

FREIGHT FACTS AND FIGURES 2 0 0 6



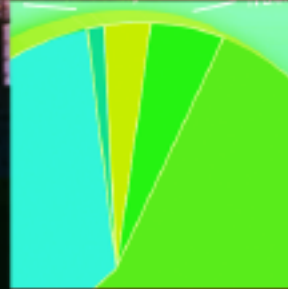
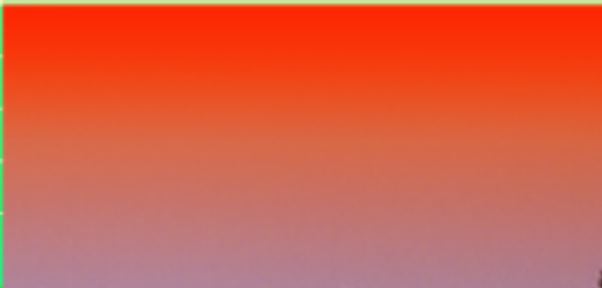
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U.S. Department of Transportation
Federal Highway Administration

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Freight Facts and Figures 2006 is a snapshot of the volume and value of freight flows in the United States, the physical network over which freight moves, the economic conditions that generate freight movements, the industry that carries freight, and the safety, energy, and environmental consequences of freight transportation. This snapshot helps planners, decisionmakers, and the public understand the magnitude and importance of freight transportation in the global economy. An electronic version of this publication is also available on www.ops.fhwa.dot.gov/freight.



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I. THE NATION SERVED BY FREIGHT

Freight transportation has grown dramatically with the growth and spread of population and economic activity within the United States and with the increasing interdependence of economies across the globe. The U.S. population grew by 29 percent between 1980 and 2004, while the economy, measured by gross domestic product (GDP), more than doubled in real terms. Other indicators of economic growth such as employment and household income have also risen, by 40 and 15 percent respectively. Foreign trade has grown faster than the overall economy, quadrupling in real value between 1980 and 2004, reflecting unprecedented global interconnectivity.

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

| | 1980 | 1990 | 2000 | 2004 | Percent change, 1980 to 2004 |
|---|---------------------|---------------------|---------------------|------------|------------------------------|
| Resident population (thousands) | 227,225 | 249,623 | (R) 282,192 | 293,655 | 29.2 |
| Households (thousands) | 80,776 | 93,347 | 104,705 | 112,000 | 38.7 |
| Median household income (\$2000) | 35,057 | 38,257 | 41,990 | 40,468 | 15.4 |
| Civilian labor force (thousands) | 106,940 | 125,840 | 142,583 | 147,401 | 37.8 |
| Employed ¹ (thousands) | 99,303 | 118,793 | 136,891 | 139,252 | 40.2 |
| Agriculture, forestry, fishing, and hunting (percent) | NA | 1.9 | 1.8 | 1.6 | NA |
| Mining | NA | 0.5 | 0.3 | 0.4 | NA |
| Construction | NA | 6.9 | 7.3 | 7.7 | NA |
| Manufacturing | NA | 16.8 | 14.4 | 11.8 | NA |
| Wholesale and retail trade | NA | 14.7 | 14.6 | 15.0 | NA |
| Transportation and utilities | NA | 5.1 | 5.4 | 5.0 | NA |
| Information | NA | 2.9 | 3.0 | 2.5 | NA |
| Financial activities | NA | 7.1 | 6.8 | 7.2 | NA |
| Professional and business services | NA | 9.4 | 10.0 | 10.1 | NA |
| Education and health services | NA | 17.5 | 19.1 | 20.6 | NA |
| Leisure and hospitality | NA | 8.0 | 8.2 | 8.5 | NA |
| Other services | NA | 4.3 | 4.7 | 5.0 | NA |
| Public administration | NA | 4.7 | 4.5 | 4.6 | NA |
| Business establishments (thousands) | NA | 6,176 | 7,070 | NA | NA |
| Governments | ² 81,831 | ³ 85,006 | ⁴ 87,576 | NA | NA |
| Gross domestic product (\$2000 millions) | 5,161,700 | 7,112,500 | 9,817,000 | 10,755,700 | 108.4 |
| Foreign trade (\$2000 millions) | 631,335 | 1,168,168 | 2,572,000 | 2,837,634 | 349.5 |
| Goods (percent) | 74.0 | 71.6 | 78.8 | 78.8 | 378.5 |
| Services (percent) | 26.0 | 28.4 | 21.2 | 21.2 | 266.7 |

Key: NA = not available; R = revised.

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

²1982

³1992

⁴2002

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

Sources: Unless otherwise stated all data from: U.S. Department of Commerce, Census Bureau, *Statistical Abstract of the United States: 2006* (Washington, DC: 2005) and earlier editions, available at

<http://www.census.gov/statab/www/> as of March 22, 2006.

Median household income: U.S. Department of Commerce, Census Bureau, Historical Income Tables, table H-6, available at www.census.gov/hhes/income/histinc/h06ar.html as of March 22, 2006.

Business establishments: U.S. Department of Commerce, Census Bureau, County Business Patterns, available at <http://www.census.gov/epcd/cbp/view/cbpview.html> as of March 22, 2006.

Gross domestic product and foreign trade: U.S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts Tables, tables 1.1.5, 1.1.6, 4.2.4, available at www.bea.doc.gov as of March 22, 2006.

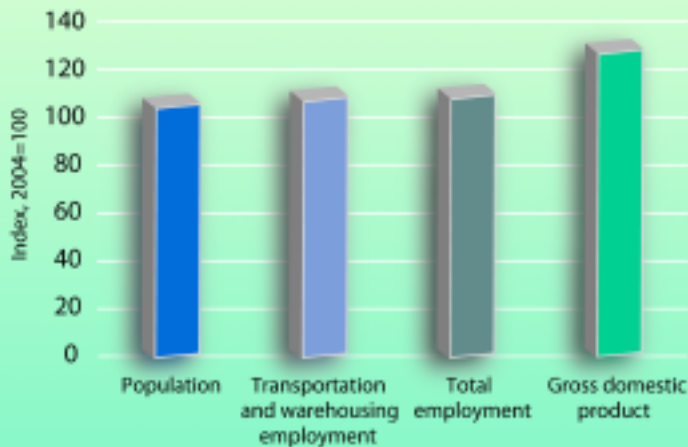
Economic activity and the demand for freight transportation are spread throughout the United States as shown by the distribution of population, employment, and income.

TABLE 1-2: POPULATION AND GROSS STATE PRODUCT (GSP) BY REGION

| | 1980 | 1990 | 2000 | 2004 | 2005 | Percent change, 1980 to 2005 |
|--|------------------|------------------|----------------------|-----------------------|-------------------|------------------------------|
| Resident Population (thousands) | 226,549 | 248,789 | (R) 282,193 | (R) 293,657 | 296,410 | 31 |
| Northeast | 49,136 | 50,828 | (R) 53,672 | (R) 54,582 | 54,642 | 11 |
| Midwest | 58,868 | 59,670 | (R) 64,497 | (R) 65,694 | 65,972 | 12 |
| South | 75,372 | 85,454 | (R) 100,566 | (R) 105,994 | 107,505 | 43 |
| West | 43,173 | 52,837 | (R) 63,458 | (R) 67,387 | 68,291 | 58 |
| GSP (\$ 2000 millions) | 5,054,549 | 6,994,329 | (R) 9,749,104 | (R) 10,661,769 | 11,035,753 | 118 |
| Northeast | 1,107,283 | 1,604,121 | (R) 2,077,436 | (R) 2,243,557 | 2,305,997 | 108 |
| Midwest | 1,262,917 | 1,566,939 | (R) 2,174,719 | (R) 2,316,348 | 2,352,354 | 86 |
| South | 1,608,531 | 2,220,755 | (R) 3,212,076 | (R) 3,586,803 | 3,738,067 | 132 |
| West | 1,075,817 | 1,602,514 | (R) 2,284,873 | (R) 2,515,061 | 2,639,335 | 145 |
| GSP per capita (\$ 2000) | 22,311 | 28,113 | (R) 34,548 | (R) 36,307 | 37,231 | 67 |
| Northeast | 22,535 | 31,560 | (R) 38,706 | (R) 41,104 | 42,202 | 87 |
| Midwest | 21,453 | 26,260 | (R) 33,718 | (R) 35,260 | 35,657 | 66 |
| South | 21,341 | 25,988 | (R) 31,940 | (R) 33,840 | 34,771 | 63 |
| West | 24,919 | 30,329 | (R) 36,006 | (R) 37,323 | 38,648 | 55 |

Key: R = revised.

FIGURE 1-1: ECONOMIC AND POPULATION PROJECTIONS, 2004 TO 2014 (INDEX, 2004 = 100)



Demand for freight transportation grows with increases in population and economic activity. Over the next ten years the U.S. economy, as measured by GDP, is projected to increase by 32 percent and the U.S. population by 9 percent. Transportation and warehousing employment is expected to increase by 12 percent over this period, about the same as employment as a whole.

TABLE 1-2: POPULATION AND GROSS STATE PRODUCT (GSP) BY REGION

Sources: **Population: 1980-1990** — U.S. Department of Commerce, Census Bureau, *Statistical Abstract of the United States: 2004-2005* (Washington, DC: 2005); **2000-2005** — Ibid., Population Division, Annual Population Estimates, table 8, available at <http://www.census.gov/popest/states/NST-ann-est.html> as of June 6, 2006; **Gross State Product: 1980-1990** — U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts, available at <http://www.bea.doc.gov/bea/regional/gsp/> as of June 11, 2004; **2000-2005** — U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts, available at <http://www.bea.doc.gov/bea/regional/gsp/> as of June 6, 2006.

FIGURE 1-1: ECONOMIC AND POPULATION PROJECTIONS, 2004 TO 2014

Sources: **Population:** U.S. Department of Commerce, U.S. Census Bureau, *Statistical Abstract of the United States: 2006* (Washington, DC: 2005), available at <http://www.census.gov/statab/www/> as of March 23, 2006.

Employment: U.S. Department of Labor, Bureau of Labor Statistics, *Employment by Major Industry Division, 1994, 2004, and projected 2014*, available at www.bls.gov as of March 23, 2006.

GDP: Congressional Budget Office, *The Budget and Economic Outlook: Fiscal Years 2005-2014, CBO's Economic Projections for 2004 through 2014*, available at <http://www.cbo.gov> as of March 23, 2006.

II. FREIGHT FLOWS

The U.S. transportation system in 2002 moved, on average, 53 million tons of freight worth \$36 billion each day. Trucks moved about 60 percent of freight by weight, the same proportion expected in 2035. However, over this period tons transported overall are expected to almost double with international shipments growing somewhat faster than domestic shipments. Trucks transported two-thirds of freight by value. This share is expected to decline slightly by 2035 as the value of intermodal shipments increases.

TABLE 2-1. SHIPMENTS BY MODE AND WEIGHT: 2002 AND 2035 (MILLIONS OF TONS)

| | 2002 | | | | 2035 | | | |
|---|-------------------|----------|----------------------|----------------------|-------------------|----------|----------------------|----------------------|
| | Total | Domestic | Exports ³ | Imports ³ | Total | Domestic | Exports ³ | Imports ³ |
| Total | (P) 19,326 | 17,670 | (P) 524 | (P) 1,133 | (P) 37,178 | 33,668 | (P) 1,105 | (P) 2,404 |
| Truck | 11,539 | 11,336 | 106 | 97 | 22,814 | 22,231 | 262 | 320 |
| Rail | 1,879 | 1,769 | 32 | 78 | 3,525 | 3,292 | 57 | 176 |
| Water | 701 | 595 | 62 | 44 | 1,041 | 874 | 114 | 54 |
| Air, air & truck | (P) 10 | 3 | (P) 3 | (P) 4 | (P) 27 | 10 | (P) 7 | (P) 10 |
| Intermodal¹ | 1,292 | 196 | 317 | 780 | 2,598 | 334 | 660 | 1,604 |
| Pipeline & unknown² | 3,905 | 3,772 | 4 | 130 | 7,172 | 6,926 | 5 | 240 |

Key: P = preliminary.

¹Intermodal includes U.S. Postal Service and courier shipments and all intermodal combinations, except air and truck.

²Pipeline and unknown shipments are combined because data on region-to-region flows by pipeline are statistically uncertain.

³Data do not include imports and exports that pass through the United States from a foreign origin to a foreign destination by any mode.

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

TABLE 2-2. SHIPMENTS BY MODE AND VALUE: 2002 AND 2035 (BILLIONS OF DOLLARS)

| | 2002 | | | | 2035 | | | |
|---|-------------------|----------|----------------------|----------------------|-------------------|----------|----------------------|----------------------|
| | Total | Domestic | Exports ³ | Imports ³ | Total | Domestic | Exports ³ | Imports ³ |
| Total | (P) 13,120 | 11,083 | (P) 735 | (P) 1,302 | (P) 38,399 | 29,592 | (P) 2,623 | (P) 6,184 |
| Truck | 8,856 | 8,447 | 201 | 208 | 23,767 | 21,655 | 806 | 1,306 |
| Rail | 382 | 288 | 26 | 68 | 702 | 483 | 63 | 156 |
| Water | 103 | 76 | 13 | 13 | 151 | 103 | 31 | 18 |
| Air, air & truck | (P) 663 | 162 | (P) 226 | (P) 275 | (P) 455 | 721 | (P) 778 | (P) 955 |
| Intermodal¹ | 1,967 | 983 | 268 | 716 | 8,966 | 4,315 | 943 | 3,708 |
| Pipeline and unknown² | 1,149 | 1,127 | 1 | 22 | 2,357 | 2,315 | 1 | 41 |

Key: P = preliminary.

¹Intermodal includes U.S. Postal Service and courier shipments and all intermodal combinations, except air and truck.

²Pipeline and unknown shipments are combined because data on region-to-region flows by pipeline are statistically uncertain.

³Data do not include imports and exports that pass through the United States from a foreign origin to a foreign destination by any mode.

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

TABLE 2-1. SHIPMENTS BY MODE AND WEIGHT: 2002 AND 2035 (MILLIONS OF TONS)

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, 2006.

TABLE 2-2. SHIPMENTS BY MODE AND VALUE: 2002 AND 2035 (BILLIONS OF DOLLARS)

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, 2006.

TABLE 2-3. TOP COMMODITIES: 2002

| Tons (millions) | | Value (\$ billions) | |
|-----------------------------------|-------------------|--------------------------|-------------------|
| Total | (P) 19,326 | Total | (P) 13,120 |
| Coal n.e.c. ¹ | 2,687 | Machinery | 1,866 |
| Gravel | 2,048 | Electronics | 948 |
| Cereal grains | 1,330 | Mixed freight | 944 |
| Crude petroleum | 1,284 | Motorized vehicles | 855 |
| Coal | 1,261 | Coal n.e.c. ¹ | 729 |
| Nonmetal min. prods. ² | 1,138 | Textiles/leather | 545 |
| Gasoline | 1,090 | Pharmaceuticals | 519 |
| Waste/scrap | 926 | Unknown | 458 |
| Fuel oils | 560 | Chemical prods. | 444 |
| Natural sands | 557 | Misc. mfg. prods. | 411 |

Key: P = preliminary.

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

² Nonmetallic mineral products.

Bulk products comprise nearly two-thirds of the tonnage but only one-fifth of the value of goods moved in 2002. Motor vehicles, machinery,

pharmaceuticals, and other manufactured goods comprise over two-thirds of commodity movements by value but only 15 percent of the tonnage.

TABLE 2-4. DOMESTIC MODE OF INTERNATIONAL SHIPMENTS BY WEIGHT AND VALUE: 2002 AND 2035

| | Tons (millions) | | Value (\$ billions) | |
|---|------------------|------------------|---------------------|------------------|
| | 2002 | 2035 | 2002 | 2035 |
| Total | (P) 1,657 | (P) 3,510 | (P) 2,037 | (P) 8,807 |
| Truck¹ | 797 | 2,116 | 1,198 | 6,193 |
| Rail | 200 | 397 | 114 | 275 |
| Water | 106 | 168 | 26 | 49 |
| Air, air & truck² | (P) 8 | (P) 19 | (P) 506 | (P) 1,772 |
| Intermodal³ | 22 | 50 | 52 | 281 |
| Pipeline & unknown⁴ | 524 | 760 | 141 | 238 |

Key: P = preliminary.

¹Excludes truck moves to and from airports.

²Includes truck moves to and from airports.

³Intermodal includes U.S. Postal Service and courier shipments and all intermodal combinations, except air and truck.

⁴Pipeline and unknown shipments are combined because data on region-to-region flows by pipeline are statistically uncertain.

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

International trade is growing rapidly and is placing pressure on the domestic transportation network and the different modes. International shipments by truck include the inland portion of intermodal shipments through ports and truck movements across land borders with Canada and Mexico.

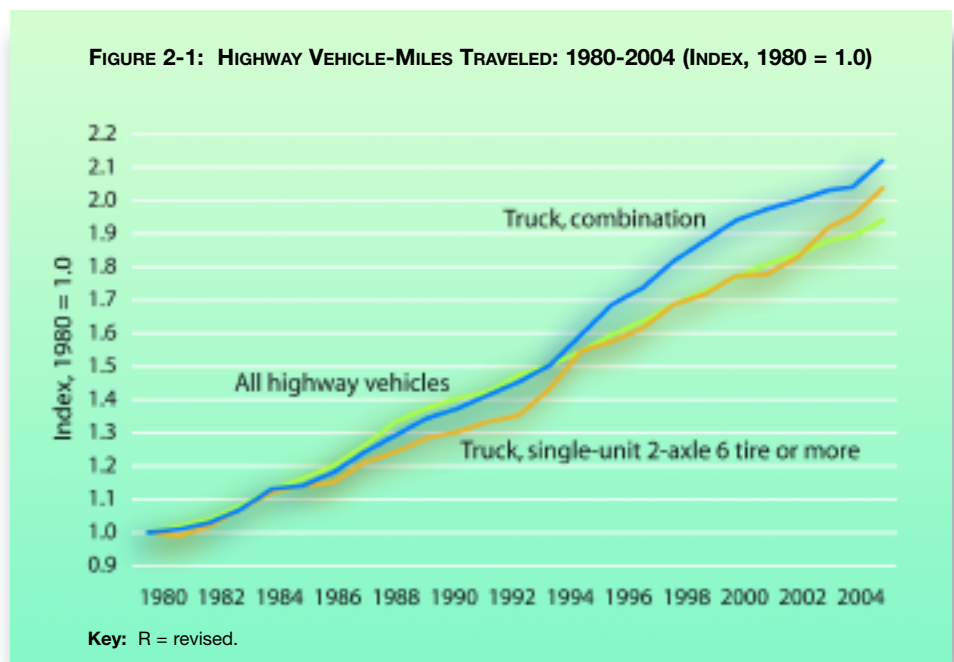
TABLE 2-3. TOP COMMODITIES: 2002

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, 2006.

TABLE 2-4. DOMESTIC MODE OF INTERNATIONAL SHIPMENTS BY WEIGHT AND VALUE: 2002 AND 2035

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, 2006.

As the demand for goods and services grows, so does the amount of truck traffic on the nation's highways. Commercial truck travel has doubled over the past two decades or so, about the same as highway travel as a whole. Consequently, truck vehicle-miles traveled (vmt) as a share of all vmt has remained relatively stable. Over this period, travel by combination trucks grew slightly faster than by single-unit trucks.



Despite doubling over the past two decades, truck traffic remains a relatively small share of highway traffic as a whole. In 2004, commercial trucks accounted for about 8 percent of highway vmt. Truck vmt is comprised of 64 percent combination truck and 36 percent single-unit truck.

Truck traffic is concentrated on major routes connecting population centers, ports, border crossings, and other major hubs of activity. Most of these routes will experience increases in truck traffic over the next twenty years, that, in combination with increases in passenger travel, will add to existing congestion.

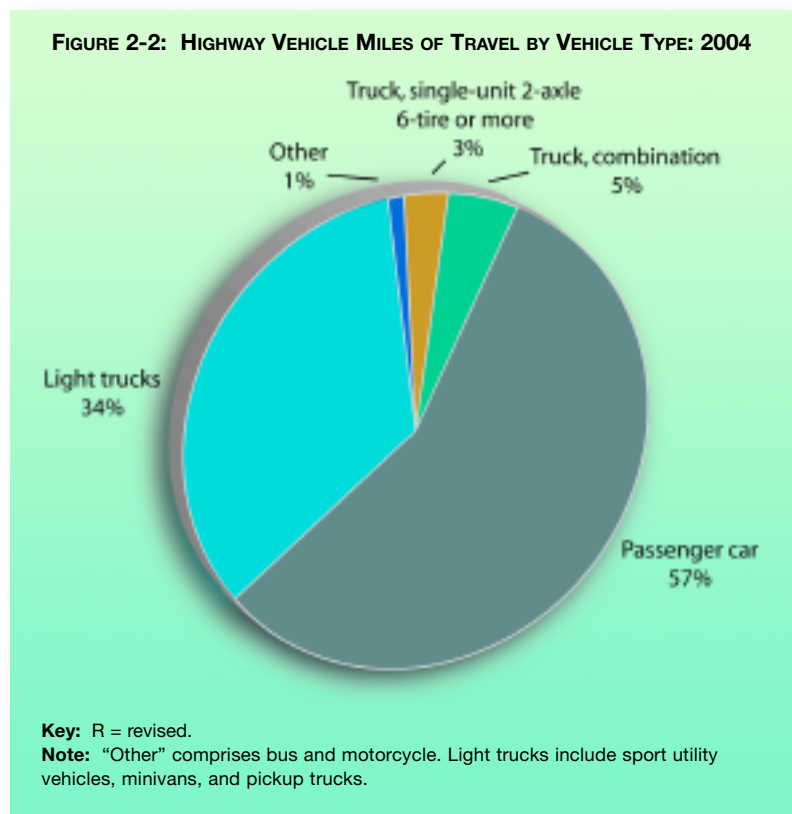


FIGURE 2-1: HIGHWAY VEHICLE-MILES TRAVELED: 1980-2004

Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, (Washington, DC: Annual issues), table VM-1, available at www.fhwa.dot.gov/policy/ohpi/hss/index.htm as of Jan. 20, 2006

FIGURE 2-2: HIGHWAY VEHICLE MILES OF TRAVEL BY VEHICLE TYPE: 2004

Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, (Washington, DC: Annual issues), table VM-1, available at www.fhwa.dot.gov/policy/ohpi/hss/index.htm as of Jan. 23, 2006.

FIGURE 2-3. ESTIMATED AVERAGE DAILY TRUCK TRAFFIC: 1998

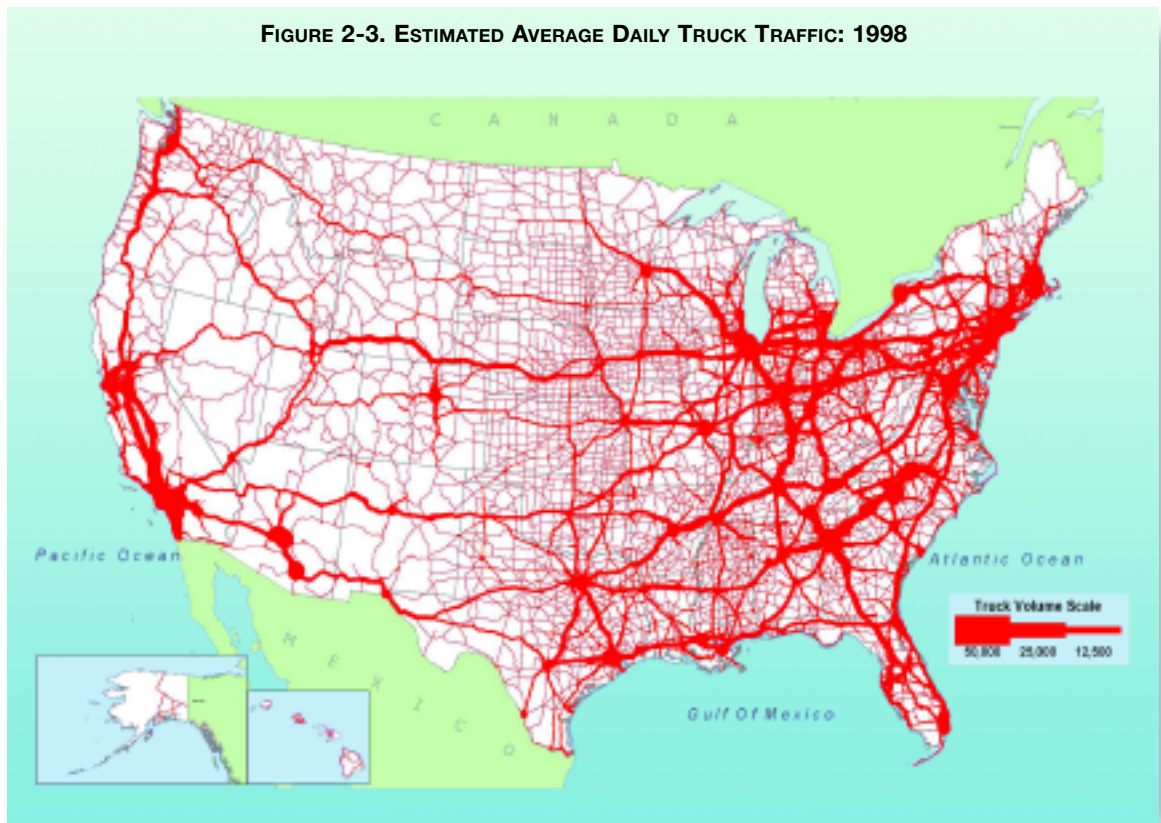


FIGURE 2-4. ESTIMATED AVERAGE DAILY TRUCK TRAFFIC: 2020

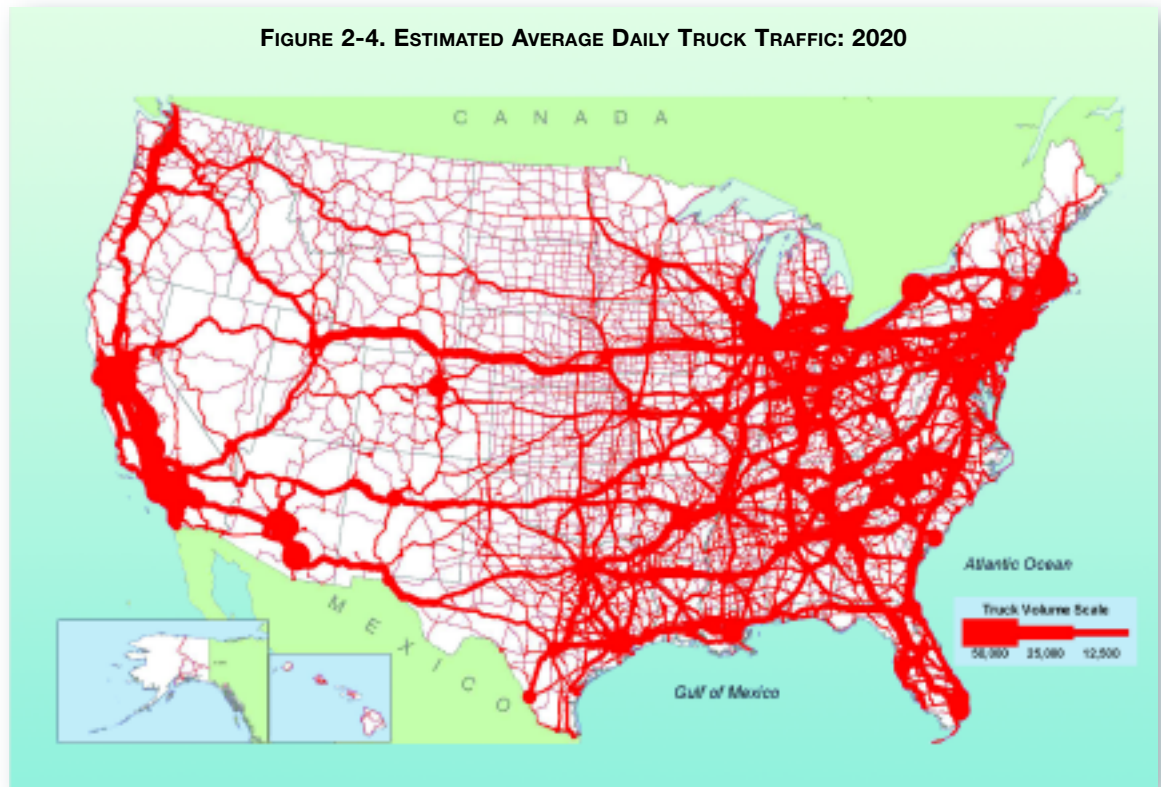


FIGURE 2-3. ESTIMATED AVERAGE DAILY TRUCK TRAFFIC: 1998

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, 2002.

FIGURE 2-4. ESTIMATED AVERAGE DAILY TRUCK TRAFFIC: 2020

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, 2002.

Some of the most severe congestion problems are found near ports, airports, and border crossings stemming from the rapid growth of international trade. Over the past two decades U.S. foreign trade in goods by value has quadrupled.

Foreign trade has had a major impact on all the borders and coasts of the United States. Since 1950, the value of merchandise trade has grown in fifteen-fold in inflation adjusted terms. In 2005, ports and airports on the Atlantic Coast remain the most important, but growth in all other regions since 1950, particularly the Pacific Coast and Mexican border, has been much faster.

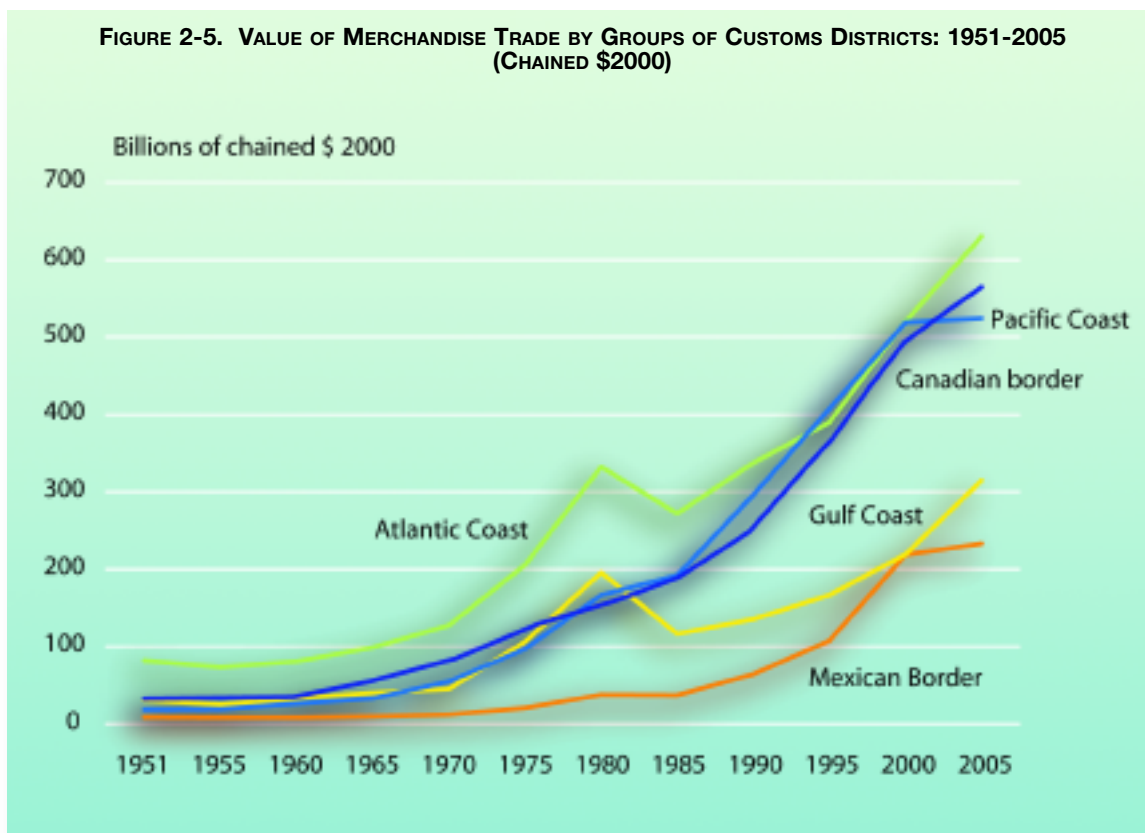


FIGURE 2-5. VALUE OF MERCHANDISE TRADE BY GROUPS OF CUSTOMS DISTRICTS: 1951-2005
Sources: 1950-1970: U.S. Census Bureau, *Historical Statistics of the United States, Colonial Times to 1970, Bicentennial Edition* (Washington, DC: 1975); 1975: U.S. Census Bureau, *Statistical Abstract of the United States: 1977* (Washington, DC: 1977); 1980-1985: U.S. Census Bureau, *Statistical Abstract of the United States: 1987* (Washington, DC: 1986); 1990-2000: U.S. Census Bureau, *Statistical Abstract of the United States: 2006* (Washington, DC: 2005); 2005: U.S. Census Bureau, Foreign Trade Division, FT920 - U.S. Merchandise Trade: Selected Highlights (Washington, DC: December 2005), available at <http://www.census.gov/foreign-trade/Press-Release/2005pr/12/ft920/> as of September 8, 2006; **Implicit GDP Deflator:** U.S. Department of Commerce, Bureau of Economic Analysis, Current-Dollar and "Real" Gross Domestic Product, available at www.bea.gov as of September 8, 2006.

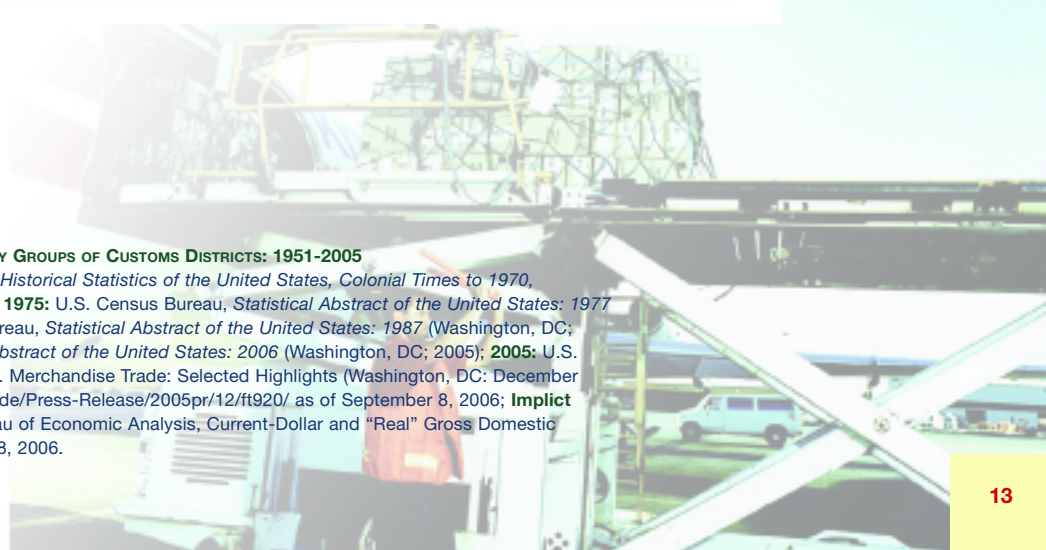
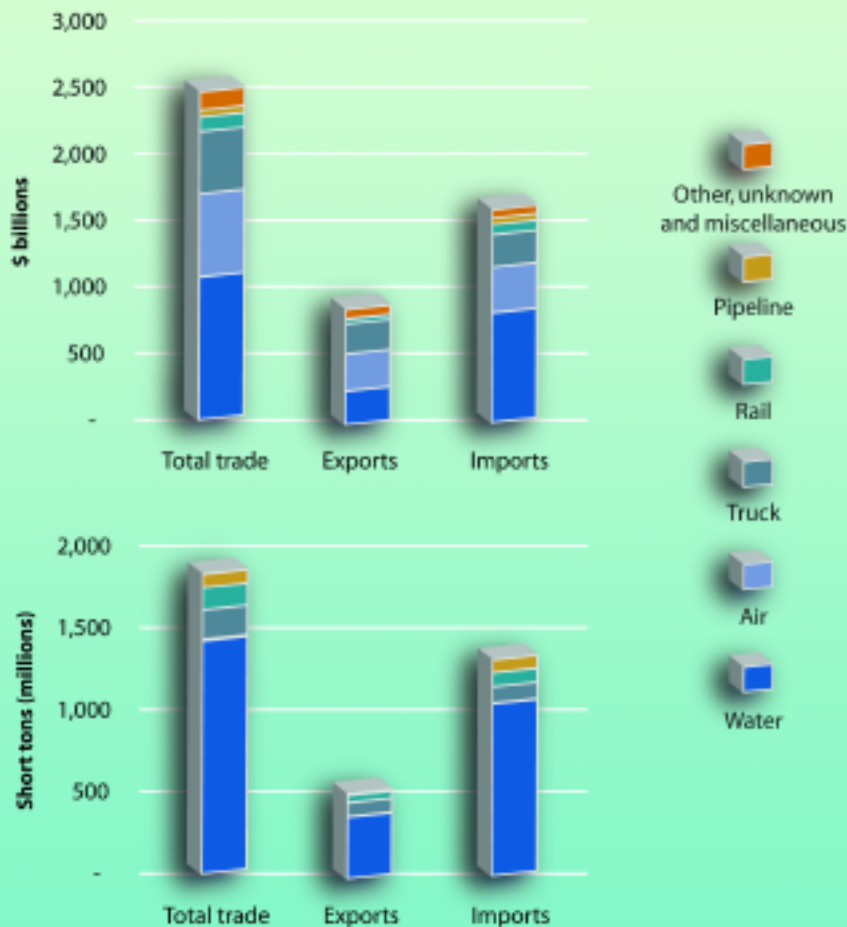


FIGURE 2-6. U.S. INTERNATIONAL MERCHANDISE TRADE BY MODE OF TRANSPORTATION: 2005



Note: 1 short ton = 2,000 pounds.

Nearly 80 percent of freight tons in U.S. foreign trade are transported by ship. Although the vast majority of freight tonnage in U.S. foreign trade moves by water, air and truck transportation are nearly as important when freight value is considered. By value, the water share drops to 44 percent, with 25 percent moving by air and 19 percent moving by truck.

The top 25 foreign trade gateways measured by value of shipments are comprised of 9 airports, 11 water ports, and 5 border crossings. At these 25 gateways, imports com-

prise 65 percent of the total. Ports with very large shares of imports relative to exports are mostly water ports (such as the ports of Los Angeles, CA, Long Beach, CA, and Tacoma, WA). Anchorage International Airport also has a very high proportion of imports relative to exports.

Measured in tons, the Port of South Louisiana handles the most freight of any water port in the United States. Water ports dominated by domestic trade include St. Louis, MO-IL; Pittsburgh, PA; Huntington, WV-KY-OH; and Valdez, AK. Water ports dominated

Source: Compiled by U.S. Department of Transportation (USDOT), Research and Innovative Technology Administration (RITA), Bureau of Transportation Statistics (BTS), August 2006. **Water and air data**—U.S. Department of Commerce, U.S. Census Bureau, Foreign Trade Division, U.S. Exports of Merchandise and U.S. Imports of Merchandise, December 2005. **Total, truck, rail, pipeline, other and unknown data**—USDOT, RITA, BTS, Transborder Freight Data 2005; and special calculation, August 2006.

FIGURE 2-7. TOP 25 U.S. FOREIGN TRADE FREIGHT GATEWAYS BY VALUE: 2005 (\$ BILLIONS)



Note: 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 include major airport(s) in the geographic area in addition to small regional airports.

Figure 2-8. Top 25 Water Ports by Weight: 2004 (Million Short Tons)

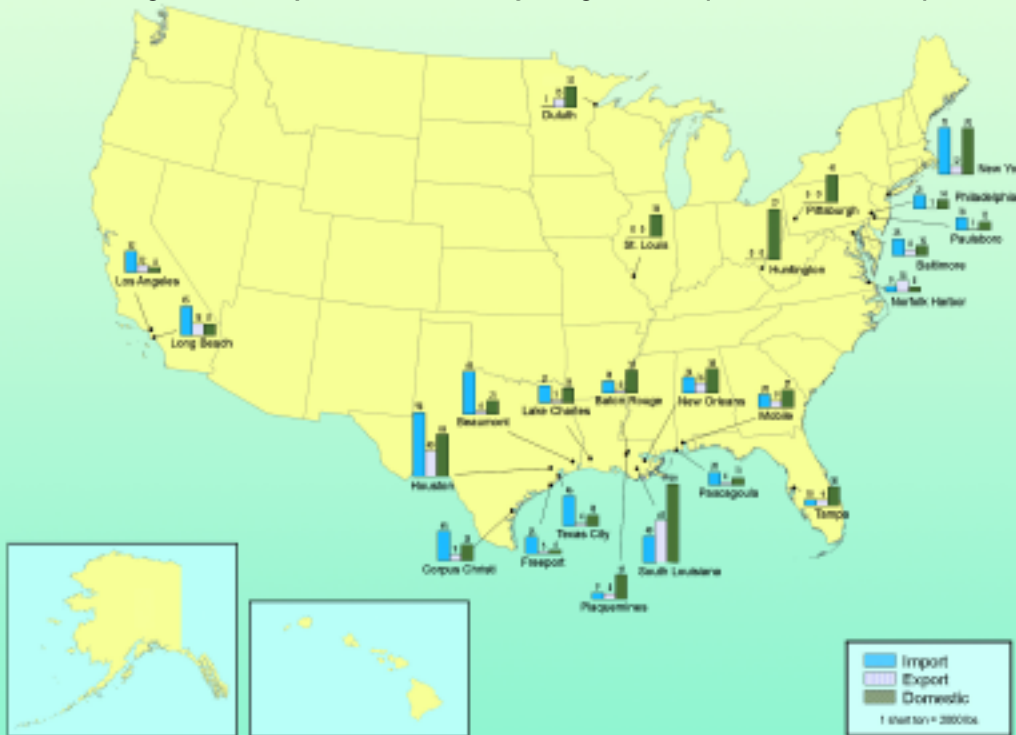


FIGURE 2-7. TOP 25 U.S. FOREIGN TRADE FREIGHT GATEWAYS BY VALUE: 2005

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *National Transportation Statistics* (Washington, DC: 2005), available at <http://www.bts.gov> as of October 16, 2006.

FIGURE 2-8. TOP 25 WATER PORTS BY WEIGHT: 2004

Source: U.S. Army Corps of Engineers, *2004 Waterborne Commerce of the United States, Part 5, National Summaries* (New Orleans, LA: 2006), table 5-2.

by foreign trade include Los Angeles, CA; Freeport, TX; Long Beach, CA; and Beaumont, TX. The top 25 water ports handle about two-thirds of all foreign and domestic goods moved by water.

Containerized cargo has grown rapidly over the past few years and is concentrated at a few large water ports. The Port of Los Angeles handles about one-fifth of all the container traffic at water ports in the United States. Together with the Port of Long Beach, this share increases to more than one-third. Container trade at the Ports of Los Angeles and Long Beach doubled between 1995 and 2005, about the same as growth in containerized cargo overall.

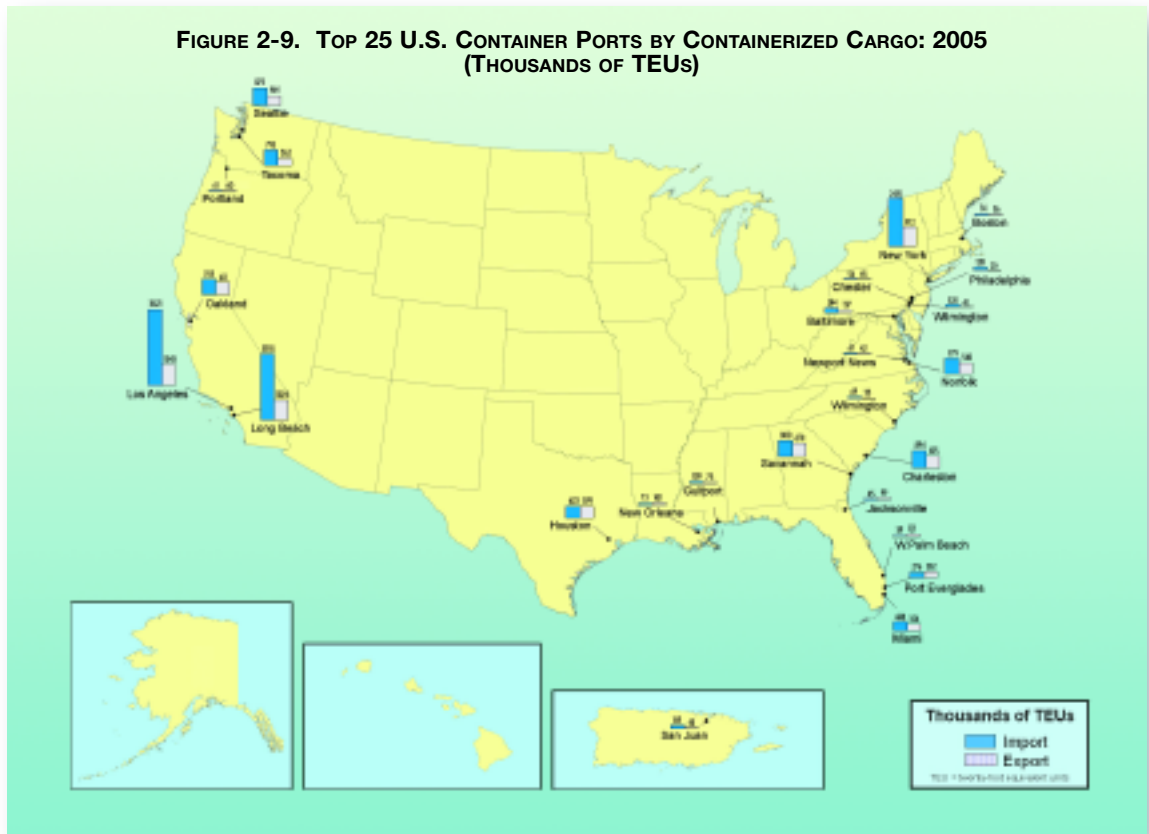


FIGURE 2-9. TOP 25 U.S. CONTAINER PORTS BY CONTAINERIZED CARGO: 2005
Source: U.S. Department of Transportation, Maritime Administration, *U.S. Waterborne Container Trade by U.S. Custom Ports, 1997-2005*, based on data provided by Port Import/Export Reporting Service, 2006, available at http://www.marad.dot.gov/MARAD_statistics/index.html as of April 27, 2006.

**TABLE 2-5. TOP 25 TRADING PARTNERS OF THE UNITED STATES (MERCHANDISE TRADE)
(\$ BILLIONS)**

| Partner | 2005 | | | | | |
|---------------------------------|------|----------------|----------------|----------------|----------------|----------------|
| | Rank | 1998 | 2000 | 2002 | 2004 | 2005 |
| Canada | 1 | 329.0 | 405.6 | 371.4 | 445.0 | 499.3 |
| Mexico | 2 | 173.7 | 247.6 | 232.3 | 266.6 | 290.2 |
| China | 3 | 85.4 | 116.3 | 147.2 | 231.4 | 285.3 |
| Japan | 4 | 179.9 | 211.8 | 172.9 | 184.0 | 193.5 |
| Germany | 5 | 76.5 | 88.0 | 89.1 | 108.6 | 119.0 |
| United Kingdom | 6 | 73.9 | 85.0 | 74.1 | 82.4 | 89.7 |
| South Korea | 7 | 40.5 | 68.2 | 58.2 | 72.5 | 71.4 |
| Taiwan | 8 | 51.3 | 64.9 | 50.6 | 56.3 | 56.9 |
| France | 9 | 41.8 | 50.0 | 47.4 | 53.1 | 56.2 |
| Malaysia | 10 | 28.0 | 36.6 | 34.4 | 39.1 | 44.2 |
| Italy | 11 | 30.0 | 36.0 | 34.4 | 38.8 | 42.5 |
| Netherlands | 12 | 26.6 | 31.7 | 28.2 | 36.9 | 41.4 |
| Venezuela | 13 | 15.8 | 24.2 | 19.6 | 29.7 | 40.4 |
| Brazil | 14 | 25.3 | 29.2 | 28.2 | 35.0 | 39.8 |
| Ireland | 15 | 14.0 | 24.1 | 29.1 | 35.6 | 38.0 |
| Singapore | 16 | 34.0 | 37.0 | 31.0 | 34.9 | 35.8 |
| Saudi Arabia | 17 | 16.9 | 20.4 | 17.9 | 26.2 | 34.1 |
| Belgium | 18 | 22.3 | 23.9 | 23.2 | 29.3 | 31.6 |
| Thailand | 19 | 18.7 | 23.0 | 19.7 | 23.9 | 27.1 |
| India | 20 | 11.8 | 14.3 | 15.9 | 21.7 | 26.8 |
| Israel | 21 | 15.6 | 20.7 | 19.5 | 23.7 | 26.6 |
| Nigeria | 22 | 5.0 | 11.3 | 7.0 | 17.8 | 25.8 |
| Hong Kong | 23 | 23.5 | 26.1 | 21.9 | 25.1 | 25.2 |
| Switzerland | 24 | 15.9 | 20.1 | 17.2 | 20.9 | 23.7 |
| Australia | 25 | 17.3 | 18.9 | 19.6 | 21.8 | 23.1 |
| Top 25 total¹ | | 1,386.3 | 1,746.7 | 1,621.2 | 1,960.5 | 2,187.5 |
| U.S. total trade | | 1,594.4 | 1,997.3 | 1,856.8 | 2,287.6 | 2,575.3 |
| Top 25 as % of total | | 87 | 87 | 87 | 86 | 85 |

¹Represents top 25 trading partners in the reference year not necessarily the partners shown here.

By a wide margin, Canada is this country's top trading partner followed by Mexico and China. China's share of trade with the United States more than doubled between 1998 and 2005, from 5 percent of total merchandise trade to 11 percent.

Trade with Canada and Mexico has grown rapidly over the past decade. Trucks carry almost two-thirds of the value of goods traded with these countries. The value of goods carried by truck increased by about 50 percent between 1997 and 2005. By weight, the water and truck modes carry the largest share of goods traded.

Trade with Canada by land modes is much higher than trade with Mexico. Both have been growing rapidly over the past few years. Imports and exports to Mexico measured by value grew by 61 percent and 49 percent respectively between 1998 and 2005.

Imports and exports to Canada grew by 64 percent and 40 percent respectively.

TABLE 2-5. TOP 25 TRADING PARTNERS OF THE UNITED STATES (MERCHANDISE TRADE)

Source: U.S. Department of Commerce, International Trade Administration, TradeStats Express, available at <http://www.ita.doc.gov/> as of April 4, 2006.

TABLE 2-6. U.S. MERCHANDISE TRADE WITH CANADA AND MEXICO BY TRANSPORTATION MODE

| Mode | 1998 | | 2000 | | 2004 | | 2005 ¹ | |
|--------------|------------------------|---------------------------------------|------------------------|---------------------------------------|------------------------|------------------------------------|------------------------|------------------------------------|
| | Value (\$ billions) | Weight (millions of short tons) | Value (\$ billions) | Weight (millions of short tons) | Value (\$ billions) | Weight (millions short tons) | Value (\$ billions) | Weight (millions short tons) |
| Truck | 350 | NA | 429 | NA | 453 | NA | 491 | 191 |
| Rail | 68 | NA | 94 | NA | 108 | NA | 116 | 141 |
| Air | 30 | <1 | 45 | 1 | 32 | <1 | 33 | <1 |
| Water | 21 | 183 | 33 | 194 | 46 | 244 | 58 | 256 |
| Pipeline | 11 | NA | 24 | NA | 39 | NA | 52 | 86 |
| Other | 23 | NA | 29 | NA | 34 | NA | 39 | 5 |
| Total | 503 | NA | 653 | 526 | 712 | NA | 790 | 679 |

Key: NA = not available.

¹2005 data are from the U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, North American Freight Transportation (Washington, DC: 2003), tables A-1 and A-2, available at www.bts.gov as of August 12, 2006.

Notes: Individual modal totals may not sum to exact totals due to rounding. 1 short ton = 2,000 pounds. For value, "Other" is the difference between the total and the sum of the individual modes.

TABLE 2-7. U.S. LAND EXPORTS TO AND IMPORTS FROM CANADA AND MEXICO BY MODE (\$ MILLIONS)

| | 1998 | 2000 | 2004 | 2005 |
|-----------------------------------|------------------|------------------|------------------|------------------|
| Exports to Canada, total | 137,745.4 | 154,847.4 | 171,878.1 | 192,907.5 |
| Truck | 114,806.1 | 129,825.3 | 135,897.5 | 151,221.7 |
| Rail | 12,279.6 | 12,946.5 | 16,596.6 | 19,321.9 |
| Pipeline | 93.4 | 161.6 | 1,584.2 | 2,393.9 |
| Other ¹ | 10,559.5 | 11,913.4 | 17,776.7 | 19,933.1 |
| Mail | 6.8 | 0.6 | 23.1 | 36.9 |
| Exports to Mexico, total | 70,173.8 | 97,158.9 | 97,303.7 | 104,276.5 |
| Truck | 60,432.1 | 82,389.2 | 79,349.2 | 83,341.2 |
| Rail | 6,188.8 | 10,495.8 | 13,632.9 | 15,747.7 |
| Pipeline | 73.4 | 301.8 | 87.2 | 543.3 |
| Other ¹ | 3,470.0 | 3,972.0 | 4,216.4 | 4,622.7 |
| Mail | 0.1 | (R) 0.0 | 18.1 | 21.6 |
| Imports from Canada, total | 162,105.7 | 210,270.5 | 236,734.9 | 265,402.1 |
| Truck | 108,856.7 | 127,816.3 | 132,762.1 | 143,695.6 |
| Rail | 37,374.1 | 49,699.2 | 57,947.2 | 60,606.3 |
| Pipeline | 11,120.1 | 23,117.1 | 36,828.3 | 48,766.5 |
| Other ¹ | 4,575.1 | 9,571.0 | 8,994.4 | 12,184.4 |
| Mail | 1.7 | 4.1 | 0.2 | 0.1 |
| FTZ ² | 177.9 | 62.8 | 202.6 | 149.3 |
| Imports from Mexico, total | 84,102.9 | 113,436.5 | 127,646.3 | 135,400.5 |
| Truck | 65,883.7 | 88,668.7 | 104,943.8 | 112,267.6 |
| Rail | 12,029.7 | 21,056.1 | 20,183.4 | 20,782.2 |
| Pipeline | 2.4 | 11.5 | 0.3 | 0.0 |
| Other ¹ | 917.8 | 1,573.9 | 1,838.7 | 1,990.2 |
| Mail | 0.2 | 0.6 | 0.0 | 0.0 |
| FTZ ² | 2,886.7 | 2,125.7 | 679.8 | 360.4 |

Key: – = value too small to report.

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

²Foreign Trade Zones (FTZs) were added as a mode of transport for land import shipments beginning in April 1995. Although FTZs are treated as a mode of transportation in the Transborder Surface Freight Data, the actual mode for a specific shipment into or out of an FTZ is unknown because U.S. Customs does not collect this information.

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

TABLE 2-6. U.S. MERCHANDISE TRADE WITH CANADA AND MEXICO

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, Transborder Freight Data, August 2006.

Table 2-7. U.S. Land Exports to and Imports from Canada and Mexico by Mode

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, Transborder Surface Freight Data, available at www.bts.gov/transborder as of March 23, 2006.

TABLE 2-8. INCOMING TRUCK CONTAINER CROSSINGS BY STATE, U.S.-CANADIAN BORDER

| State | 1998 | 2000 | 2004 | 2005 |
|-----------------------------------|---------------|------------------|----------------------|------------------|
| Alaska | 11,139 | 9,710 | 9,771 | 8,345 |
| Idaho | 44,683 | 53,102 | 48,266 | 51,157 |
| Maine | (R) 391,027 | 394,067 | (R) 509,976 | 492,542 |
| Michigan | (R) 2,254,902 | 2,471,416 | 2,661,624 | 2,674,597 |
| Minnesota | 107,667 | 131,004 | 102,963 | 90,050 |
| Montana | 168,805 | 198,745 | 165,167 | 152,433 |
| New York | NA | 1,910,176 | 1,978,035 | 1,994,093 |
| North Dakota | NA | 340,301 | 351,968 | 355,885 |
| Vermont | NA | 226,109 | 281,538 | 288,486 |
| Washington | (R) 715,759 | 497,405 | (R) 666,080 | 667,856 |
| Total U.S. - Canada border | NA | 6,232,035 | (R) 6,775,388 | 6,775,444 |

Key: NA = Not available; R = revised.

Note: Full or empty truck containers entering the United States. The data include containers moving as in-bond shipments.

Most trucks enter the United States through only four states: Texas, Michigan, New York, and California. Three border crossings — Detroit, MI; Buffalo-Niagara, NY; and Port Huron, MI — account for most trucks entering the United States from Canada.

TABLE 2-9. INCOMING TRUCK CONTAINER CROSSINGS BY STATE, U.S.-MEXICAN BORDER

| State | 1998 | 2000 | 2004 | 2005 |
|-----------------------------------|------------------|------------------|------------------|------------------|
| Arizona | 318,185 | 322,160 | 319,872 | 344,617 |
| California | 860,684 | 947,311 | 1,135,850 | 1,128,457 |
| New Mexico | 31,699 | 35,507 | 32,348 | 38,868 |
| Texas | 2,502,358 | 2,895,703 | 3,024,830 | 3,165,620 |
| Total U.S. - Mexico border | 3,712,926 | 4,200,681 | 4,512,900 | 4,677,562 |

Note: Full or empty truck containers entering the United States. The data include containers moving as in-bond shipments.

Three border crossings — Laredo, TX; Otay Mesa/San Ysidro, CA; and El Paso, TX — account for nearly two-thirds of trucks coming into the United States from Mexico.

TABLE 2-8. INCOMING TRUCK CONTAINER CROSSINGS BY STATE, U.S.-CANADIAN BORDER

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, special tabulation 2006, based on data from U.S. Customs Service, Mission Support Services, Office of Field Operations, Operations Management Database.

TABLE 2-9. INCOMING TRUCK CONTAINER CROSSINGS BY STATE, U.S.-MEXICAN BORDER

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, special tabulation 2006, based on data from U.S. Customs Service, Mission Support Services, Office of Field Operations, Operations Management Database.

Most freight trains enter the United States through five states: Michigan, Texas, Minnesota, New York, and North Dakota. Three border crossings — Port Huron, MI; Detroit, MI; and International Falls, MN — account for half of all containers coming in to the United States from Canada by rail.

TABLE 2-10. INCOMING RAIL CONTAINER CROSSINGS BY STATE, U.S.-CANADIAN BORDER

| State | 1998 | 2000 | 2004 | 2005 |
|-----------------------------------|------------------|------------------|------------------|------------------|
| Alaska | N | N | N | N |
| Idaho | 37,579 | 50,240 | 78,133 | 88,821 |
| Maine | 46,882 | 60,358 | 44,299 | 44,909 |
| Michigan | 587,317 | 679,747 | 751,600 | 730,100 |
| Minnesota | 215,899 | 250,943 | 333,657 | 322,784 |
| Montana | 23,729 | 25,255 | 39,996 | 29,399 |
| New York | 140,422 | 257,155 | 276,112 | 295,236 |
| North Dakota | NA | 154,698 | 225,284 | 233,323 |
| Vermont | 43,551 | 51,069 | 56,764 | 53,851 |
| Washington | 82,828 | 65,372 | 145,064 | 142,134 |
| Total U.S. - Canada border | 1,178,207 | 1,594,837 | 1,950,909 | 1,940,557 |

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

Note: Full or empty rail containers entering the United States. The data include containers moving as in-bond shipments.

On the Mexican border, Laredo, TX by itself accounts for 44 percent of all containers coming into the United States by rail.

TABLE 2-11. INCOMING RAIL CONTAINER CROSSINGS BY STATE, U.S.-MEXICAN BORDER

| State | 1998 | 2000 | 2004 | 2005 |
|-----------------------------------|----------------|----------------|----------------|----------------|
| Arizona | 35,812 | 50,602 | 46,899 | 46,831 |
| California | 7,755 | 9,115 | 15,091 | 18,313 |
| New Mexico | N | N | N | N |
| Texas | 344,339 | 512,108 | 613,315 | 663,415 |
| Total U.S. - Mexico border | 387,906 | 571,825 | 675,305 | 728,559 |

Key: N = not applicable.

Note: Full or empty rail containers entering the United States. The data include containers moving as in-bond shipments.

TABLE 2-10. INCOMING RAIL CONTAINER CROSSINGS BY STATE, U.S.-CANADIAN BORDER

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, special tabulation 2006, based on data from U.S. Customs Service, Mission Support Services, Office of Field Operations, Operations Management Database.

TABLE 2-11. INCOMING RAIL CONTAINER CROSSINGS BY STATE, U.S.-MEXICAN BORDER

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, special tabulation 2006, based on data from U.S. Customs Service, Mission Support Services, Office of Field Operations, Operations Management Database.

The Federal Aviation Administration (FAA) reports that Anchorage International and Memphis International are two of the most important U.S. airports that handle all-cargo aircraft. All-cargo aircraft are dedicated to the exclusive transportation of cargo. They do not include aircraft carrying passengers as well as cargo. Of the top 25 airports that handle all-cargo operations, Memphis is also one of the fastest growing, up 41 percent since 2000, along with Houston (45 percent) and Honolulu (40 percent).

TABLE 2-12. TOP 25 AIRPORTS BY LANDED WEIGHT OF ALL-CARGO OPERATIONS¹

| Airport | 2004 Rank | Landed weight (thousands of short tons) | | | | |
|---|-----------|--|---------------|---------------|---------------|---------------|
| | | 2000 | 2001 | 2002 | 2003 | 2004 |
| Anchorage, AK (Ted Stevens Anchorage International) ² | 1 | 8,084 | 7,777 | 8,994 | 9,007 | 9,844 |
| Memphis, TN (Memphis International) | 2 | 6,318 | 6,865 | 8,826 | 8,760 | 8,885 |
| Louisville, KY (Louisville International-Standiford Field) | 3 | 3,987 | 4,026 | 4,202 | 4,172 | 4,388 |
| Miami, FL (Miami International) | 4 | 2,929 | 3,055 | 3,174 | 3,239 | 3,423 |
| Los Angeles, CA (Los Angeles International) | 5 | 2,892 | 2,929 | 3,038 | 3,120 | 3,062 |
| New York, NY (John F. Kennedy International) | 6 | 2,793 | 2,543 | 2,912 | 2,937 | 2,898 |
| Chicago, IL (O'Hare International) | 7 | 2,062 | 2,012 | 2,217 | 2,351 | 2,359 |
| Indianapolis, IN (Indianapolis International) | 8 | 2,884 | 3,154 | 2,338 | 2,277 | 2,314 |
| Newark, NJ (Newark Liberty International) | 9 | 1,961 | 1,795 | 1,758 | 1,835 | 1,765 |
| Oakland, CA (Metropolitan Oakland International) | 10 | 1,811 | 1,639 | 1,746 | 1,695 | 1,703 |
| Fort Worth, TX (Dallas/Fort Worth International) | 11 | 1,691 | 1,546 | 1,481 | 1,481 | 1,431 |
| Philadelphia, PA (Philadelphia International) | 12 | 1,454 | 1,452 | 1,466 | 1,365 | 1,371 |
| Ontario, CA (Ontario International) | 13 | 1,220 | 1,291 | 1,444 | 1,338 | 1,326 |
| Atlanta, GA (William B. Hartsfield International) | 14 | 1,090 | 1,043 | 1,166 | 1,194 | 1,162 |
| Covington/Cincinnati, OH (Cincinnati/Northern Kentucky International) | 15 | 912 | 980 | 1,043 | 1,098 | 1,141 |
| Honolulu, HI (Honolulu International) | 16 | 692 | 789 | 970 | 1,017 | 970 |
| Phoenix, AZ (Sky Harbor International) | 17 | 920 | 838 | 867 | 779 | 801 |
| Dayton, OH (James M. Cox Dayton International) | 18 | 2,233 | 1,444 | 897 | 784 | 787 |
| Denver, CO (Denver International) | 19 | 900 | 803 | 783 | 747 | 763 |
| San Francisco, CA (San Francisco International) | 20 | 1,267 | 1,012 | 1,035 | 1,200 | 740 |
| Portland, OR (Portland International) | 21 | 882 | 807 | 816 | 749 | 718 |
| Houston, TX (George Bush Intercontinental) | 22 | 480 | 463 | 482 | 666 | 697 |
| Minneapolis, MN (Minneapolis-St Paul International/Wold Chamberlain) | 23 | 622 | 586 | 621 | 687 | 678 |
| Rockford, IL (Greater Rockford) | 24 | 654 | 681 | 630 | 625 | 677 |
| Salt Lake City, UT (Salt Lake City International) | 25 | 751 | 606 | 583 | 599 | 621 |
| Top 25 airports³ | | 52,381 | 50,701 | 53,942 | 53,947 | 54,526 |
| United States, all airports⁴ | | 74,743 | 71,441 | 73,433 | 73,072 | 74,297 |
| Top 25 as % of U.S. total | | 70.1% | 71.0% | 73.5% | 73.8% | 73.4% |

¹All-Cargo operations are operations dedicated to the exclusive transportation of cargo. This does not include aircraft carrying passengers that may also 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.

³Represents top 25 airports in the reference year not necessarily the airports shown here.

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.

TABLE 2-12. TOP 25 AIRPORTS BY LANDED WEIGHT OF ALL-CARGO OPERATIONS

Source: U.S. Department of Transportation, Federal Aviation Administration, Air Carrier Activity Information System

(ACAIS) database, All-Cargo Data, available at http://www.faa.gov/airports_airtraffic/airports/planning_capacity/passenger_allcargo_stats/passenger/index as of March 22, 2006.

Trucks move more than one-half of all hazardous materials shipped from within the United States. However, truck ton-miles of hazardous shipments account for a much smaller share, about one-third of all ton-miles, because such shipments travel relatively short distances. By contrast, rail accounts for only 5 percent of shipments by weight but 22 percent by ton-miles.

Table 2-13. U.S. Hazardous Materials Shipments by Transportation Mode: 2002

| Transportation mode | Value | | Tons | | Ton-miles | | Average miles per shipment |
|--|--------------|--------------|----------------|--------------|--------------|--------------|----------------------------|
| | \$ Billion | Percent | Millions | Percent | Billions | Percent | |
| All modes, total | 660.2 | 100.0 | 2,191.5 | 100.0 | 326.7 | 100.0 | 136 |
| Single modes, total | 644.5 | 97.6 | 2,158.5 | 98.5 | 311.9 | 95.5 | 105 |
| Truck ¹ | 419.6 | 63.6 | 1,159.5 | 52.9 | 110.2 | 33.7 | 86 |
| For-hire | 189.8 | 28.8 | 449.5 | 20.5 | 65.1 | 19.9 | 285 |
| Private ² | 226.7 | 34.3 | 702.2 | 32.0 | 44.1 | 13.5 | 38 |
| Rail | 31.3 | 4.7 | 109.4 | 5.0 | 72.1 | 22.1 | 695 |
| Water | 46.9 | 7.1 | 228.2 | 10.4 | 70.6 | 21.6 | S |
| Air | 1.6 | 0.2 | 0.1 | 0.003 | 0.1 | 0.03 | 2,080 |
| Pipeline ³ | 145.0 | 22.0 | 661.4 | 30.2 | S | S | S |
| Multiple modes, total | 9.6 | 1.5 | 18.7 | 0.9 | 12.5 | 3.8 | 849 |
| Parcel, U.S. Postal Service or Courier | 4.3 | 0.6 | 0.2 | 0.01 | 0.1 | 0.04 | 837 |
| Other | 5.4 | 0.8 | 18.5 | 0.8 | 12.4 | 3.8 | 1,371 |
| Unknown and other modes, total | 6.1 | 0.9 | 14.2 | 0.6 | 2.3 | 0.7 | 57 |

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

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

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

³Excludes most shipments of crude oil.

TABLE 2-14. U.S. HAZARDOUS MATERIALS SHIPMENTS BY HAZARD CLASS: 2002

| Hazard class | Description | Value | | Tons | | Ton-miles | |
|--------------|---------------------------------|--------------|--------------|----------------|--------------|--------------|--------------|
| | | \$ Billions | Percent | Millions | Percent | Billions | Percent |
| Class 1 | Explosives | 7.9 | 1.2 | 5.0 | 0.2 | 1.6 | 0.5 |
| Class 2 | Gases | 73.9 | 11.2 | 213.4 | 9.7 | 37.3 | 11.4 |
| Class 3 | Flammable liquids | 490.2 | 74.3 | 1,789.0 | 81.6 | 218.6 | 66.9 |
| Class 4 | Flammable solids | 6.6 | 1.0 | 11.3 | 0.5 | 4.4 | 1.3 |
| Class 5 | Oxidizers and organic peroxides | 5.5 | 0.8 | 12.7 | 0.6 | 4.2 | 1.3 |
| Class 6 | Toxic (poison) | 8.3 | 1.3 | 8.5 | 0.4 | 4.3 | 1.3 |
| Class 7 | Radioactive materials | 5.9 | 0.9 | 0.1 | 0.003 | 0.04 | 0.01 |
| Class 8 | Corrosive materials | 38.3 | 5.8 | 90.7 | 4.1 | 36.3 | 11.1 |
| Class 9 | Miscellaneous dangerous goods | 23.6 | 3.6 | 61.0 | 2.8 | 20.2 | 6.2 |
| Total | | 660.2 | 100.0 | 2,191.5 | 100.0 | 326.7 | 100.0 |

Table 2-13. U.S. Hazardous Materials Shipments by Transportation Mode: 2002

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, *2002 Economic Census, Transportation, 2002 Commodity Flow Survey, Hazardous Materials* (Washington, DC: December 2004), table 1a.

TABLE 2-14. U.S. HAZARDOUS MATERIALS SHIPMENTS BY HAZARD CLASS: 2002

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, *2002 Economic Census, Transportation, 2002 Commodity Flow Survey, Hazardous Materials* (Washington, DC: December 2004), table 2a.

Flammable liquids, especially gasoline, are the predominant hazardous material transported in the United States. In terms of ton-miles, flammable liquids account for about 67 percent of total ton-miles of hazardous materials shipments. The next largest class of hazardous materials in terms of ton-miles is gases at about 11 percent.

Despite the enormous amount of freight being moved by truck in the United States, the United States moves a much smaller share of its goods domestically by truck and a much greater share of goods by rail than countries in western Europe and Japan.

TABLE 2-15. DOMESTIC FREIGHT ACTIVITY BY TRANSPORTATION MODE FOR SELECTED COUNTRIES: 2003 (PERCENT SHARE OF TOTAL)

| Mode | Canada | France | Germany | Italy | Japan | United Kingdom | United States |
|--------------|------------------|------------------|---------|-------------------|-------------------|-------------------|---------------|
| Water | ¹ 5.0 | ² 6.7 | 13.1 | ³ 17.3 | ³ 41.3 | ³ 26.3 | 14.9 |
| Oil pipeline | 35.8 | 8.0 | 3.5 | 4.1 | NA | 3.8 | 14.5 |
| Rail | 37.5 | 16.9 | 17.7 | 9.8 | 4.0 | 7.5 | 39.5 |
| Road | 21.8 | 68.4 | 65.7 | 68.9 | ³ 54.6 | 62.4 | 31.1 |

Key: NA = not available.
¹Based on data from 2001.
²Based on data from 2000.
³Based on data from 2002.



TABLE 2-15. DOMESTIC FREIGHT ACTIVITY BY TRANSPORTATION MODE FOR SELECTED COUNTRIES: 2003

Sources: United States: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *National Transportation Statistics 2005* (Washington, DC: 2005).

All other countries: Organisation for Economic Cooperation and Development (OECD), *OECD in Figures — 2005 Edition* (Paris: 2005).



III. THE FREIGHT TRANSPORTATION SYSTEM

Freight is carried via an extensive network of roads, railroad, waterways, and pipelines. Road infrastructure increased slowly over the past two decades despite a large increase in the volume of traffic. Between 1980 and 2004, route miles of public roads increased by 4 percent compared with a 94 percent increase in vehicle miles traveled (vmt). Over the same period, miles of railroad dropped by more than 20 percent, while rail shipments (measured in ton-miles) increased by 81 percent.

TABLE 3-1. MILES OF INFRASTRUCTURE BY TRANSPORTATION MODE

| | 1980 | 1990 | 2000 | 2004 | Percent change, 1980-2004 |
|--|----------------------|-----------|-----------|-----------|---------------------------|
| Public roads, route miles | 3,859,837 | 3,866,926 | 3,951,101 | 3,997,462 | 3.6 |
| National Highway System (NHS) | N | N | 161,189 | 162,158 | N |
| Interstates | 41,120 | 45,074 | 46,673 | 46,837 | 13.9 |
| Other NHS | N | N | 114,516 | 115,321 | N |
| Freight intermodal connectors ¹ | N | N | N | NA | N |
| Other | N | N | 3,789,912 | 3,835,303 | N |
| Strategic Highway Corridor Network (STRAHNET) | N | N | 62,066 | 62,257 | N |
| Interstate | N | N | 46,675 | 46,837 | N |
| Non-Interstate | N | N | 15,389 | 15,420 | N |
| Railroad | 183,077 ² | 175,909 | 170,512 | 140,246 | -23.4 |
| Class I | NA | 133,189 | 120,597 | 97,496 | NA |
| Regional | NA | 18,375 | 20,978 | 15,641 | NA |
| Local | NA | 24,337 | 28,937 | 27,109 | NA |
| 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 | NA | NA |
| Gas | 1,051,774 | 1,189,200 | 1,369,300 | 1,462,300 | 39.0 |

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

¹Excludes intermodal connectors serving intercity bus, Amtrak, and public transit facilities.

²Excludes Class III railroads.

TABLE 3-1. MILES OF INFRASTRUCTURE BY TRANSPORTATION MODE

Sources: Public roads: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, (Washington, DC: Annual issues), table HM-16.

Freight intermodal connectors: U.S. Department of Transportation, Federal Highway Administration, Office of Planning, National Highway System Intermodal Connectors, available at <http://www.fhwa.dot.gov/hep10/nhs/intermodalconnectors/index.html> as of July 5, 2005

Rail: Association of American Railroads, *Railroad Facts* (Washington, DC: various issues).

Navigable channels: U.S. Army Corps of Engineers.

Great Lakes-St. Lawrence Seaway: Great Lakes-St. Lawrence Seaway System, "Seaway Facts," available at <http://www.greatlakes-seaway.com/en/aboutus/seawayfacts.html> as of Jan. 26, 2006

Oil pipelines: 1980-2002: Eno Transportation Foundation, *Transportation in America, 2002* (Washington, DC: 2002). 2003: U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Office of Pipeline Safety, Pipeline Statistics, Internet site <http://ops.dot.gov/stats/lpo.htm> as of July 5, 2005.

Gas pipelines: American Gas Association, *Gas Facts* (Arlington, VA: Annual issues).

A vast number of vehicles and vessels move goods over the transportation network. The number of commercial trucks climbed 41 percent between 1980 and 2004, but their share of the total highway vehicle fleet remained constant. The character of the commercial truck fleet itself also remained stable, with the number of combination trucks and single-unit trucks both growing by about 40 percent over this period. In comparison, the number of rail freight cars has declined since 1980 as newer cars typically have greater capacity than older ones.

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

| | 1980 | 1990 | 2000 | 2004 |
|--|--------------------|--------------------|--------------------|--------------------|
| Highway | 161,490,159 | 193,057,376 | 225,821,241 | 243,023,486 |
| Truck, single-unit 2-axle 6-tire or more | 4,373,784 | 4,486,981 | 5,926,030 | 6,161,028 |
| Truck, combination | 1,416,869 | 1,708,895 | 2,096,619 | 2,010,335 |
| Truck, total | 5,790,653 | 6,195,876 | 8,022,649 | 8,171,363 |
| Trucks as percent of all highway vehicles | 3.6 | 3.2 | 3.6 | 3.4 |
| Rail | | | | |
| Class I, locomotive | 28,094 | 18,835 | 20,028 | 22,015 |
| Class I, freight cars ¹ | 1,168,114 | 658,902 | 560,154 | 473,773 |
| Nonclass I freight cars ¹ | 102,161 | 103,527 | 132,448 | 120,169 |
| Car companies and shippers freight cars ¹ | 440,552 | 449,832 | 688,194 | 693,978 |
| Water | 38,788 | 39,445 | 41,354 | 40,290 |
| Nonself-propelled vessels ² | 31,662 | 31,209 | 33,152 | 31,296 |
| Self-propelled vessels ³ | 7,126 | 8,236 | 8,202 | 8,994 |
| Oceangoing steam and motor ships ⁴ | 864 | 636 | 454 | 412 |
| US Flag fleet as percent of world fleet ⁴ | 3.5 | 2.7 | 1.6 | 1.4 |

¹Beginning with 2001 data, Canadian-owned U.S. railroads are excluded. This accounts for about 47,000 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.

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

Sources: **Highway:** U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: annual issues).

Rail: Association of American Railroads, *Railroad Facts 2005* (Washington, DC: 2005).

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:** U.S. Department of Transportation, Maritime Administration, *Merchant Fleets of the World* (Washington, DC: Annual issues).

Most heavy truck-miles are made in the carriage of commodities. Nevertheless, about 20 percent of truck-miles are made with no product on board.

TABLE 3-3. TRUCK-MILES BY PRODUCTS CARRIED: 2002¹

| Products carried | Millions of miles |
|--|--------------------------|
| Total² | 145,172 |
| 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 products foodstuff | 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 3-3. TRUCK-MILES BY PRODUCTS CARRIED: 2002

Source: U.S. Department of Commerce, Census Bureau, *Vehicle Inventory and Use Survey 2002: United States* (Washington, DC: 2004), available at <http://www.census.gov/svsd/www/02vehinv.html> as of July 6, 2005.

TABLE 3-4. NUMBER AND VEHICLE MILES TRAVELED (VMT) OF TRUCKS BY AVERAGE WEIGHT (INCLUDING VEHICLE AND LOAD)¹

| Average weight (pounds) | 1987 | | 1992 | | 1997 | | 2002 | | Percent change, 1987-2002 | |
|-------------------------|--------------------|----------------|--------------------|----------------|--------------------|----------------|--------------------|----------------|---------------------------|------------|
| | 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 |

¹Excludes 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.

The weight profile of heavy trucks on the road (those over 10,000 pounds) changed between 1987 and 2002. The number of light-heavy trucks (between 10,000 and 19,500 pounds) and heavy-heavy trucks (over 26,000 pounds) increased 86 percent and 42 percent respectively. Over the same period, the number of medium-heavy

TABLE 3-5. COMMERCIAL VEHICLE WEIGHT ENFORCEMENT ACTIVITIES

| | 2000 | 2001 | 2002 | 2003 |
|------------------------------|-------------|-------------|-------------|-------------|
| All weighs | 192,991,221 | 198,459,894 | 208,429,680 | 177,369,377 |
| Weigh-in-motion | 92,908,114 | 98,177,442 | 106,662,180 | 95,078,759 |
| Static weighs ¹ | 100,103,107 | 100,282,452 | 101,861,470 | 82,290,618 |
| Semiportable scales | NA | 902,380 | 592,604 | 522,758 |
| Fixed scales | NA | 98,751,448 | 99,710,078 | 81,276,662 |
| Portable scales | NA | 628,624 | 1,558,788 | 491,198 |
| Violations ² | 653,720 | 663,706 | 657,308 | 515,587 |
| Axle weight violations | NA | 281,681 | 271,308 | 254,910 |
| Gross weight violations | NA | 141,707 | 144,518 | 132,258 |
| Bridge weight violations | NA | 240,318 | 241,482 | 128,419 |
| Permits ³ | 3,483,746 | 3,402,522 | 3,566,236 | 3,554,449 |
| Non-divisible trip permits | NA | 2,685,971 | 2,603,257 | 2,629,392 |
| Non-divisible annual permits | NA | 197,328 | 251,245 | 234,607 |
| Divisible trip permits | NA | 226,100 | 240,782 | 258,206 |
| Divisible annual permits | NA | 289,400 | 422,522 | 377,482 |
| Divisible overwidth permits | NA | 3,723 | 48,430 | 44,762 |

Key: NA = not available.

¹Static weighs include the total vehicles weighed from semiportable, 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 annual basis, as well as the overwidth movement of a divisible load.

TABLE 3-4. NUMBER AND VEHICLE MILES TRAVELED (VMT) OF TRUCKS BY AVERAGE WEIGHT (INCLUDING VEHICLE AND LOAD)

Sources: U.S. Department of Commerce, Census Bureau, *2002 Vehicle Inventory and Use Survey: United States* (Washington, DC: 2004), available at <http://www.census.gov/svsd/www/02vehinv.html> as of July 1, 2005; U.S.

Department of Commerce, Census Bureau, *1992 Truck Inventory and Use Survey: United States* (Washington, DC: 1995), available at <http://www.census.gov/svsd/www/97vehinv.html> as of July 1, 2005.

TABLE 3-5. COMMERCIAL VEHICLE WEIGHT ENFORCEMENT ACTIVITIES

Source: U.S. Department of Transportation, Federal Highway Administration, Annual State Certifications of Size and Weight Enforcement on Federal-aid Highways, as prescribed under CFR Part 657.

trucks (between 19,501 and 26,000 pounds) grew by only 19 percent. Trucks between 60,000 and 80,000 pounds average weight form the largest category in both number of trucks and vmt because in most cases 80,000 pounds is the maximum allowed on the highway system.

Federal and state governments are very 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 are made each year, about half are weigh-in-motion and half static. Less than 1 percent of weighs discover violations.

In addition to weight, Federal and state governments are also interested in the length and other characteristics of commercial trucks using the road system. Twenty nine states have semitrailer length limitations on the National Truck Network other than the 48-foot limit set by Federal law for a semitrailer operating in a truck tractor-semi-trailer combination.

TABLE 3-6. SEMITRAILER LENGTH LIMITATIONS ON THE NATIONAL TRUCK NETWORK BY STATE (48 FEET UNLESS OTHERWISE SPECIFIED)

| State | Length limitation (feet and inches) |
|-------------------------|-------------------------------------|
| Alabama | 53-6 |
| Arizona | 57-6 |
| Arkansas | 53-6 |
| California ¹ | 48-0 |
| Colorado | 57-4 |
| Delaware | 53-0 |
| Illinois | 53-0 |
| Indiana ² | 48-6 |
| Iowa | 53-0 |
| Kansas | 57-6 |
| Kentucky | 53-0 |
| Louisiana | 59-6 |
| Mississippi | 53-0 |
| Missouri | 53-0 |
| Montana | 53-0 |
| Nebraska | 53-0 |
| Nevada | 53-0 |
| New Mexico | 57-6 |
| North Dakota | 53-0 |
| Ohio | 53-0 |
| Oklahoma | 59-6 |
| Oregon | 53-0 |
| Pennsylvania | 53-0 |
| Rhode Island | 48-6 |
| South Dakota | 53-0 |
| Tennessee | 50-0 |
| Texas | 59-0 |
| Wisconsin ³ | 48-0 |
| Wyoming | 57-4 |

¹Semitrailers up to 53 feet may also operate without a permit by conforming to a kingpin-to-rear-most axle distance of 38 feet.

²Semitrailers up to 53 feet in length may operate without a permit by conforming to a kingpin-to-rear-most axle distance of 40 feet and 6 inches. Semitrailers that are consistent with 23 CFR 23 658.13(h) may operate without a permit provided the distance from the kingpin to the center of the rear axle is 46 feet or less.

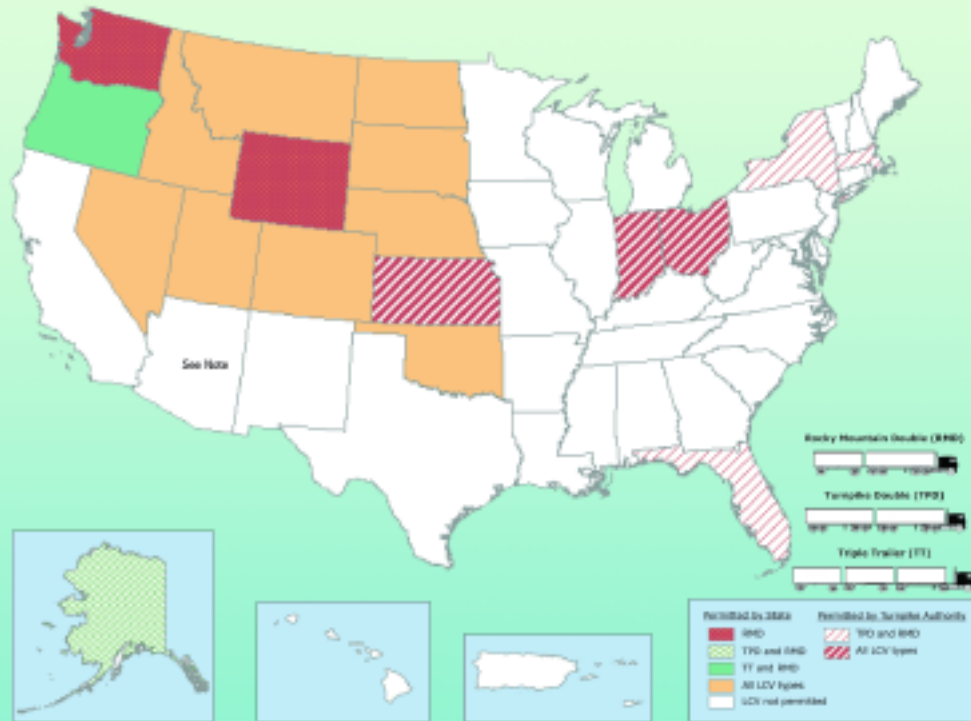
³Semitrailers up to 53 feet in length may operate without a permit by conforming to a kingpin-to-rear-most axle distance of 41 feet, measured to the center of the rear tandem assembly. Semitrailers that are consistent with 23 CFR 658.13(h) may operate without a permit provided the distance from the kingpin to the center of the rear axle is 46 feet or less.

Note: The National Truck Network is the composite of the individual network of highways from each state on which vehicles authorized by the Surface Transportation Assistance Act of 1982 are allowed to operate.

TABLE 3-6. SEMITRAILER LENGTH LIMITATIONS ON THE NATIONAL TRUCK NETWORK BY STATE

Source: U.S. Department of Transportation, Federal Highway Administration, Truck Size and Weight, Route Designations - Length, Width and Weight Limitations, Code of Federal Regulations, Title 23, Part 658.

FIGURE 3-1. PERMITTED LONGER COMBINATION VEHICLES (LCVs) BY STATE AND TRUCK CONFIGURATION



Fourteen states and six state turnpike authorities allow at least one type of Longer Combination Vehicle (LCV) on at least some parts of the road network.

FIGURE 3-1. PERMITTED LONGER COMBINATION VEHICLES (LCVs) BY STATE AND TRUCK CONFIGURATION

Source: U.S. Department of Transportation, Federal Highway Administration, *Comprehensive Truck Size and Weight Study, Volume II* (Washington, DC: 2000).

The speed limit is another important variable for road users. Speed limits for trucks vary from state to state and often differ from limits set for passenger vehicles.

As highway traffic increases over the next twenty years, the conditions that truckers will encounter on the roads are expected to worsen considerably.

TABLE 3-7. MAXIMUM POSTED SPEED LIMITS ON RURAL INTERSTATES: 2006 (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 | 65 | 65 |
| Louisiana | 70 | 70 |
| Maine | 65 | 65 |
| Maryland | 65 | 65 |
| Massachusetts | 65 | 65 |
| Michigan | 55 | 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 | ² 55 | 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 | 65 | 75 |
| Utah | 75 | 75 |
| Vermont | 65 | 65 |
| Virginia | ³ 65 | ³ 65 |
| Washington | 60 | 70 |
| West Virginia | 70 | 70 |
| Wisconsin | 65 | 65 |
| Wyoming | 75 | 75 |

¹ Urban Interstate.

² The maximum speed for trucks on the Ohio Turnpike is 65 miles per hour (mph).

³ Effective July 1, 2006, the posted speed limit on I-85 may be as high as 70 mph.

Note: 55 mph = 89 kilometers per hour (kph); 60 mph = 97 kph; 65 mph = 105 kph; 70 mph = 113 kph.

TABLE 3-7. MAXIMUM POSTED SPEED LIMITS ON RURAL INTERSTATES: 2006

Source: Insurance Institute for Highway Safety, Maximum Posted Speed Limits for Passenger Vehicles as of June 2006, available at http://www.iihs.org/laws/state_laws/speed_limit_laws.html as of June 22, 2006.



FIGURE 3-2. NATIONAL HIGHWAY SYSTEM ESTIMATED PEAK PERIOD CONGESTION: 1998

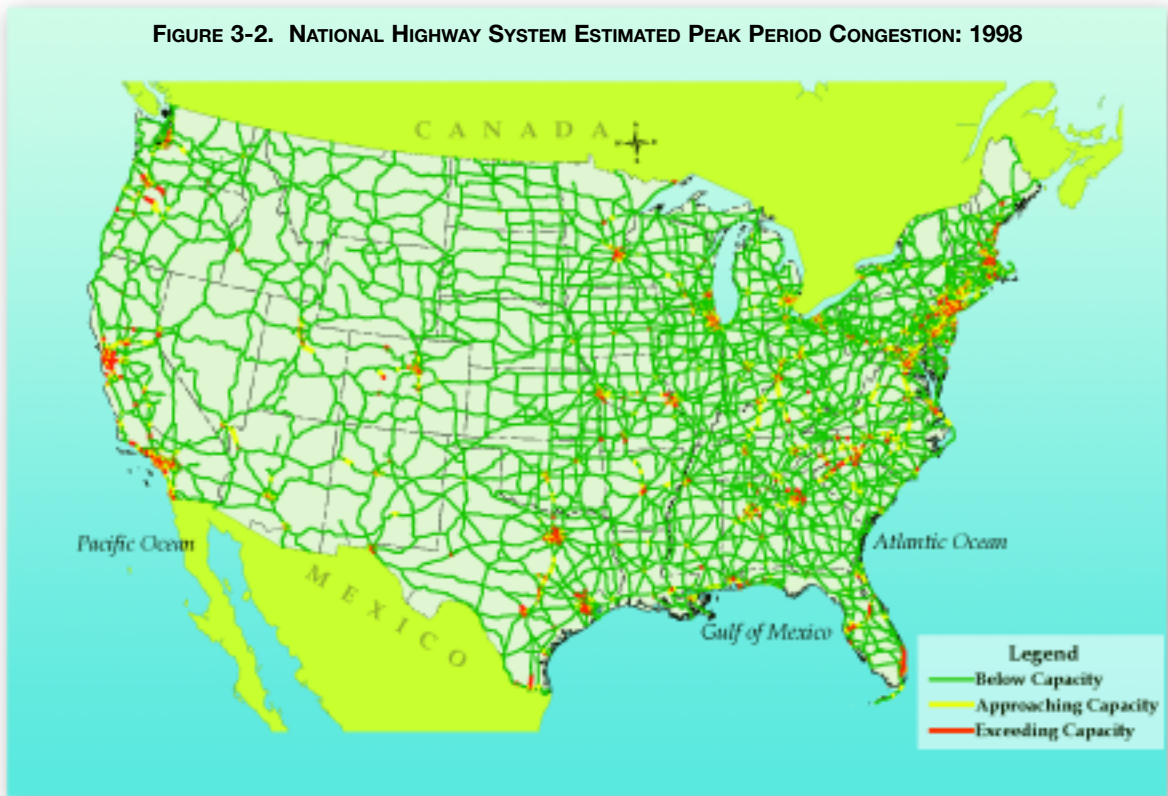


FIGURE 3-3. NATIONAL HIGHWAY SYSTEM ESTIMATED PEAK PERIOD CONGESTION: 2020

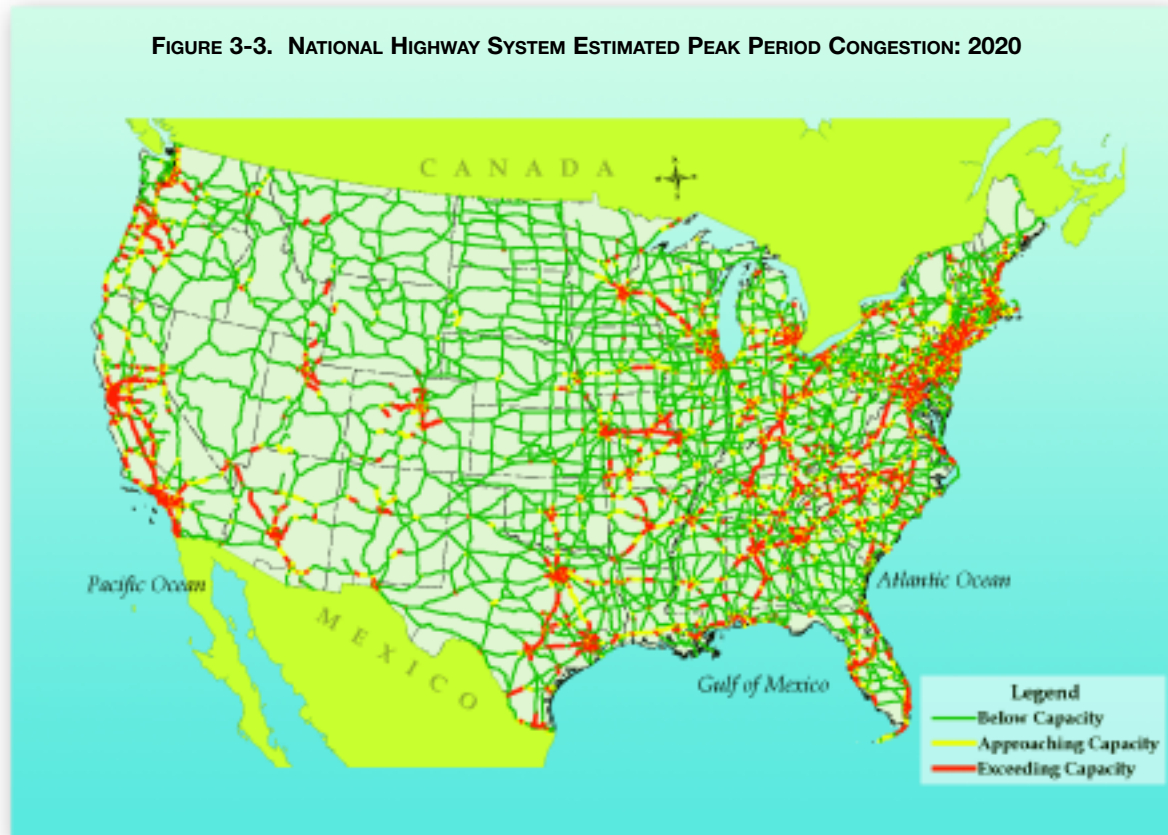


FIGURE 3-2. NATIONAL HIGHWAY SYSTEM ESTIMATED PEAK PERIOD CONGESTION: 1998

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, 2002.

FIGURE 3-3. NATIONAL HIGHWAY SYSTEM ESTIMATED PEAK PERIOD CONGESTION: 2020

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, 2002.

IV. THE FREIGHT TRANSPORTATION INDUSTRY

The freight industry has many components, encompassing companies large and small. All told there were about 200,000 transportation and warehousing establishments in 2002, with more than half of those primarily engaged in trucking. Trucking revenue accounts for about 40 percent of the transportation and warehousing sector. Revenue generated by warehousing is a small percentage of the entire transportation and warehousing sector.

TABLE 4-1. ECONOMIC CHARACTERISTICS OF TRANSPORTATION AND WAREHOUSING IN FREIGHT DOMINATED MODES NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS) BASIS

| | Establishments | | Revenue (\$ thousands) | | Payroll (\$ thousands) | | Paid Employees | |
|---|----------------|----------------|------------------------|--------------------|------------------------|--------------------|------------------|------------------|
| | 1997 | 2002 | 1997 | 2002 | 1997 | 2002 | 1997 | 2002 |
| Transportation and warehousing¹ | 178,025 | 200,421 | 318,245,044 | 394,456,801 | 82,346,182 | 118,251,681 | 2,920,777 | 3,757,426 |
| Rail transportation | NA | NA | NA | NA | NA | NA | NA | NA |
| Water transportation | 1,921 | 1,924 | 24,019,168 | 23,124,300 | 2,834,114 | 3,031,880 | 72,857 | 65,326 |
| Truck transportation ¹ | 103,798 | 112,698 | 141,225,398 | 165,561,328 | 38,471,272 | 47,833,733 | 1,293,790 | 1,437,259 |
| Pipeline transportation | 2,311 | 2,512 | 26,836,992 | 27,641,362 | 2,660,576 | 3,082,558 | 49,280 | 46,556 |
| Support activities for transportation | 30,675 | 34,223 | 39,758,245 | 62,315,569 | 12,592,441 | 16,558,036 | 411,640 | 478,166 |
| Couriers and messengers | 10,887 | 12,754 | 39,812,433 | 59,373,155 | 14,071,630 | 17,431,848 | 530,839 | 578,257 |
| Warehousing and storage ¹ | 6,497 | 12,637 | 10,657,925 | 17,924,787 | 2,926,119 | 18,689,122 | 109,760 | 639,174 |

Key: NA = not available; R = revised.

¹Enterprise support establishments are included in 2002 but not 1997, thus the two years are not comparable.

Notes: Total includes air transportation, transit and ground passenger transportation, and scenic and sightseeing transportation. Data are for establishments in which transportation is the primary business. Data exclude transportation provided privately, such as trucking organized "in-house" by a grocery company. Data are not collected for rail transportation nor for governmental organizations even when their primary activity would be classified in industries covered by the census. For example, data are not collected for publicly-operated buses and subway systems. Data for 2002 are preliminary and subject to change.

TABLE 4-2. ECONOMIC CHARACTERISTICS OF FREIGHT RAILROADS

| | Class I | | Non-Class I | | Total | |
|---------------------------------|---------|---------|-------------|--------|---------|---------|
| | 1997 | 2002 | 1997 | 2002 | 1997 | 2002 |
| Number of railroads | 9 | 7 | 541 | 545 | 550 | 552 |
| Freight revenue (billions \$) | 32.3 | 34.1 | 3.0 | 2.8 | 35.3 | 36.9 |
| Operating revenue (billions \$) | 33.1 | 35.3 | NA | NA | NA | NA |
| Employees | 177,981 | 157,372 | 22,736 | 19,688 | 200,717 | 177,060 |

Key: NA = not available.

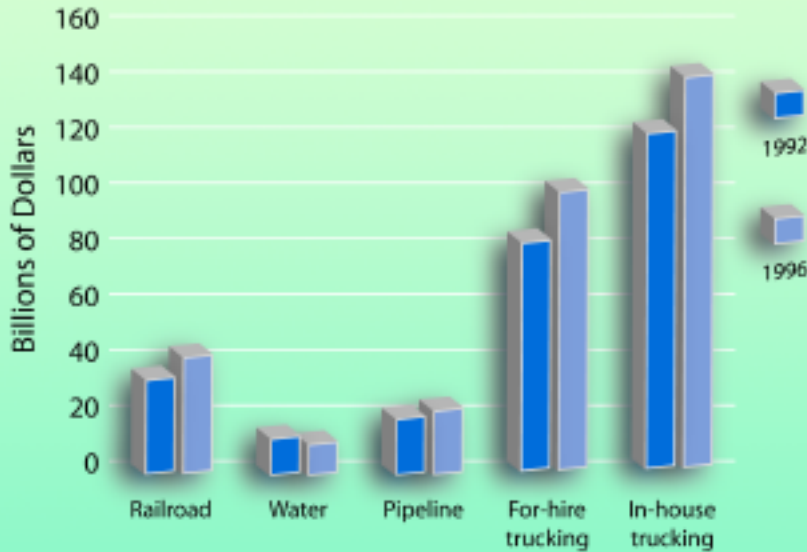
TABLE 4-1. ECONOMIC CHARACTERISTICS OF TRANSPORTATION AND WAREHOUSING IN FREIGHT DOMINATED MODES NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS) BASIS

Source: U.S. Department of Commerce, Census Bureau, *2002 Economic Census, Transportation and Warehousing, United States*, available at http://www.census.gov/econ/census02/data/us/US000_48.HTM as of September 14, 2005; U.S. Department of Commerce, Census Bureau, *1997 Economic Census, Transportation and Warehousing, United States*, available at http://www.census.gov/epcd/ec97/us/US000_48.HTM as of September 14, 2005.

TABLE 4-2. ECONOMIC CHARACTERISTICS OF FREIGHT RAILROADS

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

Figure 4-1: Value Added by Freight Transportation to GDP by Mode

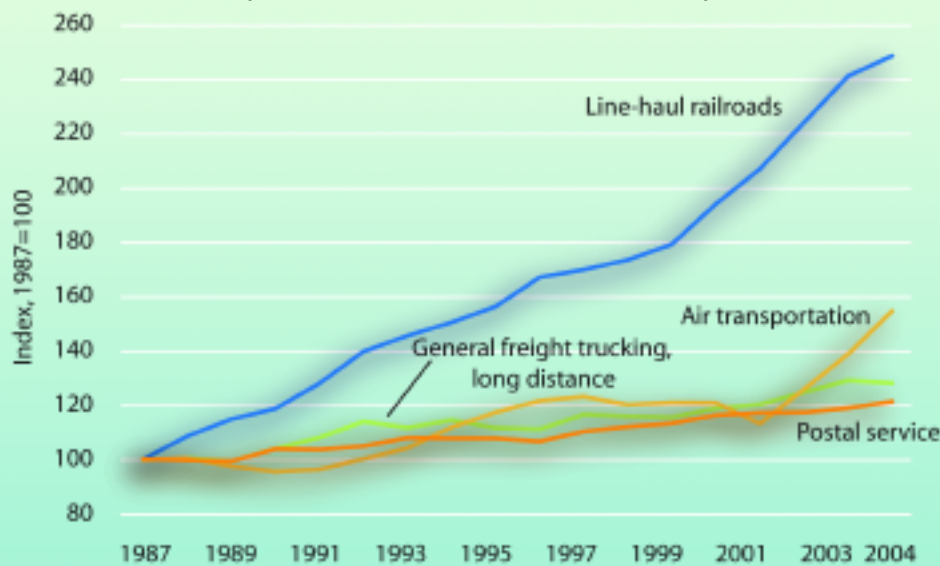


¹Based on the number of paid hours. Real gross domestic product in the business and nonfarm business sectors is the basis of the output components of the productivity measures. These output components are based on and are consistent with the National Income and Product Accounts (NIPA), including the gross domestic product (GDP) measure, prepared by the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce.

Freight transportation is a big part of the economy. The value generated by transportation services in moving goods and people on the transportation system is about 5 percent of gross domestic product. In the transportation services sector about 60 percent of the value is generated by for-hire transportation services and the rest is generated by “in-house” transportation (transportation provided by businesses for their own use).

In-house trucking accounted for \$142 billion of GDP in 1996 (the latest year for which data are available) and for-hire trucking accounted for \$101 billion.

Figure 4-2. Productivity in Selected Transportation Industries: 1987-2004 (OUTPUT PER EMPLOYEE,¹ INDEX, 1987 = 100)



¹Based on the number of paid hours. Real gross domestic product in the business and nonfarm business sectors is the basis of the output components of the productivity measures. These output components are based on and are consistent with the National Income and Product Accounts (NIPA), including the gross domestic product (GDP) measure, prepared by the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce.

In general, moving goods is cheaper now than in the past. Productivity has improved in both long-distance railroading and long-distance trucking over the past decade, but much more quickly in rail than road transportation. Between 1987 and 2004, output per hour worked more than doubled in line-haul railroading but

grew only 55 percent in long distance, general freight trucking. Line-haul railroads primarily engage in operating railroads for the transport of passengers and/or cargo over a long distance within a rail network. These establishments do not include switching and terminal operations or short distance (or local) railroads. Long distance, general freight trucking establishments are operations other than those primarily engaged in local trucking and specialized trucking. Specialized trucking establishments are engaged in the transportation of freight that, because of size, weight, shape, or other inherent characteristics, requires specialized equipment, such as flatbeds, tankers, or refrigerated trailers.

TABLE 4-3. EMPLOYMENT IN FOR-HIRE TRANSPORTATION PRIMARILY SERVING FREIGHT¹ (THOUSANDS)

| | 1980 | 1990 | 2000 | 2004 | 2005 |
|---|---------------|----------------|----------------|--------------------|----------------|
| Total U.S. labor force² | 90,528 | 109,487 | 131,785 | (R) 131,435 | 133,463 |
| Transportation and warehousing | 2,961 | 3,476 | 4,410 | (R) 4,249 | 4,347 |
| Rail transportation | 518 | 272 | 232 | (R) 226 | 228 |
| Water transportation | NA | 57 | 56 | (R) 56 | 61 |
| Truck transportation | NA | 1,122 | 1,406 | (R) 1,352 | 1,393 |
| Pipeline transportation | NA | 60 | 46 | (R) 38 | 38 |
| Support activities for transportation | NA | 364 | 537 | (R) 535 | 551 |
| Couriers and messengers | NA | 375 | 605 | (R) 557 | 572 |
| Warehousing and storage | NA | 407 | 514 | (R) 558 | 585 |

Key: NA = not available; R = revised.

¹Annual averages.

²Excludes farm employment

Note: These data include workers employed in transportation industries but not necessarily in a transportation occupation, such as a lawyer working for a trucking company. Moreover, these data exclude workers in transportation occupations employed by non-transportation industries, such as a truck driver employed by a retail company.

Employment in many transportation industries has remained steady or has grown over the past two decades, but it has plummeted in rail transportation as productivity has soared. Between 1980 and 2005, rail employment declined nearly 60 percent. Consequently, in 2005 rail transportation employed only 5 percent of those working in the transportation and warehousing industry compared with 18 percent in 1980. By comparison, employment in trucking in 2005 accounted for about one-third of employment in transportation and warehousing.

FIGURE 4-1: VALUE ADDED BY FREIGHT TRANSPORTATION TO GDP BY MODE

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, Special Tabulation, September 2000.

FIGURE 4-2. PRODUCTIVITY IN SELECTED TRANSPORTATION INDUSTRIES: 1987-2003

Source: U.S. Department of Labor, Bureau of Labor Statistics, Industry Productivity, available at <http://www.bls.gov/> as of September 12, 2006.

TABLE 4-3. EMPLOYMENT IN FOR-HIRE TRANSPORTATION PRIMARILY SERVING FREIGHT

Source: U.S. Department of Labor, Bureau of Labor Statistics, Current Employment Statistics survey, available at www.bls.gov as of May 3, 2006.

Freight transportation is a major employer, with truck driving by far the largest freight transportation occupation in the United States. There were nearly three million truck drivers in 2005; about 54 percent of these professionals drive heavy/tractor trailer trucks, 32 percent drive light/delivery service trucks, and about 14 percent are driver/sales workers.

TABLE 4-4. EMPLOYMENT IN SELECTED FREIGHT TRANSPORTATION AND FREIGHT TRANSPORTATION-RELATED OCCUPATIONS

| Occupation (SOC code) | 1999 | 2000 | 2004 | 2005 |
|---|-----------|-----------|-----------|-----------|
| Vehicle operators, pipeline operators, and primary support | | | | |
| Driver/sales worker (53-3031) | 385,210 | 373,660 | 406,910 | 400,530 |
| Truck drivers, heavy and tractor-trailer (53-3032) | 1,558,400 | 1,577,070 | 1,553,370 | 1,624,740 |
| Truck drivers, light or delivery services (53-3033) | 1,085,050 | 1,033,220 | 938,730 | 938,280 |
| Locomotive engineers (53-4011) | 19,940 | 29,390 | 31,180 | 37,390 |
| Rail yard engineers, dinkey operators, and hostlers (53-4013) | 5,070 | 4,020 | 6,170 | 6,970 |
| Railroad brake, signal, and switch operators (53-4021) | 14,500 | 16,830 | 16,410 | 20,700 |
| Railroad conductors and yardmasters (53-4031) | 36,680 | 40,380 | 35,720 | 38,330 |
| Sailors and marine oilers (53-5011) | 27,200 | 30,090 | 27,570 | 31,090 |
| Captains, mates, and pilots of water vessels (53-5021) | 20,660 | 21,080 | 25,200 | 28,570 |
| Ship engineers (53-5031) | 6,800 | 7,370 | 10,330 | 13,240 |
| Bridge and lock tenders (53-6011) | 6,970 | 4,790 | 3,500 | 3,620 |
| Gas compressor and gas pumping station operators (53-7071) | 6,940 | 6,510 | 4,680 | 3,950 |
| Pump operators, except wellhead pumpers (53-7072) | 13,480 | 13,730 | 9,810 | 9,970 |
| Transportation equipment manufacturing and maintenance occupations | | | | |
| Bus and truck mechanics and diesel engine specialists (49-3031) | 273,320 | 258,800 | 251,430 | 248,280 |
| Rail car repairers (49-3043) | 7,230 | 10,620 | 18,140 | 24,270 |
| Transportation infrastructure construction and maintenance occupations | | | | |
| Rail-track laying and maintenance equipment operators (47-4061) | 8,620 | 9,940 | 10,430 | 13,510 |
| Signal and track switch repairers (49-9097) | 3,720 | 5,540 | 7,780 | 6,100 |
| Dredge operators (53-7031) | 1,910 | 3,100 | 1,730 | 1,720 |
| Secondary support service occupations | | | | |
| Dispatchers, except police, fire, and ambulance (43-5032) | 171,560 | 167,180 | 165,910 | 172,550 |
| Postal service mail carriers (43-5052) | 352,550 | 354,980 | 344,050 | 347,180 |
| Shipping, receiving, and traffic clerks (43-5071) | 886,230 | 864,530 | 747,270 | 759,910 |
| Transportation inspectors (53-6051) | 22,440 | 26,520 | 24,140 | 25,570 |
| Tank car, truck, and ship loaders (53-7121) | 20,830 | 17,480 | 16,530 | 15,950 |

Key: SOC = Standard Occupational Classification.

TABLE 4-4. EMPLOYMENT IN SELECTED FREIGHT TRANSPORTATION AND FREIGHT TRANSPORTATION-RELATED OCCUPATIONS

Source: U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment and Wages, 2005 (Washington, DC: May 2005), available at <http://www.bls.gov/oes> as of May 24, 2006.

V. SAFETY, ENERGY, AND ENVIRONMENTAL CONSEQUENCES OF FREIGHT TRANSPORTATION

Growing demand for freight transportation heightens concerns about its safety, energy consumption, and environmental consequences. Most of our current knowledge is in safety, with some in energy consumption. More information is needed to understand and fix freight-related environmental issues.

TABLE 5-1. TRANSPORTATION FATALITIES BY FREIGHT TRANSPORTATION MODE

| | 1980 | 1990 | 2000 | 2004 | 2005 |
|--|---------------|---------------|---------------|-------------------|---------------|
| Total transportation fatalities (passenger and freight) | NA | 47,347 | 44,384 | (R) 45,005 | NA |
| Highway (passenger and freight) | 51,091 | 44,599 | 41,945 | (R) 42,836 | 44,443 |
| Large truck occupants ¹ | 1,262 | 705 | 754 | (R) 766 | 803 |
| Others killed in crashes involving large trucks | 4,709 | 4,567 | 4,528 | (R) 4,469 | 4,409 |
| Large truck occupants ¹ (percent) | 2.5 | 1.6 | 1.8 | 1.8 | 1.8 |
| Others killed in crashes involving large trucks (percent) | 9.2 | 10.2 | 10.8 | 10.4 | 10.3 |
| Railroad (passenger and freight) | 1,417 | 1,297 | 937 | (R) 896 | 892 |
| Highway-rail crossing ² | 833 | 698 | 425 | (R) 370 | 357 |
| Railroad ^{2,3} | 584 | 599 | 512 | (R) 526 | 535 |
| Waterborne (passenger and freight) | 487 | 186 | 187 | 93 | U |
| Vessel-related ⁴ | 206 | 85 | 53 | 36 | U |
| Freight ship | 8 | 0 | 0 | 2 | U |
| Tank ship | 4 | 5 | 0 | 3 | U |
| Tug / towboat | 14 | 13 | 2 | 1 | U |
| Offshore supply | NA | 2 | 3 | 0 | U |
| Fishing vessel | 60 | 47 | 30 | 14 | U |
| Mobile offshore drilling units | NA | 0 | 0 | 0 | U |
| Platform | NA | 1 | 0 | 0 | U |
| Freight barge | NA | 0 | 0 | 1 | U |
| Tank barge | NA | 0 | 0 | 0 | U |
| Miscellaneous | 56 | 11 | 6 | 6 | U |
| Not vessel-related ⁴ | 281 | 101 | 134 | 57 | U |
| Pipeline | 19 | 9 | 38 | (R) 23 | 19 |
| Hazardous liquid pipeline | 4 | 3 | 1 | 5 | 2 |
| Gas pipeline | 15 | 6 | 37 | (R) 18 | 17 |

Key: NA = not available; R = revised.

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

²Includes Amtrak.

³Includes train accidents and other incidents. Most fatalities involve trespassers who are included under other incidents (467 in 2005).

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

⁵Railroad fatalities are preliminary.

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

About 5,200 people died in crashes involving large trucks in 2005, although only 803 of those were large-truck occupants. Fatalities involving large trucks are about 12 percent of all highway fatalities, while trucks account for about 8 percent of highway vehicle-miles traveled (vmt). Despite a doubling of large truck travel between 1980 and 2005, the number of fatalities involving large trucks declined 13 percent over this period.

TABLE 5-1. TRANSPORTATION FATALITIES BY FREIGHT TRANSPORTATION MODE

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *National Transportation Statistics 2006*, available at <http://www.bts.gov/> as of

September 15, 2006

TABLE 5-2. INJURED PERSONS BY FREIGHT TRANSPORTATION MODE

| | 1980 | 1990 | 2000 | 2004 | 2005 |
|--|---------------|------------------|------------------|------------------|------------------|
| TOTAL injured persons (passenger and freight) | NA | NA | 3,259,673 | 2,818,446 | NA |
| Highway (passenger and freight) | NA | 3,231,000 | 3,189,000 | 2,788,000 | 2,699,000 |
| Large truck occupants ¹ | NA | 42,000 | 31,000 | 27,000 | 27,000 |
| Others injured in crashes involving large trucks | NA | 108,000 | 109,000 | 89,000 | 86,000 |
| Large truck occupants ¹ (percent) | NA | 1.3 | 1.0 | 1.0 | 1.0 |
| Others injured in crashes involving large trucks (percent) | NA | 3.3 | 3.4 | 3.2 | 3.2 |
| Railroad (passenger and freight) | 62,246 | 25,143 | 11,643 | (R) 9,088 | 9,105 |
| Highway-rail grade crossing ² | 3,890 | 2,407 | 1,219 | (R) 1,088 | 989 |
| Railroad ^{2,3} | 58,356 | 22,736 | 10,424 | (R) 8,000 | 8,116 |
| Waterborne (passenger and freight) | NA | NA | 757 | 703 | U |
| Vessel-related ⁴ | 180 | 175 | 150 | 198 | U |
| Freight ship | 8 | 10 | 5 | 4 | U |
| Tank ship | 9 | 13 | 3 | 7 | U |
| Tug / towboat | 27 | 19 | 10 | 22 | U |
| Offshore supply | NA | 9 | 5 | 5 | U |
| Fishing vessel | 28 | 31 | 23 | 36 | U |
| Mobile offshore drilling units | NA | 13 | 0 | 0 | U |
| Platform | NA | 9 | 0 | 0 | U |
| Freight barge | NA | 3 | 2 | 5 | U |
| Tank barge | NA | 3 | 0 | 1 | U |
| Miscellaneous | 98 | 12 | 8 | 25 | U |
| Not related to vessel casualties ⁴ | NA | NA | 607 | 505 | U |
| Pipeline | 192 | 76 | 81 | (R) 60 | 49 |
| Hazardous liquid pipeline | 15 | 7 | 4 | (R) 16 | 2 |
| Gas pipeline | 177 | 69 | 77 | (R) 44 | 47 |

Key: NA = not available; R = revised.

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

² Includes Amtrak.

³Includes train accidents and other incidents. Most injuries involve workers on duty (5,543 in 2005).

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

⁵Railroad injuries are preliminary.

Note: Numbers may not add to totals due to some injuries being counted in more than one mode.

About 113,000 people are injured each year in freight transportation. Like fatalities, most injuries involve trucks. Yet, these injuries account for less than 5 percent of the total number of people injured on the highway each year. Approximately, 10 percent of injuries are the result of non-highway related incidents, mostly railroading. Since 1980, railroading has become much safer with a drop in injuries of more than 80 percent.

TABLE 5-2. INJURED PERSONS BY FREIGHT TRANSPORTATION MODE

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *National Transportation Statistics 2006*, available at <http://www.bts.gov/> as of September 15, 2006.

Large trucks were involved in about 7 percent of all highway crashes in 2005. The estimated number of crashes in 2005 is up by about 12 percent since 1990, a good deal less than the roughly 50 percent increase in truck-miles driven over the same period.

TABLE 5-3. TRANSPORTATION ACCIDENTS BY FREIGHT TRANSPORTATION MODE

| | 1980 | 1990 | 2000 | 2004 | 2005 |
|---|--------|-----------|-----------|-----------|-----------|
| Highway (passenger and freight) | NA | 6,471,000 | 6,394,000 | 6,181,000 | 6,159,000 |
| Large truck ¹ | NA | 372,000 | 438,000 | 416,000 | 442,000 |
| Large truck ¹ (percent of total) | NA | 5.7 | 6.9 | 6.7 | 7.2 |
| Rail (passenger and freight) | | | | | |
| Highway-rail grade crossing ^{2,3} | 10,796 | 5,715 | 3,502 | (R) 3,074 | 3,040 |
| Railroad ^{2,4} | 8,205 | 2,879 | 2,983 | (R) 3,367 | 3,187 |
| Waterborne (passenger and freight) | | | | | |
| Vessel-related | 4,624 | 3,613 | 5,403 | 4,962 | NA |
| Pipeline | | | | | |
| Hazardous liquid pipeline | 246 | 180 | 146 | (R) 142 | 136 |
| Gas pipeline | 1,524 | 198 | 234 | (R) 297 | 353 |

Key: NA = not available; R = revised.

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

²Includes Amtrak.

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

⁴Train accidents only.

TABLE 5-3. TRANSPORTATION ACCIDENTS BY FREIGHT TRANSPORTATION MODE

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *National Transportation Statistics 2006*, available at <http://www.bts.gov/> as of

September 15, 2006.

TABLE 5-4. HAZARDOUS MATERIALS TRANSPORTATION INCIDENTS

| | 1980 | 1990 | 2000 | 2004 | 2005 |
|--------------------------|---------------|--------------|---------------|-------------------|---------------|
| Total | 15,719 | 8,879 | 17,557 | (R) 14,879 | 14,624 |
| Accident-related | 486 | 297 | (R) 394 | (R) 329 | 315 |
| Air | 223 | 297 | 1,419 | 995 | 1,505 |
| Accident-related | 0 | 0 | (R) 3 | 0 | 7 |
| Highway | 14,161 | 7,296 | 15,063 | (R) 13,097 | 12,359 |
| Accident-related | 347 | 249 | (R) 329 | (R) 282 | 263 |
| Rail | 1,271 | 1,279 | 1,058 | (R) 771 | 693 |
| Accident-related | 134 | 48 | 62 | (R) 47 | 45 |
| Water¹ | 34 | 7 | 17 | (R) 16 | 67 |
| Accident-related | 2 | 0 | 0 | 0 | 0 |
| Other² | 30 | 0 | 0 | 0 | 0 |
| Accident-related | 3 | 0 | 0 | 0 | 0 |

Key: R = revised.

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

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

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

Because most hazardous materials are transported by truck, most incidents related to hazardous materials transportation are on the highways. In 2005, 85 percent of all incidents were highway-related. Moreover, 71 percent of fatalities in hazardous materials transportation occurred in highway transportation during 2005.

A very small share of hazardous material transportation incidents are the result of a vehicular crash or derailment (referred to as “accident-

related”). In 2005, only 2 percent of incidents were accident-related. Most incidents occur because of human error or package failure, particularly during loading and unloading. While only 2 percent of incidents were accident-related in 2005, they accounted for nearly 80 percent of all property damage.

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

| Safety rating | 2000 | | 2004 | | 2005 | |
|----------------|---------------|--------------|------------------|--------------|--------------|--------------|
| | Number | Percent | Number | Percent | Number | Percent |
| Satisfactory | 5,309 | 51.1 | (R) 4,424 | 57.8 | 5,098 | 64.3 |
| Conditional | 3,354 | 32.3 | (R) 2,307 | 30.2 | 1,699 | 21.4 |
| Unsatisfactory | 1,481 | 14.3 | (R) 702 | 9.2 | 441 | 5.6 |
| Not rated | 245 | 2.4 | (R) 218 | 2.8 | 692 | 8.7 |
| Total | 10,389 | 100.0 | (R) 7,651 | 100.0 | 7,930 | 100.0 |

Key: R = revised

Note: A compliance review is an on-site examination of a motor carrier's records and operations to determine whether the carrier meets the Federal Motor Carrier Safety Administration's safety fitness standard. This entails having adequate safety management controls in place to ensure acceptable compliance with applicable safety requirements to reduce the risk associated with: alcohol and controlled substance testing violations; commercial driver's license standard violations; inadequate levels of financial responsibility; the use of unqualified drivers; improper use and driving of motor vehicles; unsafe vehicles operating on the highways; failure to maintain crash registers and copies of crash reports; the use of fatigued drivers; inadequate inspection, repair, and maintenance of vehicles; transportation of hazardous materials; driving and parking rule violations; violation of hazardous materials regulations; motor vehicle crashes and hazardous materials incidents.

TABLE 5-4. HAZARDOUS MATERIALS TRANSPORTATION INCIDENTS

Source: U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Office of Hazardous Materials Safety, Hazardous Materials Information System Database, available at <http://hazmat.dot.gov> as of May 24, 2006.

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

Source: U.S. Department of Transportation, Federal Motor Carrier Administration, Motor Carrier Management Information System (MCMIS), Compliance Review Activity by Safety Rating for Calendar Years, available at <http://www.fmcsa.dot.gov/> as of May 4, 2006.

The safety fitness of motor carriers has improved markedly over the past few years. In 2005, the share of motor carriers rated satisfactory was 64 percent, up from 51 percent in 2000.

Almost a quarter of roadside inspections of commercial vehicles result in the vehicle being taken out-of-service (OOS) for a serious violation. A much lower percentage of driver and hazardous materials inspections result in OOS orders. In 2005, only 7 percent of driver inspections and 6 percent of hazardous materials inspections resulted in an OOS order.

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

| | 2000 | | 2003 | | 2004 | | 2005 | |
|--|-----------|---------|---------------|---------|---------------|---------|-----------|---------|
| | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| All inspections | | | | | | | | |
| Number of inspections | 2,453,776 | 100.0 | (R) 3,013,872 | 100 | (R) 3,019,262 | 100.0 | 2,867,124 | 100.0 |
| With no violations | 639,593 | 26.1 | (R) 812,783 | 27.0 | (R) 810,814 | 26.9 | 772,850 | 27.0 |
| With violations | 1,814,183 | 73.9 | (R) 2,201,089 | 73.0 | (R) 2,208,448 | 73.1 | 2,094,274 | 73.0 |
| Driver inspections | | | | | | | | |
| Number of inspections | 2,396,688 | 100.0 | (R) 2,957,646 | 100.0 | (R) 2,962,085 | 100.0 | 2,808,360 | 100.0 |
| With no violations | 1,459,538 | 60.9 | (R) 1,883,071 | 63.7 | (R) 1,893,106 | 63.9 | 1,782,300 | 63.5 |
| With violations | 937,150 | 39.1 | (R) 1,074,575 | 36.3 | (R) 1,068,979 | 36.1 | 1,026,060 | 36.5 |
| With OOS violations | 191,031 | 8.0 | (R) 200,256 | 6.8 | (R) 197,338 | 6.7 | 184,609 | 6.6 |
| Vehicle inspections | | | | | | | | |
| Number of inspections | 1,908,300 | 100.0 | (R) 2,164,847 | 100.0 | (R) 2,252,986 | 100.0 | 2,093,394 | 100.0 |
| With no violations | 584,389 | 30.6 | (R) 675,167 | 31.2 | (R) 698,396 | 31.0 | 649,658 | 31.0 |
| With violations | 1,323,911 | 69.4 | (R) 1,489,680 | 68.8 | (R) 1,554,590 | 69.0 | 1,443,736 | 69.0 |
| With OOS violations | 452,850 | 23.7 | (R) 495,621 | 22.9 | (R) 531,927 | 23.6 | 489,754 | 23.4 |
| Hazardous materials inspections | | | | | | | | |
| Number of inspections | 133,486 | 100.0 | (R) 181,592 | 100.0 | (R) 179,213 | 100.0 | 170,962 | 100.0 |
| With no violations | 101,098 | 75.7 | (R) 148,409 | 81.7 | (R) 145,763 | 81.3 | 139,191 | 81.4 |
| With violations | 32,388 | 24.3 | (R) 33,183 | 18.3 | (R) 33,450 | 18.7 | 31,771 | 18.6 |
| With OOS violations | 9,964 | 7.5 | (R) 9,575 | 5.3 | 9,957 | 5.6 | 9,496 | 5.6 |

Key: OOS = out of service; R = revised.

Notes: A roadside inspection is an examination of individual commercial motor vehicles and drivers to determine if they are in compliance with the Federal Motor Carrier Safety Regulations and/or Hazardous Materials Regulations. Serious violations result in the issuance of driver or vehicle out of service (OOS) orders. These violations must be corrected before the driver or vehicle can return to service. Moving violations also may be recorded in conjunction with a roadside inspection.

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

Source: U.S. Department of Transportation, Federal Motor Carrier Administration, Motor Carrier Management Information System (MCMS), Roadside Inspection Activity Summary for Calendar Years, available at www.fmcsa.dot.gov as of May 4, 2006.



Table 5-7. Fuel Consumption by Transportation Mode

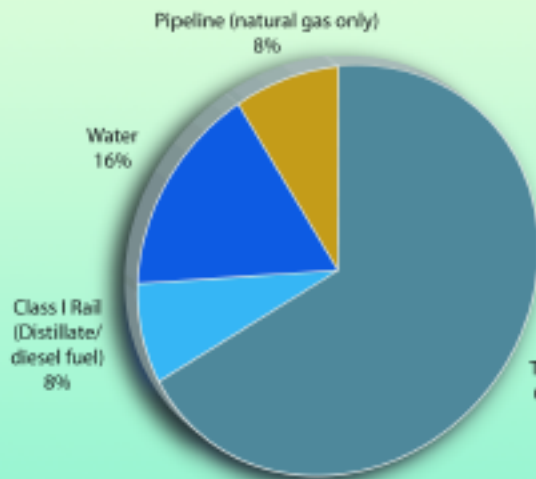
| | 1980 | 1990 | 2000 | 2003 | 2004 |
|--|---------|---------|---------|-------------|---------|
| Highway | | | | | |
| Gasoline, diesel and other fuels (million gallons) | 114,960 | 130,755 | 162,555 | (R) 170,069 | 173,750 |
| Truck, total | 19,960 | 24,490 | 35,229 | (R) 32,696 | 33,968 |
| Single-unit 2-axle 6-tire or more truck | 6,923 | 8,357 | 9,563 | (R) 8,880 | 9,263 |
| Combination truck | 13,037 | 16,133 | 25,666 | (R) 23,815 | 24,705 |
| Truck (percent of total) | 17.4 | 18.7 | 21.7 | (R) 19.2 | 19.6 |
| Rail, Class I (in freight service) | | | | | |
| Distillate / diesel fuel (million gallons) | 3,904 | 3,115 | 3,700 | 3,826 | 4,059 |
| Water | | | | | |
| Residual fuel oil (million gallons) | 8,952 | 6,326 | 6,410 | 3,874 | 4,690 |
| Distillate / diesel fuel oil (million gallons) | 1,478 | 2,065 | 2,261 | 2,217 | 2,140 |
| Gasoline (million gallons) | 1,052 | 1,300 | 1,124 | 1,107 | 1,005 |
| Pipeline | | | | | |
| Natural gas (million cubic feet) | 634,622 | 659,816 | 642,210 | (R) 591,492 | 571,853 |

Key: R = revised.

The number of gallons of fuel burned by commercial trucks nearly doubled over the past twenty years, while fuel use in several other modes declined. Between 1980 and 2004, the fuel consumed in highway freight transportation increased from 20 billion to 34 billion gallons annually. This is due to a substantial increase in the number of trucks on the road, an increase in the average number of miles traveled per truck, and a doubling of truck vmt. Over the same period, fuel use in Class I freight rail increased marginally from 3.9 to 4.1 billion gallons.

In 2004, trucking accounted for 68 percent of freight transportation energy consumption. Water transportation accounted for 16 percent, natural gas pipelines for 8 percent, and Class I rail for 8 percent.

FIGURE 5-1. ENERGY CONSUMPTION BY FREIGHT TRANSPORTATION MODE: 2004



Note: Data do not include energy consumed by oil pipelines (crude petroleum and petroleum products) nor coal slurry/water slurry pipelines.

Table 5-7. Fuel Consumption by Transportation Mode

Sources: **Highway:** U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2004* (Washington, DC: 2005), table VM-1 and similar tables in earlier editions.

Rail: Association of American Railroads, *Railroad Facts* (Washington, DC: November 2005), p. 40.

Water: U.S. Department of Energy, Energy Information Administration, *Fuel Oil and Kerosene Sales 2004* (Washington, DC: 2005), tables 2, 4, and similar tables in earlier editions.

Pipeline: U.S. Department of Energy, *Natural Gas Annual 2004*, DOE/EIA-0131(04) (Washington, DC: December 2005), table 15 and similar tables in earlier editions.

FIGURE 5-1. ENERGY CONSUMPTION BY FREIGHT TRANSPORTATION MODE: 2004

Sources: **Truck:** U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, (Washington, DC: Annual issues), table VM-1. **Rail:** Association of American Railroads, *Railroad Facts* (Washington, DC: 2005), p. 40. **Water:** U.S. Department of Energy, Energy Information Administration, *Fuel Oil and Kerosene Sales* (Washington, DC: Annual issues), tables 2 and 4; U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues), table MF-24. **Pipeline:** U.S. Department of Energy, *Natural Gas Annual 2004*, DOE/EIA-0131(04) (Washington, DC: December 2005), table 15.

Over the past two decades, miles traveled per gallon by single-unit trucks increased by more than 50 percent. Between 1980 and 2004, the fuel consumed increased 34 percent whereas miles traveled increased by 104 percent. As a result, over these years, miles per gallon increased from 5.8 to 8.8.

TABLE 5-8. SINGLE-UNIT 2-AXLE 6-TIRE OR MORE TRUCK FUEL CONSUMPTION AND TRAVEL

| | 1980 | 1990 | 2000 | 2003 | 2004 |
|---|--------|--------|--------|------------|--------|
| Number registered (thousands) | 4,374 | 4,487 | 5,926 | (R) 5,849 | 6,161 |
| Vehicle-miles (millions) | 39,813 | 51,901 | 70,500 | (R) 77,757 | 81,107 |
| Fuel consumed (million gallons) | 6,923 | 8,357 | 9,563 | (R) 8,880 | 9,263 |
| Average miles traveled per vehicle | 9,103 | 11,567 | 11,897 | (R) 13,295 | 13,164 |
| Average miles traveled per gallon | 5.8 | 6.2 | 7.4 | (R) 8.8 | 8.8 |
| Average fuel consumed per vehicle (gallons) | 1,583 | 1,862 | 1,614 | (R) 1,518 | 1,503 |

Key: R = revised

In contrast to single-unit trucks, miles traveled per gallon by combination trucks increased by only 12 percent over the past twenty years. Consequently, the gallons of fuel consumed increased by nearly 90 percent between 1980 and 2004 along with a doubling of miles traveled.

TABLE 5-9. COMBINATION TRUCK FUEL CONSUMPTION AND TRAVEL

| | 1980 | 1990 | 2000 | 2003 | 2004 |
|---|--------|--------|---------|-------------|---------|
| Number registered (thousands) | 1,417 | 1,709 | 2,097 | (R) 1,908 | 2,010 |
| Vehicle-miles traveled (millions) | 68,678 | 94,341 | 135,020 | (R) 140,160 | 145,398 |
| Fuel consumed (million gallons) | 13,037 | 16,133 | 25,666 | (R) 23,815 | 24,705 |
| Average miles traveled per vehicle | 48,472 | 55,206 | 64,399 | (R) 73,445 | 72,325 |
| Average miles traveled per gallon | 5.3 | 5.8 | 5.3 | (R) 5.9 | 5.9 |
| Average fuel consumed per vehicle (gallons) | 9,201 | 9,441 | 12,241 | (R) 12,479 | 12,289 |

Key: R = revised.

Note: 1 mile = 1.61 kilometers; 1 gallon = 3.8 liters.

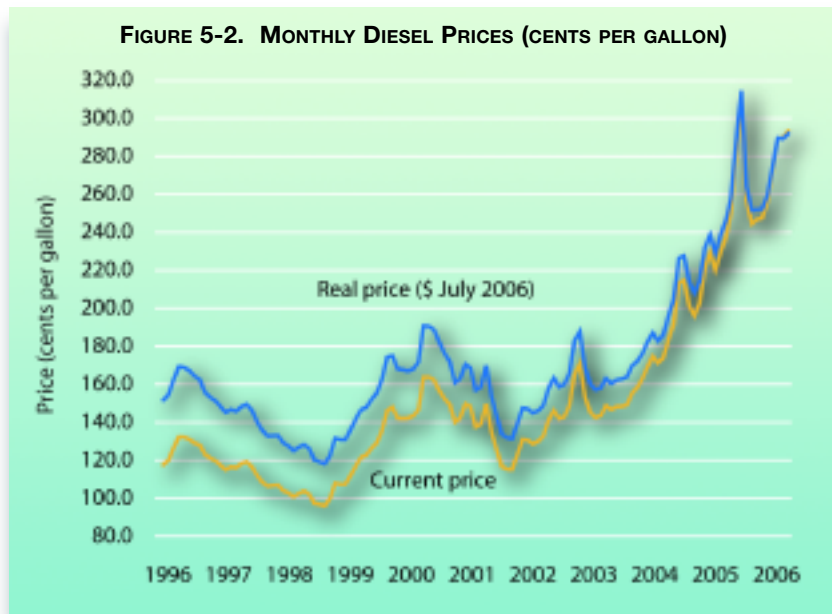
TABLE 5-8. SINGLE-UNIT 2-AXLE 6-TIRE OR MORE TRUCK FUEL CONSUMPTION AND TRAVEL

Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2004* (Washington, DC: 2005), table VM-1 and similar tables in earlier editions.

TABLE 5-9. COMBINATION TRUCK FUEL CONSUMPTION AND TRAVEL

Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2004* (Washington, DC: 2005), table VM-1 and similar tables in earlier editions.





Diesel prices were about 93 percent higher in July 2006 than 10 years earlier (in inflation-adjusted terms). Over that period prices bottomed out in February 1999 at \$1.18 a gallon (in \$ July 2006).

Energy intensity is the amount of energy used in producing a given level of output or activity, in this case transportation.

Since 1980 the energy intensity of both trucking and freight rail have improved. However, over the same period, domestic freight water transportation, measured by Btu per ton-mile, has become less energy efficient.

TABLE 5-10: ENERGY INTENSITIES OF DOMESTIC FREIGHT MODES

| | 1980 | 1990 | 2000 | 2002 | 2003 |
|---|--------|--------|------------|------------|--------|
| Highway (Btu per vehicle-mile) | 24,757 | 22,795 | (R) 23,448 | (R) 23,461 | 23,461 |
| Railroad (Class I) (Btu per freight car-mile) | 18,742 | 16,619 | 14,917 | 15,003 | 15,016 |
| Railroad (Class I) (Btu per ton-mile) | 597 | 420 | 352 | 345 | 344 |
| Water (Btu per ton-mile) | 358 | 387 | 473 | (R) 470 | 417 |

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

Air quality is affected by emissions from freight vehicles. Compared with gasoline fueled cars and trucks, diesel fueled heavy trucks emit small amounts of carbon monoxide (CO) but large amounts of nitrogen oxides (NO_x).

Freight transportation is a major source of NO_x emissions accounting for 27 percent of all U.S. NO_x emissions and half of emissions from mobile sources. Freight transportation also accounts for about one-third of emissions of particulate matter 10 microns in diameter (PM-10) from mobile sources. Most PM-10, however, comes from agricultural

FIGURE 5-2. MONTHLY DIESEL PRICES
Sources: Diesel price: U.S. Department of Energy, Energy Information Agency, U.S. Petroleum Prices, available at www.eia.doe.gov as of September 5, 2006. Consumer price index: U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index – All Urban Consumers, Monthly, available at www.bls.gov as of September 5, 2006.

TABLE 5-10: ENERGY INTENSITIES OF DOMESTIC FREIGHT MODES
Source: Oak Ridge National Laboratory, *Transportation Energy Data Book: Edition 25* (Oak Ridge, TN: 2006).

TABLE 5-11: ESTIMATED NATIONAL AVERAGE VEHICLE EMISSIONS RATES OF HEAVY-DUTY AND LIGHT-DUTY VEHICLES (GRAMS PER MILE)

| | 1990 | 2000 | 2002 | 2004 | 2005 |
|-------------------------------------|-------------|-------------|-------------|-------------|-------------|
| Gasoline (assuming zero RFG) | | | | | |
| Cars | | | | | |
| Exhaust HC | 2.79 | 0.97 | 0.81 | 0.61 | 0.52 |
| Nonexhaust HC | 1.21 | 0.92 | 0.84 | 0.77 | 0.72 |
| Total HC | 3.99 | 1.89 | 1.65 | 1.37 | 1.25 |
| Exhaust CO | 42.89 | 18.53 | 17.58 | 13.79 | 12.57 |
| Exhaust NO _x | 2.70 | 1.29 | 1.20 | 1.00 | 0.92 |
| Light trucks | | | | | |
| Exhaust HC | 3.68 | 1.45 | 1.24 | 0.96 | 0.78 |
| Nonexhaust HC | 1.36 | 0.97 | 0.89 | 0.80 | 0.76 |
| Total HC | 5.04 | 2.42 | 2.13 | 1.76 | 1.54 |
| Exhaust CO | 56.23 | 26.81 | 24.32 | 18.76 | 16.23 |
| Exhaust NO _x | 2.62 | 1.54 | 1.50 | 1.32 | 1.21 |
| Heavy trucks | | | | | |
| Exhaust HC | 3.66 | 1.22 | 0.98 | 0.73 | 0.64 |
| Nonexhaust HC | 2.74 | 1.62 | 1.48 | 1.35 | 1.24 |
| Total HC | 6.40 | 2.84 | 2.46 | 2.08 | 1.88 |
| Exhaust CO | 85.61 | 31.08 | 24.73 | 18.46 | 16.73 |
| Exhaust NO _x | 7.19 | 5.26 | 5.01 | 4.62 | 4.28 |
| Diesel | | | | | |
| Cars | | | | | |
| Exhaust HC | 0.68 | 0.80 | 0.73 | 0.60 | 0.58 |
| Exhaust CO | 1.49 | 1.78 | 1.73 | 1.59 | 1.57 |
| Exhaust NO _x | 1.83 | 1.81 | 1.62 | 1.43 | 1.32 |
| Light trucks | | | | | |
| Exhaust HC | 1.59 | 1.02 | 0.96 | 0.98 | 0.80 |
| Exhaust CO | 2.67 | 1.77 | 1.66 | 1.68 | 1.37 |
| Exhaust NO _x | 2.71 | 1.76 | 1.67 | 1.59 | 1.37 |
| Heavy trucks | | | | | |
| Exhaust HC | 2.21 | 0.79 | 0.69 | 0.58 | 0.54 |
| Exhaust CO | 10.06 | 4.10 | 3.58 | 3.19 | 3.05 |
| Exhaust NO _x | 23.34 | 18.05 | 15.52 | 12.50 | 11.45 |

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

fields, wildfires, and fugitive dust. Consequently, freight transportation is a minor factor when considering total PM-10 emissions.

Trucks are by far the largest contributor to freight emissions nationally, producing two-thirds of NO_x and PM-10 from the freight sector. The U.S. Environmental Protection Agency passed new rules requiring the use of ultra low sulfur diesel (ULSD) fuel in heavy-duty trucks and other diesel-powered highway vehicles beginning in June 2006. ULSD will reduce emissions of NO_x and PM and enable the use of advanced pollution control technologies to meet 2007 emissions standards.

TABLE 5-11: ESTIMATED NATIONAL AVERAGE VEHICLE EMISSIONS RATES OF HEAVY-DUTY AND LIGHT-DUTY VEHICLES
Source: U.S. Environmental Protection Agency, National Vehicle and Fuel Emissions Laboratory.

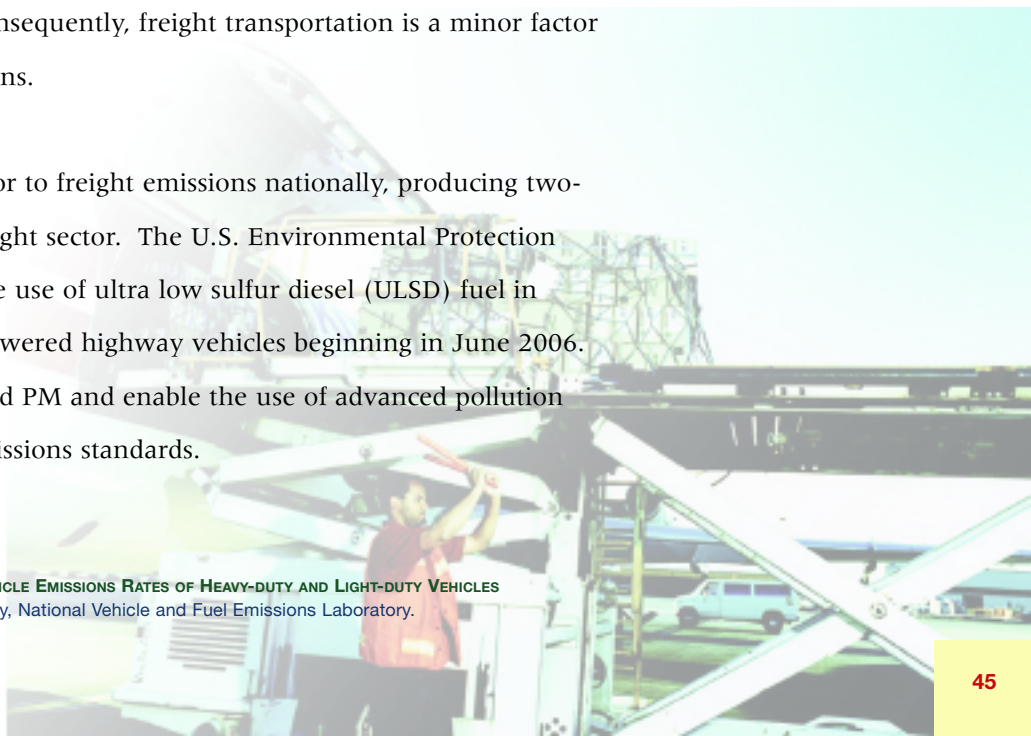


TABLE 5-12: NITROGEN OXIDES (NO_x) AND PARTICULATE MATTER (PM-10) EMISSIONS BY FREIGHT TRANSPORTATION MODE: 2002

| Mode | NO _x Emissions | | | | | PM-10 Emissions | | | |
|---------------------|---------------------------|---------|--------------------|-------------|---------|-----------------|--------------------|-------------|--|
| | Tons | Percent | As percent of: | | Tons | Percent | As percent of: | | |
| | | | All mobile sources | All sources | | | All mobile sources | All sources | |
| Heavy-duty vehicles | 3,782,000 | 66.8 | 33.0 | 17.9 | 120,000 | 64.7 | 23.3 | 0.5 | |
| Freight railroads | 857,200 | 15.1 | 7.5 | 4.1 | 21,300 | 11.5 | 4.1 | 0.1 | |
| Marine vessels | 1,011,000 | 17.9 | 8.8 | 4.8 | 44,000 | 23.7 | 8.5 | 0.2 | |
| Air freight | 8,200 | 0.1 | 0.1 | 0.0 | 300 | 0.2 | 0.1 | 0.0 | |
| Total | 5,658,400 | 100.0 | 49.4 | 26.8 | 185,600 | 100.0 | 36.0 | 0.8 | |

TABLE 5-13: CURRENT AND FUTURE NITROGEN OXIDES (NO_x) EMISSIONS BY FREIGHT TRANSPORTATION MODE

| | Tons | | | Percent change, 2002-2010 | Percent change, 2002-2020 |
|-------------------|-----------|-----------|-----------|---------------------------|---------------------------|
| | 2002 | 2010 | 2020 | | |
| Heavy-duty trucks | 3,782,000 | 2,186,900 | 662,600 | -42 | -82 |
| Freight rail | 857,200 | 563,200 | 486,400 | -34 | -43 |
| Commercial marine | 1,011,000 | 987,200 | 938,600 | -2 | -7 |
| Air freight | 8,200 | 10,000 | 12,400 | 22 | 51 |
| Freight total | 5,658,400 | 3,747,299 | 2,099,999 | -34 | -63 |

TABLE 5-14: CURRENT AND FUTURE PARTICULATE MATTER (PM-10) EMISSIONS BY FREIGHT TRANSPORTATION MODE

| | Tons | | | Percent change, 2002-2010 | Percent change, 2002-2020 |
|-------------------|---------|---------|--------|---------------------------|---------------------------|
| | 2002 | 2010 | 2020 | | |
| Heavy-duty trucks | 120,000 | 65,380 | 34,760 | -46 | -71 |
| Freight rail | 21,300 | 17,890 | 15,360 | -16 | -28 |
| Commercial marine | 44,000 | 45,330 | 46,960 | 3 | 7 |
| Air freight | 300 | 290 | 270 | -3 | -10 |
| Freight total | 185,600 | 128,889 | 97,349 | -31 | -48 |

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

Source: U.S. Department of Transportation, Federal Highway Administration, *Impacts of Freight Movement on Air Quality*, prepared by ICF Consulting, January 26, 2005, based on U.S. Environmental Protection Agency, National Emissions Inventory.

TABLE 5-13: CURRENT AND FUTURE NITROGEN OXIDES (NO_x) EMISSIONS BY FREIGHT TRANSPORTATION MODE

Source: U.S. Department of Transportation, Federal Highway Administration, *Impacts of Freight Movement on Air Quality*, prepared by ICF Consulting, January 26, 2005, based on U.S. Environmental Protection Agency, National Emissions Inventory.

Table 5-14: Current and Future Particulate Matter (PM-10) Emissions by Freight Transportation Mode

Source: U.S. Department of Transportation, Federal Highway Administration, *Impacts of Freight Movement on Air Quality*, prepared by ICF Consulting, January 26, 2005, based on U.S. Environmental Protection Agency, National Emissions Inventory.

APPENDIX A. SELECTED METRIC TABLES

TABLE 2-1M. SHIPMENTS BY MODE AND WEIGHT: 2002 AND 2035 (MILLIONS OF METRIC TONNES)

| | 2002 | | | | 2035 | | | |
|---|-------------------|----------|----------------------|----------------------|-------------------|----------|----------------------|----------------------|
| | Total | Domestic | Exports ³ | Imports ³ | Total | Domestic | Exports ³ | Imports ³ |
| Total | (P) 17,532 | 16,030 | (P) 475 | (P) 1,028 | (P) 33,727 | 30,543 | (P) 1,002 | (P) 2,181 |
| Truck | 10,468 | 10,284 | 96 | 88 | 20,697 | 20,168 | 238 | 291 |
| Rail | 1,704 | 1,605 | 29 | 71 | 3,198 | 2,987 | 52 | 160 |
| Water | 636 | 539 | 57 | 40 | 945 | 793 | 103 | 49 |
| Air, air & truck | (P) 9 | 3 | (P) 13 | (P) 4 | (P) 24 | 9 | (P) 16 | (P) 9 |
| Intermodal¹ | 1,172 | 178 | 287 | 707 | 2,357 | 303 | 599 | 1,455 |
| Pipeline & unknown² | 3,543 | 3,421 | 4 | 118 | 6,506 | 6,284 | 5 | 218 |

Key: P = preliminary.

¹ Intermodal includes U.S. Postal Service and courier shipments and all intermodal combinations, except air and truck.

² Pipeline and unknown shipments are combined because data on region-to-region flows by pipeline are statistically uncertain.

³ Data do not include imports and exports that pass through the United States from a foreign origin to a foreign destination by any mode.

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

TABLE 2-3M. TOP COMMODITIES: 2002

| Metric Tonnes (millions) | | Value (\$ billions) | |
|-----------------------------------|-------------------|--------------------------|-------------------|
| Total | (P) 17,532 | Total | (P) 13,120 |
| Coal n.e.c. ¹ | 2,437 | Machinery | 1,866 |
| Gravel | 1,858 | Electronics | 948 |
| Cereal grains | 1,207 | Mixed freight | 944 |
| Crude petroleum | 1,165 | Motorized vehicles | 855 |
| Coal | 1,144 | Coal n.e.c. ¹ | 729 |
| Nonmetal min. prods. ² | 1,032 | Textiles/leather | 545 |
| Gasoline | 989 | Pharmaceuticals | 519 |
| Waste/scrap | 840 | Unknown | 458 |
| Fuel oils | 508 | Chemical prods. | 444 |
| Natural sands | 505 | Misc. mfg. prods. | 411 |

Key: P = preliminary.

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

² Nonmetallic mineral products.

TABLE 2-1M. SHIPMENTS BY MODE AND WEIGHT: 2002 AND 2035 (MILLIONS OF METRIC TONNES)

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, *Freight Analysis Framework*, 2006.

TABLE 2-3. TOP COMMODITIES: 2002

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, *Freight Analysis Framework*, 2006.

TABLE 2-4M. DOMESTIC MODE OF INTERNATIONAL SHIPMENTS BY WEIGHT AND VALUE: 2002 AND 2035

| | Metric Tonnes (millions) | | Value (\$ billions) | |
|---|--------------------------|-----------|---------------------|-----------|
| | 2002 | 2035 | 2002 | 2035 |
| Total | (P) 1,503 | (P) 3,184 | (P) 2,037 | (P) 8,807 |
| Truck¹ | 723 | 1,919 | 1,198 | 6,193 |
| Rail | 181 | 360 | 114 | 275 |
| Water | 97 | 152 | 26 | 49 |
| Air, air & truck² | (P) 7 | (P) 17 | (P) 506 | (P) 1,772 |
| Intermodal³ | 20 | 46 | 52 | 281 |
| Pipeline & unknown⁴ | 475 | 689 | 141 | 238 |

Key: P = preliminary.

¹Excludes truck moves to and from airports.

²Includes truck moves to and from airports.

³Intermodal includes U.S. Postal Service and courier shipments and all intermodal combinations, except air and truck.

⁴Pipeline and unknown shipments are combined because data on region-to-region flows by pipeline are statistically uncertain.

Note: Numbers may not add to total due to rounding. 1 ton = 0.91 metric tonne.

TABLE 2-6M. U.S. MERCHANDISE TRADE WITH CANADA AND MEXICO BY TRANSPORTATION MODE

| Mode | 1998 | | 2000 | | 2004 | | 2005 ¹ | |
|--------------|---------------------|------------------------------------|---------------------|------------------------------------|---------------------|------------------------------------|---------------------|------------------------------------|
| | Value (\$ billions) | Weight (millions of metric tonnes) | Value (\$ billions) | Weight (millions of metric tonnes) | Value (\$ billions) | Weight (millions of metric tonnes) | Value (\$ billions) | Weight (millions of metric tonnes) |
| Truck | 350 | NA | 429 | NA | 453 | NA | 491 | 173 |
| Rail | 68 | NA | 94 | NA | 108 | NA | 116 | 128 |
| Air | 30 | <1 | 45 | <1 | 32 | <1 | 33 | <1 |
| Water | 21 | 166 | 33 | 176 | 46 | 222 | 58 | 232 |
| Pipeline | 11 | NA | 24 | NA | 39 | NA | 52 | 78 |
| Other | 23 | NA | 29 | NA | 34 | NA | 39 | 5 |
| Total | 503 | NA | 653 | 477 | 712 | NA | 790 | 616 |

Key: NA = not available.

¹2005 data are from the U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, North American Freight Transportation (Washington, DC: 2003), tables A-1 and A-2, available at www.bts.gov as of August 12, 2006.

Notes: Individual modal totals may not sum to exact totals due to rounding. 1 ton = 0.91 metric tonne. For value, "Other" is the difference between the total and the sum of the individual modes.

TABLE 2-4M. DOMESTIC MODE OF INTERNATIONAL SHIPMENTS BY WEIGHT AND VALUE: 2002 AND 2035

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, *Freight Analysis Framework*, 2006.

TABLE 2-6M. U.S. MERCHANDISE TRADE WITH CANADA AND MEXICO BY TRANSPORTATION MODE

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *Transborder Freight Data*, August 2006.

FIGURE 2-6M. U.S. INTERNATIONAL MERCHANDISE TRADE BY MODE OF TRANSPORTATION: 2005

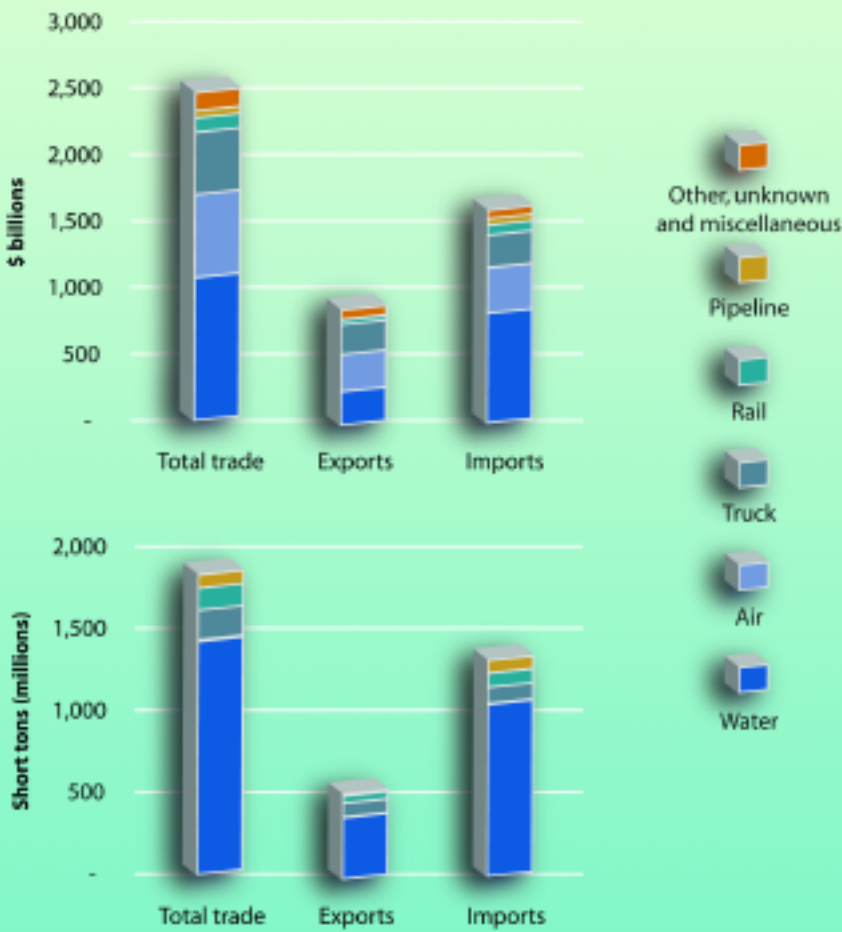


FIGURE 2-6M. U.S. INTERNATIONAL MERCHANDISE TRADE BY MODE OF TRANSPORTATION: 2005

Source: Compiled by U.S. Department of Transportation (USDOT), Research and Innovative Technology Administration (RITA), Bureau of Transportation Statistics (BTS), August 2006. **Water and air data**—U.S. Department of Commerce, U.S. Census Bureau, Foreign Trade Division, U.S. Exports of Merchandise and U.S. Imports of Merchandise, December 2005. **Total, truck, rail, pipeline, other and unknown data**—USDOT, RITA, BTS, Transborder Freight Data 2005; and special calculation, August 2006.



TABLE 2-12M. TOP 25 AIRPORTS BY LANDED WEIGHT OF ALL-CARGO OPERATIONS¹

| Airport | 2004 Rank | Landed weight (thousands of metric tonnes) | | | | |
|---|--------------|---|---------------|---------------|---------------|---------------|
| | | 2000 | 2001 | 2002 | 2003 | 2004 |
| Anchorage, AK (Ted Stevens Anchorage International) ² | 1 | 7,333 | 7,055 | 8,159 | 8,171 | 8,931 |
| Memphis, TN (Memphis International) | 2 | 5,732 | 6,228 | 8,007 | 7,947 | 8,061 |
| Louisville, KY (Louisville International-Standiford Field) | 3 | 3,617 | 3,653 | 3,812 | 3,785 | 3,981 |
| Miami, FL (Miami International) | 4 | 2,657 | 2,771 | 2,879 | 2,938 | 3,106 |
| Los Angeles, CA (Los Angeles International) | 5 | 2,624 | 2,657 | 2,756 | 2,830 | 2,778 |
| New York, NY (John F. Kennedy International) | 6 | 2,534 | 2,307 | 2,642 | 2,664 | 2,629 |
| Chicago, IL (O'Hare International) | 7 | 1,870 | 1,825 | 2,011 | 2,133 | 2,140 |
| Indianapolis, IN (Indianapolis International) | 8 | 2,616 | 2,862 | 2,121 | 2,065 | 2,099 |
| Newark, NJ (Newark Liberty International) | 9 | 1,779 | 1,628 | 1,595 | 1,664 | 1,601 |
| Oakland, CA (Metropolitan Oakland International) | 10 | 1,643 | 1,487 | 1,584 | 1,537 | 1,545 |
| Fort Worth, TX (Dallas/Fort Worth International) | 11 | 1,534 | 1,402 | 1,343 | 1,344 | 1,298 |
| Philadelphia, PA (Philadelphia International) | 12 | 1,319 | 1,318 | 1,330 | 1,238 | 1,244 |
| Ontario, CA (Ontario International) | 13 | 1,107 | 1,172 | 1,310 | 1,213 | 1,203 |
| Atlanta, GA (William B. Hartsfield International) | 14 | 989 | 946 | 1,058 | 1,083 | 1,055 |
| Covington/Cincinnati, OH (Cincinnati/Northern Kentucky International) | 15 | 828 | 889 | 946 | 996 | 1,035 |
| Honolulu, HI (Honolulu International) | 16 | 628 | 716 | 880 | 923 | 880 |
| Phoenix, AZ (Sky Harbor International) | 17 | 835 | 760 | 787 | 707 | 727 |
| Dayton, OH (James M. Cox Dayton International) | 18 | 2,026 | 1,310 | 814 | 712 | 714 |
| Denver, CO (Denver International) | 19 | 817 | 729 | 710 | 678 | 692 |
| San Francisco, CA (San Francisco International) | 20 | 1,149 | 918 | 939 | 1,089 | 671 |
| Portland, OR (Portland International) | 21 | 800 | 732 | 740 | 679 | 651 |
| Houston, TX (George Bush Intercontinental) | 22 | 435 | 420 | 437 | 604 | 632 |
| Minneapolis, MN (Minneapolis-St Paul International/Wold Chamberlain) | 23 | 564 | 532 | 564 | 624 | 615 |
| Rockford, IL (Greater Rockford) | 24 | 593 | 618 | 572 | 567 | 614 |
| Salt Lake City, UT (Salt Lake City International) | 25 | 682 | 550 | 529 | 544 | 563 |
| Top 25 airports³ | | 47,519 | 45,995 | 48,936 | 48,940 | 49,465 |
| United States, all airports⁴ | | 67,806 | 64,810 | 66,617 | 66,290 | 67,401 |
| Top 25 as % of U.S. total | | 70.1% | 71.0% | 73.5% | 73.8% | 73.4% |

¹All-Cargo operations are operations dedicated to the exclusive transportation of cargo. This does not include aircraft carrying passengers that may also 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.

³Represents top 25 airports in the reference year not necessarily the airports shown here.

⁴Limited to airports with an aggregate landed weight in excess of 45,360 metric tonnes (50,000 short tons) annually.

Note: 1 short ton = 0.91 metric tonne.

TABLE 2-12M. TOP 25 AIRPORTS BY LANDED WEIGHT OF ALL-CARGO OPERATIONS

Source: U.S. Department of Transportation, Federal Aviation Administration, Air Carrier Activity Information System (ACAIS) database, All-Cargo Data, available at http://www.faa.gov/airports_airtraffic/airports/planning_capacity/passenger_allcargo_stats/passenger/index as of March 22, 2006.

TABLE 2-13M. U.S. HAZARDOUS MATERIALS SHIPMENTS BY TRANSPORTATION MODE: 2002

| Transportation mode | Value | | Metric tonnes | | Tonne-kilometers | | Average kilometers per shipment |
|--|--------------|--------------|----------------|--------------|------------------|--------------|---------------------------------|
| | \$ Billion | Percent | (Millions) | Percent | (Billions) | Percent | |
| TOTAL all modes | 660.2 | 100.0 | 1,988.1 | 100.0 | 477.0 | 100.0 | 219 |
| Single modes, total | 644.5 | 97.6 | 1,958.2 | 98.5 | 455.4 | 95.5 | 169 |
| Truck ¹ | 419.6 | 63.6 | 1,051.9 | 52.9 | 160.8 | 33.7 | 138 |
| For-hire | 189.8 | 28.8 | 407.8 | 20.5 | 95.1 | 19.9 | 459 |
| Private ² | 226.7 | 34.3 | 637.0 | 32.0 | 64.4 | 13.5 | 61 |
| Rail | 31.3 | 4.7 | 99.2 | 5.0 | 105.2 | 22.1 | 1,118 |
| Water | 46.9 | 7.1 | 207.0 | 10.4 | 103.1 | 21.6 | S |
| Air | 1.6 | 0.2 | 0.1 | Z | 0.1 | Z | 3,347 |
| Pipeline ³ | 145.0 | 22.0 | 600.0 | 30.2 | S | S | S |
| Multiple modes, total | 9.6 | 1.5 | 17.0 | 0.9 | 18.2 | 3.8 | 1,366 |
| Parcel, U.S. Postal Service or courier | 4.3 | 0.6 | 0.2 | Z | 0.2 | Z | 1,347 |
| Other | 5.4 | 0.8 | 16.8 | 0.8 | 18.1 | 3.8 | 2,206 |
| Unknown and other modes, total | 6.1 | 0.9 | 12.9 | 0.6 | 3.4 | 0.7 | 92 |

Key: S = data are not published because of high sampling variability or other reasons; Z = zero or less than 1 unit of measure.

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

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

³Excludes most shipments of crude oil.

Note: 1 ton = 0.91 metric tonne; 1 ton-mile = 1.46 tonne-kilometer.

TABLE 2-14M. U.S. HAZARDOUS MATERIALS SHIPMENTS BY HAZARD CLASS: 2002

| Hazard Class | Description | Value | | Metric tonnes | | Tonne-kilometers | |
|--------------|---------------------------------|--------------|--------------|----------------|--------------|------------------|--------------|
| | | \$ Billions | Percent | Millions | Percent | Billions | Percent |
| Class 1 | Explosives | 7.9 | 1.2 | 4.5 | 0.2 | 2.3 | 0.5 |
| Class 2 | Gases | 73.9 | 11.2 | 193.6 | 9.7 | 54.4 | 11.4 |
| Class 3 | Flammable liquids | 490.2 | 74.3 | 1,622.9 | 81.6 | 319.1 | 66.9 |
| Class 4 | Flammable solids | 6.6 | 1.0 | 10.3 | 0.5 | 6.4 | 1.3 |
| Class 5 | Oxidizers and organic peroxides | 5.5 | 0.8 | 11.5 | 0.6 | 6.2 | 1.3 |
| Class 6 | Toxics | 8.3 | 1.3 | 7.7 | 0.4 | 6.2 | 1.3 |
| Class 7 | Radioactive materials | 5.9 | 0.9 | 0.1 | 0.003 | 0.1 | 0.01 |
| Class 8 | Corrosive materials | 38.3 | 5.8 | 82.3 | 4.1 | 52.9 | 11.1 |
| Class 9 | Miscellaneous dangerous goods | 23.6 | 3.6 | 55.4 | 2.8 | 29.4 | 6.2 |
| Total | | 660.2 | 100.0 | 1,988.1 | 100.0 | 477.0 | 100.0 |

Note: 1 ton = 0.91 metric tonne; 1 ton-mile = 1.46 tonne-kilometer.

TABLE 2-13M. U.S. HAZARDOUS MATERIALS SHIPMENTS BY TRANSPORTATION MODE: 2002

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, U.S. Department of Commerce, U.S. Census Bureau, *2002 Economic Census, Transportation, 2002 Commodity Flow Survey, Hazardous Materials* (Washington, DC: December 2004), table 1a.

TABLE 2-14M. U.S. HAZARDOUS MATERIALS SHIPMENTS BY HAZARD CLASS: 2002

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, *2002 Economic Census, Transportation, 2002 Commodity Flow Survey, Hazardous Materials* (Washington, DC: December 2004), table 2a.

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

| | 1980 | 1990 | 2000 | 2004 | Percent change, 1980-2004 |
|--|----------------------|-----------|-----------|-----------|---------------------------|
| Public roads, route kilometers | 6,211,806 | 6,223,214 | 6,358,681 | 6,433,291 | 3.6 |
| National Highway System (NHS) | N | N | 259,409 | 260,968 | N |
| Interstates | 66,176 | 72,540 | 75,113 | 75,377 | 13.9 |
| Other NHS | N | N | 184,296 | 185,591 | N |
| Freight intermodal connectors ¹ | N | N | N | NA | N |
| Other | N | N | 6,099,272 | 6,172,322 | N |
| Strategic Highway Corridor Network (STRAHNET) | N | N | 99,886 | 100,193 | N |
| Interstate | N | N | 75,116 | 75,377 | N |
| Non-Interstate | N | N | 24,766 | 24,816 | N |
| Railroad | 294,634 ² | 283,098 | 274,412 | 225,704 | -23.4 |
| Class I | NA | 214,347 | 194,082 | 156,905 | NA |
| Regional | NA | 29,572 | 33,761 | 25,172 | NA |
| Local | NA | 39,167 | 46,570 | 43,628 | NA |
| Inland waterways | | | | | |
| Navigable channels | 17,703 | 17,703 | 17,703 | 17,703 | 0.0 |
| Great Lakes-St. Lawrence Seaway | 3,769 | 3,769 | 3,769 | 3,769 | 0.0 |
| Pipelines | | | | | |
| Oil | 351,469 | 335,954 | 284,847 | NA | NA |
| Gas | 1,692,666 | 1,913,832 | 2,203,675 | 2,353,344 | 39.0 |

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

¹Excludes intermodal connectors serving intercity bus, Amtrak, and public transit facilities.

²Excludes Class III railroads.

Note: 1 mile = 1.61 kilometers.

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

Sources: Public roads: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, (Washington, DC: Annual issues), table HM-16.

Freight intermodal connectors: U.S. Department of Transportation, Federal Highway Administration, Office of Planning, National Highway System Intermodal Connectors, available at <http://www.fhwa.dot.gov/hep10/nhs/intermodalconnectors/index.html> as of July 5, 2005.

Rail: Association of American Railroads, *Railroad Facts* (Washington, DC: various issues).

Navigable channels: U.S. Army Corps of Engineers.

Great Lakes-St. Lawrence Seaway: Great Lakes-St. Lawrence Seaway System, "Seaway Facts," available at <http://www.greatlakes-seaway.com/en/aboutus/seawayfacts.html> as of Jan. 26, 2006.

Oil pipelines: 1980-2002: Eno Transportation Foundation, *Transportation in America, 2002* (Washington, DC: 2002). 2003: U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Office of Pipeline Safety, Pipeline Statistics, Internet site <http://ops.dot.gov/stats/lpo.htm> as of July 5, 2005.

Gas pipelines: American Gas Association, *Gas Facts* (Arlington, VA: Annual issues).]

TABLE 3-3M. TRUCK-KILOMETERS BY PRODUCTS CARRIED: 2002¹

| Products carried | Millions of kilometers |
|--|-------------------------------|
| Total² | 233,632 |
| Animals and fish, live | 1,182 |
| Animal feed and products of animal origin | 3,360 |
| Grains, cereal | 2,202 |
| All other agricultural products | 4,283 |
| Basic chemicals | 1,410 |
| Fertilizers and fertilizer materials | 2,681 |
| Pharmaceutical products | 491 |
| All other chemical products and preparations | 2,174 |
| Alcoholic beverages | 1,808 |
| Bakery and milled grain products | 5,717 |
| Meat, seafood, and their preparations | 4,918 |
| Tobacco products | 717 |
| All other products foodstuff | 11,954 |
| Logs and other wood in the rough | 1,849 |
| Paper or paperboard articles | 5,053 |
| Printed products | 1,231 |
| Pulp, newsprint, paper, paperboard | 3,115 |
| Wood products | 5,731 |
| Articles of base metal | 5,301 |
| Base metal in primary or semifinished forms | 4,637 |
| Nonmetallic mineral products | 4,906 |
| Tools, nonpowered | 12,487 |
| Tools, powered | 10,425 |
| Electronic and other electrical equipment | 4,866 |
| Furniture, mattresses, lamps, etc. | 3,288 |
| Machinery | 5,190 |
| Miscellaneous manufactured products | 6,449 |
| Precision instruments and apparatus | 1,181 |
| Textile, leather, and related articles | 2,475 |
| Vehicles, including parts | 6,186 |
| All other transportation equipment | 1,024 |
| Coal | 484 |
| Crude petroleum | 212 |
| Gravel or crushed stone | 4,490 |
| Metallic ores and concentrates | 73 |
| Monumental or building stone | 744 |
| Natural sands | 1,753 |
| All other nonmetallic minerals | 802 |
| Fuel oils | 1,983 |
| Gasoline and aviation turbine fuel | 1,366 |
| Plastic and rubber | 3,851 |
| All other coal and refined petroleum products | 1,886 |
| Hazardous waste (EPA manifest) | 306 |
| All other waste and scrape (non-EPA manifest) | 4,261 |
| Recyclable products | 1,484 |
| Mail and courier parcels | 7,660 |
| Empty shipping containers | 1,278 |
| Passengers | 440 |
| Mixed freight | 23,591 |
| Products, equipment, or materials not elsewhere classified | 426 |
| Products not specified | 10,232 |
| Not applicable ³ | 241 |
| No product carried | 46,634 |

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

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

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

Note: 1 mile = 1.61 kilometers

TABLE 3-3M. TRUCK-KILOMETERS BY PRODUCTS CARRIED: 2002

Source: U.S. Department of Commerce, U.S. Census Bureau, *Vehicle Inventory and Use Survey 2002: United States* (Washington, DC: 2004), available at <http://www.census.gov/svsd/www/02vehinv.html> as of July 6, 2005.

TABLE 3-4M. NUMBER AND VEHICLE-KILOMETERS TRAVELED (VKT) OF TRUCKS BY AVERAGE WEIGHT (INCLUDING VEHICLE AND LOAD)¹

| Average weight (kilograms) | 1987 | | 1992 | | 1997 | | 2002 | | Percent change, 1987-2002 | |
|-------------------------------|-----------------------|-------------------|-----------------------|-------------------|-----------------------|-------------------|-----------------------|-------------------|------------------------------|------------|
| | Number (thousands) | VKT (millions) | Number (thousands) | VKT (millions) | Number (thousands) | VKT (millions) | Number (thousands) | VKT (millions) | Number | VKT |
| Total | 3,624 | 144,796 | 4,008 | 168,960 | 4,701 | 237,983 | 5,415 | 234,359 | 49 | 62 |
| Light-heavy | 1,030 | 17,329 | 1,259 | 22,551 | 1,436 | 31,890 | 1,914 | 42,254 | 86 | 144 |
| 4,536 to 6,350 | 525 | 8,754 | 694 | 12,875 | 819 | 18,510 | 1,142 | 24,440 | 118 | 179 |
| 6,351 to 7,257 | 242 | 4,407 | 282 | 4,791 | 316 | 6,359 | 396 | 9,508 | 64 | 116 |
| 7,258 to 8,845 | 263 | 4,168 | 282 | 4,885 | 301 | 7,021 | 376 | 8,306 | 43 | 99 |
| Medium-heavy | 766 | 12,200 | 732 | 13,104 | 729 | 16,302 | 910 | 18,935 | 19 | 55 |
| 8,846 to 11,793 | 766 | 12,200 | 732 | 13,104 | 729 | 16,302 | 910 | 18,935 | 19 | 55 |
| Heavy-heavy | 1,829 | 115,266 | 2,017 | 133,305 | 2,536 | 189,791 | 2,591 | 173,169 | 42 | 50 |
| 11,794 to 14,969 | 377 | 8,708 | 387 | 9,163 | 428 | 11,414 | 437 | 9,407 | 16 | 8 |
| 14,969 to 18,144 | 209 | 6,619 | 233 | 8,505 | 257 | 10,612 | 229 | 6,067 | 10 | -8 |
| 18,144 to 22,680 | 292 | 12,271 | 339 | 15,485 | 400 | 21,047 | 318 | 10,779 | 9 | -12 |
| 22,680 to 27,216 | 188 | 11,518 | 227 | 13,999 | 311 | 20,362 | 327 | 14,404 | 74 | 25 |
| 27,216 to 36,287 | 723 | 73,127 | 781 | 82,147 | 1,070 | 120,256 | 1,179 | 124,707 | 63 | 71 |
| 36,288 to 45,359 | 28 | 2,018 | 33 | 2,460 | 46 | 3,906 | 69 | 4,747 | 144 | 135 |
| 45,360 to 58,967 | 8 | 708 | 12 | 1,181 | 18 | 1,691 | 26 | 2,528 | 238 | 257 |
| 58,967 or more | 4 | 298 | 5 | 365 | 6 | 502 | 6 | 530 | 43 | 78 |

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; 1 mile = 1.61 kilometers; 1 pound = 0.45 kilogram.

Table 5-7M. Fuel Consumption by Transportation Mode

| | 1980 | 1990 | 2000 | 2003 | 2004 |
|---|---------|---------|---------|-------------|---------|
| Highway | | | | | |
| Gasoline, diesel and other fuels (million liters) | 435,171 | 494,962 | 615,338 | (R) 643,781 | 657,715 |
| Truck, total | 75,557 | 92,705 | 133,356 | (R) 123,737 | 128,585 |
| Single-unit 2-axle 6-tire or more truck | 26,206 | 31,635 | 36,200 | (R) 33,616 | 35,064 |
| Combination truck | 49,350 | 61,070 | 97,156 | (R) 90,120 | 93,520 |
| Truck (percent of total) | 17.4 | 18.7 | 21.7 | (R) 19.2 | 19.6 |
| Rail, Class I (in freight service) | | | | | |
| Distillate / diesel fuel (million liters) | 14,778 | 11,792 | 14,006 | 14,483 | 15,365 |
| Water | | | | | |
| Residual fuel oil (million liters) | 33,887 | 23,947 | 24,264 | 14,665 | 17,754 |
| Distillate / diesel fuel oil (million liters) | 5,595 | 7,817 | 8,559 | 8,392 | 8,101 |
| Gasoline (million liters) | 3,982 | 4,921 | 4,255 | 4,192 | 3,804 |
| Pipeline | | | | | |
| Natural gas (million cubic meters) | 17,970 | 18,684 | 18,185 | (R) 16,749 | 16,193 |

Key: R = revised.

Note: 1 gallon = 3.8 liters; 1 cubic foot = 0.03 cubic meters.

TABLE 3-4M. NUMBER AND VEHICLE-KILOMETERS TRAVELED (VKT) OF TRUCKS BY AVERAGE WEIGHT (INCLUDING VEHICLE AND LOAD)¹

Sources: U.S. Department of Commerce, Census Bureau, *2002 Vehicle Inventory and Use Survey: United States* (Washington, DC: 2004), available at <http://www.census.gov/svsd/www/02vehinv.html> as of July 1, 2005; U.S. Department of Commerce, Census Bureau, *1992 Truck Inventory and Use Survey: United States* (Washington, DC: 1995), available at <http://www.census.gov/econ/www/viusmain.html> as of July 1, 2004.

Table 5-7M. Fuel Consumption by Transportation Mode

Sources: Highway: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2004* (Washington, DC: 2005), table VM-1 and similar tables in earlier editions.

Rail: Association of American Railroads, *Railroad Facts* (Washington, DC: November 2005), p. 40.

Water: U.S. Department of Energy, Energy Information Administration, *Fuel Oil and Kerosene Sales 2004* (Washington, DC: 2005), tables 2, 4, and similar tables in earlier editions.

Pipeline: U.S. Department of Energy, *Natural Gas Annual 2004*, DOE/EIA-0131(04) (Washington, DC: December 2005), table 15 and similar tables in earlier editions.

Table 5-8M. Single-Unit 2-Axle 6-Tire or More Truck Fuel Consumption and Travel

| | 1980 | 1990 | 2000 | 2003 | 2004 |
|---|--------|--------|---------|-------------|---------|
| Number registered (thousands) | 4,374 | 4,487 | 5,926 | (R) 5,849 | 6,161 |
| Vehicle-Kilometers (millions) | 64,073 | 83,527 | 113,459 | (R) 125,138 | 130,529 |
| Fuel consumed (million liters) | 26,206 | 31,635 | 36,200 | (R) 33,616 | 35,064 |
| Average kilometers traveled per vehicle | 14,649 | 18,615 | 19,146 | (R) 21,396 | 21,186 |
| Average kilometers traveled per liter | 2.4 | 2.6 | 3.1 | (R) 3.7 | 3.7 |
| Average fuel consumed per vehicle (liter) | 5,992 | 7,050 | 6,109 | (R) 5,748 | 5,691 |

Key: R = revised.

Note: 1 mile = 1.61 kilometers; 1 gallon = 3.8 liters.

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

| | 1980 | 1990 | 2000 | 2003 | 2004 |
|--|---------|---------|---------|-------------|---------|
| Number registered (thousands) | 1,417 | 1,709 | 2,097 | (R) 1,908 | 2,010 |
| Vehicle-kilometers traveled (millions) | 110,527 | 151,827 | 217,294 | (R) 225,566 | 233,995 |
| Fuel consumed (million liters) | 49,350 | 61,070 | 97,155 | (R) 90,151 | 93,520 |
| Average kilometers traveled per vehicle | 78,008 | 88,845 | 103,640 | (R) 118,198 | 116,396 |
| Average kilometers traveled per liter | 2.2 | 2.5 | 2.2 | (R) 2.5 | 2.5 |
| Average fuel consumed per vehicle (liters) | 34,831 | 35,737 | 46,339 | (R) 47,240 | 46,520 |

Key: R = revised.

Note: 1 mile = 1.61 kilometers; 1 gallon = 3.8 liters.

Table 5-8M. Single-Unit 2-Axle 6-Tire or More Truck Fuel Consumption and Travel

Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2004* (Washington, DC: 2005), table VM-1 and similar tables in earlier editions.

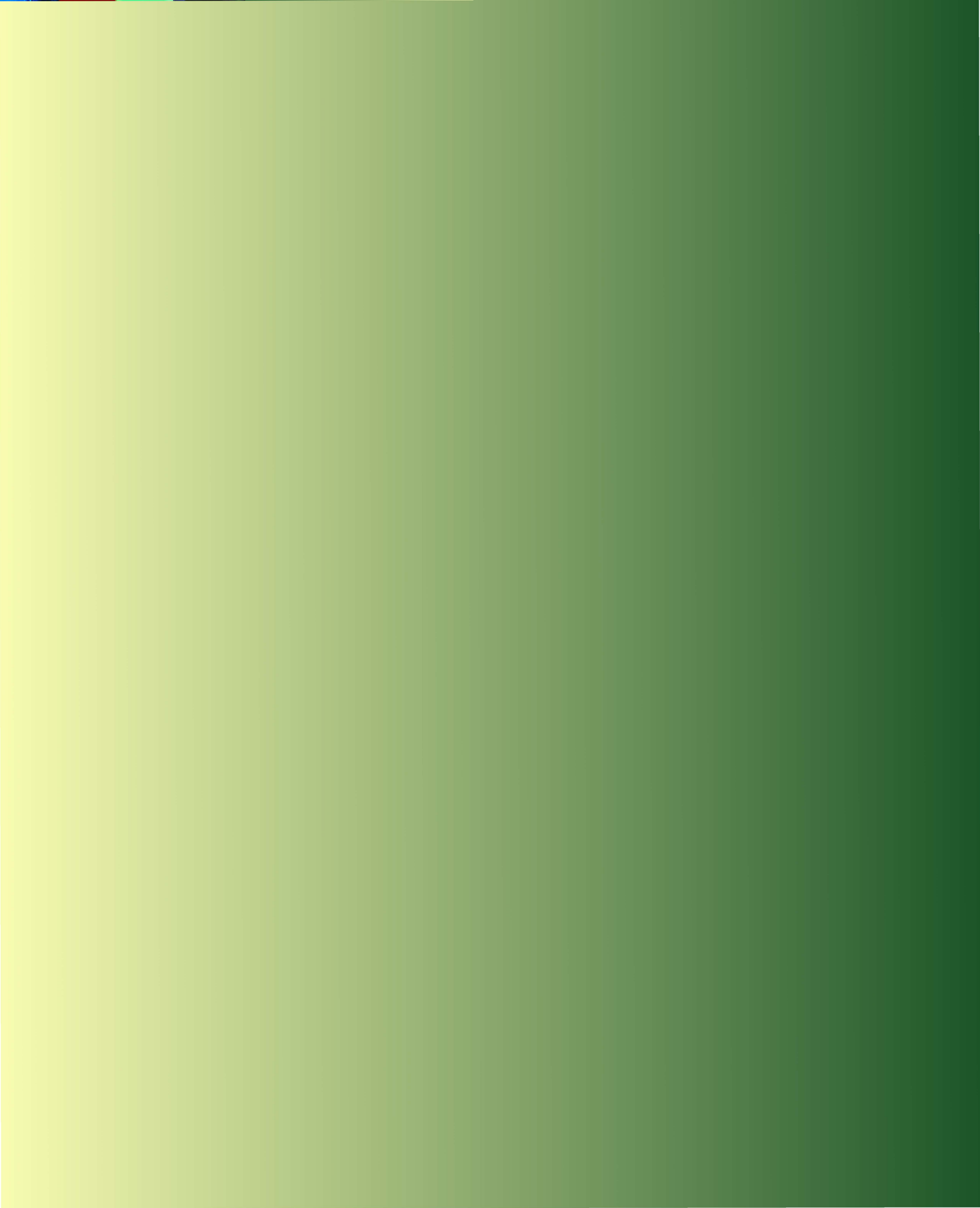
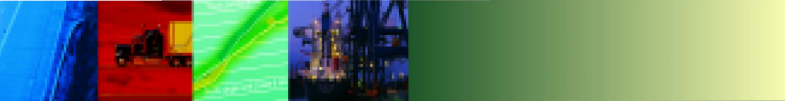
TABLE 5-9M. COMBINATION TRUCK FUEL CONSUMPTION AND TRAVEL

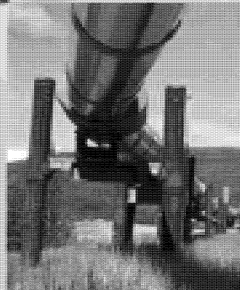
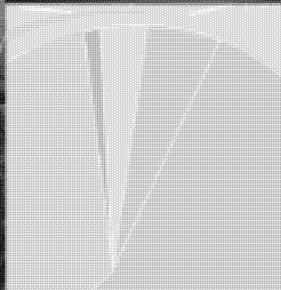
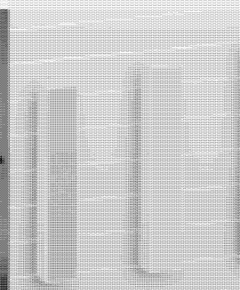
Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2004* (Washington, DC: 2005), table VM-1 and similar tables in earlier editions.



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