

III. THE FREIGHT TRANSPORTATION SYSTEM

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

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

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

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

¹Excludes Class III railroads.

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

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

Sources: Public Roads: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues), tables HM-16 and HM-49, available at

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



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

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

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

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

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

⁴1,000 gross tons and over.

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

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

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

Figure 3-1. Highway Vehicle Miles Traveled by Trucks and All Vehicles: 1980-2008

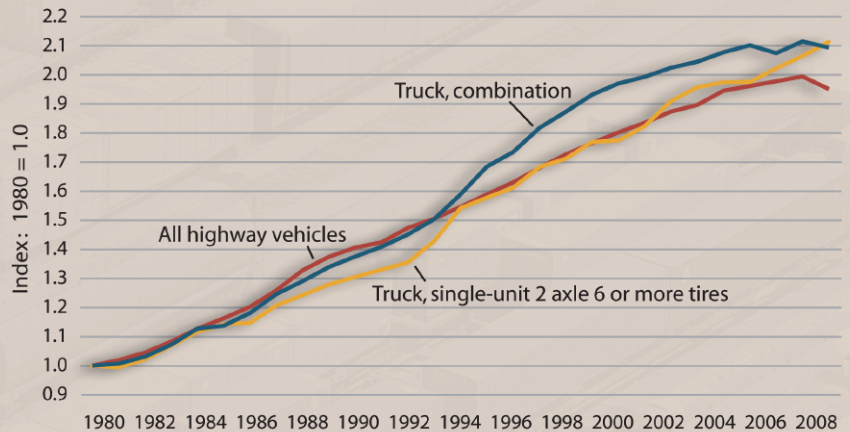


TABLE 3-2. NUMBER OF U.S. VEHICLES, VESSELS, AND OTHER CONVEYANCES: 1980-2008

Sources: Highway: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues), table VM-1, available at www.fhwa.dot.gov/policyinformation/statistics/2007/ as of July 7, 2010. **Rail: Locomotive:** Association of American Railroads, *Railroad Facts* (Washington, DC: annual issues). **Freight cars:** Association of American Railroads, *Railroad Equipment Report* (Washington, DC: annual issues). **Water: Nonself-propelled vessels and self-propelled vessels:** U.S. Army, Corps of Engineers, *Waterborne Transportation Lines of the United States, Volume 1, National Summaries* (New Orleans, LA: annual issues). **Oceangoing steam motor ships and U.S. Flag fleet:** U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics*, table 1-23, available at www.bts.gov/publications/national_transportation_statistics/html/table_01_23.html as of July 7, 2010.

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

Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues), table VM-1, available at www.fhwa.dot.gov/policyinformation/statistics/2008/ as of April 25, 2010.

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

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

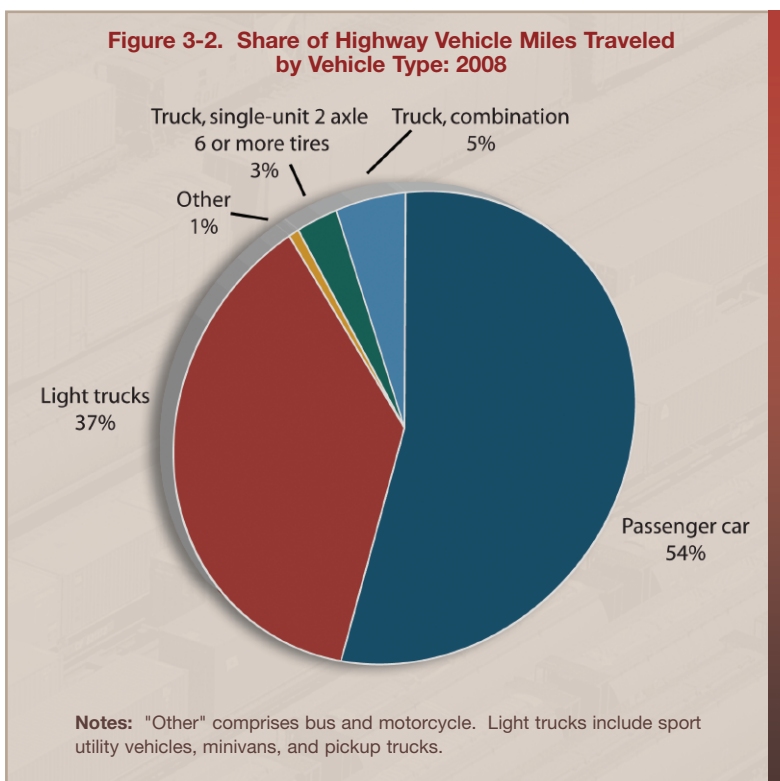


Table 3-3. Trucks and Truck Miles by Average Weight: 1987-2002¹

Average weight (pounds)	1987		1992		1997		2002		Percent Change, 1987 to 2002	
	Number (thousands)	VMT (millions)	Number (thousands)	VMT (millions)	Number (thousands)	VMT (millions)	Number (thousands)	VMT (millions)	Number	VMT
Total	3,624	89,972	4,008	104,987	4,701	147,876	5,415	145,624	49	62
Light-heavy	1,030	10,768	1,259	14,012	1,436	19,815	1,914	26,256	86	144
10,001 to 14,000	525	5,440	694	8,000	819	11,502	1,142	15,186	118	179
14,001 to 16,000	242	2,738	282	2,977	316	3,951	396	5,908	64	116
16,001 to 19,500	263	2,590	282	3,035	301	4,362	376	5,161	43	99
Medium-heavy	766	7,581	732	8,143	729	10,129	910	11,766	19	55
19,501 to 26,000	766	7,581	732	8,143	729	10,129	910	11,766	19	55
Heavy-heavy	1,829	71,623	2,017	82,832	2,536	117,931	2,591	107,602	42	50
26,001 to 33,000	377	5,411	387	5,694	428	7,093	437	5,845	16	8
33,001 to 40,000	209	4,113	233	5,285	257	6,594	229	3,770	10	-8
40,001 to 50,000	292	7,625	339	9,622	400	13,078	318	6,698	9	-12
50,001 to 60,000	188	7,157	227	8,699	311	12,653	327	8,950	74	25
60,001 to 80,000	723	45,439	781	51,044	1,070	74,724	1,179	77,489	63	71
80,001 to 100,000	28	1,254	33	1,529	46	2,427	69	2,950	144	135
100,001 to 130,000	8	440	12	734	18	1,051	26	1,571	238	257
130,001 or more	4	185	5	227	6	312	6	329	43	78

Key: VMT = vehicle miles traveled.

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

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

FIGURE 3-2. SHARE OF HIGHWAY VEHICLE MILES TRAVELED BY VEHICLE TYPE: 2008

Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues), table VM-1, available at www.fhwa.dot.gov/policyinformation/statistics/2008/ of April 25, 2010.

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

Sources: U.S. Department of Commerce, Census Bureau, *2002 Vehicle Inventory and Use Survey: United States*, EC02TV-US (Washington, DC: 2004), available at www.census.gov/prod/ec02/ec02tv-us.pdf as of April 13, 2009; U.S. Department of Commerce, Census Bureau, *1992 Truck Inventory and Use Survey: United States*, TC92-T-52 (Washington, DC: 1995), available at www.census.gov/prod/ec97/97tv-us.pdf as of June 2, 2010.

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

Federal and state governments are concerned about truck weight because of the damage that heavy trucks can do to roads and bridges. To monitor truck weight, approximately 182 million weighs were made in

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

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

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

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

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

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

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

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

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Annual State Certifications of Size and Weight Enforcement on Federal-aid Highways, as prescribed under CFR Part 657, personal communication, September 23, 2010.

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

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

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

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

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

³Passenger cars, motorcycles, and buses.

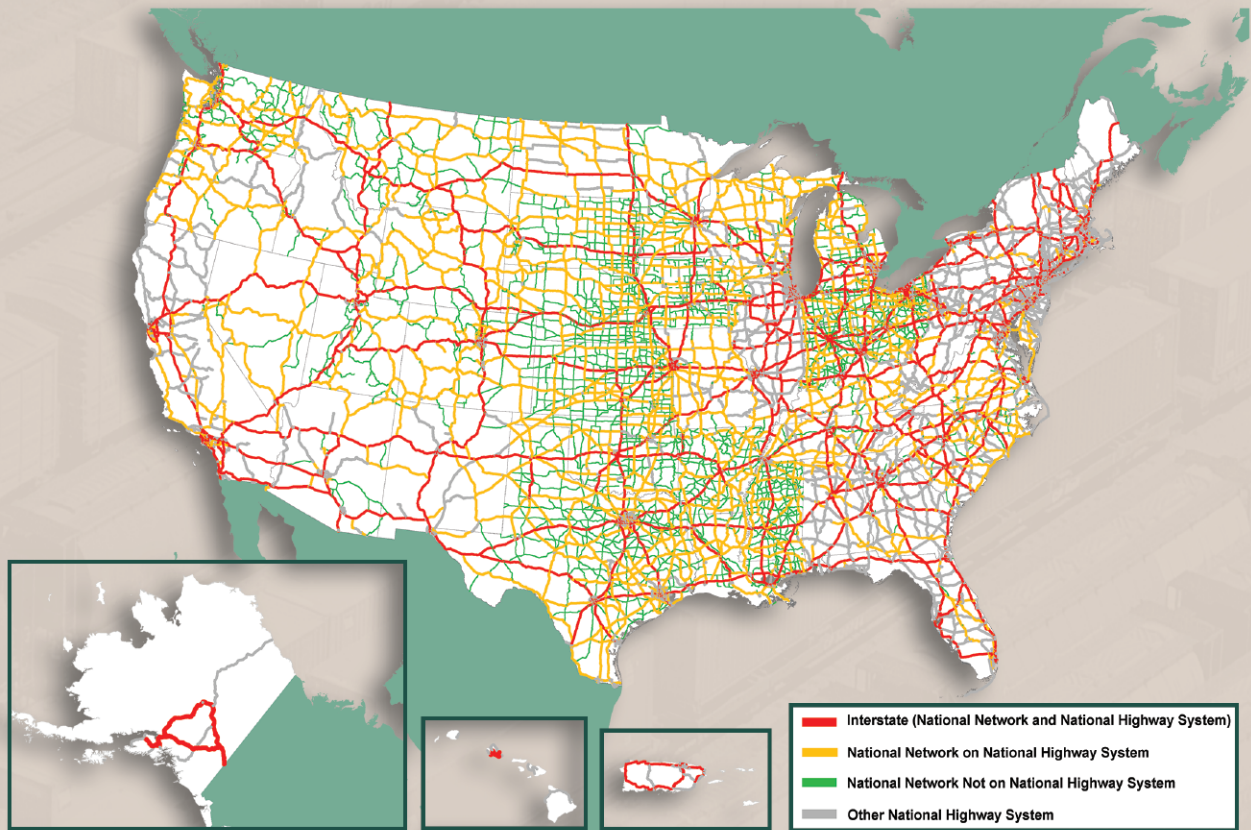
TABLE 3-5. ANNUAL VEHICLE DISTANCE TRAVELED BY HIGHWAY CATEGORY AND VEHICLE TYPE: 2008

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



The National Network was established by Congress in 1982 to facilitate interstate commerce and encourage regional and national economic growth by requiring states to allow conventional combination trucks on the Interstate System and portions of the Federal-aid Primary System of highways. The National Network, which is approximately 200,000 miles in length, has not changed significantly in 28 years.

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

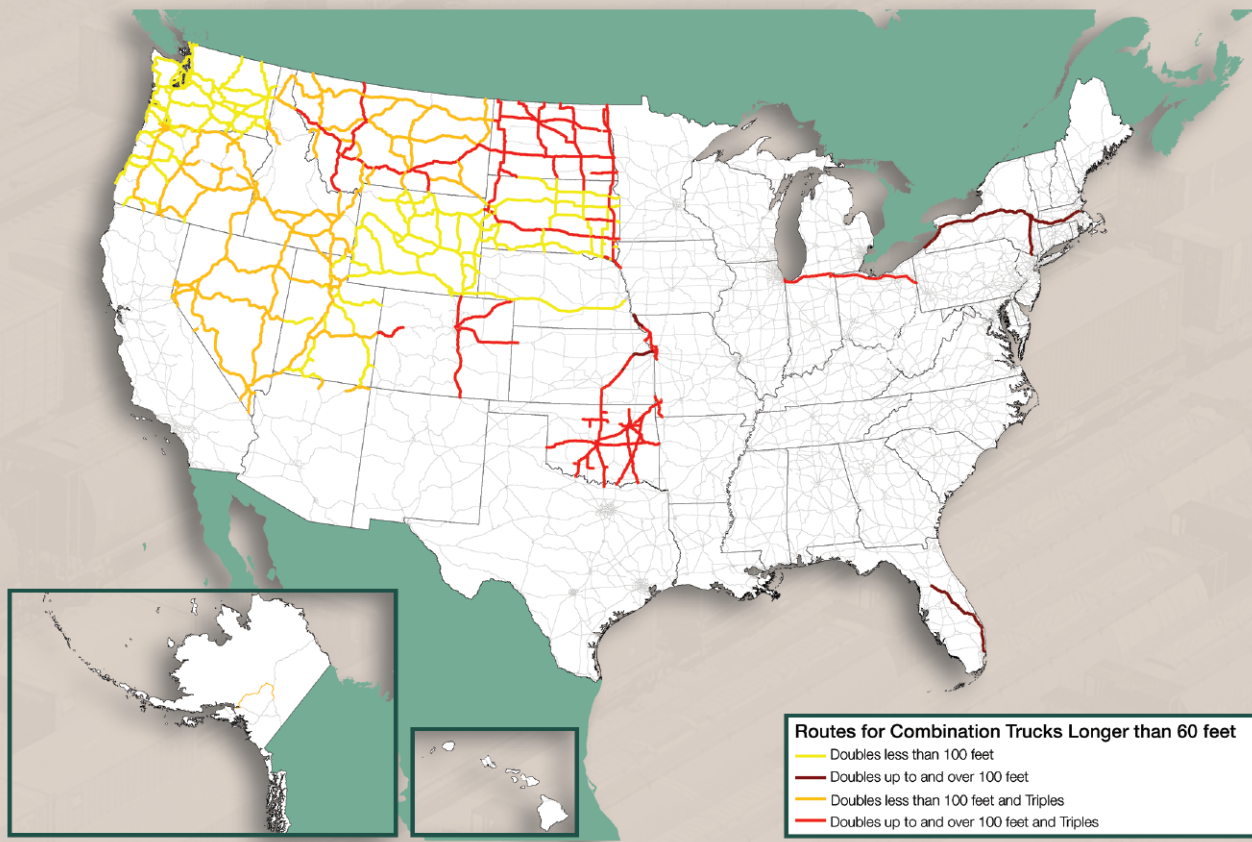


Notes: This map should not be interpreted as the official National Network and should not be used for truck size and weight enforcement purposes. The National Network and the National Highway System (NHS) are approximately 200,000 miles in length, but the National Network includes 65,000 miles of highways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

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

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

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



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

Longer combination vehicles (LCVs) are tractors pulling 1) a semitrailer longer than 28 feet and a trailer longer than 28 feet, 2) a semitrailer longer than 28 feet and a trailer no more than 28 feet long, or 3) a 28-foot semitrailer and two 28-foot trailers. Although all states allow conventional combinations consisting of a 28-foot semitrailer and a 28-foot trailer, only 14 states and 6 state turnpike authorities allow LCVs on at least some parts of their road networks. Allowable routes for LCVs have been frozen since 1991.

FIGURE 3-4. PERMITTED LONGER COMBINATION VEHICLES ON THE NATIONAL HIGHWAY SYSTEM: 2009

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



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

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

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

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



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

Source: U.S. Department of Commerce, Census Bureau, *2002 Vehicle Inventory and Use Survey: United States*, EC02TV-US, table 3a (Washington, DC: 2004), available at www.census.gov/prod/ec02/ec02tv-us.pdf as of June 2, 2010.

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

Table 3-7. Truck Miles by Products Carried: 2002¹

Products carried	Millions of miles
Total²	145,173
Animals and fish, live	735
Animal feed and products of animal origin	2,088
Grains, cereal	1,368
All other agricultural products	2,661
Basic chemicals	876
Fertilizers and fertilizer materials	1,666
Pharmaceutical products	305
All other chemical products and preparations	1,351
Alcoholic beverages	1,124
Bakery and milled grain products	3,553
Meat, seafood, and their preparations	3,056
Tobacco products	445
All other packaged foodstuffs	7,428
Logs and other wood in the rough	1,149
Paper or paperboard articles	3,140
Printed products	765
Pulp, newsprint, paper, paperboard	1,936
Wood products	3,561
Articles of base metal	3,294
Base metal in primary or semifinished forms	2,881
Nonmetallic mineral products	3,049
Tools, nonpowered	7,759
Tools, powered	6,478
Electronic and other electrical equipment	3,024
Furniture, mattresses, lamps, etc.	2,043
Machinery	3,225
Miscellaneous manufactured products	4,008
Precision instruments and apparatus	734
Textile, leather, and related articles	1,538
Vehicles, including parts	3,844
All other transportation equipment	636
Coal	301
Crude petroleum	132
Gravel or crushed stone	2,790
Metallic ores and concentrates	45
Monumental or building stone	462
Natural sands	1,089
All other nonmetallic minerals	499
Fuel oils	1,232
Gasoline and aviation turbine fuel	849
Plastic and rubber	2,393
All other coal and refined petroleum products	1,172
Hazardous waste (EPA manifest)	190
All other waste and scrape (non-EPA manifest)	2,647
Recyclable products	922
Mail and courier parcels	4,760
Empty shipping containers	794
Passengers	274
Mixed freight	14,659
Products, equipment, or materials not elsewhere classified	265
Products not specified	6,358
Not applicable ³	150
No product carried	28,977

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

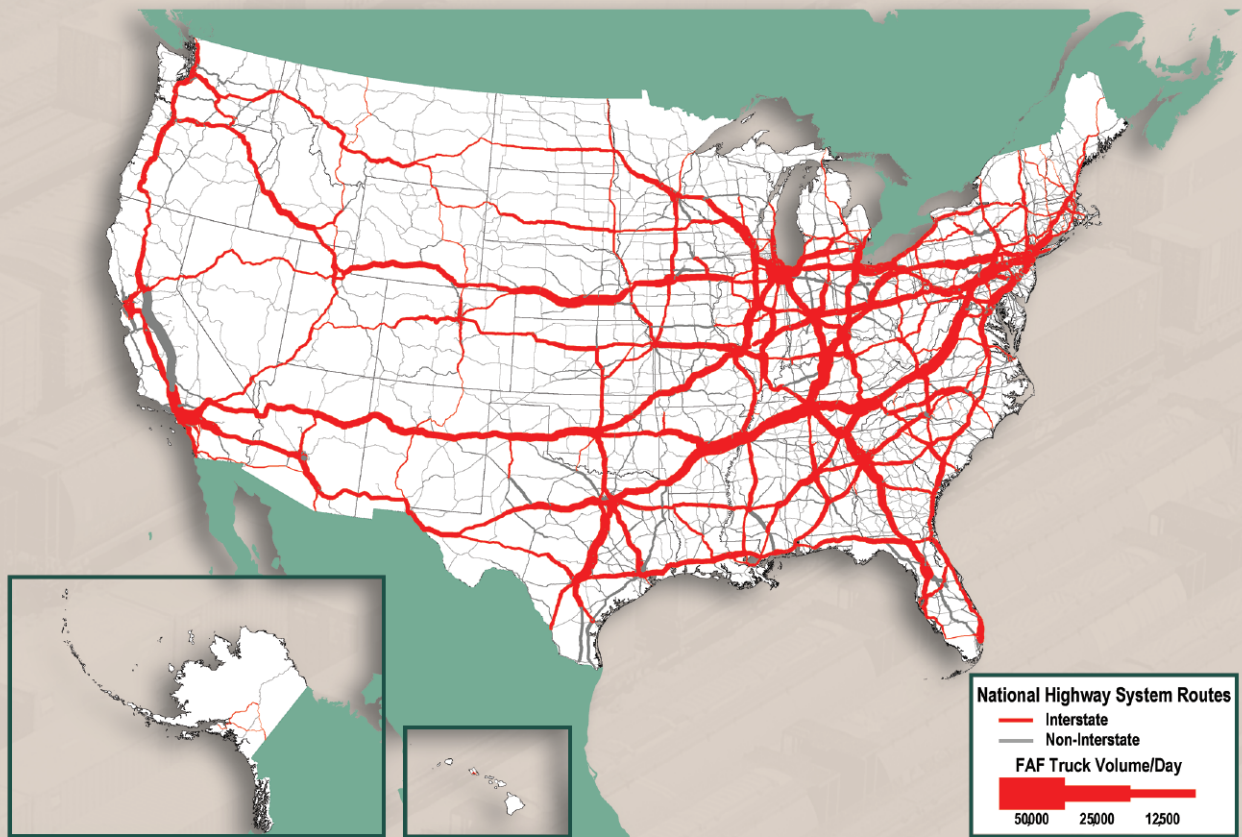
²Detail lines may not add to total because multiple products/hazardous materials may be carried at the same time.

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

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

Source: U.S. Department of Commerce, Census Bureau, *2002 Vehicle Inventory and Use Survey: United States*, EC02TV-US (Washington, DC: 2004), available at www.census.gov/prod/ec02/ec02tv-us.pdf as of June 2, 2010.

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



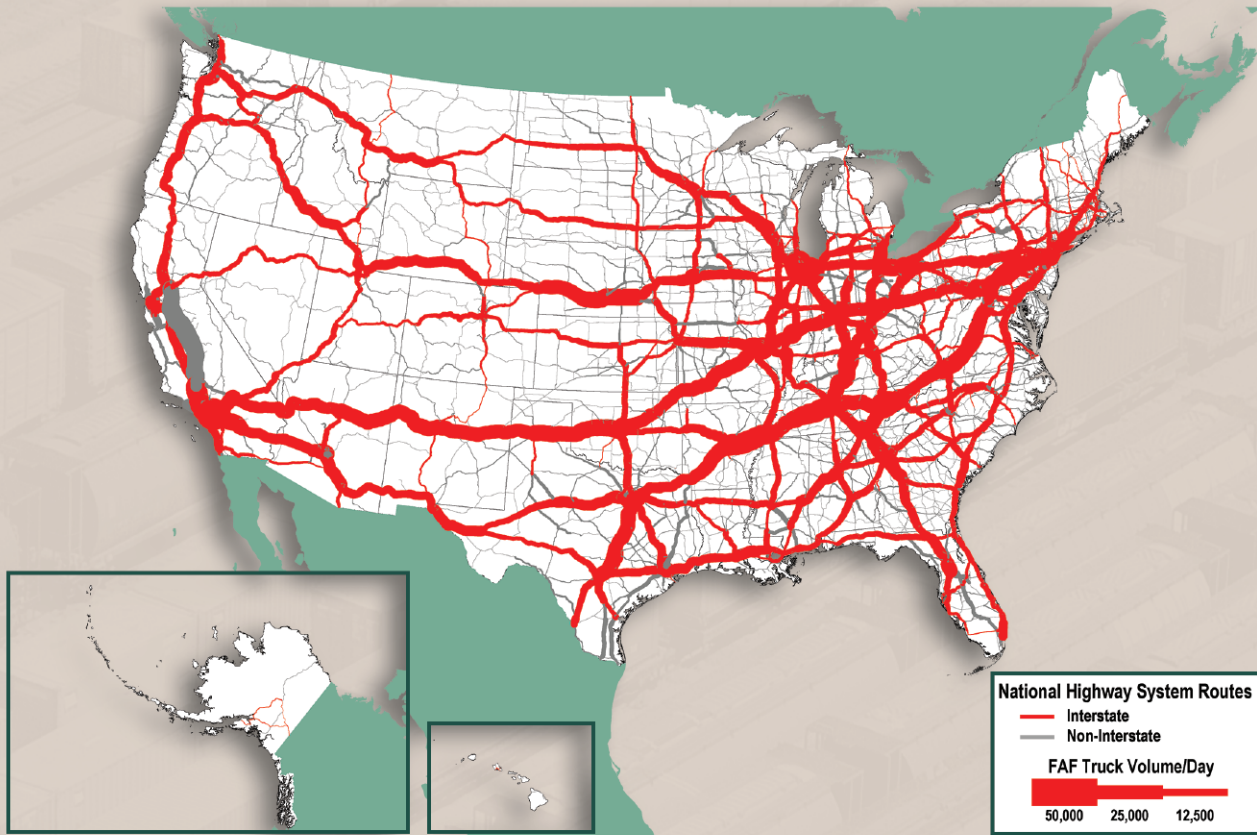
Note: Long-haul freight trucks typically serve locations at least 50 miles apart, excluding trucks that are used in movements by multiple modes and mail.

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

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

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

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



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

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

FIGURE 3-6. AVERAGE DAILY LONG-HAUL FREIGHT TRAFFIC ON THE NATIONAL HIGHWAY SYSTEM: 2040
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.1, 2010.

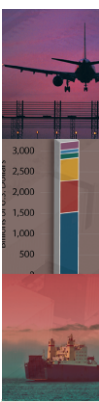
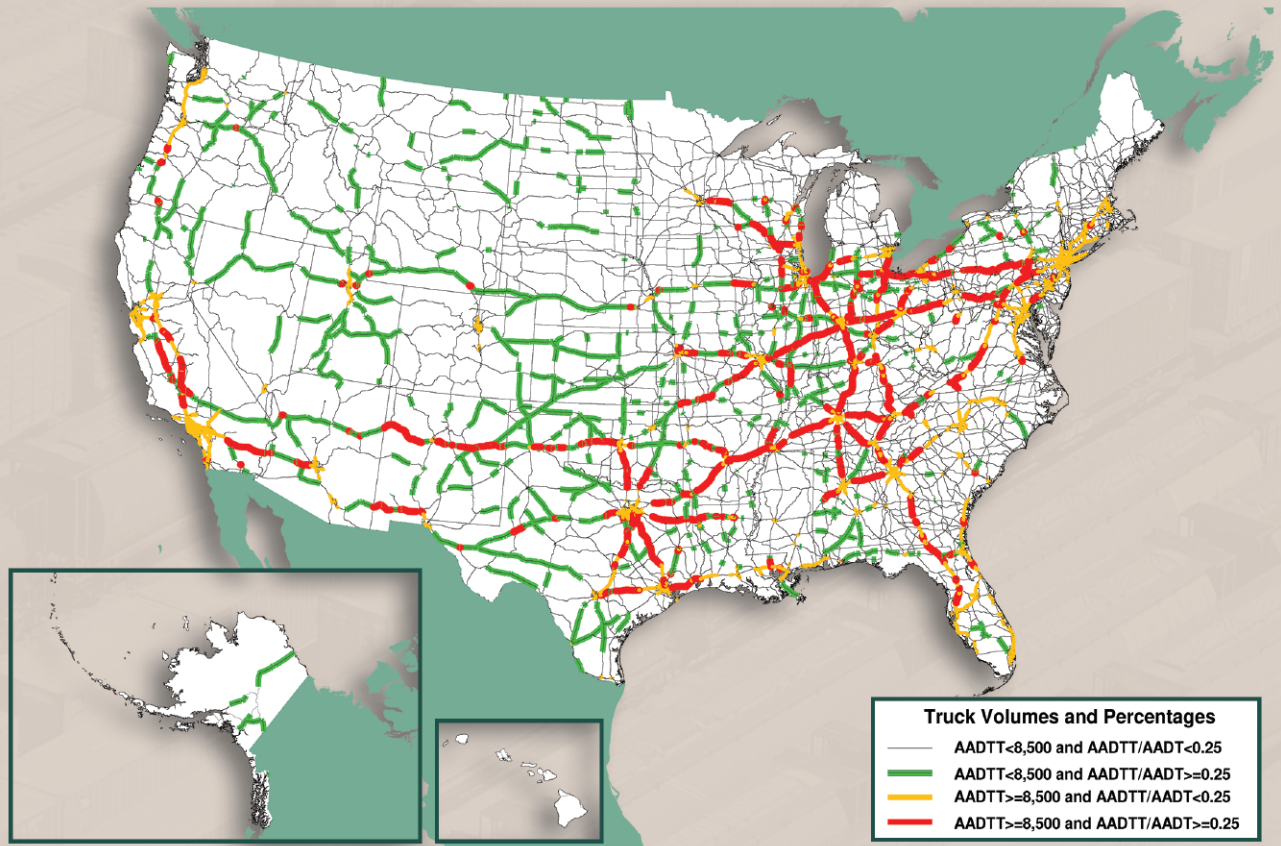


Figure 3-7. Major Truck Routes on the National Highway System: 2007



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.

Selected routes carry a significant concentration of trucks, either as an absolute number or as a percentage of the traffic stream. Nearly 6,000 miles of the NHS carry more than 8,500 trucks per day on sections where at least every fourth vehicle is a truck.

FIGURE 3-7. MAJOR TRUCK ROUTES ON THE NATIONAL HIGHWAY SYSTEM: 2007

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

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

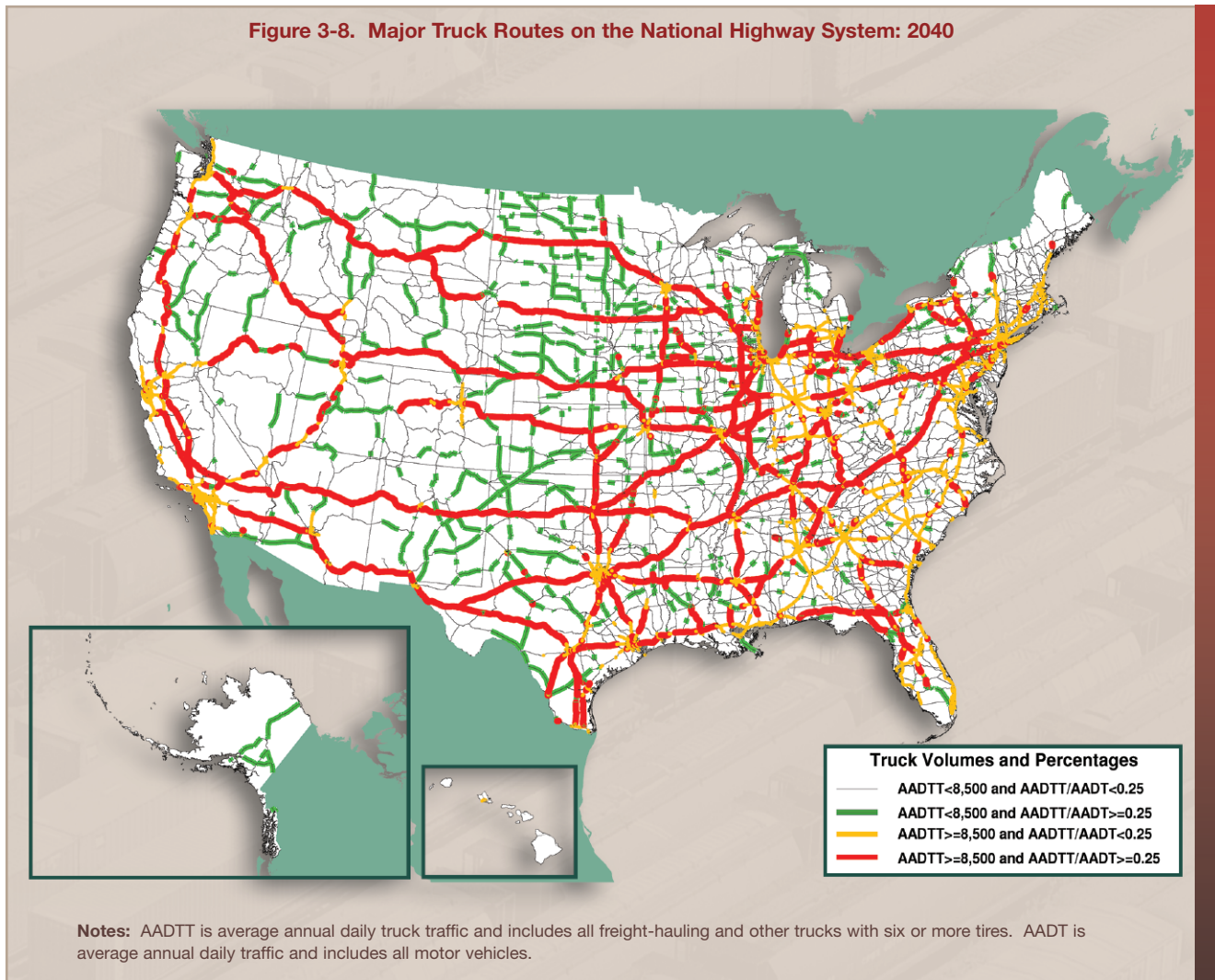
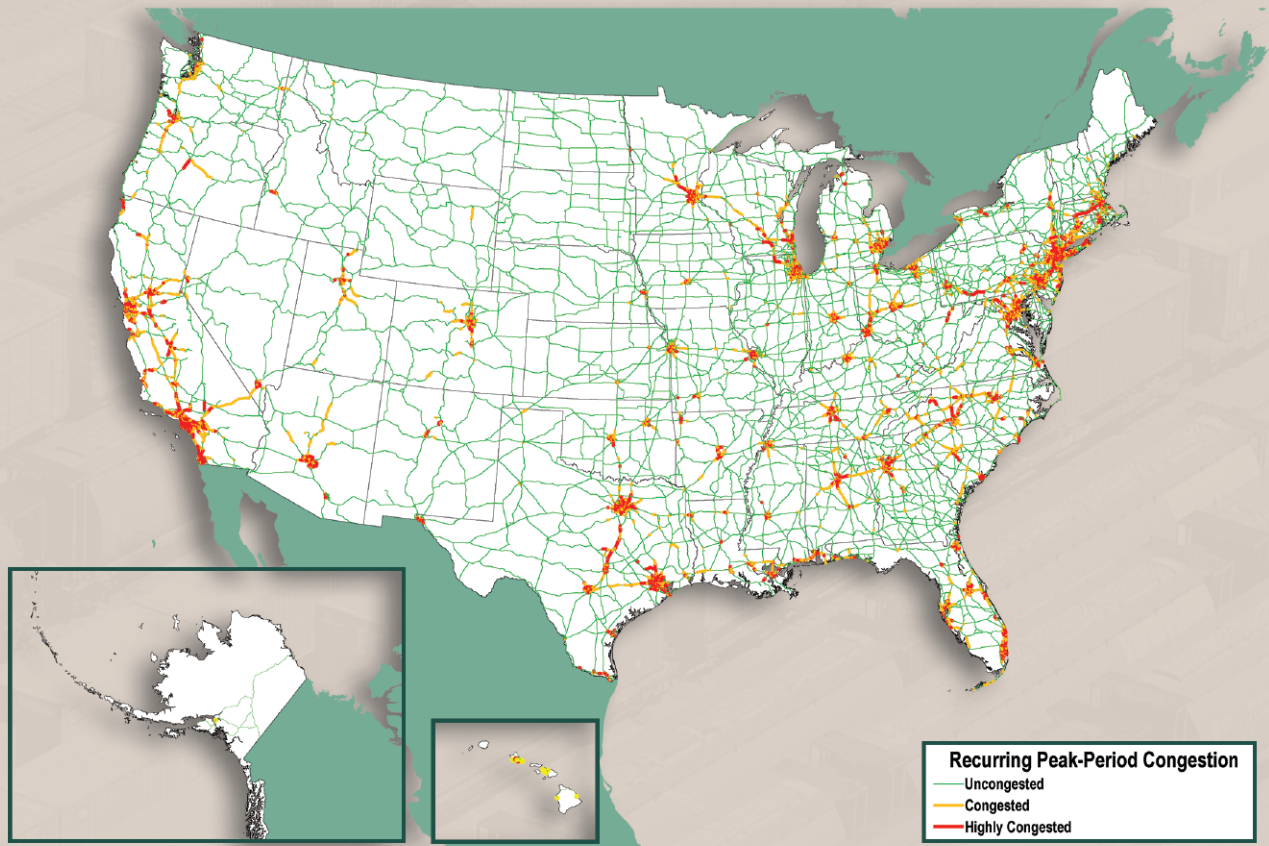


FIGURE 3-8. MAJOR TRUCK ROUTES ON THE NATIONAL HIGHWAY SYSTEM: 2040

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

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



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

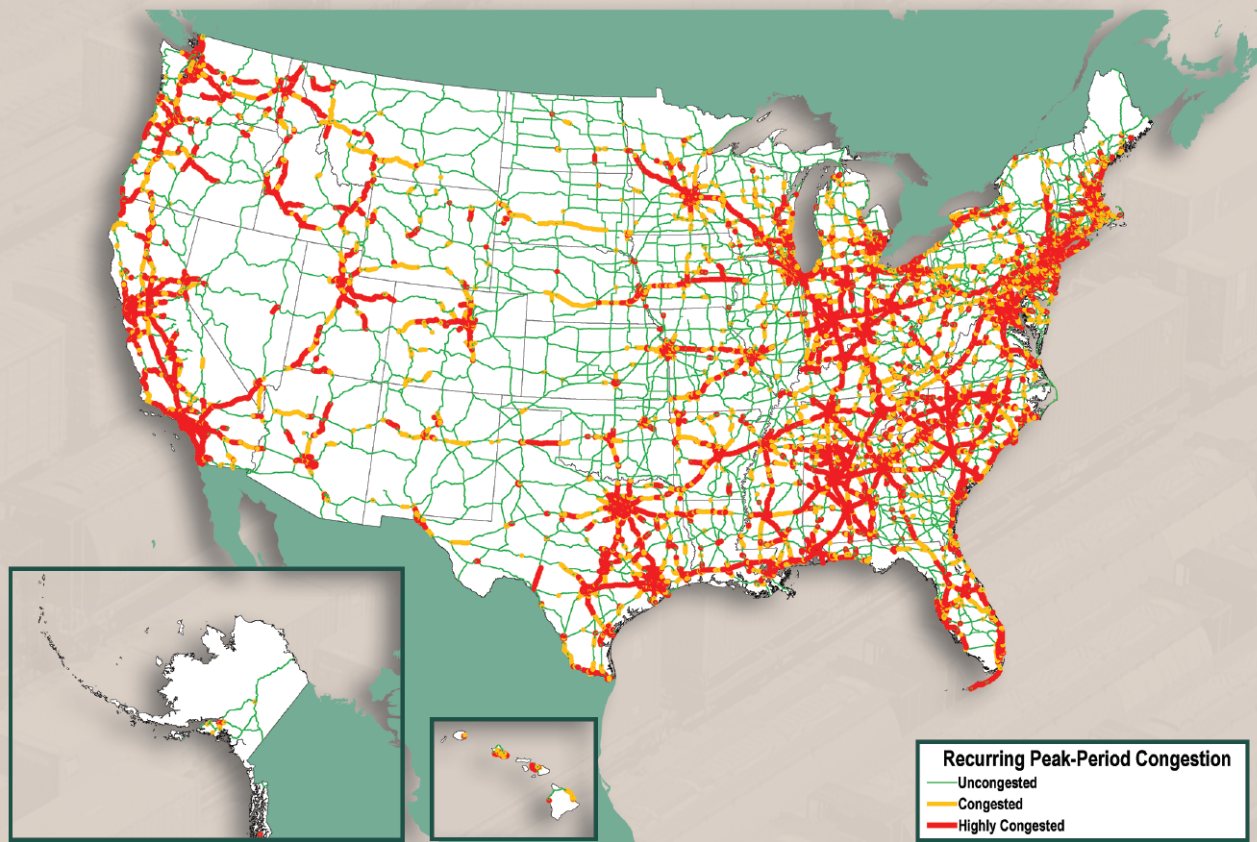
Recurring congestion caused by volumes of passenger vehicles and trucks that exceed capacity on roadways during peak periods is concentrated primarily in major metropolitan areas. In 2007, peak-period congestion resulted in traffic slowing below posted speed limits on 11,700 miles of the NHS and created stop-and-go conditions on an additional 6,700 miles.

FIGURE 3-9. PEAK-PERIOD CONGESTION ON THE NATIONAL HIGHWAY SYSTEM: 2007

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

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

Figure 3-10. Peak-Period Congestion on the National Highway System: 2040

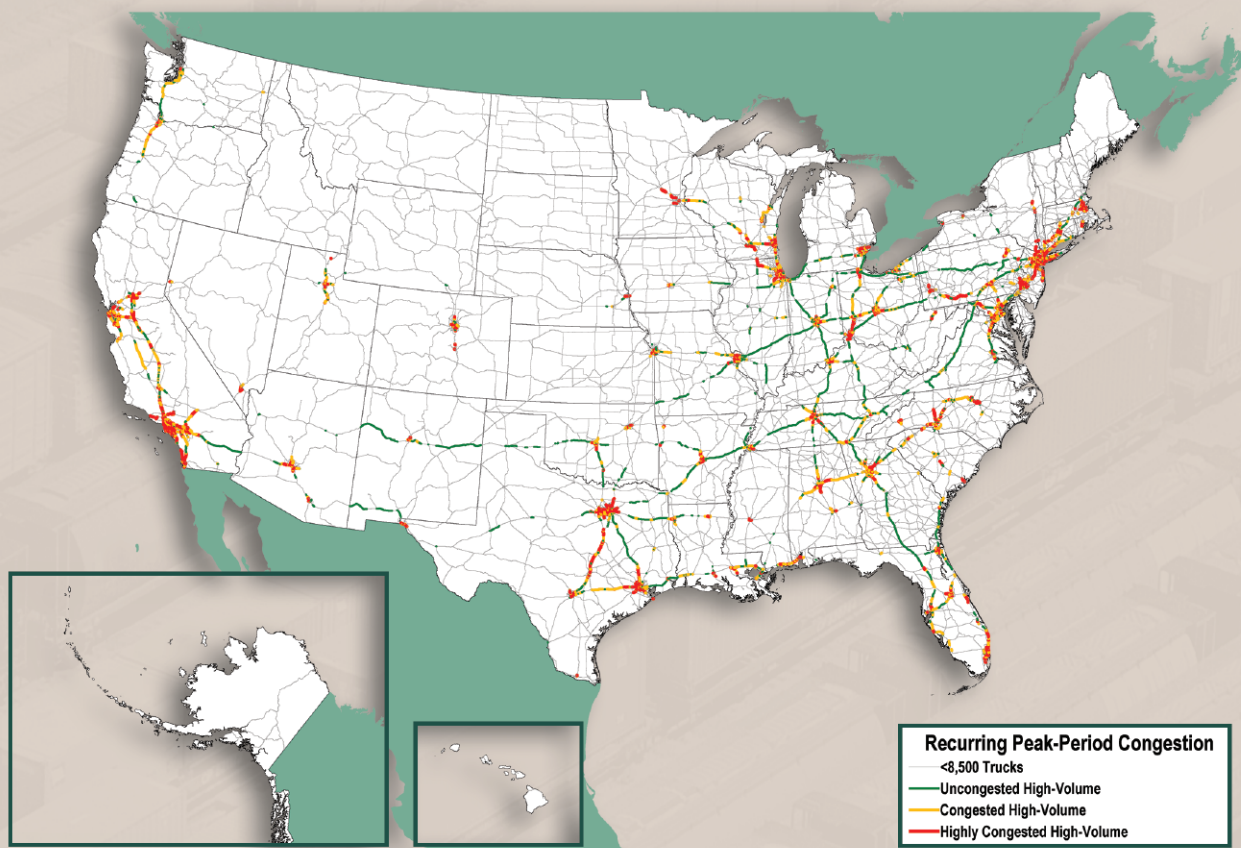


Notes: Highly congested segments are stop-and-go conditions with volume/service flow ratios greater than 0.95. Congested segments have reduced traffic speeds with volume/service flow ratios between 0.75 and 0.95. The volume/service flow ratio is estimated using the procedures outlined in the HPMS Field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

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

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

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



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

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

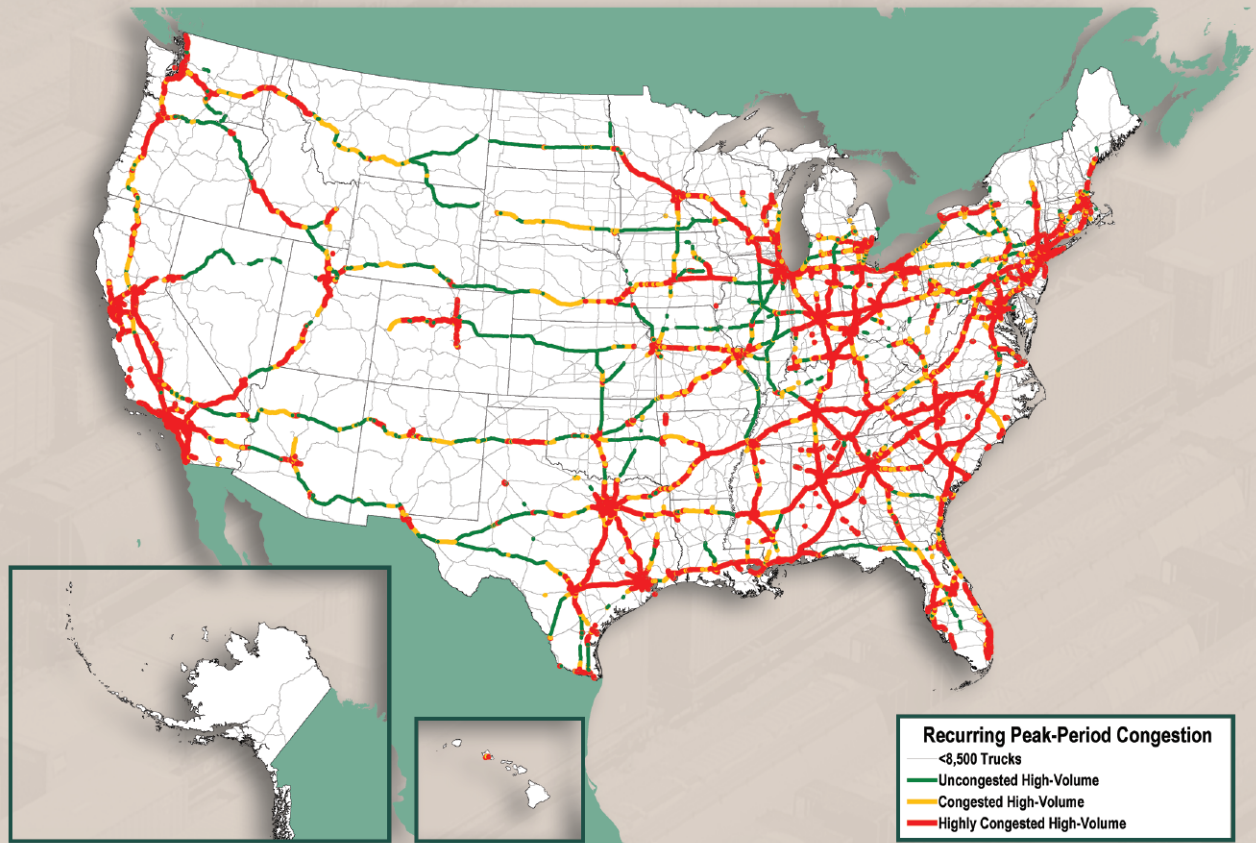
Recurring congestion slows traffic on 4,700 miles and creates stop-and-go conditions on 3,700 miles of the NHS that carry more than 8,500 trucks per day.

FIGURE 3-11. PEAK-PERIOD CONGESTION ON HIGH-VOLUME TRUCK PORTIONS OF THE NATIONAL HIGHWAY SYSTEM: 2007
Sources: U.S. Department of Transportation, Federal Highway Administration, Office of Highway Policy Information, Highway Performance Monitoring System; and Office of Freight Management and Operations, Freight Analysis Framework, version 3.1, 2010.



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

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

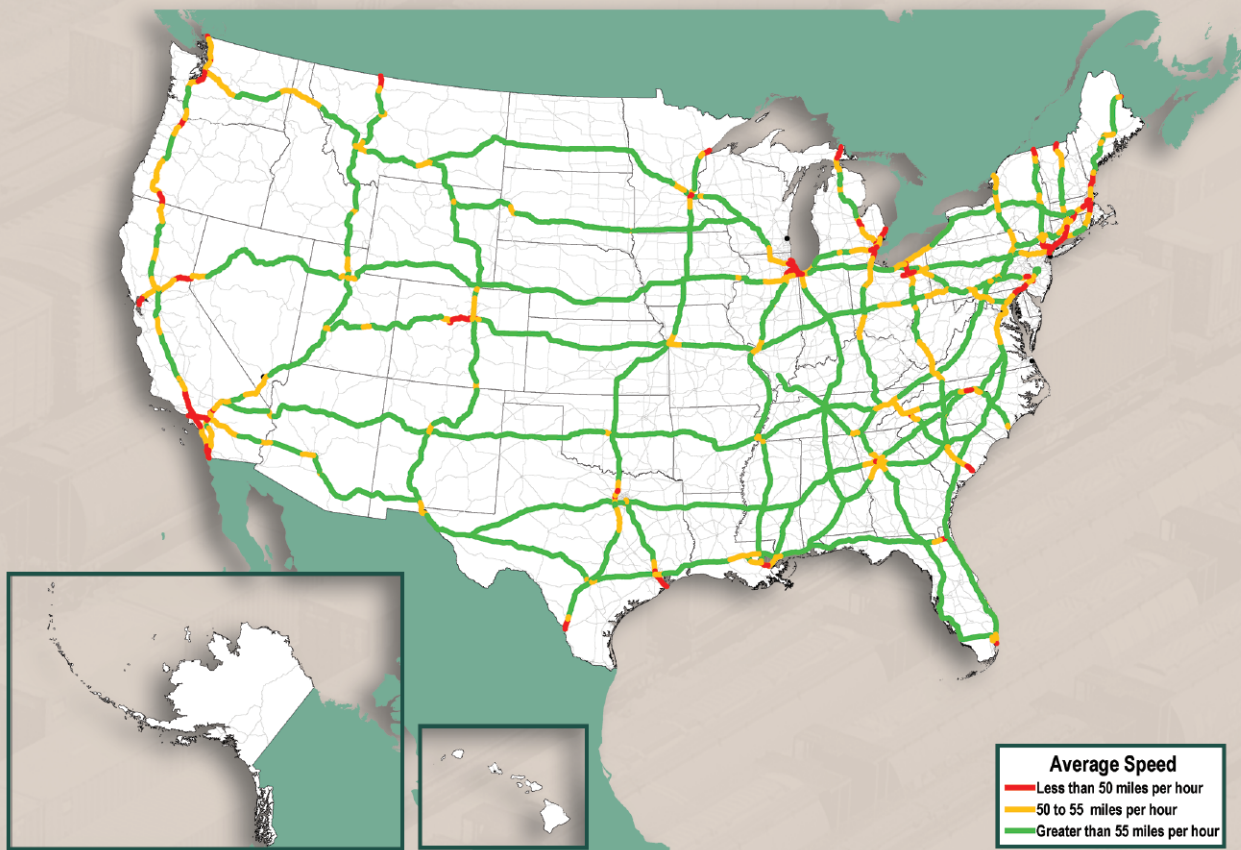


Notes: High-volume truck portions of the National Highway System carry more than 8,500 trucks per day, including freight-hauling long-distance trucks, freight-hauling local trucks, and other trucks with six or more tires. Highly congested segments are stop-and-go conditions with volume/service flow ratios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

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

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

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



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

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

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

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

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

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

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

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

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



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

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

¹Urban Interstate.

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

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

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

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

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

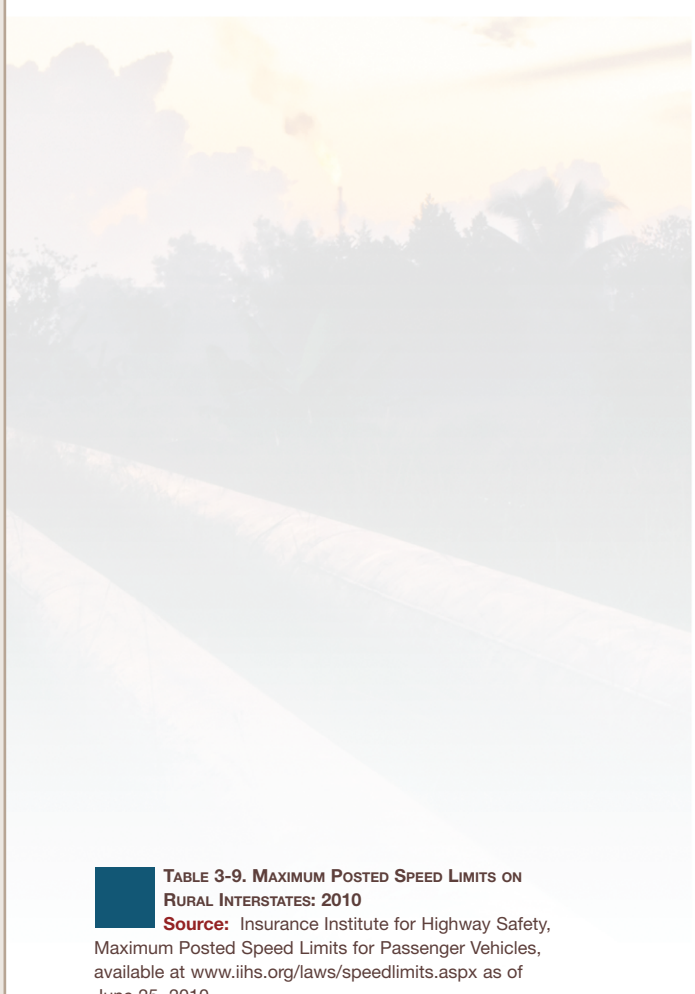


TABLE 3-9. MAXIMUM POSTED SPEED LIMITS ON RURAL INTERSTATES: 2010

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



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

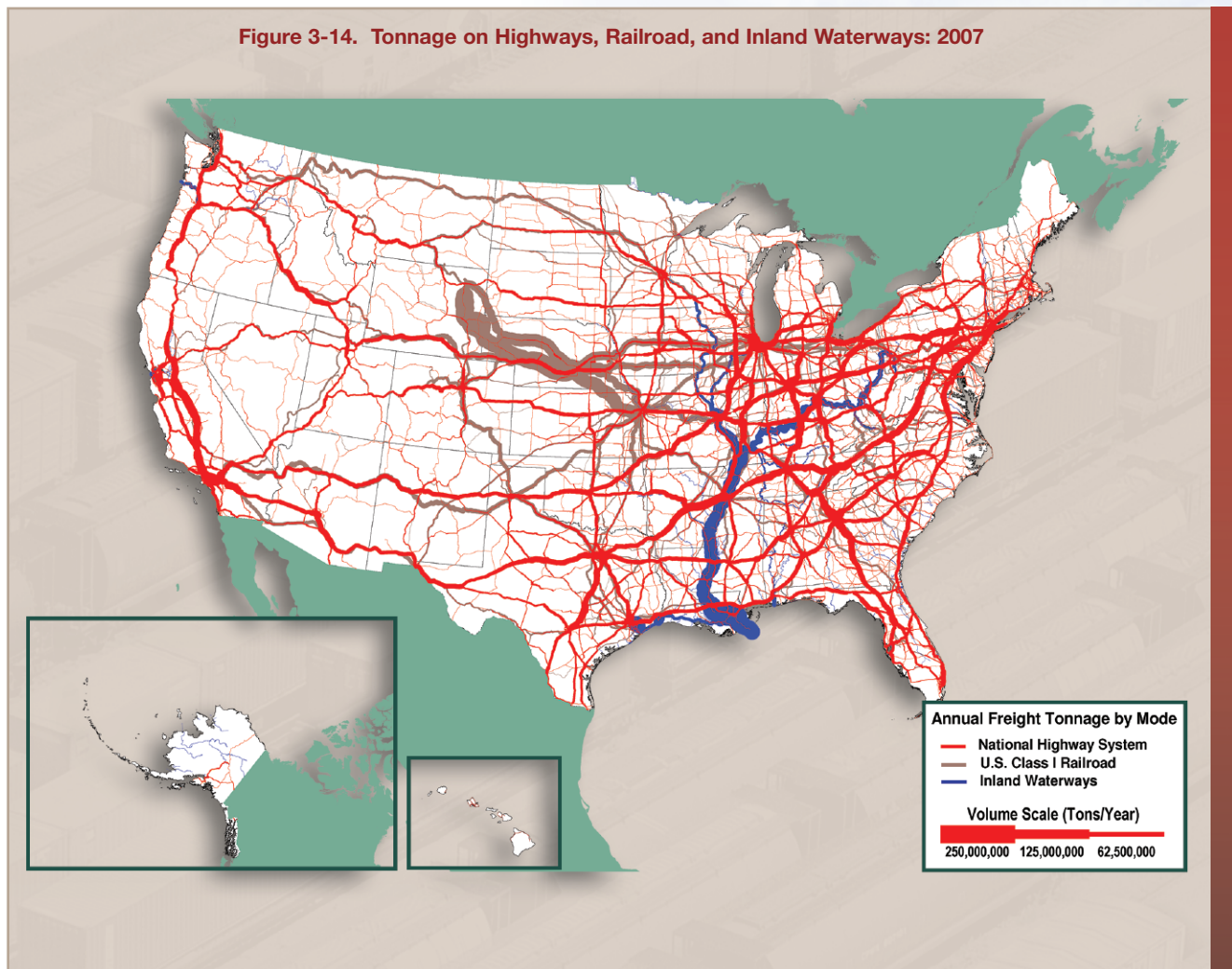
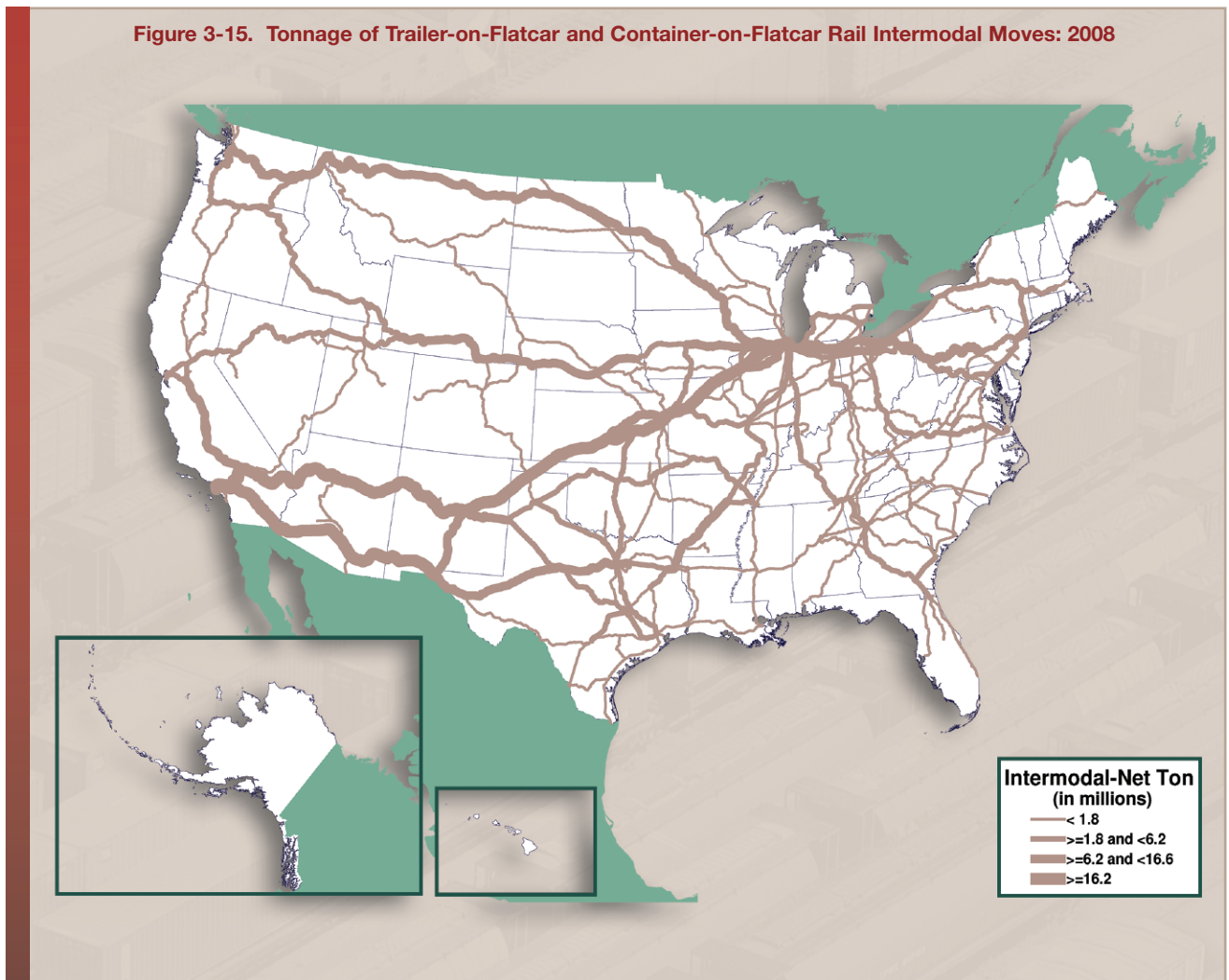


FIGURE 3-14. TONNAGE ON HIGHWAYS, RAILROAD, AND INLAND WATERWAYS: 2007

Sources: **Highways:** U.S. Department of Transportation, Federal Highway Administration, Freight Analysis Framework, version 3.1, 2007. **Rail:** Based on Surface Transportation Board, Annual Carload Waybill Sample and rail freight flow assignments done by Oak Ridge National Laboratory. **Inland Waterways:** U.S. Army Corps of Engineers (USACE), Annual Vessel Operating Activity and Lock Performance Monitoring System data, as processed for USACE by the Tennessee Valley Authority; and USACE, Institute for Water Resources, Waterborne Foreign Trade Data. Water flow assignments were done by Oak Ridge National Laboratory.

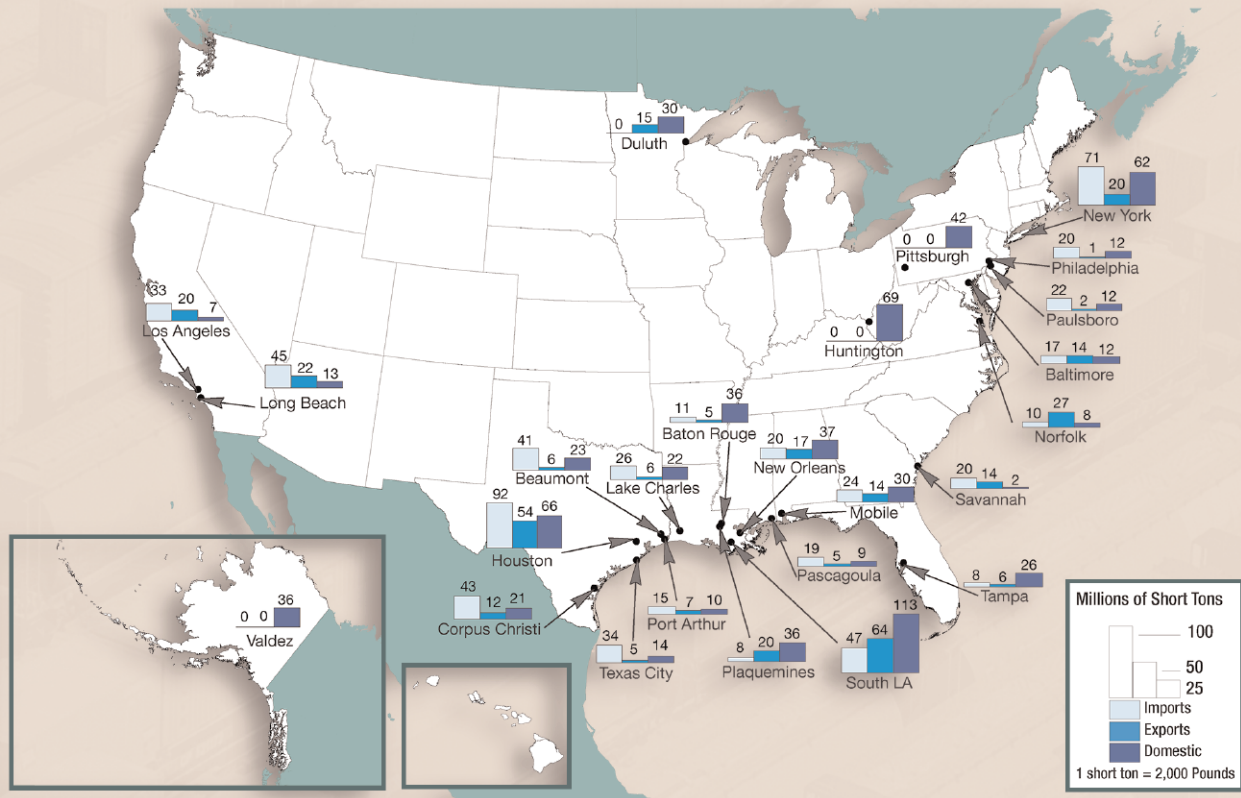
Figure 3-15. Tonnage of Trailer-on-Flatcar and Container-on-Flatcar Rail Intermodal Moves: 2008



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

FIGURE 3-15. TONNAGE OF TRAILER-ON-FLATCAR AND CONTAINER-ON-FLATCAR RAIL INTERMODAL MOVES: 2008
Source: U.S. Department of Transportation, Federal Railroad Administration, November 2010.

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



Note: 1 short ton = 2,000 pounds.

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

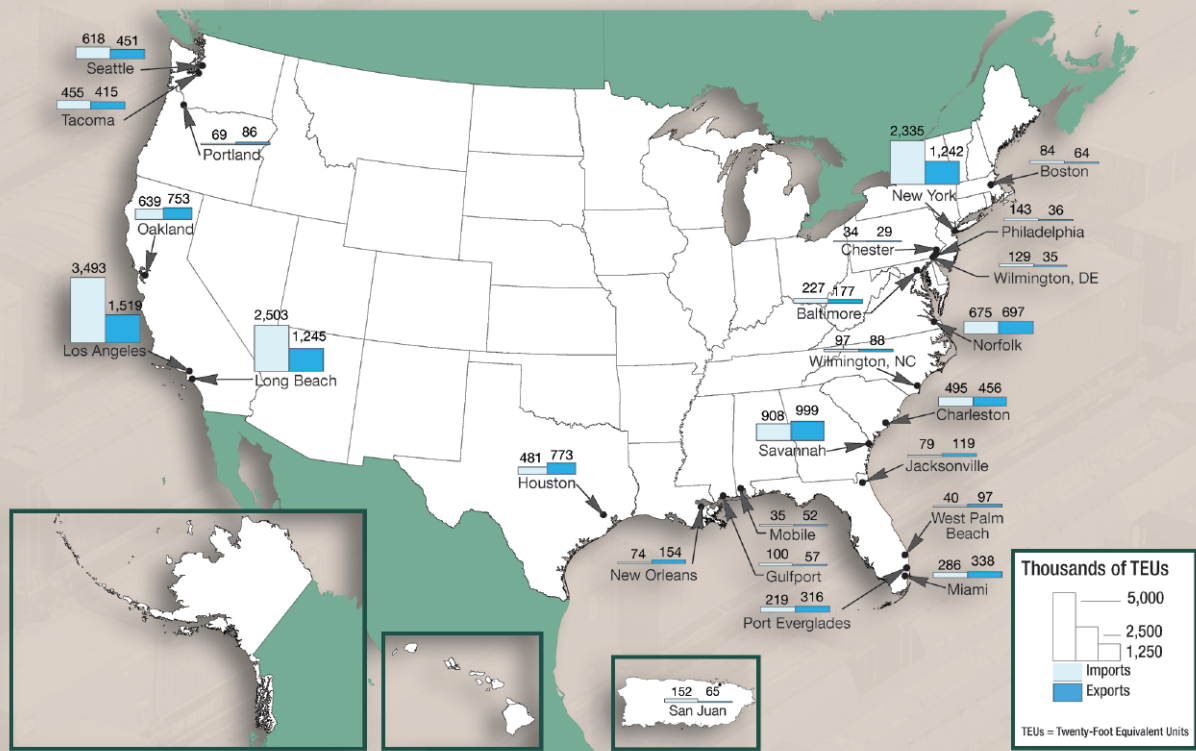


FIGURE 3-16. TOP 25 WATER PORTS BY TONNAGE: 2008

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



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



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

Containerized cargo has grown rapidly over the past few years and is concentrated at a few large water ports. The Ports of Los Angeles and Long Beach together handle about 35 percent of all container traffic at water ports in the United States. Container trade at these two ports increased by 70 percent between 1998 and 2009, slightly higher than the growth rate reported for container cargo overall.

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

Source: U.S. Department of Transportation, Maritime Administration, *U.S. Waterborne Container Trade by U.S. Custom Ports, 1997-2009*, based on data provided by Port Import/Export Reporting Service, available at www.maradot.gov/library_landing_page/data_and_statistics/Data_and_Statistics.htm as of July 6, 2010.

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

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

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

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

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

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

Note: 1 short ton = 2,000 pounds.

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

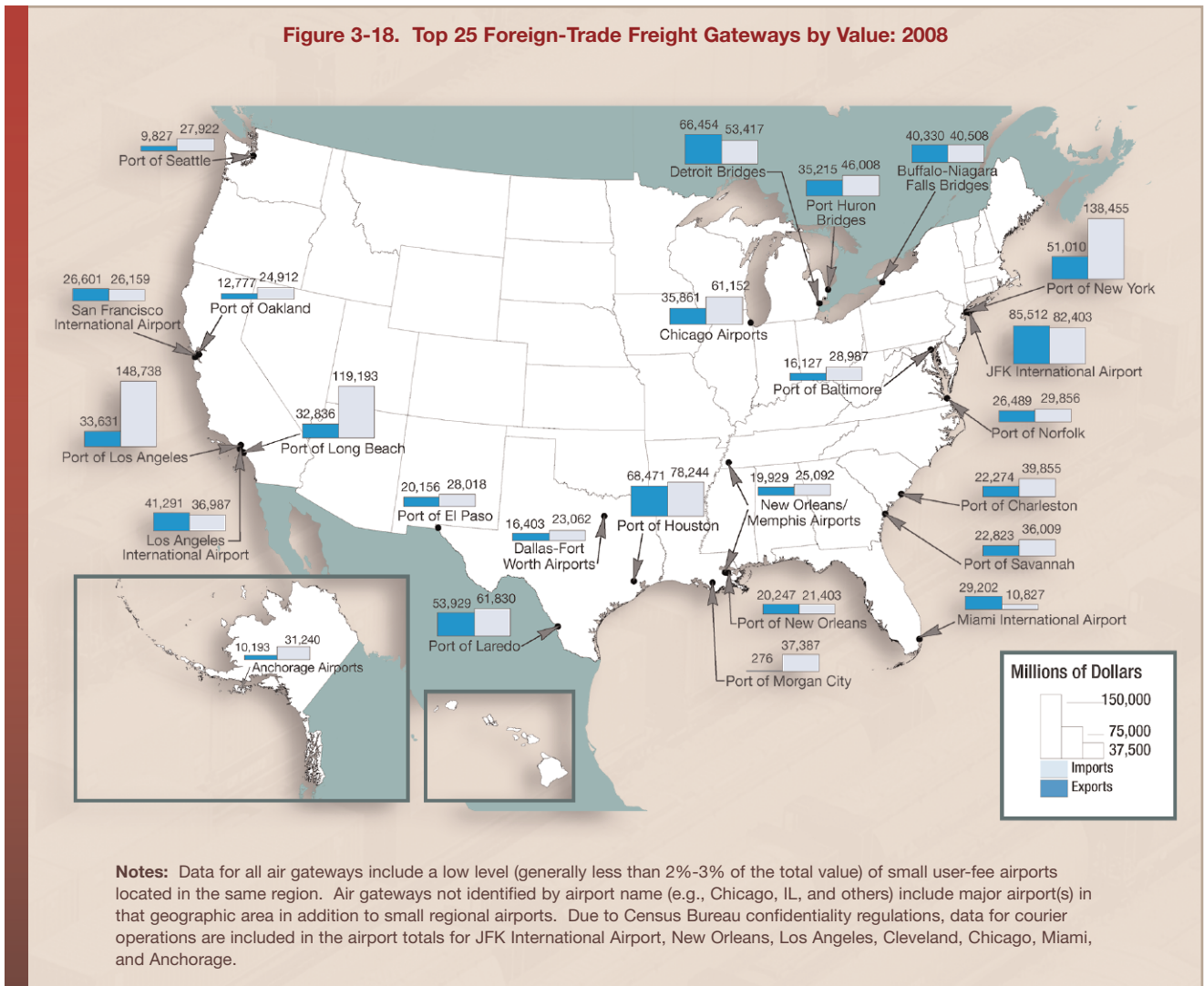
TABLE 3-10. TOP 25 AIRPORTS BY LANDED WEIGHT OF ALL-CARGO OPERATIONS: 2000-2008¹

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

www.faa.gov/airports_airtraffic/airports/planning_capacity/passenger_allcargo_stats/passenger/media/cy07_cargo.pdf as of July 7, 2010.



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



Transportation facilities that move international trade into and out of the United States demonstrate the importance of all modes and intermodal combinations to global connectivity. The top 25 foreign-trade gateways measured by value of shipments are comprised of 12 water ports, 5 land-border crossings, and 8 air gateways.

FIGURE 3-18. TOP 25 FOREIGN-TRADE FREIGHT GATEWAYS BY VALUE: 2008
Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *National Transportation Statistics 2009*, available at www.bts.gov as of April 25, 2010.