

III. THE FREIGHT TRANSPORTATION SYSTEM

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



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

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

Key: N = not applicable; NA = not available.
¹Excludes Class III railroads.

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

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

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

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

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

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

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 2007. In comparison, the number of

rail freight cars has declined since 1980 with improved utilization and the deployment of larger cars. The number of U.S.-flag water vessels decreased by 75 percent over the same period while the world fleet expanded by 33 percent.

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

Figure 3-1. Highway Vehicle Miles Traveled by Trucks and All Vehicles: 1980-2007

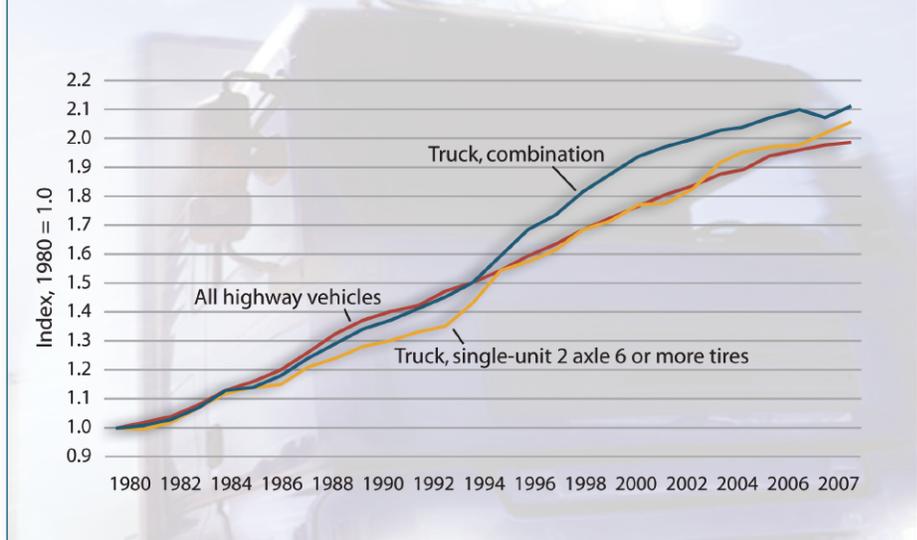


TABLE 3-2. NUMBER OF U.S. VEHICLES, VESSELS, AND OTHER CONVEYANCES: 1980-2007

Sources: **Highway:** U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues), table VM-1, available at www.fhwa.dot.gov/policyinformation/statistics/2007/ as of April 20, 2009. **Rail:** Association of American Railroads, *Railroad Facts* (Washington, DC: annual issues). **Water: Nonself-propelled vessels and self-propelled vessels:** U.S. Army, Corps of Engineers, *Waterborne Transportation Lines of the United States, Volume 1*, National Summaries (New Orleans, LA: annual issues). **Oceangoing steam motor ships and U.S. Flag fleet:** U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics*, table 1-23, available at www.bts.gov/publications/national_transportation_statistics/html/table_01_23.html as of April 20, 2009.

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

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



Despite doubling over the past two decades, truck traffic remains a relatively small share of highway traffic as a whole. In 2007, commercial trucks accounted for about 8 percent of highway vehicle miles traveled. Approximately two-thirds of commercial truck travel is by truck tractors hauling semitrailers and by other combinations, while the remaining one-third is by single-unit trucks with 6 or more tires.

The nation's truck fleet has grown significantly in number and distance driven. Of trucks weighing more

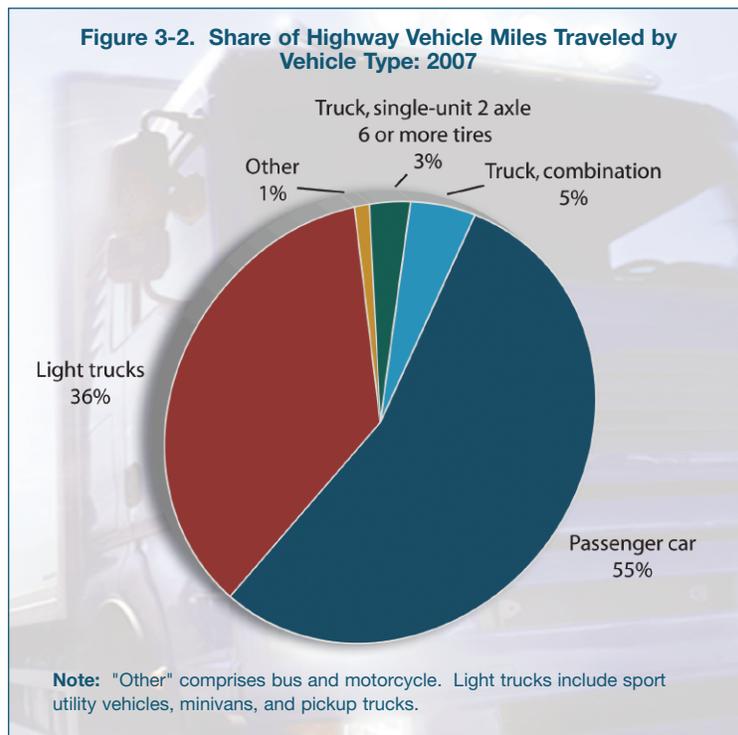


Table 3-3. Trucks and Truck Miles by Average Weight 1987-2002¹

Average weight (pounds)	1987		1992		1997		2002		Percent Change, 1987 to 2002	
	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: 2007

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

TABLE 3-3. TRUCKS AND TRUCK MILES BY AVERAGE WEIGHT 1987-2002¹

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 April 13, 2009.

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

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

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

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

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

Key: R = revised.

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: 2005-2008

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



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

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

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

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



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

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



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

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

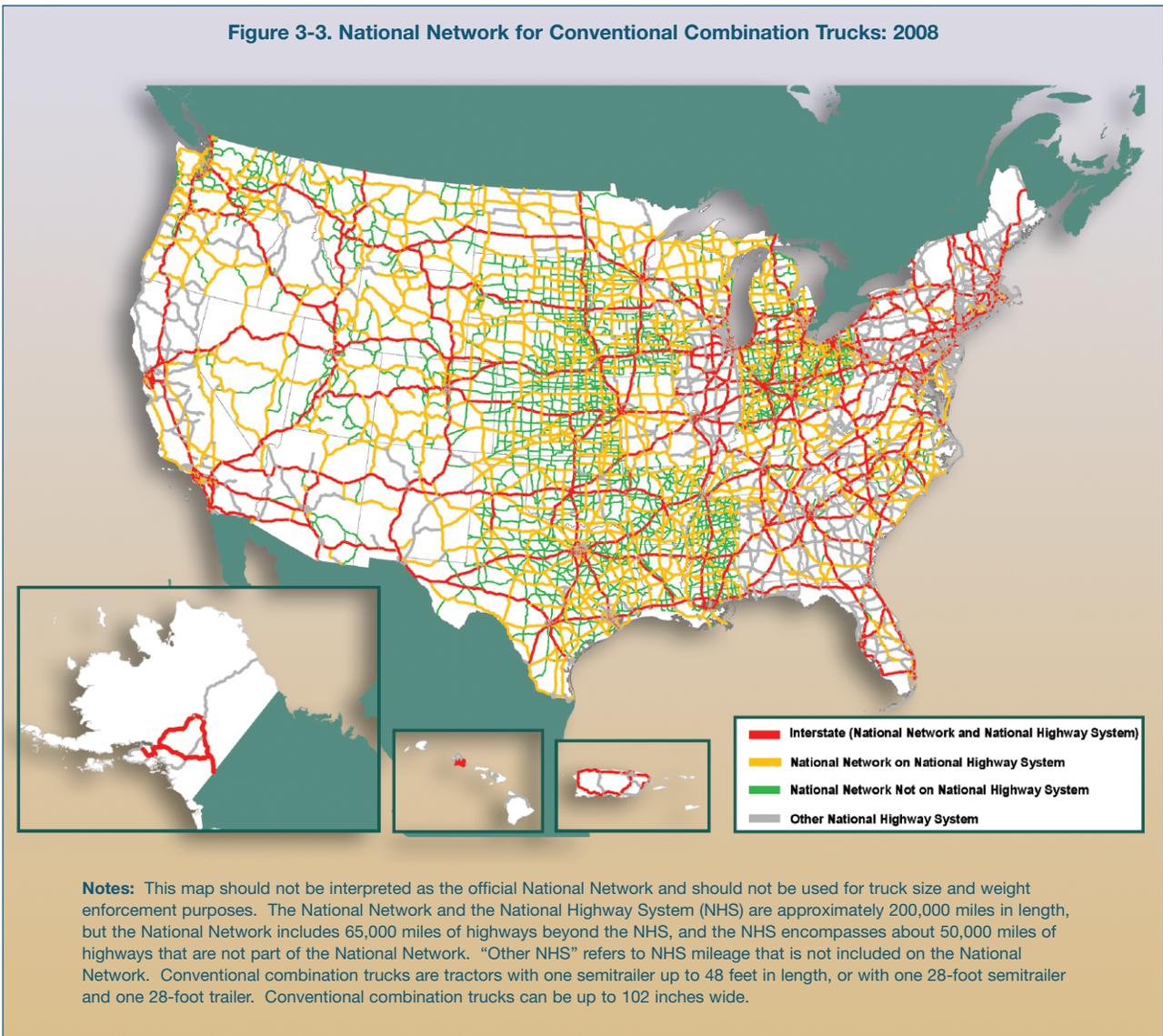
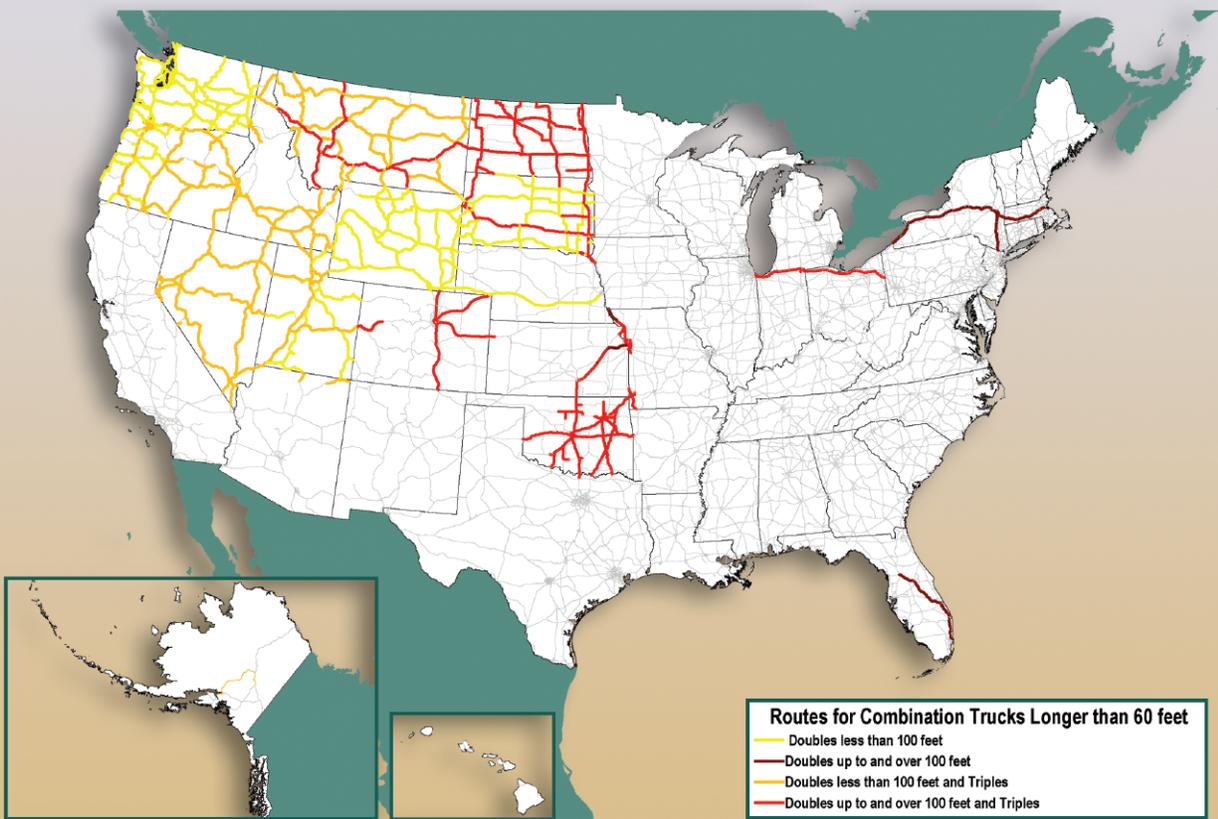


FIGURE 3-3. NATIONAL NETWORK FOR CONVENTIONAL COMBINATION TRUCKS: 2008

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



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



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

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



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



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

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

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

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

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

Table 3-7. Truck Miles by Products Carried: 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 prepared foodstuffs	7,428
Logs and other wood in the rough	1,149
Paper or paperboard articles	3,140
Printed products	765
Pulp, newsprint, paper, paperboard	1,936
Wood products	3,561
Articles of base metal	3,294
Base metal in primary or semifinished forms	2,881
Nonmetallic mineral products	3,049
Tools, nonpowered	7,759
Tools, powered	6,478
Electronic and other electrical equipment	3,024
Furniture, mattresses, lamps, etc.	2,043
Machinery	3,225
Miscellaneous manufactured products	4,008
Precision instruments and apparatus	734
Textile, leather, and related articles	1,538
Vehicles, including parts	3,844
All other transportation equipment	636
Coal	301
Crude petroleum	132
Gravel or crushed stone	2,790
Metallic ores and concentrates	45
Monumental or building stone	462
Natural sands	1,089
All other nonmetallic minerals	499
Fuel oils	1,232
Gasoline and aviation turbine fuel	849
Plastic and rubber	2,393
All other coal and refined petroleum products	1,172
Hazardous waste (EPA manifest)	190
All other waste and scrape (non-EPA manifest)	2,647
Recyclable products	922
Mail and courier parcels	4,760
Empty shipping containers	794
Passengers	274
Mixed freight	14,659
Products, equipment, or materials not elsewhere classified	265
Products not specified	6,358
Not applicable 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.

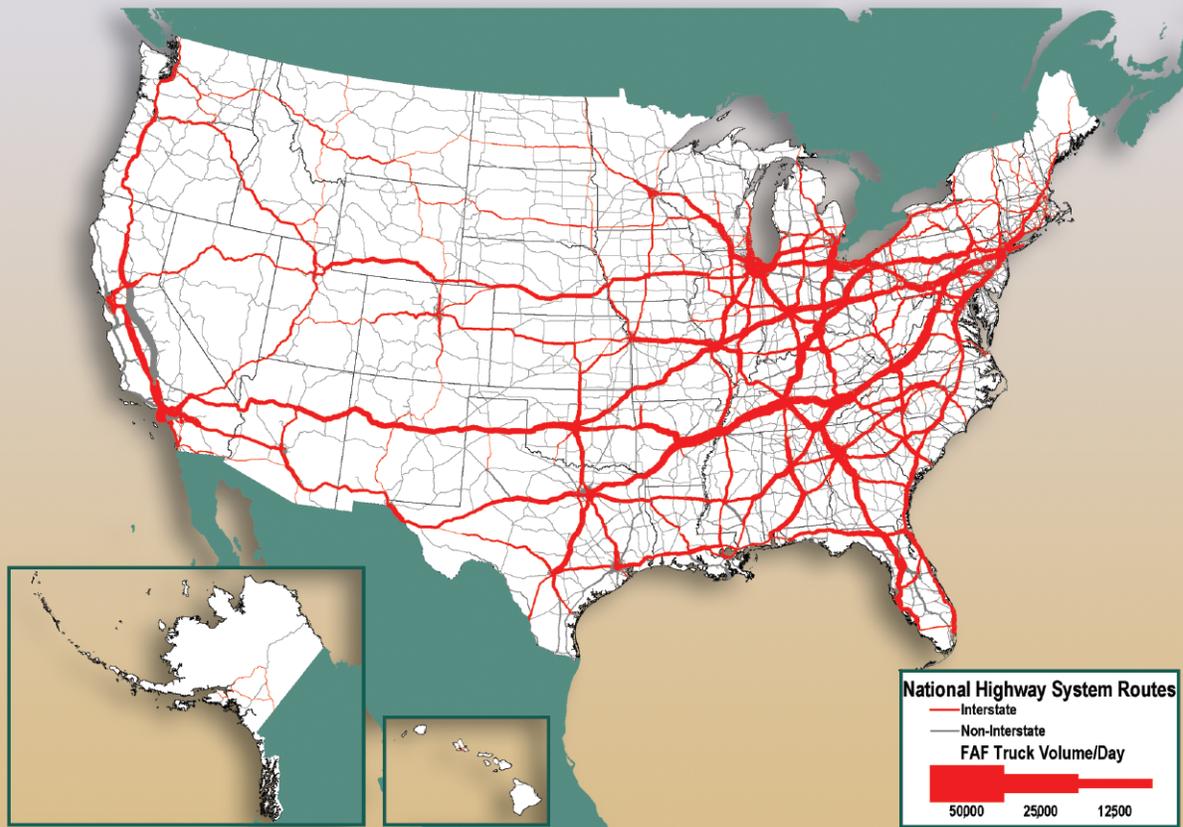
³Vehicles not in use. When the respondent had partial-year ownership of the vehicle, annual miles were adjusted to reflect miles traveled when not owned by the respondent.

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 March 30, 2009.



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



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

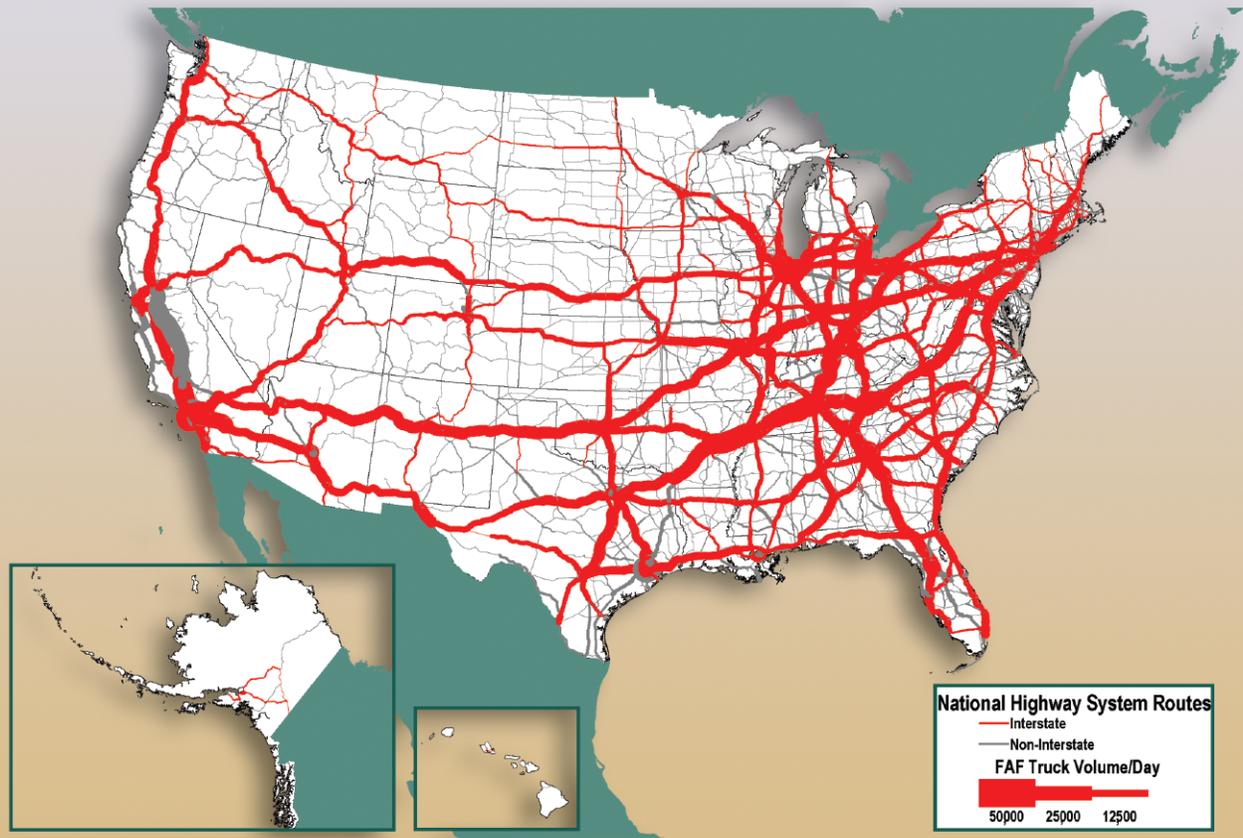
Long-haul truck traffic carrying commodities between places at least 50 miles apart is concentrated on major routes connecting population centers, ports, border crossings, and other major hubs of activity. Except for Route 99 in California, most of the heaviest traveled routes are on the Interstate System.



FIGURE 3-5. AVERAGE DAILY LONG-HAUL TRUCK TRAFFIC ON THE NATIONAL HIGHWAY SYSTEM: 2002

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

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



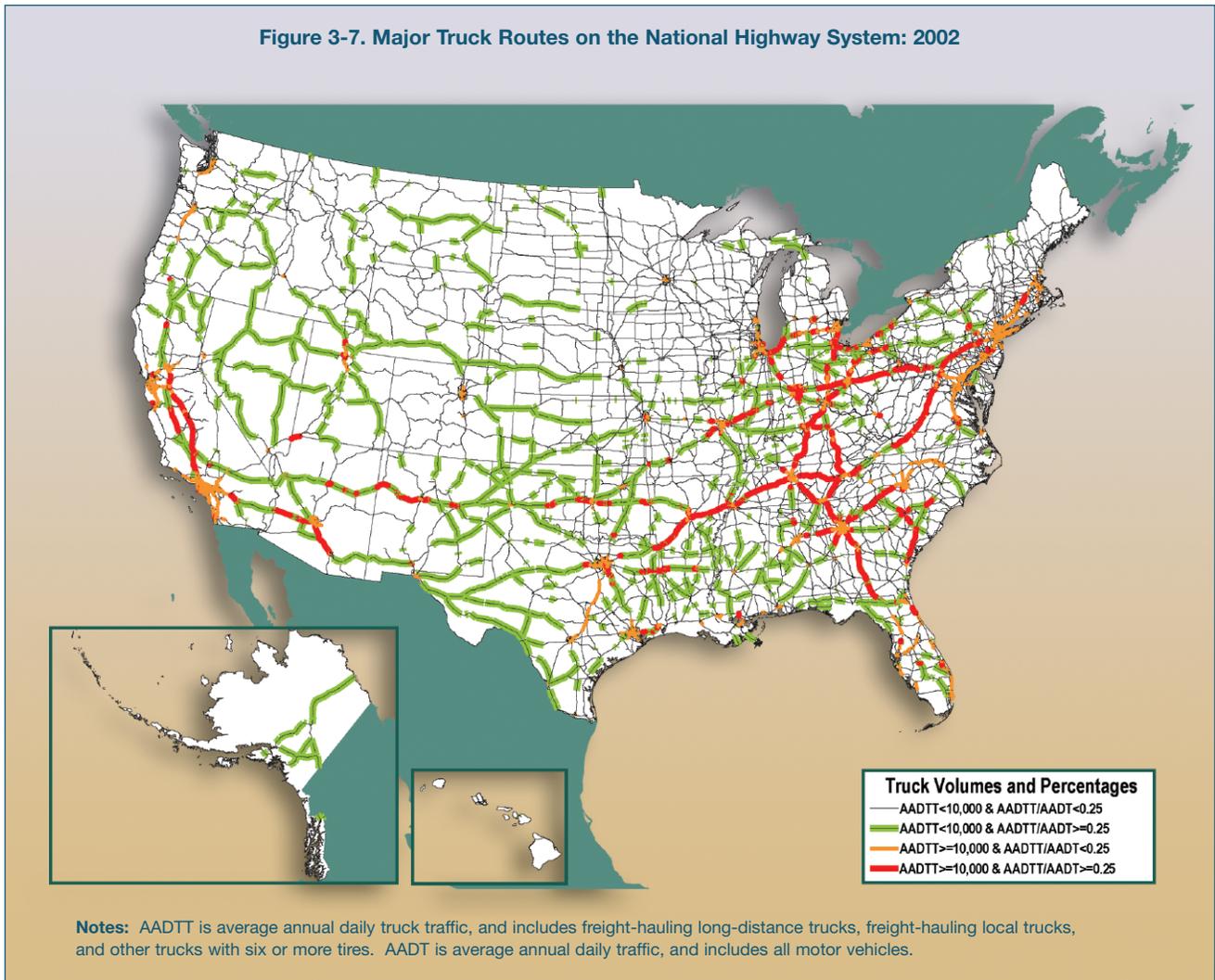
Note: Long-haul freight trucks serve locations at least 50 miles apart, excluding trucks that are used in intermodal movements.

By 2035, long-haul truck traffic between places at least 50 miles apart is expected to increase dramatically on Interstate highways and other arterials throughout the nation. Forecast data indicate that truck travel may reach 600 million miles per day.

FIGURE 3-6. AVERAGE DAILY LONG-HAUL TRUCK TRAFFIC ON THE NATIONAL HIGHWAY SYSTEM: 2035

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

Figure 3-7. Major Truck Routes on the National Highway System: 2002



Selected routes carry a significant concentration of trucks, either as an absolute number or as a percentage of the traffic stream. More than 4,000 miles of the NHS carry more than 10,000 trucks per day on sections where at least every fourth vehicle is a truck.

FIGURE 3-7. MAJOR TRUCK ROUTES ON THE NATIONAL HIGHWAY SYSTEM: 2002

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

The number of NHS miles carrying large volumes and high percentages of trucks is forecast to increase dramatically by 2035. Segments with more than 10,000 trucks per day and where at least every fourth vehicle is a truck are forecast to exceed 14,000 miles, an increase of almost 230 percent from 2002.

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

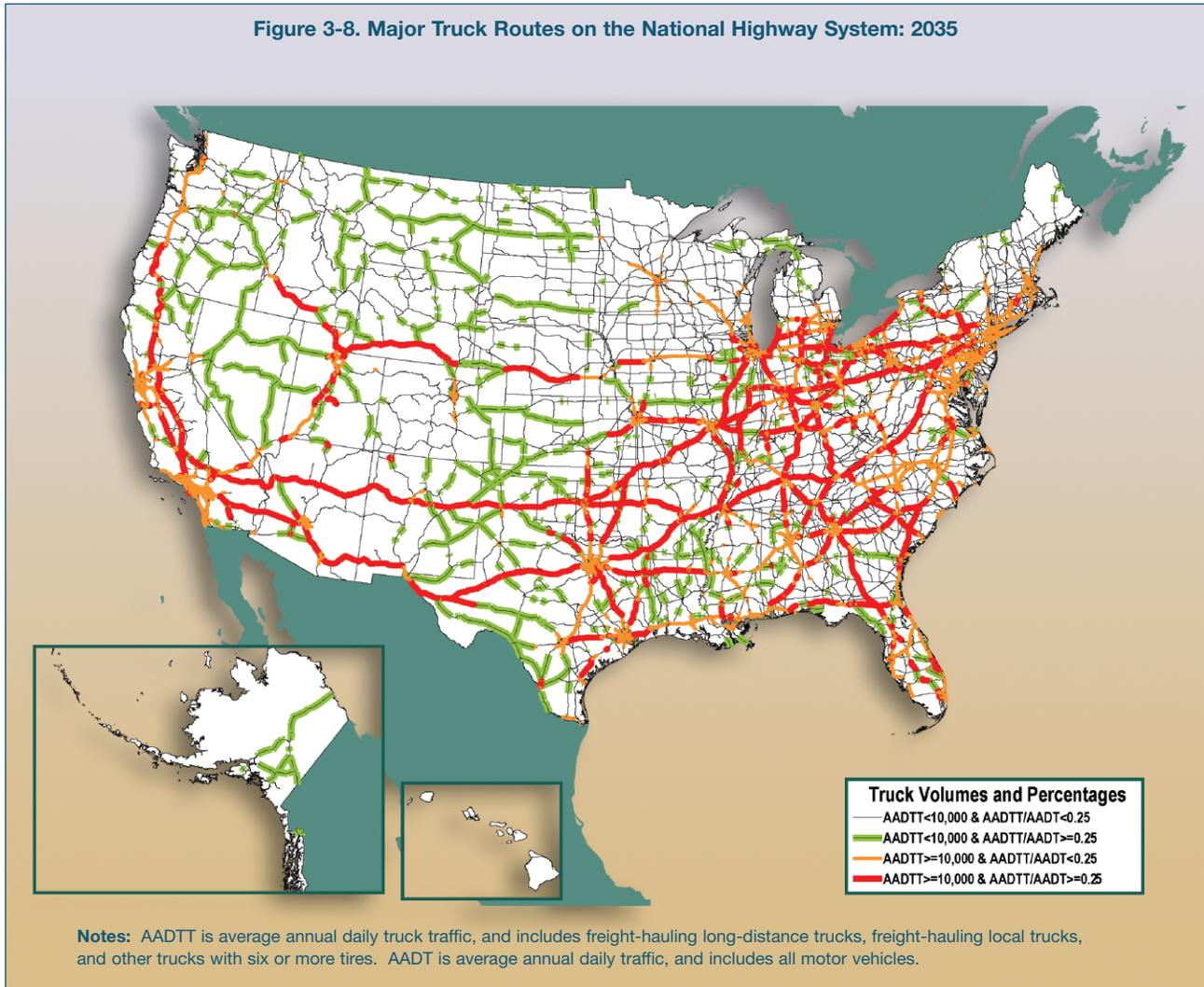
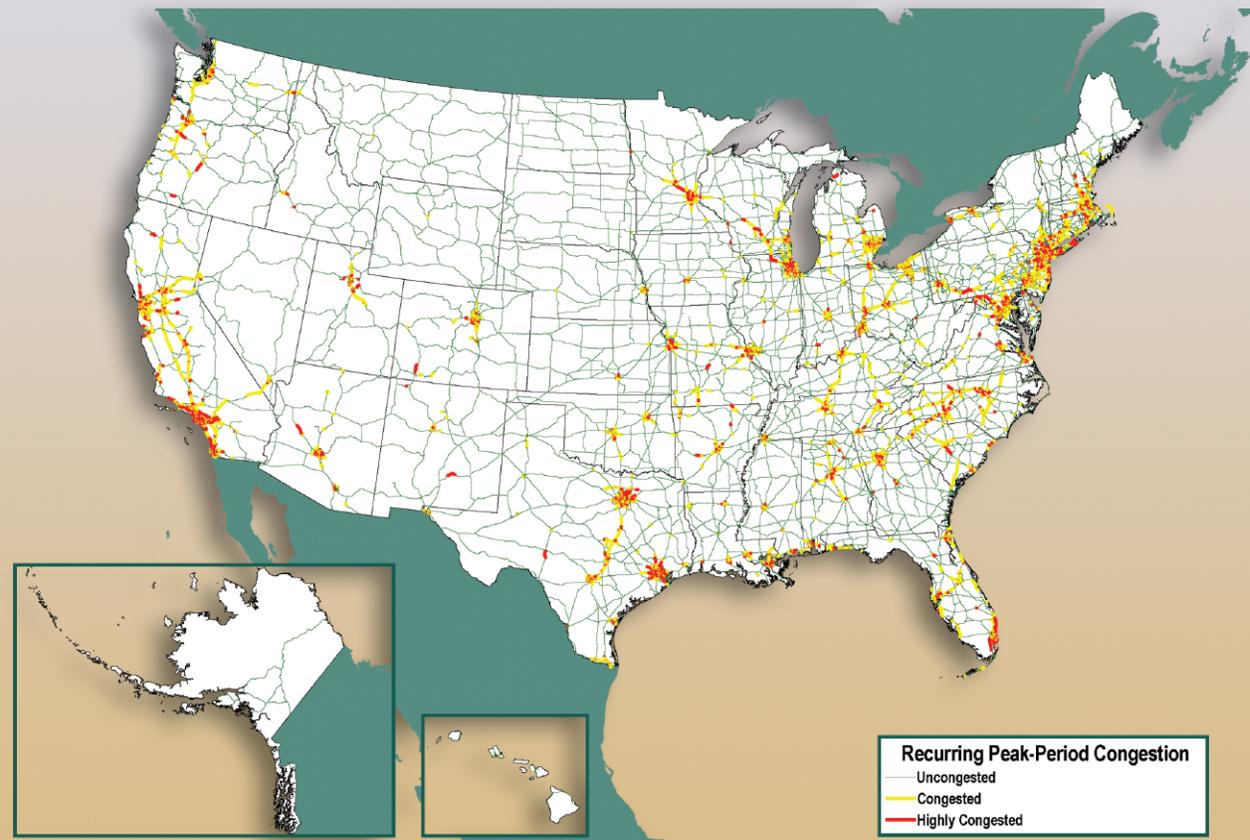


FIGURE 3-8. MAJOR TRUCK ROUTES ON THE NATIONAL HIGHWAY SYSTEM: 2035

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

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



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

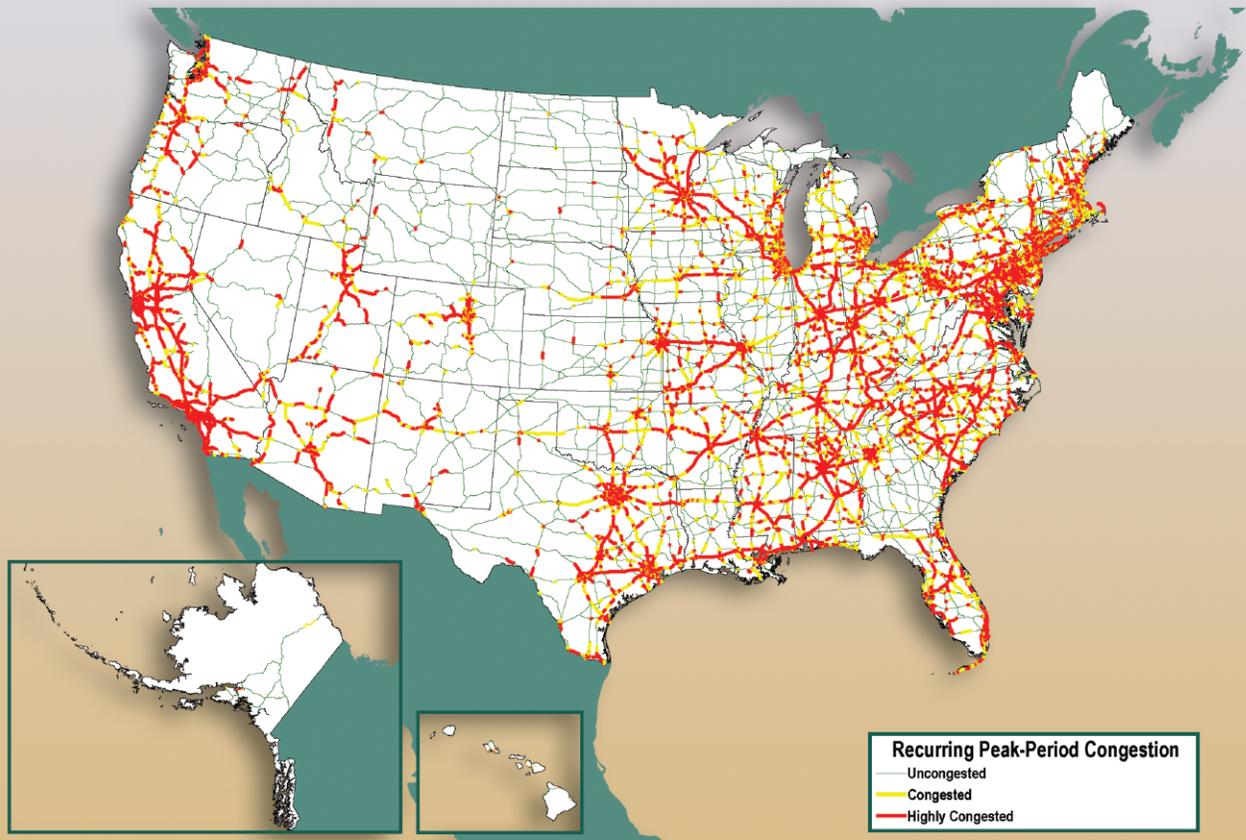
Recurring congestion caused by volumes of passenger vehicles and trucks that exceed capacity on roadways during peak periods is concentrated primarily in major metropolitan areas. In 2002, peak-period congestion resulted in traffic slowing below posted speed limits on more than 10,600 miles of the NHS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

FIGURE 3-9. PEAK-PERIOD CONGESTION ON THE NATIONAL HIGHWAY SYSTEM: 2002

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

Assuming no changes in network capacity, increases in truck and passenger vehicle traffic are forecast to expand recurring, peak-period congestion to 40 percent of the NHS in 2035 compared with 11 percent in 2002. This will slow traffic on nearly 20,000 miles of the NHS and create stop-and-go conditions on an additional 45,000 miles.

Figure 3-10. Peak-Period Congestion on the National Highway System: 2035



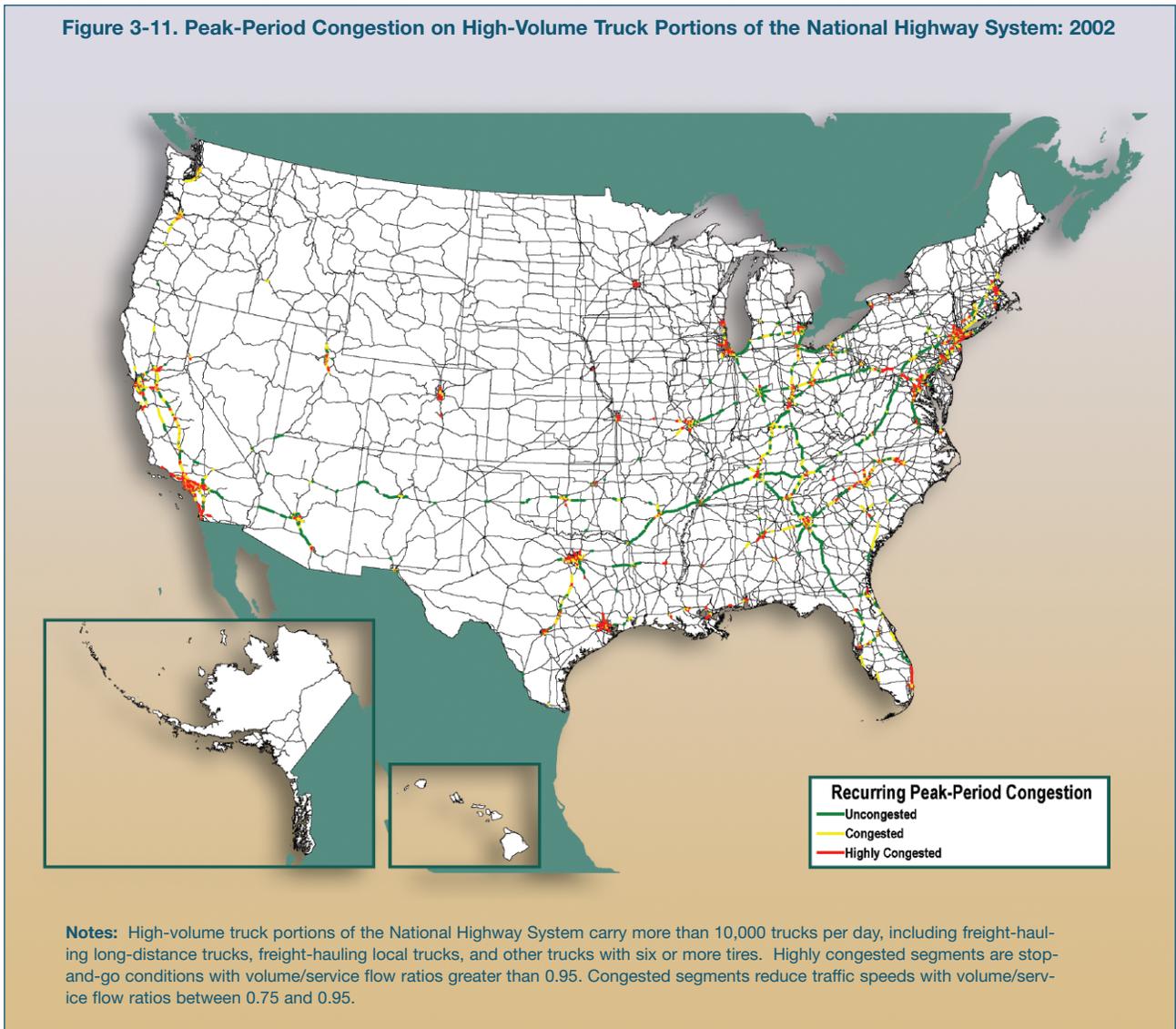
Notes: Highly congested segments are stop-and-go conditions with volume/service flow ratios greater than 0.95. Congested segments reduce traffic speeds with volume/service flow ratios between 0.75 and 0.95.

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

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



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



Congested highways carrying a large number of trucks substantially impede interstate commerce, and trucks on those segments contribute significantly to congestion. Recurring congestion slows or stops traffic on over 6,300 miles of the NHS that carry more than 10,000 trucks per day.

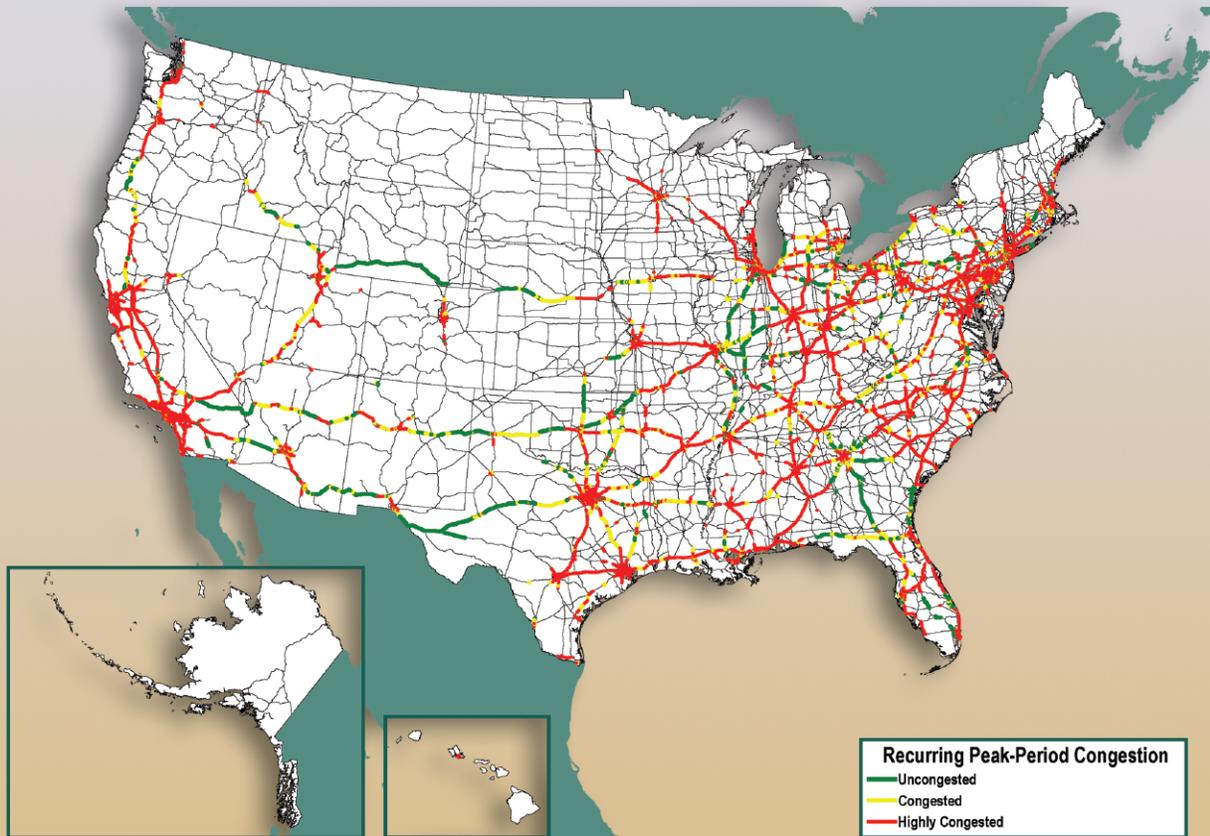


FIGURE 3-10. PEAK-PERIOD CONGESTION ON HIGH-VOLUME TRUCK PORTIONS OF THE NATIONAL HIGHWAY SYSTEM: 2002
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 2.2, 2007.



Assuming no change in network capacity, the number of NHS miles with recurring congestion and a large number of trucks is forecast to increase four fold between 2002 and 2035. On highways carrying more than 10,000 trucks per day, recurring congestion will slow traffic on more than 4,800 miles and create stop-and-go conditions on an additional 23,300 miles.

Figure 3-12. Peak-Period Congestion on High-Volume Truck Portions of the National Highway System: 2035



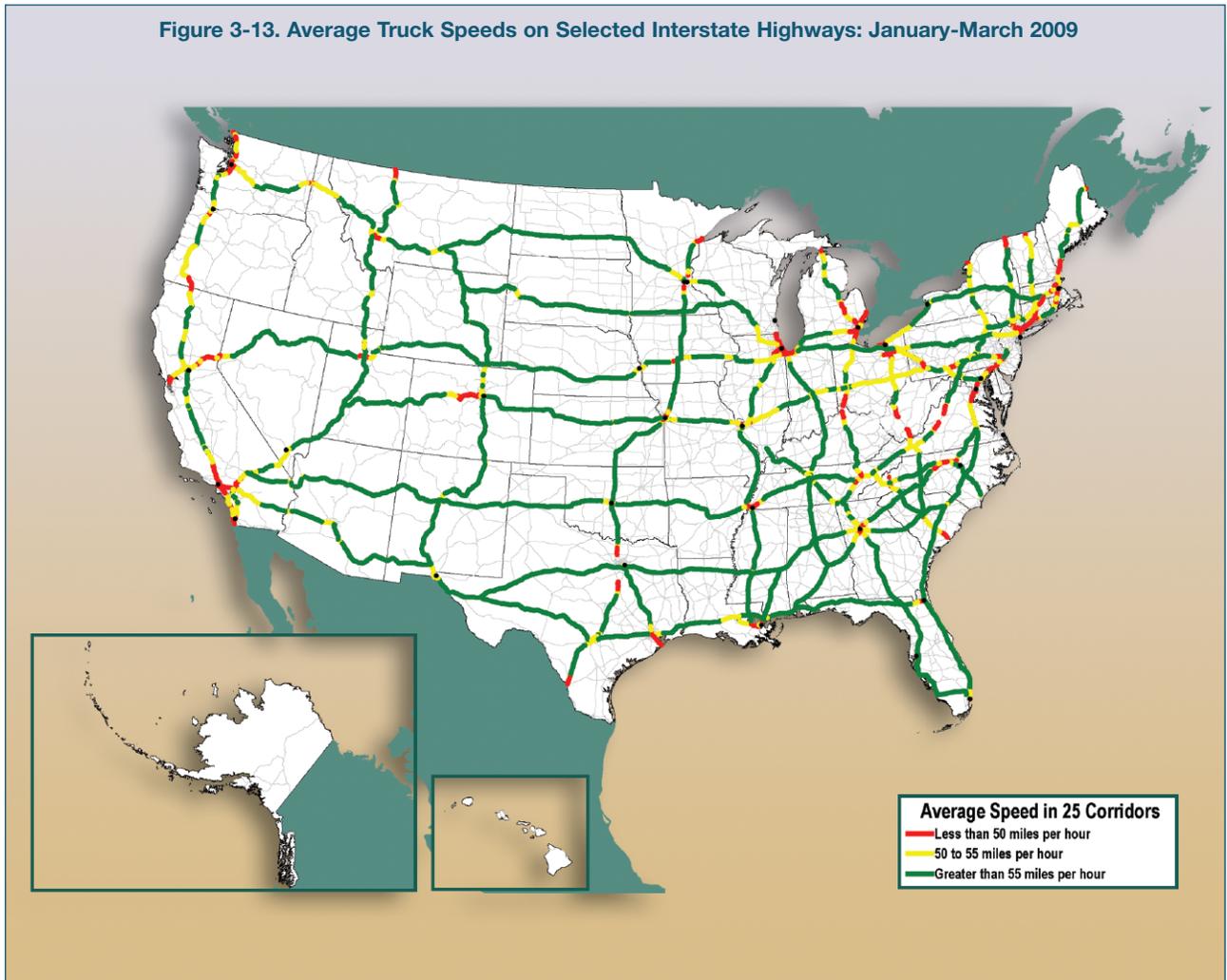
Notes: High-volume truck portions of the National Highway System carry more than 10,000 trucks per day, including freight-hauling long-distance trucks, freight-hauling local trucks, and other trucks with six or more tires. Highly congested segments are stop-and-go conditions with volume/service flow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

FIGURE 3-12. PEAK-PERIOD CONGESTION ON HIGH-VOLUME TRUCK PORTIONS OF THE NATIONAL HIGHWAY SYSTEM: 2035

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



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



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



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

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

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

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

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

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

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





Table 3-9. Maximum Posted Speed Limits on Rural Interstates: 2009 (miles per hour)

State	Truck	Car
Alabama	70	70
Alaska	65	65
Arizona	75	75
Arkansas	65	70
California	55	70
Colorado	75	75
Connecticut	65	65
Delaware	65	65
District of Columbia ¹	55	55
Florida	70	70
Georgia	70	70
Hawaii	60	60
Idaho	65	75
Illinois	55	65
Indiana	65	70
Iowa	70	70
Kansas	70	70
Kentucky	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 65	⁵ 65
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.

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

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

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

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

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

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

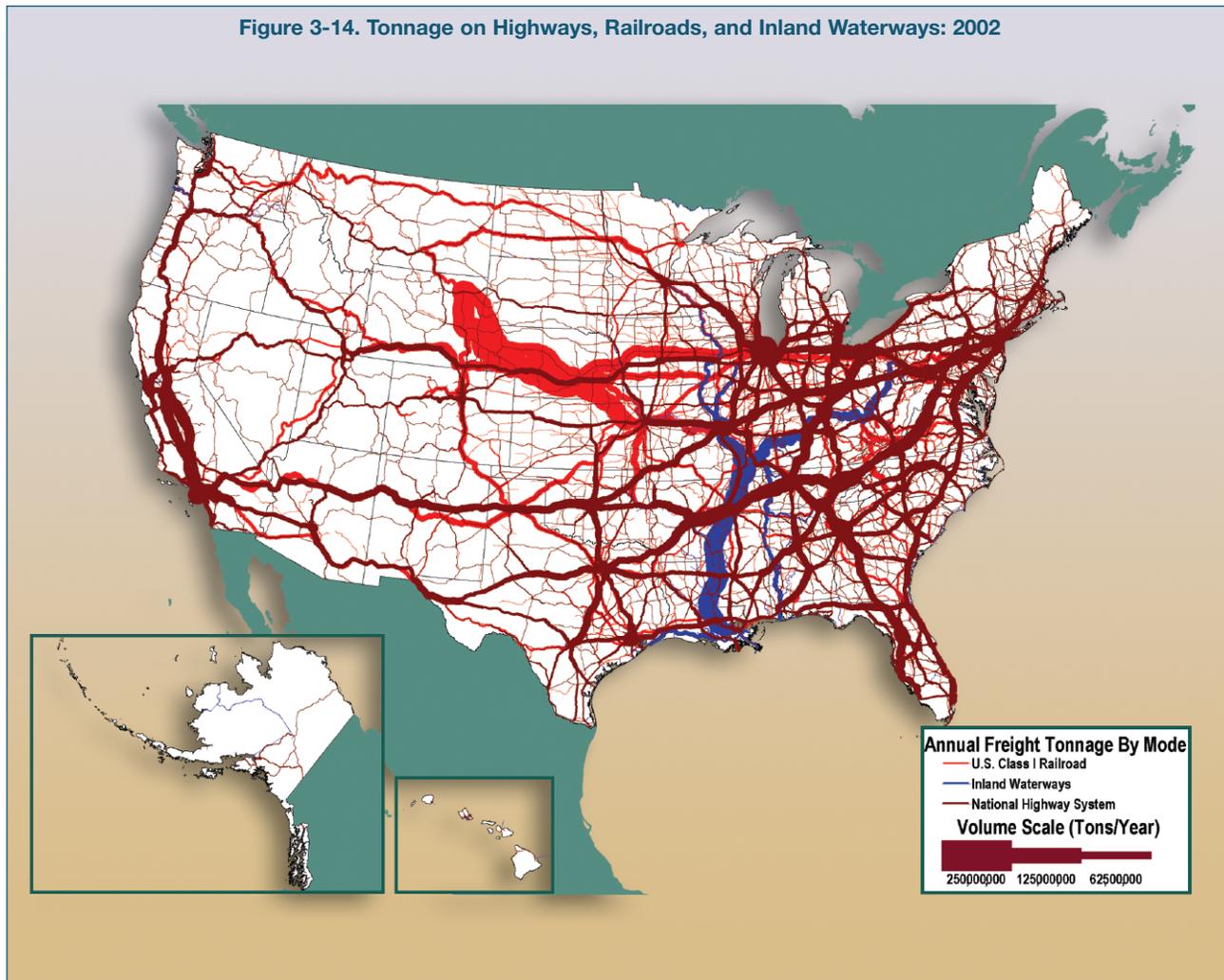
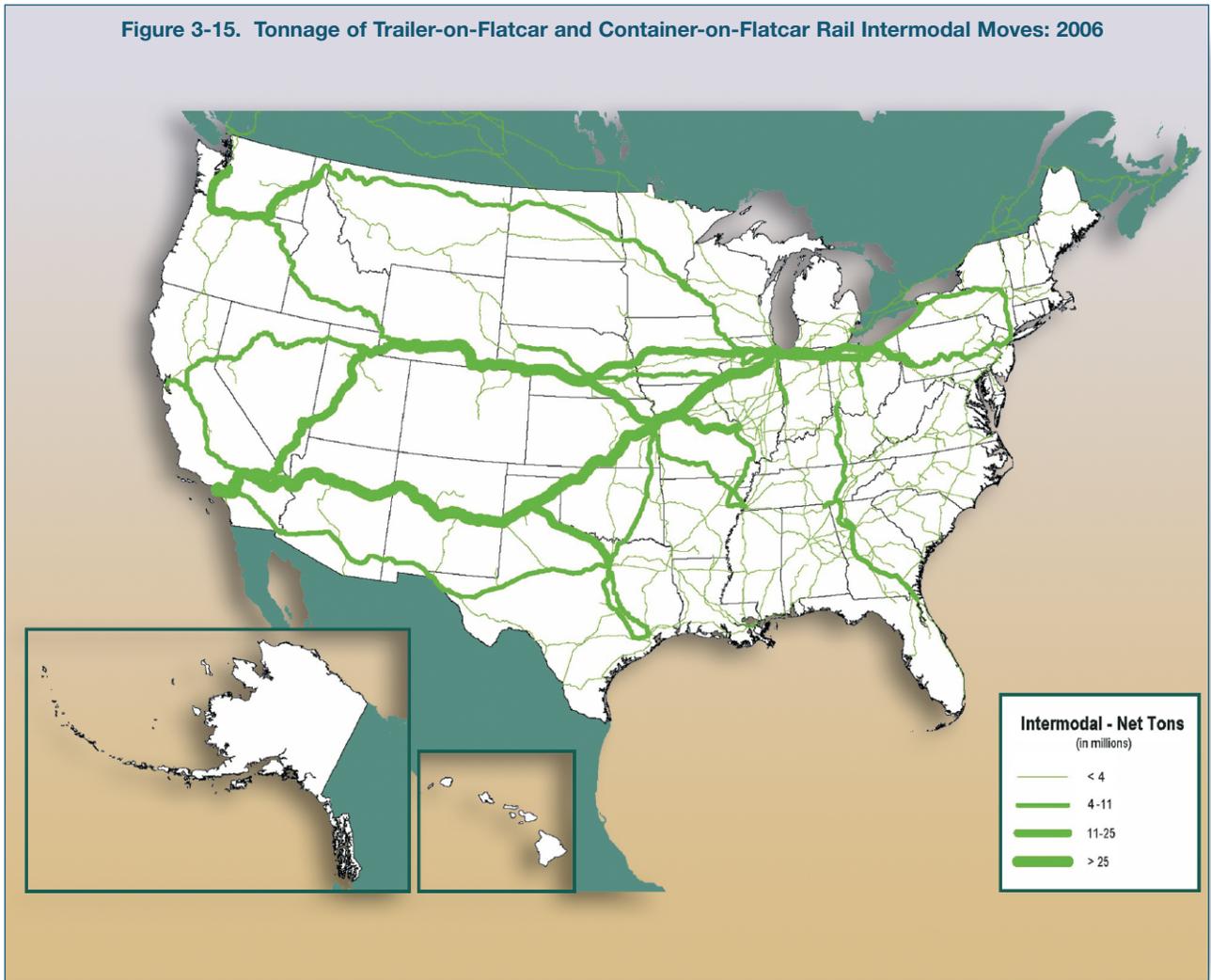


FIGURE 3-14. TONNAGE ON HIGHWAYS, RAILROADS, AND INLAND WATERWAYS: 2002

Sources: **Highways:** U.S. Department of Transportation, Federal Highway Administration, Freight Analysis Framework, version 2.2, 2007. **Rail:** Based on Surface Transportation Board, Annual Carload Waybill Sample and rail freight flow assignments done by Oak Ridge National Laboratory. **Inland Waterways:** U.S. Army Corps of Engineers (USACE), Annual Vessel Operating Activity and Lock Performance Monitoring System data, as processed for USACE by the Tennessee Valley Authority; and USACE, Institute for Water Resources, Waterborne Foreign Trade Data. Water flow assignments done by Oak Ridge National Laboratory.

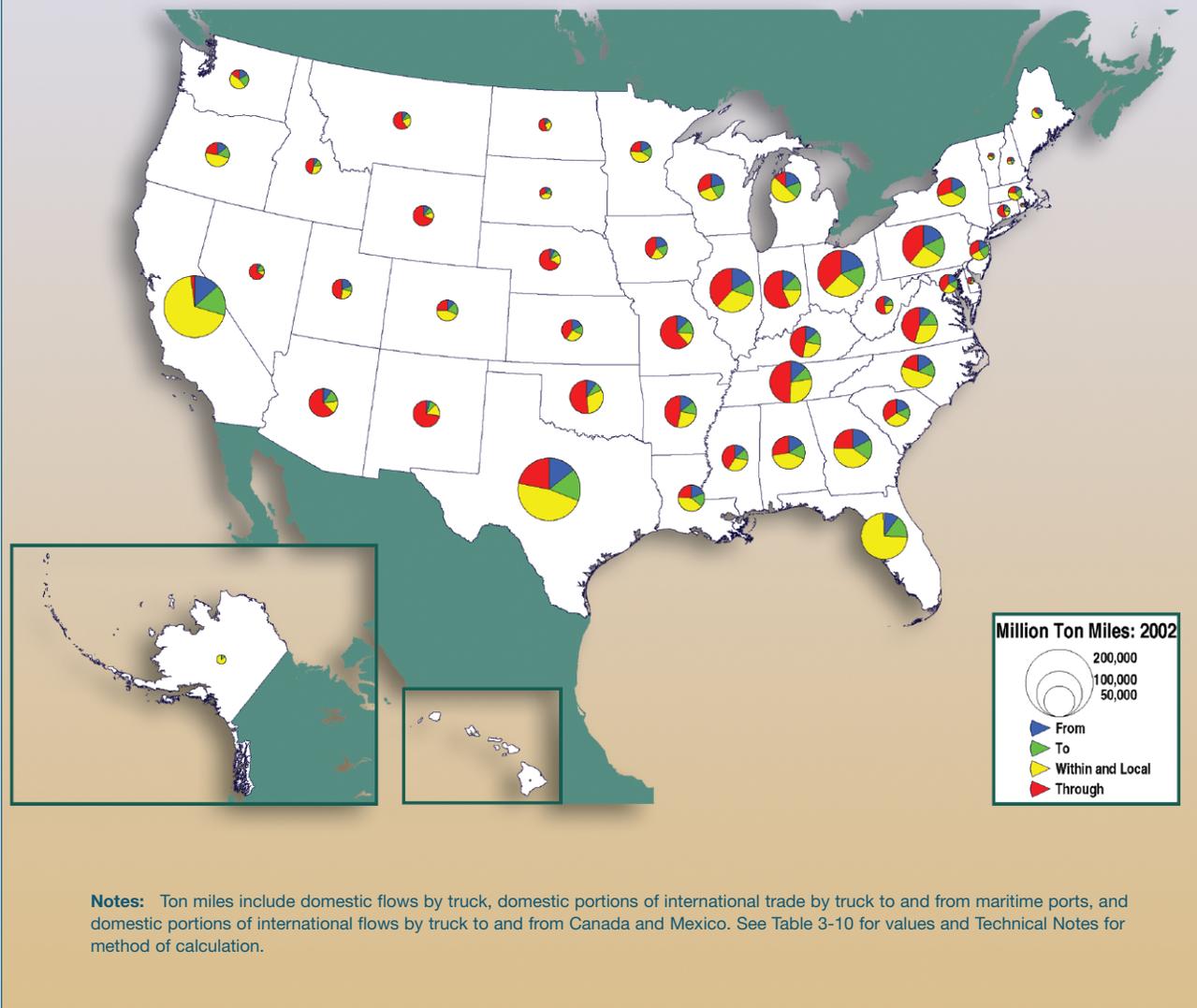
Figure 3-15. Tonnage of Trailer-on-Flatcar and Container-on-Flatcar Rail Intermodal Moves: 2006



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

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

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



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

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

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

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

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

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

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

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



Technical Notes on Calculating Truck Shipments by State

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

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

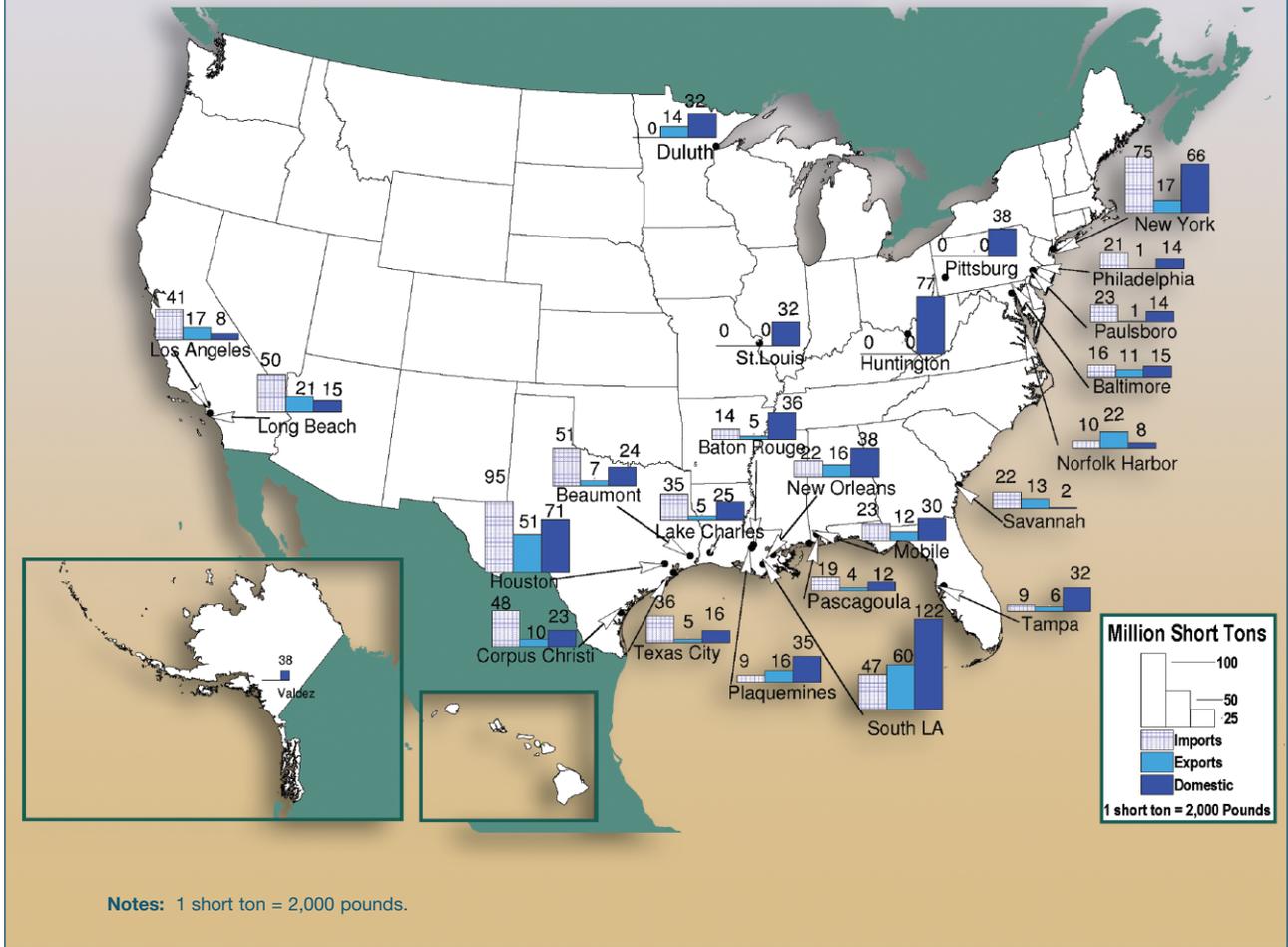
Except for truck moves of foreign trade to and from maritime ports, estimates of long-distance and local ton miles do not include truck portions of shipments using more than one mode. Inclusion of the truck portions of intermodal shipments would only increase national ton miles between one-half and two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

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





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



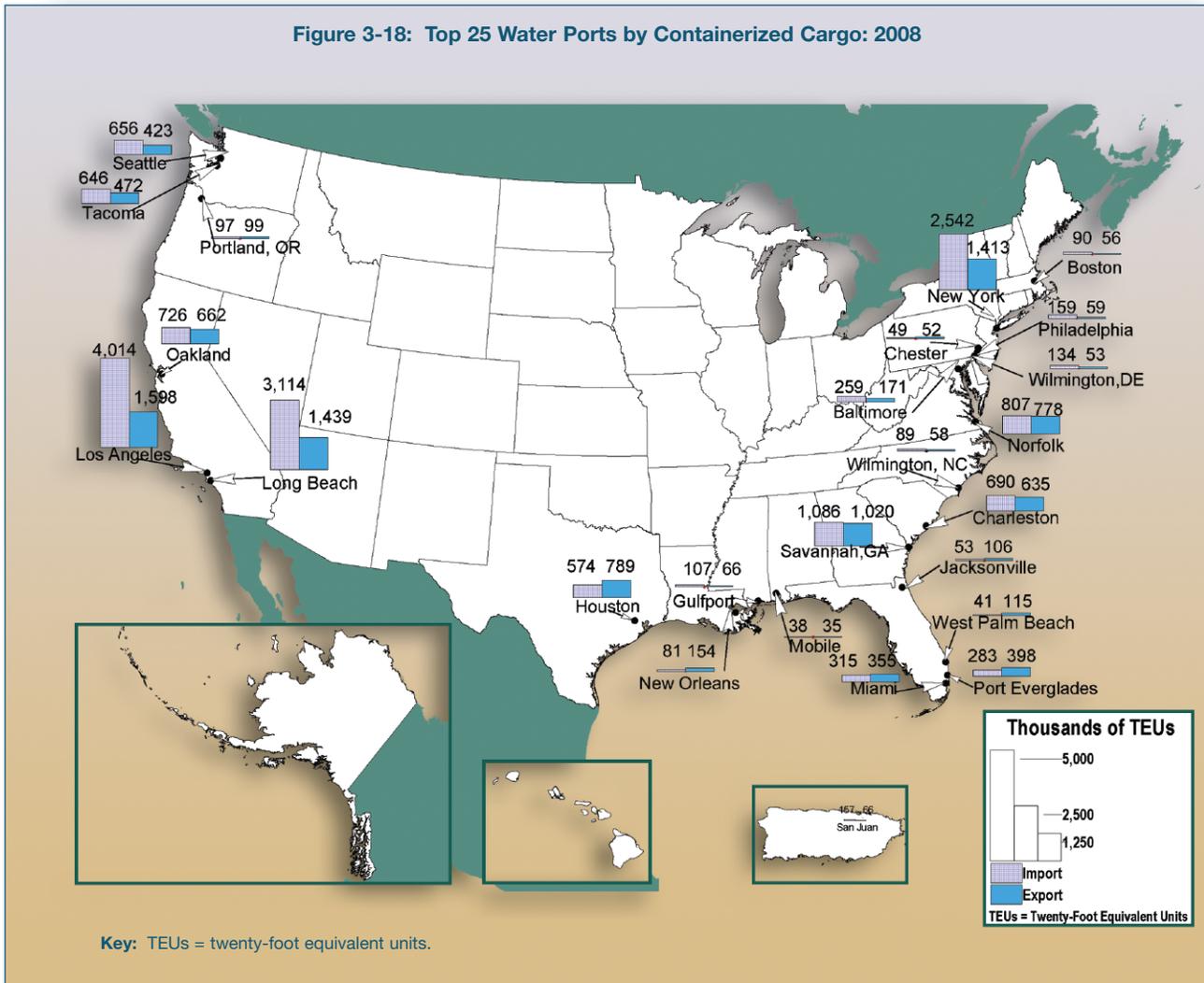
The top 25 water ports handle about two-thirds of the weight of all foreign and domestic goods moved by water. These goods are primarily bulk commodities such as coal, crude petroleum, and grain.



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

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

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



Containerized cargo has grown rapidly over the past few years and is concentrated at a few large water ports. The Ports of Los Angeles and Long Beach together handle about 32 percent of all container traffic at water ports in the United States. Container trade at these two ports nearly doubled between 1998 and 2008, slightly higher than the growth rate reported for container cargo overall.

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

Source: U.S. Department of Transportation, Maritime Administration, U.S. Waterborne Container Trade by U.S. Custom Ports, 1997-2008, based on data provided by Port Import/Export Reporting Service, available at www.marad.dot.gov/library_landing_page/data_and_statistics/Data_and_Statistics.htm as of June 12, 2009.



Table 3-11. Top 25 Airports by Landed Weight of All-Cargo Operations: 2000-2007¹

Airport	2007 Rank	Landed weight (thousands of short tons)				
		2000	2004	2005	2006	2007
Anchorage, AK (Ted Stevens Anchorage International) ²	1	8,084	9,844	10,364	10,588	10,562
Memphis, TN (Memphis International)	2	6,318	8,885	9,343	9,425	9,772
Louisville, KY (Louisville International-Standiford Field)	3	3,987	4,388	4,591	5,015	5,216
Miami, FL (Miami International)	4	2,929	3,423	3,550	3,591	3,715
Los Angeles, CA (Los Angeles International)	5	2,892	3,062	2,927	3,627	3,431
Indianapolis, IN (Indianapolis International)	6	2,884	2,314	2,545	2,627	2,652
New York, NY (John F. Kennedy International)	7	2,793	2,898	2,811	2,615	2,557
Chicago, IL (O'Hare International)	8	2,062	2,359	2,412	2,208	2,201
Newark, NJ (Newark Liberty International)	9	1,961	1,765	1,870	1,867	1,873
Oakland, CA (Metropolitan Oakland International)	10	1,811	1,703	1,797	1,798	1,811
Fort Worth, TX (Dallas/Fort Worth International)	11	1,691	1,431	1,655	1,722	1,753
Ontario, CA (Ontario International)	12	1,220	1,326	1,344	1,401	1,394
Philadelphia, PA (Philadelphia International)	13	1,454	1,371	1,401	1,366	1,375
Atlanta, GA (William B. Hartsfield International)	14	1,090	1,162	1,014	1,180	1,261
Honolulu, HI (Honolulu International)	15	692	970	828	979	1,134
San Francisco, CA (San Francisco International)	16	1,267	740	797	829	1,039
Houston, TX (George Bush Intercontinental)	17	480	697	710	696	769
Chicago/Rockford, IL (Chicago/Rockford International)	18	654	677	696	696	737
Portland, OR (Portland International)	19	882	718	747	730	713
Phoenix, AZ (Sky Harbor International)	20	920	801	778	726	711
Seattle, WA (Seattle-Tacoma International)	21	1,060	531	709	709	691
Denver, CO (Denver International)	22	900	763	763	711	642
Minneapolis, MN (Minneapolis-St Paul International/Wold-Chamberlain)	23	622	678	702	620	612
Fort Worth, TX (Fort Worth Alliance)	24	508	374	501	644	557
Salt Lake City, UT (Salt Lake City International)	25	751	621	590	548	535
Top 25 airports³		52,381	54,526	55,955	56,973	57,715
United States, all airports⁴		74,753	74,297	76,091 (R)	76,362	76,583
Top 25 as % of U.S. total		70.1	73.4	73.5	(R) 74.6	75.4

Key: R = revised.

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

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

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

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.

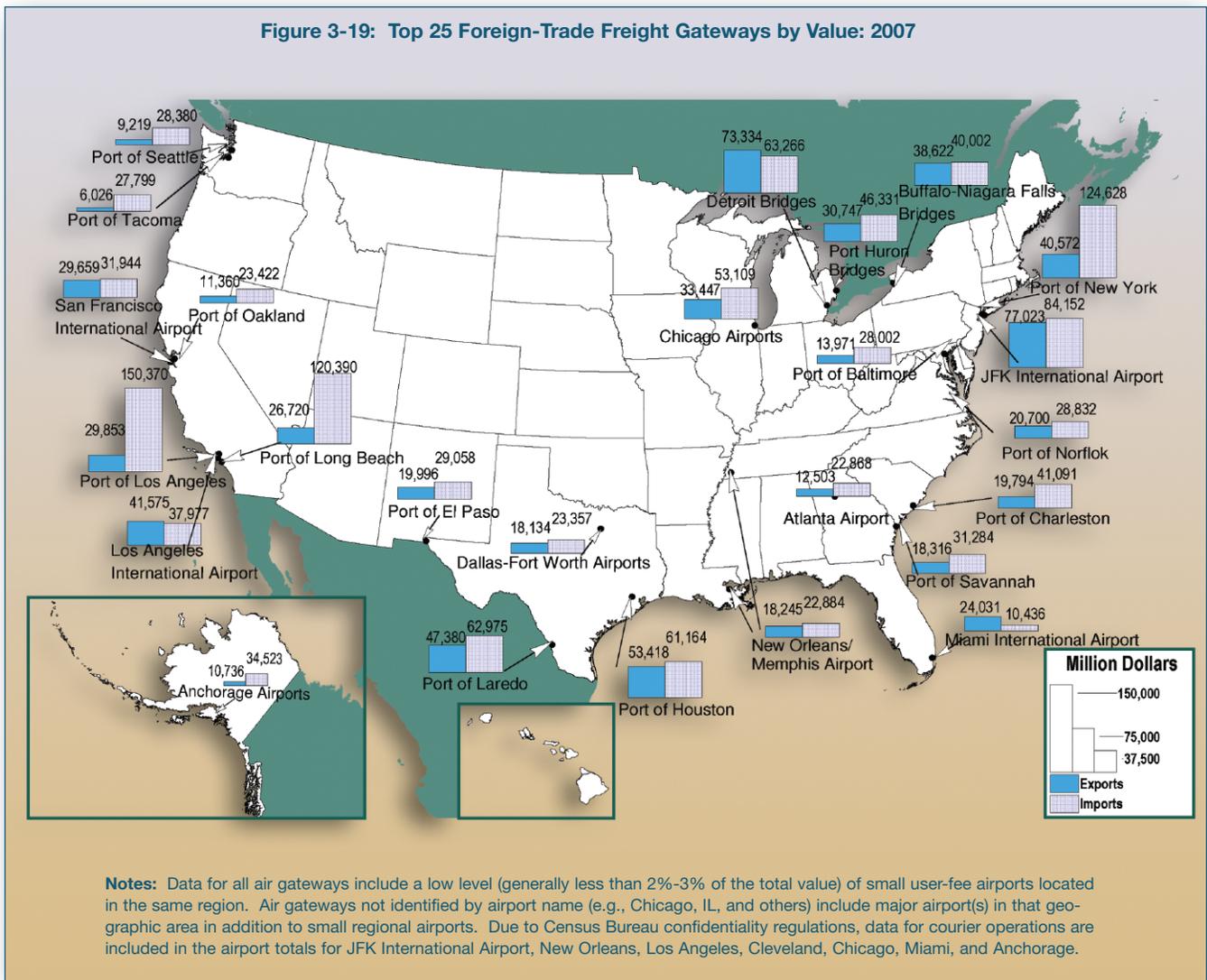
The Federal Aviation Administration reports that Anchorage International and Memphis International are two of the most important U.S. airports that handle all-cargo aircraft. All-cargo aircraft do not include aircraft carrying passengers as well as cargo.



TABLE 3-11. TOP 25 AIRPORTS BY LANDED WEIGHT OF ALL-CARGO OPERATIONS: 2000-2007¹

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 April 13, 2009.

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



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

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

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