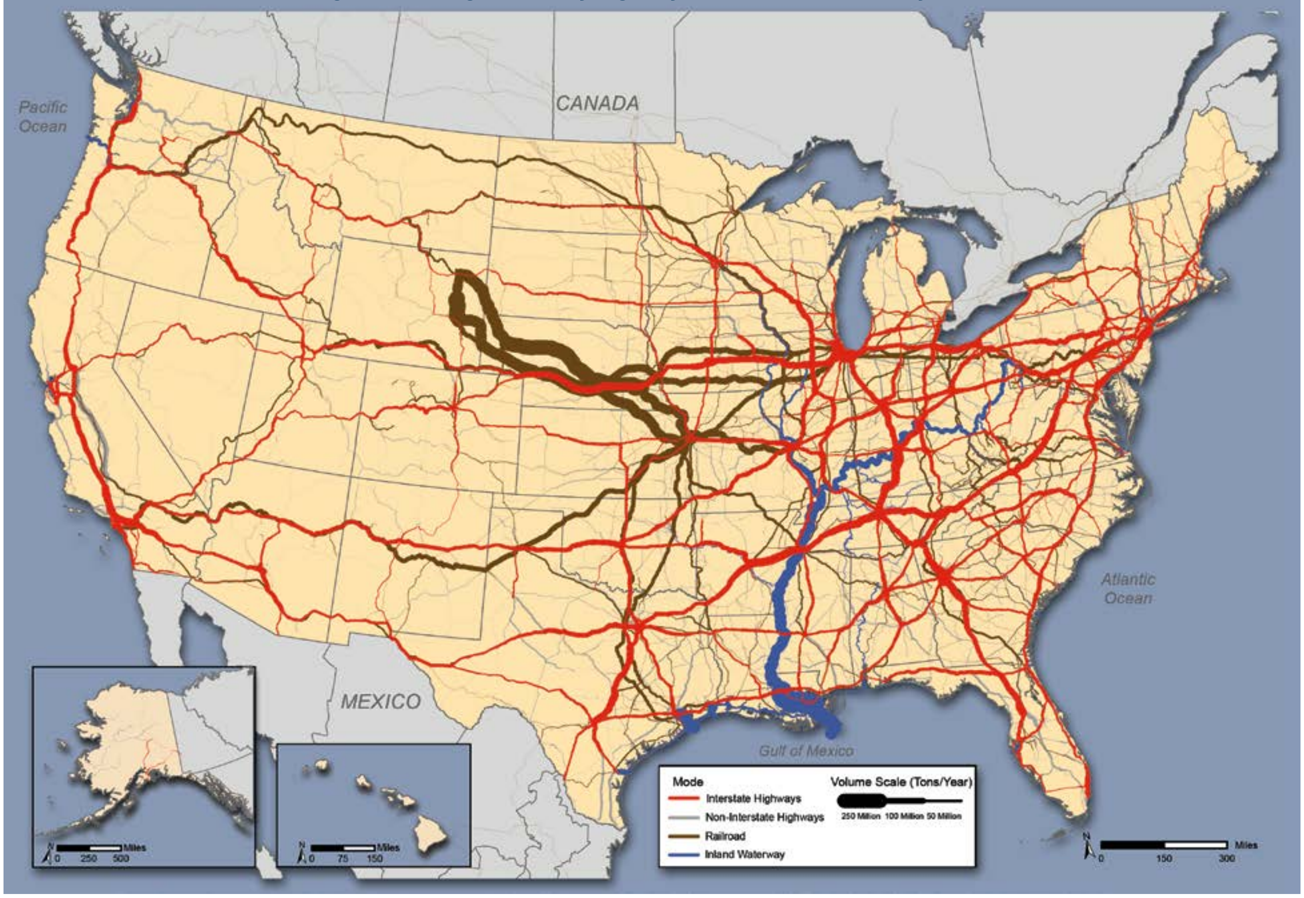
[4] Self-propelled vessels include dry cargo, passenger, off-shore support, tankers, and towboats.

A vast number of vehicles and vessels move goods over the transportation network. The number of highway vehicles 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 3-3. Number of Trucks, Locomotives, Rail Cars, and Vessels: 1990, 2000, and 2008-2011

Source: 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/2011/* as of September 11, 2013. **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 September 24, 2013.

Figure 3-1. Freight Flows by Highway, Railroad, and Waterway: 2010



Trucks carry most of the tonnage and value of freight in the United States, but railroads and waterways carry significant volumes over long distances. 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 3-1. Freight Flows by Highway, Railroad, and Waterway: 2010

Source: Highways: U.S. Department of Transportation, Federal Highway Administration, Freight Analysis Framework, Version 3.4, 2013; **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, 2013.

Figure 3-2. Top 25 U.S.-International Trade Freight Gateways by Value of Shipments: 2011

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.

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

Figure 3-2. Top 25 U.S.-International Trade Freight Gateways by Value of Shipments: 2011

Sources: Air: U.S. Department of Commerce, U.S. Census Bureau, Foreign Trade Division, special tabulation, October 2012; **Water:** U.S. Army Corps of Engineers, Institute for Water Resources, special tabulation, October 2012; **Land:** U.S. Department of Transportation, Bureau of Transportation Statistics, North American TransBorder Freight Data, special tabulation, available at *www.bts.gov/programs/international/transborder/* as of October 2012; as reported in U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics*, available at *www.rita.dot.gov/bts/publications as of October 8, 2013.*

Figure 3-3. Tonnage of Trailer-on-Flatcar and Container-on-Flatcar Rail Intermodal Moves: 2011

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.

Figure 3-3. Tonnage of Trailer-on-Flatcar and Container-on-Flatcar Rail Intermodal Moves: 2011
Source: U.S. Department of Transportation, Federal Railroad Administration, special tabulation, September 2013.

Figure 3-4. Top 25 Water Ports by Containerized Cargo: 2011

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.

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 about 37 percent of all container traffic at water ports in the United States. Container trade at these two ports increased by nearly 61 percent between 2000 and 2011, roughly equal to that reported for container cargo overall.

Figure 3-4. Top 25 Water Ports by Containerized Cargo: 2011
Source: U.S. Department of Transportation, Maritime Administration, U.S. Waterborne Container Trade by U.S. Custom Ports, based on data provided by Port Import/Export Reporting Service, available at *www.marad.dot.gov/library_landing_page/data_and_statistics/Data_and_Statistics.ht*m as of September 13, 2013.

Table 3-4. 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	(R) 4,143	(R) 3,900	(R) 3,492	(R) 3,287	(R) 3,707	4,563
2,000-2,999	(R) 3,985	4,099	(R) 3,344	(R) 2,676	(R) 2,760	2,878
3,000-3,999	3,333	2,866	2,460	(R) 2,499	(R) 2,052	2,363
4,000-4,999	4,782	5,033	(R) 5,120	(R) 5,303	(R) 5,876	6,421
> 4,999	3,344	3,961	(R) 4,313	4,434	5,126	5,997
Total Calls	**(R) 19,587**	**(R) 19,859**	**(R) 18,729**	**(R) 18,199**	**(R) 19,521**	**22,222**
Vessels						
< 2,000	212	195	196	179	178	182
2,000-2,999	257	230	219	220	206	184
3,000-3,999	177	166	141	147	130	131
4,000-4,999	258	271	284	306	315	307
> 4,999	260	277	326	366	396	418
Total Vessels	**1,164**	**1,140**	**1,166**	**1,218**	**1,225**	**1,222**

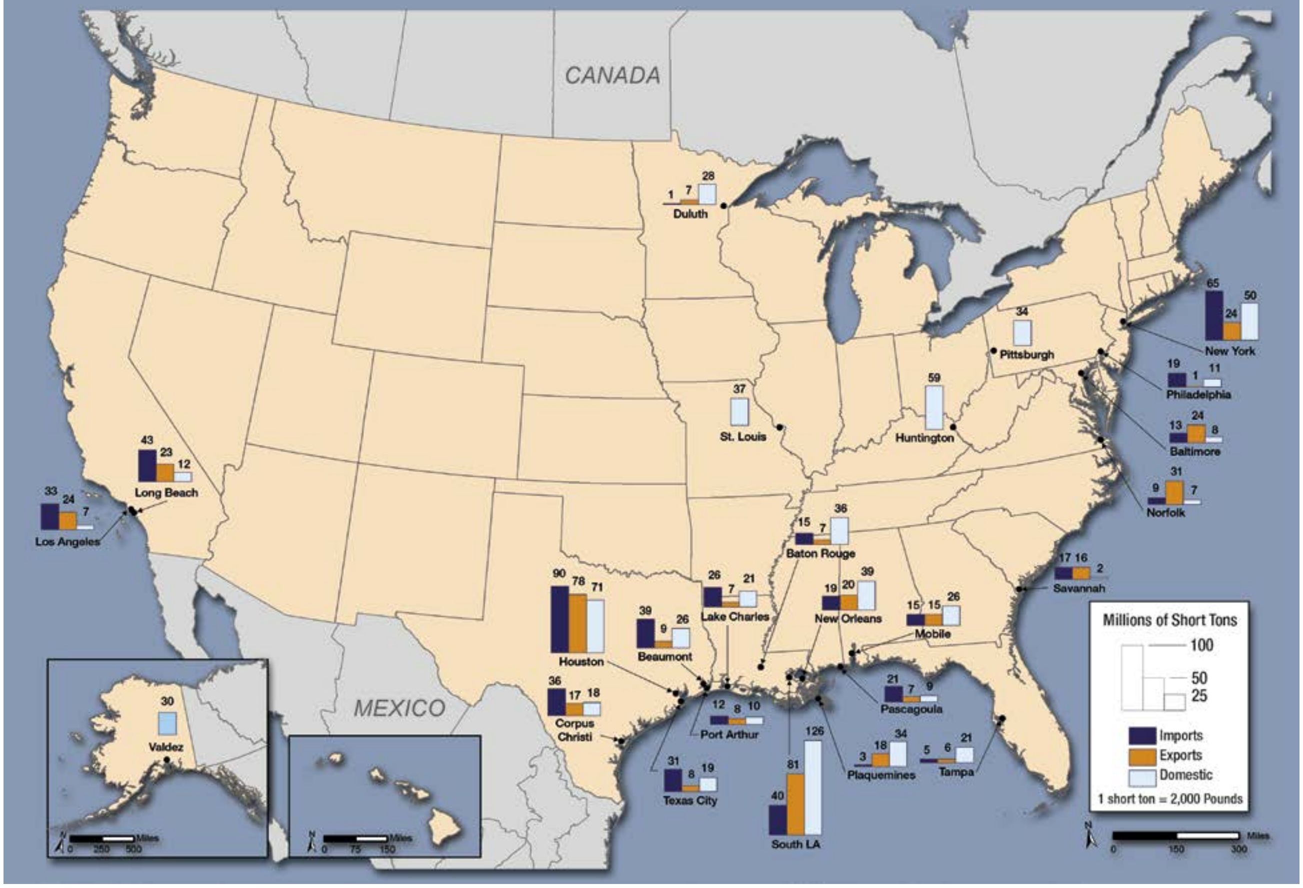
Key: TEU = twenty-foot equivalent unit; R = revised.

From 2006 to 2011, the number of calls by containership with capacities of 5,000 TEUs or greater has increased by nearly 80 percent. These large container ships accounted for 27 percent of total containership calls at U.S. ports in 2011, up from 17 percent in 2006.

Table 3-4. Containership Calls at U.S. Ports by Vessel Size and Number of Vessels: 2006-2011

Sources: Lloyd's Marine Intelligence Unit, Vessel Movements Data Files, 2006-2011 (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 as of September 25, 2013.

Figure 3-5. Top 25 Water Ports by Tonnage: 2011



Although the top ports for containerized cargo are primarily on the Pacific and Atlantic Coasts, 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 handle more than two-thirds of the weight of all foreign and domestic goods moved by water.

Figure 3-5. Top 25 Water Ports by Tonnage: 2011
Source: U.S. Army Corps of Engineers, 2011 Waterborne Commerce of the United States, Part 5, National Summaries (Alexandria, VA: 2012), table 5-2, available at *www.navigationdatacenter.us/wcsc/* as of September 17, 2013.

Table 3-5. Number of Vessel Calls at U.S. Ports: 2006-2011 (Vessels Weighing 10,000 Deadweight Tons or Greater)

Type	(R) 2006	(R) 2007	(R) 2008	(R) 2009	(R) 2010	2011	Percent Change, 2006-2011
Tanker	20,391	20,699	20,096	18,991	20,832	23,678	16.1
Double hull	17,070	18,158	18,315	18,035	20,199	23,214	36.0
Product	12,746	12,671	12,182	11,413	12,537	14,677	15.1
Double hull	9,869	10,350	10,561	10,534	11,947	14,216	44.0
Crude	7,645	8,028	7,914	7,578	8,295	9,001	17.7
Double hull	7,201	7,808	7,754	7,501	8,252	8,998	25.0
Container	19,587	19,859	18,729	18,199	19,521	22,222	13.5
Dry Bulk	11,579	10,081	9,513	7,884	9,227	10,883	-6.0
Roll on/Roll off	6,315	6,074	5,962	4,947	5,842	6,172	-2.3
Vehicle	4,181	4,084	4,101	3,336	4,100	4,339	3.8
Gas	879	824	698	659	738	846	-3.8
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	4,008	0.6
All Types	**63,053**	**61,603**	**58,751**	**54,081**	**59,871**	**67,929**	**7.7**

Key: R = revised.

In 2011, 7,662 oceangoing vessels made 67,929 calls at U.S. ports, a 13 percent increase from the previous year. Tankers accounted for 35 percent of total calls, followed by containerships (33 percent) and dry bulk vessels (16 percent). Approximately 98 percent of all tankers calling at U.S. ports are double-hull vessels, a 14 percent increase from five years earlier.

Table 3-6. Average Vessel Size per Call at U.S. Ports: 2006-2011 (Deadweight Tons)

Type	(R) 2006	(R) 2007	(R) 2008	(R) 2009	(R) 2010	2011	Percent Change, 2006-2011
Tanker	72,340	72,741	72,660	72,483	71,748	70,749	-2.2
Double hull	76,306	76,898	75,358	74,012	72,689	71,375	-6.5
Product	37,765	36,766	36,672	37,363	37,373	37,572	-0.5
Double hull	37,972	37,048	36,909	37,305	37,291	37,520	-1.2
Crude	129,984	129,521	128,056	125,377	123,703	124,847	-4.0
Double hull	128,844	129,723	127,725	125,561	123,937	124,862	-3.1
Container	46,602	47,726	49,214	50,207	51,266	51,216	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	53,701	20.5
Roll on/Roll off	19,750	19,634	20,146	20,631	20,574	20,831	5.5
Vehicle	18,801	18,585	18,886	19,203	19,261	19,745	5.0
Gas	41,287	41,262	41,388	45,078	44,154	40,744	-1.3
Cubic meters	61,739	61,486	61,921	68,722	66,980	59,697	-3.3
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	22,758	-10.4
All Types	**50,653**	**51,638**	**52,518**	**53,472**	**53,687**	**53,955**	**6.5**

Key: TEU = twenty-foot equivalent unit; R = revised.

The average vessel size per call at U.S. ports increased from 50,653 deadweight tons (DWT) in 2006 to 53,955 DWT in 2011, an increase of nearly 7 percent. The average size

Table 3-5. Number of Vessel Calls at U.S. Ports: 2006-2011 (Vessels Weighing 10,000 Deadweight Tons or Greater)

Sources: Lloyd's Marine Intelligence Unit, Vessel Movements Data Files, 2006-2011 (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* as of September 25, 2013.

Table 3-6. Average Vessel Size per Call at U.S. Ports: 2006-2011 (Deadweight Tons)

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* as of September 25, 2013.

of containerships increased by 13 percent in terms of TEU capacity (10 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.

Table 3-7. Top 25 Airports by Landed Weight of All-Cargo Operations: 2000 and 2009-2012[1]

Airport	2012 Rank	Landed weight (thousands of short tons)				
		2000	2009	2010	2011	2012
Memphis, TN (Memphis International)	1	6,318	9,464	9,772	10,152	10,263
Anchorage, AK (Ted Stevens Anchorage International)[2]	2	8,084	7,762	9,732	8,887	8,261
Louisville, KY (Louisville International-Standiford Field)	3	3,987	5,139	5,319	5,491	5,462
Miami, FL (Miami International)	4	2,929	3,176	3,453	3,317	3,574
Indianapolis, IN (Indianapolis International)	5	2,884	2,288	2,359	2,407	2,470
Chicago, IL (O'Hare International)	6	2,062	1,750	2,448	2,184	2,278
Los Angeles, CA (Los Angeles International)	7	2,892	1,884	1,977	2,022	2,102
New York, NY (John F. Kennedy International)	8	2,793	1,591	1,962	1,972	1,747
Cincinnati, OH (Cincinnati /Northern Kentucky International)	9	912	564	1,216	1,410	1,594
Fort Worth, TX (Dallas/Fort Worth International)	10	1,691	1,436	1,516	1,532	1,544
Newark, NJ (Newark Liberty International)	11	1,961	1,464	1,489	1,525	1,427
Oakland, CA (Metropolitan Oakland International)	12	1,811	1,341	1,324	1,340	1,323
Ontario, CA (Ontario International)	13	1,220	1,168	1,121	1,157	1,181
Atlanta, GA (William B. Hartsfield International)	14	1,090	1,278	1,314	1,328	1,014
Honolulu, HI (Honolulu International)	15	692	1,021	1,062	1,057	988
Philadelphia, PA (Philadelphia International)	16	1,454	1,132	994	975	947
Houston, TX (George Bush Intercontinental)	17	480	784	763	808	784
Phoenix, AZ (Sky Harbor International)	18	920	610	607	620	650
Seattle, WA (Seattle-Tacoma International)	19	1,060	803	697	679	645
Denver, CO (Denver International)	20	900	624	619	605	602
San Francisco, CA (San Francisco International)	21	1,267	747	652	622	599
Portland, OR (Portland International)	22	882	545	531	567	581
Salt Lake City, UT (Salt Lake City International)	23	751	449	424	428	438
Minneapolis, MN (Minneapolis-St Paul International/Wold-Chamberlain)	24	622	474	512	484	438
San Juan, PR (Luis Munoz Marin International)	25	485	543	441	434	425
Top 25 airports[3]		**52,381**	**48,153**	**52,350**	**52,043**	**51,338**
United States, all airports[4]		**74,743**	**63,191**	**67,530**	**66,095**	**67,448**
Top 25 as % of U.S. total		**70.1**	**76.2**	**77.5**	**78.7**	**76.1**

[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 2012.

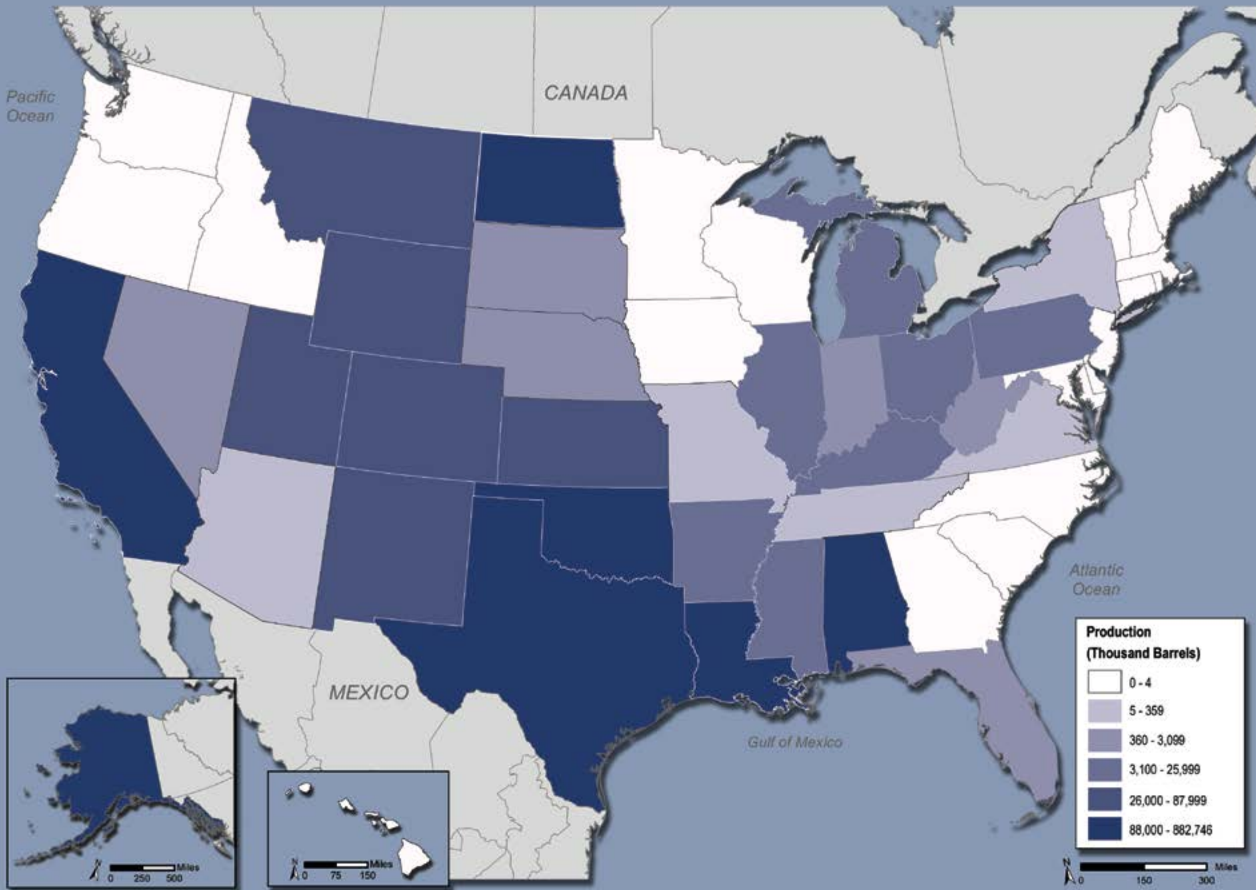
[4] Limited to airports with an aggregate landed weight in excess of 100 million pounds (50,000 short tons) annually.

Note: 1 short ton = 2,000 pounds.

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.

Table 3-7. Top 25 Airports by Landed Weight of All-Cargo Operations: 2000 and 2009-2012
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/passenger/* as of September 11, 2013.

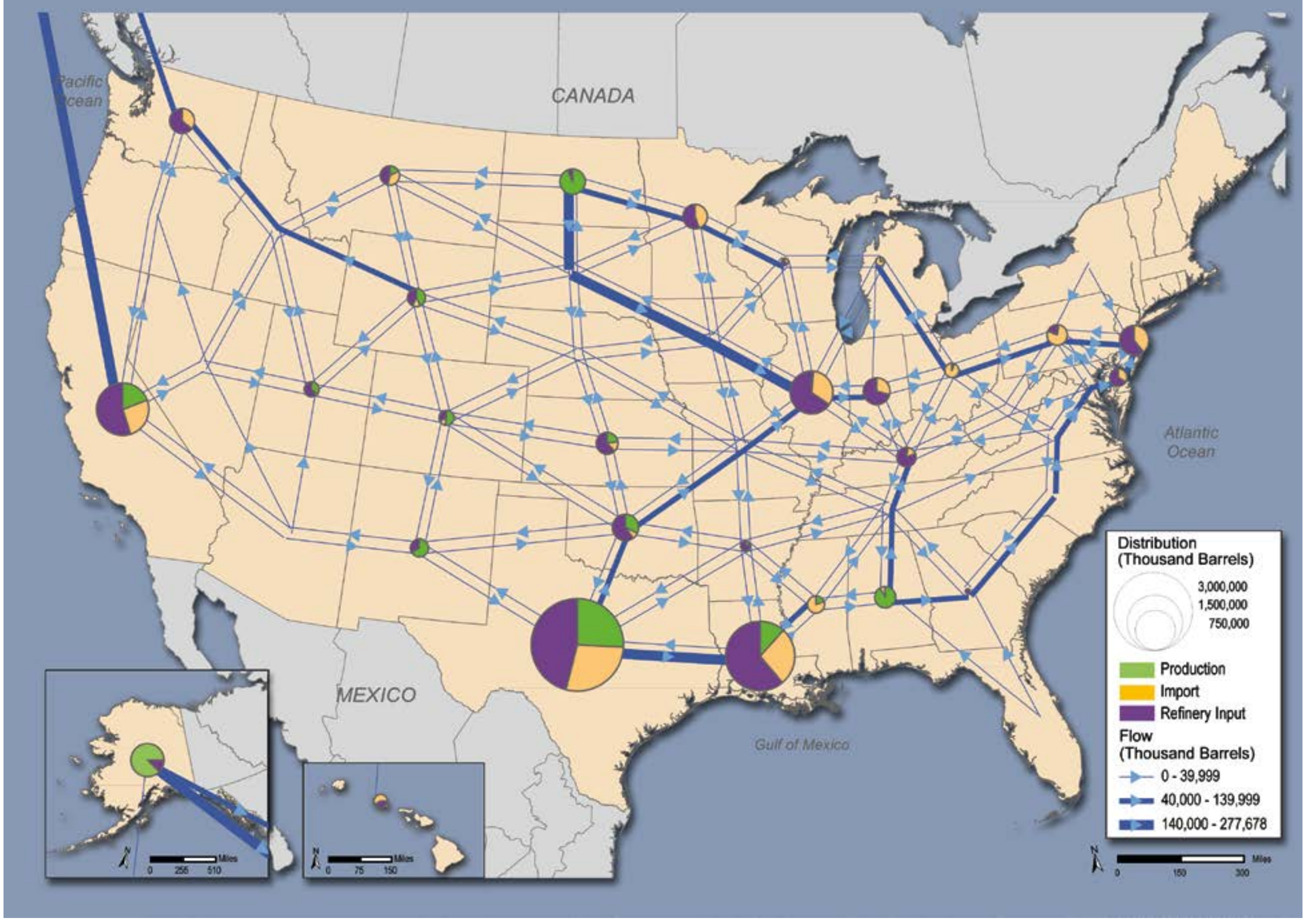
Figure 3-6. Crude Oil Production by State: 2011



A handful of states are responsible for the bulk of domestic production. Texas is the largest oil producing state while North Dakota, where the Bakken shale formation is located, has the distinction of being the fastest growing oil producer. Alaska and California also are major oil producing states.

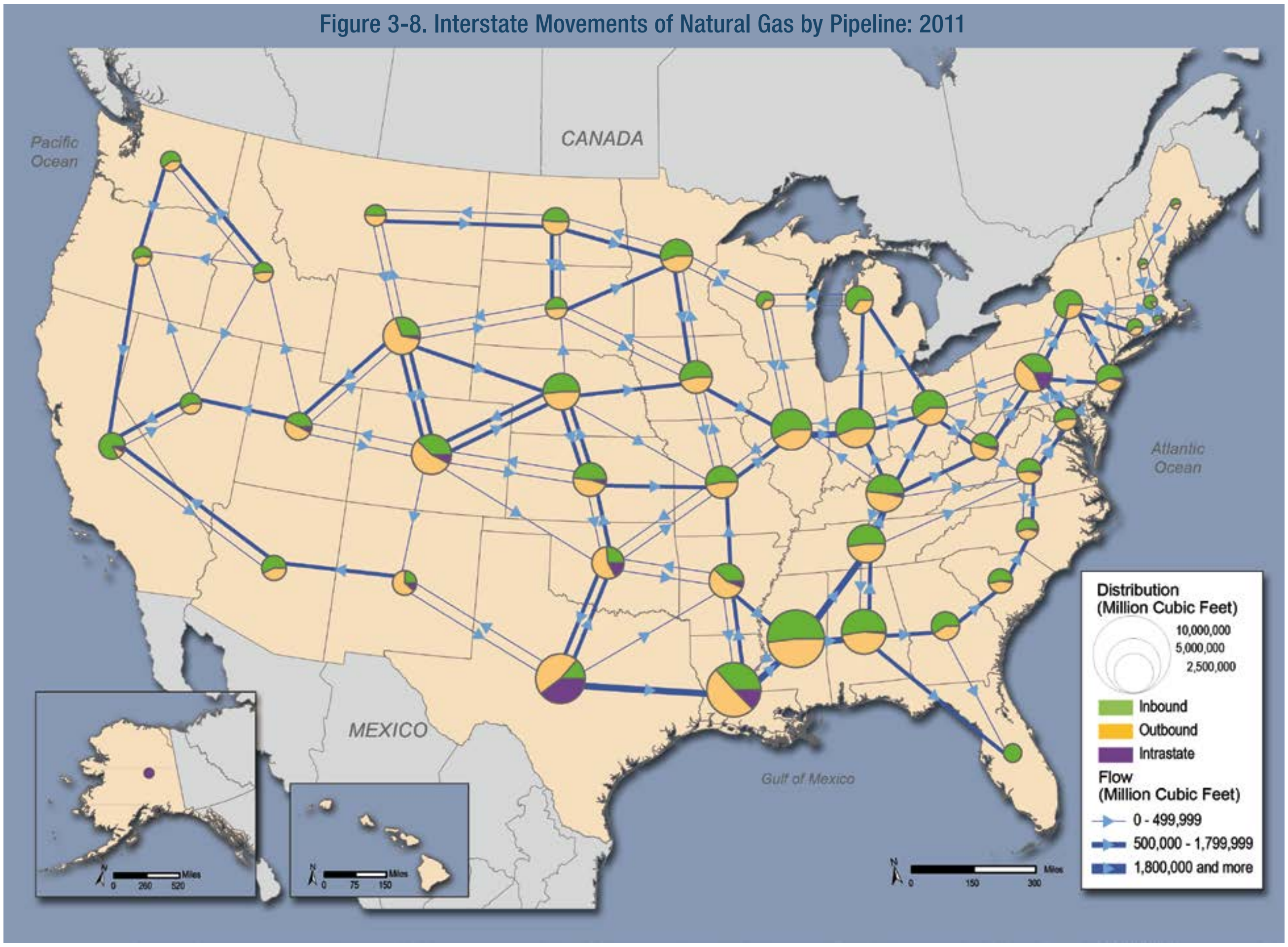
Figure 3-6. Crude Oil Production by State: 2011
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.4, 2013.

Figure 3-7. Interstate Movements of Crude Oil by Pipeline: 2011



Pipelines move large volumes of crude oil and natural gas from producing fields to markets throughout the United States. Based on FAF data, the oil and gas pipeline system moved an estimated 1.9 billion tons valued at $1.2 trillion in 2011. Large volumes of crude oil were moved from producing fields in Texas and North Dakota.

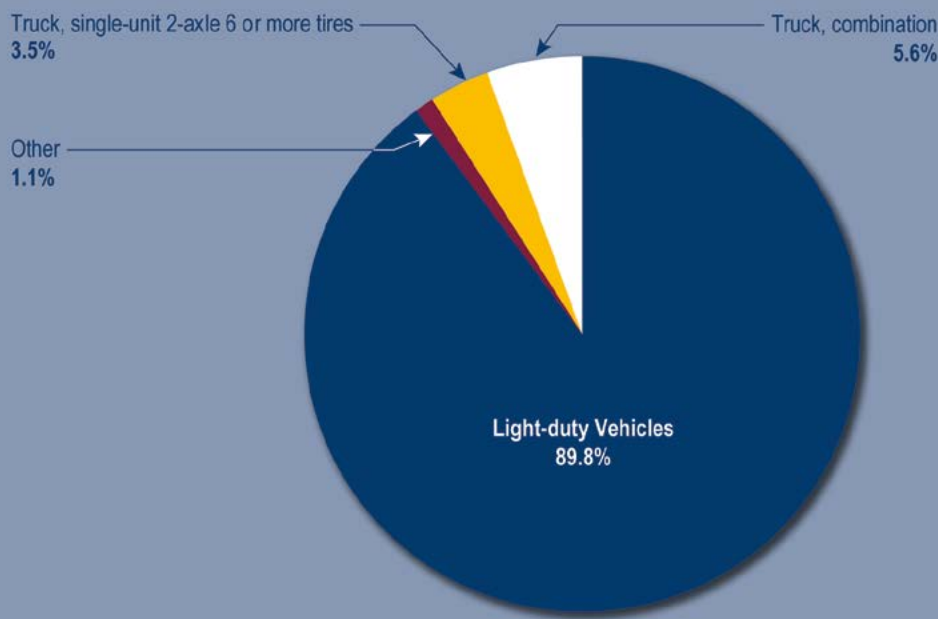
Figure 3-7. Interstate Movements of Crude Oil by Pipeline: 2011
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.4, 2013.



Natural gas is located in many of the same areas as crude oil. Gathering pipelines (or trunk lines) move the gas from the well to processing plants where impurities are removed. From the processing plants, natural gas is moved to areas of high natural gas demand via an extensive and complex system of interstate pipelines. The interstate pipeline network spans about 217,000 miles.

Figure 3-8. Interstate Movements of Natural Gas by Pipeline: 2011
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.4, 2013.

Figure 3-9. Share of Highway Vehicle-Miles Traveled by Vehicle Type: 2011



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 2011, commercial trucks accounted for about 9 percent of highway vehicle-miles traveled. Truck tractors hauling semitrailers and other truck combinations accounted for approximately 63 percent of commercial truck travel, while single-unit trucks with six or more tires accounted for the remainder.

Figure 3-9. Share of Highway Vehicle-Miles Traveled by Vehicle Type: 2011
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/2011/* as of September 2, 2013.

Table 3-8. Trucks and Truck Miles by Average Weight: 1987, 1992, 1997, and 2002[1]

Average weight (pounds)	1987 Number (thousands)	1987 VMT (millions)	1992 Number (thousands)	1992 VMT (millions)	1997 Number (thousands)	1997 VMT (millions)	2002 Number (thousands)	2002 VMT (millions)	Percent Change, 1987 to 2002 Number	Percent Change, 1987 to 2002 VMT
Total	**3,624**	**89,972**	**4,008**	**104,987**	**4,701**	**147,876**	**5,415**	**145,624**	**49.4**	**61.9**
Light-heavy	**1,030**	**10,768**	**1,259**	**14,012**	**1,436**	**19,815**	**1,914**	**26,256**	**85.9**	**143.8**
10,001 to 14,000	525	5,440	694	8,000	819	11,502	1,142	15,186	117.6	179.2
14,001 to 16,000	242	2,738	282	2,977	316	3,951	396	5,908	63.6	115.8
16,001 to 19,500	263	2,590	282	3,035	301	4,362	376	5,161	43.2	99.3
Medium-heavy	**766**	**7,581**	**732**	**8,143**	**729**	**10,129**	**910**	**11,766**	**18.8**	**55.2**
19,501 to 26,000	766	7,581	732	8,143	729	10,129	910	11,766	18.8	55.2
Heavy-heavy	**1,829**	**71,623**	**2,017**	**82,832**	**2,536**	**117,931**	**2,591**	**107,602**	**41.7**	**50.2**
26,001 to 33,000	377	5,411	387	5,694	428	7,093	437	5,845	15.9	8.0
33,001 to 40,000	209	4,113	233	5,285	257	6,594	229	3,770	9.7	-8.4
40,001 to 50,000	292	7,625	339	9,622	400	13,078	318	6,698	9.0	-12.2
50,001 to 60,000	188	7,157	227	8,699	311	12,653	327	8,950	73.8	25.1
60,001 to 80,000	723	45,439	781	51,044	1,070	74,724	1,179	77,489	63.1	70.5
80,001 to 100,000	28	1,254	33	1,529	46	2,427	69	2,950	144.3	135.2
100,001 to 130,000	8	440	12	734	18	1,051	26	1,571	238.5	257.2
130,001 or more	4	185	5	227	6	312	6	329	43.2	77.9

Key: VMT = vehicle-miles traveled.

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

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

The nation's truck fleet has grown significantly in number and distance driven. Of trucks weighing more than 10,000 pounds registered to businesses, individuals, and organizations other than government, most growth has occurred at either end of the weight spectrum. Distance traveled more than doubled between 1987 and 2002 for trucks weighing between 10,000 pounds and 26,000 pounds and for trucks weighing over 80,000 pounds. Trucks between 60,000 pounds and 80,000 pounds form the largest category in both number of trucks and vehicle-miles traveled because in most cases 80,000 pounds is the maximum weight allowed on the highway system without special permits.

Table 3-8. Trucks and Truck Miles by Average Weight: 1987, 1992, 1997, and 2002

Source: U.S. Department of Commerce, Census Bureau, 2002 Vehicle Inventory and Use Survey: United States, EC02TV-US (Washington, DC: 2004), available at *www.census.gov/prod/ec02/ec02tv-us.pdf* as of September 20, 2013; U.S. Department of Commerce, Census Bureau, 1992 Truck Inventory and Use Survey: United States, TC92-T-52 (Washington, DC: 1995), available at *www.census.gov/prod/ec97/97tv-us.pdf* as of September 20, 2013.

Table 3-9. Commercial Vehicle Weight Enforcement Activities: 2006-2012

	2006	2007	2008	2009	2010	2011	2012
All Weighs	**229,450,656**	**217,444,117**	**200,419,382**	**182,256,996**	**198,564,690**	**185,498,220**	**189,743,150**
Weigh-in-Motion	142,598,736	132,257,618	119,826,305	116,176,399	118,025,789	119,718,032	116,640,351
Static Weighs[1]	86,851,920	85,186,499	80,593,077	66,080,597	80,538,901	65,780,188	73,102,799
Semiportable Scales	422,860	425,731	357,502	373,073	285,484	323,936	278,308
Fixed Scales	85,900,007	84,213,507	79,644,702	65,182,174	79,703,573	64,922,321	72,258,822
Portable Scales	529,053	547,261	590,873	525,350	549,844	533,931	565,669
Violations[2]	**621,391**	**530,350**	**555,168**	**489,975**	**478,576**	**415,545**	**408,492**
Axle Weight Violations	269,758	233,563	248,813	220,631	216,735	178,209	179,774
Gross Weight Violations	149,561	126,761	120,384	116,291	114,171	84,490	91,006
Bridge Weight Violations	202,072	170,026	185,971	153,053	147,670	152,846	137,712
Permits[3]	**4,598,227**	**4,827,668**	**5,215,724**	**4,528,654**	**4,838,663**	**4,944,334**	**4,918,118**
Non-Divisible Trip Permits	3,399,435	3,743,323	3,693,248	3,285,801	3,510,301	3,762,553	3,878,031
Non-Divisible Annual Permits	250,505	332,148	322,288	298,805	303,230	320,767	296,870
Divisible Trip Permits	426,381	398,003	489,712	369,906	341,737	334,650	201,633
Divisible Annual Permits	521,906	354,194	710,476	574,142	683,395	526,364	541,584

[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) Pennsylvania (2006), South Dakota (2006 and 2007), and Vermont (2011).

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 189 million weighs were made in 2012, about 61 percent of which were weigh-in-motion, and 39 percent were static. Approximately 2 percent of commercial vehicle weighs discover violations.

Table 3-10. Annual Vehicle Distance Traveled by Highway Category and Vehicle Type: 2011

	Combination Trucks	Single-Unit Trucks[1]	Other[2]	Light-duty Vehicles[3]	Total, All Motor Vehicles
Interstate vehicle-miles (millions)	81,431	23,621	7,159	608,081	720,291
Interstate percent	49.7	22.8	22.2	23.0	24.4
Non-Interstate vehicle-miles (millions)	82,260	79,894	25,123	2,038,560	2,225,839
Non-Interstate percent	50.3	77.2	77.8	77.0	75.6
Total vehicle-miles, all roadways	**163,692**	**103,515**	**32,283**	**2,646,641**	**2,946,131**

[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.

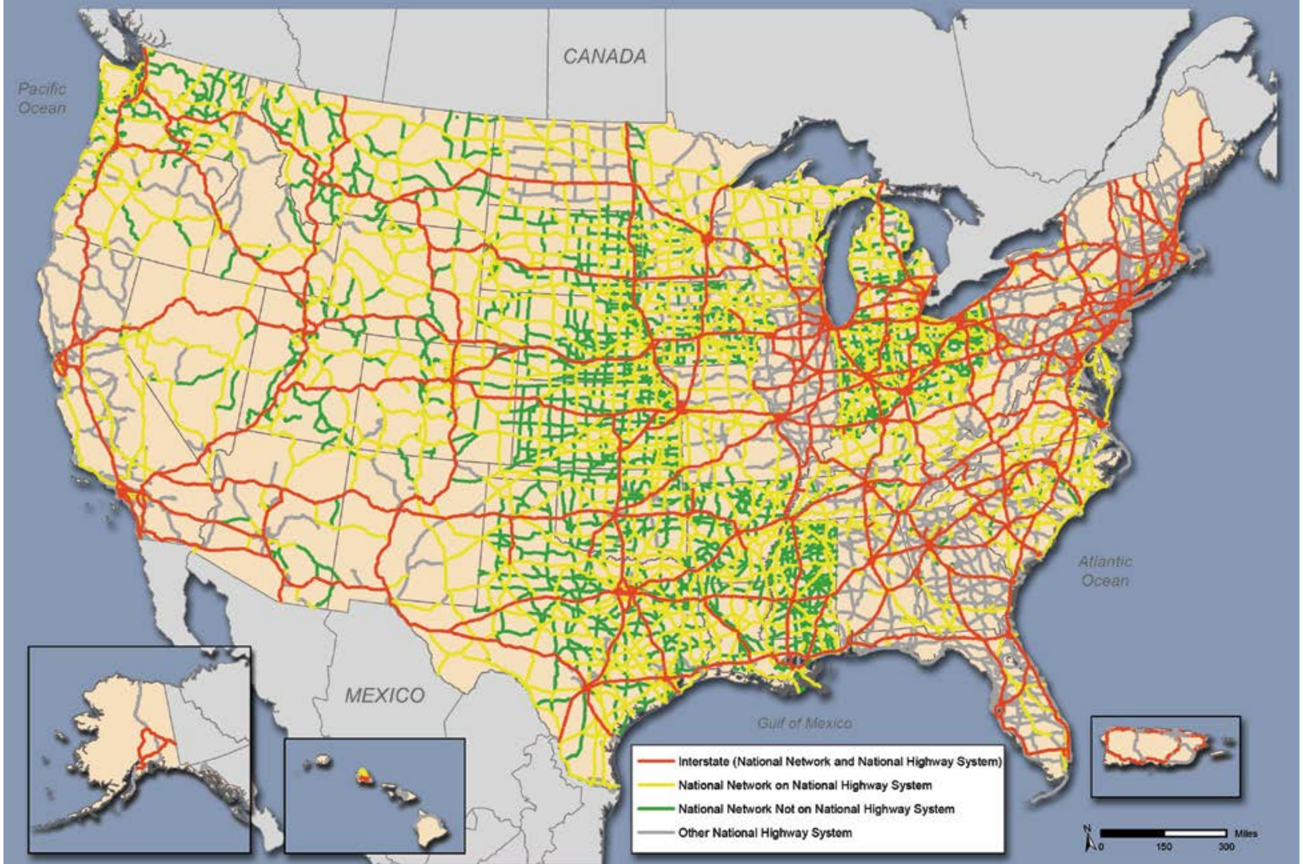
Notes: Based on a new methodology, FHWA revised its annual vehicle-miles traveled, number of vehicles, and fuel economy data beginning with 2007. Information on the new methodology is available at www.fhwa.dot.gov/policyinformation/statistics.cfm. Data in this table should not be compared to those in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

Freight moving in combination trucks depends heavily on the Interstate System. Although only one-fourth of the distance traveled by all traffic is on the Interstate System, nearly one-half of combination-truck vehicle miles of travel are on Interstate highways.

Table 3-9. Commercial Vehicle Weight Enforcement Activities: 2006-2012
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, October 5, 2013.

Table 3-10. Annual Vehicle Distance Traveled by Highway Category and Vehicle Type: 2011
Source: U.S. Department of Transportation, Federal Highway Administration, Highway Statistics, Table VM-1, available at *www.fhwa.dot.gov/policyinformation/statistics/2011/* as of September, 2, 2013.

Figure 3-10. National Network for Conventional Combination Trucks: 2013



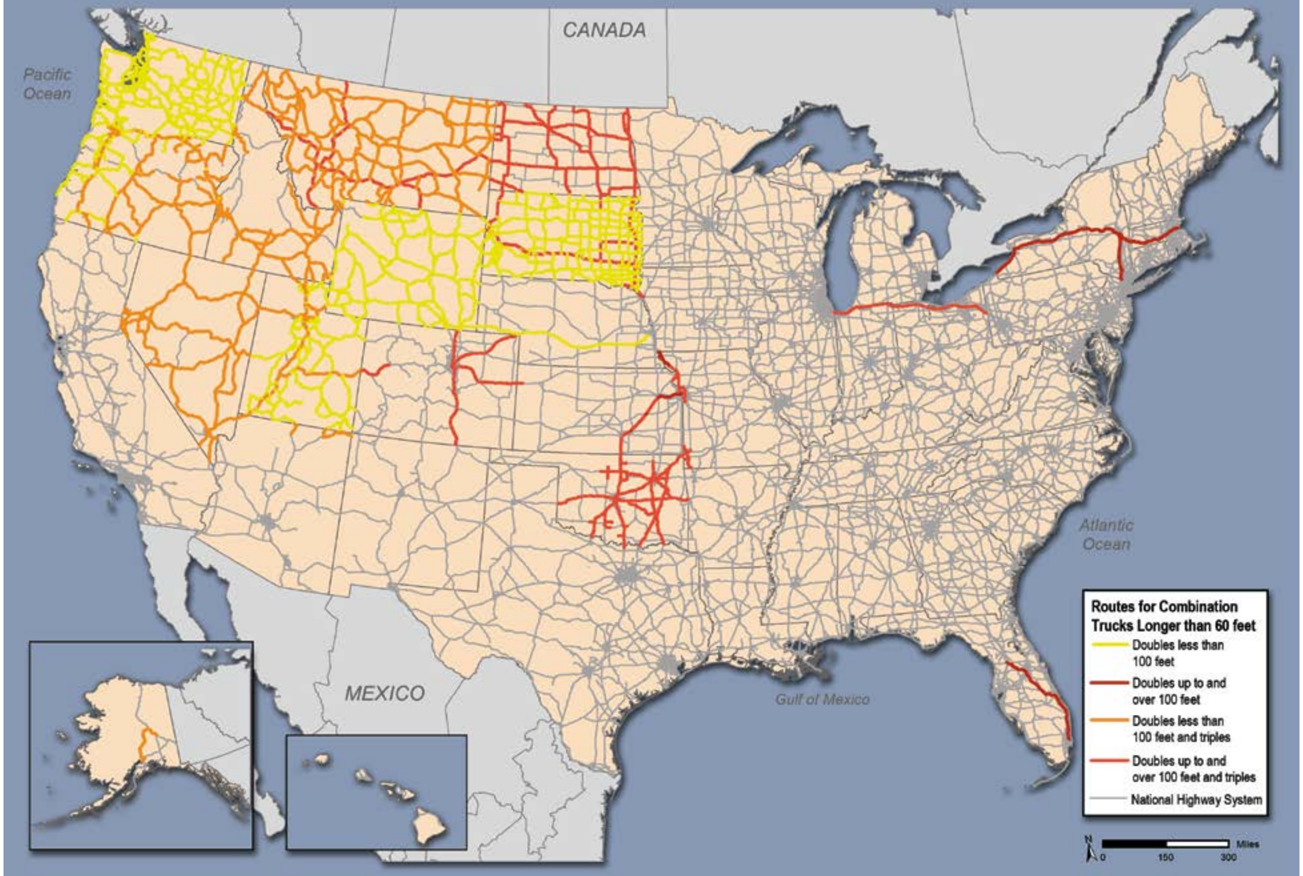
Notes: This map should not be interpreted as the official National Network and should not be used for truck size and weight enforcement purposes. The National Network and the National Highway System (NHS) are approximately 200,000 miles in length, but the National Network includes 65,000 miles of highways beyond the NHS, and the NHS encompasses about 50,000 miles of highways that are not part of the National Network.

"Other NHS" refers to NHS mileage that is not included on the National Network. Conventional combination trucks are tractors with one semitrailer up to 48 feet in length or with one 28-foot semitrailer and one 28-foot trailer. Conventional combination trucks can be up to 102 inches wide.

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

Figure 3-10. National Network for Conventional Combination Trucks: 2013
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.4, 2013.

Figure 3-11. Permitted Longer Combination Vehicles on the National Highway System: 2011



Note: Empty triples are allowed on I-80 in Nebraska. NHS mileage as of 2011, prior to MAP-21 system expansion.

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 semitrailer and a 28-foot trailer, only 14 states and 6 state turnpike authorities allow LCVs on at least some parts of their road networks. Allowable routes for LCVs have been frozen since 1991.

Figure 3-11. Permitted Longer Combination Vehicles on the National Highway System: 2011
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, 2013.

Table 3-11. 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.

Most trucks larger than pickups, minivans, other light vans, and sport utility vehicles typically operate close to home. About one-half of all trucks usually travel to destinations within 50 miles of their base, and three-fourths stayed within their base state. Less than 10 percent of trucks larger than pickups, minivans, other light vans, and sport utility vehicles typically travel to places more than 200 miles away, but these trucks account for 30 percent of the mileage.

Approximately three-fourths of the miles traveled by trucks larger than pickups, minivans, and other light vans are for the movement of products that range from electronics to sand and gravel. Most of the remaining mileage is for empty backhauls and empty shipping containers.

Table 3-11. Trucks, Truck Miles, and Average Distance by Range of Operations and Jurisdictions: 2002
Source: U.S. Department of Commerce, Census Bureau, 2002 Vehicle Inventory and Use Survey: United States, EC02TV-US, table 3a (Washington, DC: 2004), available at *www.census.gov/prod/ec02/ec02tv-us.pdf* as of September 20, 2013.

Table 3-12. Truck Miles by Products Carried: 2002

Products carried	Millions of miles
Total[1]	**145,173**
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

[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.

Table 3-12. Truck Miles by Products Carried: 2002

Source: U.S. Department of Commerce, Census Bureau, 2002 Vehicle Inventory and Use Survey: United States, EC02TV-US (Washington, DC: 2004), available at *www.census.gov/prod/ec02/ec02tv-us.pdf* as of September 20, 2013.

Figure 3-12. 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. NHS mileage as of 2011, prior to MAP-21 system expansion.

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 3-12. Average Daily Long-Haul Truck Traffic on the National Highway System: 2011
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.4, 2013.

Figure 3-13. 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. NHS mileage as of 2011, prior to MAP-21 system expansion.

By 2040, long-haul freight truck traffic in the United States is expected to increase dramatically on the NHS. Forecast data indicate that truck travel may reach 460 million miles per day.

Figure 3-13. Average Daily Long-Haul Truck Traffic on the National Highway System: 2040
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.4, 2013.

Figure 3-14. Major Truck Routes on the National Highway System: 2011

Notes: AADTT is average annual daily truck traffic and includes all freight-hauling and other trucks with six or more tires. AADT is average annual daily traffic and includes all motor vehicles. NHS mileage as of 2011, prior to MAP-21 system expansion.

Selected routes carry a significant concentration of trucks, either as an absolute number or as a percentage of the traffic stream. Nearly 14,530 miles of the NHS carry more than 8,500 trucks per day on sections where at least every fourth vehicle is 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 3-14. Major Truck Routes on the National Highway System: 2011
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.4, 2013.

Figure 3-15. Major Truck Routes on the National Highway System: 2040

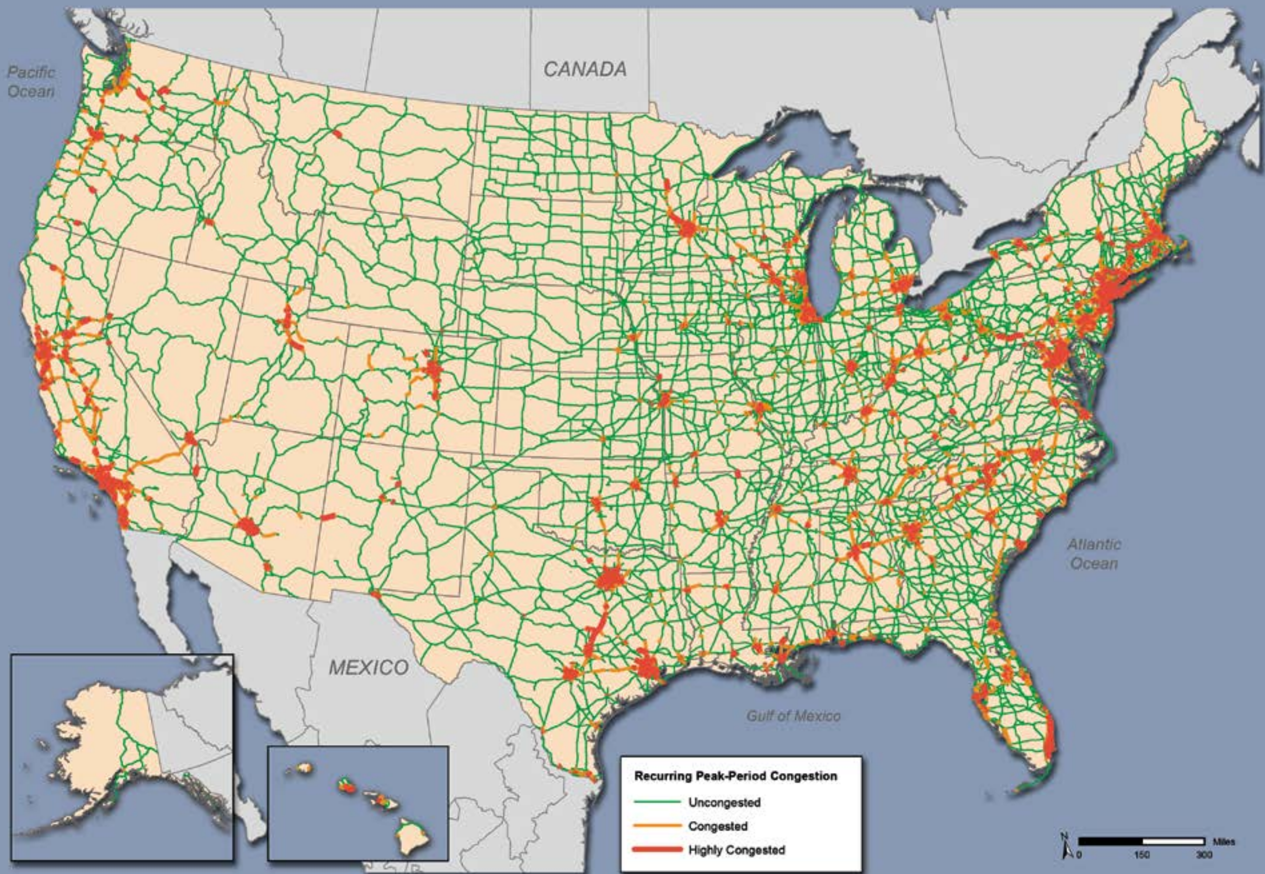
Notes: AADTT is average annual daily truck traffic and includes all freight-hauling and other trucks with six or more tires. AADT is average annual daily traffic and includes all motor vehicles. NHS mileage as of 2011, prior to MAP-21 system expansion.

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.

Figure 3-15. Major Truck Routes on the National Highway System: 2040

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.4, 2013.

Figure 3-16. Peak-Period Congestion on the National Highway System: 2011

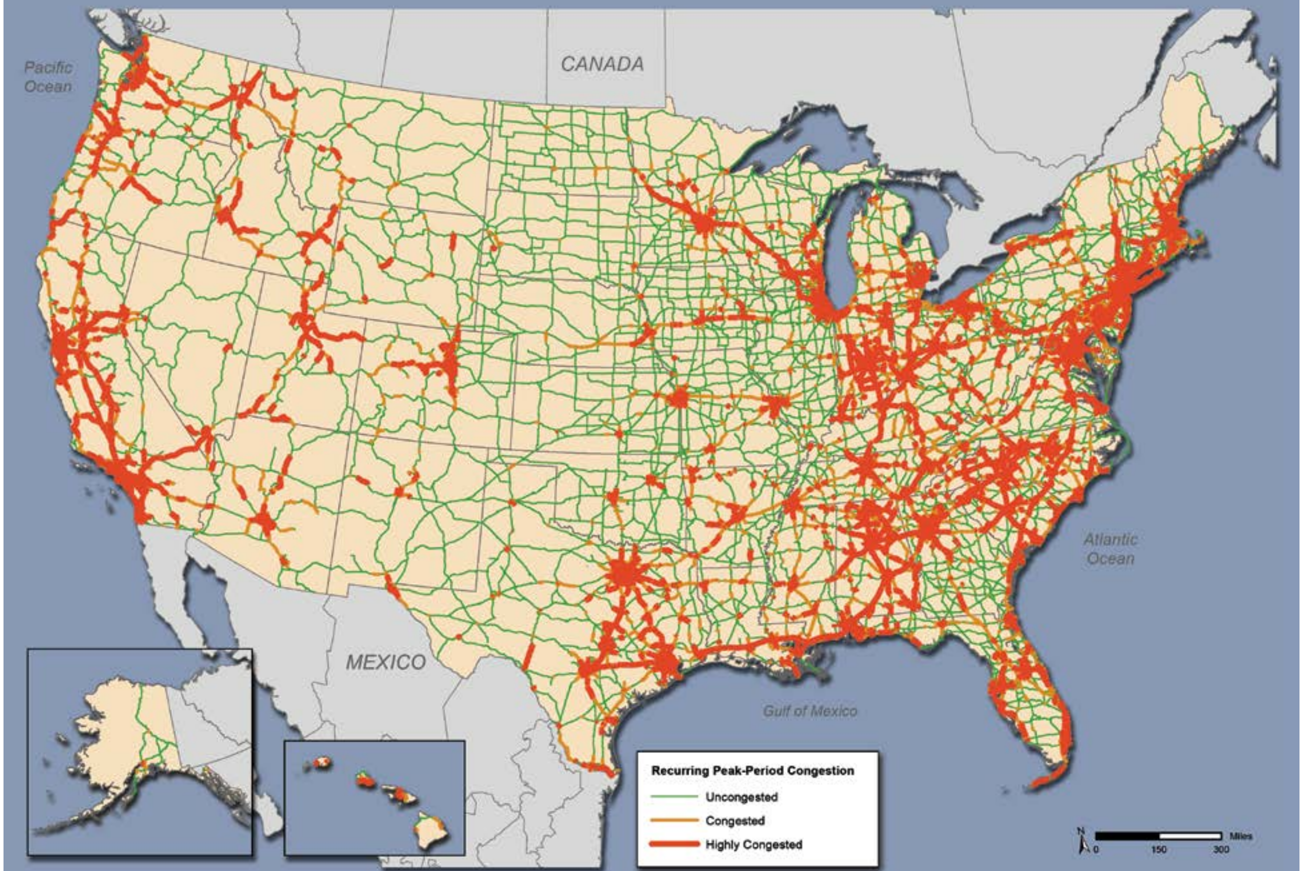


Notes: Highly congested segments are stop-and-go conditions with volume/service flow ratios greater than 0.95. Congested segment have reduced traffic speeds with volume/service flow ratios between 0.75 and 0.95.
The volume/service flow ratio is estimated using the procedures outlined in the Highway Performance Monitoring System Field Manual, Appendix N. NHS mileage as of 2011, prior to MAP-21 system expansion.

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 NHS and created stop-and-go conditions on an additional 8,700 miles.

Figure 3-16. Peak-Period Congestion on the National Highway System: 2011
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.4, 2013.

Figure 3-17. Peak-Period Congestion on the National Highway System: 2040

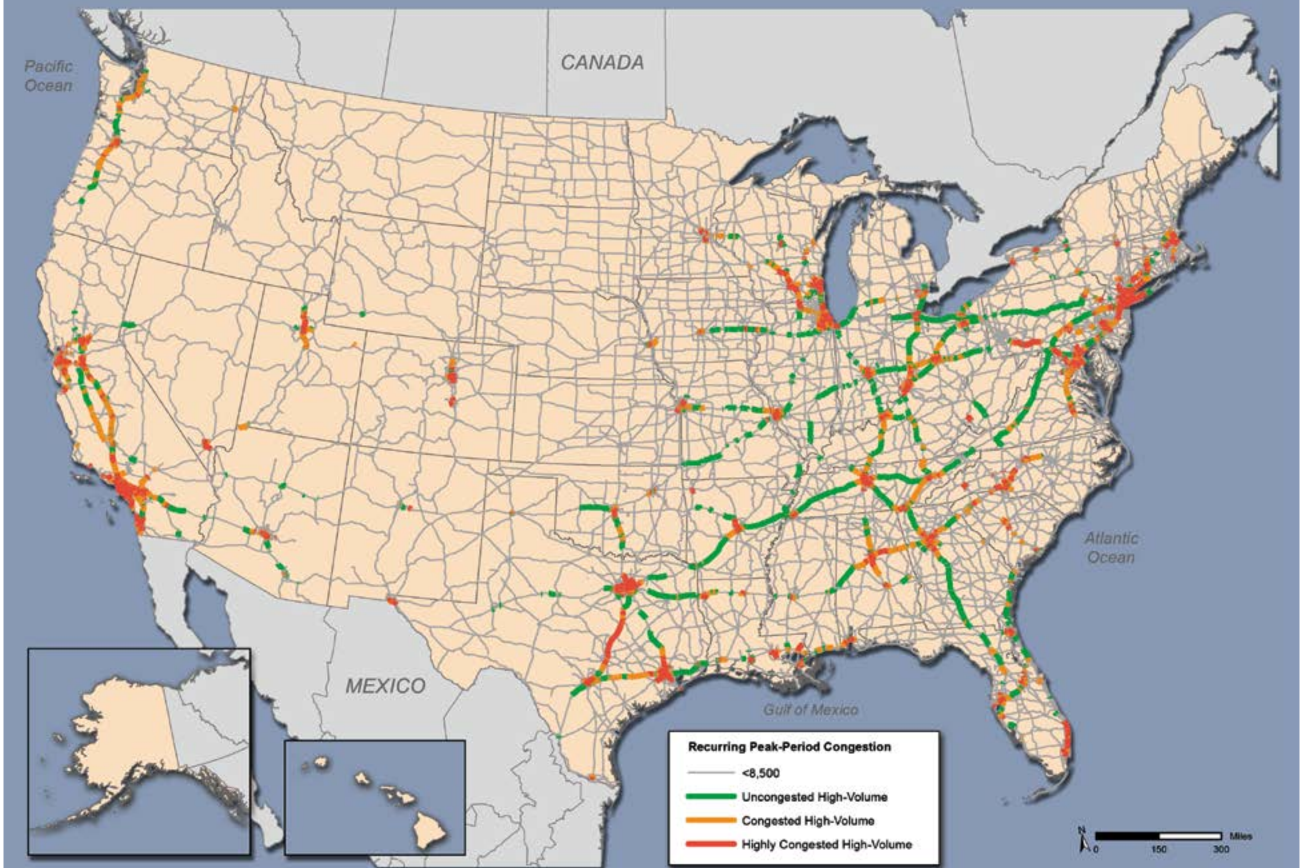


Notes: AADTT is average annual daily truck traffic and includes all freight-hauling and other trucks with six or more tires. AADT is average annual daily traffic and includes all motor vehicles. NHS mileage as of 2011, prior to MAP-21 system expansion.

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 NHS in 2040 compared with 10 percent in 2011. This will slow traffic on 28,000 miles of the NHS and create stop-and-go conditions on an additional 46,000 miles.

Figure 3-17. Peak-Period Congestion on the National Highway System: 2040
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.4, 2013.

Figure 3-18. 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 HPMS Field Manual, Appendix N. NHS mileage as of 2011, prior to MAP-21 system expansion.

Congested highways carrying a large number of trucks substantially impede interstate commerce, and trucks on those segments contribute significantly to congestion. Recurring congestion slows traffic on 5,800 miles and creates stop-and-go conditions on 4,500 miles of the NHS that carry more than 8,500 trucks per day.

Figure 3-18. Peak-Period Congestion on High-Volume Truck Portions of the National Highway System: 2011
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.4, 2013.

Figure 3-19. 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 HPMS Field Manual, Appendix N. NHS mileage as of 2011, prior to MAP-21 system expansion.

Assuming no change in network capacity, the number of NHS miles with recurring congestion and a large number of 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.

Figure 3-19. Peak-Period Congestion on High-Volume Truck Portions of the National Highway System: 2040
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.4, 2013.

Table 3-13. Performance Measurements for Selected Corridors: July-December 2012

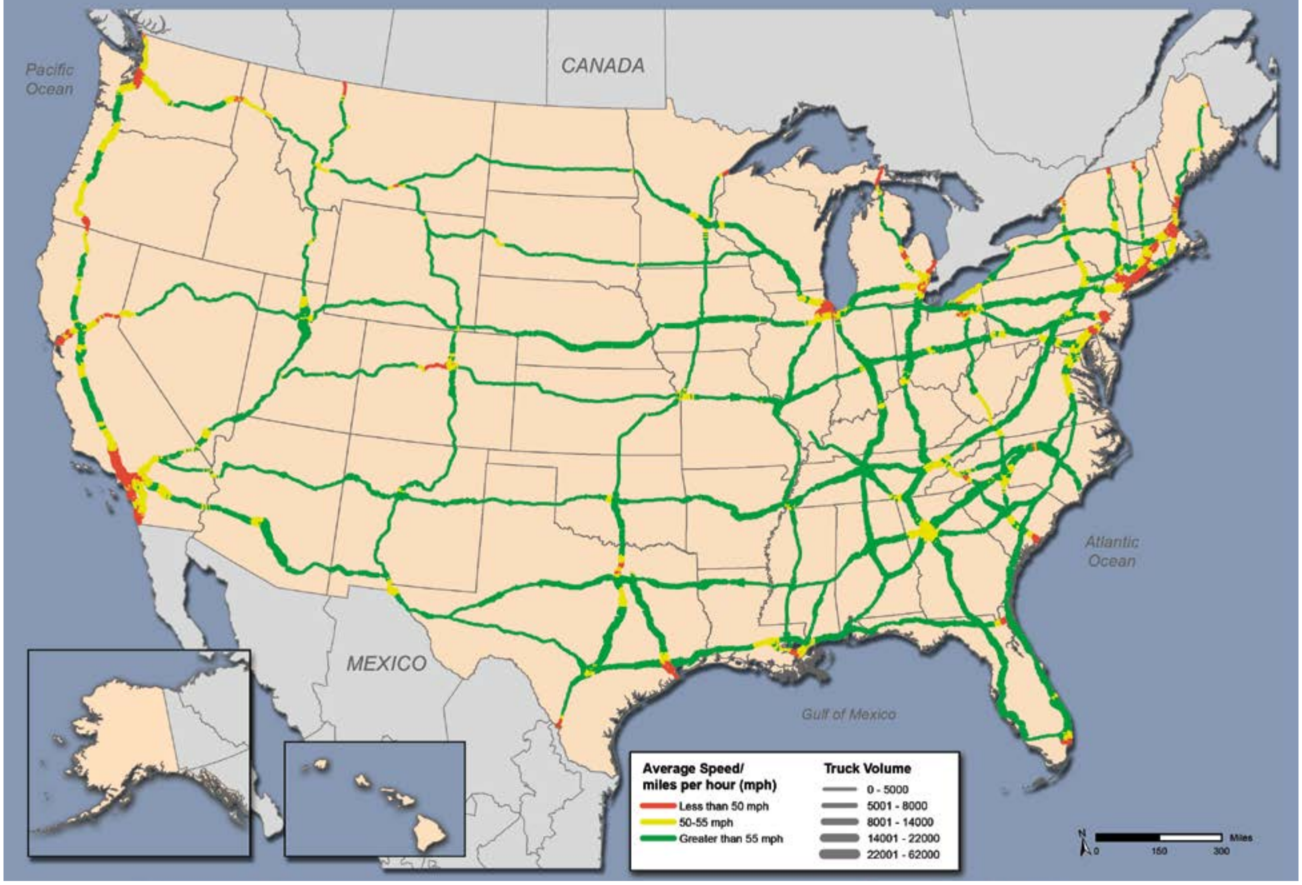
Corridor	Average Speed	Peak Period Average Speed	Non-Peak Period Average Speed	Non-Peak/ Peak Ratio	Buffer Index
I-5: Medford, OR to Seattle	56.24	55.05	57.25	1.04	30.10
I-5/CA 99: Sacramento to Los Angeles	55.90	55.46	56.30	1.02	25.86
I-10: Los Angeles to Tucson	59.50	58.60	60.18	1.03	19.17
I-10: Pensacola to I-75	63.87	63.90	63.85	1.00	4.74
I-10: San Antonio to New Orleans	61.54	60.60	62.34	1.03	23.20
I-30: Little Rock to Dallas	62.61	62.15	62.96	1.01	13.18
I-35: Laredo to Oklahoma City	61.41	60.25	62.25	1.03	20.09
I-40: Knoxville to Little Rock	62.25	61.98	62.48	1.01	15.50
I-40: Oklahoma City to Flagstaff	64.00	63.96	64.05	1.00	9.53
I-40: Raleigh to Asheville	62.37	62.03	62.61	1.01	9.80
I-55/I-39/I-94: St. Louis to Minneapolis	62.38	62.12	62.62	1.01	10.19
I-57/I-74: I-24 (IL) to I-55 (IL)	62.69	62.72	62.68	1.00	10.68
I-65/I-24: Chattanooga to Nashville to Chicago	61.10	60.48	61.58	1.02	20.68
I-70: Kansas City to Columbus	61.86	61.57	62.07	1.01	14.67
I-75: Lexington to Detroit	60.80	60.18	61.30	1.02	20.88
I-75: Tampa to Knoxville	62.45	61.74	62.93	1.02	13.81
I-78/I-76: New York to Pittsburgh	59.82	59.35	60.18	1.01	14.57
I-80: Chicago to I-76 (CO/NE border)	63.15	63.07	63.21	1.00	10.79
I-80: Cleveland to Chicago	62.44	62.46	62.43	1.00	10.54
I-80: New York to Cleveland	60.87	60.26	61.33	1.02	16.65
I-81: Harrisburg to I-40 (Knoxville)	62.43	62.38	62.48	1.00	10.34
I-84: Boise to I-86	62.72	62.54	62.85	1.00	6.34
I-94: Chicago to Detroit	60.47	60.12	60.77	1.01	8.39
I-95: Miami to I-26 (SC)	62.59	61.98	63.05	1.02	15.29
I-95: Richmond to New Haven	55.04	52.57	56.62	1.08	48.35

Notes: For this table, reliability is expressed as a Buffer Index. The Buffer Index represents the extra buffer time (or time cushion) 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 an entire corridor 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 Federal Highway Administration, (FHWA) Freight Performance Measurement (FPM) Program monitors performance on corridors that have the heaviest freight volumes. Performance measurements for selected highway corridors are shown here. This information is beneficial in understanding freight performance on these corridors and identifying areas in need of operational and capital improvements.

Table 3-13. Performance Measurements for Selected Corridors: July–December 2012
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Performance Measurement Program, special tabulation, 2013.

Figure 3-20. Intensity of Truck Freight Congestion on Selected Interstate Highways: 2012



In addition to calculating peak-period congestion from traffic volumes as shown in other figures, FHWA, 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.

To facilitate a better understanding of the intensity of truck congestion and travel reliability issues, FHWA combined truck volumes from the FAF with average truck speeds measured by the FPM Program. This information is useful to private- and public-sector freight stakeholders who desire to better understand the magnitude and severity of congestion and the constraints to mobility experienced along highways. Many major urban area Interstates that have heavy truck volumes are experiencing average speeds of less than 55 mph.

Figure 3-20. Intensity of Truck Freight Congestion on Selected Interstate Highways: 2012
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Performance Measurement Program, 2013.

Table 3-14. Top 25 Congested Freight-Significant Locations: 2012

Location	Congestion Ranking	Average Speed (mph)	Peak Period Average Speed (mph)	Non-Peak Period Average Speed (mph)	Non-Peak/ Peak Ratio
Chicago, IL: I-290 at I-90/I-94	1	30.13	22.82	32.89	1.44
Houston, TX: I-610 @ US 290	2	41.99	34.10	45.70	1.34
Austin, TX: I-35	3	35.79	23.12	42.56	1.84
Fort Lee, NJ: I-95 at SR-4	4	28.98	22.67	31.84	1.40
St. Louis, MO: I-70 at I-64 (West)	5	41.62	38.45	42.88	1.12
Louisville, KY: I-65 at I-64/I-71	6	44.93	39.34	47.35	1.20
Houston, TX: I-45 at US-59	7	38.55	30.19	42.49	1.41
Cincinnati, OH: I-71 @ I-75	8	48.12	41.59	50.58	1.22
Houston, TX: I-10 @ I-45	9	45.63	36.21	50.02	1.38
Dallas, TX: I-45 at I-30	10	42.44	34.37	45.71	1.33
Houston, TX: I-10 @ US 59	11	46.65	35.77	52.26	1.46
Chicago, IL: I-90 at I-94 (North)	12	35.39	22.64	40.99	1.81
Denver, CO: I-70 @ I-25	13	44.10	37.65	47.04	1.25
Atlanta, GA: I-285 at I-85 (North)	14	45.69	34.87	50.94	1.46
Los Angeles, CA: SR-60 at SR-57	15	46.43	39.01	49.30	1.26
Houston, TX: I-45 @ I-610 north	16	47.51	38.21	51.99	1.36
Minneapolis - St. Paul, MN: I-35W at I-494	17	44.80	35.01	49.74	1.42
Hartford, CT: I-84 at I-91	18	47.52	38.25	51.37	1.34
Nashville, TN: I-24 @ I-440N Interchange	19	49.17	41.61	52.58	1.26
Brooklyn, NY: I-278 at Belt Parkway	20	39.81	34.18	41.78	1.22
Houston, TX: I-10 @ I-610 west	21	49.69	42.28	52.86	1.25
Indianapolis, IN: I-65 @ I-70 North	22	51.64	48.26	52.93	1.10
Ft. Worth, TX: I-35W at I-30	23	47.64	40.26	50.78	1.26
Atlanta, GA: I-75 at I-285 (North)	24	48.75	38.99	53.30	1.37
Chicago, IL: I-90 at I-94 (South)	25	48.44	41.38	50.78	1.23

Key: mph = miles per hour.

Notes: FHWA 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 2012. Average speeds below a free flow of 55 miles per hour indicate congestion.

Truck speed and travel time reliability data can be used to identify and quantify major freight truck chokepoints and bottlenecks along highways that are critical to the Nation's freight transportation system. FHWA 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 non-peak 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 3-14. Top 25 Congested Freight-Significant Locations: 2012
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Performance Measurement Program, special tabulation, 2013.

Table 3-15. Largest Improvements in Average Speed for Congested Freight Highway Locations: 2012

Location	Average Speed (mph)			Peak Period Average Speed (mph)			Non-Peak Period Average Speed (mph)		
	2011	2012	Percent change, 2011-2012	2011	2012	Percent change, 2011-2012	2011	2012	Percent change, 2011-2012
Fairfax County, VA: I-495 at I-66	38.87	43.75	12.5	32.26	38.51	19.4	41.09	45.45	10.6
Milwaukee, WI: Mitchell Interchange - 94/894	47.89	53.70	12.1	44.00	51.68	17.5	49.43	54.47	10.2
Spokane, WA: I-90 at SR 195	48.61	54.20	11.5	47.68	54.50	14.3	49.02	54.07	10.3
Louisville, KY: I-65 at I-64/I-71	40.51	44.93	10.9	31.95	39.34	23.1	44.84	47.35	5.6
Buffalo-Niagara Falls, NY: I-90 at I-290	44.04	47.96	8.9	40.98	44.95	9.7	45.51	49.42	8.6
Philadelphia, PA: I-76 at I-476	45.02	48.87	8.6	37.57	41.72	11.0	48.26	51.90	7.5
Dayton, OH: I-75 at U.S. 35 Interchange	46.59	49.98	7.3	40.17	47.93	19.3	49.33	50.76	2.9
Los Angeles, CA: I-405 at I-605	45.46	48.48	6.6	36.76	38.73	5.4	50.39	52.76	4.7

Key: mph = miles per hour.

Several monitored locations have recorded noticeable improvements in performance from 2011 to 2012 when considering the averages over 24 hours.

Table 3-15. Largest Improvements in Average Speed for Congested Freight Highway Locations: 2012
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Performance Measurement Program, special tabulation, 2013.

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

Table 3-16. Maximum Posted Speed Limits on Rural Interstates: 2013 (miles per hour)

State	Truck	Car
Alabama	70	70
Alaska	65	65
Arizona	75	75
Arkansas	65	70
California	55	70
Colorado	75	75
Connecticut	65	65
Delaware	65	65
District of Columbia[1]	55	55
Florida	70	70
Georgia	70	70
Hawaii	60	60
Idaho	65	75
Illinois	65	65
Indiana	65	70
Iowa	70	70
Kansas	70	70
Kentucky	[2]65	[2]65
Louisiana	75	75
Maine	75	75
Maryland	65	65
Massachusetts	65	65
Michigan	60	70
Minnesota	70	70
Mississippi	70	70
Missouri	70	70
Montana	65	75
Nebraska	75	75
Nevada	75	75
New Hampshire	65	65
New Jersey	65	65
New Mexico	75	75
New York	65	65
North Carolina	70	70
North Dakota	75	75
Ohio	65	[3]65
Oklahoma	75	75
Oregon	55	65
Pennsylvania	65	65
Rhode Island	65	65
South Carolina	70	70
South Dakota	75	75
Tennessee	70	70
Texas	[4]70	[4]75
Utah	[5]75	[5]75
Vermont	65	65
Virginia	70	70
Washington	60	70
West Virginia	70	70
Wisconsin	65	65
Wyoming	75	75

[1] Urban Interstate.
[2] Effective July 10, 2007, the posted speed limit is 70 miles per hour (mph) in designated areas on I-75 and I-71.
[3] The posted speed limit is 70 mph on the Ohio Turnpike.
[4] In sections of I-10 and I-20 in rural West Texas, the speed limit for passenger cars and light trucks is 80 mph.
[5] Portions of I-15 have a posted limit of 80 mph.

Table 3-16. Maximum Posted Speed Limits on Rural Interstates: 2013
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 September 20, 2013.

Table 3-17. Average Truck Speeds on Selected Metropolitan Area Roadways: 2012 (miles per hour)

Metropolitan Area	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Atlanta, GA	54.05	53.99	53.70	53.73
Boston, MA	48.35	47.93	46.95	47.31
Chicago, IL	51.96	51.66	51.44	51.75
Dallas, TX	55.96	55.65	55.86	56.05
Detroit, MI	49.98	49.43	49.45	49.15
Houston, TX	53.59	53.76	53.11	53.44
Los Angeles, CA	43.35	42.73	42.58	43.37
Miami, FL	56.74	57.09	56.75	57.12
New York, NY	51.60	50.86	50.78	50.45
Philadelphia, PA	48.56	47.52	48.10	48.11
Phoenix, AZ	57.71	57.41	57.25	57.97
San Francisco, CA	45.72	44.84	43.96	43.98
Seattle, WA	49.92	51.78	50.82	49.77
Washington, DC	55.35	53.98	53.84	54.38

Analysis has shown truck speed and reliability decrease in urban areas. FHWA uses FPM Program data to measure truck speeds within 14 very large Census Metropolitan Statistical Areas. In 2012, five of the fourteen metropolitan areas had average truck speeds of less than 50 mph on their Interstates.

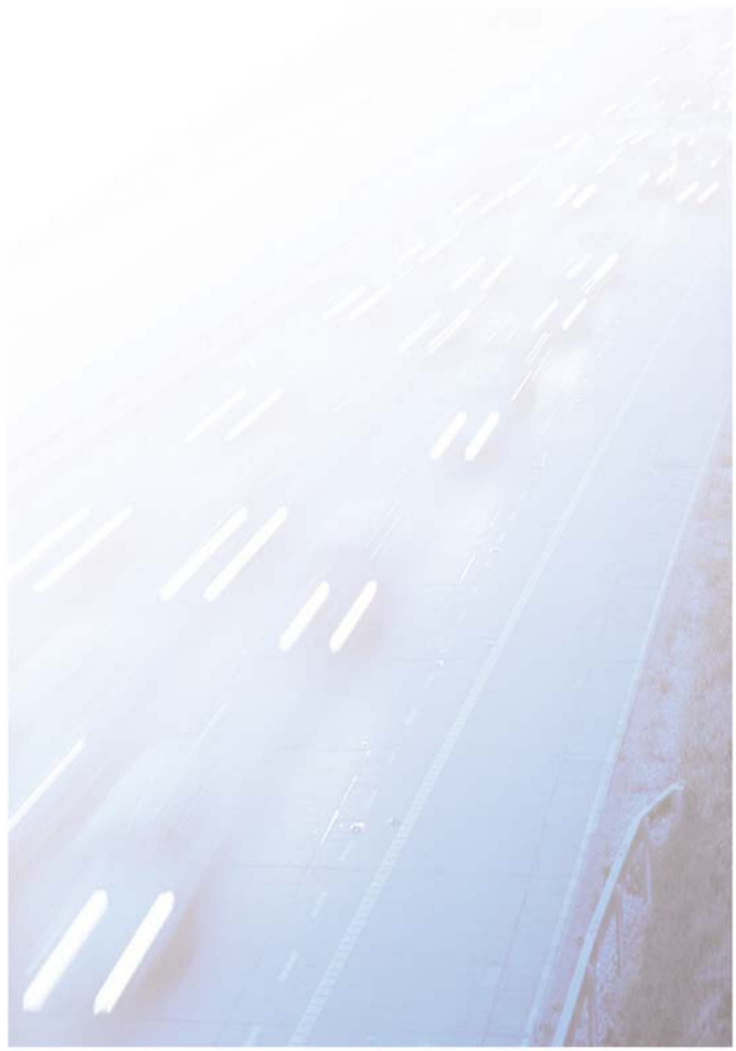


Table 3-17. Average Truck Speeds on Selected Metropolitan Area Roadways: 2012
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Performance Measurement Program, special tabulation, 2013.

Table 3-18. Truck Trip Reliability as Indicated by Minimum and Maximum Travel Times Between Selected City-Pairs: 2012

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	4:00:03	4:45:22	17.2	4:00:34	4:37:08	14.1
Chicago, IL - Milwaukee, WI	1:32:29	2:30:45	47.9	1:31:51	3:00:55	65.3
Chicago, IL - Nashville, TN	7:57:04	8:54:44	11.4	7:54:55	8:44:02	9.8
Detroit, MI - Chicago, IL	4:50:10	5:32:07	13.5	4:52:19	5:45:45	16.7
Detroit, MI - Grand Rapids, MI	2:31:51	3:02:20	18.2	2:32:22	3:00:24	16.8
Houston, TX - Beaumont, TX	1:24:46	1:50:50	26.7	1:24:44	1:52:25	28.1
Houston, TX - Dallas, TX	3:46:27	4:38:02	20.5	3:49:07	4:38:58	19.6
Houston, TX - San Antonio, TX	3:20:14	4:24:42	27.7	3:22:44	4:29:22	28.2
Indianapolis, IN - Chicago, IL	3:09:37	4:01:10	23.9	3:07:43	3:43:27	17.4
Las Vegas, NV - Los Angeles, CA	4:19:22	5:49:04	29.5	4:31:46	5:47:41	24.5
Los Angeles, CA - San Francisco, CA	7:09:31	8:29:24	17.0	7:13:36	8:42:18	18.6
Miami, FL - Tampa, FL	4:49:04	6:02:54	22.6	4:49:37	6:00:59	21.9
Nashville, TN - Indianapolis, IN	4:44:25	5:31:29	15.3	4:45:43	5:26:16	13.3
New York, NY - Albany, NY	2:45:54	4:03:50	38.0	2:46:30	3:49:55	32.0
New York, NY - Buffalo, NY	7:32:01	9:08:00	19.2	7:31:49	8:42:38	14.5
New York, NY - Hartford, CT	1:59:23	3:38:55	58.8	2:00:16	3:50:13	62.7
Philadelphia, PA - New York, NY	1:43:58	3:38:29	71.0	1:39:58	3:24:14	68.6
Phoenix, AZ - Los Angeles, CA	6:20:32	7:33:49	17.6	6:33:45	7:48:14	17.3
Phoenix, AZ - Tucson, AZ	1:51:05	2:24:36	26.2	1:51:12	2:26:07	27.1
San Antonio, TX - Austin, TX	1:25:50	2:22:29	49.6	1:26:23	2:30:31	54.2
San Diego, CA - Los Angeles, CA	2:16:10	4:10:51	59.3	2:14:54	4:08:40	59.3
San Francisco, CA - Sacramento, CA	1:37:33	3:04:44	61.8	1:33:42	2:39:18	51.9
Seattle, WA - Portland, OR	2:57:23	4:08:27	33.4	2:56:51	4:00:12	30.4
Tampa, FL - Orlando, FL	1:21:07	2:05:28	42.9	1:23:07	2:03:38	39.2
Washington, DC - Baltimore, MD	0:56:22	1:40:41	56.4	0:55:01	1:46:08	63.4

Notes: 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.

Intercity travel-time reliability is a key freight performance measure. It influences logistics, operational strategies, and load optimization. FHWA analyzed the truck trip reliability of key city-pair origins and destinations. Travel time between Philadelphia and New York City showed the greatest change, increasing 1 hour and 10 minutes in the northbound direction and more than 1 hour and four minutes in the southbound direction. Other city pairs also experienced large negative changes in travel-time reliability.

Table 3-18. Truck Trip Reliability as Indicated by Minimum and Maximum Travel Times Between Selected City-Pairs: 2012

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Performance Measurement Program, special tabulation, 2013.

Table 3-19. Number of Incoming Trucks, Trains and Loaded Containers Crossing the U.S.-Mexico and U.S.-Canada Borders: 2000, 2005, and 2009-2012 (thousands)

Metropolitan Area	2000	2005	2009	2010	2011	2012
Canadian Border						
Trucks	7,048	6,784	5,021	5,444	5,490	5,624
Loaded Truck Containers	5,335	5,819	3,897	4,171	4,049	4,069
Trains	33	33	24	26	27	29
Loaded Rail Containers	1,215	1,458	1,023	1,209	1,288	1,432
Mexican Border						
Trucks	4,526	4,676	4,291	4,743	4,868	5,104
Loaded Truck Containers	2,350	3,031	2,729	3,174	3,277	3,460
Trains	7	9	7	8	8	9
Loaded Rail Containers	266	336	239	318	359	400

Note: Trains include both passenger and freight trains.

A large number of trucks and trains carry goods into the United States from Mexico and Canada. In 2012, 5.1 million trucks hauled nearly 3.5 million loaded containers into the United States from Mexico, an increase of 13 percent and 47 percent, respectively, over 2000 levels. This increased traffic reflects a doubling in U.S.-Mexico trade, as discussed in chapter 2. In contrast, the number of incoming trucks and loaded containers from Canada declined by 20 percent and 24 percent, respectively, while incoming loaded rail containers increased by 18 percent between 2000 and 2012.

Table 3-19. Number of Incoming Trucks, Trains, and Loaded Containers Crossing the U.S-Mexico and U.S-Canada Borders: 2000, 2005, and 2009-2012

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 October 3, 2013.

Table 3-20. Average Time for Commercial Vehicles to Travel One Mile At Selected U.S.-Canada Border Crossings: 2012

Location	Direction	Average Minutes per Mile
Ambassador Bridge - Detroit, MI	Inbound	6.1
	Outbound	4.2
Port Huron, MI	Inbound	5.4
	Outbound	3.9
Peace Bridge - Buffalo, NY	Inbound	5.3
	Outbound	4.8
Lewiston-Queenston Bridge - Lewiston, NY	Inbound	4.5
	Outbound	4.1
Champlain, NY	Inbound	5.5
	Outbound	4.0
Blaine, WA	Inbound	7.8
	Outbound	6.2
Alexandria Bay, NY	Inbound	5.5
	Outbound	4.2
Pembina, ND	Inbound	5.7
	Outbound	3.9
Derby, VT	Inbound	4.5
	Outbound	3.4
Calais, ME	Inbound	3.7
	Outbound	4.0
Sumas, WA	Inbound	5.4
	Outbound	5.8
Highgate, VT	Inbound	3.7
	Outbound	2.7
Houlton, ME	Inbound	4.3
	Outbound	3.4
Sweetgrass, MT	Inbound	7.4
	Outbound	5.5
Jackman, ME	Inbound	5.9
	Outbound	4.2

Border crossings are potential bottlenecks in the freight transportation network. FHWA 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 3-20. Average Time for Commercial Vehicles to Travel One Mile At Selected U.S.-Canada Border Crossings: 2012

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, special tabulation, 2013.

Table 3-21. Average Truck Transit Times at Selected U.S.-Mexico Border Crossings: 2012

Month	Bridge of the Americas - El Paso, Texas (minutes)	Pharr-Reynosa International Bridge - Pharr, Texas (minutes)
January	53	60
February	47	63
March	54	62
April	57	56
May	45	48
June	46	43
July	48	43
August	44	45
September	42	45
October	42	55
November	47	55
December	NA	NA

Key: NA = not available.

The U.S. Department of Transportation in partnership with the Texas Department of Transportation also measures transit times from Mexico to the Unites 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.

Table 3-21. Average Truck Transit Time at Selected U.S.-Mexico Border Crossings: 2012
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, 2013.