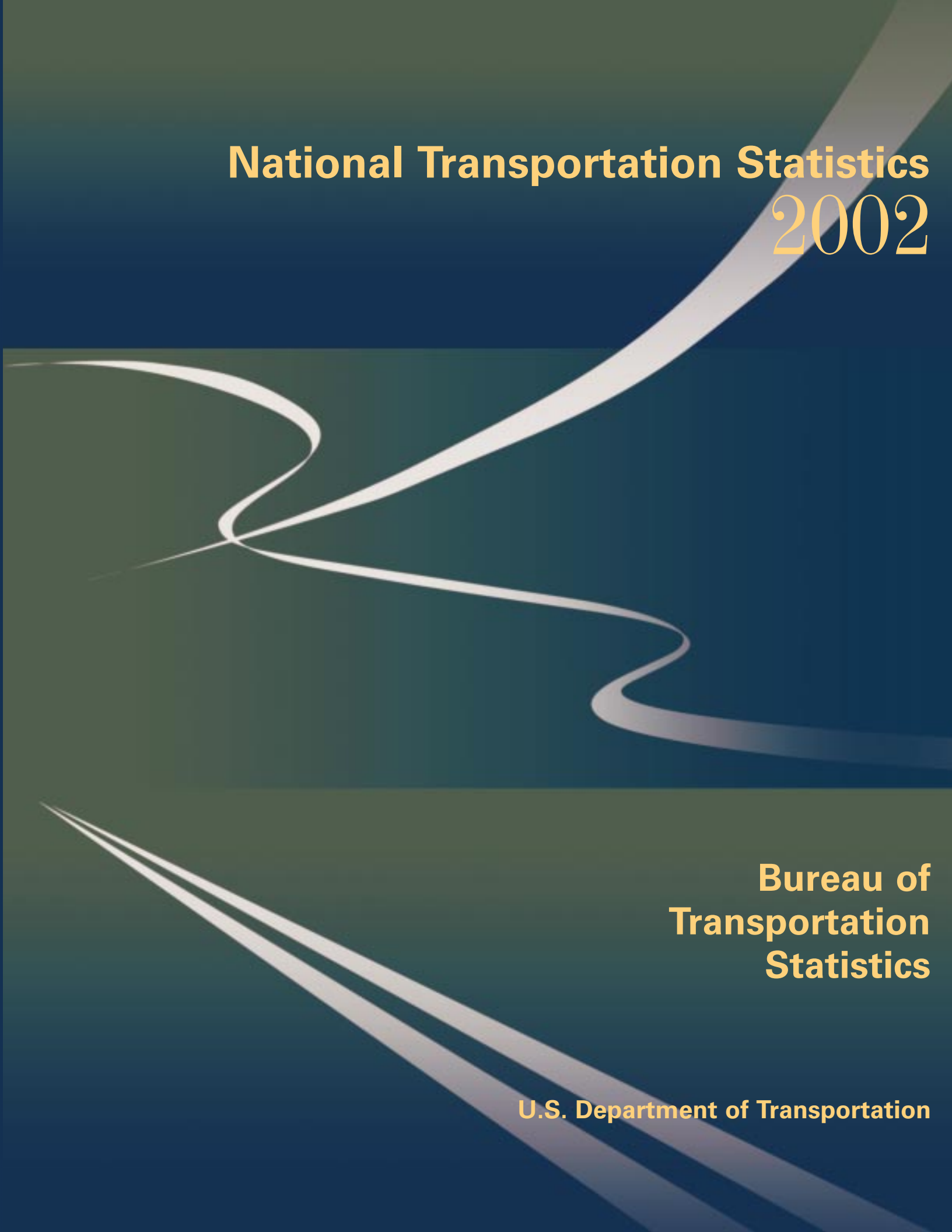
National Transportation Statistics 2002



Bureau of Transportation Statistics

U.S. Department of Transportation

National Transportation Statistics

2002

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BTS02-08

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Introduction

Compiled and published by the Bureau of Transportation Statistics (BTS), U.S. Department of Transportation, *National Transportation Statistics 2002* presents information on the U.S. transportation system[1], including its physical components, safety record, economic performance, energy use, and environmental impact. *National Transportation Statistics 2002* is a companion document to the *Transportation Statistics Annual Report*, which analyzes the data presented here.

The report has four chapters:

- Chapter 1 provides data on the extent, condition, use, and performance of the physical transportation network.
- Chapter 2 details transportation's safety record, giving data on accidents, crashes, fatalities, and injuries for each mode and hazardous materials.
- Chapter 3 focuses on the relationship between transportation and the economy, presenting data on transportation's contribution to the gross domestic product, employment by industry and occupation, and transportation-related consumer and government expenditures.
- Chapter 4 presents data on transportation energy use and transportation-related environmental impacts.

Appendix A profiles each mode,[1] and appendix B contains metric conversions of select tables.

In addition, as part of BTS's ongoing effort to identify and assess the extent of data errors, appendix C includes brief discussions of the quality of the data presented in many of the tables. BTS obtained the data in this report from many sources, including federal government agencies, private industry, and associations. Some of the data are based on samples and are subject to sampling variability. Data from all sources may be subject to omissions and errors in reporting, recording, and processing. Documents cited as sources for the tables often provide detailed information about definitions, methodologies, and statistical reliability.

Generally, data are presented in five-year increments through 1995 and annually thereafter. The web version of the report provides a more comprehensive inventory of the available data than presented here.

[1] The U.S. transportation system comprises six modes: air, highway, transit, rail, water, and pipelines.

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Chapter 2. Transportation Safety

Chapter 4. Transportation, Energy, and the Environment

TABLE A: Social and Economic Characteristics of the United States

	1980	1985	1990	1995	1996	1997	1998	1999	2000
TOTAL U.S. resident population[1] (thousands)	**226,546**	**237,924**	**248,791**	**262,803**	**265,229**	**267,784**	**270,248**	**272,691**	**281,422**
Age[2] (thousands)									
Under 18	63,754	62,623	63,949	68,555	69,109	69,603	69,903	70,199	72,294
18-24 years	30,022	28,902	26,961	25,112	24,843	24,980	25,476	26,011	27,142
25-34	37,082	41,696	43,174	40,730	40,246	39,559	38,743	37,936	39,892
35-44	25,634	31,691	37,444	42,555	43,365	44,014	44,498	44,813	45,149
45-54	22,800	22,460	25,062	31,100	32,358	33,625	34,575	35,802	37,678
55-64	21,703	22,135	21,116	21,132	21,353	21,816	22,666	23,389	24,275
65 and over	25,550	28,415	31,083	33,619	33,957	34,185	34,385	34,540	34,992
Sex[3] (thousands)									
Male	110,053	116,160	121,284	128,294	129,504	130,783	132,030	133,277	138,054
Female	116,493	122,576	127,507	134,510	135,724	137,001	138,218	139,414	143,368
Metropolitan areas[4] (population in millions)									
Large (over 1 million)	119	U	139	147	149	151	153	U	162
Medium (250,000-999,999)	41	U	41	44	44	43	43	U	40
Small (less than 250,000)	17	U	18	19	19	20	20	U	17
Rural / urban[5] (thousands)									
Rural	59,495	U	61,656	U	U	U	U	U	U
Urban	167,051	U	187,053	U	U	U	U	U	U
Regions[6] (millions)									
Northeast	49.1	49.9	50.8	51.4	51.5	51.6	51.7	51.8	53.6
South	75.4	81.4	85.5	91.8	92.9	94.2	95.3	96.5	100.2
Midwest	58.9	58.8	59.7	62.0	62.4	62.7	63.0	63.2	64.4
West	43.2	47.8	52.8	57.6	58.4	59.3	60.3	61.2	63.2
Immigrants admitted[7]	**530,639**	**570,009**	**1,536,483**	**720,461**	**915,900**	**798,378**	**R654,451**	**R646,568**	**R849,807**
Total area[8] (square miles)	**3,618,770**	**U**	**3,717,796**	**U**	**U**	**U**	**U**	**U**	**U**
Gross domestic product[9] (chained $ 1996 billions)	**4,900.9**	**5,717.1**	**6,707.9**	**7,543.8**	**7,813.2**	**8,159.5**	**8,508.9**	**8,856.5**	**9,224.0**
Agriculture, forestry, fishing	66.5	97.5	118.3	123.1	130.4	143.7	145.5	153.4	166.3
Manufacturing	832.3	987.9	1,102.3	1,284.7	1,316.0	1,387.2	1,444.3	1,532.1	1,594.6
Mining	90.6	96.2	105.8	113.0	113.0	117.0	119.7	112.0	95.2

TABLE A: Social and Economic Characteristics of the United States (Continued)

	1980	1985	1990	1995	1996	1997	1998	1999	2000
Construction	249.4	270.5	287.5	299.6	316.4	324.6	348.9	370	379.3
Transportation	154.0	170.9	180.6	225.1	243.4	248.9	257.9	268.6	281.1
Wholesale / retail trade	621.5	822.7	954.6	1,124.4	1,216.7	1,329.4	1,463.3	1,532.5	1,614.1
Finance, insurance, real estate	1,003.1	1,125.5	1,250.6	1,393.0	1,436.8	1,520.8	1,622.1	1,713.5	1,809.5
Services	928.1	1,103.3	1,361.9	1,510.4	1,564.2	1,632.2	1,699.0	1,774.8	1,865.2
Total civilian labor force (thousands)	**106,940**	**115,461**	**125,840**	**132,304**	**133,943**	**136,297**	**137,673**	**139,368**	**140,863**
Participation rate of men (percent)	77.4	76.3	76.4	75.0	74.9	75.0	74.9	74.7	74.7
Participation rate of women (percent)	51.5	54.5	57.5	58.9	59.3	59.8	59.8	60.0	60.2
Number of households (thousands)	**80,776**	**86,789**	**93,347**	**98,990**	**99,627**	**101,018**	**102,528**	**103,874**	**105,480**
Average size of households	**2.76**	**2.69**	**2.63**	**2.65**	**2.65**	**2.64**	**2.62**	**2.61**	**2.59**
Median household income[10] (chained $ 1996)	**33,722**	**34,439**	**35,945**	**35,082**	**35,492**	**36,175**	**37,430**	**[12]38,592**	**[12]38,556**
Average household expenditures[11] (chained $ 1996)	**U**	**34,253**	**34,070**	**33,217**	**33,797**	**34,038**	**34,205**	**34,841**	**U**

KEY: R = revised; U = data are not available.

1 Estimates as of July except 1980 and 1990, which are as of April 1.

2 Total population count has been revised since the 1980 census. Numbers by age have not been corrected and may not sum to total.

3 1995 through 1999 data are estimates.

4 Defined as Metropolitan Statistical Areas and Consolidated Metropolitan Statistical Areas, as of July 1, 1994.

5 As of April 1 of year indicated. The Census Bureau only tabulates urban / rural numbers for the decennial census years.

6 As of July 1 for all years except 1980 and 1990.

7 Fiscal year ending September 30.

8 The Census Bureau tabulates area (square miles) data for the decennial census years only. Data for 1990 reflect the inclusion of the Great Lakes, inland water, and coastal water. Data for prior years included inland water only.

9 Estimates for 1980 and 1985 are shown on the basis of the 1972 Standard Industrial Code (SIC); 1990-96 are based on the 1987 SIC. Values expressed as chained 1996 dollars using industry-specific, chain-type quantity indices from the Bureau of Economic Analysis.

10 Households as of March of following year.

11 Values converted to chained 1996 dollars using the chain-type price index for personal consumption expenditures from the Bureau of Economic Analysis.

12 Median income for 1999-2000 is converted to chained 1996 dollars using the CPI-U-RS price index while previous years use the CPI-U price indices. Comparisons with earlier years should be made with caution.

TABLE A: Social and Economic Characteristics of the United States (Continued)

SOURCES

U.S. resident population:
1980-99: U.S. Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States 2000* (Washington, DC: 2001), table 15.
2000: Ibid., 2000 Census of Population and Housing, *Profiles of General Demographic Characteristics 2000* (Washington DC: May 2001), table DP-1.

Age:
1980-99: Ibid., *Statistical Abstract of the United States 2000* (Washington, DC: 2001), table 12.
2000: Ibid., 2000 Census of Population and Housing, *Profiles of General Demographic Characteristics 2000* (Washington DC: May 2001), table DP-1.

Sex:
1980-99: Ibid., *Statistical Abstract of the United States 2000* (Washington, DC: 2001), table 10.
2000: Ibid., 2000 Census of Population and Housing, *Profiles of General Demographic Characteristics 2000* (Washington DC: May 2001), table DP-1.

Metropolitan areas:
1980-90, 1998: Ibid., *Statistical Abstract of the United States 2000* (Washington, DC: 2001), table 32.
2000: Ibid., 2000 Census of Population and Housing, *Profiles of General Demographic Characteristics 2000* (Washington DC: May 2001), table 2.

Rural / urban:
Ibid., *Statistical Abstract of the United States 2000* (Washington, DC: 2001), table 37.

Regions:
1990-99: Ibid., Internet site http://www.census.gov/population/estimates/state/st-99-3.txt as of Dec. 29, 1999.
2000: Ibid., 2000 Census of Population and Housing, *Profiles of General Demographic Characteristics 2000* (Washington DC: May 2001), table DP-1.

Immigrants:
1980-85: Ibid., *Statistical Abstract of the United States 1990* (Washington, DC: 1990), table 6.
1990-96: Ibid., *Statistical Abstract of the United States 1998* (Washington, DC: 1998), table 6.
1997-2000: U.S. Department of Justice, Immigration and Naturalization Service, Office of Policy and Planning, Statistics Branch, *Annual Report, Legal Immigration, Fiscal Year 2001*, No. 2, September 2000, Internet site http://www.ins.usdoj.gov/graphics/aboutins/statistics/index.htm as of September 30, 2002.

Total area:
U.S. Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States 2000* (Washington, DC:2001), table 1.

Gross domestic product:
1980-90: Ibid., *Survey of Current Business* (Washington, DC: November 1997).
1995-96: Ibid., November 1998.
1997-2000: Ibid., November 2001.

Civilian labor force:
U.S. Department of Labor, Bureau of Labor Statistics, Current Population Survey, Internet site http://www.bls.gov, specific series data query as of Dec. 20, 2001.

Participation rates:
U.S. Department of Labor, Bureau of Labor Statistics, Current Population Survey, Internet site http://www.bls.gov, specific series data queries as of Dec. 20, 2001.

Number and average size of households:
1980-97: U.S. Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States 1998* (Washington, DC: 1998), table 69.
1998-99: Ibid., *Statistical Abstract of the United States 2000* (Washington, DC: 2001), table 60.
2000: Ibid., 2000 Census of Population and Housing, *Profiles of General Demographic Characteristics 2000* (Washington DC: May 2001), table DP-1.

Median household income:
1980-98: Ibid., *Statistical Abstract of the United States 2000* (Washington, DC:2001), table 737.
1999-2000: Ibid., *Money Income in the United States 2000*, (Washington DC: 2001), table A.

Average household expenditures:
Ibid., U.S. Department of Labor, Bureau of Labor Statistics, Consumer Expenditure Survey, Internet site http://www.bls.gov/csxhome.htm.

Chapter 1

The Transportation System

Section A
Physical Extent

TABLE 1-1: System Mileage Within the United States (Statute miles)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Highway[a]	3,545,693	3,689,666	3,730,082	3,838,146	3,859,837	3,863,912	3,866,926	3,912,226	3,919,652	3,945,872	3,906,290	3,917,243	3,936,229
Class I rail[b,c]	207,334	199,798	196,479	191,520	164,822	145,764	119,758	108,264	105,779	102,128	100,570	99,430	99,250
Amtrak[c]	N	N	N	N	24,000	24,000	24,000	24,000	25,000	25,000	22,000	23,000	23,000
Transit[d]													
Commuter rail[c]	N	N	N	N	N	3,574	4,132	4,160	3,682	4,417	5,172	5,191	5,209
Heavy rail	N	N	N	N	N	1,293	1,351	1,458	1,478	1,527	1,527	1,540	1,558
Light rail	N	N	N	N	N	384	483	568	638	659	676	802	834
Navigable channels[e]	25,000	25,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000
Oil pipeline[f]	190,944	210,867	218,671	225,889	218,393	213,605	208,752	181,912	177,535	179,873	178,648	177,463	U
Gas pipeline[g]	630,950	767,520	913,267	979,263	1,051,774	1,118,875	1,206,894	1,262,152	1,276,315	1,251,199	1,294,262	R1,388,942	1,400,386

KEY: N = data do not exist; R = revised; U = data are not available.

[a] All public road and street mileage in the 50 states and the District of Columbia. For years prior to 1980, some miles of nonpublic roadways are included. No consistent data on private road mileage are available. Beginning in 1998, approximately 43,000 miles of Bureau of Land Management Roads are excluded.

[b] Data represent miles of road owned (aggregate length of road, excluding yard tracks, sidings, and parallel lines).

[c] Portions of Class I freight railroads, Amtrak, and commuter rail networks share common trackage. Amtrak data represent miles of track operated.

[d] Transit system mileage is measured in directional route-miles. A directional route-mile is the mileage in each direction over which public transportation vehicles travel while in revenue service. Directional route-miles are computed with regard to direction of service, but without regard to the number of traffic lanes or rail tracks existing in the right-of-way.

[e] The St. Lawrence Seaway is not included in this number because 3 of the 5 subsections are solely in Canadian waters, and the others are in international boundary waters. Of the 26,000 miles of navigable waterways, 10,867 miles are commercially significant shallow-draft inland waterways subject to fuel taxes.

[f] Includes trunk and gathering lines for crude-oil pipeline.

[g] Excludes service pipelines. Data not adjusted to common diameter equivalent. Mileage as of the end of each year. Includes field and gathering, transmission, and distribution mains. See table 1-8 for a more detailed breakout of oil and gas pipeline mileage.

SOURCES

Highway:
1960-95: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: Annual issues), table HM-212.
1996-98, 2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table HM-20.
1999: Ibid., personal communication, May 2002.

Class I rail:
1960-2000: Association of American Railroads, *Railroad Facts* (Washington, DC: 2001), p. 45.

Amtrak:
1980: Amtrak, Corporate Planning and Development, personal communication (Washington, DC).
1985-2000: Amtrak, Corporate Planning and Development, *Amtrak Annual Report*, Statistical Appendix (Washington, DC: Annual issues).

Transit:
1985-99: U.S. Department of Transportation, Federal Transit Administration, *National Transit Database* (Washington, DC: Annual issues), table 20 and similar tables in earlier editions.

Navigable channels:
1960-96: U.S. Army Corps of Engineers, Ohio River Division, Huntington District, *Ohio River Navigation System Report, 1996, Commerce on the Ohio River and its Tributaries* (Fort Belvoir, VA: 1996), p. 2.
1997-99: Waterborne Commerce Statistics Center Databases, personal communication, Aug. 3, 2001.

Oil pipeline:
1960-99: Eno Transportation Foundation, Inc., *Transportation in America, 2000* (Washington, DC: 2001), p. 44.

Gas pipeline:
1960-2000: American Gas Association, *Gas Facts* (Arlington, VA: Annual issues), table 5-2 and similar tables in earlier editions.

TABLE 1-2: Number of Air Carriers, Railroads, Interstate Motor Carriers, Marine Vessel Operators, and Pipeline Operators

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Air carriers[a]	N	N	39	36	63	102	70	96	96	96	96	94	91	87
Major air carriers	N	N	N	N	N	13	14	11	12	13	13	13	15	15
Other air carriers	N	N	N	N	N	89	56	85	84	83	83	81	76	72
Railroads	607	568	517	477	480	500	530	541	553	550	559	555	560	U
Class I railroads	106	76	71	73	39	25	14	11	10	9	9	9	8	U
Other railroads	501	492	446	404	441	[g]475	516	530	543	541	550	546	552	U
Interstate motor carriers[b]	[e]	[e]	[e]	[e]	U	U	216,000	346,000	379,000	417,000	477,486	517,297	560,393	592,909
Marine vessel operators[c]	U	U	U	U	U	U	U	2,519	2,505	2,494	2,534	2,391	2,341	U
Pipeline operators[d]	N	N	1,123	1,682	2,243	2,204	2,212	2,378	2,338	2,282	2,225	2,216	2,163	1,957
Hazardous liquid	N	N	N	N	N	[g]222	187	209	215	217	225	216	243	239
Natural gas transmission	N	N	420	432	474	724	866	974	970	954	880	862	828	637
Natural gas distribution	N	N	938	[f]1,500	[f]1,932	1,485	1,382	1,444	1,397	1,363	1,366	1,382	1,351	1,305

KEY: N = data do not exist; U = data are not available.

[a] Carrier groups are categorized based on their annual operating revenues as major, national, large regional, and medium regional. The thresholds were last adjusted July 1, 1999, and the threshold for major air carriers is currently $1 billion. The other air carrier category contains all national, large regional, and medium regional air carriers.

[b] Figures are for the fiscal year, October through September. The Federal Motor Carrier Safety Administration deletes motor carriers from the Motor Carrier Management Information System (MCMIS) when they receive an official notice of a change in status. This most often occurs when a safety audit or compliance review is attempted. As a result, inactive carriers may be included in the MCMIS.

[c] The printed source materials do not contain totals for the number of operators and data files from which the figures can be determined are not available prior to 1993.

[d] There is some overlap among the operators for the pipeline modes so the total number of pipeline operators is lower than the sum for the three pipeline modes.

[e] Prior to 1980, the source of motor carrier data was the Interstate Commerce Commission (ICC), which was abolished on Jan. 1, 1996. (Certain functions were transferred to the Surface Transportation Board and the Department of Transportation.) The system used by ICC to collect motor carrier data differs significantly from that used by the Federal Motor Carrier Safety Administration in its Motor Carrier Management Information System (MCMIS), which began operations in 1980. The MCMIS is updated weekly, but archive versions are not retained. Because of differences between the two systems, data are not comparable and thus are not included here.

[f] Includes master meter and mobile home park natural gas distribution operators. A master meter system is a pipeline system for distributing gas within, but not limited to, a definable area, such as a mobile home park, housing project, or apartment complex, where the operator purchases metered gas from an outside source for resale through a gas distribution pipeline system. The gas distribution pipeline system supplies the ultimate consumer who either purchases the gas directly through a meter or by other means, such as by rents.

[g] This value is for 1986. The number of hazardous liquid pipeline operators is not available for prior years.

TABLE 1-2: Number of Air Carriers, Railroads, Interstate Motor Carriers, Marine Vessel Operators, and Pipeline Operators (Continued)

SOURCES

Air carriers:

U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, *Air Carrier Financial Statistics Quarterly* (Washington, DC: Fourth quarter issues), "Alphabetical List of Air Carriers by Carrier Group ...".

Railroads:

1960-85: Association of American Railroads, *Railroad Ten-Year Trends*, Vol. 2 (Washington, DC), table I-2.
1989-98: Ibid., Vol. 16 (Washington, DC: 1999), p. 10.
1999-2000: Ibid., *Railroad Facts* (Washington, DC: Annual issues), p. 3.

Interstate motor carriers:

U.S. Department of Transportation, Federal Motor Carrier Safety Administration, Motor Carrier Management Information System (MCMIS) data, personal communication, Nov. 6, 2001.

Marine vessel operators:

1995-2000: U.S. Army Corps of Engineers, *Waterborne Transportation Lines of the United States, Volume 2, Vessel Company Summary* (New Orleans, LA: Annual issues), source data files.

Pipeline Operators:

U.S. Department of Transportation, Office of Pipeline Safety, personal communication, Nov. 15, 2001.

TABLE 1-3: Number of U.S. Airports[a]

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
TOTAL airports	**15,161**	**16,319**	**17,490**	**18,224**	**18,292**	**18,345**	**18,770**	**19,098**	**19,281**	**19,306**
Public use, total	**4,814**	**5,858**	**5,589**	**5,415**	**5,389**	**5,357**	**5,352**	**R5,324**	**5,317**	**5,315**
Lighted runways, percent	66.2	68.1	71.4	74.3	74.5	74.6	74.8	R76.1	75.9	75.9
Paved runways, percent	72.3	66.7	70.7	73.3	73.7	74.0	74.2	74.2	74.3	74.3
Private use, total	**10,347**	**10,461**	**11,901**	**12,809**	**12,903**	**12,988**	**13,418**	**13,774**	**13,964**	**13,990**
Lighted runways, percent	15.2	9.1	7.0	6.4	6.4	6.4	6.3	6.7	7.2	7.3
Paved runways, percent	13.3	17.4	31.5	33.0	32.9	33.0	33.2	31.8	32.0	32.0
Certificated[b], total	**730**	**700**	**680**	**667**	**671**	**660**	**660**	**655**	**651**	**635**
Civil	N	N	N	572	577	566	566	565	563	562
Civil-military	N	N	N	95	94	94	94	90	88	73
General aviation, total	**14,431**	**15,619**	**16,810**	**17,557**	**17,621**	**17,685**	**18,110**	**18,443**	**18,630**	**18,760**

KEY: N = data do not exist; R = revised.

[a] Includes civil and joint-use civil-military airports, heliports, STOL (short takeoff and landing) ports, and seaplane bases in the United States and its territories.

[b] Certificated airports serve air-carrier operations with aircraft seating more than 30 passengers.

SOURCES
1980-2000: U.S. Department of Transportation, Federal Aviation Administration, *Administrator's Fact Book* (Washington, DC: Annual issues), Internet site http://www.atctraining.faa.gov/ as of Aug. 1, 2001.
2001: U.S. Department of Transportation, Federal Aviation Administration, personal communication, May 27, 2002.

TABLE 1-4: Public Road and Street Mileage in the United States by Type of Surface[a] (Thousands of miles)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
TOTAL paved and unpaved	**3,546**	**3,690**	**3,730**	**3,838**	**3,860**	**3,864**	**3,867**	**3,912**	**3,934**	**3,958**	**3,949**	**3,930**	**3,950**
Paved[b]													
Low and intermediate type	672	758	897	967	1,041	1,015	1,025	1,062	1,066	[d]N	[d]N	[d]N	[d]N
High-type	558	696	762	888	1,032	1,099	1,230	1,316	1,314	[d]N	[d]N	[d]N	[d]N
Paved total	**1,230**	**1,455**	**1,658**	**1,855**	**2,073**	**2,114**	**2,255**	**2,378**	**[R]2,381**	**2,410**	**2,420**	**2,451**	**2,504**
Unpaved[c] total	**2,315**	**2,235**	**2,072**	**1,983**	**1,787**	**1,750**	**1,612**	**1,534**	**1,554**	**1,548**	**1,529**	**1,479**	**1,446**

KEY: N = data do not exist.

[a] 1960-95 data include the 50 states and the District of Columbia; 1996-2000 data include the 50 states, District of Columbia, and Puerto Rico.

[b] Paved mileage includes the following categories: low type (an earth, gravel, or stone roadway that has a bituminous surface course less than 1″ thick); intermediate type (a mixed bituminous or bituminous penetration roadway on a flexible base having a combined surface and base thickness of less than 7″); high-type flexible (a mixed bituminous or bituminous penetration roadway on a flexible base having a combined surface and base thickness of 7″ or more; high-type composite (a mixed bituminous or bituminous penetration roadway of more than 1″ compacted material on a rigid base with a combined surface and base thickness of 7″ or more; high-type rigid (Portland cement concrete roadway with or without a bituminous wearing surface of less than 1″).

[c] Unpaved mileage includes the following categories: unimproved roadways using the natural surface and maintained to permit passability; graded and drained roadways of natural earth aligned and graded to permit reasonably convenient use by motor vehicles, and that have adequate drainage to prevent serious impairment of the road by normal surface water–surface may be stabilized; and soil, gravel, or stone roadways drained and graded with a surface of mixed soil, gravel, crushed stone, slag, shell, etc.–surface may be stabilized. The percentage of unpaved roads that are nonsurfaced dropped from approximately 42% in the 1960s to about 37% in the first half of the 1970s, to about 32% in 1980 and has held at about 22% since 1985.

[d] Source no longer sorts data into these particular categories for paved minor collectors and local public roads.

NOTES

A public road is any road under the jurisdiction of and maintained by a public authority (federal, state, county, town or township, local government or instrumentality thereof) and open to public travel. No consistent data on private road mileage are available (although prior to 1980 some nonpublic roadway mileage are included). Most data are provided by the states to the US DOT Federal Highway Administration (FHWA). Some years contain FHWA estimates for some states.

Numbers may not add due to rounding.

SOURCES

1960-95: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table HM-212.

1996-2000: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues), table HM-12.

TABLE 1-5: U.S. Public Road and Street Mileage by Functional System[a]

	1990	1991	1992	1993	1994	1995	1996	1997	1998[b]	1999	2000
TOTAL urban and rural mileage	**3,866,926**	**3,883,920**	**3,901,081**	**3,905,211**	**3,906,595**	**3,912,226**	**3,919,652**	**3,945,872**	**3,906,290**	**3,917,243**	**3,936,229**
Urban mileage											
Principal arterials, Interstates	11,527	11,602	12,516	12,877	13,126	13,164	13,217	13,247	13,312	13,343	13,379
Principal arterials, other freeways, and expressways	7,668	7,709	8,491	8,841	8,994	8,970	9,027	9,063	9,127	9,132	9,140
Principal arterials, other	51,968	52,515	51,900	52,708	53,110	52,796	52,983	53,223	53,132	53,199	53,312
Minor arterials	74,659	74,795	80,815	86,821	87,857	88,510	89,020	89,185	89,496	89,432	89,789
Collectors	78,254	77,102	82,784	84,854	86,089	87,331	87,790	88,049	88,071	88,005	88,200
Local	520,568	526,139	548,560	559,776	564,609	568,935	574,728	583,973	588,504	592,974	598,421
Total	**744,644**	**749,862**	**785,066**	**805,877**	**813,785**	**819,706**	**826,765**	**836,740**	**841,642**	**846,085**	**852,241**
Rural mileage											
Principal arterials, Interstates	33,547	33,677	32,951	32,631	32,457	32,580	32,820	32,817	32,813	32,974	33,048
Principal arterials, other	83,802	86,747	94,947	96,770	97,175	97,948	98,131	98,257	98,852	98,838	98,911
Minor arterials	144,774	141,795	137,685	137,577	138,120	137,151	137,359	137,497	137,308	137,462	137,574
Major collectors	436,352	436,746	434,072	432,222	431,115	431,712	432,117	432,714	432,408	432,934	433,121
Minor collectors	293,922	293,511	284,504	282,182	282,011	274,081	273,198	272,362	272,140	271,676	271,815
Local	2,129,885	2,141,582	2,131,856	2,117,952	2,111,932	2,119,048	2,119,262	2,135,485	2,091,127	2,097,274	2,109,519
Total	**3,122,282**	**3,134,058**	**3,116,015**	**3,099,334**	**3,092,810**	**3,092,520**	**3,092,887**	**3,109,132**	**3,064,648**	**3,071,158**	**3,083,988**

[a] Includes the 50 states and the District of Columbia. When states did not submit reports, data were estimated by the U.S. Department of Transportation, Federal Highway Administration.

[b] Beginning in 1998, approximately 43,000 miles of Bureau of Land Management roads are excluded.

NOTE

A public road is any road under the ownership of and maintained by a public authority (federal, state, county, town or township, local government or instrumentality thereof) and open to public travel. No consistent data on private road mileage are available. For more detailed information, including breakouts of mileage by ownership and type of surface, see the source document.

SOURCES

1990-95: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table HM-220.

1996-98, 2000: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues), table HM-20. Available at www.fhwa.dot.gov/ohim/ohimstat.htm as of October 2001.

1999: Ibid., personal communication, May 2002.

TABLE 1-6: Estimated U.S. Roadway Lane-Miles by Functional System[a]

	1980	1985	1990	1995	1996	1997	1998[R,d]	1999[R]	2000
TOTAL lane-miles	**7,922,174**	**8,017,994**	**8,051,081**	**8,158,253**	**8,178,654**	**[R]8,242,437**	**8,160,858**	**8,177,983**	**8,223,393**
Urban									
Interstates	48,458	57,295	62,214	71,377	71,790	[R]72,257	73,006	73,293	73,915
Other arterials[b]	333,673	371,649	399,376	445,828	449,480	[R]453,623	454,060	450,411	455,857
Collectors	145,128	162,377	167,770	185,032	186,923	[R]188,850	187,533	186,334	188,568
Local	867,986	951,018	1,041,136	1,137,870	1,149,456	[R]1,167,946	1,177,009	1,185,948	1,196,840
Total urban	**1,395,245**	**1,542,339**	**1,670,496**	**1,840,107**	**1,857,649**	**[R]1,882,676**	**1,891,608**	**1,895,986**	**1,915,180**
Rural									
Interstates	130,980	131,907	135,871	131,916	132,963	133,165	133,231	134,198	134,587
Other arterials[b]	507,098	510,005	517,342	530,706	532,856	[R]536,989	537,993	539,293	539,918
Collectors[c]	1,431,267	1,466,789	1,467,602	1,417,428	1,416,662	[R]1,418,637	1,415,774	1,413,953	1,414,665
Local	4,457,584	4,366,954	4,259,770	4,238,096	4,238,524	[R]4,270,970	4,182,252	4,194,553	4,219,043
Total rural	**6,526,929**	**6,475,655**	**6,380,585**	**6,318,146**	**6,321,005**	**[R]6,359,761**	**6,269,250**	**6,281,997**	**6,308,213**

KEY: R = revised.

[a] Includes the 50 States and the District of Columbia.

[b] For urban: the sum of other freeways and expressways, other principal arterials, and minor arterials. For rural: the sum of other principal arterials and minor arterials.

[c] Includes minor and major collectors.

[d] Beginning in 1998, approximately 86,000 lane-miles of Bureau of Land Management roads are excluded.

NOTE
In estimating rural and urban lane mileage, the U.S. Department of Transportation, Federal Highway Administration assumed that rural minor collectors and urban/rural local roads are two lanes wide.

SOURCES
1980-95: U.S. Department of Transportation, Federal Highway Administration, Office of Highway Information Management, table HM-260 (unpublished).
1996-98, 2000: U.S. Department of Transportation, *Highway Statistics* (Washington, DC: Annual issues), table HM-60. Internet address www.fhwa.dot.gov/ohim.ohimstat.htm as of Dec. 27, 2001.
1999: Ibid., personal communication, June 5, 2002.

TABLE 1-7: Number of Stations Served by Amtrak and Rail Transit, Fiscal Year

	1985	1990	1995	1996	1997	1998	1999	2000
Amtrak	503	516	530	542	516	508	510	515
Rail transit	1,895	2,169	2,382	2,325	2,391	2,524	2,567	2,595

NOTE
Rail transit is the sum of commuter rail, heavy rail, and light rail. In several large urban areas, Amtrak and commuter rail stations are shared.

SOURCES
Amtrak:
Amtrak, *Amtrak Annual Report*, Statistical Appendix (Washington, DC: Annual issues).

Rail transit:
U.S. Department of Transportation, Federal Transit Administration, National Transit Database (Washington, DC: Annual issues), table 20 (for 2000 issue) and similar tables in earlier editions.

TABLE 1-8: ADA Lift- or Ramp-Equipped Transit Buses

	1993	1994	1995	1996	1997	1998	1999	2000
Large buses, total	**46,413**	**46,979**	**46,355**	**45,587**	**45,502**	**46,188**	**46,891**	**47,017**
ADA-lift or ramp-equipped	23,338	24,398	27,420	29,073	29,684	33,512	36,029	37,581
Percent	50.3	51.9	59.2	63.8	65.2	72.6	76.8	79.9
Medium buses, total	**3,542**	**3,693**	**3,879**	**4,233**	**5,136**	**5,929**	**6,613**	**7,455**
ADA-lift or ramp-equipped	1,911	2,153	2,561	3,081	4,143	5,150	5,959	6,926
Percent	54.0	58.3	66.0	72.8	80.7	86.9	90.1	92.9
Small buses, total	**3,964**	**4,738**	**5,372**	**5,998**	**6,853**	**7,147**	**8,265**	**8,850**
ADA-lift or ramp-equipped	3,146	3,795	4,539	5,269	6,194	6,545	7,722	8,366
Percent	79.4	80.1	84.5	87.8	90.4	91.6	93.4	94.5
Articulated buses, total	**1,807**	**1,613**	**1,716**	**1,551**	**1,484**	**1,566**	**1,849**	**2,002**
ADA-lift or ramp-equipped	693	719	861	893	911	1,071	1,503	1,712
Percent	38.4	44.6	50.2	57.6	61.4	68.4	81.3	85.5
TOTAL buses	**55,726**	**57,023**	**57,322**	**57,369**	**58,975**	**60,830**	**63,618**	**65,324**
Total ADA-lift or ramp-equipped buses	29,088	31,065	35,381	38,316	40,932	46,278	51,213	54,585
Percent	52.2	54.5	61.7	66.8	69.4	76.1	80.5	83.6

KEY: ADA = Americans with Disabilities Act of 1992.

NOTES

Includes buses of transit agencies receiving federal funding for bus purchases, and buses of agencies not receiving federal funds that voluntarily report data to the Federal Transit Administration.

Large buses have more than 35 seats; medium buses have 25-35 seats; small buses have less than 25 seats; articulated buses are extra-long buses that measure between 54 and 60 feet.

SOURCE

U.S. Department of Transportation, Federal Transit Administration, *2000 National Summaries and Trends* (Washington, DC: 2001).

TABLE 1-9: ADA Accessible Rail Transit Stations by Agency

Type of rail transit/agency	Primary city served	Number of stations					Number of ADA accessible stations				
		1996	1997	1998	1999	2000	1996	1997	1998	1999	2000
Heavy rail											
Bay Area Rapid Transit	San Francisco, CA	36	39	39	39	39	36	39	39	39	39
Los Angeles County Metropolitan Transportation Authority	Los Angeles, CA	5	8	8	13	16	5	8	8	13	16
Washington Metropolitan Area Transit Authority	Washington, DC	74	75	75	76	78	74	75	75	76	78
Miami-Dade Transit Agency	Miami, FL	21	21	21	21	21	0	0	0	0	0
Metropolitan Atlanta Rapid Transit Authority	Atlanta, GA	36	36	36	36	36	36	36	36	36	36
Chicago Transit Authority	Chicago, IL	140	141	141	142	142	0	0	0	14	54
Massachusetts Bay Transportation Authority	Boston, MA	53	53	53	53	53	33	33	33	37	37
Mass Transit Administration - Maryland DOT	Baltimore, MD	14	14	14	14	14	14	14	14	14	14
Metropolitan Transportation Authority New York City Transit	New York, NY	468	468	468	468	468	28	30	30	31	41
Port Authority of New York and New Jersey Transit	New York, NY	13	13	13	13	13	6	6	6	6	6
Metropolitan Transit Authority Staten Island Railway	New York, NY	22	22	22	22	22	2	2	2	2	2
Greater Cleveland Regional Transit Authority	Cleveland, OH	18	18	18	18	18	4	6	6	7	8
Southeastern Pennsylvania Transportation Authority	Philadelphia, PA	76	76	76	76	76	4	4	4	4	4
Port Authority Transit of Allegheny County	Pittsburgh, PA	13	13	13	13	13	3	3	5	5	5
Commuter rail											
Southern California Regional Railroad Authority	Los Angeles, CA	U	45	46	46	47	U	45	46	46	47
Northeast Illinois Regional Commuter Railroad Corporation	Chicago, IL	226	226	226	227	227	91	104	104	111	115
Northern Indiana Commuter Transportation District	Chicago, IL	18	18	18	18	18	7	7	7	7	7
Massachusetts Bay Transportation Authority	Boston, MA	U	U	117	119	120	U	U	67	69	74
New Jersey Transit Corporation	New York, NY	158	158	158	162	162	22	22	41	46	46
Metropolitan Transportation Authority Long Island Railroad	New York, NY	134	134	124	124	124	15	15	88	97	97
Metropolitan Transportation Authority Metro-North Railroad Company	New York, NY	106	106	106	106	108	17	19	20	20	20
Southeastern Pennsylvania Transportation Authority	Philadelphia, PA	181	177	177	177	177	25	30	30	30	30
Light rail											
Los Angeles County Metropolitan Transportation Authority	Los Angeles, CA	36	36	36	36	36	36	36	36	36	36
San Francisco Municipal Railway	San Francisco, CA	11	11	11	11	11	0	0	0	0	0
Sacramento Regional Transit District	Sacramento, CA	28	28	28	29	29	0	0	0	29	29
San Diego Trolley, Inc.	San Diego, CA	38	41	49	49	49	38	41	49	49	49
Santa Clara Valley Transit Authority	San Jose, CA	33	34	34	34	47	5	5	5	5	21
Regional Transportation District	Denver, CO	15	15	15	15	20	15	15	15	15	20

TABLE 1-9: ADA Accessible Rail Transit Stations by Agency (Continued)

Type of rail transit/agency	Primary city served	Number of stations					Number of ADA accessible stations				
		1996	1997	1998	1999	2000	1996	1997	1998	1999	2000
Regional Transit Authority of Orleans and Jefferson	New Orleans, LA	2	9	9	9	9	2	9	9	9	9
Massachusetts Bay Transportation Authority	Boston, MA	95	95	95	95	95	9	9	9	12	12
Mass Transit Administration - Maryland DOT	Baltimore, MD	24	24	32	32	32	24	24	32	32	32
Bi-State Development Agency	St. Louis, MO	18	18	18	18	18	18	18	18	18	18
New Jersey Transit Corporation	Newark, NJ	11	11	11	11	11	0	0	0	0	0
Niagara Frontier Transit Metro System, Inc.	Buffalo, NY	14	14	14	14	14	7	7	7	7	7
Greater Cleveland Regional Transit Authority	Cleveland, OH	33	33	33	34	34	2	5	5	7	7
Tri-County Metropolitan Transportation District of Oregon	Portland, OR	27	27	29	47	47	26	26	28	46	46
Port Authority of Allegheny County	Pittsburgh, PA	13	13	13	13	13	0	13	13	13	13
Southeastern Pennsylvania Transportation Authority	Philadelphia, PA	64	64	64	64	64	0	0	0	0	0
Memphis Area Transit Authority	Memphis, TN	20	20	27	28	28	20	20	27	28	28
Dallas Area Rail Transit Authority	Dallas, TX	14	20	20	20	20	14	20	20	20	20
Galveston-Island Transit	Galveston, TX	3	3	3	U	U	3	3	3	U	U
Utah Transit Authority	Salt Lake City, UT	NA	NA	NA	16	16	NA	NA	NA	16	16
King County Department of Transportation	Seattle, WA	14	14	14	9	9	14	14	14	9	9
Kenosha Transit	Kenosha, WI	NA	NA	NA	NA	1	NA	NA	NA	NA	0

KEY: ADA = Americans with Disabilities Act of 1992; NA = not applicable; U = data are not available.

NOTE
Directly operated service only. Directly operated transit is service provided by a public transit agency using its own employees to operate transit vehicles. Transit service purchased under contract by a public transit agency is not considered directly operated transit.

SOURCE
U.S. Department of Transportation, Federal Transit Administration, *National Transit Database* (Washington, DC: Annual Issues), Internet site http://www.ntdprogram.com/NTD/ntdhome.nsf?OpenDatabase as of October 2002.

TABLE 1-10: U.S. Oil and Gas Pipeline Mileage

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Oil pipeline													
Crude lines[a]	141,085	149,424	146,275	145,679	129,831	117,812	118,805	97,029	92,610	91,523	87,663	86,369	U
Product lines	49,859	61,443	72,396	80,210	88,562	95,793	89,947	84,883	84,925	88,350	90,985	91,094	U
Total	**190,944**	**210,867**	**218,671**	**225,889**	**218,393**	**213,605**	**208,752**	**181,912**	**177,535**	**179,873**	**178,648**	**177,463**	**U**
Gas pipeline[b]													
Distribution mains	391,400	494,500	594,800	648,200	701,800	753,400	837,300	936,800	959,500	957,100	999,000	R1,094,500	1,110,000
Transmission pipelines[c]	183,700	211,300	252,200	262,600	266,500	271,200	280,100	263,900	259,300	251,100	255,800	R254,000	250,600
Field and gathering lines	55,800	61,700	66,300	68,500	83,500	94,300	89,500	60,400	57,500	43,000	40,200	R40,400	39,800
Total	**630,950**	**767,520**	**913,267**	**979,263**	**1,051,774**	**1,118,875**	**1,206,894**	**1,261,100**	**1,276,315**	**1,251,199**	**1,295,000**	**R1,388,942**	**1,400,386**

KEY: R = revised; U = data are not available.

[a] Includes trunk and gathering lines.

[b] Excludes service pipe. Data are not adjusted to common diameter equivalent. Mileage as of the end of each year.

[c] After 1975, includes 5,000-6,200 miles of underground storage pipe.

NOTE
For gas pipeline data from 1960-1997, numbers may not add to totals due to rounding because the source provides exact numbers for totals, but rounded mileage for subtotals. Exact subtotals were not available for 1998.

SOURCES
Oil pipeline:
1960-99: Eno Transportation Foundation, Inc., *Transportation in America, 2000* (Washington, DC: 2001), p. 44.

Gas pipeline:
1960-2000: American Gas Association, *Gas Facts* (Arlington, VA: Annual issues), tables 5-1 and 5-2, and similar tables in earlier editions.

Section B
Vehicle, Aircraft, and Vessel Inventory

TABLE 1-11: Number of U.S. Aircraft, Vehicles, Vessels, and Other Conveyances

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Air													
Air carrier[a]	2,135	2,125	2,679	2,495	3,808	4,678	6,083	7,411	7,478	7,616	8,111	8,228	R8,055
General aviation[b] (active fleet)	76,549	95,442	131,743	168,475	211,045	210,654	198,000	188,089	191,129	192,414	204,710	219,464	217,533
Highway (registered vehicles)													
Passenger car	61,671,390	75,257,588	89,243,557	106,705,934	121,600,843	127,885,193	133,700,496	128,386,775	129,728,341	129,748,704	131,838,538	132,432,044	133,621,420
Motorcycle	574,032	1,381,956	2,824,098	4,964,070	5,693,940	5,444,404	4,259,462	3,897,191	3,871,599	3,826,373	3,879,450	4,152,433	4,346,068
Other 2-axle 4-tire vehicle	N	[i]	14,210,591	20,418,250	27,875,934	37,213,863	48,274,555	65,738,322	69,133,913	70,224,082	71,330,205	75,356,376	79,084,979
Truck													
Single-unit 2-axle 6-tire or more truck	N	13,999,285	3,681,405	4,231,622	4,373,784	4,593,071	4,486,981	5,023,670	5,266,029	5,293,358	5,734,925	5,762,864	5,926,030
Combination truck	[h]11,914,249	786,510	905,082	1,130,747	1,416,869	1,403,266	1,708,895	1,695,751	1,746,586	1,789,968	1,997,345	2,028,562	2,096,619
Bus	272,129	314,284	377,562	462,156	528,789	593,485	626,987	685,503	694,781	697,548	715,540	728,777	746,125
Total highway	**74,431,800**	**91,739,623**	**111,242,295**	**137,912,779**	**161,490,159**	**177,133,282**	**193,057,376**	**205,427,212**	**210,441,249**	**211,580,033**	**215,496,003**	**220,461,056**	**225,821,841**
Transit[c]													
Motor bus	49,600	49,600	49,700	50,811	59,411	64,258	58,714	67,107	71,678	72,770	72,142	74,228	P75,013
Light rail cars	2,856	1,549	1,262	1,061	1,013	717	913	999	1,140	1,229	1,220	1,297	P1,577
Heavy rail cars	9,010	9,115	9,286	9,608	9,641	9,326	10,419	10,157	10,201	10,242	10,301	10,306	P10,591
Trolley bus	3,826	1,453	1,050	703	823	676	832	885	871	859	880	859	P951
Commuter rail cars and locomotives	N	N	N	N	4,500	4,035	4,415	4,565	4,665	4,943	4,963	4,883	P5,073
Demand response	N	N	N	N	N	14,490	16,471	29,352	30,804	32,509	29,646	31,884	P33,080
Other[d]	N	N	N	N	N	867	1,197	2,809	3,003	3,808	4,703	5,059	P5,208
Rail													
Class I													
Freight cars	1,658,292	1,478,005	1,423,921	1,359,459	1,168,114	867,070	658,902	583,486	570,865	568,493	575,604	579,140	560,154
Locomotive	29,031	27,780	27,077	27,846	28,094	22,548	18,835	18,812	19,269	19,684	20,261	20,256	20,028
Nonclass I freight cars	32,104	37,164	29,787	29,407	102,161	111,086	103,527	84,724	87,364	116,108	121,659	126,762	132,448
Car companies and shippers freight cars	275,090	R285,493	330,473	334,739	440,552	443,530	449,832	550,717	582,344	585,818	618,404	662,934	688,194
Amtrak													
Passenger train car	N	N	N	1,913	2,128	1,854	1,863	1,722	1,730	1,728	1,962	1,992	1,894
Locomotive	N	N	N	355	419	291	318	313	299	332	345	329	378
Water													
Nonself-propelled vessels[e]	16,777	17,033	19,377	25,515	31,662	33,597	31,209	31,360	32,811	33,011	33,509	33,387	33,152

Continued next page

TABLE 1-11: Number of U.S. Aircraft, Vehicles, Vessels, and Other Conveyances (Continued)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Self-propelled vessels[f]	6,543	6,083	6,455	6,144	7,126	7,522	8,236	8,281	8,293	8,408	8,523	8,379	8,202
Oceangoing steam and motor ships (1,000 gross tons and over)	2,926	2,376	1,579	857	864	737	636	509	495	477	470	463	454
Recreational boats[g]	2,450,484	4,138,140	5,128,345	7,303,286	8,577,857	9,589,483	10,996,253	11,734,710	11,877,938	12,312,982	12,565,930	12,738,271	12,782,143

KEY: N = data do not exist; P = preliminary; R = revised.

[a] Air carrier aircraft are those carrying passengers or cargo for hire under 14 CFR 121 and 14 CFR 135. Beginning in 1990, the number of aircraft is the monthly average of the number of aircraft reported in use for the last three months of the year. Prior to 1990, it was the number of aircraft reported in use during December of a given year.

[b] 1995-97 data may not be comparable to earlier years due to changes in methodology. Includes air taxi aircraft.

[c] Prior to 1984, excludes most rural and smaller systems funded via Sections 18 and 16(b)(2), Urban Mass Transportation Act of 1964, as amended. Also prior to 1984, includes total vehicles owned and leased.

[d] Other includes aerial tramway, automated guideway transit, cablecar, ferry boat, inclined plane, monorail, and vanpool.

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

[f] Self-propelled vessels include dry-cargo and/or passenger, offshore supply vessels, railroad-car ferries, tankers, and towboats.

[g] Recreational vessels that are required to be numbered in accordance with Chapter 123 of Title 46 U.S.C.

[h] Included in single-unit truck.

[i] All trucks.

NOTES
Transit motor bus figure is also included as part of bus in the highway category.
For more detail on oceangoing vessels, see table 1-20.

SOURCES
Air:
Air carrier:
1960-65: U.S. Department of Transportation, Federal Aviation Administration, *FAA Statistical Handbook of Aviation*, *1970* (Washington, DC: 1970), table 5.3.
1970-75: Ibid., *1979 edition* (Washington, DC: 1979), table 5.1.
1980-85: Ibid., *Calendar Year 1986* (Washington, DC: 1986), table 5.1.
1990: Ibid., *Calendar Year 1997* (Washington, DC: unpublished), table 5.1, personal communication, Mar. 19, 1999.
1995-2000: Aerospace Industries Association, *Aerospace Facts and Figures* (Washington DC: 2001/2002), "Active U.S. Air Carrier Fleet".
General aviation:
1960-65: U.S. Department of Transportation, Federal Aviation Administration, *FAA Statistical Handbook of Aviation*, *1969* (Washington, DC: 1969), table 9.10.
1970-75: Ibid., *Calendar Year 1976* (Washington, DC: 1976), table 8-6.
1980: Ibid., *General Aviation Activity Survey*, Calendar Year 1980 (Washington, DC: 1981), table 1-3.
1985: Ibid., *Calendar Year 1985* (Washington, DC: 1987), table 2-9.
1990-2000: Ibid., *General Aviation and Air Taxi Activity Survey, Calendar Year 2000* (Washington, DC: 2002), table 1.2.

TABLE 1-11: Number of U.S. Aircraft, Vehicles, Vessels, and Other Conveyances (Continued)

Highway:
Passenger car:
1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table MV-201.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1
Motorcycle:
1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table MV-201.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.
Other 2-axle 4-tire vehicles:
1970-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.
Single-unit and combination trucks, and buses:
1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

Transit:
1960-97: American Public Transit Association, *Transit Fact Book* (Washington, DC: 1999), table 44.
1998-2000: Ibid., *Public Transportation Fact Book* (Washington DC: 2002), table 46.

Rail (all categories, except Amtrak):
1960-2000: Association of American Railroads, *Railroad Facts 2001* (Washington, DC: October 2001).

Amtrak:
Passenger train-cars and locomotives:
1975-80: Amtrak, State and Local Affairs Department, personal communication.
1985-2000: Ibid., *Amtrak Annual Report*, Statistical Appendix (Washington, DC: Annual issues), p. 47.

Water transportation:
Nonself-propelled vessels and self-propelled vessels:
1960-2000: 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:
1960-2000: U.S. Department of Transportation, Maritime Administration, *Merchant Fleets of the World* (Washington, DC: Annual issues).
Recreational boats:
1960-2000: U.S. Department of Transportation, U.S. Coast Guard, *Boating Statistics* (Washington, DC: Annual issues).

TABLE 1-12: Sales or Deliveries of New Aircraft, Vehicles, Vessels, and Other Conveyances

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Civilian aircraft (shipments)														
Transport[a]	245	233	311	315	387	278	521	256	269	374	559	620	R485	U
Helicopters	N	598	482	864	1,366	384	603	292	278	346	363	361	R493	U
General aviation	7,588	11,852	7,283	14,072	11,881	2,029	1,144	1,077	R1,115	R1,549	R2,193	R2,475	R2,802	U
Highway														
Passenger car (new retail sales)	6,641,000	9,332,000	8,400,000	8,624,000	8,979,000	11,042,000	9,300,000	8,635,000	8,527,000	8,272,000	8,142,000	8,698,000	8,847,000	U
Motorcycle (new retail sales)[b]	N	N	1,125,000	940,000	1,070,000	710,000	303,000	309,000	330,000	356,000	432,000	R546,000	710,000	U
Truck (factory sales)[c]	1,194,475	1,716,564	1,660,446	2,231,630	1,667,283	3,356,905	3,692,474	5,689,551	5,748,147	6,125,935	6,407,702	7,345,059	7,022,478	U
Bus; includes school bus (factory sales)	i	35,241	31,994	40,530	34,385	33,533	32,731	23,918	27,583	26,882	27,483	i	i	i
Recreational vehicle (shipments)	N	192,830	380,300	339,600	178,500	351,700	347,300	475,200	466,800	438,800	441,300	481,200	418,300	U
Bicycle[d]	N	N	N	N	9,000,000	11,400,000	10,800,000	12,000,000	10,900,000	11,000,000	11,100,000	11,600,000	11,900,000	11,300,000
Transit (deliveries)														
Motor bus[e]	2,415	3,000	1,424	5,261	4,572	3,367	4,779	6,022	6,016	6,329	7,135	6,815	7,696	U
Light rail	0	0	0	0	32	63	55	38	39	76	80	123	136	P111
Heavy rail	416	580	308	127	130	441	10	72	10	34	120	122	204	P751
Trolley bus	0	0	0	1	98	0	118	3	3	0	54	0	0	U
Commuter rail	214	666	302	2,165	152	179	83	38	111	198	122	132	116	P54
Class I rail (deliveries)														
Freight car[f]	57,047	77,822	66,185	72,392	85,920	12,080	32,063	60,853	57,877	50,396	75,685	74,223	55,791	U
Locomotive	389	1,387	1,029	772	1,480	522	530	928	761	743	889	709	640	U
Amtrak (deliveries)														
Passenger train car	N	N	N	109	109	N	58	76	92	10	0	0	26	U
Locomotive	N	N	N	30	17	10	0	10	0	111	35	0	4	U

TABLE 1-12: Sales or Deliveries of New Aircraft, Vehicles, Vessels, and Other Conveyances (Continued)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Water transport														
Merchant vessel[g]	20	13	13	15	23	14	0	1	0	1	4	2	0	U
Recreational boat[h]	N	N	N	N	R569,700	R636,800	R504,100	663,760	634,750	610,100	575,800	584,900	R574,000	541,300

KEY: N = data do not exist; P = preliminary; R = revised; U = data are not available.

[a] U.S.-manufactured fixed-wing aircraft over 33,000 pounds empty weight, including all jet transports plus the 4-engine turboprop-powered Lockheed L-100.

[b] Includes domestic and imported vehicles. Prior to 1985, all terrain vehicles (ATVs) were included in the motorcycle total. In 1995, the Motorcycle Industry Council revised its data for the years 1985 to present to exclude ATVs from its totals.

[c] Includes large passenger or utility vehicles that may be considered cars in other tables.

[d] Includes domestic and imported vehicles, wheel sizes 20 inches and over. Data from 1997 onwards are projections.

[e] Buses or bus-type vehicles only. Includes demand response. Excludes vanpool vans and most rural and smaller systems prior to 1984. Transit motor bus figure is also included as part of the bus total in the highway category.

[f] Includes all railroads and private car owners.

[g] Self-propelled, 1,000 or more gross tons.

[h] Retail unit estimates. Includes outboard, inboard, and sterndrive boats, jet boats (since 1995), personal watercraft (since 1991), sailboats, and canoes. Also includes inflatable boats (until 1992) and sailboards (until 1990).

[i] Included in truck figure.

SOURCES

Civilian aircraft:
1960-2000: Aerospace Industries Association, *Aerospace Facts and Figures* (Washington, DC: Annual issues), "Civil Aircraft Shipments".

Highway:
Passenger cars and trucks:
1960-97: American Automobile Manufacturers Association, *Motor Vehicle Facts & Figures, 1998* (Southfield, MI: 1999), p. 21 (passenger car) and p. 6 (truck).
1998-2000: Ward's Communications, *Motor Vehicle Facts & Figures, 2001* (Detroit, MI: 2001), p. 21 (passenger car) and p. 6 (truck).
Motorcycles:
1970-2000: Motorcycle Industry Council, Inc., *Motorcycle Statistical Annual, 2001* (Irvine, CA: 2002), p. 8 and similar tables in earlier editions.
Buses:
1965-97: American Automobile Manufacturers Association, *Motor Vehicle Facts & Figures, 1998* (Detroit, MI: 1998), p. 6 and similar tables in earlier editions.
1998-2000: Ward's Communications, *Motor Vehicle Facts & Figures, 1999* (Detroit, MI: 1999), p. 6 and similar tables in earlier editions.
Recreational vehicles:
1965-97: Ibid., *Motor Vehicle Facts & Figures, 1998* (Detroit, MI: 1998), p. 12 and similar tables in earlier editions.
1998-2000: Ward's Communications, *Motor Vehicle Facts & Figures, 2001* (Detroit, MI: 2001), p. 11.
Bicycles:
1980-2001: National Bicycle Dealers Association, Internet site http://www.nbda.com as of July 24, 2002, and personal communication, Sept. 24, 1996.

Transit:
1960-2001: American Public Transit Association, *Public Transportation Fact Book 2002* (Washington, DC: February 2002), table 56 and similar tables in earlier editions.

Class I rail:
1960-2000: Association of American Railroads, *Railroad Facts* (Washington, DC: 2001), p. 55 and similar tables in earlier editions.

Amtrak:
1975-80: Ibid., *Railroad Facts* (Washington, DC: 1997), p. 17 and similar tables in earlier editions.
1985-2000: Amtrak, *Amtrak Annual Report*, Statistical Appendix (Washington, DC: Annual issues).

Water:
Merchant vessel:
1960-2000: U.S. Department of Transportation, Maritime Administration, *Merchant Fleets of the World* (Washington, DC: Annual issues).
Recreational boat:
1980-2001: National Marine Manufacturers Association, *Boating 2001* (Chicago, IL: 2002), annual retail unit estimates.

TABLE 1-13: Active Air Carrier and General Aviation Fleet by Type of Aircraft

	1965	1970	1975	1980	1985[f]	1990	1995	1996	1997	1998	1999	2000
AIR CARRIER[a]	**2,125**	**2,679**	**2,495**	**3,808**	**4,678**	**6,083**	**7,411**	**7,478**	**7,616**	**8,111**	**8,228**	**7,935**
Fixed Wing	**2,104**	**2,663**	**2,488**	**3,803**	**4,673**	**6,072**	**7,293**	**7,357**	**7,482**	**7,994**	**8,106**	**7,898**
Turbojet												
Four engine	511	931	602	436	322	432	435	440	450	447	441	441
Three engine	173	659	994	1,347	1,488	1,438	1,210	1,212	1,224	1,238	1,181	1,103
Two engine	41	546	518	743	1,354	2,278	3,187	3,270	3,434	3,726	4,008	4,277
Total turbojet	**725**	**2,136**	**2,114**	**2,526**	**3,164**	**4,148**	**4,832**	**4,922**	**5,108**	**5,411**	**5,630**	**5,821**
Turboprop												
Four engine	215	110	68	92	108	88	81	56	45	39	28	31
Two engine	89	259	192	590	965	1,507	1,632	1,635	1,596	1,789	1,759	1,457
One engine	8	5	N	N	N	N	0	5	5	4	1	0
Total turboprop	**312**	**374**	**260**	**682**	**1,073**	**1,595**	**1,713**	**1,696**	**1,646**	**1,832**	**1,788**	**1,488**
Piston												
Four engine	447	34	37	73	38	31	15	18	19	17	19	17
Three engine	590	110	69	N	4	6	1	7	4	3	3	3
Two engine	30	9	8	522	394	292	333	317	298	391	292	260
One engine	N	N	N	N	N	N	399	397	407	340	374	309
Total piston	**1,067**	**153**	**114**	**595**	**436**	**329**	**748**	**739**	**728**	**751**	**688**	**589**
Helicopter	**21**	**16**	**7**	**2**	**5**	**11**	**118**	**121**	**134**	**117**	**122**	**37**
GENERAL AVIATION (GENERAL FLEET)[b]	**95,442**	**161,743**	**168,475**	**211,043**	**196,500**	**198,000**	**188,089**	**191,129**	**192,414**	**204,710**	**219,464**	**217,533**
Fixed Wing	**[c]93,130**	**127,934**	**161,570**	**200,097**	**184,700**	**184,500**	**162,342**	**163,691**	**166,854**	**175,203**	**184,723**	**183,276**
Turbojet												
Two engine	N	[e]822	[e]1,742	2,551	3,600	3,700	4,071	4,077	4,638	5,513	6,387	6,215
Other	N	128	[e]34	441	50	400	488	347	539	552	733	786
Total turbojet	**N**	**950**	**1,776**	**2,992**	**4,100**	**4,100**	**4,559**	**4,424**	**5,178**	**6,066**	**7,120**	**7,001**
Turboprop												
Two engine	N	1,287	[e]2,486	3,966	4,900	4,900	4,295	4,917	4,939	5,076	4,641	5,040
One engine	N	138	33	N	N	N	668	719	650	1,033	1,018	678
Other	N	33	N	123	100	400	32	80	29	65	21	45
Total turboprop	**N**	**1,458**	**2,519**	**4,090**	**5,000**	**5,300**	**4,995**	**5,716**	**5,619**	**6,174**	**5,679**	**5,762**

TABLE 1-13: Active Air Carrier and General Aviation Fleet by Type of Aircraft (Continued)

	1965	1970	1975	1980	1985[f]	1990	1995	1996	1997	1998	1999	2000
Piston												
Two engine	[d]11,422	15,835	[e]20,331	24,366	22,100	21,100	15,706	16,082	15,938	18,659	20,930	20,951
One engine	81,134	109,492	136,944	168,435	153,400	154,000	137,049	137,401	140,038	144,234	150,886	149,422
Other	N	199	N	212	100	100	33	68	79	70	108	140
Total piston	**92,556**	**125,526**	**157,275**	**193,014**	**175,600**	**175,200**	**152,788**	**153,551**	**156,056**	**162,963**	**171,923**	**170,513**
Rotorcraft	**1,503**	**2,255**	**4,073**	**6,001**	**6,000**	**6,900**	**5,830**	**6,570**	**6,786**	**7,425**	**7,448**	**7,150**
Piston	N	1,666	2,499	2,794	2,700	3,200	1,863	2,507	2,259	2,545	2,564	2,680
Turbine												
Multiengine	N	N	N	N	N	N	733	643	764	843	839	694
One engine	N	589	N	N	N	N	3,234	3,420	3,762	4,038	4,045	3,776
Total turbine	**N**	**589**	**1,574**	**3,207**	**3,300**	**3,700**	**3,967**	**4,063**	**4,527**	**4,881**	**4,884**	**4,470**
Other Aircraft	**809**	**1,554**	**2,832**	**4,945**	**5,800**	**6,600**	**4,741**	**4,244**	**4,092**	**5,580**	**6,765**	**6,700**
Gliders	N	N	N	N	N	N	2,182	1,934	2,016	2,105	2,041	2,041
Lighter-than-Air	N	N	N	N	N	N	2,559	2,310	2,075	3,475	4,725	4,660
Experimental	**N**	**N**	**N**	**N**	**N**	**N**	**15,176**	**16,625**	**14,680**	**16,502**	**20,528**	**20,407**
Amateur Built	N	N	N	N	N	N	9,328	11,566	10,261	13,189	16,858	16,739
Exhibition	N	N	N	N	N	N	2,245	2,094	1,798	1,630	1,999	1,973
Other	N	N	N	N	N	N	3,603	2,965	2,620	1,684	1,671	1,694

KEY: N = data are not available.

[a] Air carrier aircraft are aircraft carrying passengers or cargo for hire under 14 CFR 121 (large aircraft-more than 30 seats) and 14 CFR 135 (small aircraft-30 seats or less). This definition is more encompassing than that in the Federal Aviation Administration (FAA) Aviation Forecast- jet aircraft, 60 seats or more carrying passengers or cargo for hire. Beginning in 1990, the number of aircraft is the monthly average reported in use for the last three months of the year. Prior to 1990, it was the number of aircraft reported in use during December of a given year.

[b] Columns may not add to totals due to estimation procedures. Beginning in 1993, excludes commuters. Prior to 1993, single engine turboprops were included in "Other turboprops"; single and multiengine turbine rotorcraft were not shown separately; gliders and lighter-than-air aircraft were combined into the "Other" category; and experimental aircraft were included in the appropriate aircraft type. For example, prior to 1993, the single engine piston aircraft type included both experimental and nonexperimental aircraft Starting in 1993, that aircraft type only includes nonexperimental aircraft. Due to changes in methodology beginning in 1995, estimates may not be comparable to those for 1994 and earlier years. Values for 1991 through 1994 were revised to reflect changes in adjustment for nonresponse bias.

[c] Total includes 574 turbine aircraft of unspecified subtype.

[d] Multiengine.

[e] Single-engine.

[f] Source reported rounded data for general aviation.

Continued next page

TABLE 1-13: Active Air Carrier and General Aviation Fleet by Type of Aircraft (Continued)

NOTES

Prior to 1970, aircraft counts included aircraft retained in FAA data systems until the owners requested that they be deregistered. As a result, thousands of aircraft that had been destroyed over the years remained in the system. Since 1970, annual verification of aircraft registrations is required. Failure to comply with this requirement leads to revocation of the registration certificate and exclusion of the aircraft from the official count of the following year. Listed engine configurations (e.g., two-, three-, multi-) represent all applicable combinations for each aircraft type. Totals may not agree with those in other tables as revisions to prior year data are reported at the aggregate level only.

SOURCES

Air carriers:

1965: U.S. Department of Transportation, Federal Aviation Administration, *FAA Statistical Handbook of Aviation, 1966 Edition.* (Washington, DC: 1966), table 7.5.
1970: Ibid., *Calendar Year 1971.* (Washington, DC: 1972), table 5.5.
1975: Ibid., *Calendar Year 1975.* (Washington, DC: Dec. 31, 1975), table 5.3.
1980: Ibid., *Calendar Year 1980.* (Washington, DC: Dec. 31, 1980), table 5.2.
1985: Ibid., *Calendar Year 1993.* FAA-APO-95-5 (Washington, DC: 1995), table 5.2.
1990: Ibid., *Calendar Year 1996*, Internet site: http://www.api.faa.gov/handbook96/toc96.htm, as of Mar. 31, 2000, table 5.2.
1995-2000: Aerospace Industries Association, Aerospace Facts and Figures (Washington DC: 2001/2002), "Active U.S. Air Carrier Fleet."

General aviation:

1965: U.S. Department of Transportation, Federal Aviation Administration, *FAA Statistical Handbook of Aviation, 1966 Edition.* (Washington, DC: 1966), table 5.1.
1970: Ibid., *Calendar Year 1971.* (Washington, DC: 1972), table 8.3.
1975: Ibid., *Calendar Year 1975.* (Washington, DC: Dec. 31, 1975), table 8.4.55

1980: Ibid., *General Aviation Activity and Avionics Survey, Annual Report Calendar Year 1980*, FAA-MS-81-5 (Washington, DC: December 1985), table 2-6.
1985: Ibid., *Annual Summary Report 1994 Data*, FAA-APO-95-10 (Washington, DC: 1996), table 1.2.
1990-2000: Ibid., *General Aviation and Air Taxi Activity Survey, Calendar Year 2000* (Washington, DC: 2002), table 1.2 and similar tables in earlier editions.

TABLE 1-14: U.S. Automobile and Truck Fleets by Use (Thousands)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001[e]
TOTAL automobiles and trucks in fleets	**U**	**U**	**U**	**U**	**U**	**15,257**	**15,570**	**15,869**	**16,879**	**15,530**	**15,196**	**13,642**
Number of automobiles in fleets of 25 or more (10 or more cars from 1999)[a]												
Business[b]	2,889	2,628	2,492	1,751	1,722	1,326	1,295	1,188	1,159	3,195	2,950	2,620
Government[c]	538	504	516	401	428	1,214	1,209	1,218	1,030	885	883	734
Utilities	551	544	548	386	382	376	376	377	359	320	317	U[f]
Police	249	250	264	264	266	269	274	280	289	302	306	312
Taxi (includes vans)	141	141	140	140	141	139	130	181	190	135	136	142
Rental (includes vans and SUVs)	990	1,160	1,448	1,501	1,473	1,518	1,590	1,608	1,602	1,733	1,581	1,542
Number of automobiles in fleets of 4 to 24 (4 to 9 cars from 1999)[a]	U	U	U	U	U	4,200	4,250	4,373	4,921	1,172	1,173	1,290
Total automobiles in fleets	**U**	**U**	**U**	**U**	**U**	**9,042**	**9,124**	**9,225**	**9,550**	**7,742**	**7,346**	**6,640**
Number of trucks in fleets of 25 or more (10 or more trucks from 1999)[a]												
Business[d]	U	U	1,080	1,378	1,375	1,205	1,275	1,332	1,360	3,016	3,026	2,820
Government[c]	U	U	297	632	646	2,221	2,215	2,223	2,010	2,400	2,408	2,052
Utilities	U	U	593	493	487	480	482	483	459	499	498	U[f]
Other (police, taxi, etc.)	U	U	7	7	7	7	7	7	8	8	8	9
Rental trucks (not vans and SUVs)	U	U	304	308	363	202	197	179	181	213	248	246
Number of trucks in fleets of 4 to 24 (4 to 9 trucks from 1999)[a]	U	U	U	U	U	2,100	2,270	2,420	3,311	1,652	1,662	1,875
Total trucks in fleets	**U**	**U**	**U**	**U**	**U**	**6,215**	**6,446**	**6,644**	**7,329**	**7,788**	**7,850**	**7,002**

KEY: SUV = sport utility vehicle; U = data are not available.

[a] The data source, Bobit Publishing, changed data collection categories from 1999.

[b] Includes driver schools.

[c] Includes military vehicles and federal, state, county, and local government vehicles.

[d] Businesses with 25 or more Class 1-5 trucks including leasing, construction, plumbing, heating, food distribution, pest control, cable TV, etc. (Also applies post-1999 data).

[e] 2001 data does not include employee-owned fleet information as the source has stopped publishing the data.

[f] Business and utility data have been combined in the *Automotive Fleet Fact Book*, 2002.

SOURCE
Bobit Publishing Co., *Automotive Fleet Fact Book*, 2002.

TABLE 1-15: Annual U.S. Motor Vehicle Production and Factory (Wholesale) Sales (Thousands)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Production													
Passenger cars	6,703	9,335	6,550	6,717	6,376	8,185	6,077	6,351	6,083	5,927	5,554	5,638	5,542
Commercial vehicles[a]	1,202	1,785	1,734	2,270	1,634	3,468	3,706	5,635	5,749	6,192	6,448	7,387	7,228
Total	**7,905**	**11,120**	**8,284**	**8,987**	**8,010**	**11,653**	**9,783**	**11,985**	**11,833**	**12,119**	**12,003**	**13,025**	**12,771**
Factory (wholesale) sales													
Passenger cars	6,675	9,306	6,547	6,713	6,400	8,002	6,050	6,310	6,140	6,070	5,677	5,428	5,504
Commercial vehicles[a]	1,194	1,752	1,692	2,272	1,667	3,464	3,725	5,713	5,776	6,153	6,435	6,699	7,022
Total	**7,869**	**11,057**	**8,239**	**8,985**	**8,067**	**11,467**	**9,775**	**12,023**	**11,916**	**12,223**	**12,112**	**12,127**	**12,527**

[a] Includes trucks under 10,000 pounds gross vehicle weight rating (GVWR), such as compact and conventional pickups, sport utility vehicles, minivans, and vans, and trucks and buses over 10,000 pounds GVWR.

NOTES
Factory sales can be greater than production total because of sales from previous year's inventory.
Numbers may not add to totals due to rounding.

SOURCE
1960-2000: Ward's, *Motor Vehicle Facts & Figures 2001* (Southfield, MI: 2001), p. 3.

TABLE 1-16: Retail[a] New Passenger Car Sales (Thousands)

	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
TOTAL new passenger car sales	**8,400**	**8,624**	**8,979**	**11,042**	**9,300**	**8,635**	**8,527**	**8,272**	**8,142**	**8,698**	**8,847**
Domestic[b]	**7,119**	**7,053**	**6,581**	**8,205**	**6,897**	**7,129**	**7,254**	**6,917**	**6,762**	**6,979**	**6,831**
Imports	**1,280**	**1,571**	**2,398**	**2,838**	**2,403**	**1,506**	**1,273**	**1,355**	**1,380**	**1,719**	**2,016**
Japan	313	808	1,906	2,218	1,719	982	727	726	691	758	863
Germany	750	493	305	424	265	207	238	297	367	467	517
Other	217	271	187	196	419	317	308	332	322	494	637

[a] Retail new car sales include both sales to individuals and to corporate fleets. It also includes leased cars.

[b] Includes cars produced in Canada and Mexico.

SOURCES
1970: American Automobile Manufacturers Association, *Motor Vehicle Facts & Figures 1992* (Detroit, MI: 1992), p. 16.
1980: Ibid., *Motor Vehicle Facts & Figures 1997* (Detroit, MI: 1997), p. 19.
1975, 1985-2000: Ward's, *Motor Vehicle Facts & Figures 2001* (Southfield, MI: 2001), p. 21.

TABLE 1-17: New and Used Passenger Car Sales and Leases (Thousands)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
TOTAL new and used passenger car sales	**46,830**	**45,465**	**45,164**	**46,575**	**49,131**	**50,393**	**49,327**	**49,512**	**48,982**	**49,438**	**50,466**	**U**
New passenger car sales[a]	9,300	8,175	8,214	8,518	8,990	8,635	8,526	8,272	8,142	8,698	8,846	U
Used passenger car sales[b]	37,530	37,290	36,950	38,057	40,141	41,758	40,801	R41,237	R40,841	R40,739	41,620	42,624
Value of transactions ($ billions)	R220	R229	R246	257	R291	R319	R329	R336	335	R350	R357	376
Average price (current $)	R5,857	R6,143	R6,656	R6,742	R7,245	R7,644	R8,073	R8,139	R8,211	R8,587	R8,578	8,832
New passenger car leases[c]	534	667	882	1,197	1,715	1,795	1,806	2,062	2,174	2,271	2,272	U

KEY: R = revised; U = data are not available.

[a] Includes leased cars.

[b] Used car sales include sales from franchised dealers, independent dealers, and casual sales.

[c] Consumer leases only.

SOURCES

New passenger car sales:
Ward's, *Motor Vehicle Facts & Figures, 2001* (Southfield, MI: 2001), p.15.

Used passenger car sales:
ADT Automotive, *2001 Used Car Market Report* (Nashville, TN: 2000), p. 5.

Leased passenger cars:
CNW Marketing / Research, personal communication, May 31, 2000, Aug. 13, 2001, and Aug. 26, 2002.

TABLE 1-18: Retail Sales of New Cars by Sector (Thousands)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Total	**6,641**	**9,333**	**8,402**	**8,538**	**8,982**	**10,978**	**9,300**	**R8,687**	**R8,527**	**R8,273**	**8,142**	**8,697**	**8,852**	**8,422**
Sales of new cars														
Consumer	5,645	7,103	6,252	5,907	6,100	7,092	5,677	R4,351	R4,079	R3,909	3,988	R4,389	R4,696	4,640
Business	930	2,140	2,056	2,508	2,758	3,754	3,477	R4,186	R4,273	R4,217	3,984	R4,135	3,989	3,617
Government	66	89	94	123	124	132	147	R151	R176	R147	R171	R173	R167	166
Percentage of total sales														
Consumer	85.0	76.1	74.4	69.2	67.9	64.6	61.0	R50.1	R47.8	R47.3	49.0	R50.5	53.0	55.1
Business	14.0	22.9	24.5	29.4	30.7	34.2	37.4	R48.2	R50.1	R51.0	48.9	R47.5	45.1	42.9

KEY: R = revised.

NOTES
Includes imported cars, but not vans, trucks, or sport utility vehicles. Numbers may not add to totals due to rounding.

SOURCE
U.S. Department of Commerce, Bureau of Economic Analysis, National Income and Wealth Division, unpublished data.

TABLE 1-19: Period Sales, Market Shares, and Sales-Weighted Fuel Economies of New Domestic and Imported Automobiles

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Sales[a] (thousands)										
Total units	9,095	10,969	9,224	8,725	8,652	8,261	8,071	8,646	8,978	8,308
Minicompact	428	52	77	45	34	40	12	13	19	33
Subcompact	3,441	2,382	2,030	1,518	1,315	1,510	1,491	1,622	1,789	922
Compact	599	3,526	3,156	3,290	3,493	2,937	2,309	2,367	2,398	3,058
Midsize	3,073	3,118	2,512	2,499	2,488	2,531	3,107	3,359	3,352	2,669
Large	1,336	1,516	1,279	1,321	1,259	1,162	1,050	1,181	1,297	1,507
Two-seater	216	374	170	53	62	81	101	103	122	118
Market share, percent										
Minicompact	4.7	0.5	0.8	0.5	0.4	0.5	0.2	0.1	0.2	0.4
Subcompact	37.8	21.7	22.0	17.4	15.2	18.3	18.5	18.8	19.9	11.1
Compact	6.6	32.1	34.2	37.7	40.4	35.6	28.6	27.4	26.7	36.8
Midsize	33.8	28.4	27.2	28.6	28.8	30.6	38.5	38.9	37.3	32.1
Large	14.7	13.8	13.9	15.1	14.6	14.1	13.0	13.7	14.4	18.1
Two-seater	2.4	3.4	1.8	0.6	0.7	1.0	1.3	1.2	1.4	1.4
Fuel economy, mpg										
Fleet	23.2	27.0	27.6	28.0	28.3	28.3	28.3	28.0	28.2	28.5
Minicompact	29.4	32.7	26.4	27.0	27.2	26.3	23.9	24.8	25.6	24.6
Subcompact	27.3	30.1	31.3	31.7	32.1	32.6	31.3	31.0	31.1	29.6
Compact	22.3	29.6	28.9	30.2	30.4	30.0	30.8	30.2	30.4	31.3
Midsize	21.3	24.9	25.9	25.9	26.4	26.3	26.9	27.0	26.8	27.2
Large	19.3	22.3	23.5	24.1	24.2	24.5	24.6	24.4	25.3	25.4
Two-seater	21.0	27.6	28.0	24.7	25.4	26.3	25.4	25.2	25.8	26.5

KEY: mpg = miles per gallon.

[a] Sales period is October 1 of the previous year through September 30 of the current year. These figures represent only those sales that could be matched to corresponding U.S. Environmental Protection Agency fuel economy values.

NOTE
Numbers and percents may not add to totals due to rounding.

SOURCE
Light-Duty Vehicle MPG and Market Shares System Database, as cited in Oak Ridge National Laboratory, *Transportation Energy Data Book*, Edition 21, ORNL-6966 (Oak Ridge, TN: 2001), table 7.5, p. 7-6, and personal communication, Sept. 3, 2002.

TABLE 1-20: Period Sales, Market Shares, and Sales-Weighted Fuel Economies of New Domestic and Imported Light Trucks

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Sales[a] (thousands)										
Total units	2,217	4,235	4,515	5,934	6,237	6,527	7,138	8,002	8,307	8,020
Small pickups	516	864	1,136	1,068	1,010	978	891	1,111	1,072	819
Large pickups	1,115	1,691	1,116	1,473	1,607	1,594	1,947	2,022	1,969	1,988
Small vans	14	438	1,012	1,331	1,307	1,298	1,273	1,372	1,272	1,051
Large vans	328	536	319	328	293	304	331	364	369	324
Small SUV	52	442	402	510	580	350	487	662	756	895
Medium SUV	152	187	434	1,077	1,272	1,448	1,586	1,758	2,167	2,158
Large SUV	40	78	94	149	168	555	622	713	702	785
Market share, percent										
Small pickups	23.3	20.4	25.2	18.0	16.2	15.0	12.5	13.9	12.9	10.2
Large pickups	50.3	39.9	24.7	24.8	25.8	24.4	27.3	25.3	23.7	24.8
Small vans	0.6	10.3	22.4	22.4	21.0	19.9	17.8	17.1	15.3	13.1
Large vans	14.8	12.7	7.1	5.5	4.7	4.7	4.6	4.5	4.4	4.0
Small SUV	2.3	10.4	8.9	8.6	9.3	5.4	6.8	8.3	9.1	11.2
Medium SUV	6.9	4.4	9.6	18.1	20.4	22.2	22.2	22.0	26.1	26.9
Large SUV	1.8	1.8	2.1	2.5	2.7	8.5	8.7	8.9	8.5	9.8
Fuel economy, mpg										
Fleet	18.1	20.4	20.5	20.2	20.4	20.1	20.3	20.0	20.4	20.5
Small pickups	25.5	26.8	24.5	24.4	24.8	24.1	24.1	22.6	22.0	21.3
Large pickups	17.0	19.0	17.5	17.8	17.9	18.5	18.3	18.1	18.7	19.0
Small vans	19.6	23.9	22.3	22.4	22.3	22.5	23.0	22.8	23.0	23.1
Large vans	16.3	16.4	17.1	17.2	17.3	18.0	18.2	17.7	18.2	18.3
Small SUV	17.7	22.1	22.5	22.0	22.6	23.3	23.7	23.6	23.8	24.3
Medium SUV	14.9	17.2	19.7	19.2	19.6	19.1	20.0	20.0	20.4	20.7
Large SUV	13.7	17.1	16.5	16.1	17.3	17.5	17.4	17.1	17.5	17.6

KEY: mpg = miles per gallon; SUV = sport utility vehicle.

[a] Sales period is October 1 of the previous year through September 30 of the current year. These figures represent only those sales that could be matched to corresponding U.S. Environmental Protection Agency fuel economy values.

NOTES

Numbers and percents may not add to totals due to rounding.

Fleet sales total cannot be compared with truck sales in table 1-10 for the following reasons: 1) this table includes both domestic and imported trucks, whereas the numbers in table 1-10 are for domestic trucks only; and 2) this table covers only light trucks, whereas the numbers in table 1-10 include heavy trucks.

SOURCE

Light-Duty Vehicle MPG and Market Shares System Database, as cited in Oak Ridge National Laboratory, *Transportation Energy Data Book*, Edition 21, ORNL-6966 (Oak Ridge, TN: 2001), table 7.6, p. 7-7, and personal communication, Sept. 3, 2002.

TABLE 1-21: Number of Trucks by Weight

	Thousands of trucks		Percent change
	1992	1997	1992-97
All trucks	**59,200.8**	**72,800.3**	**23.0%**
Truck category			
Light			
Less than 6,001 lb	50,545.7	62,798.4	24.2%
Medium			
6,001 to 10,000 lb	4,647.5	5,301.5	14.1%
10,001 to 14,000 lb	694.3	818.9	17.9%
14,001 to 16,000 lb	282.4	315.9	11.9%
16,001 to 19,500 lb	282.3	300.8	6.6%
Light-heavy			
19,501 to 26,000 lb	732.0	729.3	-0.4%
Heavy			
26,001 to 33,000 lb	387.3	427.7	10.4%
33,001 to 40,000 lb	232.6	256.7	10.4%
40,001 to 50,000 lb	338.6	399.9	18.1%
50,001 to 60,000 lb	226.7	311.4	37.4%
60,001 to 80,000 lb	781.1	1,069.8	37.0%
80,001 to 100,000 lb	33.3	46.3	39.0%
100,001 to 130,000 lb	12.3	17.9	45.5%
130,000 lb or more	4.6	5.9	28.3%
Not reported	<50	<50	N

KEY: lb = pound; N = data do not exist.

NOTES

Average vehicle weight is the empty weight of the vehicle plus the average load of the vehicle.

Excludes vehicles owned by Federal, state, or local governments; ambulances; buses; motor homes; farm tractors; unpowered trailer units; and trucks reported to have been sold, junked, or wrecked prior to July 1 of the year preceding the survey.

SOURCE

U.S. Census Bureau, *1997 Economic Census: Vehicle Inventory and Use Survey: United States*, EC97TV-US (Washington, DC: 1999).

TABLE 1-22: World Motor Vehicle Production, Selected Countries (Thousands)

	Passenger cars[b]										
	1961	1971	1981	1991	1994	1995	1996	1997	1998	1999	2000
TOTAL world	**11,391**	**26,453**	**27,407**	**35,287**	**35,730**	**36,111**	**37,318**	**38,474**	**37,286**	**38,816**	**40,732**
U.S. percent of world	**48**	**32**	**23**	**15**	**19**	**18**	**16**	**15**	**15**	**15**	**14**
Argentina	78	193	139	114	338	227	269	366	353	225	239
Australia	182	393	352	269	323	314	303	320	350	294	324
Austria	8	1	7	14	45	59	97	98	91	124	116
Belgium	N	279	216	253	409	386	368	356	319	218	912
Brazil	98	342	406	705	1,248	1,297	1,459	1,680	1,244	1,102	1,348
Canada	328	1,083	803	1,060	1,214	1,337	1,279	1,374	1,122	1,626	1,551
China	N	N	N	81	250	321	382	482	507	570	620
Czech Republic[a]	59	149	181	173	174	208	263	321	368	348	428
France	988	2,694	2,612	3,188	3,175	3,051	3,148	2,259	2,603	2,676	2,883
Germany	1,802	3,829	3,758	4,677	4,094	4,360	4,540	4,678	5,348	5,310	4,803
India	22	42	42	179	237	330	396	410	384	519	514
Italy	694	1,701	1,257	1,633	1,341	1,422	1,318	1,563	1,402	1,410	1,422
Japan	250	3,718	6,974	9,753	7,802	7,611	7,864	8,491	8,056	8,100	8,363
South Korea	N	N	69	1,158	1,806	2,003	2,265	2,308	1,625	2,362	2,602
Malaysia	N	N	N	102	137	164	176	280	126	200	280
Mexico	N	154	355	720	857	699	798	855	953	994	1,130
Netherlands	13	78	78	85	92	100	145	197	243	262	215
Poland	14	86	248	168	349	347	353	295	460	651	533
Portugal	N	N	N	N	38	41	119	186	181	187	191
Romania	N	N	N	84	85	71	76	108	104	88	58
Russia	149	518	1,324	1,308	796	838	868	982	U	946	966
Spain	55	453	855	1,943	1,974	2,131	2,213	2,342	2,217	2,029	2,445
Sweden	110	287	258	269	353	388	368	376	368	385	260
Taiwan	N	N	N	266	291	282	265	268	293	255	265
Turkey	N	13	25	196	213	233	208	243	U	U	297
United Kingdom	1,004	1,742	955	1,237	1,467	1,532	1,686	1,698	1,748	1,787	1,629
United States	5,522	8,584	6,253	5,439	6,614	6,351	6,083	5,927	5,554	5,638	5,542
Yugoslavia, Federal Republic of	15	114	240	213	8	8	9	11	U	U	U

Continued next page

TABLE 1-22: World Motor Vehicle Production, Selected Countries (Thousands) (Continued)

	Commercial vehicles[c]										
	1961	1971	1981	1991	1994	1995	1996	1997	1998	1999	2000
TOTAL world	**3,809**	**6,948**	**9,729**	**11,996**	**13,952**	**13,926**	**14,147**	**14,988**	**14,811**	**16,132**	**16,796**
U.S. percent of world	**30**	**30**	**17**	**28**	**40**	**40**	**40**	**41**	**44**	**46**	**43**
Argentina	58	60	33	25	70	59	44	80	105	80	101
Australia	49	77	40	15	31	17	19	29	34	17	25
Austria	5	6	8	6	3	9	9	10	12	16	25
Belgium	1	17	41	84	70	82	69	74	87	74	121
Brazil	47	174	374	255	334	332	346	388	329	242	323
Canada	63	277	520	829	1,106	1,071	1,118	1,198	1,050	1,430	1,411
China	N	N	N	628	1,103	1,114	1,084	1,096	1,121	1,235	1,389
Czech Republic[a]	17	28	49	29	6	8	9	47	42	27	27
France	217	316	408	423	383	424	443	322	351	357	469
Germany	411	312	358	358	262	307	303	345	379	378	395
India	32	47	107	176	238	306	366	336	129	261	282
Italy	65	116	176	245	194	245	227	254	290	291	316
Japan	789	2,093	4,206	3,492	2,752	2,585	2,482	2,484	1,994	1,805	1,781
South Korea	N	N	65	340	506	523	548	510	329	471	513
Malaysia	N	N	N	0	0	0	0	0	7	5	15
Mexico	N	57	242	269	266	236	422	503	500	540	792
Netherlands	6	13	12	26	23	32	19	20	28	25	52
Poland	22	60	60	25	16	34	48	27	39	44	24
Portugal	N	N	N	26	87	16	13	81	90	65	56
Romania	N	N	N	10	5	22	23	21	23	19	14
Russia	406	612	874	744	206	156	136	192	U	226	237
Spain	20	79	132	139	168	203	199	220	609	644	587
Sweden	22	30	55	75	82	102	95	104	114	109	36
Taiwan	N	N	N	116	132	124	101	113	112	95	100
Turkey	N	12	22	46	31	49	69	102	U	U	133
United Kingdom	443	456	230	217	228	233	238	238	233	186	189
United States	1,131	2,088	1,690	3,372	5,649	5,635	5,716	6,192	6,452	7,387	7,228
Yugoslavia, Federal Republic of	5	18	27	26	2	2	1	2	U	U	U

TABLE 1-22: World Motor Vehicle Production, Selected Countries (Thousands) (Continued)

	Total										
	1961	1971	1981	1991	1994	1995	1996	1997	1998	1999	2000
TOTAL world	**15,200**	**33,401**	**37,136**	**47,283**	**49,681**	**50,037**	**51,465**	**53,463**	**52,098**	**54,948**	**57,528**
U.S. percent of world	**44**	**32**	**21**	**19**	**25**	**24**	**23**	**23**	**23**	**24**	**22**
Argentina	136	253	172	139	409	286	313	446	458	305	340
Australia	231	470	392	284	354	331	322	349	384	311	348
Austria	13	7	15	20	48	68	106	108	103	139	141
Belgium	1	296	257	337	479	468	437	430	406	291	1,033
Brazil	145	516	780	960	1,582	1,629	1,805	2,067	1,573	1,344	1,671
Canada	391	1,360	1,323	1,889	2,320	2,408	2,397	2,571	2,173	3,057	2,962
China	N	N	N	709	1,353	1,435	1,466	1,578	1,628	1,805	2,009
Czech Republic[a]	76	177	230	202	180	216	272	369	411	376	455
France	1,205	3,010	3,020	3,611	3,558	3,475	3,591	2,581	2,954	3,033	3,352
Germany	2,213	4,141	4,116	5,035	4,356	4,667	4,843	5,023	5,727	5,688	5,198
India	54	89	149	355	475	636	762	746	513	780	796
Italy	759	1,817	1,433	1,878	1,534	1,667	1,545	1,817	1,693	1,701	1,738
Japan	1,039	5,811	11,180	13,245	10,554	10,196	10,346	10,975	10,050	9,905	10,145
South Korea	N	N	134	1,498	2,312	2,526	2,813	2,818	1,954	2,832	3,115
Malaysia	N	N	N	102	137	164	176	280	134	205	295
Mexico	N	211	597	989	1,123	935	1,220	1,358	1,453	1,534	1,923
Netherlands	19	91	90	111	115	132	164	218	271	287	267
Poland	36	146	308	193	365	381	401	322	499	695	556
Portugal	N	N	N	26	125	57	132	267	271	252	247
Romania	N	N	N	94	90	93	99	129	127	107	72
Russia	555	1,130	2,198	2,052	1,002	994	1,004	1,174	U	1,172	1,203
Spain	75	532	987	2,082	2,142	2,334	2,412	2,562	2,826	2,672	3,033
Sweden	132	317	313	344	435	490	463	480	483	494	296
Taiwan	N	N	N	382	423	406	366	381	405	350	365
Turkey	N	25	47	242	244	282	277	344	U	U	431
United Kingdom	1,447	2,198	1,185	1,454	1,695	1,765	1,924	1,936	1,981	1,973	1,817
United States	6,653	10,672	7,943	8,811	12,263	11,986	11,799	12,119	12,006	13,025	12,771
Yugoslavia, Federal Republic of	20	132	267	239	9	10	10	14	U	U	U

KEY: N = data do not exist; U = data are not available.

[a] Formerly Czechoslovakia.

[b] Does not include minivans, pickups, and sport utility vehicles.

[c] Includes all trucks and buses. Light trucks, such as pickups, sport utility vehicles, and minivans are included under commercial vehicles.

NOTES

Prior to 2000, the country of manufacture was recognized as the producing country. To conform with current OICA (International Organization of Motor Vehicle Manufacturers) practices, starting in 2000, the country of final assembly was recognized as the producing country. This explains the sudden change in trends across some countries from 1999 to 2000.

Numbers may not add to total due to rounding.

SOURCE

Ward's, *Motor Vehicle Facts & Figures 2001* (Southfield, MI: 2001), p. 12 and similar tables in previous editions.

TABLE 1-23: Number and Size of the U.S. Flag Merchant Fleet and Its Share of the World Fleet (Oceangoing ships of 1,000 gross tons and over)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
World fleet	**17,317**	**18,329**	**19,980**	**22,872**	**24,867**	**25,555**	**23,596**	**25,608**	**26,858**	**27,557**	**27,825**	**28,259**	**28,318**	**28,296**
U.S. fleet	**2,926**	**2,376**	**1,579**	**857**	**864**	**737**	**636**	**509**	**495**	**477**	**470**	**463**	**454**	**443**
U.S. share of the world fleet	**17%**	**13%**	**8%**	**4%**	**3%**	**3%**	**3%**	**2%**	**2%**	**2%**	**2%**	**2%**	**2%**	**2%**
Freighters, total	**2,138**	**1,747**	**1,076**	**511**	**471**	**417**	**367**	**295**	**292**	**288**	**289**	**284**	**286**	**283**
Deadweight tons (DWT) (thousands)	**21,877**	**18,127**	**11,733**	**7,051**	**6,885**	**7,353**	**7,265**	**6,517**	**6,419**	**6,458**	**6,732**	**6,696**	**6,680**	**6,635**
General cargo[a]	N	N	N	356	259	209	166	142	146	142	140	137	136	132
DWT (thousands)	N	N	N	4,640	3,329	2,980	2,605	2,472	2,467	2,420	2,400	2,404	2,362	2,162
Containership	N	N	N	109	121	104	92	81	83	85	91	89	90	91
DWT (thousands)	N	N	N	1,773	2,289	2,651	2,856	2,600	2,639	2,743	3,096	3,056	3,058	3,200
Partial containerships	N	N	N	37	68	63	59	3	1	1	N	N	N	N
DWT (thousands)	N	N	N	510	940	904	836	57	17	17	N	N	N	N
RO/RO	N	N	N	9	23	41	50	69	62	60	58	58	60	60
DWT (thousands)	N	N	N	128	327	818	968	1,388	1,296	1,278	1,236	1,236	1,260	1,273
Tankers, total	**422**	**341**	**294**	**267**	**308**	**258**	**233**	**181**	**173**	**161**	**154**	**154**	**142**	**130**
DWT (thousands)	**7,815**	**7,561**	**7,739**	**9,711**	**16,152**	**15,534**	**15,641**	**11,028**	**10,378**	**9,696**	**9,289**	**9,373**	**8,447**	**7,532**
Petroleum/chemical ships[b]	N	N	N	N	N	244	219	167	159	148	145	146	142	130
DWT (thousands)	N	N	N	N	N	14,574	14,681	10,123	9,473	8,857	8,737	8,845	8,447	7,532
Liquefied petroleum /natural gas ships	N	N	N	N	N	14	14	14	14	13	9	8	N	N
DWT (thousands)	N	N	N	N	N	960	960	905	905	839	552	528	N	N
Combination/passenger and cargo, total	**309**	**227**	**171**	**60**	**65**	**37**	**10**	**13**	**15**	**14**	**12**	**11**	**11**	**13**
DWT (thousands)	**2,070**	**1,488**	**1,107**	**388**	**446**	**299**	**91**	**115**	**139**	**136**	**116**	**99**	**99**	**105**
Bulk carriers, total	**57**	**61**	**38**	**19**	**20**	**25**	**26**	**20**	**15**	**14**	**15**	**14**	**15**	**17**
DWT (thousands)	**805**	**1,107**	**767**	**544**	**607**	**1,152**	**1,270**	**925**	**575**	**321**	**604**	**579**	**604**	**706**

KEY: N = data do not exist; RO/RO = roll-on/roll-off vessels.

[a] Includes barge carriers.

[b] Includes integrated tug/barges.

NOTES
Excludes nonmerchant type and/or U.S. Navy-owned vessels currently in the National Defense Reserve Fleet.
Excludes ships operating exclusively on the Great Lakes and inland waterways and special types such as: channel ships, icebreakers, cable ships, and merchant ships owned by military forces. All data are as of December 31 of year shown.

SOURCES
1960-2000: U.S. Department of Transportation, Maritime Administration, *Merchant Fleets of the World* (Washington, DC: Annual issues), and unpublished revisions.
2001: U.S. Department of Transportation, Maritime Administration, personal communication, Aug. 27, 2002.

Section C
Condition

TABLE 1-24: U.S. Airport Runway Pavement Conditions

	1986	1990	1993	1997	1999	2000	2001
NPIAS[a] airports, total	**3,243**	**3,285**	**3,294**	**3,331**	**3,344**	**3,361**	**3,364**
Condition, percent							
Good	61	61	68	72	72	73	73
Fair	28	29	25	23	23	22	22
Poor	11	10	7	5	5	5	5
Commercial service airports[b], total	**550**	**568**	**554**	**566**	**547**	**546**	**546**
Condition, percent							
Good	78	78	79	79	78	79	79
Fair	15	17	18	19	20	19	19
Poor	7	5	3	2	R2	2	2

KEY: NPIAS = National Plan of Integrated Airport Systems.

[a] The U.S. Department of Transportation, Federal Aviation Administration's (FAA's) National Plan of Integrated Airport Systems is composed of all commercial service airports, all reliever airports, and selected general aviation airports. It does not include over 1,000 publicly owned public-use landing areas, privately owned public-use airports, and other civil landing areas not open to the general public. NPIAS airports account for almost all enplanements. In 2001, there were 15,942 non-NPIAS airports. See table 1-3 for more detail on airports.

[b] Commercial service airports are defined as public airports receiving scheduled passenger service, and having at least 2,500 enplaned passengers per year.

NOTES
Data are as of January 1 of each year. Runway pavement condition is classified by the FAA as follows:
Good: All cracks and joints are sealed.
Fair: Mild surface cracking, unsealed joints, and slab edge spalling.
Poor: Large open cracks, surface and edge spalling, vegetation growing through cracks and joints.

SOURCES
Condition
1986-90: U.S. Department of Transportation, Federal Aviation Administration, *National Plan of Integrated Airport Systems* (Washington DC: 1991).
1993: Ibid. (Washington DC: 1995).
1997, 1999-2001: U.S. Department of Transportation, Federal Aviation Administration, Office of Airport Planning and Programming, National Planning Division, personal communication, 1997, 2000, Aug. 20, 2001, May 27, 2002.

Total number of airports
1986-2001: Ibid., June 23, 2000, Aug. 20, 2001, and May 27, 2002.

TABLE 1-25: Median Age of Automobiles and Trucks in Operation in the United States

Year	Automobiles	Trucks
1970	4.9	5.9
1975	5.4	5.8
1980	6.0	6.3
1985	6.9	7.6
1990	6.5	6.5
1995	7.7	7.6
1996	7.9	7.7
1997	8.1	7.8
1998	8.3	7.6
1999	8.3	7.2
2000	8.3	6.9

NOTE
The National Personal Transportation Survey conducted by the U.S. Department of Transportation, Federal Highway Administration, estimates the mean age of automobiles, trucks, and vans for several years:

	1969	1977	1983	1990	1995
Automobiles	5.1	5.5	6.7	7.6	8.2
Trucks	N	6.4	7.9	9.0	[a]8.3

[a] Includes vans.

KEY: N = data do not exist.

SOURCE
The R.L. Polk Co., personal communication, Aug. 9, 2001.

TABLE 1-26: Condition of U.S. Roadways by Functional System

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
RURAL											
Interstates											
Miles reported	**33,547**	**33,677**	**33,027**	**29,089**	**31,502**	**31,254**	**31,312**	**31,431**	**30,498**	**32,820**	**32,888**
Poor, percent	8.7	7.6	5.2	7.0	6.5	6.3	3.9	3.6	4.1	2.4	2.1
Mediocre, percent	[b]	[b]	14.1	27.7	26.5	20.7	19.1	19.1	16.5	14.0	12.2
Fair, percent	31.9	31.7	17.4	20.9	23.9	22.3	21.7	20.7	17.8	18.1	16.9
Good, percent	[b]	[b]	27.6	36.1	33.2	36.9	38.8	41.0	42.6	44.0	44.8
Very good, percent	59.5	60.7	35.6	8.3	9.9	13.9	16.6	15.7	19.0	21.5	23.9
Unpaved, percent	N	N	N	N	N	N	N	N	N	N	N
Miles not reported	**N**	**N**	**N**	**3,563**	**955**	**1,326**	**1,508**	**1,382**	**2,313**	**153**	**162**
Other principal arterials											
Miles reported	**83,802**	**85,729**	**94,798**	**78,296**	**89,506**	**89,265**	**92,103**	**92,170**	**93,333**	**97,247**	**97,284**
Poor, percent	3.4	3.6	3.3	2.9	2.4	4.4	1.4	1.6	1.4	0.9	0.8
Mediocre, percent	[b]	[b]	5.9	9.2	8.2	7.6	5.8	4.9	4.6	3.7	3.2
Fair, percent	42.6	44.5	34.6	54.8	57.4	51.1	49.1	47.7	43.3	41.5	38.7
Good, percent	[b]	[b]	28.5	26.7	26.6	27.9	34.4	[R]37.2	38.3	40.5	42.9
Very good, percent	53.8	51.9	27.6	6.4	5.4	9.0	9.3	8.6	12.3	13.5	14.4
Unpaved, percent	N	N	N	N	N	N	N	N	N	N	N
Miles not reported	**N**	**N**	**N**	**17,905**	**7,489**	**8,683**	**6,028**	**6,083**	**5,524**	**1,587**	**1,625**
Minor arterials											
Miles reported	**144,735**	**142,866**	**137,637**	**134,837**	**124,877**	**121,443**	**126,381**	**126,525**	**130,591**	**135,192**	**136,092**
Poor, percent	4.6	4.3	3.9	3.9	3.5	3.7	2.3	2.3	1.9	1.7	1.7
Mediocre, percent	[b]	[b]	7.1	9.1	10.5	9.0	8.2	6.7	6.0	5.2	5.3
Fair, percent	48.2	47.3	36.4	53.5	57.9	54.7	50.7	50.4	47.2	47.3	46.2
Good, percent	[b]	[b]	25.3	25.0	23.6	23.9	31.0	33.6	34.3	34.4	35.6
Very good, percent	47.2	48.4	26.8	8.5	4.5	8.7	7.7	7.0	10.6	11.4	11.2
Unpaved, percent	—	—	N	N	N	N	N	N	N	N	N
Miles not reported	**N**	**N**	**N**	**12,740**	**13,294**	**15,708**	**[R]10,978**	**10,978**	**6,664**	**1,968**	**1,227**

Continued next page

TABLE 1-26: Condition of U.S. Roadways by Functional System (Continued)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Major collectors											
Miles reported	**436,365**	**436,737**	**434,175**	**432,223**	**431,111**	**431,712**	**432,117**	**386,122**	**R171,134**	**163,544**	**388,485**
Poor, percent	8.9	7.7	7.8	6.8	6.5	6.5	6.7	7.8	R8.8	9.3	8.5
Mediocre, percent	b	b	11.0	12.4	11.3	11.4	10.3	12.3	R13.0	12.1	12.7
Fair, percent	43.8	45.2	32.3	37.7	33.5	30.8	R34.4	37.6	R33.5	33.2	43.7
Good, percent	b	b	17.7	16.3	16.1	17.4	20.0	23.0	R21.3	20.9	22
Very good, percent	36.2	36.1	20.4	15.9	21.9	23.7	18.4	19.3	R23.4	24.5	13.2
Unpaved, percent	11.1	11.0	10.7	10.9	10.7	10.2	10.1	N	N	N	N
Miles not reported[a]	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**2,402**	**R217,566**	**U**	**U**
URBAN											
Interstates											
Miles reported	**11,527**	**11,603**	**12,466**	**10,738**	**12,338**	**12,307**	**12,430**	**12,477**	**12,231**	**13,109**	**13,139**
Poor, percent	8.6	7.7	7.1	10.6	13.0	10.4	8.6	9.0	9.4	7.3	6.5
Mediocre, percent	b	b	13.2	30.9	29.9	26.8	28.3	27.0	25.5	23.1	21.7
Fair, percent	32.2	32.3	17.0	23.6	24.2	23.8	24.7	24.4	21.8	22.6	21.4
Good, percent	b	b	28.0	28.3	26.7	27.5	30.7	32.9	32.0	34.9	37.1
Very good, percent	59.1	60.0	34.7	6.5	6.2	11.4	7.6	6.7	11.4	12.0	13.3
Unpaved, percent	N	N	N	N	N	N	N	N	N	N	N
Miles not reported	**N**	**N**	**N**	**2,140**	**788**	**857**	**787**	**771**	**1,040**	**230**	**226**
Other freeways and expressways											
Miles reported	**7,670**	**7,714**	**8,465**	**7,011**	**7,618**	**7,804**	**8,410**	**8,480**	**8,772**	**8,860**	**8,794**
Poor, percent	2.2	2.3	2.6	3.8	5.3	4.8	3.4	3.3	3.2	2.6	2.8
Mediocre, percent	b	b	5.9	9.4	12.7	9.8	8.7	8.7	8.7	8.0	8.1
Fair, percent	43.9	44.2L	32.4	60.6	58.1	54.7	54.7	58.5	54.3	53.6	50.6
Good, percent	b	b	28.1	22.7	20.9	20.4	26.3	25.2	27.1	30.0	31.6
Very good, percent	53.9	53.5	31.0	3.5	2.9	10.3	6.8	4.2	6.6	6.8	6.8
Unpaved, percent	N	N	N	N	N	N	N	N	N	N	N
Miles not reported	**N**	**N**	**N**	**1,846**	**1,377**	**1,166**	**R617**	**579**	**397**	**281**	**355**

TABLE 1-26: Condition of U.S. Roadways by Functional System (Continued)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Other principal arterials											
Miles reported	**51,987**	**52,349**	**52,165**	**30,337**	**38,598**	**41,444**	**44,498**	**45,009**	**44,886**	**48,045**	**47,797**
Poor, percent	5.9	6.6	6.8	9.2	12.5	12.4	11.8	12.1	12.9	12.5	13.2
Mediocre, percent	[b]	[b]	11.5	13.3	16.3	14.7	14.1	14.6	18.5	18.1	16.8
Fair, percent	49.0	49.1	34.8	55.0	50.8	47.2	48.9	49.5	45.3	45.2	45.1
Good, percent	[b]	[b]	21.4	19.3	16.6	15.9	17.5	17.8	17.6	18.8	19.4
Very good, percent	45.1	44.3	25.3	3.3	3.8	9.7	7.7	6.0	5.8	5.4	5.4
Unpaved, percent	N	N	N	N	N	N	N	N	N	N	N
Miles not reported	**N**	**N**	**N**	**22,498**	**14,492**	**11,352**	**8,485**	**8,209**	**8,246**	**5,154**	**5,518**
Minor arterials											
Miles reported	**74,656**	**74,979**	**80,368**	**86,819**	**87,852**	**88,510**	**89,020**	**88,484**	**[R]45,275**	**43,481**	**88,339**
Poor, percent	8.9	7.4	7.9	7.9	6.7	6.7	6.9	7.2	[R]5.7	5.8	10.0
Mediocre, percent	[b]	[b]	14.3	13.8	12.3	13.6	13.0	13.0	12.2	11.7	16.0
Fair, percent	48.5	49.9	34.1	40.2	38.1	36.9	37.9	37.9	[R]36.0	35.3	39.8
Good, percent	[b]	[b]	19.2	18.4	20.5	20.4	20.7	21.4	[R]22.1	20.5	16.9
Very good, percent	42.1	42.1	24.0	19.4	22.1	22.1	21.1	20.6	[R]24.0	26.8	17.3
Unpaved, percent	0.5	0.6	0.5	0.4	0.3	0.3	0.4	N	N	N	N
Miles not reported[b]	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**374**	**[R]43,435**	**U**	**U**

Continued next page

TABLE 1-26: Condition of U.S. Roadways by Functional System (Continued)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Collectors											
Miles reported	**78,248**	**77,097**	**82,657**	**84,856**	**86,098**	**87,331**	**87,790**	**86,666**	**R53,806**	**52,002**	**86,026**
Poor, percent	16.5	11.2	10.5	10.6	9.8	9.7	9.7	10.6	R8.1	9.0	14.7
Mediocre, percent	b	b	16.9	16.8	16.2	16.8	16.6	16.0	R12.8	13.0	17.4
Fair, percent	50.4	53.5	35.2	40.0	40.0	39.0	39.2	39.0	R39.4	37.4	35.7
Good, percent	b	b	17.3	16.1	17.0	17.2	18.2	18.4	R18.8	17.2	14.2
Very good, percent	31.7	34.2	19.1	15.5	16.0	16.6	15.4	15.9	R20.9	23.4	18
Unpaved, percent	1.3	1.1	1.1	1.0	0.9	0.8	0.9	N	N	N	N
Miles not reported[b]	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**663**	**R32,921**	**U**	**U**

KEY: N = data do not exist; R = revised; U = data are not available; — = value too small to report.

[a] The increase in miles not reported can be attributed to the fact that many states are electing to report pavement conditions by the more objective International Roughness Indicator (IRI) rather than by the Present Serviceability Rating (PSR), which has traditionally been used to determine pavement conditions for these systems.

[b] Included in row below.

NOTES

Because of the transition to a new indicator for pavement condition beginning with U.S. Department of Transportation, Federal Highway Administration (FHWA) data published in 1993, comparisons between pre-1993 data and 1993 and later data are difficult. Thus, trend comparisons should be made with care. For additional information, the reader is referred to the accuracy profile for this table in the appendix. Total mileage in this table will not match that in table 1-5 because of a change in the method of creating mileage-based tables derived from the Highway Performance Monitoring System, beginning with the 1997 issue of FHWA's Highway Statistics

Data are for the 50 states and the District of Columbia.

Percents may not add to totals due to rounding.

SOURCES

1990-92: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues), table HM-63.

1993-98, 2000: Ibid., table HM-63 for rural major collector, urban minor arterial, and urban collector, and table HM-64 for all other categories.

1999: U.S. Department of Transportation, Federal Highway Administration, personal communication, June 5, 2002.

TABLE 1-27: Condition of U.S. Highway Bridges

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Urban bridges	108,770	112,363	115,312	117,488	121,141	122,537	124,950	127,633	128,312	130,339	133,384	133,401
Rural bridges	463,435	461,673	456,885	456,228	455,319	458,598	456,913	455,118	454,664	455,203	456,290	456,284
Total	**572,205**	**574,036**	**572,197**	**573,716**	**576,460**	**581,135**	**581,863**	**582,751**	**582,976**	**585,542**	**589,674**	**589,685**
Urban deficient bridges												
Structurally	16,847	17,032	16,323	15,932	15,692	15,205	15,094	14,846	14,073	12,967	12,695	12,705
Functionally	30,266	30,842	26,243	26,511	27,024	27,487	28,087	26,865	27,588	29,065	29,398	29,383
Total	**47,113**	**47,874**	**42,566**	**42,443**	**42,716**	**42,692**	**43,181**	**41,711**	**41,661**	**42,032**	**42,093**	**42,088**
Rural deficient bridges												
Structurally	121,018	117,502	102,375	96,048	91,991	89,112	86,424	83,629	78,999	75,183	70,881	70,890
Functionally	70,089	66,751	54,150	53,489	52,808	53,463	53,121	50,545	51,912	52,835	52,112	52,056
Total	**191,107**	**184,253**	**156,525**	**149,537**	**144,799**	**142,575**	**139,545**	**134,174**	**130,911**	**128,018**	**122,993**	**122,946**
All deficient bridges												
Structurally	137,865	134,534	118,698	111,980	107,683	104,317	101,518	98,475	93,072	88,150	83,576	83,595
Functionally	100,355	97,593	80,393	80,000	79,832	80,950	81,208	77,410	79,500	81,900	81,510	81,439
Total	**238,220**	**232,127**	**199,091**	**191,980**	**187,515**	**185,267**	**182,726**	**175,885**	**172,572**	**170,050**	**165,086**	**165,034**

NOTES

Structurally deficient bridges are defined as those needing significant maintenance attention, rehabilitation, or replacement.

Functionally deficient bridges are defined as those that do not have the lane widths, shoulder widths, or vertical clearances adequate to serve traffic demand, or the bridge may not be able to handle occasional roadway flooding.

Table includes: Rural–Interstate, principal arterial, minor arterial, major collector, minor collector and local roads; Urban–Interstate, other freeways or expressways, other principal arterial, minor arterial, collector, and local roads.

Data for 1990, 1992, 1997-99, and 2001 are as of December of those years; data for 1991 and 1994-96 are as of June of those years; data for 1993 are as of September of that year; data for 2000 are as of August of that year.

SOURCES

1990-2000: U.S. Department of Transportation, Federal Highway Administration, Office of Bridge Technology, National Bridge Inventory Database, personal communication, Aug. 14, 2001.

2001: U.S. Department of Transportation, Federal Highway Administration, Office of Bridge Technology, National Bridge Inventory Database, *Count of Bridges by Highway System*, Internet site http://www.fhwa.dot.gov/bridge/britab.htm as of Aug. 28, 2002.

TABLE 1-28: Average Age of Urban Transit Vehicles (Years)

	1985	1990	1995	1996	1997	1998	1999	2000
Transit rail								
Commuter rail locomotives[a]	16.3	15.7	15.9	17.6	17.0	14.7	13.2	13.4
Commuter rail passenger coaches	19.1	17.6	21.4	24.1	21.6	19.4	17.5	16.9
Commuter rail self-propelled passenger cars	12.3	15.9	19.8	21.1	22.3	23.2	24.3	25.4
Heavy-rail passenger cars	17.1	16.2	19.3	20.2	21.1	22.0	22.5	22.9
Light rail vehicles (streetcars)	20.6	15.2	16.8	16.0	15.9	15.7	15.7	16.1
Transit bus[b]								
Articulated	3.4	7.6	10.9	11.5	11.9	11.3	8.6	6.5
Full-size	8.1	8.2	8.7	8.8	8.6	8.5	8.4	8.1
Mid-size	5.6	6.6	6.9	6.3	5.8	5.7	5.6	5.6
Small	4.8	3.9	4.1	4.1	4.0	4.0	4.1	4.2
Trolley	U	10.9	13.1	14.0	14.7	14.6	15.6	16.4
Other								
Vans	3.8	2.8	3.1	3.1	3.0	2.9	3.1	3.1
Ferry boats	U	21.7	23.4	25.3	25.4	25.8	25.1	25.6

KEY: U = data are not available.

[a] Locomotives used in Amtrak intercity passenger services are not included.

[b] Full-size buses have more than 35 seats; mid-size buses have 25-35 seats; small buses have fewer than 25 seats.

SOURCE
1985-2000: U.S. Department of Transportation, Federal Transit Administration, *National Transit Database* (Washington, DC: Annual issues), table 29 and similar tables in earlier editions.

TABLE 1-29: Class I Railroad Locomotive Fleet by Year Built (Locomotive units)

Year built[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Total	**18,835**	**18,344**	**18,004**	**18,161**	**18,505**	**18,812**	**19,269**	**19,684**	**20,261**	**20,256**	**20,028**
Before 1970	5,117	4,353	4,038	3,766	3,535	[b]	[b]	[b]	[b]	[b]	[f]
1970-74	3,852	3,617	3,384	3,248	3,184	[c]6,048	[c]5,783	[c]5,529	[c]5,565	[c]5196	[f]
1975-79	4,432	4,375	4,292	4,352	4,275	4,254	4,274	4,219	4,116	4,000	[g]8,541
1980-84	2,837	2,826	2,784	2,730	2,625	2,754	2,735	2,728	2,723	2,581	2,411
1985-89	1,989	1,985	1,970	1,968	1,971	1,890	1,866	1,829	1,830	1,779	1,775
1990	608	605	604	604	599	[d]2,965	[d]2,959	[d]2,958	[d]2,736	[d]2,688	[d]2,648
1991		583	595	595	594	[e]	[e]	[e]	[e]	[e]	[e]
1992			337	340	339	[e]	[e]	[e]	[e]	[e]	[e]
1993				558	602	[e]	[e]	[e]	[e]	[e]	[e]
1994					781	[e]	[e]	[e]	[e]	[e]	[e]
1995						901	945	983	953	951	973
1996							707	696	708	706	697
1997								742	741	743	745
1998									889	890	890
1999										722	713
2000											635

[a] Disregards year of rebuilding.

[b] Included in 1970-74 category.

[c] Includes all locomotives built before 1975.

[d] Includes locomotives built between 1990-94.

[e] Included in 1990 category.

[f] Included in 1975-79 category.

[g] Includes all locomotives built before 1980.

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

TABLE 1-30: Age and Availability of Amtrak Locomotive and Car Fleets

	1972	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Locomotives											
Percent available for service[a]	N	87	83	93	84	88	88	88	88	90	89
Average age (years)[b]	22.3	14.4	7.4	7.0	12.0	13.9	14.4	12.0	12.6	12.8	11.2
Passenger and other train cars											
Percent available for service[a]	N	82	77	90	90	90	90	91	93	91	91
Average age (years)[b]	22.0	24.7	14.3	14.2	20.0	21.8	20.7	19.8	21.1	22.2	19.4

KEY: N = data do not exist.

[a] Year-end daily average. Active units less backshop units undergoing heavy maintenance less back-ordered units undergoing progressive maintenance and running repairs.

[b] Year-end average.

NOTE
1972 was Amtrak's first full fiscal year of operation.

SOURCES
1972-80: Amtrak, *Amtrak Annual Report* (Washington, DC: Annual issues).
1985-99: Ibid., *Amtrak Annual Report*, Statistical Appendix (Washington, DC: Annual issues).
2000: Ibid., *Amtrak Annual Report*, Statistical Appendix (Washington, DC: Annual issues).

TABLE 1-31: U.S. Flag Vessels by Type and Age (Number of vessels)

	Vessel type							
Age[a]	Dry cargo	Tanker	Towboat	Passenger[c]	Offshore support/ crewboats[d]	Dry barge	Tank/ liquid barge[e]	Total[b]
1990–91								
<6	80	6	132	151	85	2,335	162	2,951
6–10	161	38	706	120	318	4,570	316	6,229
11–15	212	50	1,029	110	474	7,639	829	10,343
16–20	141	35	844	80	144	6,374	750	8,368
21–25	82	38	750	65	84	2,607	759	4,385
>25	196	86	1,718	188	51	3,372	1,049	6,660
Total[b]	**900**	**257**	**5,210**	**721**	**1,168**	**27,110**	**3,874**	**39,342**
1992								
<6	36	5	134	219	93	3,224	296	4,012
6–10	73	28	398	198	208	1,783	121	2,829
11–15	135	54	1,137	203	567	9,114	902	12,150
16–20	73	33	926	169	189	6,696	740	8,853
21–25	31	42	716	122	91	2,475	677	4,167
>25	124	82	1,874	287	53	3,496	1,123	7,049
Total[b]	**497**	**249**	**5,203**	**1,201**	**1,205**	**26,981**	**3,864**	**39,313**
1993								
<6	25	3	135	207	103	3,558	325	4,356
6–10	67	22	205	221	107	1,070	68	1,764
11–15	135	43	1,221	211	597	8,810	869	11,894
16–20	70	33	968	164	218	6,772	791	9,019
21–25	41	31	674	129	106	2,904	655	4,543
>25	128	73	2,008	311	64	3,713	1,256	7,555
Total[b]	**470**	**205**	**5,219**	**1,243**	**1,197**	**26,982**	**3,970**	**39,306**
1994								
<6	46	4	146	157	107	3,630	399	4,489
6–10	103	12	151	185	61	1,171	36	1,719
11–15	200	36	1,135	123	540	7,903	754	10,691
16–20	130	44	966	122	309	6,314	799	8,684
21–25	90	32	664	82	130	3,873	638	5,509
>25	206	74	2,107	259	86	3,706	1,327	7,765
Total[b]	**778**	**202**	**5,179**	**928**	**1,236**	**26,757**	**3,966**	**39,064**
1995								
<6	38	5	168	149	119	3,975	489	4,943
6–10	90	8	134	195	58	1,483	46	2,014
11–15	168	34	959	133	463	6,387	611	8,760
16–20	135	38	988	121	412	6,507	736	8,939
21–25	80	29	726	91	141	4,897	697	6,661
>25	213	64	2,146	263	92	3,966	1,403	8,148
Total[b]	**726**	**178**	**5,127**	**954**	**1,288**	**27,375**	**3,985**	**39,641**
1996								
<6	43	7	205	153	123	5,189	573	6,293
6–10	74	8	118	188	61	2,041	87	2,577
11–15	141	29	715	142	351	4,505	346	6,229
16–20	155	36	1,036	119	460	7,234	840	9,881
21–25	79	23	842	87	155	5,416	723	7,325
>25	229	62	2,386	290	144	4,766	1,576	9,453
Total[b]	**713**	**161**	**5,177**	**967**	**1,274**	**28,775**	**4,036**	**41,104**

Continued next page

TABLE 1-31: U.S. Flag Vessels by Type and Age (Number of vessels) (Continued)

	Vessel type							
Age[a]	Dry cargo	Tanker	Towboat	Passenger[c]	Offshore support/ crewboats[d]	Dry barge	Tank/ liquid barge[e]	Total[b]
1997								
<6	52	8	227	150	122	5,515	519	6,593
6–10	66	2	118	187	94	2,582	181	3,230
11–15	96	27	396	152	223	1,800	137	2,831
16–20	183	36	1,173	131	588	8,943	928	11,982
21–25	84	21	918	102	177	5,772	727	7,801
>25	209	53	2,332	302	159	4,284	1,477	8,816
Total[b]	**692**	**147**	**5,173**	**1,025**	**1,369**	**29,040**	**3,971**	**41,419**
1998								
<6	56	12	247	150	163	5,877	485	6,991
6–10	55	3	124	168	105	3,117	267	3,839
11–15	105	19	196	166	111	1,113	72	1,782
16–20	179	31	1,198	129	634	8,591	865	11,626
21–25	88	22	979	106	211	5,909	763	8,076
>25	230	48	2,487	292	195	4,817	1,499	9,573
Total[b]	**714**	**135**	**5,237**	**1,011**	**1,423**	**29,557**	**3,952**	**42,032**
1999								
<6	60	12	302	144	245	6,640	565	7,968
6–10	49	3	140	146	114	3,192	298	3,943
11–15	97	12	146	183	61	1,231	39	1,769
16–20	146	35	1,101	120	571	7,414	742	10,129
21–25	99	30	953	95	283	5,302	760	7,522
>25	243	50	2,447	282	191	5,491	1,560	10,267
Total[b]	**695**	**142**	**5,098**	**970**	**1,470**	**29,414**	**3,973**	**41,766**
2000								
<6	66	11	325	134	246	6,721	582	8,085
6–10	50	4	143	118	106	3,051	329	3,802
11–15	113	8	142	178	58	1,565	48	2,112
16–20	136	34	929	124	454	5,846	602	8,125
21–25	105	30	954	90	332	5,365	712	7,588
>25	263	48	2,497	271	214	6,461	1,714	11,470
Total[b]	**737**	**135**	**4,995**	**918**	**1,414**	**29,141**	**4,011**	**41,354**

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

[b] Totals may be greater than sum of columns because of unclassified vessels and vessels of unknown age; figures include vessels available for operation.

[c] Includes passenger excursion/sightseeing, combination passenger and dry-cargo vessels, and ferries.

[d] In 1992, offshore supply boats were designated as crewboats.

[e] In 1992, tank barges were designated as liquid barges.

SOURCE

U.S. Army Corps of Engineers, *Waterborne Transportation Lines of the United States, Volume 1, National Summaries* (New Orleans, LA: Annual issues), table 4 in 2000 and similar tables in previous years; also available on Internet site www.wrsc.usace.army.mil/ndc/ as of June 25, 2002.

Section D
Travel and Goods Movement

TABLE 1-32: U.S. Vehicle-Miles (Millions)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Air													
Air carrier, large certificated, domestic, all services	858	1,134	2,068	1,948	2,523	3,046	3,963	4,629	4,811	4,911	5,035	5,332	R5,664
General aviation[a]	1,769	2,562	3,207	4,238	5,204	4,673	4,548	3,795	3,524	3,877	N	N	N
Highway													
Passenger car[b,c]	587,012	722,696	916,700	1,033,950	1,111,596	1,246,798	1,408,266	1,438,294	1,469,854	1,502,556	1,549,577	1,569,100	1,601,914
Motorcycle[b]	h	h	2,979	5,629	10,214	9,086	9,557	9,797	9,920	10,081	10,283	10,584	10,479
Other 2-axle 4-tire vehicle[c]	h	h	123,286	200,700	290,935	390,961	574,571	790,029	816,540	850,739	868,275	901,022	924,018
Truck													
Single-unit 2-axle 6-tire or more truck	98,551	128,769	27,081	34,606	39,813	45,441	51,901	62,705	64,072	66,893	68,021	70,304	70,583
Combination truck	28,854	31,665	35,134	46,724	68,678	78,063	94,341	115,451	118,899	124,584	128,359	132,384	135,208
Bus	4,346	4,681	4,544	6,055	6,059	4,478	5,726	6,420	6,563	6,842	7,007	7,662	7,601
Total highway[c]	**R718,762**	**R887,812**	**1,109,724**	**1,327,664**	**1,527,295**	**R1,774,826**	**2,144,362**	**2,422,696**	**2,485,848**	**2,561,695**	**2,631,522**	**2,691,056**	**2,749,803**
Transit													
Motor bus[d]	1,576	1,528	1,409	1,526	1,677	1,863	2,130	2,184	2,221	2,245	2,175	2,276	P2,315
Light rail	75	42	34	24	18	17	24	35	38	41	44	49	P53
Heavy rail	391	395	407	423	385	451	537	537	543	558	566	578	P595
Trolley bus	101	43	33	15	13	16	14	14	14	14	14	14	P15
Commuter rail	N	N	N	173	179	183	213	238	242	251	260	266	P271
Demand responsive[d]	N	N	N	N	N	247	306	507	548	585	671	718	P759
Ferry boat	N	N	N	N	i	i	2	3	2	3	3	3	P3
Other	N	N	N	15	15	15	16	34	43	50	63	69	P71
Total transit[e]	**2,143**	**2,008**	**1,883**	**2,176**	**2,287**	**2,791**	**3,242**	**3,550**	**3,650**	**3,746**	**3,794**	**3,972**	**P4,081**

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TABLE 1-32: U.S. Vehicle-Miles (Millions) (Continued)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Rail													
Class I freight, train-miles	404	421	427	403	428	347	380	458	469	475	475	490	504
Class I freight, car-miles	28,170	29,336	29,890	27,656	29,277	24,920	26,159	30,383	31,715	31,660	32,657	33,851	34,590
Intercity/Amtrak[f], train-miles	209	172	93	30	30	30	33	32	30	32	33	34	35
Intercity/Amtrak[f], car-miles	2,208	1,775	690	253	235	251	301	292	276	288	312	342	368
Total train-miles[g]	**613**	**593**	**520**	**433**	**458**	**377**	**413**	**490**	**499**	**507**	**508**	**524**	**539**

KEY: N = data do not exist; P = preliminary; R = revised.

[a] All operations other than those operating under 14 CFR 121 and 14 CFR 135. Data for 1996 are estimated using new information on nonrespondents and are not comparable to earlier years. Mileage in source is multiplied by 1.151 to convert to nautical-miles for 1985-1997.

[b] U.S. Department of Transportation, Federal Highway Administration (FHWA), provides data separately for passenger car and motorcycle in its annual *Highway Statistics* series. However, the 1995 summary report provides updated data for passenger car and motorcycle combined. Passenger car figures in this table were computed by U.S. Department of Transportation, Bureau of Transportation Statistics, by subtracting the most current motorcycle figures from the aggregate passenger car and motorcycle figures.

[c] In July 1997, the FHWA published revised vehicle-miles data for the highway modes for many years. The major change reflected the reassignment of some vehicles from the passenger car category to the other 2-axle 4-tire vehicle category. This ca tegory was calculated prior to rounding.

[d] Motor bus and demand responsive figures are also included in the bus figure for highway.

[e] Prior to 1985, excludes demand responsive and most rural and smaller systems funded via Sections 18 and 16(b)2, Federal Transit Act. The series is not continuous between 1980 and 1985. Transit rail modes are measured in car-miles. Car-miles measure individual vehicle-miles in a train. A 10-car train traveling 1 mile would equal 1 train-mile and 10 car-miles.

[f] Amtrak began operations in 1971.

[g] Although both train-miles and car-miles are shown for rail, only train-miles are included in the total. A train-mile is the movement of a train, which can consist of multiple vehicles (cars), the distance of 1 mile. This differs from a vehicle-mile, which is the movement of 1 vehicle the distance of 1 mile. A 10-vehicle train traveling 1 mile would be measured as 1 train-mile and 10 vehicle-miles. Caution should be used when comparing train-miles with vehicle miles.

[h] 1960–65, motorcycle data are included in passenger car, and other 2-axle 4-tire vehicle data included in single-unit 2-axle 6-tire or more truck.

[i] Ferry boat included with other.

TABLE 1-32: U.S. Vehicle-Miles (Millions) (Continued)

SOURCES

Air:

Air carrier:

1960: Civil Aeronautics Board, *Handbook of Airline Statistics 1969* (Washington, DC: 1970), part III, table 2.
1965-70: Ibid., *Handbook of Airline Statistics 1973* (Washington, DC: 1974), part III, table 2.
1975-80: Ibid., *Air Carrier Traffic Statistics* (Washington, DC: 1976, 1981), p. 4 (December 1976) and p. 2 (December 1981).
1985-2000: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, *Air Carrier Traffic Statistics* (Washington, DC: Annual December issues), p. 2, line 27 plus line 50.

General aviation:

1960-65: U.S. Department of Transportation, Federal Aviation Administration, *FAA Statistical Handbook of Aviation 1972* (Washington, DC: 1973), table 9.10.
1970-75: U.S. Department of Transportation, Federal Aviation Administration, *FAA Statistical Handbook of Aviation 1976* (Washington, DC: 1976), table 8-5.
1980: U.S. National Transportation Safety Board estimate, personal communication, Dec. 7, 1998.
1985-90: Ibid., *General Aviation Activity and Avionics Survey* (Washington, DC: Annual issues,) table 3.3.
1995-97: Ibid., *General Aviation and Air Taxi Activity and Avionics Survey* (Washington, DC: Annual issues), table 3.3.

Highway:

Passenger car and motorcycle:

1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, Internet site http://www.fhwa.dot.gov/ohim/summary95/index.html, as of July 28, 2000, table VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1, and Internet site www.fhwa.dot.gov/ohim/ohimstat.htm.

Motorcycle:

1970-80: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics, Summary to 1985* (Washington, DC: 1986), table VM-201A.
1985-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1, and Internet site www.fhwa.dot.gov/ohim/ohimstat.htm.

Other 2-axle 4-tire vehicle:

1970-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, Internet site http://www.fhwa.dot.gov/ohim/summary95/index.html, as of July 28, 2000, table VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1, and Internet site www.fhwa.dot.gov/ohim/ohimstat.htm.

Single-unit 2-axle 6-tires or more truck, combination truck, and bus:

1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, Internet site http://www.fhwa.dot.gov/ohim/summary95/index.html, as of July 28, 2000, table VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1, and Internet site www.fhwa.dot.gov/ohim/ohimstat.htm.

Transit:

1960-2000: American Public Transit Association, *Public Transportation Fact Book* (Washington, DC: 2002), table 42, 84, and similar tables in earlier editions.

Rail:

Class I rail freight train- and car-miles:

1960-2000: Association of American Railroads, *Railroad Facts 2000* (Washington, DC: 2001), p. 33 (train-miles) and p. 34 (car-miles).

Intercity/Amtrak train-miles:

1960-70: Association of American Railroads, *Yearbook of Railroad Facts* (Washington, DC: 1975), p. 39.
1975-2000: Amtrak, *Amtrak Annual Report*, Statistical Appendix (Washington, DC: Annual issues).

Intercity/Amtrak car-miles:

1960-75: Association of American Railroads, *Yearbook of Railroad Facts* (Washington, DC: 1975), p. 40.
1980-2000: Amtrak, Amtrak Corporate Reporting, Route Profitability System, personal communication, 2001.

TABLE 1-33: Roadway Vehicle-Miles Traveled (VMT) and VMT per Lane-Mile by Functional Class

	1980	1985	1990	1995	1996	1997	1998	1999	2000
VMT (millions)									
Urban									
Interstate	161,242	216,188	278,901	R341,528	351,579	361,401	374,622	383,103	393,420
Other arterials[a]	484,189	578,270	699,233	R815,170	834,623	846,659	862,994	877,796	899,794
Collector	83,043	89,578	106,297	R126,929	129,310	130,143	131,919	131,549	135,316
Local	126,791	160,062	191,053	205,907	208,374	222,142	228,530	234,507	235,634
Total urban	**855,265**	**1,044,098**	**1,275,484**	**R1,489,534**	**1,523,886**	**1,560,345**	**1,598,065**	**1,626,955**	**1,664,164**
Rural									
Interstate	135,084	154,357	200,173	223,382	232,565	240,255	251,520	260,060	268,850
Other arterials[a]	262,774	282,803	330,866	368,595	378,847	392,058	403,484	413,152	420,398
Collector[b]	189,468	206,669	240,460	236,148	241,030	254,364	257,858	264,345	267,412
Local	84,704	86,899	97,379	105,164	107,752	114,673	120,595	125,875	127,859
Total rural	**672,030**	**730,728**	**868,878**	**933,289**	**960,194**	**1,001,350**	**1,033,457**	**1,063,432**	**1,084,519**
VMT per lane-mile (thousands)									
Urban									
Interstate	3,327	3,773	4,483	R4,784	4,897	R5,002	R5,131	5,229	5,325
Other arterials[a]	1,451	1,556	1,751	R1,829	1,857	R1,866	R1,901	1,950	1,977
Collector	572	552	634	686	692	R689	R703	706	718
Local	146	168	184	181	181	R190	R194	198	197
Total urban	**613**	**677**	**764**	**R810**	**820**	**R829**	**R845**	**858**	**869**
Rural									
Interstate	1,031	1,170	1,473	1,693	1,749	1,804	R1,888	1,939	1,998
Other arterials[a]	518	555	640	695	R711	R730	R750	766	779
Collector[b]	132	141	164	167	170	179	182	187	189
Local	19	20	23	25	25	27	29	30	30
Total rural	**103**	**113**	**136**	**148**	**R152**	**157**	**R165**	**169**	**172**

KEY: R = revised.

[a] For urban: the sum of other freeways and expressways, other principal arterials, and minor arterials.
For rural: the sum of other principal arterials and minor arterials.

[b] Collector is the sum of major and minor collectors (rural only).

NOTE
See table 1-6 for estimated highway lane-miles by functional class.

SOURCES
1980-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-202.
1995-98, 2000: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, D7C: Annual issues), table VM-2 and VM-2A.
1999: U.S. Department of Transportation, Federal Highway Administration, personal communication, June 5, 2002.

Lane-miles:
1980-95: U.S. Department of Transportation, Federal Highway Administration, Office of Highway Information Management, unpublished data, 1997, table HM-260.
1996-98, 2000: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues), table HM-60.
1999: U.S. Department of Transportation, Federal Highway Administration, personal communication, June 5, 2002.

TABLE 1-34: U.S. Passenger-Miles (Millions)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Air													
Air carrier, certificated, domestic, all services	31,099	53,226	108,442	136,000	204,368	277,836	345,873	403,888	434,652	450,612	463,262	488,357	R516,129
General aviation[a]	2,300	4,400	9,100	11,400	14,700	12,300	13,000	10,800	12,000	12,500	13,100	13,500	U
Total	**33,399**	**57,626**	**117,542**	**147,400**	**219,068**	**290,136**	**358,873**	**414,688**	**446,652**	**463,112**	**476,362**	**501,857**	**U**
Highway													
Passenger car[b,c]	1,144,673	1,394,803	1,750,897	1,954,166	2,011,989	2,094,621	2,281,391	R2,286,887	2,337,068	R2,389,065	R2,463,828	2,494,870	2,547,044
Motorcycle[b,c]	g	g	3,277	6,192	12,257	11,812	12,424	R10,777	R10,912	R11,089	R11,311	11,642	11,527
Other 2-axle 4-tire vehicle[c]	h	h	225,613	363,267	520,774	688,091	999,754	R1,256,146	R1,298,299	R1,352,675	R1,380,557	1,432,625	1,469,189
Truck													
Single-unit 2-axle 6-tire or more truck	98,551	128,769	27,081	34,606	39,813	45,441	51,901	62,705	64,072	66,893	68,021	70,304	70,583
Combination truck	28,854	31,665	35,134	46,724	68,678	78,063	94,341	115,451	118,899	124,584	128,359	132,384	135,208
Bus[d]	N	N	N	N	N	94,925	121,398	136,104	R139,136	145,060	148,558	162,445	161,152
Total[c]	**1,272,078**	**1,555,237**	**2,042,002**	**2,404,954**	**2,653,510**	**3,012,953**	**3,561,209**	**R3,868,070**	**R3,968,386**	**R4,089,366**	**R4,200,635**	**4,304,270**	**4,394,703**
Transit													
Motor bus[d]	N	N	N	N	21,790	21,161	20,981	18,818	19,096	19,604	20,360	21,205	P21,241
Light rail	N	N	N	N	381	350	571	860	957	1,035	1,128	1,206	P1,356
Heavy rail	N	N	N	N	10,558	10,427	11,475	10,559	11,530	12,056	12,284	12,902	P13,844
Trolley bus	N	N	N	N	219	306	193	187	184	189	182	186	P192
Commuter rail	4,197	4,128	4,592	4,513	6,516	6,534	7,082	8,244	8,351	8,038	8,704	8,766	P9,402
Demand responsive[d]	N	N	N	N	N	364	431	607	656	754	735	813	P839
Ferry boat	N	N	N	N	j	j	286	260	265	294	294	310	P330
Other	N	N	N	N	390	439	124	273	339	369	441	469	P462
Total[e]	**i4,197**	**i4,128**	**i4,592**	**i4,513**	**39,854**	**39,581**	**41,143**	**39,808**	**41,378**	**42,339**	**44,128**	**45,857**	**P47,666**
Rail													
Intercity / Amtrak[f]	17,064	13,260	6,179	3,931	4,503	4,825	6,057	5,545	5,050	5,166	5,304	5,330	5,498

KEY: N = data do not exist; P = preliminary; R = revised; U = data are not available.

[a] All operations other than those operating under 14 CFR 121 and 14 CFR 135.

[b] U.S. Department of Transportation, Federal Highway Administration (FHWA), provides data separately for passenger car and motorcycle in its annual Highway Statistics series. However, the 1995 summary report provides updated data for passenger car and motorcycle combined. Passenger car figures in this table were computed by U.S. Department of Transportation, Bureau of Transportation Statistics by subtracting the most current motorcycle figures from the aggregate passenger car and motorcycle figures.

[c] In July 1997, FHWA published revised passenger-miles data for the highway modes for a number of years. The major change reflected the reassignment of some vehicles from the passenger car category to the other 2-axle 4-tire vehicle category. Passenger-miles for passenger car, motorcycle, and other 2-axle 4-tire vehicles were derived by multiplying vehicle-miles for these vehicles by average vehicle occupancy rates, provided by the Nationwide Personal Transportation Survey, 1977, 1983, and 1995.

Continued next page

TABLE 1-34: U.S. Passenger-Miles (Millions) (Continued)

[d] Motor bus and demand responsive figures are also included in the bus figure for highway.

[e] Prior to 1985, excludes demand responsive and most rural and smaller systems funded via Sections 18 and 16(b)2, Federal Transit Act. The series is not continuous between 1980 and 1985. Transit rail modes are measured in car-miles. Car-miles measure individual vehicle-miles in a train. A 10-car train traveling 1 mile would equal 1 train-mile and 10 car-miles.

[f] Amtrak began operations in 1971. Does not include contract commuter passengers.

[g] Included in passenger car.

[h] Included in other single-unit 2-axle 6-tire or more truck.

[i] Includes commuter rail figures only.

[j] Ferryboat included in other.

NOTES

Air carrier passenger-miles are computed by summing the products of the aircraft-miles flown on each interairport segment multiplied by the number of passengers carried on that segment. Highway passenger-miles from 1960 to 1994 are calculated by multiplying vehicle-miles of travel as cited by FHWA by the average number of occupants for each vehicle type. Average vehicle occupancy rates are based on various sources, such as the Nationwide Personal Transportation Survey, conducted by the Federal Highway Administration, and the Truck Inventory and Use Survey, conducted by the Bureau of the Census. Transit passenger-miles are the cumulative sum of the distances ridden by each passenger. Rail passenger-miles represent the movement of 1 passenger for 1 mile.

SOURCES

Air:

Air carrier, domestic, all services:

1960: Civil Aeronautics Board, *Handbook of Airline Statistics, 1969* (Washington, DC: 1970), part III, table 2.

1965-70: Ibid., *Handbook of Airline Statistics, 1973* (Washington, DC: 1974), part III, table 2.

1975-80: Ibid., *Air Carrier Traffic Statistics* (Washington, DC: 1976, 1981), p. 4 (December 1976) and p. 2 (December 1981).

1985-2000: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, *Air Carrier Traffic Statistics* (Washington, DC: Annual December issues), page 2, line 1.

General aviation:

1960-99: Eno Transportation Foundation, Inc., *Transportation in America, 2000* (Washington, DC: 2001), pp. 14-15.

Highway:

Passenger car and motorcycle:

1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, Internet site http://www.fhwa.dot.gov/ohim/summary95/index.html as of July 28, 2000, table VM-201A.

1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1 and Internet site www.fhwa.dot.gov/ohim/ohimstat.htm.

Motorcycle:

1970-80: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1985* (Washington, DC: 1986), table VM-201A.

1985-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1 and Internet site www.fhwa.dot.gov/ohim/ohimstat.htm.

Other 2-axle 4-tire vehicle:

1970-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, Internet site http://www.fhwa.dot.gov/ohim/summary95/index.html as of July 28, 2000, table VM-201A.

1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1 and Internet site www.fhwa.dot.gov/ohim/ohimstat.htm.

Single-unit 2-axle 6-tires or more truck, combination truck, and bus:

1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, Internet site http://www.fhwa.dot.gov/ohim/summary95/index.html as of July 28, 2000, table VM-201A.

1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1, and Internet site www.fhwa.dot.gov/ohim/ohimstat.htm.

TABLE 1-34: U.S. Passenger-Miles (Millions) (Continued)

Transit:
Ferryboat and other:
1996-99: American Public Transit Association, personal communication, Aug. 13, 2001.
2000: Ibid., *Public Transportation Fact Book* (Washington, DC: 2002), table 84.
All other data:
1960-2000: American Public Transit Association, *Public Transportation Fact Book* (Washington, DC: 2002), table 30 and similar tables in earlier editions.

Rail, Intercity / Amtrak:
1960-80: Association of American Railroads, *Railroad Facts* (Washington, DC: Annual issues).
1985: Amtrak, *Amtrak FY95 Annual Report* Statistical Appendix (Washington, DC: 1996), p. 4.
1990-2000: Ibid., *Amtrak FY00 Annual Report* Statistical Appendix (Washington, DC: 2001), p. 46.

TABLE 1-35: Principal Means of Transportation to Work (Thousands)

	1985		1989		1993		1997		1999		2001	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
All workers	**99,592**	**100.0**	**106,630**	**100.0**	**103,741**	**100.0**	**116,469**	**100.0**	**118,041**	**100.0**	**120,191**	**100.0**
Automobile	86,148	86.5	93,943	88.1	91,301	88.0	101,907	87.5	103,466	87.7	105,586	87.8
Drives self	72,137	72.4	81,322	76.3	79,449	76.6	90,207	77.5	92,363	78.2	93,942	78.2
Carpool	14,011	14.1	12,621	11.8	11,852	11.4	11,700	10.0	11,103	9.4	11,644	9.7
2-person	10,381	10.4	9,708	9.1	9,105	8.8	9,294	8.0	8,705	7.4	9,036	7.5
3-person	2,024	2.0	1,748	1.6	1,684	1.6	1,526	1.3	1,454	1.2	1,635	1.4
4+ person	1,606	1.6	1,165	1.1	1,063	1.0	881	0.8	945	0.8	973	0.8
Public transportation[a]	5,091	5.1	4,880	4.6	4,740	4.6	5,337	4.6	5,779	4.9	5,627	4.7
Taxicab	129	0.1	152	0.1	117	0.1	139	0.1	144	0.1	133	0.1
Bicycle or motorcycle	958	1.0	795	0.7	744	0.7	738	0.6	749	0.6	847	0.7
Walks only	4,032	4.0	3,634	3.4	3,227	3.1	3,869	3.3	3,627	3.1	3,408	2.8
Other means[b]	286	0.3	491	0.5	474	0.5	867	0.7	987	0.8	1,049	0.9
Works at home	2,947	3.0	2,736	2.6	3,137	3.0	3,611	3.1	3,288	2.8	3,401	2.8

[a] Public transportation refers to bus, streetcar, subway, or elevated trains.

[b] Other means include ferryboats, surface trains, and van service.

NOTE
Principal means of transportation refers to the mode used most often, when different means of transportation were used on different days of the week, or the mode used for the longest distance during the trip to work, when more than one mode is used to get to work each day.

SOURCE
U.S. Department of Housing and Urban Development, *American Housing Survey* (Washington, DC: various years).

TABLE 1-36: Long-Distance Travel in the United States by Selected Trip Characteristics: 1995 (Roundtrips of 100 miles or more, one way, U.S. destinations only)

	Household trips (thousands)		Person trips (thousands)		Person-miles (millions)		Personal-use vehicle trips (thousands)		Personal-use vehicle-miles (millions)	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
TOTAL	**656,462**	**100.0**	**1,001,319**	**100.0**	**826,804**	**100.0**	**505,154**	**100.0**	**280,127**	**100.0**
Principal means of transportation										
Personal-use vehicle	505,154	77.0	813,858	81.3	451,590	54.6	505,154	100.0	280,127	100.0
Airplane	129,164	19.7	161,165	16.1	355,286	43.0	NA	NA	NA	NA
Commercial airplane	124,884	19.0	155,936	15.6	347,933	42.1	NA	NA	NA	NA
Bus	17,340	2.6	20,445	2.0	13,309	1.6	NA	NA	NA	NA
Intercity	2,755	0.4	3,244	0.3	2,723	0.3	NA	NA	NA	NA
Charter or tour	11,890	1.8	14,247	1.4	9,363	1.1	NA	NA	NA	NA
Train	4,200	0.6	4,994	0.5	4,356	0.5	NA	NA	NA	NA
Ship, boat, or ferry	391	0.1	614	0.1	1,834	0.2	NA	NA	NA	NA
Other	213	RZ	243	RZ	429	0.1	NA	NA	NA	NA
Roundtrip distance										
Less than 300 miles	194,098	29.6	306,433	30.6	74,658	9.0	185,418	36.7	45,159	16.1
300–499 miles	174,389	26.6	274,045	27.4	106,007	12.8	159,743	31.6	61,779	22.1
500–999 miles	140,046	21.3	214,006	21.4	146,631	17.7	106,846	21.2	72,114	25.7
1,000–1,999 miles	76,110	11.6	108,331	10.8	153,316	18.5	36,722	7.3	49,952	17.8
2,000 miles or more	71,819	10.9	98,503	9.8	346,192	41.9	16,425	3.3	51,123	18.3
Mean (miles)	872	NA	826	NA	NA	NA	555	NA	NA	NA
Median (miles)	438	NA	425	NA	NA	NA	368	NA	NA	NA
Calendar quarter										
1st quarter	130,963	19.9	200,331	20.0	155,603	18.8	99,549	19.7	50,801	18.1
2nd quarter	168,669	25.7	258,400	25.8	208,256	25.2	130,135	25.8	72,421	25.9
3rd quarter	193,913	29.5	304,542	30.4	261,463	31.6	152,862	30.3	90,558	32.3
4th quarter	162,917	24.8	238,047	23.8	201,471	24.4	122,607	24.3	66,346	23.7

Continued next page

TABLE 1-36: Long-Distance Travel in the United States by Selected Trip Characteristics: 1995 (Roundtrips of 100 miles or more, one way, U.S. destinations only) (Continued)

	Household trips (thousands)		Person trips (thousands)		Person-miles (millions)		Personal-use vehicle trips (thousands)		Personal-use vehicle-miles (millions)	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Main purpose of trip										
Business	192,537	29.3	224,835	22.5	212,189	25.7	125,036	24.8	61,929	22.1
Pleasure	372,586	56.8	630,110	62.9	506,971	61.3	305,571	60.5	177,698	63.4
Visit relatives or friends	195,468	29.8	330,755	33.0	264,769	32.0	159,981	31.7	92,190	32.9
Leisure[a]	177,119	27.0	299,355	29.9	242,201	29.3	145,590	28.8	85,508	30.5
Rest or relaxation	65,017	9.9	115,154	11.5	100,838	12.2	53,780	10.6	33,598	12.0
Sightseeing	24,272	3.7	42,649	4.3	50,781	6.1	18,069	3.6	14,654	5.2
Outdoor recreation	39,899	6.1	65,418	6.5	41,620	5.0	35,987	7.1	19,407	6.9
Entertainment	37,456	5.7	58,757	5.9	42,929	5.2	27,920	5.5	14,531	5.2
Personal business	91,319	13.9	146,338	14.6	107,621	13.0	74,532	14.8	40,490	14.5
Other	19	RZ	36	RZ	23	RZ	16	RZ	9	RZ
Vacation or weekend trips										
Vacation trip	301,197	45.9	515,383	51.5	484,144	58.6	236,055	46.7	154,167	55.0
Weekend trip	400,755	61.0	621,948	62.1	475,269	57.5	310,379	61.4	169,309	60.4
1 or 2 nights away from home	240,808	36.7	377,893	37.7	222,418	26.9	199,831	39.6	94,865	33.9
3–5 nights away from home	159,946	24.4	244,055	24.4	252,851	30.6	110,548	21.9	74,444	26.6
Travel party type										
One adult, no children under 18	386,479	58.9	386,510	38.6	352,350	42.6	275,034	54.4	144,795	51.7
Two or more adults, no children under 18	155,147	23.6	299,485	29.9	248,762	30.1	133,163	26.4	79,273	28.3
One adult, children under 18	29,436	4.5	67,959	6.8	48,083	5.8	24,879	4.9	13,827	4.9
Two or more adults, children under 18	66,086	10.1	225,875	22.6	158,334	19.2	60,497	12.0	34,759	12.4
No adult, one or more children under 18	19,313	2.9	21,489	2.1	19,275	2.3	11,581	2.3	7,473	2.7
Mean travel party size	1.6	NA	2.2	NA	NA	NA	1.7	NA	NA	NA
Nights away from home										
None	164,032	25.0	239,727	23.9	104,444	12.6	140,914	27.9	49,619	17.7
1–3 nights	321,227	48.9	502,465	50.2	331,504	40.1	259,354	51.3	131,559	47.0
4–7 nights	121,279	18.5	184,766	18.5	243,546	29.5	76,380	15.1	61,318	21.9
8 or more nights	49,924	7.6	74,361	7.4	147,309	17.8	28,506	5.6	37,631	13.4
Mean, excluding none (nights)	4.4	NA	4.3	NA	NA	NA	4.0	NA	NA	NA

TABLE 1-36: Long-Distance Travel in the United States by Selected Trip Characteristics: 1995 (Roundtrips of 100 miles or more, one way, U.S. destinations only) (Continued)

	Household trips (thousands)		Person trips (thousands)		Person-miles (millions)		Personal-use vehicle trips (thousands)		Personal-use vehicle-miles (millions)	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Type of lodging at destination										
Friend's or relative's home	211,832	43.6	345,506	45.9	290,428	41.0	170,271	47.3	103,180	45.7
Hotel, motel, or resort	201,264	41.4	282,929	37.6	318,323	44.9	126,160	35.1	82,447	36.5
Rented cabin, condo, or vacation home	20,205	4.2	38,572	5.1	26,269	3.7	18,103	5.0	9,819	4.3
Owned cabin, condo, or vacation home	17,607	3.6	30,648	4.1	31,161	4.4	14,631	4.1	10,809	4.8
Camper, trailer, recreational vehicle, tent	11,944	2.5	22,208	3.0	15,836	2.2	11,663	3.2	8,204	3.6
Other type of lodging	23,452	4.8	32,095	4.3	27,080	3.8	18,917	5.3	11,542	5.1
Nights at destination										
Mean nights at destination	4.20	NA	4.0	NA	NA	NA	3.8	NA	NA	NA
Friend's or relative's home	4.33	NA	4.0	NA	NA	NA	3.6	NA	NA	NA
Hotel, motel, or resort	3.05	NA	3.0	NA	NA	NA	2.8	NA	NA	NA

KEY: NA = not applicable; RZ = rounds to or represents zero.

[a] Includes other leisure purposes not shown separately.

NOTES
Numbers and percents may not add to totals due to rounding.
See glossary for definitions of categories.

SOURCE
U.S. Department of Transportation, Bureau of Transportation Statistics, *1995 American Travel Survey Profile*, BTS/ATS95-US (Washington, DC: October 1997).

TABLE 1-37: Long-Distance Travel in the United States by Selected Traveler Characteristics: 1995 (Roundtrips of 100 miles or more, one way, U.S. destinations only)

	Person trips (thousands)		Person-miles (millions)		Personal-use vehicle trips (thousands)		Personal-use vehicle-miles (millions)	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
TOTAL all person trips	**1,001,319**	**100**	**834,676**	**100**	**813,858**	**100**	**454,787**	**100**
Travelers by age								
Under 18 years	159,779	16.0	115,869	13.9	139,360	17.1	78,517	17.3
18–24 years	92,129	9.2	67,224	8.1	79,810	9.8	43,821	9.6
25–29 years	80,060	8.0	64,009	7.7	66,510	8.2	35,809	7.9
30–39 years	189,917	19.0	167,583	20.1	146,527	18.0	78,970	17.4
40–49 years	199,991	20.0	170,379	20.4	157,063	19.3	83,046	18.3
50–59 years	137,841	13.8	118,433	14.2	110,208	13.5	61,856	13.6
60–64 years	48,683	4.9	43,574	5.2	40,647	5.0	25,258	5.6
65 years and over	92,919	9.3	87,603	10.5	73,733	9.1	47,512	10.4
Total	**1,001,319**	**100**	**834,676**	**100**	**813,858**	**100**	**454,787**	**100**
Median (years)	38				38			
Female								
Under 18 years	79,580	7.9	58,716	7.0	68,650	8.4	39,122	8.6
18–24 years	42,743	4.3	32,706	3.9	36,161	4.4	19,702	4.3
25–29 years	36,422	3.6	29,473	3.5	29,986	3.7	16,077	3.5
30–39 years	82,471	8.2	70,360	8.4	65,056	8.0	34,606	7.6
40–49 years	84,135	8.4	70,696	8.5	67,855	8.3	36,039	7.9
50–59 years	59,721	6.0	50,449	6.0	48,867	6.0	27,483	6.0
60–64 years	21,310	2.1	19,576	2.3	17,217	2.1	10,942	2.4
65 years and over	44,129	4.4	41,278	4.9	33,409	4.1	20,513	4.5
Total	**450,512**	**45.0**	**373,254**	**44.7**	**367,203**	**45.1**	**204,485**	**45.0**
Median (years)	37				37			

TABLE 1-37: Long-Distance Travel in the United States by Selected Traveler Characteristics: 1995 (Roundtrips of 100 miles or more, one way, U.S. destinations only) (Continued)

	Person trips (thousands)		Person-miles (millions)		Personal-use vehicle trips (thousands)		Personal-use vehicle-miles (millions)	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Race								
White	891,443	89.0	739,444	88.6	726,632	89.3	403,045	88.6
Black	59,923	6.0	44,935	5.4	49,175	6.0	28,115	6.2
Asian or Pacific Islander	22,922	2.3	28,690	3.4	15,954	2.0	10,570	2.3
American Indian, Eskimo, or Aleutian	10,707	1.1	8,103	1.0	8,807	1.1	5,233	1.2
Other	16,324	1.6	13,504	1.6	13,290	1.6	7,825	1.7
Total	**1,001,319**	**100**	**834,676**	**100**	**813,858**	**100**	**454,788**	**100**
Ethnicity								
(Hispanic origin)	52,822	5.3	38,177	4.6	44,219	5.4	23,183	5.1
(Not of Hispanic origin)	948,497	94.7	796,499	95.4	769,640	94.6	431,605	94.9
Total	**1,001,319**	**100**	**834,676**	**100**	**813,858**	**100**	**454,788**	**100**
Household income								
Less than $25,000	155,555	15.5	112,236	13.4	131,901	16.2	71,556	15.7
$25,000–$39,999	200,981	20.1	148,185	17.8	175,186	21.5	98,074	21.6
$40,000–$49,999	166,699	16.6	125,296	15.0	144,160	17.7	78,294	17.2
$50,000–$59,999	143,946	14.4	118,691	14.2	117,579	14.4	66,363	14.6
$60,000–$74,999	134,348	13.4	118,169	14.2	106,083	13.0	61,169	13.5
$75,000–$99,999	104,698	10.5	102,112	12.2	79,397	9.8	45,406	10.0
$100,000 or more	95,092	9.5	109,987	13.2	59,553	7.3	33,925	7.5
Household type								
Family household	840,438	83.9	693,794	83.1	692,146	85.0	388,534	85.4
Married-couple household	726,982	72.6	606,630	72.7	597,863	73.5	335,980	73.9
With children under 18 years	379,139	37.9	302,958	36.3	313,451	38.5	172,014	37.8
Female householder	76,942	7.7	60,665	7.3	62,583	7.7	35,023	7.7
With children under 18 years	43,389	4.3	31,963	3.8	35,986	4.4	19,421	4.3
Male householder	36,515	3.6	26,499	3.2	31,700	3.9	17,531	3.9
With children under 18 years	13,226	1.3	9,845	1.2	11,207	1.4	6,583	1.4
Nonfamily household	160,881	16.1	140,881	16.9	121,712	15.0	66,254	14.6

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TABLE 1-37: Long-Distance Travel in the United States by Selected Traveler Characteristics: 1995 (Roundtrips of 100 miles or more, one way, U.S. destinations only) (Continued)

	Person trips (thousands)		Person-miles (millions)		Personal-use vehicle trips (thousands)		Personal-use vehicle-miles (millions)	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Educational attainment (Persons 16 years and over)								
Less than high school graduate	68,338	7.9	48,533	6.6	59,159	8.6	33,428	8.7
High school graduate	219,549	25.5	165,361	22.6	187,762	27.2	105,957	27.6
Some college, no degree	182,146	21.2	146,379	20.0	153,399	22.3	86,304	22.5
Associate's degree	58,431	6.8	46,401	6.3	49,081	7.1	26,264	6.8
Bachelor's degree	193,651	22.5	181,233	24.8	145,438	21.1	79,779	20.8
Some grad school or grad degree	137,513	16.0	144,155	19.7	94,221	13.7	52,678	13.7
Total	**859,629**	**100**	**732,062**	**100**	**689,060**	**100**	**384,409**	**100**
Activity status (Persons 16 years and over)								
Working full time	547,232	63.7	470,855	64.3	428,319	62.2	228,969	59.6
Retired	95,039	11.1	88,837	12.1	77,921	11.3	52,589	13.7
Other	217,357	25.3	172,371	23.5	182,820	26.5	102,851	26.8
Total	**859,629**	**100**	**732,062**	**100**	**689,060**	**100**	**384,409**	**100**

NOTE
This table excludes travel outside the United States. Numbers and percents may not add to totals due to rounding.

SOURCE
U.S. Department of Transportation, Bureau of Transportation Statistics, 1995 American Travel Survey data.

TABLE 1-38: U.S. Air Carrier Aircraft Departures, Enplaned Revenue Passengers, and Enplaned Revenue Tons

	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
AIRPORT DEPARTURES											
Total performed[a]	**4,555,516**	**5,156,848**	**5,505,659**	**6,641,681**	**8,030,530**	**8,204,674**	**8,095,888**	**8,248,269**	**8,605,486**	**8,951,773**	**8,597,344**
Total scheduled	**4,530,535**	**5,204,564**	**5,591,596**	**6,758,571**	**7,920,467**	**8,064,653**	**7,907,554**	**8,094,020**	**8,432,940**	**12,452,678**	**8,371,976**
Large hubs											
Performed	2,437,958	2,887,239	3,439,446	4,167,868	5,162,534	5,257,541	5,266,560	5,416,158	5,645,179	5,888,557	5,640,977
Scheduled	2,409,874	2,905,923	3,487,660	4,237,466	5,147,875	5,243,646	5,219,161	5,405,728	5,570,419	9,494,118	5,558,323
Medium hubs											
Performed	902,652	1,048,726	1,185,008	1,394,833	1,439,639	1,425,280	1,430,537	1,429,730	1,499,243	1,572,495	1,555,145
Scheduled	899,543	1,058,438	1,201,540	1,417,762	1,387,833	1,356,162	1,352,944	1,345,197	1,404,482	1,507,479	1,451,072
Small hubs											
Performed	640,589	598,559	514,176	669,450	738,231	754,914	695,841	714,920	746,625	777,318	758,195
Scheduled	644,133	608,738	524,048	679,103	711,947	722,170	660,685	674,812	770,092	758,396	747,745
Nonhubs											
Performed	574,317	622,324	367,029	409,530	690,126	766,939	702,950	687,461	714,439	713,403	643,027
Scheduled	576,985	631,465	378,348	424,240	672,812	742,675	674,764	668,283	687,947	692,685	614,836
ENPLANED REVENUE PASSENGERS[b]	**196,782,144**	**281,408,852**	**363,341,497**	**438,544,001**	**526,055,483**	**558,183,741**	**568,615,687**	**588,335,318**	**610,628,716**	**638,902,993**	**595,655,501**
Large hubs	133,975,900	197,679,376	264,507,144	317,595,099	392,601,890	417,339,694	426,246,423	442,402,443	458,665,099	478,845,117	444,795,896
Medium hubs	36,539,613	51,664,627	65,770,376	80,466,373	85,929,285	89,018,764	90,779,705	91,755,793	96,394,866	101,986,095	98,649,285
Small hubs	19,406,607	23,393,324	24,240,726	30,771,383	33,561,098	37,122,974	36,298,979	37,675,305	38,644,557	40,116,465	36,413,142
Nonhubs	6,860,024	8,671,525	8,823,251	9,711,146	13,963,210	14,702,309	15,290,580	16,501,777	16,924,194	17,955,316	15,797,178
ENPLANED REVENUE TONS[c]	**3,661,061**	**5,088,313**	**4,024,470**	**6,298,824**	**9,365,017**	**10,333,298**	**13,520,228**	**14,083,769**	**14,911,847**	**R14,989,871**	**19,990,361**
Freight											
Large hubs	2,265,665	3,008,311	2,047,988	3,001,217	4,402,327	4,653,189	5,691,363	6,208,629	5,993,061	6,661,817	7,063,435
Medium hubs	358,044	414,325	469,057	1,446,744	1,950,318	2,169,411	3,855,449	3,897,242	4,382,712	4,450,393	6,645,641
Small hubs	99,133	73,795	48,127	191,358	541,062	755,232	963,093	1,019,615	1,053,050	930,518	1,290,734
Nonhubs	41,922	65,756	35,855	93,407	310,772	469,962	653,542	659,028	638,894	R645,477	767,627
Total freight	**2,764,763**	**3,562,187**	**2,601,027**	**4,732,726**	**7,204,479**	**8,047,795**	**11,163,448**	**11,784,514**	**12,067,717**	**R12,688,205**	**15,767,438**

Continued next page

TABLE 1-38: U.S. Air Carrier Aircraft Departures, Enplaned Revenue Passengers, and Enplaned Revenue Tons (Continued)

	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Mail											
Large hubs	677,179	1,091,059	1,082,567	1,146,589	1,546,568	1,630,445	1,699,154	1,662,643	2,183,127	1,649,611	1,179,946
Medium hubs	151,498	255,929	268,179	292,899	442,814	466,583	473,577	482,710	502,096	503,965	407,337
Small hubs	48,486	148,116	59,917	108,656	136,008	157,137	138,818	127,748	126,793	108,582	93,841
Nonhubs	19,134	31,021	12,781	17,954	35,149	31,338	45,232	26,154	32,114	39,508	2,541,799
Total mail	**896,298**	**1,526,125**	**1,423,443**	**1,566,098**	**2,160,538**	**2,285,503**	**2,356,781**	**2,299,255**	**2,844,130**	**2,301,666**	**4,222,923**

KEY: R = revised.

[a] Total performed includes scheduled departures performed minus those scheduled departures that did not occur plus unscheduled service.

[b] The number of persons receiving air transportation from an air carrier for which renumeration is received by the carrier, excluding persons receiving reduced rate charges, such as air carrier employees, infants, and others (except ministers of religion, elderly individuals, and handicapped individuals).

[c] The number of short tons of freight transported by an air carrier aboard an aircraft.

NOTES

Data are for all scheduled and nonscheduled service by large certificated U.S. air carriers at all airports served within the 50 states, the District of Columbia, and other U.S. areas designated by the Federal Aviation Administration. Not all scheduled service is actually performed. Moreover, for several years, total performed departures exceed total scheduled departures because nonscheduled departures are included in the totals. Prior to 1993, all scheduled and some nonscheduled enplanements for certificated air carriers were included; no enplanements were included for air carriers offering charter service only. Prior to 1990, freight includes both freight and express shipments, and mail includes priority and nonpriority U.S. mail and foreign mail; beginning in 1990, only aggregate numbers are reported.

Large certificated air carriers operate aircraft with seating capacity of more than 60 seats or a maximum payload capacity of more than 18,000 pounds and hold Certificates of Public Convenience and Necessity issued by the U.S. Department of Transportation authorizing the performance of air transportation. Data for commuter, intrastate, and foreign-flag air carriers are not included.

Air traffic hubs are designated as geographical areas based on the percentage of total passengers enplaned in the area. A hub may have more than one airport in it. (This definition of hub should not be confused with the definition used by the airlines in describing their "hub-and-spoke" route structures) Individual communities fall into four hub classifications as determined by each community's percentage of total enplaned revenue passengers in all services and all operations of U.S. certificated route carriers within the 50 states, the District of Columbia, and other U.S. areas. Classifications are based on the percentage of total enplaned revenue passengers for each year according to the following: one percent or more = large, 0.25 to 0.9999 percent = medium, 0.05 to 0.249 percent = small, less than 0.05 = nonhub.

SOURCE

U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, *Airport Activity Statistics of Certified Route Air Carriers* (Washington, DC: Annual issues), tables 2, 3, 4, and 5.

TABLE 1-39: Passengers Boarded at the Top 50 U.S. Airports[a]

	1991		2001		
	Rank	Total enplaned passengers	Rank	Total enplaned passengers	Percent change 1991-2001
Atlanta, GA (Hartsfield Intl.)	4	17,691,130	1	36,378,501	105.6%
Chicago, IL (O'Hare Intl.)	1	25,872,241	2	28,625,264	10.6%
Dallas / Ft. Worth, TX (Dallas / Ft. Worth Intl.)	2	22,656,394	3	25,197,150	11.2%
Los Angeles, CA (Los Angeles Intl.)	3	18,303,046	4	22,862,216	24.9%
Phoenix, AZ (Phoenix Sky Harbor Intl.)	7	10,972,232	5	16,539,155	50.7%
Denver, CO (Denver Intl.)	6	12,313,733	6	16,384,990	33.1%
Las Vegas, NV (McCarran Intl.)	17	8,222,488	7	16,099,776	95.8%
Minneapolis, MN (Minneapolis-St. Paul Intl.)	13	8,862,828	8	15,648,293	76.6%
Houston, TX (George Bush Intercontinental)	18	7,813,856	9	15,637,528	100.1%
Detroit, MI (Wayne County)	9	9,618,283	10	15,463,770	60.8%
San Francisco, CA (San Francisco Intl.)	5	14,026,226	11	13,846,425	-1.3%
Newark, NJ (Newark)	8	9,737,488	12	13,813,852	41.9%
St. Louis, MO (Lambert-St. Louis Muni.)	10	9,351,642	13	12,864,305	37.6%
Seattle, WA (Seattle-Tacoma Intl.)	20	7,696,481	14	12,694,210	64.9%
Orlando, FL (Orlando Intl.)	22	7,605,356	15	12,597,086	65.6%
Miami, FL (Miami Intl.)	11	9,309,591	16	11,492,541	23.4%
Philadelphia, PA (Philadelphia Intl.)	24	6,381,130	17	10,383,439	62.7%
New York, NY (La Guardia)	12	9,194,825	18	10,296,767	12.0%
Charlotte, NC (Douglas Muni.)	21	7,668,793	19	10,225,979	33.3%
Boston, MA (Logan Intl.)	14	8,862,052	20	9,989,937	12.7%
New York, NY (John F. Kennedy Intl.)	16	8,245,014	21	9,645,995	17.0%
Baltimore, MD (Baltimore-Washington Intl.)	31	4,249,906	22	9,450,116	122.4%
Pittsburgh, PA (Greater Pittsburgh)	19	7,707,902	23	8,710,821	13.0%
Cincinnati, OH (Greater Cincinnati)	29	4,314,474	24	8,349,380	93.5%
Salt Lake City, UT (Salt Lake City Intl.)	25	5,470,129	25	7,835,901	43.2%
Honolulu, HI (Honolulu Intl.)	15	8,772,316	26	7,789,539	-11.2%
Tampa, FL (Tampa Intl.)	28	4,338,195	27	7,452,492	71.8%
Miami / Ft. Lauderdale, FL (Ft. Lauderdale-Hollywood Intl.)	37	3,451,761	28	7,371,233	113.5%
San Diego, CA (San Diego Intl.-Lindbergh)	26	5,386,803	29	7,245,787	34.5%
Chicago, IL (Midway)	43	2,936,521	30	7,062,993	140.5%
Portland, OR (Portland Intl.)	39	3,164,431	31	5,973,721	88.8%
San Jose, CA (Norman Y. Mineta San Jose International)	41	3,150,397	32	5,865,502	86.2%
Washington, DC (Ronald Reagan National)	23	6,631,273	33	5,779,214	-12.8%
Washington, DC (Dulles Intl.)	27	4,709,400	34	5,745,399	22.0%
Cleveland, OH (Hopkins Intl.)	35	3,545,000	35	5,528,666	56.0%
Kansas City, MO (Kansas City Intl.)	38	3,288,900	36	5,494,516	67.1%

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TABLE 1-39: Passengers Boarded at the Top 50 U.S. Airports[a] (Continued)

	1991		2001		
	Rank	Total enplaned passengers	Rank	Total enplaned passengers	Percent change 1991-2001
Oakland, CA (Oakland Metropolitan Intl.)	42	2,956,220	37	5,485,948	4.0%
Memphis, TN (Memphis Intl.)	36	3,494,675	38	4,778,872	9.4%
New Orleans, LA (New Orleans Intl.)	40	3,151,718	39	4,678,835	4.6%
San Juan, PR (Luis Munoz Marin Intl.)	34	3,739,126	40	4,537,641	84.0%
Raleigh-Durham, NC (Raleigh-Durham)	30	4,309,550	41	4,483,332	40.6%
Houston, TX (William P. Hobby)	33	3,765,759	42	4,120,895	69.7%
Nashville, TN (Metropolitan)	32	3,901,875	43	4,079,836	31.9%
Sacramento, CA (Sacramento International)	52	2,105,016	44	3,873,560	20.0%
Los Angeles, CA (Orange County)	47	2,573,035	45	3,618,558	57.0%
Austin, TX (Robert Muller Muni.)	54	2,021,120	46	3,428,839	29.1%
Indianapolis, IN (Indianapolis Intl.)	46	2,585,727	47	3,409,526	4.0%
Dallas, TX (Love Field)	45	2,792,557	48	3,350,775	9.4%
Hartford / Springfield / Westfield CT (Bradley Intl.)	51	2,107,004	49	3,307,481	4.6%
San Antonio, TX (San Antonio Intl.)	48	2,520,324	50	3,254,348	84.0%
Total top 50		**354,856,365**		**498,750,905**	**40.6%**
All airports		**428,319,248**		**595,655,501**	**39.1%**

[a] Rank order by total enplaned passengers on large certificated U.S. air carriers, scheduled and nonscheduled operations, at all airports served within the 50 states, the District of Columbia, and other U.S. areas designated by the Federal Aviation Administration. Prior to 1993, all scheduled and some nonscheduled enplanements for certificated air carriers were included; no enplanements were included for air carriers offering charter service only.

Large certificated air carriers hold Certificates of Public Convenience and Necessity issued by the U.S. Department of Transportation authorizing the performance of air transportation. Large certificated air carriers operate aircraft with seating capacity of more than 60 seats or a maximum payload capacity of more than 18,000 pounds. Data for commuter, intrastate, and foreign-flag air carriers are not included.

NOTE

The following airports appeared in the top 50 ranking in 1991 but were not among the top 50 for 2001: Ontario, CA ranked 44th (2,837,028); West Palm Beach, FL ranked 49th (2,355,922); and Albuquerque, NM ranked 50th (2,350,612).

SOURCES

1991: U.S. Department of Transportation, Federal Aviation Administration and Research and Special Programs Administration, *Airport Activity Statistics of Certificated Route Air Carriers, 12 Months Ending December 31, 1991* (Washington, DC: 1992), tables 3 and 4.

2001: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, *Airport Activity Statistics of Certificated Air Carriers: Summary Tables, Twelve Months Ending December 31, 2001* (Washington, DC: 2002), tables 3 and 4.

TABLE 1-40: Air Passenger Travel Arrivals in the United States from Selected Foreign Countries (Thousands)

	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Flag of carrier											
United States	6,502	10,031	11,798	19,145	24,582	25,148	26,744	27,390	27,462	29,837	27,985
Foreign	6,144	10,231	12,357	17,269	22,328	24,704	27,571	28,791	30,324	32,380	28,715
Total arriving passengers	**12,646**	**20,262**	**24,156**	**36,414**	**46,910**	**49,853**	**54,315**	**56,181**	**57,785**	**62,217**	**56,700**
Country of embarkation[a]											
Australia	106	227	277	495	581	622	618	613	670	812	739
Bahama Islands	758	1,123	1,503	1,679	1,433	1,487	1,530	1,396	1,337	1,471	1,458
Barbados	76	135	216	228	222	212	203	195	197	208	191
Belgium	144	242	281	417	379	407	589	715	730	778	598
Bermuda	398	497	434	487	426	363	425	407	384	374	334
Brazil	212	300	352	584	1,112	1,176	1,388	1,377	1,154	1,280	1,094
Canada[b]	N	N	N	6,870	7,417	8,501	8,895	9,613	9,926	10,497	U
China/Taiwan	50	113	206	325	972	1,017	1,068	1,080	1,170	1,186	1,092
Colombia	173	315	279	286	481	499	586	606	649	674	683
Denmark	222	267	241	313	221	236	252	225	223	232	240
Dominican Republic	336	468	606	948	1,136	1,168	1,168	1,251	1,368	1,498	1,430
France	512	689	955	1,777	2,045	2,178	2,323	2,523	2,591	3,147	3,023
Germany	622	1,175	1,582	2,466	3,125	3,173	3,545	3,558	3,491	3,886	3,519
Grand Cayman	25	121	173	273	314	323	328	370	335	343	317
Greece	121	208	187	132	220	235	186	192	191	195	135
Haiti	91	133	192	233	314	303	289	293	327	303	317
Hong Kong	98	228	270	356	658	668	589	592	650	731	735
Ireland	220	220	274	448	642	721	716	775	950	1,064	992
Israel	84	189	294	204	412	483	482	502	547	577	400
Italy	431	537	662	792	1,007	1,047	1,097	1,078	1,171	1,511	1,269

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TABLE 1-40: Air Passenger Travel Arrivals in the United States from Selected Foreign Countries (Thousands) (Continued)

	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Jamaica	457	429	707	975	1,124	1,136	1,162	1,219	1,209	1,248	1,226
Japan	1,095	1,624	2,435	4,528	5,676	6,349	6,736	6,630	6,991	6,974	5,876
Korea, Republic of	105	234	390	826	1,335	1,514	1,625	1,184	1,240	1,470	1,262
Mexico	1,626	2,886	2,719	4,313	4,884	5,591	6,124	6,318	6,576	6,999	6,591
Netherlands	312	427	583	837	1,580	1,774	2,074	2,213	2,318	2,401	2,132
Netherland Antilles	213	327	407	388	339	305	368	382	371	389	371
Panama Republic	97	150	180	153	225	229	227	267	308	359	343
Philippines	108	194	145	246	397	379	410	275	331	405	400
Spain	306	312	419	558	604	618	675	732	734	827	758
Switzerland	236	312	452	616	733	790	910	1,068	1,026	1,069	913
United Kingdom	1,549	2,973	3,460	5,166	6,648	7,131	7,935	8,640	8,780	9,382	8,435
Venezuela	205	533	248	458	786	659	709	810	794	718	730
Total	**10,988**	**17,588**	**21,129**	**38,377**	**47,448**	**51,294**	**55,232**	**57,099**	**58,739**	**63,008**	**U**

KEY: N = data do not exist; U = data are not available.

[a] Country where passenger boarded a direct flight to the United States.

[b] Canadian figure represents number of revenue passengers on scheduled commercial and charter flights. Does not include foreign (non-Canadian, non-U.S.) scheduled carriers.

NOTES

Includes passengers on international commercial flights arriving at U.S. airports and travelers between U.S. airports in the 50 states, Puerto Rico, Guam, or the Virgin Islands, and other U.S. territories.

Data compiled from flight reports required by the U.S. Immigration and Naturalization Service. Table includes a selected sample of countries of embarkation for passengers arriving in the United States.

Because two different data sources are used, the total number of arriving passengers may be less than the total for "country of embarkation" listed here.

SOURCES

1975-90: U.S. Department of Transportation, Research and Special Programs Administration, Volpe National Transportation Systems Center, *U.S. International Air Travel Statistics* (Cambridge, MA: Annual issues), table IIa.

1995: U.S. Department of Commerce, International Trade Administration, *U.S. International Air Passenger Statistics Report, Calendar Year 1995* (Washington, DC: 1996), table IIa.

1996-2001: Ibid., *U.S. International Air Travel Statistics Report* (Washington, DC: Annual issues), table IIa. Canada: Statistics Canada, *Air Carrier Traffic at Canadian Airports* (Canada: Annual issues) and personal communication, Aug. 21, 2002.

TABLE 1-41: Air Passenger Travel Departures from the United States to Selected Foreign Countries (Thousands)

	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Flag of carrier											
United States	5,912	9,369	10,696	17,628	22,231	22,901	24,302	24,513	25,457	27,431	25,483
Foreign	6,141	9,886	11,791	16,418	20,795	22,884	25,382	26,350	28,399	30,068	27,111
Total departing passengers	**12,053**	**19,256**	**22,487**	**34,046**	**43,026**	**45,785**	**49,684**	**50,863**	**53,856**	**57,498**	**52,594**
Country of debarkation[a]											
Australia	103	245	232	540	560	614	606	607	686	806	713
Bahama Islands	704	1,006	1,151	1,279	1,024	994	983	955	1,027	1,137	1,007
Barbados	74	126	204	230	217	210	200	196	202	214	204
Belgium	134	231	249	395	340	380	513	622	713	740	586
Bermuda	372	467	389	277	199	196	215	207	206	189	150
Brazil	206	291	322	560	1,024	1,135	1,292	1,297	1,134	1,194	1,081
Canada[b]	N	N	N	6,870	7,405	8,477	8,890	9,647	9,913	10,459	U
China/Taiwan	41	90	187	337	891	945	939	934	975	1,026	944
Colombia	171	299	294	277	461	467	567	588	585	622	649
Denmark	188	254	254	307	229	227	259	217	214	227	239
Dominican Republic	322	443	528	896	995	1,057	1,070	1,108	1,263	1,294	1,214
France	470	635	894	1,626	1,868	2,021	2,147	2,289	2,544	3,082	2,927
Germany	649	1,178	1,539	2,339	2,883	2,978	3,178	3,210	3,364	3,722	3,389
Grand Cayman	26	112	161	250	264	285	290	305	291	289	271
Greece	123	190	210	129	194	206	192	181	170	170	126
Haiti	81	124	169	201	292	288	284	295	315	296	300
Hong Kong	59	152	238	310	640	651	610	621	621	728	733
Ireland	163	212	233	311	409	449	488	554	743	809	797
Israel	105	186	255	259	426	492	499	488	515	480	374
Italy	409	495	660	731	955	1,006	1,055	1,041	1,101	1,366	1,182

Continued next page

TABLE 1-41: Air Passenger Travel Departures from the United States to Selected Foreign Countries (Thousands) (Continued)

	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Jamaica	416	382	607	888	987	988	1,018	1,018	1,086	1,095	1,084
Japan	1,183	1,602	2,255	4,471	5,452	6,187	6,796	6,487	6,709	6,985	5,993
Korea, Republic of	60	186	333	723	1,252	1,382	1,461	1,032	1,101	1,307	1,137
Mexico	1,525	2,886	2,671	4,136	4,568	5,133	5,613	5,771	6,217	6,510	6,025
Netherlands	304	409	562	777	1,444	1,636	1,920	1,933	2,009	2,107	1,854
Netherland Antilles	184	282	395	377	295	288	319	340	335	337	344
Panama Republic	100	142	209	183	214	221	240	272	299	344	355
Philippines	81	160	165	195	281	275	306	218	272	348	309
Spain	260	273	397	540	573	577	615	669	708	782	732
Switzerland	224	306	434	600	712	760	811	906	983	1,038	905
United Kingdom	1,446	2,840	3,322	4,903	6,372	6,693	7,475	8,143	8,717	9,154	8,180
Venezuela	198	518	245	444	778	644	698	782	793	694	728
Total	**10,381**	**16,722**	**19,764**	**36,361**	**44,204**	**47,862**	**51,549**	**52,933**	**55,811**	**59,551**	**U**

KEY: N = data do not exist; U = data are not available.

[a] Country where passenger deboarded a direct flight from the United States.

[b] Canadian figure represents number of revenue passengers on scheduled commercial and charter flights. Does not include foreign (non-Canadian, non-U.S.) scheduled carriers.

NOTES

Includes passengers on international commercial flights departing U.S. airports, and travelers between U.S. airports in the 50 states, Puerto Rico, Guam, or the Virgin Islands, and other U.S. territories. Data compiled from flight reports required by the U.S. Immigration and Naturalization Service. Table includes a selected sample of countries of debarkation for passengers boarding in the United States. Because two different data sources are used, the total number of departing passengers may be less than the total for "country of debarkation" listed here.

SOURCES

1975-90: U.S. Department of Transportation, Research and Special Programs Administration, Volpe National Transportation Systems Center, *U.S. International Air Travel Statistics* (Cambridge, MA: Annual issues), table IId.

1995: U.S. Department of Commerce, International Trade Administration, *U.S. International Air Passenger Statistics Report, Calendar Year 1995* (Washington, DC: 1996), table IId.

1996-2001: Ibid., *U.S. International Air Travel Statistics Report* (Washington, DC: Annual issues), table IId. Canada: Statistics Canada, *Air Carrier Traffic at Canadian Airports* (Canada: Annual issues) and personal communication, Aug. 21, 2002.

TABLE 1-42: U.S.-Canadian Border Land-Passenger Gateways: Entering the United States, 2000-2001

All U.S.-Canadian land gateways	2000		2001
All personal vehicle passengers	90,046,948	All personal vehicle passengers	74,971,105
All personal vehicles	36,915,053	All personal vehicles	34,308,013
All bus passengers	4,872,943	All bus passengers	4,456,436
All pedestrians	585,191	All pedestrians	749,805
All train passengers	269,502	All train passengers	253,652
All buses	189,264	All buses	169,412
Personal vehicle passengers – top 5 gateways			
Detroit, MI	21,723,936	Buffalo-Niagara Falls, NY	16,571,352
Buffalo-Niagara Falls, NY	16,523,141	Detroit, MI	15,156,971
Blaine, WA	8,234,557	Blaine, WA	6,926,914
Port Huron, MI	6,865,507	Port Huron, MI	4,698,825
Sault Ste. Marie, MI	3,881,423	Champlain-Rouses Point, NY	2,902,006
Personal vehicles – top 5 gateways			
Detroit, MI	8,360,352	Detroit, MI	7,585,477
Buffalo-Niagara Falls, NY	7,657,846	Buffalo-Niagara Falls, NY	7,396,036
Blaine, WA	3,332,147	Blaine, WA	2,892,208
Port Huron, MI	2,332,469	Port Huron, MI	2,198,962
Calais, ME	1,414,327	Calais, ME	1,232,755
Bus passengers – top 5 gateways			
Buffalo-Niagara Falls, NY	1,973,016	Buffalo-Niagara Falls, NY	1,618,598
Detroit, MI	857,607	Detroit, MI	989,750
Blaine, WA	441,320	Blaine, WA	382,273
Champlain-Rouses Point, NY	317,205	Champlain-Rouses Point, NY	291,421
Port Huron, MI	155,153	Port Huron, MI	140,955
Pedestrians – top 5 gateways			
Buffalo-Niagara Falls, NY	280,941	Buffalo-Niagara Falls, NY	414,704
Sumas, WA	57,222	Sumas, WA	98,968
Calais, ME	51,033	Calais, ME	49,148
Portland, ME[a]	29,495	Portland, ME[a]	32,876
International Falls-Rainer, MN	26,456	International Falls-Rainer, MN	27,287
Train passengers – top 5 gateways			
Buffalo-Niagara Falls, NY	53,603	Buffalo-Niagara Falls, NY	53,337
Blaine, WA	46,343	Blaine, WA	43,136
Port Huron, MI	40,633	Champlain-Rouses Point, NY	35,257
Champlain-Rouses Point, NY	38,459	Skagway, AK	33,753
Skagway, AK	35,253	Port Huron, MI	33,130
Buses – top 5 gateways			
Buffalo-Niagara Falls, NY	66,771	Buffalo-Niagara Falls, NY	53,231
Detroit, MI	41,234	Detroit, MI	39,754
Blaine, WA	18,104	Blaine, WA	16,561
Champlain-Rouses Point, NY	11,728	Champlain-Rouses Point, NY	10,374
Skagway, AK	8,579	Sault Ste. Marie, MI	8,719

[a] Gateway is a pedestrian/ferry combination crossing.

NOTE
Data reflect all personal vehicles, buses, passengers and pedestrians entering the United States across the U.S.-Canadian border, regardless of nationality.

SOURCE
U.S. Department of Transportation, Bureau of Transportation Statistics, special tabulation, August 2002. Based on the following primary data source: U.S. Department of Treasury, U.S. Customs Service, Office of Field Operations, Operations Management Database (Washington, DC: 2001).

TABLE 1-43: U.S.-Mexican Border Land-Passenger Gateways: Entering the United States, 2000-2001

All U.S.-Mexican land gateways	2000		2001
All personal vehicle passengers	239,794,552	All personal vehicle passengers	209,105,846
All personal vehicles	91,156,796	All personal vehicles	89,526,957
All pedestrians	47,089,642	All pedestrians	51,501,321
All bus passengers	3,465,916	All bus passengers	3,366,795
All buses	270,792	All buses	288,285
All train passengers	18,254	All train passengers	18,895
Personal vehicle passengers – top 5 gateways			
El Paso, TX	48,420,274	El Paso, TX	39,200,481
San Ysidro, CA	31,025,343	San Ysidro, CA	33,003,554
Hidalgo, TX	21,947,731	Hidalgo, TX	17,713,609
Calexico, CA	20,094,460	Laredo, TX	17,282,264
Brownsville, TX	19,693,130	Brownsville, TX	16,951,901
Personal vehicles – top 5 gateways			
El Paso, TX	16,697,439	El Paso, TX	16,135,835
San Ysidro, CA	14,106,704	San Ysidro, CA	15,001,616
Hidalgo, TX	8,779,691	Hidalgo, TX	7,549,907
Brownsville, TX	7,877,255	Brownsville, TX	7,548,394
Laredo, TX	7,151,127	Laredo, TX	7,454,330
Pedestrians – top 5 gateways			
Calexico, CA	8,352,324	San Ysidro, CA	11,435,946
San Ysidro, CA	7,542,450	El Paso, TX	7,201,100
Hidalgo, TX	5,825,155	Calexico, CA	7,119,785
Laredo, TX	5,492,769	Laredo, TX	5,060,947
Nogales, AZ	4,677,819	Nogales, AZ	4,874,738
Bus passengers – top 5 gateways			
Otay Mesa, CA	845,775	San Ysidro, CA	897,047
San Ysidro, CA	783,762	Laredo, TX	720,559
Hidalgo, TX	648,751	Hidalgo, TX	659,450
Laredo, TX	608,184	Otay Mesa, CA	457,980
El Paso, TX	155,493	El Paso, TX	195,399
Buses – top 5 gateways			
San Ysidro, CA	101,244	San Ysidro, CA	102,627
Otay Mesa, CA	47,683	Otay Mesa, CA	57,954
Laredo, TX	34,529	Laredo, TX	39,718
Hidalgo, TX	31,836	Hidalgo, TX	33,017
Brownsville, TX	16,073	Brownsville, TX	14,026
Train passengers – top 5 gateways			
Eagle Pass, TX	5,792	Eagle Pass, TX	6,704
Nogales, AZ	4,752	Tecate, CA	5,018
Tecate, CA	3,418	Nogales, AZ	2,648
El Paso, TX	2,188	El Paso, TX	2,337
Calexico East, CA	1,687	Calexico East, CA	1,722

NOTE
Data reflect all personal vehicles, buses, passengers and pedestrians entering the United States across the U.S.-Mexican border, regardless of nationality.

SOURCE
U.S. Department of Transportation, Bureau of Transportation Statistics, special tabulation, August 2002. Based on the following primary data source: U.S. Department of Treasury, U.S. Customs Service, Office of Field Operations, Operations Management Database (Washington, DC: 2001).

TABLE 1-44: U.S. Ton-Miles of Freight (Millions)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
TOTAL U.S. ton-miles of freight (millions)	**U**	**1,854,034**	**2,206,713**	**2,284,706**	**2,988,522**	**2,949,410**	**3,195,677**	**3,648,036**	**3,724,723**	**3,682,437**	**3,710,237**	**3,814,225**	**U**
Air carrier, domestic all services[a]	**553**	**1,353**	**2,709**	**3,470**	**4,528**	**5,156**	**9,064**	**12,520**	**12,861**	**13,601**	**13,840**	**14,202**	**14,983**
Intercity truck[b]	**285,000**	**359,000**	**412,000**	**454,000**	**555,000**	**610,000**	**735,000**	**921,000**	**972,000**	**996,000**	**1,027,000**	**P1,093,000**	**U**
Class I rail[c]	**572,309**	**697,878**	**764,809**	**754,252**	**918,958**	**876,984**	**1,033,969**	**1,305,688**	**1,355,975**	**1,348,926**	**1,376,802**	**1,433,461**	**1,465,960**
Domestic water transportation[d]	**U**	**489,803**	**596,195**	**565,984**	**921,836**	**892,970**	**833,544**	**807,728**	**764,687**	**707,410**	**672,795**	**655,862**	**645,799**
Coastwise	U	302,546	359,784	315,846	[e] 631,149	610,977	479,134	440,345	408,086	349,843	314,864	292,730	283,872
Lakewise	U	75,918	79,416	68,517	61,747	48,184	60,930	59,704	58,335	62,166	61,654	57,045	57,879
Internal	U	109,701	155,816	180,399	227,343	232,708	292,393	306,329	296,791	294,023	294,896	304,724	302,558
Intraport	U	1,638	1,179	1,222	1,596	1,102	1,087	1,350	1,475	1,378	1,381	1,362	1,490
Oil pipeline[b]	**229,000**	**306,000**	**431,000**	**507,000**	**588,200**	**564,300**	**584,100**	**601,100**	**619,200**	**616,500**	**619,800**	**617,700**	**577,300**

KEY: P = preliminary; U = data are not available.

[a] Includes freight, express, and mail revenue ton-miles as reported on U.S. DOT Form 41.

[b] Intercity truck and oil pipeline estimates are reported in billions. The U.S. Department of Transportation, Bureau of Transportation Statistics converted these estimates to millions.

[c] Revenue ton-miles.

[d] Excludes intraterritorial traffic, for which ton-miles were not compiled.

[e] Reflects startup between 1975 and 1980 of Alaska pipeline and consequent water transportation of crude petroleum from Alaskan ports to mainland United States for refining.

NOTE
Domestic water transportation numbers may not add to totals due to rounding.

SOURCES
Air carrier, domestic, all services:
1960-65: Civil Aeronautics Board, *Handbook of Airline Statistics, 1969* (Washington, DC: 1970).
1970-80: Ibid., *Air Carrier Traffic Statistics* (Washington, DC: Annual issues), p. 2, line 3.
1985-2000: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, *Air Carrier Traffic Statistics* (Washington, DC: Annual issues), p. 2, line 3.

Intercity truck:
1960-99: Eno Transportation Foundation, Inc., *Transportation in America, 2000* (Washington, DC: 2001), p. 12.

Class I rail:
1960-2000: Association of American Railroads, *Railroad Facts* (Washington, DC: 2001), p. 27.

Domestic water transportation:
1965-2000: U.S. Army Corps of Engineers, *Waterborne Commerce of the U.S.* (New Orleans, LA: Annual issues), part 5, section 1, table 1-4, and similar tables in earlier editions.

Oil pipeline:
1960-70: Eno Transportation Foundation, Inc., *Transportation in America, 1998* (Washington, DC: 1998), p. 44.
1975: Association of Oil Pipe Lines, *Shifts in Petroleum Transportation* (Washington, DC: Annual issues), table 4.
1980-2000: Ibid., *Shifts in Petroleum Transportation* (Washington, DC: Annual issues), table 1.

TABLE 1-45: Average Length of Haul, Domestic Freight and Passenger Modes (Miles)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Freight													
Air carrier	953	943	1,014	1,082	1,052	1,157	1,389	1,160	1,181	1,077	1,078	1,001	U
Truck[a]	272	259	263	286	363	366	391	416	426	435	442	458	U
Class I rail	461	503	515	541	616	665	726	843	842	851	835	835	843
Water													
Coastwise	1,496	1,501	1,509	1,362	1,915	1,972	1,604	1,652	1,526	1,330	1,261	1,279	1,251
Lakewise	522	494	506	530	536	524	553	514	508	507	505	501	506
Internal	282	297	330	358	405	435	470	494	477	466	472	488	481
Intraport	U	U	U	16	17	15	13	16	17	15	15	15	16
Oil pipeline													
Crude	325	320	300	633	871	777	812	797	779	781	767	766	U
Petroleum products	269	335	357	516	414	391	387	402	413	413	420	418	U
Passenger													
Air carrier, domestic, scheduled	583	614	678	698	736	758	803	791	802	817	812	824	833
Bus, intercity	79	94	106	113	125	121	141	140	143	144	144	143	U
Commuter rail	21	21	22	23	23	24	22	24	24	23	23	23	U
Amtrak[b]	N	N	N	236	216	231	273	268	257	256	252	248	244

KEY: N = data do not exist; U = data are not available.

[a] Total Class I and Class II motor carriers of freight (less-than-truckload, specialized carrier for truckload, and others).

[b] Amtrak began operations in 1971. Data are reported for fiscal years.

NOTES

Average length of haul for freight is calculated by dividing ton-miles in the previous table by estimates of tonnage from the various data sources. The calculation of average length of haul for passenger trips varies by mode: for air carrier it is calculated by dividing revenue passenger-miles by revenue passenger enplanements; for commuter rail, intercity bus, and Amtrak it is calculated by dividing passenger-miles by number of passengers.

SOURCES

Freight:

Air carrier, truck:
Eno Transportation Foundation, Inc., *Transportation In America, 2000* (Washington, DC: 2001), p. 51.

Class I rail:
Association of American Railroads, *Railroad Facts* (Washington, DC: 2001), p. 36.

Water:
U.S. Army Corps of Engineers, *Waterborne Commerce of the United States, Part 5* (New Orleans, LA: Annual issues), section 1, table 1-4

Oil pipeline:
1960-70: Transportation Policy Associates, Washington, DC, personal communication.
1975-99: Eno Transportation Foundation, Inc., *Transportation in America, 2000* (Washington, DC: 2001), p. 51.

Passenger:

Air carrier:
U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, *Air Carrier Traffic Statistics* (Washington, DC: Annual issues).

Intercity bus and commuter rail:
Eno Transportation Foundation, Inc., *Transportation in America, 2000* (Washington, DC: 2001), p. 50.

Amtrak:
1970-85: Amtrak, corporate communication, Jan. 26, 1999.
1990-2000: Amtrak, *Amtrak Annual Report* (Washington, DC: 2001), Statistical Appendix, pp. 23-25.

TABLE 1-46: Top U.S. Foreign Trade Freight Gateways by Value of Shipments (Current $ billions)

		2000				2001			
Gateway	Type	Rank	Exports	Imports	Total	Rank	Exports	Imports	Total
JFK International Airport, NY	Air	1	56.0	75.5	131.6	1	50.1	66.5	116.6
Port of Los Angeles, CA	Water	2	16.7	85.1	101.8	2	17.4	86.8	104.2
Port of Long Beach, CA	Water	3	16.9	81.3	98.2	3	16.7	78.0	94.7
Port of Detroit, MI	Land	4	49.5	44.9	94.4	4	49.2	42.8	92.0
Port of New York, NY and NJ	Water	7	19.7	61.2	80.9	5	22.7	63.2	85.9
Port of Laredo, TX	Land	6	39.2	44.4	83.7	6	34.7	44.9	79.6
Los Angeles International Airport, CA	Air	8	41.7	35.6	77.3	7	34.0	29.9	63.9
San Francisco Airport, CA	Air	5	41.8	46.9	88.7	8	32.3	29.6	62.0
Port of Buffalo-Niagara Falls, NY	Land	9	36.2	33.9	70.1	9	29.4	31.1	60.5
Port of Huron, MI	Land	10	18.8	40.9	59.7	10	17.3	38.4	55.6
Chicago, IL	Air	11	20.4	25.4	45.7	11	19.9	25.0	44.9
Port of Houston, TX	Water	12	18.7	24.6	43.4	12	19.5	25.0	44.5
Port of El Paso, TX	Land	13	17.5	21.9	39.4	13	15.9	22.0	37.9
Port of Charleston, SC	Water	16	11.3	20.2	31.5	14	12.5	20.9	33.4
Port of Seattle, WA	Water	14	5.4	26.9	32.3	15	5.3	23.3	28.6
New Orleans, LA	Air	15	16.2	15.9	32.0	16	13.8	13.5	27.4
Port of Oakland, CA	Water	18	9.6	15.5	25.1	17	7.7	17.2	25.0
Port of Norfolk Harbor, VA	Water	17	11.1	14.1	25.2	18	11.3	13.6	24.9
Miami International Airport, FL	Air	20	15.9	7.7	23.6	19	15.4	7.2	22.6
Anchorage, AK	Air	21	3.5	19.7	23.2	20	5.1	16.8	21.9
Port of Baltimore, MD	Water	22	5.3	15.3	20.6	21	5.1	15.7	20.8
Cleveland, OH	Air	19	11.8	12.7	24.5	22	9.2	10.5	19.7
Port of Otay Mesa Station, CA	Land	25	8.1	10.7	18.8	23	8.2	11.2	19.4
Dallas-Fort Worth, TX	Air	23	10.1	10.2	20.4	24	8.8	10.0	18.8
Port of Tacoma, WA	Water	24	4.4	15.5	19.8	25	4.3	14.4	18.7
Port of Savannah, GA	Water	30	5.9	10.5	16.3	26	6.4	10.7	17.2
Port of New Orleans, LA	Water	26	7.6	11.2	18.8	27	8.1	8.8	17.0
Port of Miami, FL	Water	27	8.4	9.1	17.5	28	8.5	8.1	16.6
Port of Champlain-Rouses Pt., NY	Land	28	6.0	11.3	17.3	29	5.9	10.2	16.2
Atlanta, GA	Air	29	8.4	8.7	17.2	30	7.6	8.3	15.8
Port of Nogales, AZ	Land	31	5.3	8.3	13.6	31	4.6	7.9	12.5
Port of Hidalgo, TX	Land	32	6.2	6.4	12.6	32	5.7	6.7	12.4
Port of Blaine, WA	Land	33	5.6	6.7	12.3	33	5.1	6.6	11.7
Port of Brownsville-Cameron, TX	Land	34	6.2	5.9	12.1	34	5.8	5.1	10.9

Continued next page

TABLE 1-46: Top U.S. Foreign Trade Freight Gateways by Value of Shipments (Current $ billions) (Continued)

Gateway	Type	2000 Rank	2000 Exports	2000 Imports	2000 Total	2001 Rank	2001 Exports	2001 Imports	2001 Total
Port of Jacksonville, FL	Water	43	1.9	8.4	10.3	35	2.0	8.8	10.8
Port of Portland, OR	Water	41	3.0	7.5	10.5	36	2.7	8.0	10.7
Port of Alexandria Bay, NY	Land	35	4.6	7.4	12.0	37	4.1	6.6	10.6
Port of Port Everglades, FL	Water	40	4.7	5.8	10.5	38	4.4	5.9	10.3
Port of South Louisiana, LA	Water	36	7.1	4.0	11.1	39	6.5	3.5	10.0
Port of Philadelphia, PA	Water	45	0.5	9.5	10.0	40	0.6	9.4	10.0
Newark, NJ	Air	38	3.9	6.7	10.6	41	3.2	6.2	9.4
Boston Logan Airport, MA	Air	44	5.9	4.4	10.3	42	5.7	3.6	9.2
Port of Pembina, ND	Land	39	5.3	5.2	10.6	43	4.4	4.5	8.9
Seattle-Tacoma International Airport, WA	Air	47	3.7	4.8	8.5	44	3.5	5.3	8.8
Philadelphia International Airport, PA	Air	56	3.2	2.8	6.0	45	4.9	3.9	8.8
Port of Sweetgrass, MT	Land	49	3.4	4.4	7.8	46	3.8	4.4	8.3
Port of Morgan City, LA	Water	46	0.1	9.3	9.4	47	0.1	7.7	7.8
San Juan International Airport, PR	Air	58	2.6	2.7	5.4	48	3.7	4.1	7.8
Houston International Airport, TX	Air	52	4.5	2.7	7.2	49	4.8	2.9	7.7
Port of Corpus Christi, TX	Water	42	1.6	8.7	10.3	50	1.2	6.5	7.7
Total top 50 gateways		NA	[a]618.9	[a]989.1	[a]1,608.1	NA	579.5	920.8	1,500.3

KEY: U = data are not available; NA = not applicable.

[a] Based on top 50 freight gateways in 2000.

NOTES

All data: Trade levels reflect the mode of transportation as a shipment enters or exits at a border port. Flows through individual ports are based on reported data collected from U.S. trade documents. Trade does not include low-value shipments. (In general, these are imports valued at less than $1,250 and exports that are valued at less than $2,500).

Air: Data for all air gateways include a low level (generally less than 2%-3% of the total value) of small user-fee airports located in the same region. Air gateways not identified by airport name (e.g., Chicago, IL, and others) include major airport(s) in that geographic area in addition to small regional airports. In addition, due to Bureau of Census confidentiality regulations, data for courier operations are included in the airport totals for JFK International Airport, New Orleans, Los Angeles, Cleveland, Chicago, Miami, and Anchorage.

Water: The Port of South Louisiana includes the following individual ports in Louisiana: Destrehan, Gramercy, St. Rose, and Good Hope.

In 2000, Port of Beaumont, TX (water) ranked 37th, Port of Calexico-East, CA (land) ranked 48th, and Port of Highgate Springs-Alburg, VT (land) ranked 50th.

Numbers may not add to totals due to rounding.

SOURCES

Air: U.S. Department of Commerce, Bureau of the Census, Foreign Trade Division, special tabulation, August 2002.

Water: U.S. Department of Transportation, Maritime Administration, Office of Statistical and Economic Analysis, personal communication, Aug. 27, 2002.

Land: U.S. Department of Transportation, Bureau of Transportation Statistics, Transborder Surface Freight Data, August 2002.

TABLE 1-47: U.S.-Canadian Border Land-Freight Gateways: Number of Truck or Railcar Crossings, 2000-2001

Truck	2000		2001
Total U.S.-Canadian border	**7,048,128**	**Total U.S.-Canadian border**	**6,776,909**
Total top 5 gateways	**4,714,339**	**Total top 5 gateways**	**4,448,865**
Detroit, MI	1,769,389	Detroit, MI	1,642,042
Buffalo-Niagara Falls, NY	1,198,085	Buffalo-Niagara Falls, NY	1,123,971
Port Huron, MI	839,200	Port Huron, MI	828,802
Blaine, WA	516,829	Blaine, WA	471,731
Champlain-Rouses Point, NY	390,836	Champlain-Rouses Point, NY	382,319
Rail			
Total U.S.-Canadian border	**1,594,837**	**Total U.S.-Canadian border**	**1,779,345**
Total top 5 gateways	**1,169,034**	**Total top 5 gateways**	**1,277,982**
Port Huron, MI	425,211	Port Huron, MI	449,299
Detroit, MI	237,968	Detroit, MI	304,591
Buffalo-Niagara Falls, NY	181,462	International Falls, MN	205,430
International Falls, MN	171,551	Portal, ND	168,137
Portal, ND	152,842	Buffalo-Niagara Falls, NY	150,525

NOTES
Truck: Data represent the number of truck crossings, not the number of unique vehicles. Data are for both loaded and empty trucks.
Rail: Data includes both loaded and unloaded railcars.

SOURCE
U.S. Department of Transportation, Bureau of Transportation Statistics, special tabulation, August 2002. Based on the following primary data source: U.S. Department of Treasury, U.S. Customs Service, Office of Field Operations, Operations Management Database, special tabulation (Washington, DC: 2001).

TABLE 1-48: U.S.-Mexican Border Land-Freight Gateways: Number of Truck or Railcar Crossings, 2000-2001

Truck	2000		2001
Total U.S.-Mexican border	**4,525,579**	**Total U.S.-Mexican border**	**4,304,959**
Total top 5 gateways	**3,575,207**	**Total top 5 gateways**	**3,398,053**
Laredo, TX	1,493,073	Laredo, TX	1,403,914
El Paso, TX	720,406	Otay Mesa/San Ysidro, CA	708,446
Otay Mesa/San Ysidro, CA	688,340	El Paso, TX	660,583
Hidalgo, TX	374,150	Hidalgo, TX	368,395
Brownsville, TX	299,238	Calexico East, CA	256,715
Rail			
Total U.S.-Mexican border	**571,825**	**Total U.S.-Mexican border**	**582,652**
Total top 5 gateways	**562,710**	**Total top 5 gateways**	**572,034**
Laredo, TX	243,369	Laredo, TX	273,935
Brownsville, TX	139,803	Brownsville, TX	101,787
Eagle Pass, TX	94,113	Eagle Pass, TX	93,108
Nogales, AZ	50,602	Nogales, AZ	58,667
El Paso, TX	34,823	El Paso, TX	44,537

NOTES
Truck: Data represent the number of truck crossings, not the number of unique vehicles. Data are for both loaded and empty trucks.
Rail: Data includes both loaded and unloaded railcars.

SOURCE
U.S. Department of Transportation, Bureau of Transportation Statistics, special tabulation, August 2002. Based on the following primary data source: U.S. Department of Treasury, U.S. Customs Service, Office of Field Operations, Operations Management Database, special tabulation (Washington, DC: 2001).

TABLE 1-49: U.S. Waterborne Freight (Million short tons)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
TOTAL	**1,099.9**	**1,272.9**	**1,531.7**	**1,695.0**	**1,998.9**	**1,788.4**	**2,163.9**	**2,240.4**	**2,284.1**	**2,333.1**	**2,339.5**	**2,322.6**	**2,461.6**
Foreign, total	**339.3**	**443.7**	**581.0**	**748.7**	**921.4**	**774.3**	**1,041.6**	**1,147.4**	**1,183.4**	**1,220.6**	**1,245.4**	**1,260.8**	**1,391.8**
Imports	211.3	269.8	339.3	476.6	517.5	412.7	600.0	672.7	732.6	788.3	840.7	860.8	976.8
Exports	128.0	173.9	241.6	272.1	403.9	361.6	441.6	474.7	450.8	432.3	404.7	400.0	415.0
Domestic, total	**760.6**	**829.2**	**950.7**	**946.3**	**1,077.5**	**1,014.1**	**1,122.3**	**1,093.0**	**1,100.7**	**1,112.5**	**1,094.1**	**1,061.8**	**1,069.8**
Inland	291.1	369.6	472.1	503.9	535.0	534.7	622.6	620.3	622.1	630.6	625.0	624.6	628.4
Coastal	209.2	201.5	238.4	231.9	329.6	309.8	298.6	266.6	267.4	263.1	249.6	228.8	226.9
Great Lakes	155.1	153.7	157.1	129.3	115.1	92.0	110.2	116.1	114.9	122.7	122.2	113.9	114.4
Intraport	104.2	102.9	81.5	78.3	94.2	74.3	86.4	83.1	89.0	89.8	90.1	88.7	94.6
Intraterritory	1.0	1.5	1.6	2.9	3.6	3.4	4.5	6.9	7.3	6.3	7.2	5.9	5.5

NOTES
Beginning in 1996, shipments of fish are excluded from domestic tonnage totals.
Numbers may not add to totals due to rounding.

SOURCES
1960-2000: U.S. Army Corps of Engineers, *Waterborne Commerce of the United States* (New Orleans, LA: March 2002), part 5, tables 1-3 and 1-6.

TABLE 1-50: Tonnage of Top 50 U.S. Water Ports, Ranked by Total Tons[a]

	1990		2000		
	Rank	Total tons (Millions)	Rank	Total tons (Millions)	Percent change 1990-2000
South Louisiana, LA	1	194.2	1	217.8	12.1%
Houston, TX	3	126.2	2	191.4	51.7%
New York, NY and NJ	2	140.0	3	138.7	-1.0%
New Orleans, LA	6	62.7	4	90.8	44.7%
Corpus Christi, TX	7	62.0	5	83.1	34.0%
Beaumont, TX	23	26.7	6	82.7	209.2%
Huntington, WV	34	17.3	7	76.9	344.1%
Long Beach, CA	10	52.4	8	70.1	33.8%
Baton Rouge, LA	5	78.1	9	65.6	-16.0%
Texas City, TX	12	48.1	10	61.6	28.1%
Plaquemine, LA	8	56.6	11	59.9	5.9%
Lake Charles, LA	16	40.9	12	55.5	35.8%
Mobile, AL	15	41.1	13	54.2	31.7%
Pittsburgh, PA	19	35.5	14	53.9	51.9%
Los Angeles, CA	13	46.4	15	48.2	4.0%
Valdez, AK	4	96.0	16	48.1	-49.9%
Tampa, FL	11	51.6	17	46.5	-9.9%
Philadelphia, PA	14	41.8	18	43.9	4.8%
Norfolk Harbor, VA	9	53.7	19	42.4	-21.1%
Duluth-Superior, MN and WI	17	40.8	20	41.7	2.2%
Baltimore, MD	18	39.5	21	40.8	3.3%
Portland, OR	21	27.5	22	34.3	25.0%
St. Louis, MO and IL	22	27.1	23	33.3	23.0%
Freeport, TX	40	14.5	24	31.0	113.8%
Portland, ME	51	10.8	25	29.3	172.3%
Pascagoula, MS	24	26.5	26	28.7	8.4%
Paulsboro, NJ	27	23.3	27	26.9	15.2%
Seattle, WA	30	21.6	28	24.2	12.0%
Chicago, IL	28	22.5	29	23.9	6.2%
Marcus Hook, PA	25	25.9	30	22.6	-12.7%
Port Everglades, FL	42	14.1	31	22.5	59.1%
Tacoma, WA	31	21.4	32	22.3	4.0%
Port Arthur, TX	20	30.7	33	21.4	-30.3%

TABLE 1-50: Tonnage of Top 50 U.S. Water Ports, Ranked by Total Tons[a] (Continued)

	1990		2000		
	Rank	Total tons (Millions)	Rank	Total tons (Millions)	Percent change 1990-2000
Charleston, SC	54	9.7	34	21.1	117.3%
Boston, MA	29	21.9	35	20.8	-5.3%
Jacksonville, FL	36	15.1	36	19.7	30.3%
Savannah, GA	44	13.6	37	19.7	45.0%
Richmond, CA	32	21.2	38	19.5	-8.0%
Memphis, TN	47	12.4	39	18.3	47.8%
Anacortes, WA	35	15.4	40	18.0	17.1%
Detroit, MI	33	17.7	41	17.3	-2.5%
Indiana Harbor, IN	37	14.7	42	16.2	10.3%
Honolulu, HI	50	11.3	43	15.8	39.3%
Cleveland, OH	41	14.4	44	14.4	0.2%
Cincinnati, OH	46	12.6	45	14.3	13.6%
Lorain, OH	43	14.0	46	14.2	1.5%
San Juan, PR	39	14.5	47	13.9	-4.4%
Newport News, VA	26	24.9	48	13.8	-44.6%
Toledo, OH	38	14.7	49	13.3	-9.2%
Two Harbors, MN	48	12.3	50	13.1	6.2%
Total top 50		**1,877.9**		**2,217.3**	**18.1%**
All ports		**2,163.9**		**2,461.6**	**13.8%**

[a] Tonnage totals include both domestic and foreign waterborne trade.

NOTES
In 1990, Grays Harbor, Washington, ranked 45th (12.8 tons) and Ashtabula, Ohio, ranked 49th (11.9 tons).
Numbers may not add to totals due to rounding.

SOURCES
1990: U.S. Army Corps of Engineers, *Waterborne Commerce of the United States, Calendar Year 1990, Part 5, National Summaries* (New Orleans, LA: 1993), table 5-2.
2000: Ibid., *Waterborne Commerce of the United States, Calendar Year 2000, Part 5, National Summaries* (New Orleans, LA: 2002), tables 1-1 and 5-2.

TABLE 1-51: Growth of Freight Activity in the United States: Comparison of the 1993 and 1997 Commodity Flow Surveys

Mode of transportation	Value			Tons			Ton-miles		
	1993 (billion $ 1997)	1997 (billion $ 1997)	Percent change	1993 (millions)	1997 (millions)	Percent change	1993 (billions)	1997 (billions)	Percent change
TOTAL all modes	**6,360.8**	**6,944.0**	**9.2**	**9,688.5**	**11,089.7**	**14.5**	**2,420.9**	**2,661.4**	**9.9**
Single modes, total	**5,376.3**	**5,719.6**	**6.4**	**8,922.3**	**10,436.5**	**17.0**	**2,136.9**	**2,383.5**	**11.5**
Truck[a]	4,791.0	4,981.5	4.0	6,385.9	7,700.7	20.6	869.5	1,023.5	17.7
For-hire truck	2,856.1	2,901.3	1.6	2,808.3	3,402.6	21.2	629.0	741.1	17.8
Private truck[b]	1,910.4	2,036.5	6.6	3,543.5	4,137.3	16.8	235.9	268.6	13.9
Rail	269.2	319.6	18.7	1,544.1	1,549.8	0.4	942.6	1,022.5	8.5
Water	67.1	75.8	13.1	505.4	563.4	11.5	272.0	261.7	–3.8
Shallow draft	44.3	53.9	21.7	362.5	414.8	14.4	164.4	189.3	15.2
Great Lakes	1.3	1.5	15.4	33.0	38.4	16.4	12.4	13.4	8.2
Deep draft	21.5	20.4	–4.9	109.9	110.2	0.2	95.2	59.0	–38.0
Air (includes truck and air)	151.3	229.1	51.4	3.1	4.5	42.6	4.0	6.2	55.5
Pipeline[c]	97.8	113.5	16.1	483.6	618.2	27.8	S	S	S
Multiple modes, total	**720.9**	**945.9**	**31.2**	**225.7**	**216.7**	**–4.0**	**191.5**	**204.5**	**6.8**
Parcel, U.S. Postal Service or courier	612.8	855.9	39.7	18.9	23.7	25.4	13.2	18.0	36.8
Truck and rail	90.4	75.7	–16.3	40.6	54.2	33.5	37.7	55.6	47.5
Truck and water	10.2	8.2	–19.4	68.0	33.2	–51.2	40.6	34.8	–14.4
Rail and water	4.0	1.8	–55.2	79.2	79.3	0.1	70.2	77.6	10.5
Other multiple modes	3.5	4.3	22.0	18.9	26.2	38.6	S	18.6	S
Other/unknown modes, total	**263.6**	**278.6**	**5.7**	**540.5**	**436.5**	**–19.2**	**92.6**	**73.4**	**–20.7**

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

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

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

[c] Excludes most shipments of crude oil.

NOTE
Numbers and percents may not add to totals due to rounding.

SOURCE
U.S. Department of Transportation, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, *1997 Economic Census, Transportation, 1997 Commodity Flow Survey* (Washington, DC: December 1999), table 1b; the Bureau of Transportation Statistics converted the value of 1993 commodities from 1993 current dollars to 1997 constant dollars using Bureau of Economic Analysis chain-type price deflators.

TABLE 1-52: Value, Tons, and Ton-Miles of Freight Shipments within the United States by Domestic Establishments, 1997

SCTG	Commodity description	Value ($ billions)	Percent	Tons (millions)	Percent	Ton-miles (billions)	Percent	Value per ton ($)	Average miles per shipment
01	Live animals and live fish	6.2	0.1	5.9	0.1	1.5	0.1	1,042	272
02	Cereal grains	59.6	0.9	489.7	4.4	200.6	7.5	122	125
03	Other agricultural products	102.3	1.5	201.7	1.8	80.8	3.0	508	438
04	Animal feed and products of animal origin (NEC)	66.8	1.0	219.7	2.0	46.8	1.8	304	79
05	Meat, fish, seafood, and their preparations	183.8	2.6	79.5	0.7	36.4	1.4	2,312	137
06	Milled grain products, preparations, and bakery products	109.9	1.6	102.7	0.9	48.5	1.8	1,069	122
07	Other prepared foodstuffs and fats and oils	346.4	5.0	396.9	3.6	124.1	4.7	873	127
08	Alcoholic beverages	87.9	1.3	81.1	0.7	27.8	1.0	1,085	58
09	Tobacco products	56.4	0.8	4.1	0.0	1.0	0.0	13,661	296
10	Monumental or building stone	2.7	0.0	15.9	0.1	1.5	0.1	172	115
11	Natural sands	4.3	0.1	442.5	4.0	25.5	1.0	10	46
12	Gravel and crushed stone	11.5	0.2	1,814.8	16.4	92.9	3.5	6	36
13	Nonmetallic minerals (NEC)	11.3	0.2	235.7	2.1	52.2	2.0	48	174
14	Metallic ores and concentrates	12.6	0.2	90.7	0.8	47.7	1.8	139	303
15	Coal	25.5	0.4	1,217.0	11.0	542.3	20.4	21	81
17	Gasoline and aviation turbine fuel	217.1	3.1	962.8	8.7	136.6	5.1	225	45
18	Fuel oils	94.3	1.4	481.7	4.3	51.2	1.9	196	28
19	Coal and petroleum products (NEC)	74.9	1.1	475.1	4.3	81.9	3.1	158	85
20	Basic chemicals	159.6	2.3	296.1	2.7	136.8	5.1	539	332
21	Pharmaceutical products	224.4	3.2	9.9	0.1	5.6	0.2	22,678	692
22	Fertitizers	27.3	0.4	179.1	1.6	43.6	1.6	153	116
23	Chemical products and preparations (NEC)	209.5	3.0	92.0	0.8	45.0	1.7	2,276	333
24	Plastics and rubber	278.8	4.0	130.4	1.2	69.1	2.6	2,138	451
25	Logs and other wood in the rough	15.1	0.2	370.7	3.3	28.1	1.1	41	85
26	Wood products	126.4	1.8	329.1	3.0	96.9	3.6	384	287
27	Pulp, newsprint, paper, and paperboard	106.6	1.5	152.3	1.4	83.7	3.1	700	194
28	Paper or paperboard articles	98.3	1.4	73.5	0.7	22.0	0.8	1,338	307
29	Printed products	260.3	3.7	78.1	0.7	22.8	0.9	3,335	431
30	Textiles, leather, and articles of textiles or leather	379.2	5.5	45.9	0.4	24.7	0.9	8,266	912
31	Nonmetallic mineral products	109.2	1.6	910.1	8.2	91.4	3.4	120	401
32	Base metal in primary or semifinished forms and in finished basic shapes	285.7	4.1	335.9	3.0	117.5	4.4	851	276
33	Articles of base metal	227.2	3.3	106.5	1.0	48.7	1.8	2,133	403
34	Machinery	417.1	6.0	49.9	0.4	27.0	1.0	8,356	356

Continued next page

TABLE 1-52: Value, Tons, and Ton-Miles of Freight Shipments within the United States by Domestic Establishments, 1997 (Continued)

SCTG	Commodity description	Value ($ billions)	Percent	Tons (millions)	Percent	Ton-miles (billions)	Percent	Value per ton ($)	Average miles per shipment
35	Electronic and other electrical equipment and components and office equipment	869.7	12.5	39.6	0.4	27.1	1.0	21,955	640
36	Motorized and other vehicles (including parts)	571.0	8.2	98.1	0.9	45.9	1.7	5,822	278
37	Transportation equipment (NEC)	129.2	1.9	5.5	0.0	3.8	0.1	23,587	796
38	Precision instruments and apparatus	157.9	2.3	2.9	0.0	2.2	0.1	53,741	840
39	Furniture, mattresses and mattress supports, lamps, lighting fittings, and illuminated signs	97.3	1.4	19.9	0.2	11.6	0.4	4,885	625
40	Miscellaneous manufactured products	420.9	6.1	112.5	1.0	39.9	1.5	3,741	860
41	Waste and scrap	32.7	0.5	177.8	1.6	40.1	1.5	184	164
43	Mixed freight	230.4	3.3	110.3	1.0	17.2	0.6	2,090	252
	Commodity unknown	36.5	0.5	46.2	0.4	11.8	0.4	791	499
	All commodities	**6,943.8**	**100.0**	**11,089.8**	**100.0**	**2,661.8**	**100.0**		

KEY: NEC = not elsewhere classified; SCTG=Standard Classification of Transportation Goods.

NOTE

The 1997 Commodity Flow Survey data reported in this table are based on SCTG code, which differs from the code used in the 1993 CFS. Therefore, data in this table are not directly comparable to the 1993 data reported in the 1998 edition of National Transportation Statistics.

SOURCE

U.S. Department of Transportation, Bureau of Trasnportation Statistics, U.S. Department of Commerce, Census Bureau, *1997 Economic Census*, Transportation 1997 *Commodity Flow Survey* (Washington, DC: December 1999), table 7.

TABLE 1-53: Value of U.S. Land Exports to and Imports from Canada and Mexico by Mode ($ millions)

	1994	1995	1996	1997	1998	1999	2000	2001
Exports to Canada								
Truck	89,151.1	97,423.4	102,743.0	111,173.8	114,806.1	123,140.0	129,825.3	117,694.5
Rail	13,593.9	15,271.9	15,678.7	13,255.6	12,279.6	11,754.6	12,946.5	12,972.7
Pipeline	133.8	121.3	162.2	180.6	93.4	113.9	161.6	221.3
Other[a]	21,753.2	17,010.5	20,467.5	9,336.1	10,559.5	11,360.0	11,913.4	14,772.0
Mail	69.3	57.0	58.3	24.1	6.8	5.6	0.6	1.1
Total	**R124,701.2**	**129,884.1**	**139,109.7**	**R133,970.3**	**137,745.4**	**146,374.1**	**154,847.4**	**145,661.6**
Exports to Mexico								
Truck	39,066.5	35,914.2	44,091.8	55,592.6	60,432.1	66,923.8	82,389.2	74,223.1
Rail	4,192.0	4,694.4	5,119.2	5,648.0	6,188.8	5,710.6	10,495.8	10,389.4
Pipeline	0.4	1.0	2.3	68.3	73.4	144.2	301.8	296.1
Other[a]	3,238.9	2,025.8	2,540.1	2,860.5	3,470.0	3,349.6	3,972.0	4,017.7
Mail[b]	5.5	26.8	–	0.1	0.1	0.7	R–	0.1
Total	**46,503.3**	**42,662.2**	**51,753.4**	**64,169.5**	**70,164.4**	**76,129.0**	**97,158.9**	**88,926.4**
Imports from Canada								
Truck	79,456.4	88,964.9	98,400.8	99,814.8	108,856.7	118,901.4	127,816.3	117,129.9
Rail	30,322.8	39,996.9	39,811.0	38,293.0	37,374.1	46,255.4	49,699.2	47,197.9
Pipeline	9,728.6	10,606.6	12,796.2	13,879.5	11,120.1	12,055.5	23,117.1	25,908.5
Other[a]	3,991.6	3,888.2	4,968.4	3,572.5	4,575.1	6,386.9	9,571.0	10,523.8
Mail	5.5	5.2	6.9	0.4	1.7	13.1	4.1	7.2
FTZ[c]	U	207.6	223.4	122.4	177.9	111.2	62.8	86.1
Total	**123,504.9**	**R143,669.5**	**R156,206.6**	**155,682.6**	**162,105.7**	**183,723.5**	**210,270.5**	**200,853.4**
Imports from Mexico								
Truck	35,013.9	43,014.3	48,350.0	56,716.5	65,883.7	76,448.0	88,668.7	86,377.2
Rail	7,769.0	9,137.9	12,297.7	12,646.9	12,029.7	14,693.4	21,056.1	22,056.8
Pipeline	187.9	27.4	8.1	3.6	2.4	1.5	11.5	1.6
Other[a]	643.5	768.9	639.2	668.2	917.8	1,255.8	1,573.9	1,539.7
Mail	1.9	1.3	1.5	0.2	0.2	0.2	0.6	0.1
FTZ[c]	U	1,099.2	2,015.6	2,119.6	2,886.7	2,624.4	2,125.7	1,894.9
Total	**43,616.2**	**R54,048.9**	**R63,312.2**	**72,155.0**	**81,720.3**	**95,023.4**	**113,436.5**	**111,870.3**

KEY: – = value too small to report; FTZ = foreign trade zone; R = revised; U = data are not available.

[a] 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.

[b] Beginning in January 1996, new edit checks were added to the processing of the Transborder Surface Freight Data. Because of these checks, the number of mail export shipments from the United States to Mexico declined sharply between 1995 and 1996. The Census Bureau found that a number of rail shipments were misidentified as mail shipments in 1994 and 1995, although the exact proportion of these is unknown.

[c] Foreign Trade Zones (FTZs) were added as a mode of transport for land import shipments beginning in April 1995. Although FTZs are being 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.

TABLE 1-53: Value of U.S. Land Exports to and Imports from Canada and Mexico by Mode ($ millions) (Continued)

NOTES

Shipments that neither originate nor terminate in the United States (i.e., in transit, in-bond shipments) are not included here, although they use the U.S. transportation system. These shipments are usually part of Mexico-Canada trade, and simply pass through the United States. Transshipments, however, are included between 1994, 1995, and 1996; these are shipments that entered or exited the United States by way of a Customs port on the northern or southern border, but whose origin or destination was a country other than Canada or Mexico. Starting in 1997, transshipments are excluded. Users should note these differences before comparing figures for 1994-96 with 1997 and subsequent year data. Data exclude export shipments valued at less than $2,500 and import shipments valued at less than $1,250.

Numbers may not add to totals due to rounding.

SOURCE

U.S. Department of Transportation, Bureau of Transportation Statistics, Transborder Surface Freight Data, Internet site www.bts.gov/transborder, 2002.

TABLE 1-54: Crude Oil and Petroleum Products Transported in the United States by Mode

	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Crude oil										
Ton-miles (billions)										
Pipelines[a]	288.0	362.6	334.4	334.8	335.9	338.3	337.4	334.1	321.1	283.4
Water carriers	40.6	c387.4	449.2	291.2	247.7	202.4	147.3	117.9	100.0	91.0
Motor carriers[b]	1.4	2.5	1.8	1.5	1.7	1.7	1.7	1.6	1.4	1.2
Railroads	1.5	0.5	0.8	0.7	0.8	0.8	0.5	0.5	0.5	0.4
Total	**331.5**	**753.0**	**786.2**	**628.2**	**586.0**	**543.2**	**486.9**	**454.1**	**423.0**	**376.0**
Percent of total										
Pipelines[a]	86.9	48.2	42.5	53.3	57.3	62.3	69.3	73.6	75.9	75.4
Water carriers	12.2	51.4	57.2	46.4	42.3	37.3	30.3	26.0	23.6	24.2
Motor carriers[b]	0.4	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3
Railroads	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Refined petroleum products										
Ton-miles (billions)										
Pipelines[a]	219.0	225.6	229.9	249.3	265.2	280.9	279.1	285.7	296.6	293.9
Water carriers	257.4	230.4	141.2	157.8	153.2	154.1	148.3	147.1	147.5	153.4
Motor carriers[b]	26.2	24.3	26.9	28.2	24.6	28.0	26.0	26.7	27.6	30.1
Railroads	12.6	12.0	11.3	13.3	15.9	16.0	16.2	16.2	18.2	19.9
Total	**515.2**	**492.3**	**409.3**	**448.6**	**458.9**	**479.0**	**469.6**	**475.7**	**489.9**	**497.3**
Percent of total										
Pipelines[a]	R42.5	R45.8	R56.2	R55.6	R57.8	R58.6	R59.4	R60.1	60.5	59.1
Water carriers	R50.0	R46.8	R34.5	R35.2	R33.4	R32.2	R31.6	R30.9	30.1	30.8
Motor carriers[b]	R5.1	5.0	R6.6	R6.3	5.3	5.9	R5.5	R5.6	5.6	6.1
Railroads	R2.4	R2.4	2.7	R2.9	R3.5	R3.3	3.5	3.4	3.7	4.0
Combined crude and petroleum products										
Ton-miles (billions)										
Pipelines[a]	507.0	588.2	564.3	584.1	601.1	619.2	616.5	619.8	617.7	577.3
Water carriers	298.0	c617.8	590.4	449.0	400.9	356.5	295.6	265.0	247.5	244.4
Motor carriers[b]	27.6	26.8	28.7	29.7	26.3	29.7	27.7	28.3	29.0	31.3
Railroads	14.1	12.5	12.1	14.0	16.6	16.8	16.7	16.7	18.7	20.3
Total	**846.7**	**1,245.3**	**1,195.5**	**1,076.8**	**1,044.9**	**1,022.2**	**956.5**	**929.8**	**912.9**	**873.3**
Percent of total										
Pipelines[a]	59.9	47.2	47.2	54.2	57.5	60.6	64.5	66.7	67.7	66.1
Water carriers	35.2	49.6	49.4	41.7	38.4	34.9	30.9	28.5	27.1	28.0
Motor carriers[b]	3.3	2.2	2.4	2.8	2.5	2.9	2.9	3.0	3.2	3.6
Railroads	1.7	1.0	1.0	1.3	1.6	1.6	1.8	1.8	2.1	2.3

KEY: R = revised.

[a] The amount carried by pipeline is based on ton-miles of crude and petroleum products transported through federally regulated pipelines (84%), plus estimated ton-miles of crude and petroleum products transported through nonfederally regulated pipelines (16%).

[b] The amount carried by motor carriers is estimated.

[c] Reflects the entrance between 1975 and 1980 of the Alaska pipeline, moving crude petroleum for water transportation to U.S. refineries.

SOURCES
1975: Association of Oil Pipe Lines, *Shifts in Petroleum Transportation* (Washington, DC), table 6.
1980-2000: Ibid., (Annual issues), tables 1, 2, and 3.

TABLE 1-55: U.S. Hazardous Materials Shipments by Transportation Mode, 1997

	Value		Tons		Ton-mile Value	
Transportation mode	**($ million)**	**Percent**	**(thousands)**	**Percent**	**(millions)**	**Percent**
Single modes, total	**452.7**	**97.1**	**1,541.7**	**98.5**	**258.9**	**98.1**
Truck[a]	298.2	63.9	869.8	55.6	74.9	28.4
For-hire	134.3	28.8	336.4	21.5	45.2	17.1
Private[b]	160.7	34.5	522.7	33.4	28.8	10.9
Rail	33.3	7.1	96.6	6.2	74.7	28.3
Water	27.0	5.8	143.2	9.1	68.2	25.9
Air	8.6	1.8	0.1	—	0.1	—
Pipeline[c]	85.7	18.4	432.1	27.6	S	S
Multiple modes, total	**5.7**	**1.2**	**6.0**	**0.4**	**3.1**	**1.2**
Parcel, U.S. Postal Service or Courier	2.9	0.6	0.1	—	0.1	—
Other	2.9	0.6	5.9	0.4	3.0	1.1
Unknown and other modes, total	**7.9**	**1.7**	**17.5**	**1.1**	**1.8**	**0.7**
TOTAL all modes	**466.4**	**100.0**	**1,565.2**	**100.0**	**263.8**	**100.0**

KEY: — = less than 1 unit of measure or equal to zero; S = data are not published because of high sampling variability or other reasons.

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

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

[c] Excludes most shipments of crude oil. See previous table for the estimated amount of crude oil and petroleum products transported in the United States.

NOTE
Numbers and percents may not add to totals due to rounding.

SOURCE
U.S. Department of Transportation, Bureau of Transportation Statistics, U.S. Department of Commerce, Census Bureau, *1997 Economic Census, Transportation, 1997 Commodity Flow Survey, Hazardous Materials* (Washington, DC: December 1999), table 1.

TABLE 1-56: U.S. Hazardous Materials Shipments by Hazard Class, 1997

Hazard class and description	Value		Tons		Ton-miles		Average miles per shipment
	($ billion)	Percent	(thousands)	Percent	(millions)	Percent	
Class 1. Explosives	4.3	0.9	1.5	0.1	S	S	549
Class 2. Gases	40.9	8.8	115.0	7.3	21.8	8.3	66
Class 3. Flammable liquids	335.6	72.0	1,264.3	80.8	160.0	60.6	73
Class 4. Flammable solids	3.9	0.8	11.8	0.8	9.6	3.6	838
Class 5. Oxidizers and organic peroxides	4.5	1.0	9.2	0.6	4.5	1.7	193
Class 6. Toxics (poison)	10.1	2.2	6.4	0.4	2.8	1.1	402
Class 7. Radioactive materials	2.7	0.6	0.9	0.1	RZ	RZ	445
Class 8. Corrosive materials	40.4	8.7	91.6	5.9	41.2	15.6	201
Class 9. Miscellaneous dangerous goods	23.9	5.1	65.3	4.2	22.7	8.6	323
Total	**466.4**	**100.0**	**1,565.2**	**100.0**	**263.8**	**100.0**	**113**

KEY: RZ = less than 1 unit of measure or rounds to zero; S = data were not published because of high sampling variability or other reasons.

NOTE
Numbers and percents may not add to totals due to rounding.

SOURCE
U.S. Department of Transportation, Bureau of Transportation Statistics and U.S. Department of Commerce, Census Bureau, *1997 Economic Census, Transportation, 1997 Commodity Flow Survey, Hazardous Materials* (Washington, DC: December 1999), table 2.

TABLE 1-57: Worldwide Commercial Space Launches

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	TOTAL 1990-2001
TOTAL space launches	**R15**	**12**	**14**	**R11**	**R15**	**R23**	**R24**	**R38**	**R41**	**R39**	**35**	**16**	**283**
United States													
Athena	0	0	0	0	0	1	0	R1	R1	3	0	0	6
Atlas	R1	2	3	R3	R4	R8	R7	6	R5	R4	3	1	47
Conestoga	0	0	0	0	0	1	0	0	0	0	0	0	1
Delta	R5	4	3	1	1	1	R3	7	11	5	2	1	44
Pegasus	0	0	0	1	0	R1	R1	3	R4	R2	2	0	14
Taurus	0	0	0	0	0	0	0	0	R1	1	0	1	3
Titan	3	0	0	0	0	0	0	0	0	0	0	0	3
Total	**R9**	**6**	**6**	**R5**	**R5**	**R12**	**R11**	**R17**	**R22**	**R15**	**7**	**3**	**118**
Europe													
Ariane 4	5	6	6	6	8	8	9	11	9	8	8	6	90
Ariane 5	0	0	0	0	0	0	0	0	0	0	4	2	6
Total	**5**	**6**	**6**	**6**	**8**	**8**	**9**	**11**	**9**	**8**	**12**	**8**	**96**
Russia													
Cosmos	0	0	0	0	0	0	0	0	0	1	2	0	3
Dnepr	0	0	0	0	0	0	0	0	0	1	1	0	2
Proton	0	0	0	0	0	0	2	6	4	5	6	2	25
Shtil	0	0	0	0	0	0	0	0	1	0	0	0	1
Soyuz	0	0	0	0	0	0	0	0	0	6	3	0	9
Start	0	0	0	0	0	0	0	1	0	0	1	1	3
Total	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**7**	**5**	**13**	**13**	**3**	**43**
Ukraine													
Zenit 2	0	0	0	0	0	0	0	0	1	0	0	0	1
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**

TABLE 1-57: Worldwide Commercial Space Launches (Continued)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	TOTAL 1990-2001
China													
Long March 2C	0	0	0	0	0	0	0	1	4	1	0	0	6
Long March 2E	0	0	2	0	1	3	0	0	0	0	0	0	6
Long March 3	1	0	0	0	1	0	1	0	0	0	0	0	3
Long March 3B	0	0	0	0	0	0	1	2	0	0	0	0	3
Total	**1**	**0**	**2**	**0**	**2**	**3**	**2**	**3**	**4**	**1**	**0**	**0**	**18**
Sea Launch[a]													
Zenit 3SL	0	0	0	0	0	0	0	0	0	R2	3	2	7
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**R2**	**3**	**2**	**7**

KEY: R = revised.

[a] Sea Launch is an international venture involving organizations in four countries and uses its own launch facility outside national borders. Their first commercial launch, in 1999, was licensed by the Federal Aviation Administration.

NOTES

A commercial launch is a launch that is internationally competed (i.e., available in principle to international launch providers) or whose primary payload is commercial in nature. FAA-licensed launches carrying captive government (NASA and DOD) or industry payloads (ORBCOMM, Delta 3 demosat, Zenit 3SL demosat, and others) are counted here.

Data are for orbital launches only.

SOURCES

1990–99: U.S. Department of Transportation, Federal Aviation Administration, Associate Administrator for Commercial Space Transportation, personal communication, June 4, 2002.

2000-2001: U.S. Department of Transportation, Federal Aviation Administration, *Commercial Space Transportation: 2001 Year in Review* (Washington, DC: January 2002), Internet site http://ast.faa.gov/launch_info/ as of June 4, 2002.

Section E
Physical Performance

TABLE 1-58: Passengers Denied Boarding by the Largest U.S. Air Carriers[a] (Thousands)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Boarded	420,696	429,190	445,271	449,184	457,286	460,277	480,555	502,960	514,170	523,081	543,344	498,304
Denied boarding[b]												
Voluntary	561	599	718	632	771	794	899	1,018	R1,091	1,024	1,062	899
Involuntary	67	47	46	51	53	49	58	54	45	46	57	43
Total	**628**	**646**	**764**	**683**	**824**	**843**	**957**	**1,071**	**R1,136**	**1,070**	**1,120**	**942**
Percent denied boarding	0.15	0.15	0.17	0.15	0.18	0.18	0.20	0.21	0.22	0.20	0.21	0.19

KEY: R = revised.

[a] Data are for nonstop scheduled service flights between points within the United States (including territories) by the 10 largest U.S. air carriers (i.e., those with at least 1% of total domestic scheduled-service passenger revenues: Alaska, America West, American, Continental, Delta, Northwest, Southwest, TWA, United, and US Airways). Before 1994, carriers included both majors and national airlines (i.e., airlines with over $100 million in revenue).

[b] Number of passengers who hold confirmed reservations and are denied boarding ("bumped") from a flight because it is oversold. These figures include only passengers whose oversold flight departs without them; they do not include passengers affected by canceled, delayed, or diverted flights.

SOURCE
U.S. Department of Transportation, Office of the Secretary, *Air Travel Consumer Report* (Washington, DC: Annual April issues).

TABLE 1-59: Mishandled-Baggage Reports Filed by Passengers with the Largest U.S. Air Carriers[a]

	1990[b]	1995	1996	1997	1998	1999	2000	2001
Total mishandled-baggage reports (millions)	2.66	2.28	2.46	2.28	2.48	2.54	2.74	2.22
Enplaned passengers (domestic) (millions)	395.70	439.80	464.00	459.83	481.70	499.10	517.40	488.40
Reports per 1,000 passengers	6.73	5.18	5.30	4.96	5.16	5.08	5.29	4.55

[a] Data include nonstop scheduled service between points within the United States (including territories) by the 10 largest U.S. air carriers (i.e., those with at least 1% of the total domestic scheduled service passenger revenues: Alaska, America West, American, Continental, Delta, Northwest, Southwest, TWA, United, and US Airways).

[b] Includes Pan Am.

NOTES
Domestic system only.
Based on passenger reports of mishandled baggage, including those that did not subsequently result in claims for compensation.

SOURCE
U.S. Department of Transportation, Office of the Secretary, *Air Travel Consumer Report* (Washington, DC: Annual February compilations).

TABLE 1-60: Flight Operations Arriving On Time by the Largest U.S. Air Carriers[a] (Percent)

	1990[b]	1995	1996	1997	1998	1999	2000	2001
On-time flight operations	79.4	78.6	74.5	77.7	77.2	76.1	72.6	77.4

[a] Data include nonstop scheduled service between points within the United States (including territories) by the 10 largest U.S. air carriers (i.e., those with at least 1% of the total domestic scheduled service passenger revenues: Alaska, America West, American, Continental, Delta, Northwest, Southwest, TWA, United, and US Airways).

[b] Includes Pan Am.

NOTES
A flight is considered on time if it arrived less than 15 minutes after the scheduled time shown in the carriers' Computerized Reservations Systems. Canceled and diverted operations are counted as late.

SOURCE
U.S. Department of Transportation, Office of the Secretary, *Air Travel Consumer Report* (Washington, DC: Annual February compilations), table 1a, 12-month column.

TABLE 1-61: FAA-Cited Causes of Departure and En Route Delays (After pushing back from the gate)

	1987	1988	1989	1990	1995	1996	1997	1998	1999	[b]2000
Operations delayed (thousands)	356	338	394	393	237	272	245	306	374	450
Cause (percent)										
Weather	67	70	57	56	72	74	68	74	69	69
Airport terminal volume	11	9	29	35	18	18	22	15	12	14
Air Route Traffic Control Center volume	13	12	8	2	[a]	[a]	[a]	[a]	[a]	[a]
Closed runways / taxiways	4	5	3	3	3	3	3	3	5	6
National Airspace System equipment	4	3	2	1	3	2	3	2	2	2
Other	1	1	1	4	4	2	4	6	13	9

KEY: ARTCC = Air Route Traffic Control Center; FAA = Federal Aviation Administration.

[a] Delays due to ARTCC volume are included in delays due to terminal volume from 1991.

[b] Data are preliminary and subject to change.

NOTE
Percentages may not add to 100 due to rounding.

SOURCES
1987-97: U.S. Department of Transportation, Federal Aviation Administration, *Aviation Capacity Enhancement Plan* (Washington, DC: Annual issues).
1998-2000: U.S. Department of Transportation, Federal Aviation Administration, Internet site www.faa.gov/apa/Delays/atDelays.htm as of Aug. 8, 2002.

TABLE 1-62: Major U.S. Air Carrier Delays, Cancellations, and Diversions

	1990	1995	1996	1997	1998	1999	R2000	2001
Total operations	**5,270,893**	**5,327,435**	**5,351,983**	**5,411,843**	**5,384,721**	**5,527,884**	**5,683,047**	**5,967,780**
Late departures	753,182	919,839	1,102,484	944,633	1,014,904	1,091,584	1,319,153	1,180,673
Late arrivals	1,087,774	1,141,647	1,362,702	1,193,678	1,227,741	1,320,591	1,557,784	1,343,608
Cancellations	52,458	91,905	128,536	97,763	144,509	154,311	187,490	231,198
Diversions	15,954	10,492	14,121	12,081	13,161	13,555	14,254	12,909

KEY: R = revised.

NOTES

Late departures and arrivals are strongly seasonal and are affected by weather and heavy demand in winter and summer months. The term "late" is defined as 15 minutes after the scheduled departure or arrival time. Major air carriers are the 10 largest U.S. air carriers. A canceled flight is one that was not operated, but was listed in a carrier's computer reservation system within seven calendar days of the scheduled departure. A diverted flight is one that left from the scheduled departure airport but flew to a destination point other than the scheduled destination point.

SOURCE

U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, Airline Service Quality Performance data.

TABLE 1-63: Annual Person-Hours of Highway Traffic Delay Per Person

Population group	Urban area	1982	1985	1990	1995	1996	1997	1998	1999	2000	Percent change[a] Short-term 1994-2000 Percent	Short-term 1994-2000 Rank	Long-term 1982-2000 Percent	Long-term 1982-2000 Rank
Medium	Albany-Schenectady-Troy, NY	1	R1	R4	R4	R4	R4	R5	R6	6	50	32	500	29
Medium	Albuquerque, NM	R2	R5	R8	R17	R21	R23	R25	R26	21	40	42	950	5
Small	Anchorage, AK	2	3	3	2	2	2	2	2	2	0	69	0	74
Large	Atlanta, GA	R6	R10	R11	R26	R30	R31	R33	R29	33	43	39	450	33
Medium	Austin, TX	R4	R8	R9	R18	R21	R25	R21	R26	28	100	10	600	21
Small	Bakersfield, CA	1	1	R2	R3	R3	R3	R3	R3	4	100	10	300	45
Large	Baltimore, MD	R4	R6	R15	R17	R18	R19	R18	R18	20	25	58	400	38
Small	Beaumont, TX	R2	R3	R3	R3	R3	R4	R6	R6	6	100	10	200	60
Medium	Birmingham, AL	3	4	5	10	11	11	13	13	14	75	19	367	43
Very large	Boston, MA	R9	R12	R18	R23	R23	R25	R25	R27	28	22	59	211	59
Small	Boulder, CO	1	2	2	R3	R3	R4	R4	R4	5	67	23	400	38
Small	Brownsville, TX	1	1	R1	2	2	2	R2	R2	3	50	32	200	60
Large	Buffalo-Niagara Falls, NY	R1	R1	R2	R2	R2	R3	R3	R4	5	150	6	400	38
Small	Charleston, SC	5	6	10	9	9	10	11	12	12	33	51	140	68
Medium	Charlotte, NC	R4	R7	R11	R12	R14	R17	R18	R19	22	83	17	450	33
Very large	Chicago, IL-Northwestern, IN	R7	R11	R18	R21	R28	R26	R28	R28	27	50	32	286	48
Large	Cincinnati, OH-KY	R2	R3	R7	R12	R14	R17	R17	R18	20	67	23	900	6
Large	Cleveland, OH	R1	R1	R3	R9	R10	R12	R9	R9	8	33	51	700	17
Small	Colorado Springs, CO	1	R2	R2	R6	R6	R8	R10	R12	13	225	3	1,200	3
Large	Columbus, OH	R2	R2	R8	R15	R17	R19	R19	R20	17	21	60	750	16
Small	Corpus Christi, TX	R2	R2	R2	R2	R2	R2	R2	R3	3	50	32	50	73
Very large	Dallas -Fort Worth, TX	R6	R13	R18	R26	R25	R24	R29	R40	37	61	29	517	28
Large	Denver, CO	R7	R8	R12	R23	R26	R29	R32	R32	35	84	16	400	38
Very large	Detroit, MI	R7	R7	R20	R26	R26	R27	R27	R26	25	-11	73	257	54
Medium	El Paso, TX-NM	R1	R1	R2	R5	R4	R5	R5	R8	10	100	10	900	6
Small	Eugene-Springfield, OR	1	R1	2	R3	R3	R3	R4	R5	7	250	2	600	21
Small	Fort Myers - Cape Coral, FL	1	2	3	6	6	7	7	7	7	40	42	600	21
Medium	Fresno, CA	R3	R3	R7	R5	R6	R7	R8	R10	11	120	8	267	51
Large	Fort Lauderdale-Hollywood-Pompano Beach, FL	R3	R4	R8	R14	R16	R18	R18	R23	28	133	7	833	12
Medium	Hartford-Middletown, CT	R3	R6	R7	R5	R6	R7	R8	R9	11	120	8	267	51
Medium	Honolulu, HI	R5	R7	R15	R15	R15	R13	R14	R15	11	-27	75	120	70

TABLE 1-63: Annual Person-Hours of Highway Traffic Delay Per Person (Continued)

Population group	Urban area	1982	1985	1990	1995	1996	1997	1998	1999	2000	Percent change[a] Short-term 1994-2000 Percent	Short-term 1994-2000 Rank	Long-term 1982-2000 Percent	Long-term 1982-2000 Rank
Very large	Houston, TX	R19	R33	R24	R27	R30	R36	R34	R40	36	33	51	89	71
Large	Indianapolis, IN	R2	R2	R4	R19	R22	R24	R19	R19	20	18	64	900	6
Medium	Jacksonville, FL	R3	R4	R9	R18	R17	R18	R15	R15	15	7	68	400	38
Large	Kansas City, MO-KS	R1	R2	R3	R6	R8	R8	R9	R11	9	29	56	800	13
Small	Laredo, TX	1	1	1	R2	R2	R3	R3	R3	3	200	4	200	60
Large	Las Vegas, NV	R3	R5	R12	R13	R14	R16	R16	R17	18	38	45	500	29
Very large	Los Angeles, CA	R22	R27	R63	R55	R61	R59	R63	R62	62	19	62	182	64
Medium	Louisville, KY-IN	R4	R5	R5	R13	R17	R19	R20	R21	21	50	32	425	37
Medium	Memphis, TN-AR-MS	R1	R2	R5	R11	R11	R13	R14	R14	16	78	18	1,500	2
Large	Miami-Hialeah, FL	R9	R11	R21	R27	R27	R30	R28	R29	33	14	67	267	51
Large	Milwaukee, WI	R2	R3	R5	R11	R12	R12	R13	R14	15	67	23	650	19
Large	Minneapolis-St. Paul, MN	R1	R4	R8	R16	R17	R23	R23	R27	26	73	20	2,500	1
Medium	Nashville, TN	R6	R7	R9	R14	R15	R18	R16	R19	20	67	23	233	57
Large	New Orleans, LA	R4	R5	R6	R11	R11	R11	R11	R11	10	-17	74	150	66
Very large	New York, NY-Northeastern, NJ	R6	R7	R18	R18	R19	R21	R22	R23	23	44	38	283	49
Large	Norfolk - Newport News-Virginia Beach, VA	R5	R7	R9	R11	R12	R12	R14	R15	12	20	61	40	68
Large	Oklahoma City, OK	R1	R2	R2	R4	R5	R6	R6	R7	6	100	10	500	29
Medium	Omaha, NE-IA	R2	R3	R5	R8	R9	R10	R10	R11	11	38	46	450	33
Large	Orlando, FL	R5	R9	R11	R19	R21	R24	R27	R26	31	63	28	520	27
Small	Pensacola, FL	1	2	6	8	8	9	9	10	11	38	46	1,000	4
Very large	Philadelphia, PA-NJ	R5	R6	R9	R12	R13	R13	R15	R16	15	36	50	200	60
Large	Phoenix, AZ	R7	R8	R14	R16	R20	R23	R20	R26	28	56	31	300	45
Large	Pittsburgh, PA	R4	R5	R7	R8	R7	R8	R8	R9	7	17	66	75	72
Large	Portland-Vancouver, OR-WA	R3	R3	R8	R18	R19	R19	R20	R21	23	64	27	667	18
Medium	Providence-Pawtucket, RI-MA	R2	R4	R8	R11	R14	R11	R14	R17	19	90	15	850	11
Medium	Richmond, VA	1	2	4	10	10	10	12	12	10	43	40	900	6
Medium	Rochester, NY	R0	R1	R2	R3	R3	R3	R3	R4	3	50	32	NM	75
Large	Sacramento, CA	R5	R7	R14	R14	R17	R15	R15	R16	19	19	63	280	50
Small	Salem, OR	1	1	R3	R4	R6	R6	R7	R6	7	40	42	600	21
Medium	Salt Lake City, UT	R1	R2	R4	R10	R8	R7	R8	R8	9	0	69	800	13

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TABLE 1-63: Annual Person-Hours of Highway Traffic Delay Per Person (Continued)

Population group	Urban area	1982	1985	1990	1995	1996	1997	1998	1999	2000	Percent change[a] Short-term 1994-2000 Percent	Short-term 1994-2000 Rank	Long-term 1982-2000 Percent	Long-term 1982-2000 Rank
Large	San Antonio, TX	R3	R7	R6	R10	R10	R10	R13	R18	20	300	1	567	26
Large	San Bernardino-Riverside, CA	R4	R7	R19	R20	R22	R23	R27	R26	30	58	30	650	19
Large	San Diego, CA	R4	R7	R17	R14	R15	R18	R17	R21	24	71	21	500	29
Very large	San Francisco-Oakland, CA	R12	R24	R37	R30	R31	R28	R32	R34	41	71	22	242	56
Large	San Jose, CA	R10	R21	R43	R26	R25	R23	R26	R31	33	38	46	230	58
Large	Seattle-Everett, WA	R8	R14	R24	R30	R34	R36	R35	R37	34	17	65	325	44
Small	Spokane, WA	2	3	R3	R4	R4	R5	R5	R5	5	0	69	150	66
Large	St. Louis, MO-IL	R5	R7	R9	R16	R16	R18	R18	R19	20	33	51	300	45
Medium	Tacoma, WA	R2	R3	R9	R11	R11	R12	R12	R15	14	27	57	600	21
Large	Tampa-St. Petersburg-Clearwater, FL	R8	R9	R14	R23	R22	R21	R21	R22	21	-9	72	163	65
Medium	Tucson, AZ	R2	R2	R5	R8	R8	R11	R12	R12	11	38	46	450	33
Medium	Tulsa, OK	1	2	3	3	4	5	6	6	9	200	4	800	13
Large	West Palm Beach - Boca Raton-Delray Beach, FL	2	2	7	14	16	15	18	20	20	43	40	900	6
Very large	Washington, DC-MD-VA	R10	R14	R22	R29	R32	R31	R36	R37	35	30	55	250	55
	75 Area Average	R7	R10	R19	R21	R23	R24	R25	R26	27	36		278	
	Very Large Area Average	R10	R14	R28	R28	R31	R31	R33	R35	35	32		237	
	Large Area Average	R4	R6	R12	R16	R18	R19	R20	R21	22	44		423	
	Medium Area Average	R2	R4	R6	R11	R11	R12	R12	R14	14	55		469	
	Small Area Average	2	2	4	R4	R5	R5	R6	R6	7	62		289	

KEY: NM = not meaningful; R = revised. Very large urban areas – over 3 million population. Large urban areas – over 1 million and less than 3 million population. Medium urban areas – over 500,000 and less than 1 million population. Small urban areas – less than 500,000 population.

[a] Percent change was calculated using the numbers in this table and were not obtained from the source mentioned below. Rank is based on the calculated percent change with the highest number corresponding to a rank of 1.

NOTE
The cities shown represent the 50 largest metropolitan areas, as well as others chosen by the states sponsoring the Texas Transportation Institute study on mobility.

SOURCE
1982 - 2000: Texas Transportation Institute, *The 2002 Annual Urban Mobility Report* (College Station, TX: 2002) from Internet site http://mobility.tamu.edu as of Aug. 1, 2002.

TABLE 1-64: Roadway Congestion Index

Population group	Urban area	1982	1985	1990	1995	1996	1997	1998	1999	2000	Percent change[a] Short-term 1994-2000 Percent	Short-term 1994-2000 Rank	Long-term 1982-2000 Percent	Long-term 1982-2000 Rank
Medium	Albany-Schenectady-Troy, NY	0.46	0.51	0.68	0.72	0.74	0.75	0.75	0.77	0.78	7	24	32	42
Medium	Albuquerque, NM	0.62	0.69	0.85	R1.00	R1.05	R1.06	R1.08	R1.08	1.09	12	44	47	66
Small	Anchorage, AK	0.58	0.63	0.62	0.60	0.59	0.59	0.62	0.61	0.62	1	6	4	2
Large	Atlanta, GA	0.77	0.93	0.98	1.13	1.17	1.24	1.28	1.27	1.32	19	67	55	73
Medium	Austin, TX	0.73	0.81	0.90	0.94	0.97	R1.01	R1.03	R1.07	1.11	21	71	38	56
Small	Bakersfield, CA	0.54	0.56	0.64	0.72	0.74	0.75	0.76	R0.78	0.76	5	13	22	18
Large	Baltimore, MD	0.75	0.80	0.95	1.03	1.03	1.05	1.06	1.07	1.10	10	35	35	47
Small	Beaumont, TX	R0.65	0.72	0.74	0.80	0.84	0.85	0.85	0.86	0.84	6	17	19	17
Medium	Birmingham, AL	0.69	0.70	0.78	0.87	0.90	0.93	0.96	0.98	0.99	14	51	30	35
Very large	Boston, MA	0.88	0.98	1.09	1.21	1.22	1.25	1.27	1.28	1.30	11	41	42	62
Small	Boulder, CO	0.55	0.59	0.65	0.74	0.76	0.81	0.83	0.83	0.81	9	31	26	23
Small	Brownsville, TX	0.54	0.54	0.62	0.70	0.71	0.73	0.76	0.75	0.78	9	31	24	21
Large	Buffalo-Niagara Falls, NY	0.53	0.55	0.60	0.67	0.66	0.68	0.70	0.72	0.76	8	26	23	20
Small	Charleston, SC	0.85	0.88	0.96	0.93	0.92	0.93	0.97	0.98	0.98	3	9	13	8
Medium	Charlotte, NC	0.86	1.02	1.05	0.95	1.01	1.07	1.09	1.14	1.15	21	71	29	30
Very large	Chicago, IL-Northwestern, IN	0.95	1.02	1.18	1.22	1.27	1.27	1.31	1.31	1.31	14	51	36	48
Large	Cincinnati, OH-KY	0.70	0.78	0.92	1.00	1.04	1.09	1.11	1.12	1.13	13	48	43	63
Large	Cleveland, OH	0.68	0.65	0.83	0.92	0.94	0.96	0.98	R0.98	0.97	6	17	29	30
Small	Colorado Springs, CO	0.50	0.60	0.62	0.73	0.76	0.81	0.83	0.85	0.86	18	65	36	48
Large	Columbus, OH	0.63	0.68	R0.85	R0.97	1.00	R1.02	R1.04	R1.04	1.02	8	26	39	57
Small	Corpus Christi, TX	0.57	0.65	0.67	0.64	0.66	0.70	0.70	0.71	0.70	6	17	13	8
Very large	Dallas -Fort Worth, TX	R0.73	R0.86	R0.96	R0.96	R0.98	R1.01	R1.07	R1.07	1.10	14	51	37	54
Large	Denver, CO	0.82	0.86	0.92	1.07	1.12	1.14	1.18	1.20	1.23	21	71	41	60
Very large	Detroit, MI	0.89	0.91	1.08	1.16	1.18	1.18	1.18	1.20	1.22	7	24	33	45
Medium	El Paso, TX-NM	0.62	0.70	0.73	0.85	0.84	0.86	0.91	0.94	0.98	13	48	36	48
Small	Eugene-Springfield, OR	0.53	0.58	0.68	0.78	0.82	0.84	0.87	0.91	0.94	19	67	41	60
Large	Fort Lauderdale-Hollywood-Pompano Beach, FL	0.69	0.75	0.90	1.05	1.07	1.12	1.12	1.17	1.23	20	70	54	71
Small	Fort Myers - Cape Coral, FL	0.83	0.87	0.95	0.90	0.92	0.94	0.94	0.95	0.96	6	17	13	8
Medium	Fresno, CA	0.67	0.65	R0.86	0.87	0.89	0.92	0.96	R0.98	0.99	14	51	32	42
Medium	Hartford-Middletown, CT	0.61	0.74	R0.82	0.86	0.87	0.90	0.91	0.94	0.97	12	44	36	48
Medium	Honolulu, HI	0.79	0.84	1.03	R1.08	1.07	1.06	1.06	1.06	1.04	-3	1	25	22
Very large	Houston, TX	1.03	1.11	R1.04	1.00	R1.02	R1.05	R1.08	R1.08	1.09	9	31	6	4
Large	Indianapolis, IN	0.64	0.69	0.83	R1.12	R1.13	R1.16	R1.14	R1.13	1.13	8	26	49	68

TABLE 1-64: Roadway Congestion Index (Continued)

Population group	Urban area	1982	1985	1990	1995	1996	1997	1998	1999	2000	Percent change[a] Short-term 1994-2000 Percent	Short-term 1994-2000 Rank	Long-term 1982-2000 Percent	Long-term 1982-2000 Rank
Medium	Jacksonville, FL	0.75	0.81	0.94	1.04	1.02	1.01	1.01	1.00	1.02	0	5	27	24
Large	Kansas City, MO-KS	0.50	0.58	0.63	0.72	0.75	0.76	0.77	0.79	0.81	11	41	31	37
Small	Laredo, TX	0.55	0.56	0.56	0.53	0.56	0.60	0.63	0.61	0.56	2	8	1	1
Large	Las Vegas, NV	0.69	0.78	R1.06	1.12	1.12	1.11	1.13	1.18	1.23	10	35	54	71
Very large	Los Angeles, CA	1.29	1.31	1.59	1.52	1.56	1.54	1.58	1.58	1.59	9	31	30	35
Medium	Louisville, KY-IN	0.78	0.78	0.80	R0.99	R1.01	1.05	1.08	1.09	1.09	12	44	31	37
Medium	Memphis, TN-AR-MS	0.71	0.70	0.88	0.96	0.98	0.98	0.99	0.98	1.00	6	17	29	30
Large	Miami-Hialeah, FL	0.95	0.99	1.20	1.25	1.23	1.23	1.22	1.23	1.28	6	17	33	45
Large	Milwaukee, WI	0.71	0.80	R0.93	0.94	0.99	1.01	1.02	1.05	1.08	17	63	37	54
Large	Minneapolis-St. Paul, MN	0.66	0.76	0.89	1.06	1.08	1.13	1.18	1.20	1.22	18	65	56	74
Medium	Nashville, TN	0.83	R0.82	0.85	0.93	0.93	R0.96	0.97	R0.98	0.98	8	26	15	12
Large	New Orleans, LA	0.92	0.97	0.94	0.99	0.96	0.97	1.00	0.99	0.97	-2	4	5	3
Very large	New York, NY-Northeastern, NJ	0.77	R0.86	0.99	1.04	1.08	1.13	1.14	1.15	1.16	14	51	39	57
Large	Norfolk - Newport News-Virginia Beach, VA	R0.84	R0.89	R0.91	R0.91	R0.94	R0.95	0.96	0.97	0.96	5	13	12	7
Large	Oklahoma City, OK	0.65	0.71	0.73	0.82	0.84	0.85	0.86	0.88	0.87	10	35	22	18
Medium	Omaha, NE-IA	0.62	0.70	0.75	0.81	0.84	0.85	0.87	0.90	0.90	10	35	28	27
Large	Orlando, FL	0.82	0.93	0.95	0.97	1.00	R1.03	1.05	R1.07	1.11	15	59	29	30
Small	Pensacola, FL	0.61	0.69	0.84	0.88	0.86	0.88	0.87	0.88	0.92	5	13	31	37
Very large	Philadelphia, PA-NJ	0.82	0.87	0.94	R1.00	R1.01	R1.05	R1.08	R1.10	1.10	10	35	28	27
Large	Phoenix, AZ	0.95	0.98	1.01	1.08	1.14	1.12	1.16	1.21	1.27	23	74	32	42
Large	Pittsburgh, PA	0.70	0.73	0.75	0.76	0.76	0.76	0.78	0.78	0.77	3	9	7	6
Large	Portland-Vancouver, OR-WA	0.81	0.90	R1.02	1.15	1.20	1.22	1.22	1.24	1.27	15	59	46	65
Medium	Providence-Pawtucket, RI-MA	R0.71	0.83	0.89	0.84	R0.86	0.89	0.93	0.95	0.98	16	61	27	24
Medium	Richmond, VA	0.67	0.73	0.75	0.78	0.80	0.81	0.83	0.83	0.83	4	11	16	13
Medium	Rochester, NY	0.51	0.57	0.69	0.77	0.77	0.76	0.77	0.78	0.80	6	17	29	30
Large	Sacramento, CA	0.76	0.88	1.05	1.12	1.17	1.14	1.18	1.20	1.25	13	48	49	68
Small	Salem, OR	0.56	0.64	0.79	0.77	0.79	0.82	0.86	0.85	0.87	8	26	31	37
Medium	Salt Lake City, UT	0.66	0.71	0.84	1.04	R1.04	1.01	1.01	1.00	0.97	-3	1	31	37
Large	San Antonio, TX	0.69	R0.78	0.74	0.87	0.89	0.92	R0.97	R1.03	1.05	24	75	36	48
Large	San Bernardino-Riverside, CA	0.78	0.90	R1.14	1.16	1.18	1.16	1.20	1.24	1.26	14	51	48	67
Large	San Diego, CA	0.79	0.90	1.19	R1.17	R1.17	R1.18	R1.20	1.25	1.32	16	61	53	70
Very large	San Francisco-Oakland, CA	1.06	1.17	1.35	1.34	1.35	1.36	1.37	1.39	1.45	14	51	39	57

TABLE 1-64: Roadway Congestion Index (Continued)

Population group	Urban area	1982	1985	1990	1995	1996	1997	1998	1999	2000	Percent change[a] Short-term 1994-2000 Percent	Short-term 1994-2000 Rank	Long-term 1982-2000 Percent	Long-term 1982-2000 Rank
Large	San Jose, CA	1.07	1.13	1.24	1.13	1.11	1.11	1.13	1.19	1.34	19	67	27	24
Large	Seattle-Everett, WA	1.07	1.17	1.21	R1.10	R1.12	R1.16	R1.19	R1.22	1.23	14	51	16	13
Small	Spokane, WA	0.66	0.71	0.74	0.76	0.78	0.80	0.81	0.83	0.82	5	13	16	13
Large	St. Louis, MO-IL	0.87	0.94	0.91	1.00	1.01	1.02	R1.02	1.03	1.03	4	11	16	13
Medium	Tacoma, WA	0.75	0.78	0.91	R1.12	R1.13	1.15	1.18	1.19	1.20	10	35	45	64
Large	Tampa-St. Petersburg-Clearwater, FL	R1.07	R1.12	R1.10	R1.16	R1.14	R1.11	R1.11	R1.12	1.13	-3	1	6	4
Medium	Tucson, AZ	R0.78	0.76	0.89	R0.95	0.97	1.00	1.04	1.05	1.06	11	41	28	27
Medium	Tulsa, OK	0.73	0.75	0.76	0.77	0.79	0.80	0.82	0.83	0.87	12	44	14	11
Large	West Palm Beach - Boca Raton-Delray Beach, FL	0.57	0.65	0.84	0.99	1.00	1.02	1.06	1.11	1.15	17	63	58	75
Very large	Washington, DC-MD-VA	0.99	1.13	1.24	1.32	1.32	1.33	1.35	1.34	1.35	1	6	36	48
	75-Area Average	R0.82	R0.89	R1.01	R1.06	R1.08	R1.10	R1.12	R1.14	1.15	11		33	
	Very Large Area Average	R0.95	R1.03	R1.17	R1.19	R1.21	R1.23	R1.25	R1.26	1.28	11		33	
	Large Area Average	R0.76	0.83	R0.93	R1.01	R1.03	1.05	R1.07	1.09	1.12	13		36	
	Medium Area Average	0.68	R0.73	R0.83	R0.90	R0.92	R0.94	R0.95	R0.97	0.98	10		30	
	Small Area Average	R0.61	R0.66	R0.72	R0.75	R0.76	R0.78	R0.80	R0.81	R0.81	7		20	

KEY: R = revised. Very large urban areas – over 3 million population. Large urban areas – over 1 million and less than 3 million population. Medium urban areas – over 500,000 and less than 1 million population. Small urban areas – less than 500,000 population.

[a] Rank is based on the calculated point change with the lowest number corresponding to a rank of 1.

NOTES

The Roadway Congestion Index (RCI) is a measure of vehicle travel density on major roadways in an urban area. An RCI exceeding 1.0 indicates an undesirable congestion level, on an average, on the freeways and principal arterial street systems during the peak period. The cities shown represent the 50 largest metropolitan areas, as well as others chosen by the states sponsoring the Texas Transportation Institute's study on mobility.

SOURCE

1982 - 2000: Texas Transportation Institute, *The 2002 Annual Urban Mobility Report* (College Station, TX: 2002) from Internet site http://mobility.tamu.edu as of Aug. 1, 2002.

TABLE 1-65: Annual Highway Congestion Cost

Population group	Urban area	Annual congestion cost per capita ($)						Annual congestion cost ($ millions)					
		1998 Value	1999 Value	2000 Value	1998 Rank	1999 Rank	2000 Rank	1998 Value	1999 Value	2000 Value	1998 Rank	1999 Rank	2000 Rank
Medium	Albany-Schenectady-Troy, NY	R70	R90	115	65	64	62	35	45	60	63	63	62
Medium	Albuquerque, NM[R]	415	435	380	17	19	32	240	260	225	39	41	45
Small	Anchorage, AK[R]	20	20	20	73	73	74	5	5	5	73	73	72
Large	Atlanta, GA[R]	575	530	635	5	9	8	1,615	1,515	1,885	9	9	9
Medium	Austin, TX[R]	385	470	550	18	14	13	265	330	400	37	35	30
Small	Bakersfield, CA[R]	50	50	60	68	71	70	20	20	25	67	67	67
Large	Baltimore, MD[R]	315	335	395	27	31	25	675	720	860	19	19	19
Small	Beaumont, TX[R]	70	70	105	65	68	65	10	10	15	69	71	70
Medium	Birmingham, AL[R]	235	240	285	42	45	40	155	160	190	48	49	47
Very large	Boston, MA[R]	435	470	525	15	14	14	1,310	1,425	1,595	10	10	10
Small	Boulder, CO[R]	0	0	45	74	74	72	0	0	5	74	74	72
Small	Brownsville, TX[R]	0	0	0	74	74	75	0	0	0	74	74	75
Large	Buffalo-Niagara Falls, NY[R]	50	75	95	68	67	67	55	80	105	60	60	60
Small	Charleston, SC[R]	170	195	220	51	50	47	75	85	100	57	58	61
Medium	Charlotte, NC	R315	R345	410	27	27	23	R195	R215	265	45	46	41
Very large	Chicago, IL-Northwestern, IN	R480	R480	505	9	13	17	R3,855	R3,880	4,095	3	3	3
Large	Cincinnati, OH-KY	R315	R335	395	27	31	25	R400	R430	505	26	26	27
Small	Cleveland, OH[R]	170	175	165	51	55	58	315	330	315	31	35	38
Small	Colorado Springs, CO[R]	175	195	235	50	50	44	75	85	110	57	58	59
Large	Columbus, OH[R]	335	365	330	24	26	37	345	380	345	29	30	34
Small	Corpus Christi, TX[R]	30	50	50	72	71	71	10	15	15	69	70	70
Large	Dallas-Fort Worth, TX[R]	505	705	695	8	2	3	1,830	2,650	2,640	8	4	5
Large	Denver, CO	R540	R560	640	7	8	7	R985	R1,045	1,225	14	17	16
Very large	Detroit, MI	R470	R465	475	13	16	20	R1,880	R1,865	1,905	7	8	8
Medium	El Paso, TX-NM[R]	85	140	185	63	59	55	55	90	120	60	57	57
Small	Eugene-Springfield, OR[R]	45	90	115	70	64	62	10	20	25	69	67	67
Small	Fort Myers-Cape Coral, FL[R]	110	110	105	59	61	65	30	30	30	64	65	65
Large	Fort Lauderdale-Hollywood-Pompano Beach, FL[R]	305	395	520	32	22	16	455	590	810	25	23	20
Medium	Fresno, CA[R]	145	180	215	54	54	49	80	100	120	56	56	57
Medium	Hartford-Middletown, CT[R]	140	190	215	55	52	49	90	120	140	55	54	52
Medium	Honolulu, HI[R]	265	275	225	36	40	46	185	190	155	47	47	50

TABLE 1-65: Annual Highway Congestion Cost (Continued)

Population group	Urban area	Annual congestion cost per capita ($)						Annual congestion cost ($ millions)					
		1998 Value	1999 Value	2000 Value	1998 Rank	1999 Rank	2000 Rank	1998 Value	1999 Value	2000 Value	1998 Rank	1999 Rank	2000 Rank
Very large	Houston, TX	R595	R705	675	4	2	4	R1,905	R2,320	2,285	6	6	7
Large	Indianapolis, IN[R]	335	335	385	24	31	29	340	340	395	30	33	31
Medium	Jacksonville, FL[R]	260	265	285	37	42	40	220	225	245	42	44	42
Large	Kansas City, MO-KS[R]	160	200	175	53	48	56	220	275	245	42	40	42
Small	Laredo, TX	55	R55	25	67	70	73	10	R10	5	69	71	72
Large	Las Vegas, NV[R]	275	310	345	35	36	36	305	355	415	32	31	29
Very large	Los Angeles, CA	R1,070	R1,095	1,155	1	1	1	R13,345	R13,770	14,635	1	1	1
Medium	Louisville, KY-IN[R]	350	395	400	21	22	24	290	330	335	36	35	36
Medium	Memphis, TN-AR-MS	R235	R245	290	42	44	38	R230	R240	285	40	42	39
Large	Miami-Hialeah, FL	R475	R505	600	11	10	10	R990	R1,060	1,365	13	16	11
Large	Milwaukee, WI[R]	230	265	285	44	42	40	300	350	390	33	32	33
Large	Minneapolis - St. Paul, MN	R420	R485	495	16	12	18	R980	R1,130	1,220	15	14	17
Medium	Nashville, TN[R]	285	345	395	33	27	25	190	235	275	46	43	40
Large	New Orleans, LA	R185	R200	195	48	48	52	R205	R220	215	44	45	46
Very large	New York, NY-Northeastern, NJ	R380	R420	450	19	20	21	R6,215	R6,900	7,660	2	2	2
Large	Norfolk-Newport News-Virginia Beach, VA[R]	250	270	230	39	41	45	360	400	345	28	29	34
Large	Oklahoma City, OK[R]	110	140	115	59	59	62	115	145	125	53	50	54
Medium	Omaha, NE-IA[R]	180	190	200	49	52	51	105	115	125	54	55	54
Large	Orlando, FL[R]	465	455	575	14	18	11	520	520	690	24	25	24
Small	Pensacola, FL[R]	135	165	165	56	56	58	40	50	50	62	62	63
Very large	Philadelphia, PA-NJ	R260	R280	290	37	39	38	R1,180	R1,280	1,325	12	12	13
Large	Phoenix, AZ[R]	350	460	525	21	17	14	865	1,185	1,360	16	13	12
Large	Pittsburgh, PA	R135	R155	130	56	58	60	R245	R280	235	38	38	44
Large	Portland-Vancouver, OR-WA[R]	355	390	445	20	24	22	525	580	670	23	24	25
Medium	Providence-Pawtucket, RI-MA	R250	R310	365	39	36	35	R225	R280	335	41	38	36
Medium	Richmond, VA[R]	200	205	195	46	47	52	125	130	125	51	53	54
Medium	Rochester, NY[R]	45	70	75	70	68	69	30	45	50	64	63	63
Large	Sacramento, CA[R]	280	315	385	34	35	29	375	430	540	27	26	26
Small	Salem, OR[R]	105	105	130	61	62	60	20	20	25	67	67	67
Medium	Salt Lake City, UT[R]	135	160	190	56	57	54	120	145	170	52	50	48
Large	San Antonio, TX[R]	245	335	380	41	31	32	300	415	475	33	28	28

Continued next page

TABLE 1-65: Annual Highway Congestion Cost (Continued)

Population group	Urban area	Annual congestion cost per capita ($)						Annual congestion cost ($ millions)					
		1998 Value	1999 Value	2000 Value	1998 Rank	1999 Rank	2000 Rank	1998 Value	1999 Value	2000 Value	1998 Rank	1999 Rank	2000 Rank
Large	San Bernardino-Riverside, CA[R]	480	490	575	9	11	11	670	685	810	20	22	20
Large	San Diego, CA[R]	310	400	480	31	21	19	820	1,080	1,295	17	15	15
Very large	San Francisco-Oakland, CA	[R]570	[R]630	795	6	6	2	[R]2,285	[R]2,535	3,210	4	5	4
Large	San Jose, CA[R]	475	565	635	11	7	8	780	945	1,065	18	18	18
Large	Seattle-Everett, WA	[R]620	[R]675	660	2	4	5	[R]1,225	[R]1,345	1,315	11	11	14
Small	Spokane, WA[R]	75	90	90	64	64	68	25	30	30	66	65	65
Large	St. Louis, MO-IL[R]	325	345	395	26	27	25	645	695	805	22	21	22
Medium	Tacoma, WA	[R]220	[R]290	280	45	38	43	[R]130	[R]175	170	49	48	48
Large	Tampa-St Petersburg-Clearwater, FL[R]	[R]350	[R]375	380	21	25	32	[R]650	[R]715	745	21	20	23
Medium	Tucson, AZ[R]	195	210	220	47	46	47	130	140	150	49	52	51
Medium	Tulsa, OK[R]	100	105	170	62	62	57	75	80	135	57	60	53
Large	W Palm Bch-Boca Raton-Delray Bch, FL[R]	315	345	385	27	27	29	300	340	395	33	33	31
Very large	Washington, DC-MD-VA	[R]620	[R]655	655	2	5	6	[R]2,170	[R]2,320	2,325	5	6	6
	75-Area Average[a,R]	433	471	507				56,055	61,555	67,355			
	Very Large Area Average[a,R]	572	615	648				35,975	38,945	41,675			
	Large Area Average[a,R]	344	380	424				16,580	18,580	21,165			
	Medium Area Average[a,R]	218	248	273				3,170	3,650	4,075			
	Small Area Average[a,R]	90	102	115				330	380	440			

KEY: R = revised. Very large urban areas - over 3 million population. Large urban areas - over 1 million and less than 3 million population. Medium urban areas - over 500,000 and less than 1 million population. Small urban areas - less than 500,000 population.

[a] For the year 2000, data was obtained from table A-9 from the Texas Transportation Institute's *The 2001 Annual Urban Mobility Report* referenced below. For other years, the averages were calculated using data obtained from the web site.

NOTES

The cities shown represent the 50 largest metropolitan areas, as well as others chosen by the states sponsoring the Texas Transportation Institute study on mobility.

The cost of congestion is estimated with a value for each hour of travel time and each gallon of fuel. For a more detailed explanation of the formulas used, see the source document.

The source, for the year 2001, decided to only publish congestion cost per capita, contrary to previous years when the source would publish data for eligible drivers, as well as per capita. To account for this change, the entire table has been updated to reflect the data based on congestion cost per capita.

SOURCE

1998-2000: Texas Transportation Institute, *The 2001 Annual Urban Mobility Report* (College Station, TX: 2001) obtained from Internet site http://mobility.tamu.edu as of Aug. 6, 2002.

TABLE 1-66: Amtrak On-Time Performance Trends and Hours of Delay by Cause

	1980	1985	1990	1995	1996	1997	1998	1999	2000
On-time performance, total % (weighted)	69	81	76	76	71	74	79	79	78
Short distance (<400 miles)	71	82	82	81	76	79	81	80	81
Long distance (>=400 miles)	64	78	53	57	49	53	59	61	56
Hours of delay by cause, total									
Amtrak[a,b]	N	N	3,565	5,527	5,193	5,310	4,796	4,891	20,187
Freight[c]	N	N	4,244	11,224	11,438	12,904	14,202	16,158	33,718
Other[d]	N	N	4,316	8,497	8,425	7,611	8,291	8,203	14,718
Total[e]	**N**	**N**	**12,126**	**25,248**	**25,056**	**25,825**	**27,289**	**29,252**	**68,623**

KEY: N = data do not exist.

[a] Beginning in 2000, the significant increase in hours of delay is the result of including the hours of delay from both Amtrak's Northeast Corridor and operations on contract railroads. The data also reflects the addition of several delay categories. Therefore, pre-2000 data may not be comparable to data from 2000 and subsequent years.

[b] Amtrak delays include equipment malfunctions, train servicing in stations, and passenger-related delays.

[c] Freight delays include maintenance of way/slow orders, freight train interference, and signal delays.

[d] Other delays include passenger train interference, waiting for connections, running time, weather-related delays, and miscellaneous.

[e] Numbers may not add to totals due to rounding.

NOTES: All percentages are based on Amtrak's fiscal year (October 1–September 30).
Amtrak trips are considered delayed based on the following chart:

Trip length (miles)	Delayed departure time (minutes)
0-250	10
251-350	15
351-450	20
451-550	25
≥551	30

SOURCES:
On-time performance:
1980: Amtrak, *National Railroad Passenger Corporation Annual Report* (Washington, DC: 1981).
1985–2000: Ibid., *Amtrak Annual Report*, Statistical Appendix (Washington, DC: Annual issues).

Hours of Delay:
1980: Amtrak, *National Railroad Passenger Corporation Annual Report* (Washington, DC: 1981).
1985–99: Ibid., *Amtrak Annual Report*, Statistical Appendix (Washington, DC: Annual issues).
2000: Amtrak, personal communication, Dec. 4, 2001.

Chapter 2

Transportation Safety

Section A
Multimodal

TABLE 2-1: Transportation Fatalities by Mode

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
TOTAL fatalities	**U**	**U**	**U**	**U**	**U**	**U**	**47,347**	**44,527**	**44,798**	**44,444**	**43,909**	**44,036**	**R44,313**	**U**
Air														
U.S. air carrier[a]	499	261	146	124	1	526	39	168	380	8	1	12	92	531
Commuter carrier[b]	N	N	N	28	37	37	6	9	14	46	0	12	5	13
On-demand air taxi[c]	N	N	N	69	105	76	51	52	63	39	45	38	71	60
General aviation[d]	787	1,029	1,310	1,252	1,239	956	767	735	636	631	624	619	593	P563
Highway														
Passenger car occupants	N	N	N	25,929	27,449	23,212	24,092	22,423	22,505	22,199	21,194	20,862	R20,699	20,233
Motorcyclists	790	1,650	2,280	3,189	5,144	4,564	3,244	2,227	2,161	2,116	2,294	2,483	R2,897	3,181
Truck occupants[e]														
Light	N	N	N	4,856	7,486	6,689	8,601	9,568	9,932	10,249	10,705	11,265	R11,526	11,677
Large	N	N	N	961	1,262	977	705	648	621	723	742	759	R754	704
Bus occupants	N	N	N	53	46	57	32	33	21	18	38	59	22	34
Pedestrians	7,210	7,990	8,950	7,516	8,070	6,808	6,482	5,584	5,449	5,321	5,228	4,939	R4,763	4,882
Pedalcyclists	490	690	760	1,003	965	890	859	833	765	814	760	754	R693	728
Other[f]	27,909	36,759	40,637	1,018	669	628	584	501	609	573	540	596	R591	677
Total highway fatalities	**36,399**	**47,089**	**52,627**	**44,525**	**51,091**	**43,825**	**44,599**	**41,817**	**k42,065**	**42,013**	**41,501**	**41,717**	**R41,945**	**42,116**
Railroad[g]														
Highway-rail grade crossing	1,421	1,610	1,440	917	833	582	698	579	488	461	431	402	425	421
Railroad	924	923	785	575	584	454	599	567	551	602	577	530	512	548
Transit[h]	**N**	**N**	**N**	**N**	**N**	**N**	**339**	**274**	**264**	**275**	**286**	**299**	**295**	**U**
Waterborne[i]														
Vessel-related[j]	N	N	178	243	206	131	85	51	52	50	71	57	32	U
Not related to vessel casualties	N	N	420	330	281	130	101	95	95	88	95	86	87	U
Recreational boating	739	1,360	1,418	1,466	1,360	1,116	865	829	709	821	815	734	701	U

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TABLE 2-1: Transportation Fatalities by Mode (Continued)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Pipeline	N	N	N	15	19	33	9	21	53	10	20	25	38	7
Hazardous liquid pipeline	N	N	4	7	4	5	3	3	5	0	2	4	1	0
Gas pipeline	N	N	26	8	15	28	6	18	48	10	18	21	37	7

KEY: N = data do not exist; P = preliminary; R = revised; U = data are not available.

[a] Carriers operating under 14 CFR 121, all scheduled and nonscheduled service. Since Mar. 20, 1997, 14 CFR 121 include aircraft with 10 or more seats that formerly operated under 14 CFR 135. This change makes it difficult to compare pre-1997 data for 14 CFR 121 and 14 CFR 135 with more recent data.

[b] All scheduled service operating under 14 CFR 135 (commuter air carriers). Before Mar. 20, 1997, 14 CFR 135 applied to aircraft with 30 or fewer seats. Since Mar. 20, 1997, 14 CFR 135 includes only aircraft with fewer than 10 seats. This change makes it difficult to compare pre-1997 data for 14 CFR 121 and 14 CFR 135 with more recent data.

[c] Nonscheduled service operating under 14 CFR 135 (on-demand air taxis).

[d] All operations other than those operating under 14 CFR 121 and 14 CFR 135.

[e] Large trucks are defined as trucks over 10,000 pounds gross vehicle weight rating, including single-unit trucks and truck tractors. Light trucks are defined as trucks of 10,000 pounds gross vehicle weight rating or less, including pickups, vans, truck-based station wagons, and utility vehicles.

[f] Includes occupants of other vehicle types and other nonmotorists. For 1960-70, the U.S. Department of Transportation, National Highway Traffic Safety Administration did not break out fatality data to the same level of detail as in later years, so fatalities for those years also include occupants of passenger cars, trucks, and buses.

[g] Includes Amtrak. Highway-rail grade crossing fatalities data for 1970 and before is not comparable with data after 1970 due to change in reporting system. Fatalities include those resulting from train accidents, train incidents, and nontrain incidents. Highway-rail grade crossing fatalities are counted under highway, except train occupants.

[h] Fatalities include those resulting from all reportable incidents, not just from accidents.

[i] Vessel-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.

[j] 1995-2000 data come from the Marine Safety Management Information System. Data for prior years may not be directly comparable.

[k] Includes 2 fatalities that have not been assigned to a specific vehicle type.

NOTES

Numbers may not add to totals because some fatalities are counted in more than one mode. To avoid double counting, the following adjustments have been made: most (not all) highway-rail grade-crossing fatalities have not been added because most (not all) such fatalities involve motor vehicles and, thus, are already included in highway fatalities; for transit, all commuter rail fatalities and motor-bus, trolley-bus, demand-responsive, and van-pool fatalities arising from accidents have been subtracted because they are counted as railroad, highway, or highway-rail grade-crossing fatalities. The reader cannot reproduce the total fatalities in this table by simply leaving out the number of highway-rail grade-crossing fatalitites in the sum and subtracting the above transit submodes, because in so doing, grade-crossing fatalities not involving motor vehicles would be left out (see table 2-35 on rail). An example of such a fatality is a bicyclist hit by a train at a grade crossing.

Caution must be exercised in comparing fatalities across modes because significantly different definitions are used. In particular, rail and transit fatalities include incident-related (as distinct from accident-related) fatalities, such as fatalities from falls in transit stations or railroad employee fatalities from a fire in a workshed. Equivalent fatalities for the air and highway modes (fatalities at airports not caused by moving aircraft or fatalities from accidents in automobile repair shops) are not counted toward the totals for these modes. Thus, fatalities not necessarily directly related to in service transportation are counted for the transit and rail modes, potentially overstating the risk for these modes.

TABLE 2-1: Transportation Fatalities by Mode (Continued)

SOURCES

Air:

1960: National Transportation Safety Board, *Annual Review of Aircraft Accident Data: U.S. Air Carrier Operations, Calendar Year 1967* (Washington, DC: December 1968).
1965-70: Ibid., *Annual Review of Aircraft Accident Data: U.S. Air Carrier Operations, Calendar Year 1975*, NTSB/ARC-77/1 (Washington, DC: January 1977).
1975: Ibid., *Annual Review of Aircraft Accident Data: U.S. Air Carrier Operations, Calendar Year 1983*, NTSB/ARC-87/01 (Washington, DC: February 1987), table 18.
1980: Ibid., *Annual Review of Aircraft Accident Data: U.S. Air Carrier Operations, Calendar Year 1981*, NTSB/ARC-85/01 (Washington, DC: February 1985), tables 2 and 16.
1985-2001: Ibid., Internet site www.ntsb.gov/aviation, table 5 as of Aug. 21, 2002.

Commuter:

1975-80: National Transportation Safety Board, *Annual Review of Aircraft Accident Data: U.S. Air Carrier Operations, Calendar Year 1980*, NTSB/ARC-83/01 (Washington, DC: January 1983), tables 26 and 40.
1985-2001: Ibid., Internet site www.ntsb.gov/aviation, table 9 as of Aug. 21, 2002.

On-demand air taxi:

1975-80: National Transportation Safety Board, *Annual Review of Aircraft Accident Data: U.S. Air Carrier Operations, Calendar Year 1981*, NTSB/ARC-85/01 (Washington, DC: February 1985), table 61.
1985-2001: Ibid., Internet site www.ntsb.gov/aviation, table 9 as of Aug. 21, 2002.

General aviation:

1960-70: National Transportation Safety Board, *Annual Review of Aircraft Accident Data: U.S. General Aviation, Calendar Year 1970*, NTSB/ARG-74/1 (Washington, DC: April 1974), table 117.
1975-80: Ibid., *Annual Review of Aircraft Accident Data: General Aviation, Calendar Year 1985*, NTSB/ARG-87/03 (Washington, DC: October 1987), table 21.
1985-2001: Ibid., Internet site www.ntsb.gov/aviation, table 10 as of Aug. 21, 2002 and personal communication, Nov. 15, 2002.

Highway:

1960-65: Estimated by U.S. Department of Transportation, National Highway Traffic Safety Administration from data supplied by U.S. Department of Health and Human Services, National Center for Health Statistics, and individual state accident reports (adjusted to 30-day deaths). Fatalities data prior to 1975 have been adjusted to reflect the Fatality Analysis Reporting System's definition of a fatal crash as one that involves a motor vehicle on a trafficway that results in the death of a vehicle occupant or a nonmotorist within 30 days of the crash.
1970-2001: Ibid., *Traffic Safety Facts 2000*, DOT HS 809 100 (Washington, DC: December 2000), table 4 and personal communication, Sept. 9, 2002.

Rail:

Highway-rail grade crossing:

1960-70: National Safety Council, *Accident Facts, 1974* (Washington, DC: 1974).
1975-80: U.S. Department of Transportation, Federal Railroad Administration, Office of Policy and Program Development, personal communication.
1985-90: Ibid., *Rail-Highway Crossing Accident/Incident and Inventory Bulletin* (Washington, DC: Annual issues), table S.
1995-2001: Ibid., Railroad Safety Statistics Annual Report 2000 (Washington, DC: July 2001), tables 1-1 and 8-13.

Railroad:

1960-65: National Safety Council, *Accident Facts, 1974* (Washington, DC: 1974).
1970-90: U.S. Department of Transportation, Federal Railroad Administration, *Highway-Rail Crossing Accident/Incident and Inventory Bulletin* (Washington, DC: Annual issues), table 7.
1995-2001: Ibid., Railroad Safety Statistics Annual Report 2000 (Washington, DC: July 2001), tables 1-1 and 8-13.

Transit:

1990-99: U.S. Department of Transportation, Federal Transit Administration, *Safety Management Information Statistics 1999* (Washington, DC: 2001), p. 41.
2000: U.S. Department of Transportation, Federal Transit Administration, personal communications, Mar. 19, 2002.

Water:

Vessel- and nonvessel-related:

1970-90: U.S. Department of Transportation, U.S. Coast Guard, Office of Investigations and Analysis, Compliance Analysis Division, (G-MOA-2), personal communication, Apr. 13, 1999.
1995-2000: U.S. Department of Transportation, U.S. Coast Guard, Data Administration Division (G-MRI-1), personal communication, Dec. 12, 2001.

Recreational boating:

1960-2000: Ibid., Office of Boating Safety, *Boating Statistics* (Washington, DC: Annual issues).

Hazardous liquid and gas pipeline:

1970-2001: U.S. Department of Transportation, Research and Special Programs Administration, Office of Pipeline Safety, personal communication and Internet site http://ops.dot.gov as of Aug. 22, 2002.

TABLE 2-2: Injured Persons by Transportation Mode

	1960	1965	1970	1975	1980	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
TOTAL injured persons	**U**	**U**	**U**	**U**	**U**	**U**	**U**	**U**	**3,517,767**	**3,532,287**	**3,397,512**	**3,241,660**	**3,284,450**	**3,240,424**	**U**
Air[a]															
U.S. air carrier[b]	N	N	107	81	19	19	30	29	25	77	43	30	R67	27	16
Commuter carrier[c]	N	N	N	N	14	14	14	11	17	2	1	2	2	7	4
On-demand air taxi[d]	N	N	N	N	43	43	44	36	14	22	23	10	14	12	23
General aviation[e]	N	N	715	769	R681	681	501	409	396	365	350	327	322	310	322
Highway															
Passenger car occupants	N	N	N	N	N	N	N	2,376,439	2,469,358	2,458,080	2,340,612	2,201,375	2,137,503	2,051,609	1,926,625
Motorcyclists	N	N	N	N	N	N	N	84,285	57,480	55,281	52,574	48,974	49,986	57,723	60,236
Truck occupants[f]															
Light	N	N	N	N	N	N	N	505,144	722,496	761,478	754,820	762,506	846,865	886,566	860,527
Large	N	N	N	N	N	N	N	41,822	30,344	32,760	30,913	28,767	32,892	30,832	29,424
Bus occupants	N	N	N	N	N	N	N	32,691	19,214	20,291	16,887	15,559	21,958	17,769	15,427
Pedestrians	N	N	N	N	N	N	N	104,805	85,837	81,797	77,011	68,955	85,235	77,625	77,619
Pedalcyclists	N	N	N	N	N	N	N	74,903	66,572	58,158	57,802	53,379	51,290	51,160	45,277
Other[g]	N	N	N	N	N	N	N	10,578	13,977	15,473	16,995	12,519	10,509	15,466	17,536
Total highway	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**3,230,666**	**3,465,279**	**3,483,319**	**3,347,614**	**3,192,035**	**3,236,238**	**3,188,750**	**3,032,672**
Railroad[h]															
Highway-rail grade crossing	3,367	3,725	3,272	3,860	3,550	3,550	2,687	2,407	1,894	1,610	1,540	1,303	1,396	1,219	1,154
Railroad	16,113	21,930	17,934	50,138	58,696	58,696	31,617	22,736	12,546	10,948	10,227	10,156	10,304	10,424	9,739
Transit[i]	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**54,556**	**57,196**	**55,288**	**56,132**	**55,990**	**55,325**	**56,697**	**U**
Waterborne[j]															
Vessel-related[k]	N	N	105	97	180	180	172	175	145	223	121	135	131	125	U
Not related to vessel casualties[k]	N	N	U	U		U	U	U	1,833	1,327	1,037	540	500	564	U
Recreational boating	929	927	780	2,136	2,650	2,650	2,757	3,822	4,141	4,442	4,555	4,612	4,315	4,355	U
Pipeline															
Hazardous liquid pipeline	N	N	21	17	15	15	18	7	11	13	5	6	20	4	10
Gas pipeline	N	N	233	214	177	177	108	69	53	114	72	76	93	77	46

KEY: N = data do not exist; P = preliminary; R = revised; U = data are not available.

[a] Injuries classified as serious. See definitions of injuries in the glossary.

[b] All scheduled and nonscheduled service operating under 14 CFR 121. Since Mar. 20, 1997, 14 CFR 121 includes only aircraft with 10 or more seats formerly operated under 14 CFR 135. This change makes it difficult to compare pre-1997 data for 14 CFR 121 and 14 CFR 135 with more recent years' data.

[c] All scheduled service operating under 14 CFR 135 (commuter air carriers). Before Mar. 20, 1997, 14 CFR 135 applied to aircraft with 30 or fewer seats. Since Mar. 20, 1997, 14 CFR 135 includes only aircraft with fewer than 10 seats. This change makes it difficult to compare pre-1997 data for 14 CFR 121 and 14 CFR 135 with more recent years' data.

[d] Nonscheduled service operating under 14 CFR 135 (on-demand air taxis).

TABLE 2-2: Injured Persons by Transportation Mode (Continued)

[e] All operations other than those operating under 14 CFR 121 and 14 CFR 135.

[f] Large trucks are defined as trucks over 10,000 pounds gross vehicle weight rating, including single-unit trucks and truck tractors. Light trucks are defined as trucks of 10,000 pounds gross vehicle weight rating or less, including pickups, vans, truck-based station wagons, and utility vehicles.

[g] Includes occupants of other unknown vehicle types and other nonmotorists.

[h] Includes Amtrak. Figures include those injuries resulting from train accidents, train incidents, and nontrain incidents. Injury figures also include occupational illness. Railroad injuries data for 1970 and before are not comparable with post-1970 data due to change in reporting system. Highway-rail grade crossing injuries are counted under highway, except train occupants.

[i] Includes motor bus, commuter rail, heavy rail, light rail, demand responsive, van pool, and automated guideway. Transit injuries include those resulting from all reportable incidents, not just from accidents.

[j] Vessel-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.

[k] 1992-2000 data come from the Marine Safety Management Information System. Data for prior years may not be directly comparable.

NOTES

The motor vehicle injury data in this table come from the U.S. Department of Transportation, National Highway Traffic Safety Administration's General Estimates System (GES). The data from GES, which began operation in 1988, are obtained from a nationally representative probability sample selected from all police-reported crashes. The GES sample includes only crashes where a police accident report was completed and the crash resulted in property damage, injury, or death. The resulting figures do not take into account crashes that were not reported to the police or did not result in property damage. The 1993 *National Transportation Statistics (NTS) Historical Compendium* and earlier editions used injury figures estimated by the National Safety Council, which used a different set of methods to arrive at its figures. Thus, the injury figures in this edition of NTS may not be comparable with those found in the Compendium and earlier editions.

Numbers may not add to totals because some injuries are counted in more than one mode. To avoid double counting, the following adjustments have been made in the total injured row:

- most (not all) highway-rail grade crossing injuries have not been added because most (not all) such injuries involve motor vehicles and are already included in highway injuries;
- for transit, all commuter rail injuries and motor-bus, trolley-bus, demand-responsive, and van-pool injuries arising from for transit, all commuter rail injuries and motor-bus, trolley-bus, demand-responsive, and van-pool injuries arising from accidents have been subtracted because they are counted as railroad, highway, or highway-rail grade crossing injuries.

The reader cannot reproduce the total injuries count in this table by simply leaving out the number of highway-rail grade crossing injuries in the sum and subtracting the above transit submodes, because in so doing, grade-crossing injuries not involving motor vehicles would be left out (see table 2-35 on rail). An example of such an injury is a bicyclist injured by a train at a grade crossing.

SOURCES

Air:

U.S. air carrier:

1970-90: National Transportation Safety Board, Annual Review of Aircraft Accident Data: U.S. Air Carrier Operations (Washington, DC: Annual issues).
1995-2001: Ibid., Analysis and Data Division, personal communications, Aug. 8, 1996, Mar. 10, 1999, Mar. 23, 2000, May 7, 2002, and Sept. 11, 2002.

Commuter carrier, and on-demand air taxi:

1980-90: National Transportation Safety Board, Annual Review of Aircraft Accident Data: U.S. Air Carrier Operations (Washington, DC: Annual issues).
1995-2001: Ibid., Analysis and Data Division, personal communications, 1996, 1997, 1998, 2000, May 7, 2002, and Sept. 11, 2002.

General aviation:

1970-90: National Transportation Safety Board, Annual Review of Aircraft Accident Data: General Aviation (Washington, DC: Annual issues).
1995-2001: Ibid., Analysis and Data Division, personal communications, 1996, 1997, 1998, 2000, May 7, 2002 and Sept. 11, 2002.

Highway:

1990-99: U.S. Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, *Traffic Safety Facts 1999*, DOT HS 809 100 (Washington, DC: December 2000), table 4.
2001: Ibid., General Estimates System Database and personal communication, Sept. 10, 2002.

Continued next page

TABLE 2-2: Injured Persons by Transportation Mode (Continued)

Rail:
Highway-rail grade crossings:
1960-70: National Safety Council, *Accident Facts, 1974* (Washington, DC: 1974).
1975: U.S. Department of Transportation, Federal Railroad Administration, Office of Policy and Program Development, personal communication.
1980-90: Ibid., *Rail-Highway Crossing Accident/Incident and Inventory Bulletin* (Washington, DC: Annual issues), table S.
1995-2001: U.S. Department of Transportation, Federal Railroad Administration, *Railroad Safety Statistics Annual Report 2001*(Washington, DC: Sept. 2002), tables 1-1 and 8-13.
Railroad:
1960-70: National Safety Council, *Accident Facts, 1974* (Washington, DC: 1974).
1970-90: U.S. Department of Transportation, Federal Railroad Administration, *Highway-Rail Crossing Accident/Incident and Inventory Bulletin* (Washington, DC: Annual issues), table 7.
1995-2001: U.S. Department of Transportation, Federal Railroad Administration, *Railroad Safety Statistics Annual Report 2001* (Washington, DC: Sept. 2002), tables 1-1 and 8-13.

Transit:
1990-2000: U.S. Department of Transportation, Federal Transit Administration, *Safety Management Information Statistics* (Washington, DC: Annual issues).

Water:
Waterborne transportation:
1970-90: U.S. Department of Transportation, U.S. Coast Guard, Office of Investigations and Analysis, Compliance Analysis Division, (G-MOA-2), personal communication, Apr. 13, 1999.
1995-2000: Ibid., Data Administration Division (G-MRI-1), personal communication, Dec. 12, 2001.
Recreational boating:
1960-2000: Ibid., Office of Boating Safety, *Boating Statistics* (Washington, DC: Annual issues).

Hazardous liquid and gas pipeline:
1970-2001: U.S. Department of Transportation, Research and Special Programs Administration, Office of Pipeline Safety, personal communication and Internet site http://ops.dot.gov as of Sept. 10, 2002.

TABLE 2-3: Transportation Accidents[a] by Mode

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Air														
U.S. air carrier[b]	90	83	55	37	19	21	24	36	37	49	50	51	56	45
Commuter carrier[c]	N	N	N	48	38	18	15	12	11	16	8	13	12	7
On-demand air taxi[d]	N	N	N	152	171	157	107	75	90	82	77	73	R80	72
General aviation[e]	4,793	5,196	4,712	3,995	3,590	2,739	2,241	2,056	1,908	1,845	1,904	1,906	R1,835	1,723
Highway														
Passenger car	N	N	N	N	N	N	5,561,000	5,594,000	5,599,000	5,423,000	5,146,000	4,916,000	4,926,000	4,832,000
Motorcycle	N	N	N	N	N	N	103,000	66,000	66,000	61,000	54,000	57,000	69,000	73,000
Truck[f]														
Light	N	N	N	N	N	N	2,152,000	2,750,000	2,881,000	2,901,000	2,867,000	3,080,000	3,208,000	3,254,000
Large	N	N	N	N	N	N	372,000	363,000	378,000	421,000	392,000	452,000	438,000	409,000
Bus	N	N	N	N	N	N	60,000	59,000	57,000	53,000	53,000	63,000	56,000	54,000
Total highway crashes[a]	**N**	**N**	**N**	**N**	**N**	**N**	**6,471,000**	**6,699,000**	**6,770,000**	**6,624,000**	**6,335,000**	**6,279,000**	**6,394,000**	**6,323,000**
Rail														
Highway-rail grade crossing[g,h]	3,195	3,820	3,559	12,076	10,612	6,919	5,715	4,633	4,257	3,865	3,508	3,489	3,502	3,233
Railroad[g,i]	N	N	8,095	8,041	8,205	3,275	2,879	2,459	2,443	2,397	2,575	2,768	2,983	2,987
Transit[j]	**N**	**N**	**N**	**N**	**N**	**N**	**58,002**	**25,683**	**25,166**	**24,924**	**23,937**	**23,310**	**24,261**	**U**
Waterborne														
Vessel-related	N	N	2,582	3,310	4,624	3,439	3,613	4,298	4,264	4,198	4,374	4,036	3,791	U
Recreational boating	2,738	3,752	3,803	6,308	5,513	6,237	6,411	8,019	8,026	8,047	8,061	7,931	7,740	U
Pipeline														
Hazardous liquid pipeline	N	N	351	254	246	183	180	188	194	171	153	168	147	129
Gas pipeline	N	N	1,077	1,338	1,524	334	198	161	187	175	236	173	234	209

KEY: N = data do not exist; P = preliminary; R = revised; U = data are not available.

[a] The U.S. Department of Transportation, National Highway Traffic Safety Administration uses the term "crash" instead of accident in its highway safety data. Highway crashes often involve more than one motor vehicle, hence "total highway crashes" is smaller than the sum of the components. Estimates of highway crashes are rounded to the nearest thousand in the source document.

[b] Carriers operating under 14 CFR 121, all scheduled and nonscheduled service. Since Mar. 20, 1997, 14 CFR 121 includes only aircraft with 10 or more seats formerly operated under 14 CFR 135. This change makes it difficult to compare pre-1997 data for 14 CFR 121 and 14 CFR 135 with more recent years' data.

[c] All scheduled service operating under 14 CFR 135. Since Mar. 20, 1997, 14 CFR 121 includes only aircraft with 10 or more seats formerly operated under 14 CFR 135. This change makes it difficult to compare pre-1997 data for 14 CFR 121 and 14 CFR 135 with more recent years' data.

[d] Nonscheduled service operating under 14 CFR 135.

[e] All operations other than those operating under 14 CFR 121 and 14 CFR 135.

[f] Large trucks are defined as trucks over 10,000 pounds gross vehicle weight rating, including single-unit trucks and truck tractors. Light trucks are defined as trucks of 10,000 pounds gross vehicle weight rating or less, including pickups, vans, truck-based station wagons, and utility vehicles.

[g] Includes Amtrak.

[h] Includes both accidents and incidents. Data not comparable after 1970 due to change in reporting system. Most highway-rail grade crossing accidents are counted under highway.

[i] Train accidents only.

[j] Accident figures include collisions with vehicles, objects, and people, derailments / vehicles going off the road. Accident figures do not include fires and personal casualties.

Continued next page

TABLE 2-3: Transportation Accidents[a] by Mode (Continued)

NOTES

The motor vehicle crash data in this table come from the U.S. Department of Transportation, National Highway Traffic Safety Administrations' General Estimates System (GES), which began operation in 1988. GES data are obtained from a nationally representative probability sample selected from all police-reported crashes. The GES sample includes only crashes where a police accident report was completed and the crash resulted in property damage, injury, or death. The resulting figures do not take into account crashes that were not reported to the police or did not result in property damage. The 1993 National Transportation Statistics (NTS) Historical Compendium and earlier editions used crash figures estimated by the National Safety Council, which used a different set of methods to arrive at its figures. Thus, the crash figures in this edition of NTS may not be comparable with those found in the Compendium and earlier editions.

Numbers may not add to totals because some accidents / crashes are counted in more than one mode. To avoid double counting, the following adjustments have been made in the total accidents row:

- most (not all) highway-rail grade-crossing injuries have not been added because most (not all) such accidents involve motor vehicles and, thus, are already included in highway crashes;
- for transit, all commuter rail accidents and motor bus, trolley bus, demand responsive, and van pool accidents have been subtracted because they are counted as railroad, highway, or highway-rail grade-crossing accidents.

Note that the reader cannot reproduce the total accidents count in this table by simply leaving out highway-rail grade-crossing accidents in the sum and subtracting the above transit submodes, because in so doing, grade-crossing accidents not involving motor vehicles would be left out (see table 2-35 on rail). An example of such an accident is a bicyclist hit by a train at a grade crossing.

SOURCES

Air:

Air carrier:

1960: National Transportation Safety Board, *Annual Review of Aircraft Accident Data: U.S. Air Carrier Operations, Calendar Year 1967* (Washington, DC: December 1968).

1965-70: Ibid., *Annual Review of Aircraft Accident Data: U.S. Air Carrier Operations, Calendar Year 1975*, NTSB/ARC-77/1 (Washington, DC: January 1977).

1975: Ibid., *Annual Review of Aircraft Accident Data: U.S. Air Carrier Operations, Calendar Year 1983*, NTSB/ARC-87/01 (Washington, DC: February 1987), table 18.

1980: Ibid., *Annual Review of Aircraft Accident Data: U.S. Air Carrier Operations, Calendar Year 1981*, NTSB/ARC-85/01 (Washington, DC: February 1985), tables 2 and 16.

1985-2001: Ibid., Internet site www.ntsb.gov/aviation as of Aug. 27, 2002, table 5.

Commuter air carrier:

1975-80: National Transportation Safety Board, *Annual Review of Aircraft Accident Data: U.S. Air Carrier Operations, Calendar Year 1980*, NTSB/ARC-83/01 (Washington, DC: January 1983), tables 26 and 40.

1985-2001: Ibid., Internet site www.ntsb.gov/aviation as of Aug. 27, 2002, table 8.

On-demand air taxi:

1975-80: National Transportation Safety Board, *Annual Review of Aircraft Accident Data: U.S. Air Carrier Operations, Calendar Year 1981*, NTSB/ARC-85/01 (Washington, DC: February 1985), table 61.

1985-2001: Ibid., Internet site www.ntsb.gov/aviation as of Aug. 27, 2002, table 9.

General aviation:

1960-70: National Transportation Safety Board, *Annual Review of Aircraft Accident Data: General Aviation, Calendar Year 1970*, NTSB/ARG-74/1 (Washington, DC: April 1974), table 117.

1975-80: Ibid., *Annual Review of Aircraft Accident Data: General Aviation, Calendar Year 1985*, NTSB/ARG-87/03 (Washington, DC: October 1987), table 21.

1985-2001: Ibid., Internet site www.ntsb.gov/aviation as of Aug. 27, 2002, table 10 and personal communication, Nov. 15, 2002.

Highway:

1990-2001: U.S. Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, *Traffic Safety Facts 2001*, DOT HS 809 100 (Washington, DC: December 2000), table 1 and personal communication, Sept. 10, 2002.

TABLE 2-3: Transportation Accidents[a] by Mode (Continued)

Rail:
Highway-rail grade crossings:
1960-70: U.S. Department of Transportation, Federal Railroad Administration, Office of Policy and Program Development, *Rail-Highway Grade-Crossing Accidents* (Washington, DC: Annual issues).
1975-80: Ibid., Office of Policy and Program Development, personal communication.
1985-90: Ibid., *Rail-Highway Crossing Accident/Incident and Inventory Bulletin* (Washington, DC: Annual issues), table S.
1991-2001: Ibid., *Railroad Safety Statistics Annual Report 2001* (Washington, DC: July 2001), table 1-1.
Railroad:
1970-90: U.S. Department of Transportation, Federal Railroad Administration, Office of Policy and Program Development, *Accident/Incident Bulletin* (Washington, DC: Annual issues), table 4.
1991-2001: Ibid., *Railroad Safety Statistics Annual Report 2001* (Washington, DC: July 2001), table 1-1.

Transit:
1990-2000: U.S. Department of Transportation, Federal Transit Administration, *Safety Management Information Statistics 2000* (Washington, DC: 2000), pp. 51-54.

Water:
Vessel-related:
1970-91: U.S. Department of Transportation, U.S. Coast Guard, Office of Investigations and Analysis, Compliance Analysis Division, personal communication, Apr. 13, 1999.
1992-2000: Ibid., Data Administration Division (G-MRI-1), personal communication, Dec. 12, 2001.
Recreational boating:
1960-2000: Ibid., Office of Boating Safety, *Boating Statistics* (Washington, DC: Annual issues).

Hazardous liquid and gas pipeline:
1970-2001: U.S. Department of Transportation, Research and Special Programs Administration, Office of Pipeline Safety, Internet site, http://ops.dot.gov as of Nov. 15, 2002.

TABLE 2-4: Distribution of Transportation Fatalities by Mode

	1999		2000	
	Number	Percent	Number	Percent
TOTAL of all modes[a]	44,036	100.0	R44,313	100.0
Passenger car occupants	20,862	47.4	R20,699	46.7
Light-truck occupants	11,265	25.6	R11,526	26.0
Pedestrians struck by motor vehicles	4,939	11.2	R4,763	10.7
Motorcyclists	2,483	5.6	R2,897	6.5
Large-truck occupants	759	1.7	R754	1.7
Recreational boating	734	1.7	701	1.6
Pedalcyclists struck by motor vehicles	754	1.7	R693	1.6
General aviation	619	1.4	R593	1.3
Railroad trespassers[b] (excluding grade crossings)	479	1.1	463	1.0
Other and unknown motor vehicle occupants	447	1.0	R450	1.0
Other nonoccupants struck by motor vehicles[c]	149	0.34	R141	0.32
Air carriers	12	0.03	92	0.21
Waterborne transportation (nonvessel-related)	86	0.20	87	0.20
Heavy rail transit (subway)	84	0.19	80	0.18
Air taxi	38	0.09	71	0.16
Grade crossings, not involving motor vehicles[d]	57	0.13	64	0.14
Private grade crossings, with motor vehicles	36	0.08	55	0.12
Waterborne transportation (vessel-related)	57	0.13	32	0.07
Light rail transit	17	0.04	30	0.07
Railroad employees on duty and contractors	38	0.09	25	0.06
Bus occupants (school, intercity, and transit)	59	0.13	22	0.05
Gas distribution pipelines	19	0.04	22	0.05
Railroad-related, not otherwise specified	10	0.02	20	0.05
Gas transmission pipelines	2	<0.01	15	0.03
Transit buses, fatalities not related to accidents[e]	12	0.03	8	0.02
Commuter air	12	0.03	5	0.01
Passengers on railroad trains	3	<0.01	4	<0.01
Hazardous liquid pipelines	4	<0.01	1	<0.01
Demand response transit, fatalities not related to accidents[e]	0	-	0	-
Other counts, redundant with above[f]				
Large-truck occupants and nonoccupants	5,380	NA	5,211	NA
Public grade crossings, with motor vehicles	309	NA	306	NA

TABLE 2-4: Distribution of Transportation Fatalities by Mode (Continued)

	1999		2000	
	Number	Percent	Number	Percent
Commuter rail	95	NA	87	NA
Transit buses, accident-related fatalities	90	NA	82	NA
Outside planes in crashes[g]	5	NA	13	NA
Demand responsive transit, accident-related fatalities	1	NA	8	NA

KEY: NA = not applicable; R = revised.

[a] Unless otherwise specified, includes fatalities outside the vehicle.

[b] Includes fatalities outside trains, except at grade crossings.

[c] Includes all nonoccupant fatalities, except pedalcyclists and pedestrians.

[d] Public grade-crossing fatalities involving motor vehicles are included in counts for motor vehicles.

[e] Fatalities not related to transit bus and demand responsive transit accidents are not included under highway submodes.

[f] Fatalities at grade crossings with motor vehicles are included under relevant motor vehicle modes. Commuter rail fatalities are counted under railroad. For transit bus and demand responsive transit accidents, occupant fatalities are counted under "bus" and nonoccupant fatalities are counted under "pedestrians," "pedalcyclists," or other motor vehicle categories.

[g] Includes nonoccupant fatalities resulting from aviation accidents.

SOURCES

Air data:
National Transportation Safety Board, Internet site www.ntsb.gov/aviation as of Oct. 2, 2002, and personal communication, Nov. 15, 2002.

Highway data:
U.S. Department of Transportation, National Highway Traffic Safety Administration, *Traffic Safety Facts 2000* (DOT HS 809 337) (Washington, DC : December 2001), table 4 and personal communication Sept. 10, 2002.

Railroad data:
U.S. Federal Railroad Administration, *Railroad Safety Statistics, Annual Report 2001* (Washington, DC: July 2002), table 1-3.

Transit data:
U.S. Department of Transportation, Federal Transit Administration, *Safety Management Information Statistics* (Washington, DC: Annual issues).

Waterborne transportation:
U.S. Department of Transportation, U.S. Coast Guard, Data Administration Division (G-MRI-1), personal communication, Dec. 12, 2001.

Recreational boating:
Ibid. Office of Boating Safety. *Boating Statistics* (Washington, DC: Annual issues).

Pipeline data:
U.S. Department of Transportation, Research and Special Programs Administration, Office of Pipeline Safety, and Internet site http://ops.dot.gov as of Oct 2, 2002.

TABLE 2-5: Highway-Rail Grade-Crossing Safety and Property Damage Data

	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Fatalities	[a]1,440	917	833	582	698	579	488	461	431	402	425	419
Injured persons	3,272	3,860	3,550	2,687	2,407	1,894	1,610	1,540	1,303	1,396	1,219	1,155
Accidents	[a]3,559	12,076	10,612	6,919	5,715	4,633	4,257	3,865	3,508	3,489	3,502	3,232
Property damage ($ millions)												
Railroad vehicles and property	N	N	6.5	8.7	13.1	10.1	8.8	15.0	14.4	23.0	14.8	8.2

KEY: N = data do not exist.

[a] 1970 data are not comparable to later years due to change in reporting system.

SOURCES

Fatalities, injuries, accidents:

1970–85: U.S. Department of Transportation, Federal Railroad Administration, Office of Policy and Program Development, *Rail-Highway Crossing Accident/Incident and Inventory Bulletin* (Washington, DC: Annual issues), tables S and 11.
1990–2000: Ibid., *Railroad Safety Statistics Annual Report 2000* (Washington, DC: 2001), table 1.1.
2001: Ibid., *Railroad Safety Statistics Interim Report 2001* (Washington, DC: July 2002), table 1.1.

Property damage:

1970–96: U.S. Department of Transportation, Federal Railroad Administration, Office of Policy and Program Development, *Accident/Incident Bulletin* (Washington, DC: Annual issues), table 5.
1997–2000: Ibid., *Railroad Safety Statistics Annual Report* (Washington, DC: Annual issues), table 5.6.
2001: Ibid., *Railroad Safety Statistics Interim Report 2001* (Washington, DC: July 2002), table 1.1.

TABLE 2-6: Hazardous Materials Fatalities, Injuries, Accidents, and Property Damage Data

	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Total fatalities	**27**	**19**	**8**	**8**	**7**	**120**	**12**	**13**	**R10**	**R15**	**7**
Accident-related	21	14	7	7	6	7	10	8	R8	R10	6
Air fatalities	**0**	**0**	**0**	**0**	**0**	**110**	**0**	**0**	**0**	**0**	**0**
Accident-related	0	0	0	0	0	0	0	0	0	0	0
Highway fatalities	**27**	**17**	**8**	**8**	**7**	**8**	**12**	**13**	**R10**	**R15**	**7**
Accident-related	21	12	7	7	6	5	10	8	R8	R10	6
Rail fatalities	**0**	**2**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**R0**	**0**
Accident-related	0	2	0	0	0	2	0	0	0	0	0
Water[a] fatalities	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Accident-related	0	0	0	0	0	0	0	0	0	0	0
Other[b] fatalities	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Accident-related	0	0	0	0	0	0	0	0	0	0	0
Total injured persons	**648**	**626**	**253**	**423**	**400**	**1,175**	**R221**	**R195**	**R263**	**R248**	**135**
Accident-related	168	47	16	18	18	864	16	R13	R15	16	8
Air injured persons	**5**	**8**	**4**	**39**	**33**	**33**	**24**	**20**	**12**	**R5**	**13**
Accident-related	0	0	0	0	0	0	0	0	0	0	0
Highway injured persons	**527**	**493**	**195**	**311**	**296**	**216**	**R152**	**R151**	**R216**	**R161**	**93**
Accident-related	156	43	9	9	14	22	11	R9	R15	15	8
Rail injured persons	**99**	**121**	**53**	**73**	**71**	**926**	**45**	**22**	**35**	**82**	**29**
Accident-related	12	4	7	9	4	842	5	4	0	1	0
Water[a] injured persons	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**
Accident-related	0	0	0	0	0	0	0	0	0	0	0
Other[b] injured persons	**15**	**3**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Accident-related	0	0	0	0	0	0	0	0	0	0	0
Total incidents	**10,951**	**15,719**	**6,019**	**8,879**	**R14,742**	**R13,952**	**R14,001**	**R15,500**	**R17,657**	**R17,583**	**17,557**
Accident-related	440	486	364	297	R295	R333	R313	R318	R367	R382	351
Air incidents	**147**	**223**	**114**	**297**	**R813**	**R918**	**R1,029**	**R1,386**	**R1,583**	**R1,420**	**1,077**
Accident-related	0	0	0	0	0	0	1	R2	0	1	1
Highway incidents	**10,063**	**14,161**	**4,752**	**7,296**	**12,764**	**R11,916**	**R11,864**	**R13,111**	**R14,992**	**R15,093**	**15,582**
Accident-related	330	347	302	249	R245	R290	R259	R265	R303	R319	297
Rail incidents	**694**	**1,271**	**842**	**1,279**	**1,153**	**1,112**	**1,103**	**989**	**R1,074**	**R1,053**	**894**
Accident-related	109	134	61	48	50	43	R53	51	R64	62	53
Water[a] incidents	**28**	**34**	**7**	**7**	**12**	**6**	**5**	**R14**	**8**	**R17**	**4**
Accident-related	0	2	0	0	0	0	0	0	0	0	0
Other[b] incidents	**19**	**30**	**304**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Accident-related	1	3	1	0	0	0	0	0	0	0	0

Continued next page

TABLE 2-6: Hazardous Materials Fatalities, Injuries, Accidents, and Property Damage Data (Continued)

	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Total property damage (current $ thousands)[c]	**8,090**	**10,829**	**22,993**	**32,353**	**30,903**	**46,849**	**33,450**	**R46,259**	**R63,280**	**R76,753**	**61,296**
Accident-related	6,051	6,236	20,268	24,792	R23,528	R37,753	25,125	R36,931	R49,697	R60,805	50,040
Air property damage	**8.9**	**12.3**	**12.3**	**142**	**101**	**87**	**336**	**267**	**286**	**272**	**310**
Accident-related	0	0	0	0	0	0	0	0	0	42	50
Highway property damage	**5,584**	**7,324**	**12,690**	**20,190**	**22,144**	**29,257**	**24,720**	**R28,614**	**R32,327**	**R49,678**	**39,942**
Accident-related	3,694	3,782	10,175	14,132	R16,268	R22,293	17,786	R21,489	R21,129	R36,785	30,097
Rail property damage	**2,488**	**2,952**	**10,274**	**11,952**	**8,485**	**17,385**	**8,356**	**16,364**	**R30,607**	**R26,520**	**21,020**
Accident-related	2,357	2,357	10,094	10,660	7,260	15,460	7,339	15,442	R28,568	23,978	19,892
Water[a] property damage	**6.1**	**505**	**3.2**	**70**	**174**	**120**	**38**	**1,015**	**61**	**R283**	**25**
Accident-related	0	81	0	0	0	0	0	0	0	0	0
Other[b] property damage	**3.5**	**35**	**14.4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Accident-related	0.3	15.6	<0.1	0	0	0	0	0	0	0	0

KEY: R = revised.

[a] Water category only includes nonbulk marine. Bulk marine hazardous materials incidents are reported to the U.S. Coast Guard and are not included.

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

[c] Property damage under $30,000 is reported to the nearest $100. Property damage $30,000 or greater is reported to the nearest $1,000, therefore the total may not equal the sum.

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.

SOURCES

1975-85: U.S. Department of Transportation, Research and Special Programs Administration, Office of Hazardous Materials Safety, Hazardous Materials Information System Database, 1999.

1990: Ibid. Internet site http://hazmat.dot.gov/10yearfrm.htm, as of May 2, 2000.

1995-2001: Ibid. Internet site http://hazmat.dot.gov/files/hazmat/10year/10yearfrm.htm as of Aug. 21, 2002.

TABLE 2-7: Transportation-Related Occupational Fatalities[a]

	1992	1993	1994	1995	1996	1997	1998	1999	2000
TOTAL occupational fatalities	**6,217**	**6,331**	**R6,588**	**R6,210**	**R6,112**	**R6,218**	**R6,026**	**R6,054**	**5,915**
Transportation-related fatalities									
Highway[b]	1,158	1,243	R1,336	R1,329	R1,324	R1,387	R1,431	R1,496	1,363
Nonhighway[c]	436	392	R407	R388	R369	377	R384	R352	399
Aircraft	353	282	R424	R278	R320	261	R223	R228	280
Worker struck by vehicle[d]	346	365	R383	R385	R349	367	413	377	370
Water vehicle[e]	109	120	R92	R84	R107	109	112	102	84
Railway[f]	65	86	81	82	R75	93	60	56	71
Total transportation-related[g]	**2,484**	**2,501**	**R2,740**	**R2,560**	**R2,556**	**R2,599**	**R2,630**	**R2,618**	**2,571**
Percent of total occupational fatalities									
Highway	19	20	20	21	22	22	24	25	23
Nonhighway	7	6	6	6	6	6	6	6	7
Aircraft	6	4	6	4	5	4	4	4	5
Worker struck by vehicle	6	6	6	6	6	6	7	6	6
Water vehicle	2	2	1	1	2	2	2	2	1
Railway	1	1	1	1	1	1	1	1	1
Total transportation-related	**40**	**40**	**42**	**41**	**42**	**42**	**44**	**43**	**43**

KEY: R = revised.

[a] Based on the 1992 Bureau of Labor Statistics, *Occupational Injury and Illness Classification Manual*.

[b] Includes collisions between vehicles/mobile equipment moving in the same or opposite directions, such as in an intersection; between moving and standing vehicles/mobile equipment at the side of a roadway; or a vehicle striking a stationary object. Also includes noncollisions, e.g., jack-knifed or overturned vehicle/mobile equipment–no collision; ran off highway–no collision; struck by shifting load; sudden start or stop; not elsewhere classified.

[c] Refers to farms and industrial premises. Includes collisions between vehicles/mobile equipment; vehicles/mobile equipment striking a stationary object. Also includes noncollisions such as a fall from a moving vehicle/mobile equipment, fall from and struck by vehicle/mobile equipment, overturned vehicle/mobile equipment, and loss of control of vehicle/mobile equipment.

[d] Includes worker struck by vehicle/mobile equipment in roadway, on side of road, in a parking lot, or nonroad area.

[e] Includes collisions, explosions, fires, fall from or on ship/boat, and sinking/capsized water vehicles involved in transportation. Does not include fishing boats.

[f] Includes collisions between railway vehicles, railway vehicle and other vehicle, railway vehicle and other object, and derailment.

[g] Numbers may not add to totals because transportation categories may include subcategories not shown separately.

NOTES

Percentages may not add to totals due to rounding.

The above categories do not define the types of jobs people had, nor the industries in which they worked. The categories define the ways in which they died. For example, a representative traveling for business reasons who is killed in a rail accident would be listed under rail.

SOURCE

U.S. Department of Labor, Bureau of Labor Statistics, *News: National Census of Fatal Occupational Injuries*, Internet site www.bls.gov/iif/ as of July 23, 2002. This document is based on the U.S. Department of Labor, Bureau of Labor Statistics, *Census of Fatal Occupational Injuries* (Washington, DC: Annual issues), table 1.

TABLE 2-8: Reporting Thresholds for Property Damage by U.S. Department of Transportation Modal Administrations

Modal administration	Reporting threshold
Federal Aviation Administration	More than $25,000 damage to property other than the aircraft.
Federal Highway Administration	None; each state defines its own threshold and FHWA collects state reports.
Federal Railroad Administration	More than $6,600 in damages to railroad on-track equipment, signals, track, track structures, and roadbed for accidents other than at grade crossings. No threshold for grade-crossing accidents.
National Highway Traffic Safety Administration	None; property-damage-only crashes are recorded through the General Estimates System, a nationally representative sample of police-reported crashes of all severities.
Federal Transit Administration	More than $1,000.
Research and Special Programs Administration	More than $50,000 for gas pipelines. More than $50,000 for hazardous liquid pipelines.
U. S. Coast Guard	More than $25,000 for commercial vessels. More than $2,000 for recreational boats.

SOURCES

Federal Aviation Administration:
49 CFR 830.5 (as of Oct. 1, 2001).

Federal Highway Administration:
U.S. Department of Transportation, Federal Highway Administration, personal communication, 1997.

Federal Railroad Administration:
U.S. Department of Transportation, Federal Railroad Administration, *Railroad Safety Statistics Annual Report 2000* (Washington, DC: July 2001).

National Highway Traffic Safety Administration:
U.S. Department of Transportation, National Highway Traffic Safety Administration, *Traffic Safety Facts 2000*, DOT HS 809 337 (Washington, DC: 2001).

Federal Transit Administration:
U.S. Department of Transportation, Federal Transit Administration, *Safety Management Information Statistics (SAMIS) Annual Report 1999*, DOT-FTA-MA-26-5011-00-1 (Washington, DC: 2000).

Research and Special Programs Administration:
Gas pipeline: 49 CFR 191.3 (as of Oct. 1, 2001).
Oil pipeline: 49 CFR 195.50 (as of Oct. 1, 2001).

U.S. Coast Guard:
Commercial shipping: 46 CFR 4.05-1 (as of Oct. 1, 2001).
Recreational boating: 33 CFR 173.55 (as of July 2, 2001).

Section B
Air

TABLE 2-9: U.S. Air Carrier[a] Safety Data

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001[b]
Total fatalities	**499**	**261**	**146**	**124**	**1**	**526**	**39**	**168**	**380**	**8**	**1**	**12**	**92**	**531**
Total seriously injured persons	**N**	**N**	**107**	**81**	**19**	**30**	**29**	**25**	**77**	**43**	**30**	**67**	**27**	**18**
Total accidents	**90**	**83**	**55**	**37**	**19**	**21**	**24**	**36**	**37**	**49**	**50**	**R51**	**R56**	**45**
Fatal accidents	17	9	8	3	1	7	6	3	5	4	1	2	3	6
Aircraft-miles (millions)	**1,130**	**1,536**	**2,685**	**2,478**	**2,924**	**3,631**	**4,948**	**5,654**	**5,873**	**6,697**	**6,737**	**7,102**	**7,521**	**6,809**
Rates per 100 million aircraft-miles														
Fatalities	44.159	16.992	5.438	5.004	0.034	14.486	0.788	2.971	6.470	0.119	0.015	0.169	1.223	7.799
Seriously injured persons	N	N	3.985	3.269	0.650	0.826	0.586	0.442	1.311	0.642	0.445	R0.943	0.359	0.264
Total accidents	7.965	5.404	2.048	1.493	0.650	0.578	0.485	0.637	R0.630	0.732	0.742	R0.718	R0.745	0.661
Fatal accidents	1.504	0.586	0.298	0.121	0.034	0.193	0.121	0.053	0.085	0.060	0.015	R0.028	0.040	0.088
Aircraft departures (thousands)	**N**	**N**	**N**	**N**	**5,479**	**6,307**	**8,092**	**8,457**	**8,229**	**10,318**	**10,980**	**11,309**	**11,437**	**10,510**
Rates per 100,000 aircraft departures														
Fatalities	N	N	N	N	0.018	8.340	0.482	1.987	4.618	0.078	0.009	0.106	0.804	5.052
Seriously injured persons	N	N	N	N	0.347	0.476	0.358	0.296	0.936	0.417	0.273	R0.592	0.236	0.171
Total accidents	N	N	N	N	0.347	0.333	0.297	0.426	0.450	0.475	0.455	R0.451	R0.490	0.428
Fatal accidents	N	N	N	N	0.018	0.111	0.074	0.035	0.061	R0.039	R0.009	R0.018	R0.026	0.057
Flight hours (thousands)	**N**	**4,691**	**6,470**	**5,607**	**7,067**	**8,710**	**12,150**	**13,505**	**13,746**	**15,838**	**16,813**	**17,555**	**18,295**	**16,731**
Rates per 100,000 flight hours														
Fatalities	N	5.564	2.257	2.212	0.014	6.039	0.321	1.244	2.764	0.051	0.006	0.068	0.503	3.174
Seriously injured persons	N	N	1.654	1.445	0.269	0.344	0.239	0.185	0.560	0.271	0.178	0.382	0.148	0.108
Total accidents	N	1.769	0.850	0.660	0.269	0.241	0.198	0.267	0.234	0.309	0.297	0.291	R0.306	0.269
Fatal accidents	N	0.192	0.124	0.054	0.014	0.080	0.049	0.022	0.036	0.025	0.006	R0.011	R0.016	0.036

KEY: N = data do not exist; R = revised.

[a] Air carriers operating under 14 CFR 121, scheduled and nonscheduled service. Includes all scheduled and nonscheduled service accidents involving all-cargo carriers and commercial operators of large aircraft when those accidents occurred during 14 CFR 121 operations. Since Mar. 20, 1997, 14 CFR 121 includes aircraft with 10 or more seats formerly operated under 14 CFR 135. This change makes it difficult to compare pre-1997 data for 14 CFR 121 and 14 CFR 135 with more recent data.

[b] Other than the persons aboard the aircraft who were killed, fatalities resulting from the September 11 terrorist acts are excluded.

Continued next page

TABLE 2-9: U.S. Air Carrier[a] Safety Data (Continued)

NOTES

Miles, departures, and flight hours are compiled by the U.S. Department of Transportation, Federal Aviation Administration.

Rates are computed by dividing the number of fatalities, serious injuries, total accidents, and fatal accidents by the number of miles, departures, or flight hours. These figures are based on information provided by airlines to the U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information.

SOURCES

Fatalities, accidents, miles, departures, and flight hours:

1960: National Transportation Safety Board, *Annual Review of Aircraft Accident Data: U.S. Air Carrier Operations, Calendar Year 1967* (Washington, DC: December 1968).

1965-70: Ibid., *Calendar Year 1975*, NTSB/ARC-77/1 (Washington, DC: January 1977).

1975 (all categories except miles): Ibid., *Calendar Year 1983*, NTSB/ARC-87/01 (Washington, DC: February 1987), table 18.

1975 (miles): Ibid., *Calendar Year 1975*, NTSB/ARC-77/1 (Washington, DC: January 1977).

1980: Ibid., *Calendar Year 1981*, NTSB/ARC-85/01 (Washington, DC: February 1985), tables 2 and 16.

1985-2001: Ibid., National Transportation Safety Board, Internet site www.ntsb.gov/aviation/Table5.htm as of July 26, 2002 and personal communication, Nov. 15, 2002.

Serious injuries:

1970-85: Ibid., *Annual Review of Aircraft Accident Data: U.S. Air Carrier Operations* (Washington, DC: Annual issues).

1990-2001: Ibid., Analysis and Data Division, personal communication, July 26, 2002 and Nov. 15, 2002.

TABLE 2-10: U.S. Commuter Air Carrier[a] Safety Data

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Total fatalities	**37**	**37**	**6**	**9**	**14**	**46**	**0**	**12**	**5**	**13**
Total seriously injured persons	**14**	**14**	**11**	**17**	**2**	**1**	**2**	**2**	**7**	**4**
Total accidents	**38**	**18**	**15**	**12**	**11**	**16**	**8**	**13**	**12**	**7**
Fatal	8	7	3	2	1	5	0	5	1	2
Aircraft-miles (millions)	**192**	**301**	**450**	**550**	**591**	**246**	**51**	**R52**	**R46**	**39**
Rates per 100 million aircraft-miles										
Fatalities[b]	19.27	12.29	1.33	1.64	2.37	18.70	0.00	26.09	R10.86	33.33
Seriously injured persons	7.29	4.65	2.44	3.09	0.34	0.41	3.92	4.35	R15.21	10.26
Total accidents[b,c]	19.79	5.98	3.33	2.18	1.86	6.50	15.69	28.26	R26.09	17.97
Fatal[b,c]	4.17	2.33	0.67	0.36	0.17	2.03	0.00	10.87	R2.17	5.13
Aircraft departures (thousands)	**1,777**	**2,561**	**3,160**	**3,220**	**3,515**	**1,394**	**707**	**R672**	**611**	**498**
Rates per 100 thousand aircraft departures										
Fatalities[b]	2.08	1.44	0.19	0.28	0.40	3.30	0.00	1.79	0.82	2.61
Seriously injured persons	0.79	0.55	0.35	0.53	0.06	0.07	0.28	0.30	1.15	0.80
Total accidents[c]	2.14	0.70	0.47	0.37	0.31	1.15	1.13	1.93	1.96	1.41
Fatal	0.45	0.27	0.09	0.06	0.03	0.36	0.00	0.74	0.16	0.40
Flight hours (thousands)	**1,176**	**1,737**	**2,342**	**2,628**	**2,757**	**983**	**354**	**343**	**374**	**331**
Rates per 100 thousand flight hours										
Fatalities	3.15	2.13	0.26	0.34	0.51	4.68	0.00	3.50	1.34	3.93
Seriously injured persons	1.19	0.81	0.47	0.65	0.07	0.10	0.56	0.58	1.87	1.21
Total accidents[c]	3.23	1.04	0.64	0.46	0.40	1.63	2.26	3.79	3.21	2.11
Fatal[c]	0.68	0.40	0.13	0.08	0.04	0.51	0.00	1.46	0.27	0.60

KEY: R = revised.

[a] Air carriers operating under 14 CFR 135, scheduled service. Includes accidents involving all-cargo air carriers when those accidents occurred during scheduled 14 CFR 135 operations. Before Mar. 20, 1997, 14 CFR 135 applied to aircraft with 30 or fewer seats. Since Mar. 20, 1997, 14 CFR 135 includes only aircraft with fewer than 10 seats. This change makes it difficult to compare pre-1997 data with more recent years' data.

[b] Data updated by rounding to two significant digits instead of one.

[c] Rates are based on all accidents, including some that involve operators not reporting mileage or other traffic data to the U.S. Department of Transportation.

NOTES

Miles, departures, and hours are compiled by the U.S. Department of Transportation, Federal Aviation Administration.

Rates are computed by dividing the number of fatalities, serious injuries, total accidents, and fatal accidents by the number of miles, departures, or flight hours. These figures are based on information provided by airlines to the U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information.

SOURCES

Fatalities, accidents, aircraft-miles, aircraft departures, and flight hours:

1980: National Transportation Safety Board, *Annual Review of Aircraft Accident Data: U.S. Air Carrier Operations, Calendar Year 1980*, NTSB/ARC-83/01 (Washington, DC: January 1983), tables 26 and 40.

1985-2001: Ibid., Internet site www.ntsb.gov/aviation/Table 8.htm as of May 8, 2002.

Serious injuries:

1980-85: Ibid., *Annual Review of Aircraft Accident Data: U.S. Air Carrier Operations* (Washington, DC: Annual issues).

1990-2001: Ibid., Analysis and Data Division, personal communications, July 26, 2002.

TABLE 2-11: U.S. Air Carrier[a] Fatal Accidents by First Phase of Operation[b]

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	P2001
Total fatal accidents	**6**	**4**	**4**	**1**	**4**	**3**	**5**	**4**	**1**	**2**	**3**	**6**
Phase of operation												
Approach/descent/landing	1	2	1	0	2	2	0	0	0	1	R0	0
Taxi/takeoff/climb	3	1	2	0	1	0	3	2	0	0	R1	2
Cruise (in-flight)	1	0	0	0	0	0	1	1	0	0	1	0
Standing (static)	1	1	1	1	0	0	0	1	1	1	1	0
Maneuvering	0	0	0	0	1	0	0	0	0	0	0	0
Other/not reported	0	0	0	0	0	1	1	0	0	0	0	c4

KEY: P = preliminary.

[a] 14 CFR 121. Before Mar. 20, 1997, 14 CFR 121 applied only to aircraft with more than 30 seats or a maximum payload capacity of more than 7,500 pounds. Since Mar. 20, 1997, 14 CFR 121 includes aircraft with 10 or more seats that formerly operated under 14 CFR 135. This change makes it difficult to compare pre-1997 data with more recent data.

[b] First phase of operation is the phase of flight in which the first occurrence leading to the accident happened.

[c] Other/not reported numbers for 2001 are unusually high because of the incidents occurring on September 11.

SOURCES

1990-95: National Transportation Safety Board, *Annual Review of Aircraft Accident Data: U.S. Air Carrier Operations* (Washington, DC: Annual issues), table 18.

1996-2001: Ibid., personal communication, Aug. 21, 2002 and Nov. 15, 2002.

TABLE 2-12: U.S. Commuter Air Carrier[a] Fatal Accidents by First Phase of Operation

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	P2001
Total fatal accidents	**3**	**8**	**7**	**4**	**3**	**2**	**1**	**5**	**0**	**5**	**1**	**2**
Phase of operation												
Approach/descent/landing	0	3	5	1	2	0	1	2	0	0	1	0
Taxi/takeoff/climb	0	0	1	1	0	1	0	1	0	2	0	2
Cruise (in-flight)	2	2	1	1	1	0	0	0	0	3	0	0
Standing (static)	0	1	0	1	0	0	0	0	0	0	0	0
Maneuvering[b]	1	1	0	0	0	1	0	2	0	0	0	0
Other/not reported	0	1	0	0	0	0	0	0	0	0	0	0

KEY: P = preliminary.

[a] 14 CFR 135, scheduled operations. Before Mar. 20, 1997, 14 CFR applied to aircraft with 30 or fewer seats. Since Mar. 20, 1997, 14 CFR 135 includes only aircraft with fewer than 10 seats. This change makes it difficult to compare pre-1997 data with more recent years' data.

[b] Includes instructional flights performing turns and agricultural flights for spraying and buzzing (repeated passes over a particular location).

SOURCES

1990-96: National Transportation Safety Board, *Annual Review of Aircraft Accident Data: U.S. Air Carrier Operations* (Washington, DC: Annual issues), table 36.

1997-2001: Ibid., personal communication, Aug. 21, 2002.

TABLE 2-13: U.S. On-Demand Air Taxi[a] Safety Data

	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Total fatalities	**69**	**105**	**76**	**51**	**52**	**63**	**39**	**45**	**38**	**71**	**60**
Total seriously injured persons	**N**	**43**	**R44**	**36**	**14**	**22**	**23**	**10**	**14**	**12**	**24**
Total accidents	**152**	**171**	**157**	**107**	**75**	**90**	**82**	**77**	**73**	**R80**	**72**
Fatal	24	46	35	29	24	29	15	17	12	22	18
Flight hours (thousands)	**2,526**	**3,618**	**2,570**	**2,249**	**2,486**	**3,220**	**3,098**	**3,802**	**3,298**	**3,553**	**3,400**
Rates per 100,000 flight hours[b]											
Fatalities	2.73	2.90	2.96	2.27	2.09	1.96	1.26	1.18	1.15	2.00	1.76
Seriously injured persons	N	1.19	R1.71	1.60	0.56	0.68	0.74	0.26	0.42	0.34	0.71
Total accidents	6.02	4.73	6.11	4.76	3.02	2.80	2.65	2.03	2.21	R2.25	2.12
Fatal	0.95	1.27	1.36	1.29	0.97	0.90	0.48	0.45	0.36	0.62	0.53

KEY: N = data do not exist; R = revised.

[a] Air carriers operating under 14 CFR 135, nonscheduled service. Accidents on foreign soil and in foreign waters are excluded.

[b] Rates are computed by dividing the number of fatalities, serious injuries, total accidents, and fatal accidents by the number of flight hours.

NOTE
Hours are estimated by the U.S. Department of Transportation, Federal Aviation Administration.

SOURCES
Fatalities and accidents:
1975-80: National Transportation Safety Board, *Annual Review of Aircraft Accident Data: U.S. Air Carrier Operations, Calendar Year 1981*, NTSB/ARC-85/01 (Washington, DC: February 1985), table 61.
1985: Ibid., Internet site www.ntsb.gov/aviation/Table9.htm as of July 26, 2002.
1990-2001: Ibid., Analysis and Data Division, personal communications, July 29, 2002.

Flight hours:
1975-80: National Transportation Safety Board, *Annual Review of Aircraft Accident Data: U.S. Air Carrier Operations, Calendar Year 1981*, NTSB/ARC-85/01 (Washington, DC: February 1985), table 61.
1985-2002: Ibid., Internet site www.ntsb.gov/aviation/Table9.htm as of July 26, 2002.

Serious injuries:
1980-85: Ibid., *Annual Review of Aircraft Accident Data: U.S. Air Carrier Operations* (Washington, DC: Annual issues).
1990-2001: Ibid., Analysis and Data Division, personal communications, July 29, 2002 and Nov. 15, 2002.

TABLE 2-14: U.S. General Aviation[a] Safety Data

	1960[d]	1965[d]	1970[d]	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Total fatalities	**787**	**1,029**	**1,310**	**1,252**	**1,239**	**956**	**767**	**735**	**636**	**631**	**624**	**619**	**R593**	**563**
Total seriously injured persons	**N**	**N**	**715**	**769**	**681**	**501**	**409**	**396**	**365**	**350**	**327**	**322**	**R311**	**320**
Total accidents[b]	**4,793**	**5,196**	**4,712**	**3,995**	**3,590**	**2,739**	**2,241**	**2,056**	**1,908**	**1,845**	**1,904**	**1,906**	**R1,835**	**1,723**
Fatal	429	538	641	633	618	498	443	413	361	350	364	340	R342	325
Flight hours (thousands)	**13,121**	**16,733**	**26,030**	**28,799**	**36,402**	**28,322**	**28,510**	**24,906**	**24,881**	**25,591**	**25,518**	**29,713**	**P29,057**	**P26,220**
Rates per 100,000 flight hours[c]														
Fatalities	6.00	6.15	5.03	4.35	3.40	3.38	2.69	2.95	2.56	2.47	2.45	2.08	2.04	2.15
Seriously injured persons	N	N	2.75	2.67	1.87	1.77	1.43	1.59	1.47	1.37	1.28	1.08	1.07	1.22
Total accidents	36.53	31.05	18.10	13.87	9.86	9.66	7.86	8.26	7.67	7.21	7.46	6.41	6.32	6.57
Fatal	3.27	3.22	2.46	2.20	1.70	1.75	1.55	1.66	1.45	1.37	1.43	1.14	1.18	1.24

KEY: N = data do not exist; P = preliminary; R = revised.

[a] U.S. registered civil aircraft not operated under 14 CFR 121 or 14 CFR 135. Accidents on foreign soil and in foreign waters are excluded. Suicide/sabotage cases included in accidents and fatalities but excluded from accident rates in this table are: 1985 (3 accidents, 2 fatal accidents); 1990 (1,0); 1995 (4,3).

[b] Since April 1995, the National Transportation Safety Board has been required by law to investigate all public-use accidents, increasing the number of NTSB reported general aviation accidents by approximately 1.75%.

[c] Rates are computed by dividing the number of fatalities, serious injuries, total accidents, and fatal accidents by the number of flight hours.

[d] Data for 1960, 1965, and 1970 include air taxi.

NOTE
Flight hours are estimated by the U.S. Department of Transportation, Federal Aviation Administration.

SOURCES
Fatalities and accidents:
1960-70: National Transportation Safety Board, *Annual Review of Aircraft Accident Data: U.S. General Aviation, Calendar Year 1970*, NTSB/ARG-74/1 (Washington, DC: April 1974), table 117.
1975-80: Ibid., *Annual Review of Aircraft Accident Data: General Aviation, Calendar Year 1985*, NTSB/ARG-87/03 (Washington, DC: October 1987), table 21.
1985: Ibid., Internet site www.ntsb.gov/aviation/Table10.htm as of July 29, 2002.
1990-2001: Ibid., Analysis and Data Division, personal communications, July 29, 2002 and Nov. 15, 2002.

Flight hours:
1990-2001: Ibid., Internet site www.ntsb.gov/aviation/Table10.htm as of July 29, 2002 and Nov. 15, 2002.

Serious injuries:
1970-85: National Transportation Safety Board, *Annual Review of Aircraft Accident Data: General Aviation* (Washington, DC: Annual issues).
1990-2001: Ibid., Analysis and Data Division, personal communications, July 29, 2002 and Nov. 15, 2002.

TABLE 2-15: Number of Pilot-Reported Near Midair Collisions (NMAC) by Degree of Hazard

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Total NMAC	**568**	**758**	**454**	**238**	**194**	**238**	**211**	**R257**	**R239**	**211**
Degree of hazard, totals										
Critical[a]	118	180	74	32	26	31	22	28	R30	37
Potential[b]	319	423	266	139	101	105	100	R110	R130	93
No hazard[c]	122	133	114	63	55	70	53	55	R49	50
Unclassified[d]	9	22	0	4	12	32	36	64	R30	31
NMAC involving aircraft operating under 14 CFR 121[e]	U	U	121	43	50	81	64	63	R69	48

KEY: R = revised; U = data are not available.

[a] A situation where collision avoidance was due to chance, rather than an act on the part of the pilot. Less than 100 feet of aircraft separation would be considered critical.

[b] An incident that would probably have resulted in a collision if no action had been taken by either pilot. Less than 500 feet would usually be required in this case.

[c] When direction and altitude would have made a midair collision improbable, regardless of evasive action taken.

[d] No determination could be made due to insufficient evidence or unusual circumstances, or because incident is still under investigation.

[e] Before Mar. 20, 1997, 14 CFR 121 applied only to aircraft with more than 30 seats or a maximum payload capacity of more than 7,500 pounds. Since Mar. 20, 1997, 14 CFR 121 includes aircraft with 10 or more seats that formerly operated under 14 CFR 125. This change makes it difficult to compare pre-1997 data with more recent years' data.

NOTE
Includes air carriers, general aviation, military, and other aircraft involved in public-use operations.

SOURCES
U.S. Department of Transportation, Federal Aviation Administration, *Aviation Safety Statistical Handbook Annual Report* (Washington, DC: Annual issues) and personal communication, Aug. 6, 2002.
NMAC involving 121 aircraft: Ibid. Air Traffic Resource Management, personal communications, Aug. 6, 2002.

TABLE 2-16: Airline[a] Passenger Screening Results by Type of Weapons Detected, Persons Arrested, and Bomb Threats Received

	1980	1985	1990	1995	1996	1997	1998	1999	2000
Persons screened (millions)	**585**	**993**	**1,145**	**1,263**	**1,497**	**1,660**	**1,667**	**1,767**	**1,812**
Type of weapon detected									
Firearms									
Handguns	1,878	2,823	2,490	2,230	1,999	1,905	1,401	1,421	1,643
Long guns	36	90	59	160	156	162	114	131	294
Total	**1,914**	**2,913**	**2,549**	**2,390**	**2,155**	**2,067**	**1,515**	**1,552**	**1,937**
Other / other dangerous articles[b]	108	74	304	N	N	N	N	N	N
Explosive / incendiary devices	8	12	15	N	N	N	N	N	N
Persons arrested									
Carrying firearms / explosives	1,031	1,310	1,336	1,194	999	924	660	633	600
Giving false information	32	42	18	68	131	72	86	58	61
Bomb threats received									
Against airports	1,179	477	448	346	N	N	N	N	N
Against aircraft	268	153	338	327	N	N	N	N	N

KEY: N = data do not exist.

[a] Includes operators with a U.S. Department of Transportation, Federal Aviation Administration operating certificate engaged in scheduled passenger or public charter passenger operations and airports at which these operations are conducted.

[b] In 1980 and 1985, the "other category was included with firearms; in 1990, "other" became "other dangerous articles."

NOTES

Beginning in 1996, the Office of Civil Aviation Security Policy and Planning stopped keeping records of bomb threats received due to inconsistent reporting. The reporting of other / other dangerous articles was discontinued in 1992 and reporting of explosive / incendiary devices was discontinued in 1994 for the same reasons.

SOURCES

Persons screened, type of weapon detected, and persons arrested:

1980-85: U.S. Department of Transportation, Federal Aviation Administration, *Semiannual Report to Congress on the Effectiveness of the Civil Aviation Security Program, July 1-December 31, 1985* (Washington, DC: May 1986).

1990-2000: Ibid. Office of Civil Aviation Security Policy and Planning, *Annual Report to Congress on Civil Aviation Security* (Washington, DC: Annual issues), and personal communications, May 27, 1999, Mar. 29, 2000, and Aug. 7, 2001.

Bomb threats received:

U.S. Department of Transportation, Federal Aviation Administration, *Criminal Acts Against Civil Aviation* (Washington, DC: Annual issues).

Section C
Highway

TABLE 2-17: Motor Vehicle Safety Data

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Fatalities	**36,399**	**47,089**	**52,627**	**44,525**	**51,091**	**43,825**	**44,599**	**41,817**	**42,065**	**42,013**	**41,501**	**41,717**	**R41,945**	**42,116**
Injured persons[E]	**N**	**N**	**N**	**N**	**N**	**N**	**3,230,666**	**3,465,279**	**3,483,319**	**3,347,614**	**3,192,035**	**3,236,238**	**3,188,750**	**3,032,672**
Crashes[E]	**N**	**N**	**N**	**N**	**N**	**N**	**6,471,202**	**6,699,415**	**6,769,583**	**6,624,149**	**6,334,573**	**6,279,036**	**6,393,624**	**6,322,896**
Vehicle-miles (millions)	**718,763**	**887,811**	**1,109,724**	**1,327,664**	**1,527,295**	**1,774,827**	**2,144,362**	**2,422,696**	**2,485,848**	**2,561,695**	**2,631,522**	**2,691,056**	**2,749,803**	**U**
Rates per 100 million vehicle-miles														
Fatalities	5.1	5.3	4.7	3.4	3.3	2.5	2.1	1.7	1.7	1.6	1.6	1.6	1.5	U
Injured persons[E]	N	N	N	N	N	N	151	143	140	131	121	120	116	U
Crashes[E]	N	N	N	N	N	N	302	277	272	259	241	233	233	U

KEY: E = estimated; N = data do not exist; R = revised; U = data are not available.

SOURCES

Fatalities:

1960-70: Estimated by U.S. Department of Transportation, National Highway Traffic Safety Administration from data supplied by U.S. Department of Health and Human Services, National Center for Health Statistics, and individual state accident reports (adjusted to 30-day deaths). Fatalities data prior to 1975 have been adjusted to reflect the Fatality Analysis Reporting System's definition of a fatal crash as one that involves a motor vehicle on a trafficway, which results in the death of a vehicle occupant or a nonmotorist within 30 days of the crash.

1975-2001: U.S. Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, *Traffic Safety Facts 2000*, DOT HS 809 337 (Washington, DC: December 2001), table 2 and personal communication, Sept. 10, 2002.

Injured persons:

1990-2001: Ibid., *Traffic Safety Facts 2000*, DOT HS 809 337 (Washington, DC: December 2001), table 2 and personal communication, Sept. 10, 2002.

Crashes:

1990-2001: Ibid., *Traffic Safety Facts 2000*, DOT HS 809 337 (Washington, DC: December 2001), table 1 and personal communication, Sept. 10, 2002.

Vehicle-miles:

1960-65: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.

1975-2001: U.S. Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, *Traffic Safety Facts 2000*, DOT HS 809 337 (Washington, DC: December 2001), table 2 and personal communication, Sept. 10, 2002.

Fatality and injury rates:

1960-65: Calculated by U.S. Department of Transportation, Bureau of Transportation Statistics.

1970-2001: U.S. Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, *Traffic Safety Facts 2000*, DOT HS 809 337 (Washington, DC: December 2001), table 2 and personal communication, Sept. 10, 2002.

Crash rates:

Calculated by U.S. Department of Transportation, Bureau of Transportation Statistics.

TABLE 2-18: Motor Vehicle Fatalities, Vehicle-Miles, and Associated Rates by Highway Functional System

	1980	1985	1990	1995	1996	1997	1998	1999	2000
Fatalities									
Rural, total	**29,545**	**24,492**	**25,786**	**23,978**	**24,510**	**24,811**	**24,751**	**25,185**	**23,640**
Interstate	2,263	2,141	2,707	2,675	2,905	3,040	3,105	3,244	3,199
Other arterial	12,268	9,940	9,893	9,947	9,458	9,678	9,594	9,573	8,913
Collector	10,004	8,209	8,852	7,401	7,481	7,643	7,593	7,595	7,147
Local	5,010	4,202	4,334	3,955	4,666	4,450	4,459	4,773	4,381
Urban, total	**21,546**	**19,333**	**18,813**	**17,839**	**17,555**	**16,758**	**16,143**	**15,970**	**15,695**
Interstate	2,184	2,025	2,252	2,154	2,323	2,292	2,283	2,353	2,388
Other arterial	12,752	12,521	11,742	10,916	10,756	10,239	9,902	9,628	9,442
Collector	2,226	1,696	1,427	1,441	1,290	1,163	1,037	1,031	987
Local	4,384	3,091	3,392	3,328	3,186	3,064	2,921	2,958	2,878
Vehicle-miles of travel (VMT) (millions)									
Rural, total	**672,030**	**730,728**	**868,878**	**933,289**	**960,194**	**1,001,350**	**1,033,457**	**1,062,623**	**1,084,961**
Interstate	135,084	154,357	200,173	223,382	232,565	240,255	251,520	260,166	268,960
Other arterial	262,774	282,803	330,866	368,595	378,847	392,058	403,484	413,320	420,569
Collector	189,468	206,669	240,460	236,148	241,030	254,364	257,858	264,453	267,521
Local	84,704	86,899	97,379	105,164	107,752	114,673	120,595	124,684	127,911
Urban, total	**855,265**	**1,044,098**	**1,275,484**	**1,489,534**	**1,523,886**	**1,560,345**	**1,598,065**	**1,626,618**	**1,664,842**
Interstate	161,242	216,188	278,901	341,528	351,579	361,401	374,622	382,259	393,580
Other arterial	484,189	578,270	699,233	815,170	834,623	846,659	862,994	878,153	900,161
Collector	83,043	89,578	106,297	126,929	129,310	130,143	131,919	131,603	135,371
Local	126,791	160,062	191,053	205,907	208,374	222,142	228,530	234,603	235,730
Fatality rates per 100 million vehicle miles									
Rural, total	**4.40%**	**3.35%**	**2.97%**	**2.57%**	**2.55%**	**2.48%**	**2.39%**	**2.37%**	**2.18%**
Interstate	1.68%	1.39%	1.35%	1.20%	1.25%	1.27%	1.23%	1.25%	1.19%
Other arterial	4.67%	3.51%	2.99%	2.70%	2.50%	2.47%	2.38%	2.32%	2.12%
Collector	5.28%	3.97%	3.68%	3.13%	3.10%	3.00%	2.94%	2.87%	2.67%
Local	5.91%	4.84%	4.45%	3.76%	4.33%	3.88%	3.70%	3.83%	3.43%
Urban, total	**2.52%**	**1.85%**	**1.47%**	**1.20%**	**1.15%**	**1.07%**	**1.01%**	**0.98%**	**0.94%**
Interstate	1.35%	0.94%	0.81%	0.63%	0.66%	0.63%	0.61%	0.62%	0.61%
Other arterial	2.63%	2.17%	1.68%	1.34%	1.29%	1.21%	1.15%	1.10%	1.05%
Collector	2.68%	1.89%	1.34%	1.14%	1.00%	0.89%	0.79%	0.78%	0.73%
Local	3.46%	1.93%	1.78%	1.62%	1.53%	1.38%	1.28%	1.26%	1.22%

NOTES:
Includes the 50 states and the District of Columbia.
Fatality figures reflect original figures received by FHWA from NHTSA, and, when totaled, differ slightly from the revised NHTSA figures that appear in other tables in this volume.

SOURCES:
Fatalities:
1980-95: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, Internet site www.fhwa.dot.gov/ohim/ohimstat.htm as of Oct. 25, 2000.
1996-97: Ibid., *Highway Statistics*, Internet site www.fhwa.dot.gov/ohim/ohimstat.htm as of Oct. 25, 2000, table FI-1.
1998: Ibid., table FI-20.
1999: Ibid., personal communication, June 5, 2002.
2000: Ibid., Internet site http://fhwa.dot.gov/ohim/hs00/re.htm as of October 2001, table FI-20.

Vehicle miles:
1980-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-202.
1995-98: Ibid., *Highway Statistics*, Internet site www.fhwa.dot.gov/ohim/ohimstat.htm as of Oct. 25, 2000, tables VM-2 and VM-2a.
1999: Ibid., personal communication, June 5, 2002.
2000: Ibid., Internet site http://fhwa.dot.gov/ohim/hs00/re.htm as of Oct. 2001, table VM-2.

Fatality rates:
Calculated by the U.S. Department of Transportation, Bureau of Transportation Statistics.

TABLE 2-19: Occupant Fatalities by Vehicle Type and Nonoccupant Fatalities

	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
TOTAL traffic fatalities	**44,525**	**51,091**	**43,825**	**44,599**	**41,817**	**[d]42,065**	**42,013**	**41,501**	**41,717**	**[R]41,945**	**42,116**
Occupant fatalities (by vehicle type)	**35,925**	**41,927**	**36,043**	**37,134**	**35,291**	**35,695**	**35,725**	**35,382**	**35,875**	**[R]36,348**	**36,386**
Passenger car, total	**25,929**	**27,449**	**23,212**	**24,092**	**22,423**	**22,505**	**22,199**	**21,194**	**20,862**	**[R]20,699**	**20,233**
Subcompact[a]	3,834	7,299	7,993	8,309	6,791	6,618	6,220	5,514	4,887	[R]4,773	4,417
Compact	614	927	2,635	5,310	6,899	7,288	7,195	6,804	6,942	[R]7,022	6,718
Intermediate	1,869	3,878	4,391	4,849	4,666	4,670	4,794	4,617	4,721	[R]5,204	5,401
Full[b]	10,800	11,580	6,586	4,635	3,413	3,417	3,481	3,106	2,887	[R]3,184	3,168
Unknown	8,812	3,765	1,607	989	654	512	509	1,153	1,425	[R]516	529
Truck[c], total	**5,817**	**8,748**	**7,666**	**9,306**	**10,216**	**10,553**	**10,972**	**11,447**	**12,024**	**[R]12,280**	**12,381**
Light	4,856	7,486	6,689	8,601	9,568	9,932	10,249	10,705	11,265	[R]11,526	11,677
Large	961	1,262	977	705	648	621	723	742	759	[R]754	704
Other vehicles, total	**4,179**	**5,730**	**5,165**	**3,736**	**2,652**	**2,637**	**2,554**	**2,741**	**2,989**	**[R]3,369**	**3,772**
Motorcycle	3,189	5,144	4,564	3,244	2,227	2,161	2,116	2,294	2,483	[R]2,897	3,181
Bus	53	46	57	32	33	21	18	38	59	22	34
Other / unknown vehicle type	937	540	544	460	392	455	420	409	447	[R]450	557
Nonoccupant fatalities, total	**8,600**	**9,164**	**7,782**	**7,465**	**6,526**	**6,368**	**6,288**	**6,119**	**5,842**	**[R]5,597**	**5,730**
Pedestrian	7,516	8,070	6,808	6,482	5,584	5,449	5,321	5,228	4,939	[R]4,763	4,882
Pedalcyclist	1,003	965	890	859	833	765	814	760	754	[R]693	728
Other	81	129	84	124	109	154	153	131	149	[R]141	120

KEY: R = revised.

[a] Includes minicompact cars (wheelbase under 95 inches) and subcompact cars (wheelbase between 95 and 99 inches).

[b] Includes cars with a wheelbase of 110 inches or greater.

[c] See table 2-23 for definitions of light and large trucks.

[d] Includes two fatalities that could not be assigned to a category above.

SOURCES

U.S. Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, *Traffic Safety Facts 2000*, DOT HS 809 337 (Washington, DC: December 2001), table 13 and personal communication, Sept. 10, 2002.

Breakout of passenger car types:

U.S. Department of Transportation, National Center for Statistics and Analysis, Fatality Analysis Reporting System Database, 2002.

TABLE 2-20: Occupant and Nonmotorist Fatalities in Crashes by Number of Vehicles and Alcohol Involvement (AI)

	1985		1990		1995		1996		1997	
	Fatal	RAI	Fatal	RAI	Fatal	RAI	Fatal	RAI	Fatal	AI
TOTAL fatalities	**43,825**	**23,167**	**44,599**	**22,587**	**41,817**	**17,732**	**42,065**	**17,749**	**42,013**	**R16,711**
Percent of total fatalities		53		51		42		42		R40
Motorist fatalities, total	**36,043**	**19,271**	**37,134**	**18,953**	**35,291**	**14,796**	**35,695**	**14,830**	**35,725**	**R14,051**
Single-vehicle crashes	17,130	10,882	18,159	11,162	16,732	8,868	16,723	8,781	16,529	R8,244
Two-vehicle crashes	16,467	7,296	16,262	6,676	15,744	5,017	15,935	5,084	16,218	R4,904
More than two-vehicle crashes	2,446	1,093	2,713	1,115	2,815	911	3,037	965	2,978	R904
Nonmotorist fatalities, total	**7,782**	**3,896**	**7,465**	**3,634**	**6,526**	**2,936**	**6,368**	**2,919**	**6,288**	**R2,660**
Pedestrians	**6,808**	**3,574**	**6,482**	**3,264**	**5,584**	**2,607**	**5,449**	**2,593**	**5,321**	**R2,350**
Single-vehicle crashes	6,342	3,278	5,990	2,966	R5,110	2,364	5,024	2,358	4,876	R2,112
Multiple-vehicle crashes	466	297	492	298	474	243	425	235	445	R239
Pedalcyclists	**890**	**283**	**859**	**314**	**833**	**290**	**765**	**265**	**814**	**R252**
Single-vehicle crashes	864	271	832	301	807	279	739	253	788	R244
Multiple-vehicle crashes	26	13	27	14	26	11	26	12	26	8
Others / unknown	**84**	**38**	**124**	**57**	**109**	**39**	**154**	**61**	**153**	**R58**

KEY: AI = Alcohol involvement; Fatal = fatalities; R = revised.

NOTES

Alcohol involvement pertains to any driver, pedestrian, or pedalcyclist involved in the accident. Alcohol results are determined from positive blood alcohol concentration tests and police-reported alcohol involvement and are adjusted by the U.S. Department of Transportation, National Highway Traffic Safety Administration.

In 2001, NHTSA adopted a new method to estimate missing blood alcohol concentration (BAC) test result data. This new method, multiple imputation, is being used by NHTSA's National Center for Statistics and Analysis (NCSA) to improve the scope of alcohol involvement statistics by the Fatality Analysis Reporting System (FARS). As a result of the methodology change, alcohol involvement fatalities have undergone a complete revision.

Alcohol involvement numbers may not equal totals due to rounding.

SOURCE

U.S. Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, Fatality Analysis Reporting System (FARS) Database, personal communication, Sept. 10, 2002.

TABLE 2-21: Passenger Car Occupant Safety Data

	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Fatalities	**25,929**	**27,449**	**23,212**	**24,092**	**22,423**	**22,505**	**22,199**	**21,194**	**20,862**	**R20,699**	**20,233**
Injured persons[E]	**N**	**N**	**N**	**2,376,439**	**2,469,358**	**2,458,080**	**2,340,612**	**2,201,375**	**2,137,503**	**2,051,609**	**1,926,625**
Crashes[E]	**N**	**N**	**N**	**5,560,592**	**5,593,685**	**5,598,699**	**5,423,286**	**5,146,124**	**4,915,734**	**4,926,243**	**4,831,727**
Vehicle-miles (millions)	**1,030,376**	**1,107,056**	**1,248,981**	**1,427,178**	**1,478,352**	**1,499,139**	**1,528,399**	**1,555,901**	**1,566,808**	**1,582,113**	**U**
Rates per 100 million vehicle-miles											
Fatalities	2.5	2.5	1.9	1.7	1.5	1.5	1.5	1.4	1.3	1.3	U
Injured persons[E]	N	N	N	R166	167	164	153	141	136	130	U
Crashes[E]	N	N	N	390	378	373	355	331	314	311	U

KEY: E = estimated; N = data do not exist; R = revised; U = data are not available.

NOTES

The injury and crash data in this table are from the U.S. Department of Transportation (USDOT), National Highway Traffic Safety Administration's (NHTSA) General Estimates System (GES). The data from GES, which began operation in 1988, are obtained from a nationally representative probability sample selected from all police-reported crashes. The GES sample includes only crashes where a police accident report was completed and the crash resulted in property damage, injury, or death. The resulting figures do not take into account crashes that were not reported to the police or that did not result in property damage. The 1993 *National Transportation Statistics* (NTS) *Historical Compendium* and earlier editions illustrated crashes and injury figures estimated by the National Safety Council, which used a different set of methods to arrive at its figures. Thus, the injury and crash figures in this edition of NTS may not be comparable with those found in the *Compendium* and earlier editions.

USDOT, Bureau of Transportation Statistics rounded vehicle-miles to the nearest billion.

Vehicle-miles in this table and in table 2-23 are taken from NHTSA revised data and are not based exclusively on USDOT, Federal Highway Administration (FHWA) data. The change was made to reflect the different vehicle classification schemes used by FHWA. and NHTSA. Thus, vehicle-miles for passenger cars, and light and large trucks in this table and table 2-23 should not be compared with vehicle-miles in chapter 1, which are taken directly from FHWA.

SOURCES

Fatalities, injuries, vehicle miles, fatality and injury rates:

U.S. Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, *Traffic Safety Facts 2000*, DOT HS 809 337 (Washington, DC: December 2001), table 7 and personal communication, Sept. 10, 2002.

Crashes:

U.S. Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, Fatality Analysis Reporting System Database and General Estimates System Database, personal communication, Sept. 10, 2002.

Crash rates:

Calculated by U.S. Department of Transportation, Bureau of Transportation Statistics by dividing the number of crashes by the vehicle-miles traveled.

TABLE 2-22: Motorcycle Rider Safety Data

	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Fatalities	**3,189**	**5,144**	**4,564**	**3,244**	**2,227**	**2,161**	**2,116**	**2,294**	**2,483**	**R2,897**	**3,181**
Injured persons[E]	**N**	**N**	**N**	**84,285**	**57,480**	**55,281**	**52,574**	**48,974**	**49,986**	**57,723**	**60,236**
Crashes[E]	**N**	**N**	**N**	**103,114**	**66,354**	**66,224**	**61,451**	**54,477**	**57,322**	**68,783**	**73,326**
Vehicle-miles (millions)	**5,629**	**10,214**	**9,086**	**9,557**	**9,797**	**9,920**	**10,081**	**10,283**	**10,584**	**10,479**	**U**
Rates per 100 million vehicle-miles[a]											
Fatalities	57	50	50	34	23	22	21	22	R23	R28	U
Injured persons[E]	N	N	N	882	587	557	522	476	472	R553	U
Crashes[E]	N	N	N	1,079	677	668	610	530	542	656	U

KEY: E = estimated; N = data do not exist; R = revised; U = data are not available.

[a] U.S. Department of Transportation (USDOT), National Highway Traffic Safety Administration (NHTSA) rounds its injury and crash data to the nearest thousand before publishing them, but it calculates injury rates using the unrounded data. NHTSA also calculates fatality and injury rates using vehicle-miles expressed to a higher level of precision than shown here. USDOT, Bureau of Transportation Statistics rounded vehicle-miles to the nearest 100 million in this table.

NOTE

The injury and crash data in this table are from NHTSA's General Estimates System (GES). The data from the GES, which began operation in 1988, are obtained from a nationally representative probability sample selected from all police-reported crashes. The GES sample includes only crashes where a police accident report was completed and the crash resulted in property damage, injury, or death. The resulting figures do not take into account crashes that were not reported to the police or that did not result in property damage. The 1993 *National Transportation Statistics* (NTS) *Compendium* and earlier editions illustrated crashes and injury figures estimated by the National Safety Council, which used a different set of methods to arrive at its figures. Thus, the injury and crash figures in this edition of NTS may not be comparable with those found in the *Compendium* and earlier editions.

SOURCES

Fatalities, injuries, and vehicle-miles:

U.S. Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, *Traffic Safety Facts 2000*, DOT HS 809 337 (Washington, DC: December 2001), table 10 and personal communication, Sept. 10, 2002.

Crashes:

U.S. Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, Fatality Analysis Reporting System Database and General Estimates System Database, personal communication, Sept. 10, 2002.

TABLE 2-23: Truck Occupant Safety Data

	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Fatalities											
Light	4,856	7,486	6,689	8,601	9,568	9,932	10,249	10,705	11,265	R11,526	11,677
Large	961	1,262	977	705	648	621	723	742	759	R754	704
Total	**5,817**	**8,748**	**7,666**	**9,306**	**10,216**	**10,553**	**10,972**	**11,447**	**12,024**	**R12,280**	**12,381**
Injured persons[E]											
Light	N	N	N	505,144	722,496	761,478	754,820	762,506	846,865	886,566	860,527
Large	N	N	N	41,822	30,344	32,760	30,913	28,767	32,892	30,832	29,424
Total	**N**	**N**	**N**	**546,966**	**752,840**	**794,238**	**785,733**	**791,273**	**879,757**	**917,398**	**889,951**
Crashes[E]											
Light	N	N	N	2,152,486	2,749,596	2,880,782	2,900,896	2,866,729	3,079,617	3,207,738	3,254,027
Large	N	N	N	371,801	362,883	378,335	421,377	391,807	452,444	437,861	409,352
Total[a]	**N**	**N**	**N**	**2,459,908**	**3,039,159**	**3,175,497**	**3,225,320**	**3,167,967**	**3,425,409**	**3,539,797**	**3,560,956**
Vehicle-miles (millions)											
Light	204,274	295,475	388,778	555,659	749,971	787,255	824,896	861,951	903,314	943,819	U
Large	81,330	108,491	123,504	146,242	178,156	182,971	191,477	196,380	202,688	205,791	U
Rates per 100 million vehicle-miles											
Fatalities											
Light	2.4	2.5	1.7	1.5	1.3	1.3	1.2	1.2	1.2	1.2	U
Large	1.2	1.2	0.8	0.5	0.4	0.3	0.4	0.4	0.4	0.4	U

Continued next page

TABLE 2-23: Truck Occupant Safety Data (Continued)

	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Injured persons[E]											
Light	N	N	N	91	96	97	92	88	94	94	U
Large	N	N	N	29	17	18	16	15	16	15	U
Crashes[E]											
Light	N	N	N	387	367	366	352	333	341	340	U
Large	N	N	N	254	204	207	220	200	223	213	U

KEY: E = estimated; N = data do not exist; R = revised; U = data are not available.

[a] Crashes often involve more than one type of truck (light or large), hence "total truck crashes" is smaller than the sum of the components.

NOTES

Large trucks - trucks over 10,000 pounds gross vehicle weight rating, including single-unit trucks and truck tractors. Light trucks - trucks of 10,000 pounds gross vehicle weight rating or less, including pickups, vans, truck-based station wagons, and utility vehicles. The injury and crash data in this table are from the U.S. Department of Transportation (USDOT), National Highway Traffic Safety Administration's (NHTSA) General Estimates System (GES). The data from GES, which began operation in 1988, are obtained from a nationally representative probability sample selected from all police-reported crashes. The GES sample includes only crashes where a police accident report was completed and the crash resulted in property damage, injury, or death. The resulting figures do not take into account crashes that were not reported to the police or that did not result in property damage.

The *1993 National Transportation Statistics (NTS) Historical Compendium* and earlier editions illustrated crashes and injury figures estimated by the National Safety Council, which used a different set of methods to arrive at its figures. Thus, the injury and crash figures in this edition of NTS may not be comparable with those found in the *Compendium* and earlier editions.

USDOT, Bureau of Transportation Statistics rounded vehicle-miles to the nearest billion.

Vehicle-miles in this table and in table 2-19 are taken from NHTSA revised data and are not based exclusively on USDOT, Federal Highway Administration (FHWA) data, as they have been in earlier reports. The change was made to reflect the different vehicle classification schemes used by FHWA and NHTSA. Thus, vehicle-miles for passenger cars and light and large trucks in table 2-19 and this table should not be compared with vehicle-miles in Chapter 1, which are taken directly from FHWA.

SOURCES

Fatalities, injuries, vehicle-miles, fatality and injury rates:

U.S. Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, *Traffic Safety Facts 2000*, DOT HS 809 337 (Washington, DC: December 2001), tables 8, 9, and personal communication, Sept. 10, 2002.

Crashes:

Ibid., National Center for Statistics and Analysis, Fatality Analysis Reporting System Database and General Estimates System Database, personal communication, Sept. 10, 2002.

Crash rates:

Calculated by the U.S. Department of Transportation, Bureau of Transportation Statistics.

TABLE 2-24: Bus Occupant Safety Data[a]

	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Fatalities	**53**	**46**	**57**	**32**	**33**	**21**	**18**	**38**	**59**	**22**	**34**
Injured persons[E]	**N**	**N**	**N**	**32,691**	**19,214**	**20,291**	**16,887**	**15,559**	**21,958**	**17,769**	**15,427**
Crashes[E]	**N**	**N**	**N**	**60,412**	**58,847**	**57,185**	**53,376**	**53,385**	**62,591**	**55,594**	**54,264**
Vehicle-miles (millions)	**6,055**	**6,059**	**4,478**	**5,726**	**6,420**	**6,563**	**6,842**	**7,007**	**7,662**	**7,601**	**U**
Rates per 100 million vehicle-miles[b]											
Fatalities	0.9	0.8	1.3	0.6	0.5	0.3	0.3	0.5	0.8	0.3	U
Injured persons[E]	N	N	N	571	299	309	247	222	287	234	U
Crashes[E]	N	N	N	1,055	917	871	780	762	817	731	U

KEY: E = estimated; N = data do not exist; U = data are not available.

[a] Bus includes school, transit, and intercity buses.

[b] The U.S. Department of Transportation (USDOT), National Highway Traffic Safety Administration (NHTSA) rounds its injury and crash data to the nearest thousand, but injury and crash rates are calculated using the unrounded data. NHTSA also calculates fatality, injury, and crash rates using vehicle-miles expressed to a higher level of precision than shown here. Thus, injury and crash rates shown in this table may differ slightly from the rates that would be calculated from the data in this table. USDOT, Bureau of Transportation Statistics has rounded vehicle-miles to the nearest 100 million in this table.

NOTE

The injury and crash data in this table are from the U.S. Department of Transportation (USDOT), National Highway Traffic Safety Administration's (NHTSA) General Estimates System (GES). The data from GES, which began operation in 1988, are obtained from a nationally representative probability sample selected from all police-reported crashes. The GES sample includes only crashes where a police accident report was completed and the crash resulted in property damage, injury, or death. The resulting figures do not take into account crashes that were not reported to the police or that did not result in property damage. The 1993 National Transportation Statistics (NTS) Historical Compendium and earlier editions illustrated crashes and injury figures estimated by the National Safety Council, which used a different set of methods to arrive at its figures. Thus, the injury and crash figures in this edition of NTS may not be comparable with those found in the Compendium and in earlier editions.

SOURCES

Fatalities and injuries:

1975-2000: U.S. Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, *Traffic Safety Facts 2000*, DOT HS 809 337 (Washington, DC: December 2001), tables 4, 51, and personal communication, Sept. 10, 2002.

Crashes:

1990-2000: Ibid., General Estimates System Database, personal communication, Sept 10, 2002.

Vehicle-miles:

1975-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995* (Washington, DC: July 1997), table VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

TABLE 2-25: Fatalities by Highest Blood Alcohol Concentration (BAC) in Highway Crashes

	1985	1990	1995	1996	1997	1998	1999	2000	2001
Total fatalities	**43,825**	**44,599**	**41,817**	**42,065**	**42,013**	**41,501**	**41,717**	**R41,945**	**42,116**
Fatalities in alcohol-related crashes[R]	**23,167**	**22,587**	**17,732**	**17,749**	**16,711**	**16,673**	**16,572**	**17,380**	**17,448**
Percent	52.9%	50.6%	42.4%	42.2%	38.5%	40.2%	39.7%	41.4%	41.4%
BAC = 0.00									
Number[R]	20,659	22,012	24,085	24,316	25,302	24,828	25,145	24,565	24,668
Percent	47.1%	49.4%	57.6%	57.8%	61.5%	59.8%	60.3%	58.6%	58.6%
BAC = 0.01 - 0.07									
Number[R]	3,081	2,980	2,490	2,486	2,290	2,465	2,321	2,511	2,515
Percent	7.0%	6.7%	6.0%	5.9%	8.3%	5.9%	5.6%	6.0%	6.0%
BAC = 0.08+									
Number[R]	20,086	19,607	15,242	15,263	14,421	14,207	14,250	14,870	14,933
Percent	45.8%	44.0%	36.4%	36.3%	30.3%	34.2%	29.6%	35.5%	35.5%

KEY: BAC = blood alcohol concentration; R = revised.

NOTES

BAC values have been assigned by U.S. Department of Transportation, National Highway Traffic Safety Administration (NHTSA) when alcohol test results are unknown. Alcohol-related crashes pertain to the BAC of the driver and nonoccupants struck by motor vehicles. For some years, numbers may not add to totals due to rounding.

In 2001, NHTSA adopted a new method to estimate missing blood alcohol concentration (BAC) test result data. This new method, multiple imputation, is being used by NHTSA's National Center for Statistics and Analysis (NCSA) to improve the scope of alcohol involvement statistics by the Fatality Analysis Reporting System (FARS). As a result of the methodology change, BAC 0.08 breakouts, which coincide with many state laws, can now be determined. Thus, NHTSA's general reporting categories have been modified to reflect this and are now BAC 0.00, BAC 0.01-0.07, and BAC 0.08+.

SOURCE

U.S. Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, *Traffic Safety Facts 2000*, DOT HS 809 337 (Washington, DC: December 2001), table 13 and personal communication, Sept. 10, 2002.

TABLE 2-26: Number of States with Different Types of Anti-DUI / DWI Legislation in Effect as of January 1 of the Listed Year

	1986	1990	1992	1994	1996	1997	1998	1999	2000	2001
BAC = 0.08 per se laws[a]	2	4	5	10	13	13	15	16	[c]18	[c]20
BAC level 0.02 or less for persons younger than 21 years	0	0	3	12	[c]28	[c]38	[c]51	[c]51	[c]51	[c]51
Administrative license revocation (ALR) for DUI / DWI offenders[b]	[c]21	[c]27	[c]30	[c]33	[c]38	[c]40	[c]41	[c]41	[c]41	[c]41

KEY: BAC = blood alcohol concentration; DUI = driving under the influence; DWI = driving while intoxicated.

[a] Per se law makes it illegal in and of itself to drive with an alcohol concentration measured at or above a certain level.

[b] States that impose additional thresholds for ALR beyond those imposed for DUI/DWI are not included in these figures.

[c] Includes the District of Columbia.

NOTE
National Uniform Minimum Drinking Age Act, which standardized the minimum drinking age at 21, was enacted in 1984.

SOURCES
0.02 BAC and Administrative license revocation:
1986-98: U.S. Department of Transportation, National Highway Traffic Safety Administration, Traffic Safety Programs, Research and Evaluation Division, personal communications, Apr. 9, 1999 and Oct. 4, 1999.
1999-2000: Ibid. Impaired Driving Division, personal communications, May 22, 2000.
2001: Ibid. *Setting Limits, Saving Lives* (Washington, DC: April 2001), DOT HS 809-241.

0.08 BAC
1986-2000: Ibid. *Presidential Initiative for Making 0.08 BAC the National Legal Limit, A Progress Report*, Internet site http://www.nhtsa.dot.gov/people/injury/alcohol/limit.08/08progressreport/index.html as of Aug. 13, 2001.
2001: Ibid. *Setting Limits, Saving Lives* (Washington, DC: April 2001), DOT HS 809-241.

TABLE 2-27: Motor Vehicle Fatal Crashes by Day of Week, Time of Day, and Weather and Light Conditions (Percent)

	1990	1995	1996	1997	1998	1999	2000	2001
TOTAL fatal crashes	**39,836**	**37,241**	**37,494**	**37,324**	**37,107**	**37,140**	**R37,526**	**37,795**
Day of week								
Sunday	16.1	15.7	15.2	15.8	15.5	15.7	16.1	16.0
Monday	11.7	12.4	12.7	12.1	12.4	12.6	R12.3	12.6
Tuesday	11.5	11.8	12.4	11.9	12.4	11.9	12.0	12.1
Wednesday	11.5	11.9	12.2	13.0	12.4	12.5	12.2	12.2
Thursday	R12.6	13.0	13.3	13.0	13.5	12.9	13.0	12.7
Friday	R16.7	16.6	16.1	16.1	15.8	15.9	16.0	16.1
Saturday	R20.0	18.5	18.2	18.0	18.0	18.5	18.5	18.2
Unknown	0.02	0.03	0.04	0.05	0.04	0.01	R0.01	0.04
Time of day								
Midnight to 3 a.m.	15.7	12.8	12.6	12.2	12.3	12.2	12.5	12.5
3 a.m. to 6 a.m.	7.7	7.5	7.4	7.2	7.3	7.6	8.0	7.6
6 a.m. to 9 a.m.	8.6	9.2	9.5	9.9	9.7	10.1	9.9	9.8
9 a.m. to noon	R8.5	9.4	9.7	9.9	10.2	10.1	9.9	10.0
Noon to 3 p.m.	R11.6	12.9	12.7	13.3	13.4	13.2	13.1	13.2
3 p.m. to 6 p.m.	R15.7	16.8	16.9	16.6	16.8	16.8	16.7	16.6
6 p.m. to 9 p.m.	R15.6	15.9	15.7	15.9	15.6	15.4	R15.3	15.4
9 p.m. to midnight	15.9	14.6	14.6	14.1	13.8	13.8	13.7	14.1
Unknown	0.8	0.9	0.9	0.9	0.9	0.8	0.9	0.8
Atmospheric condition								
Normal	86.7	86.7	86.3	86.4	87.2	89.0	R88.0	88.1
Rain	9.3	8.6	8.4	8.8	8.8	7.3	R7.1	7.5
Snow/sleet	1.6	2.4	2.7	2.5	1.7	1.6	R2.3	1.8
Other/unknown	2.3	2.3	2.6	2.3	2.3	2.0	R2.6	2.6
Light condition								
Daylight	45.0	48.7	49.3	50.3	50.5	50.7	R50.5	50.7
Dark, but lighted	17.7	16.0	15.9	15.6	14.9	15.0	15.9	15.6
Dark	32.7	30.7	30.3	29.5	30.0	29.7	R29.2	29.0
Dawn or dusk	4.2	4.2	4.2	4.2	4.3	4.3	R4.1	4.1
Unknown	0.3	0.4	0.3	0.4	0.3	0.3	R0.4	0.7

KEY: R = revised.

SOURCES

U.S. Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, *Traffic Safety Facts 2000*, DOT HS 809 337 (Washington, DC: December 2001), tables 24, 25, and personal communication, Sept. 10, 2002.

TABLE 2-28: Motor Vehicle Fatal Crashes by Posted Speed Limit

	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
TOTAL fatal crashes	**39,161**	**45,284**	**R39,196**	**39,836**	**37,241**	**37,494**	**37,324**	**37,107**	**37,140**	**R37,526**	**37,795**
Under 55 mph											
5,10,15, 20, 25 mph[a]	2,617	2,865	2,504	2,234	1,893	1,896	1,955	1,873	1,863	R1,827	1,877
30, 35 mph	6,099	8,527	R7,890	7,756	6,681	6,445	6,383	6,025	5,946	R6,079	6,179
40, 45 mph	4,276	6,256	R6,812	7,092	6,938	7,096	7,132	7,349	7,245	R7,315	7,532
50 mph	2,241	2,431	2,072	2,054	1,927	1,908	1,788	1,771	1,909	R1,833	1,801
Total	**15,233**	**20,079**	**19,278**	**19,136**	**17,439**	**17,345**	**17,258**	**17,018**	**16,963**	**R17,054**	**17,389**
55 mph and above											
55 mph	16,094	20,352	R18,863	17,556	16,753	14,097	12,897	12,522	12,184	R12,143	11,798
60 mph	0	0	2	18	16	523	935	1,073	1,069	R1,163	1,230
65 mph	1	0	2	2,175	2,323	3,214	3,311	3,421	3,537	R3,686	3,682
70 mph	0	0	3	0	38	1,282	1,633	1,835	2,079	R2,230	2,125
Over 70 mph	0	0	1	0	10	344	475	482	504	513	508
Total	**R16,095**	**20,352**	**R18,871**	**19,749**	**19,140**	**19,460**	**19,251**	**19,333**	**19,373**	**R19,735**	**19,343**
Unknown, total	**R7,833**	**4,853**	**R1,047**	**951**	**662**	**689**	**815**	**756**	**804**	**R737**	**1,063**

KEY: mph = miles per hour.

[a] The "No Statutory Limit" speed limit designation is included in this category.

NOTES

In 1974, Congress enacted a national maximum speed limit of 55 miles per hour (mph). Amendments in 1987 and 1991 allowed states to increase speed limits to 65 mph on rural Interstates and similar highways.

The National Maximum Speed Limit was repealed in late 1995; speed limits are again set by the states, some of which have raised their maximum speed limits to 70 mph or above.

SOURCES

U.S. Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, *Traffic Safety Facts 2000*, DOT HS 809 337 (Washington, DC: December 2001), table 30, and personal communication, Sept. 10, 2002.

TABLE 2-29: Safety Belt and Motorcycle Helmet Use (percent)

	1994	1996	1998	2000[c]
OVERALL SAFETY BELT USE	**58**	**61**	**69**	**71**
Drivers	59	62	70	72
Passengers	55	59	65	68
Passenger cars	**63**	**64**	**71**	**74**
Drivers	64	65	72	75
Passengers	59	62	68	70
Light trucks[a]	**50**	**56**	**66**	**68**
Drivers	51	58	67	69
Passengers	49	53	61	65
MOTORCYCLE HELMET USE[b]	**63**	**64**	**67**	**U**
Operators	67	66	64	72
Riders	54	58	84	62

KEY: U = data are not available.

[a] Includes pickup trucks, vans, minivans, and sport utility vehicles.

[b] In 1994, operators and riders were counted as helmeted if wearing any type of helmet. In 1996 and 1998, only those operators and riders wearing safety helmets that met U.S. Department of Transportation (DOT) standards were counted. Those safety helmets that do not meet DOT standards were treated as if the operator/rider were not wearing a helmet.

[c] The results from the 2000 National Occupant Protection Use Survey were not published to the same degree of precision as previous years' data.

NOTE
Occupants of commercial and emergency vehicles are excluded.

SOURCES
1994-98: U.S. Department of Transportation, National Highway Traffic Safety Administration, Research Note, Observed Safety Belt Use in 1998 (Washington, DC: September 1999), Internet site http://www.nhtsa.dot.gov/people/ncsa/98obbelt.html as of Aug. 27, 2002, table 3.
2000: Ibid., Research Note, Observed Safety Belt Use: Fall 2000 National Occupant Protection Use Survey Internet site http://www.nhtsa.dot.gov/people/ncsa/pdf/00-035.pdf as of Aug. 27, 2002, tables 1 and 4. Data are from the National Occupant Protection Use Survey (NOPUS), Moving Traffic Study, 1994, 1996, 1998, and 2000.

TABLE 2-30: Estimated Number of Lives Saved by Use of Restraints

	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	Total 1975-2000
Safety belts[a]	**978**	**575**	**2,435**	**6,592**	**9,790**	**10,414**	**10,750**	**11,018**	**11,197**	**11,889**	**135,102**
Air bags	**0**	**0**	**0**	**37**	**470**	**686**	**842**	**1,043**	**1,263**	**1,584**	**6,553**
Motorcycle helmets	**823**	**871**	**788**	**602**	**506**	**490**	**486**	**500**	**551**	**631**	**17,787**
Age 21 minimum legal drinking age	**412**	**595**	**701**	**1,033**	**851**	**846**	**846**	**861**	**901**	**922**	**20,043**
Child restraints	**36**	**49**	**153**	**222**	**279**	**365**	**312**	**299**	**307**	**R316**	**R4,816**
Safety seats	33	39	135	193	232	313	266	244	277	282	4,118
Adult safety belts[b]	3	10	18	29	47	52	46	55	30	33	697

KEY: R = revised.

[a] Represents all adults and children age 5 and older. Data are for passenger vehicles, which include cars, light trucks, vans, pickups, and utility vehicles. Excludes medium and heavy trucks.

[b] Represents children age 4 and younger restrained only by adult safety belts.

NOTE
Total reflects lives saved for *all* years from 1975 to 2000.

SOURCES
Motorcycle helmets:
U.S. Department of Transportation, National Highway Traffic Safety Administration, *Traffic Safety Fact Sheet 2000: Motorcycles* (Washington, DC: 2002) DOT HS 809 326, and personal communication, Apr. 5, 2000.

Minimum drinking age:
Ibid., *Traffic Safety Fact Sheet 2000: Alcohol* (Washington, DC: 2002) DOT HS 809 323, and personal communication, Apr. 5, 2000.

All other restraint use:
Ibid., *Traffic Safety Fact Sheet 2000: Occupant Protection* (Washington, DC: 2002) DOT HS 809 327, and personal communication, Apr. 5, 2000.

Section D
Transit

TABLE 2-31: Transit Safety and Property Damage Data

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Fatalities[a]	**339**	**300**	**273**	**281**	**320**	**274**	**264**	**275**	**286**	**299**	**295**
Injuries[a]	**54,556**	**52,125**	**55,089**	**52,668**	**58,193**	**57,196**	**55,288**	**56,132**	**55,990**	**55,325**	**56,697**
Accidents[b]	**58,002**	**46,467**	**36,380**	**30,559**	**29,972**	**25,683**	**25,166**	**24,924**	**23,937**	**23,310**	**24,261**
Incidents[a,b] (includes accidents)	**90,163**	**83,139**	**73,831**	**64,986**	**70,693**	**62,471**	**59,392**	**61,561**	**60,094**	**58,703**	**59,898**
Vehicle-miles (millions)	**2,490**	**2,478**	**2,510**	**2,535**	**2,581**	**2,620**	**2,605**	**2,702**	**2,833**	**2,927**	**3,002**
Rates per 100 million vehicle-miles[c]											
Fatalities (all reportable incidents)	13.6	12.1	10.9	11.1	12.4	10.5	10.1	10.2	10.1	10.2	9.8
Injuries (all reportable incidents)	2,191	2,103	2,195	2,077	2,254	2,183	2,122	2,078	1,976	1,890	1,889
Accidents	2,329	1,875	1,450	1,205	1,161	980	966	922	845	796	808
Property damage[d] (current $ millions)	**38.0**	**37.5**	**37.5**	**44.9**	**38.4**	**46.3**	**57.6**	**55.5**	**61.5**	**55.3**	**58.9**

[a] Totals do not include data for cable car, inclined plane, jitney, and ferry boat. These data appear in the footnotes for table 2-33.

[b] Accidents include collisions with other vehicles, objects, and people (except suicides), and derailments/buses going off the road. Incidents include accidents plus personal casualties (inside vehicles, inside stations, and boarding and alighting vehicle) and fires.

[c] Fatality and injury rates are based on total incidents including accidents and were calculated by dividing the number of fatalities, injuries, and incidents in this table by the number of vehicle miles.

[d] Total does not include property damage for cable car, inclined plane, jitney, and ferry boat, which were: 1990–$335,000; 1991–$410,000; 1992–$288,000; 1993–$221,000; 1994–$322,000; 1995–$3,263,000; 1996–$157,000; 1997–$67,000; 1998–$24,000; 1999–$104,000; 2000–$77,000.

NOTES

Data are provided only for transit systems that furnished safety data for inclusion in the U.S. Department of Transportation, Federal Transit Administration, *Transit Safety and Security Statistics and Analysis*, annual reports.

Transit vehicle-miles in this table differ from those reported in Chapter 1. The American Public Transit Association, which is the source for the vehicle-miles table in Chapter 1, includes all transit systems, while *Safety Management Information Statistics* (SAMIS) covers only directly operated urban transit systems.

Prior to the 2000 edition, *Transit Safety and Security Statistics and Analysis Report* was entitled Safety Management Information Statistics (SAMIS) annual report.

SOURCE

U.S. Department of Transportation, Federal Transit Administration, *2000 Transit Safety and Security Statistics and Analysis Report* (Cambridge, MA: 2002).

TABLE 2-32: Transit Safety Data by Mode[a] for All Reported Accidents[b]

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Fatalities											
Motor bus[c]	92	80	91	79	90	69	82	100	90	91	82
Light rail	5	11	6	14	10	10	5	3	14	13	22
Heavy rail	51	59	33	37	41	43	32	28	18	21	19
Commuter rail	63	63	43	59	82	56	30	52	67	64	56
Demand responsive	0	2	0	2	2	1	3	2	2	1	4
Van pool	0	0	0	0	0	0	0	0	0	0	0
Automated guideway	1	0	0	0	0	0	0	0	1	0	0
Total	**212**	**215**	**173**	**191**	**225**	**179**	**152**	**185**	**192**	**190**	**183**
Injured persons											
Motor bus[c]	18,876	19,016	20,556	20,862	19,663	20,879	21,222	20,145	R20,136	20,291	20,329
Light rail	465	474	468	361	327	355	680	320	332	427	415
Heavy rail	296	308	273	365	309	348	431	336	261	286	425
Commuter rail	84	560	110	210	216	159	213	99	66	54	53
Demand responsive	286	200	233	224	399	395	379	499	492	632	869
Van pool	16	36	13	58	24	23	25	52	53	37	49
Automated guideway	0	0	0	1	1	0	0	1	1	0	0
Total	**20,023**	**20,594**	**21,653**	**22,081**	**20,939**	**22,159**	**22,950**	**21,452**	**R21,341**	**21,727**	**22,140**
Accidents											
Motor bus[c]	55,289	44,467	34,282	28,596	27,754	23,819	23,425	R22,991	22,277	21,137	22,127
Light rail	699	671	600	449	512	309	341	363	328	300	357
Heavy rail	144	188	613	662	744	637	346	R278	293	396	364
Commuter rail	175	248	181	208	266	216	201	R162	193	215	268
Demand responsive	1,613	814	668	524	659	647	774	886	664	862	997
Van pool	81	79	35	119	36	54	78	160	179	130	157
Automated guideway	1	1	1	1	1	1	1	R2	3	0	1
Total	**58,002**	**46,468**	**36,380**	**30,559**	**29,972**	**25,683**	**25,166**	**R24,842**	**23,937**	**23,040**	**24,271**
Vehicle-miles (millions)											
Motor bus[c]	1,668	1,661	1,688	1,690	1,702	1,702	1,687	1,719	1,779	1,835	1,868
Light rail	24	27	28	27	34	34	37	41	43	48	52
Heavy rail	529	522	520	518	522	537	543	558	566	578	595
Commuter rail	187	188	188	206	210	217	203	216	242	249	253
Demand responsive	74	71	72	77	94	109	108	134	157	167	179
Van pool	8	8	13	16	18	19	25	33	44	49	52
Automated guideway	0.6	0.5	1.0	1.0	1.2	1.1	1.4	1.4	1.4	1.4	1.6
Total	**2,490**	**2,478**	**2,510**	**2,535**	**2,581**	**2,620**	**2,605**	**2,702**	**2,833**	**2,927**	**3,002**
	Rates per 100 million vehicle-miles[d]										
Fatalities											
Motor bus[c]	5.5	4.8	5.4	4.7	5.3	4.1	4.9	5.8	5.1	5.0	4.4
Light rail	20.8	40.3	21.2	51.1	29.6	29.0	13.3	7.4	32.3	27.1	42.3
Heavy rail	9.6	11.3	6.3	7.1	7.9	8.0	5.9	5.0	3.2	3.6	3.2
Commuter rail	33.6	33.4	22.9	28.6	39.0	25.8	14.8	24.1	27.6	25.7	22.1

TABLE 2-32: Transit Safety Data by Mode[a] for All Reported Accidents[b] (Continued)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
	Rates per 100 million vehicle-miles[d]										
Fatalities											
Demand responsive	0	2.8	0	2.6	2.1	0.9	2.8	1.5	1.3	0.6	2.2
Van pool	0	0	0	0	0	0	0	0	0	0	0
Automated guideway	162.0	0	0	0	0	0	0	0	69.0	0	0
All modes	**8.5**	**8.7**	**6.9**	**7.5**	**8.7**	**6.8**	**5.8**	**6.8**	**6.8**	**6.5**	**6.1**
Injured persons											
Motor bus[c]	1,132	1,145	1,218	1,234	1,155	1,227	1,258	1,172	1,132	1,106	1,088
Light rail	1,933	1,735	1,654	1,318	968	1,030	1,815	785	767	889	798
Heavy rail	56	59	52	71	59	65	79	60	46	50	71
Commuter rail	45	297	59	102	103	73	105	46	27	22	21
Demand responsive	386	282	324	292	425	361	349	372	313	379	485
Van pool	208	430	103	363	132	123	101	158	121	75	94
Automated guideway	0	0	0	104	85	0	0	70	69	0	0
All modes	**804**	**831**	**863**	**871**	**811**	**846**	**881**	**794**	**753**	**742**	**738**
Accidents											
Motor bus[c]	3,315	2,678	2,031	1,692	1,631	1,400	1,389	1,338	1,252	1,152	1,184
Light rail	2,906	2,456	2,121	1,639	1,516	897	910	891	758	624	687
Heavy rail	27	36	118	128	142	119	64	R50	52	69	61
Commuter rail	93	132	96	101	127	100	99	R75	80	86	106
Demand response	2,177	1,147	928	682	702	591	714	661	423	516	557
Van pool	1,052	944	278	744	198	289	314	485	408	263	301
Automated guideway	162	204	102	104	85	87	69	R139	207	0	62
All modes	**2,329**	**1,875**	**1,450**	**1,205**	**1,161**	**980**	**966**	**R919**	**845**	**787**	**809**

KEY: R = revised.

[a] Accident statistics for cable car, inclined plane, jitney, and ferry boat are not available. The number of incidents, fatalities, and injuries for these modes appear in the footnotes for table 2-33.

[b] Accidents include collisions with vehicles, objects, people (except suicides), and derailments/vehicles going off road.

[c] Motor bus also includes trolley bus.

[d] Rates are based on total incidents including accidents and were calculated by dividing the number of fatalities, injuries, and incidents in this table by the number of vehicle-miles.

NOTES

Data are provided only for transit systems that furnished safety data for inclusion in the U.S. Department of Transportation, Federal Transit Administration *Transit Safety and Security Statistics and Analysis* annual reports. Data covers only direct-operated urban transit systems. Vehicle-miles for all transit systems including nonurban and purchased can be found in the vehicle-miles table in chapter 1.

Prior to the 2000 edition, *Transit Safety and Security Statistics and Analysis Report* was entitled *Safety Management Information Statistics* (SAMIS) annual report.

SOURCE

U.S. Department of Transportation, Federal Transit Administration, *2000 Transit Safety and Security Statistics and Analysis Report* (Cambridge, MA: 2002).

TABLE 2-33: Transit Safety Data by Mode[a] for All Reported Incidents[b]

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Fatalities											
Motor bus[c]	110	88	99	83	108	82	101	109	109	102	90
Light rail	7	13	9	15	13	15	6	3	23	17	30
Heavy rail	117	103	91	83	85	79	74	77	54	84	80
Commuter rail	104	93	74	98	112	92	72	79	94	95	87
Demand responsive	0	3	0	2	2	6	11	7	4	1	8
Van pool	0	0	0	0	0	0	0	0	0	0	0
Automated guideway	1	0	0	0	0	0	0	0	2	0	0
Total	**339**	**300**	**273**	**281**	**320**	**274**	**264**	**275**	**286**	**299**	**295**
Injured persons											
Motor bus[c]	40,006	38,619	40,090	38,873	42,195	41,297	39,709	39,181	41,035	41,221	40,925
Light rail	1,244	1,251	1,268	982	1,181	1,319	1,604	1,087	1,076	1,271	1,338
Heavy rail	10,036	9,285	10,446	10,532	11,673	11,238	11,093	12,285	11,059	9,665	10,848
Commuter rail	2,438	2,308	2,546	1,560	2,374	2,374	1,953	2,388	1,677	1,761	1,783
Demand responsive	807	622	713	652	731	935	882	1,121	1,064	1,345	1,736
Van pool	21	40	19	59	29	25	27	54	67	41	52
Automated guideway	4	0	7	10	10	8	20	16	12	21	15
Total	**54,556**	**52,125**	**55,089**	**52,668**	**58,193**	**57,196**	**55,288**	**56,132**	**55,990**	**55,325**	**56,697**
All incidents											
Motor bus[c]	70,437	63,453	52,482	45,580	49,185	42,780	40,456	40,524	41,616	41,094	41,677
Light rail	1,465	1,543	1,492	1,136	1,413	1,276	1,350	1,173	1,121	1,182	1,319
Heavy rail	12,178	14,102	15,512	15,082	15,869	14,327	13,748	15,151	13,516	12,196	12,782
Commuter rail	3,031	2,716	3,160	2,111	3,115	2,847	2,449	3,078	2,410	2,499	2,072
Demand responsive	2,965	1,241	1,137	946	1,062	1,173	1,284	1,454	1,221	1,577	1,871
Van pool	84	83	40	121	39	58	80	162	194	135	160
Automated guideway	3	1	8	10	10	10	25	19	16	20	17
Total	**90,163**	**83,139**	**73,831**	**64,986**	**70,693**	**62,471**	**59,392**	**61,561**	**60,094**	**58,703**	**59,898**
Unlinked passenger trips (millions)[d]											
Motor bus[c]	4,912	4,780	4,728	4,585	4,567	4,539	4,464	4,554	4,712	4,926	4,959
Light rail	174	184	187	187	274	249	259	259	273	289	316
Heavy rail	2,252	2,123	2,119	1,960	2,149	2,034	2,157	2,429	2,393	2,521	2,632
Commuter rail	286	274	262	303	318	322	302	311	360	374	388
Demand responsive	14	13	13	15	17	18	17	48	22	23	24
Van pool	2	2	3	4	5	5	6	8	9	10	10
Automated guideway	6	4	5	5	6	6	6	6	6	5	6
Total	**7,646**	**7,380**	**7,318**	**7,059**	**7,335**	**7,172**	**7,211**	**7,615**	**7,774**	**8,149**	**8,337**
Rates per 100 million unlinked passenger trips (millions)[e]											
Fatalities											
Motor bus[c]	2.2	1.8	2.1	1.8	2.4	1.8	2.3	2.4	2.3	2.1	1.8
Light rail	4.0	7.1	4.8	8.0	4.7	6.0	2.3	1.2	8.4	5.9	9.5
Heavy rail	5.2	4.9	4.3	4.2	4.0	3.9	3.4	3.2	2.3	3.3	3.0
Commuter rail	36.4	33.9	28.3	32.4	35.2	28.6	23.8	25.4	26.1	25.4	22.4
Demand responsive	0	22.6	0	13.5	12.0	33.9	65.5	14.6	18.1	4.3	32.8

TABLE 2-33: Transit Safety Data by Mode[a] for All Reported Incidents[b] (Continued)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
	Rates per 100 million unlinked passenger trips (millions)[e]										
Fatalities											
Van pool	0	0	0	0	0	0	0	0	0	0	0
Automated guideway	17.0	0	0	0	0	0	0	0	32.5	0	0
All modes	**4.4**	**4.1**	**3.7**	**4.0**	**4.4**	**3.8**	**3.7**	**3.6**	**3.7**	**3.7**	**3.5**
Injured persons											
Motor bus[c]	815	808	848	848	924	910	890	860	871	837	825
Light rail	715	682	677	524	432	529	620	419	394	440	423
Heavy rail	446	437	493	537	543	553	514	506	462	383	412
Commuter rail	853	843	972	516	747	738	646	769	466	471	459
Demand responsive	5,835	4,678	5,393	4,401	4,390	5,286	5,251	2,336	4,821	5,846	7,113
Van pool	1,037	1,721	584	1,398	638	537	R461	701	773	411	524
Automated guideway	68	0	127	194	160	123	317	272	195	389	239
All modes	**714**	**706**	**753**	**746**	**793**	**798**	**767**	**737**	**720**	**679**	**680**
All incidents											
Motor bus[c]	1,434	1,327	1,110	994	1,077	943	906	890	883	834	840
Light rail	842	841	796	606	516	512	522	452	411	410	417
Heavy rail	541	664	732	769	738	705	637	624	565	484	486
Commuter rail	1,060	991	1,207	698	980	885	810	991	670	668	533
Demand responsive	21,440	9,333	8,600	6,385	6,378	6,632	7,644	3,030	5,532	6,854	7,666
Van pool	4,147	3,570	1,229	2,867	858	1,245	R1,366	2,104	2,238	1,353	1,611
Automated guideway	51	28	145	194	160	154	396	323	260	371	271
All modes	**1,179**	**1,126**	**1,009**	**921**	**964**	**871**	**824**	**808**	**773**	**720**	**718**

KEY: R = revised.

[a] The figures for cable car, inclined plane, jitney, and ferry boat are lumped together and appear in this footnote as follows:

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Fatalities:	2	1	0	1	0	0	1	0	0	0	0
Injuries:	378	327	399	383	616	598	354	357	379	1,091	762
Incidents:	186	411	400	411	650	536	301	353	253	1,078	745

[b] Incidents include accidents (collisions with vehicles, objects, people (except suicides), derailments/vehicles going off road), plus personal casualties, fires, and property damage associated with transit agency revenue vehicles and all transit facilities.

[c] Motor bus also includes trolley bus.

[d] The number of unlinked passenger trips is equivalent to the number of passengers who board public transit vehicles. Passengers are counted each time they board a vehicle regardless of how many vehicles are necessary for a passenger to get to their destination.

[e] Rates are based on total incidents including accidents and were calculated by dividing the number of fatalities, injuries, and incidents in this table by the number of unlinked passenger trips.

NOTES

Data are provided only for transit systems that furnished safety data for inclusion in the U.S. Department of Transportation, Federal Transit Administration *Transit Safety and Security Statistics and Analysis* annual reports. Data covers only direct-operated urban transit systems. Vehicle-miles for all transit systems including nonurban and purchased can be found in the vehicle-miles table in chapter 1.

Prior to the 2000 edition, *Transit Safety and Security Statistics and Analysis Report was entitled Safety Management Information Statistics* (SAMIS) annual report.

SOURCE

U.S. Department of Transportation, Federal Transit Administration, *2000 Transit Safety and Security Statistics and Analysis Report* (Cambridge, MA: 2002).

TABLE 2-34: Reports of Violent Crime, Property Crime, and Arrests by Transit Mode

	1995	1996	1997	1998	1999	2000
Reported offenses, violent crime						
Homicide[a]	**19**	**20**	**19**	**51**	**21**	**12**
Motor bus	8	9	6	40	7	7
Commuter rail	1	1	4	1	3	1
Demand responsive	0	0	0	0	0	0
Heavy rail	8	9	8	6	11	4
Light rail	2	1	1	4	0	0
Other[b]	0	0	0	0	0	0
Forcible rape[c]	**29**	**38**	**31**	**47**	**27**	**37**
Motor bus	11	13	10	16	14	10
Commuter rail	5	4	7	1	3	3
Demand responsive	0	0	2	4	1	0
Heavy rail	13	19	8	24	8	20
Light rail	0	2	4	2	0	4
Other[b]	0	0	0	0	1	0
Robbery[d]	**2,811**	**4,563**	**4,760**	**3,684**	**3,789**	**3,480**
Motor bus	909	871	870	605	764	916
Commuter rail	181	242	187	133	183	144
Demand responsive	1	3	0	1	3	4
Heavy rail	1,490	3,164	3,394	2,686	2,588	2,174
Light rail	181	238	222	220	200	213
Other[b]	49	45	87	39	51	29
Aggravated assault[e]	**2,701**	**3,084**	**3,105**	**2,314**	**2,448**	**2,217**
Motor bus	1,941	1,677	1,294	1,186	1,268	1,070
Commuter rail	133	69	92	80	97	58
Demand responsive	6	13	13	13	14	16
Heavy rail	437	1,074	1,051	837	903	839
Light rail	157	199	143	170	135	208
Other[b]	27	52	512	28	31	26
Reported offenses, property crime						
Theft[f]	**10,596**	**13,238**	**14,486**	**11,830**	**12,896**	**13,393**
Motor bus	2,738	3,408	2,920	2,327	2,487	2,548
Commuter rail	2,238	2,262	2,345	2,021	1,872	2,139
Demand responsive	2	8	40	15	4	19
Heavy rail	4,625	6,794	8,321	6,807	7,789	7,856
Light rail	451	609	479	496	530	724
Other[b]	542	157	381	164	214	107
Vehicle theft[g]	**2,182**	**2,261**	**2,276**	**2,225**	**1,876**	**2,112**
Motor bus	263	306	198	208	198	169
Commuter rail	253	125	262	470	272	367
Demand responsive	0	1	3	9	28	6
Heavy rail	1,536	1,694	1,630	1,234	1,203	1,285
Light rail	128	135	179	273	156	279
Other[b]	2	0	4	31	19	6

TABLE 2-34: Reports of Violent Crime, Property Crime, and Arrests by Transit Mode (Continued)

	1995	1996	1997	1998	1999	2000
Burglary[h]	**1,759**	**1,650**	**1,757**	**491**	**415**	**563**
Motor bus	156	104	94	75	86	142
Commuter rail	178	177	260	217	170	191
Demand responsive	2	0	4	3	1	6
Heavy rail	1,367	1,278	1,343	110	91	82
Light rail	43	78	48	70	42	131
Other[b]	13	13	8	16	25	11
Arson[i]	**63**	**96**	**75**	**60**	**53**	**50**
Motor bus	29	67	33	21	15	24
Commuter rail	14	1	21	10	12	6
Demand responsive	0	0	0	0	0	0
Heavy rail	14	22	16	27	20	16
Light rail	6	6	5	2	6	4
Other[b]	0	0	0	0	0	0
Reported offenses, arrests						
Other assaults[j]	**2,991**	**3,088**	**2,697**	**2,787**	**2,641**	**2,799**
Motor bus	1,896	1,571	1,439	1,400	1,217	1,159
Commuter rail	144	106	140	122	164	142
Demand responsive	4	0	16	3	4	3
Heavy rail	645	932	881	898	888	1,085
Light rail	181	330	195	282	269	354
Other[b]	121	149	26	82	99	56
Vandalism[k]	**17,228**	**8,627**	**9,539**	**6,571**	**6,895**	**7,312**
Motor bus	13,343	6,167	5,262	3,656	4,178	4,579
Commuter rail	1,071	309	659	778	507	264
Demand responsive	12	17	8	10	16	7
Heavy rail	1,157	1,339	1,128	1,067	1,222	1,200
Light rail	1,505	609	2,084	947	892	1,215
Other[b]	140	186	398	113	80	47
Sex offenses[l]	**664**	**803**	**1,047**	**962**	**1,009**	**844**
Motor bus	242	260	363	258	321	220
Commuter rail	100	41	82	91	85	84
Demand responsive	5	0	6	2	5	1
Heavy rail	249	430	517	541	515	477
Light rail	59	71	79	68	80	58
Other[b]	9	1	0	2	3	4
Drug abuse violations[m]	**2,578**	**3,944**	**4,355**	**3,792**	**4,131**	**4,083**
Motor bus	1,037	2,122	1,970	1,414	1,705	1,443
Commuter rail	303	393	477	495	303	196
Demand responsive	1	0	15	21	8	1
Heavy rail	1,078	1,130	1,530	1,550	1,606	1,915
Light rail	151	298	336	271	501	520
Other[b]	8	1	27	41	8	8

Continued next page

TABLE 2-34: Reports of Violent Crime, Property Crime, and Arrests by Transit Mode (Continued)

	1995	1996	1997	1998	1999	2000
Driving under the influence[n]	**466**	**129**	**205**	**176**	**204**	**194**
Motor bus	91	82	101	101	132	67
Commuter rail	26	21	22	21	12	44
Demand responsive	0	0	1	4	0	0
Heavy rail	52	8	22	21	42	39
Light rail	292	16	31	21	15	33
Other[b]	5	2	28	8	3	11
Drunkenness[o]	**10,479**	**6,921**	**8,632**	**12,643**	**11,487**	**6,087**
Motor bus	6,457	3,936	5,346	3,046	3,609	3,337
Commuter rail	71	23	226	156	112	170
Demand responsive	2	2	46	34	2	1
Heavy rail	1,511	1,617	1,601	7,340	5,831	1,240
Light rail	2,255	1,305	1,258	1,844	1,913	1,316
Other[b]	183	38	155	223	20	23
Disorderly conduct[p]	**22,206**	**26,178**	**25,325**	**15,897**	**15,971**	**27,314**
Motor bus	4,681	5,025	6,978	4,521	5,471	3,745
Commuter rail	810	1,085	1,399	1,525	797	706
Demand responsive	5	8	47	5	5	6
Heavy rail	15,258	19,183	15,309	8,227	7,856	21,087
Light rail	1,164	800	1,177	1,408	1,767	1,737
Other[b]	288	77	415	211	75	33
Trespassing[q]	**3,362**	**3,497**	**7,444**	**6,049**	**3,670**	**4,303**
Motor bus	928	604	1,225	1,283	1,065	1,329
Commuter rail	845	674	4,150	2,850	1,080	709
Demand responsive	0	0	2	2	0	0
Heavy rail	1,155	1,208	1,398	1,254	1,044	1,267
Light rail	400	653	463	443	436	985
Other[b]	34	358	206	217	45	13
Fare evasion[r]	**33,903**	**47,873**	**53,406**	**58,856**	**55,194**	**53,863**
Motor bus	3,172	2,372	1,819	1,694	2,388	591
Commuter rail	140	334	310	204	167	179
Demand responsive	1	1	2	5	1	3
Heavy rail	8,247	39,957	46,106	40,350	35,033	28,933
Light rail	22,212	1,185	912	12,798	17,320	24,124
Other[b]	131	4,024	4,257	3,805	285	33

TABLE 2-34: Reports of Violent Crime, Property Crime, and Arrests by Transit Mode (Continued)

	1995	1996	1997	1998	1999	2000
Curfew and loitering laws[s]	**1,878**	**872**	**1,960**	**1,161**	**3,022**	**3,630**
Motor bus	1,201	241	1,112	291	495	469
Commuter rail	19	27	223	72	172	329
Demand responsive	0	1	5	0	0	0
Heavy rail	462	493	530	680	1,789	2,324
Light rail	161	95	80	106	509	498
Other[b]	35	15	10	12	57	10

[a] The killing of one or more human beings by another. This includes murder, non-negligent manslaughter, and manslaughter by negligence.

[b] Other transit mode includes automated guideway, cable car, ferryboat, trolleybus, vanpool, monorail, and inclined plane.

[c] The carnal knowledge of a female forcibly and against her will. This includes assault to rape or attempt to rape.

[d] The taking or attempting to take anything of value from the care, custody, or control of a person or persons by force or threat of force or violence and/or by putting the victim in fear. The use or threat of force includes firearms, knives or cutting instruments, other dangerous weapons (clubs, acid, explosives), and strong-arm techniques (hands, fists, feet).

[e] An unlawful attack by one person upon another for the purpose of inflicting severe or aggravated bodily injury. This type of assault usually is accompanied by the use of a weapon or by means likely to produce death or great bodily harm.

[f] The unlawful taking, carrying, leading, or riding away of property from the possession or constructive possession of another. This includes pocket-picking, purse-snatching, shoplifting, thefts from motor vehicles, thefts of motor vehicle parts and accessories, theft of bicycles, theft from buildings, theft from coin-operated devices or machines, and all other theft not specifically classified.

[g] The theft or attempted theft of a motor vehicle. A motor vehicle is a self-propelled vehicle that runs on the surface of land and not on rails. Examples of motor vehicles are automobiles, trucks, buses, motor cycles, and motor scooters.

[h] The unlawful entry of a structure to commit a felony or a theft. This includes offenses known locally as burglary (any degree), unlawful entry with intent to commit a larceny or felony, breaking and entering with intent to commit a larceny, housebreaking, safe-cracking, and all attempts at these offenses.

[i] To unlawfully and intentionally damage, or attempt to damage, any real or personal property by fire or incendiary device.

[j] An unlawful attack or attempt by one person upon another where no weapon was used or which did not result in serious or aggravated injury to the victim. This includes simple assault, minor assault, assault and battery, injury by culpable negligence, intimidation, coercion, hazing, and all attempts to commit these offenses.

[k] The willful or malicious destruction, injury, disfigurement, or defacement of any public or private property, real or personal, without consent of the owner or person having custody or control by cutting, tearing, breaking, marking, painting, drawing, covering with filth, or any other such means as may be specified by local law.

[l] Any sexual acts except forcible rape, prostitution, and commercialized vice. This includes offenses against chastity, common decency, morals, and the like, such as: adultery and fornication, buggery, incest, indecent exposure, indecent liberties, seduction, sodomy or crime against nature, statutory rape (no force), and all attempts to commit any of the above.

[m] Arrests requested based on the narcotics used. This includes all arrests for violations of state and local laws, specifically those relating to the unlawful possession, sale, use, growing, manufacturing, and making of narcotic drugs.

[n] The driving or operating of any vehicle or common carrier while drunk or under the influence of liquor or narcotics.

[o] Arrests for all offenses of drunkenness, which is the consumption of alcoholic beverages to the extent that one's mental faculties and physical coordination are substantially impaired. This includes drunkenness, drunk and disorderly, common or habitual drunkard, and intoxication.

[p] All charges of committing a breach of the peace. This includes, affray; unlawful assembly; disturbing the peace; disturbing meetings; disorderly conduct in state institutions, at court, at fairs, on trains or public conveyances, etc.; blasphemy, profanity, and obscene language; desecrating the flag; refusing to assist an officer; and all attempts to commit any of the above.

[q] To unlawfully enter land, a dwelling, or other real property.

[r] The unlawful use of transit facilities by riding without paying the applicable fare.

[s] All arrests for violations of local curfew or loitering ordinances where such laws exist.

Continued next page

TABLE 2-34: Reports of Violent Crime, Property Crime, and Arrests by Transit Mode (Continued)

NOTES

Data are from transit agencies in urbanized areas over 200,000 population and include patrons, employees, and others.

The figures for violent and property crime follow the FBI Uniform Crime Reporting Handbook, (Washington, DC: 1984) and are based on records of calls for service, complaints, and/or investigations. These figures are for reported offenses and do not reflect the findings of a court, coroner, jury, or decision of a prosecutor..

Security data was first reported to the Federal Transit Administration in 1995 and were not compiled for earlier years.

SOURCE

1995: U.S. Department of Transportation, Federal Transit Administration, *National Transit Database, Data Tables*, Internet site http://www.fta.dot.gov/fta/library/reference/sec15/1995/htm/ as of May 2, 2000, tables 23-25.

1996-97: Ibid., Internet site http://www.ntdprogram.com/NTD/NTDData.nsf/Data+Tables/OpenView as of May 2, 2000, tables 23-25.

1998: Ibid., tables 24-26.

1999: Ibid., tables 25-27.

2000: Ibid., Internet site http://www.ntdprogram.com as of July 24, 2002, tables 25-27.

Section E
Railroad

TABLE 2-35: Railroad and Grade-Crossing Fatalities by Victim Class

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Passengers on trains	**4**	**3**	**3**	**0**	**12**	**6**	**4**	**14**	**4**	**3**
Railroad only	4	3	3	0	12	6	2	3	4	3
Grade crossing only	0	0	0	0	0	0	2	11	0	0
Employees on duty	**97**	**46**	**40**	**34**	**33**	**37**	**27**	**31**	**24**	**22**
Railroad only	97	44	35	32	32	37	23	29	22	21
Grade crossing only	0	2	5	2	1	0	4	2	2	1
Employees not on duty	**4**	**2**	**0**	**2**	**0**	**0**	**2**	**0**	**1**	**0**
Railroad only	3	2	0	2	0	0	2	0	1	0
Grade crossing only	1	0	0	0	0	0	0	0	0	0
Contractor employees	**[b]7**	**[b]4**	**[b]3**	**7**	**9**	**11**	**5**	**12**	**3**	**4**
Railroad only	[b]7	[b]4	[b]3	7	9	11	5	11	3	4
Grade crossing only	[b]0	[b]0	[b]0	0	0	0	0	1	0	0
Nontrespassers[a]	**[R,b]739**	**[R,b]507**	**[R,b]551**	**443**	**365**	**363**	**326**	**305**	**335**	**269**
Railroad only	[R,b]16	[R,b]10	[R,b]15	32	27	15	9	8	19	11
Grade crossing only	[R,b]723	[b]497	[b]536	411	338	348	317	297	316	258
Trespassers	**566**	**474**	**700**	**660**	**620**	**646**	**644**	**570**	**570**	**669**
Railroad only	[R]457	391	543	494	471	533	536	479	463	509
Grade crossing only	[R]109	83	157	166	149	113	108	91	107	160
Volunteer employees	**N**	**N**	**N**	**N**	**N**	**0**	**0**	**0**	**0**	**0**
Railroad only	N	N	N	N	N	0	0	0	0	0
Grade crossing only	N	N	N	N	N	0	0	0	0	0
Railroad only	[R]584	454	599	567	551	602	577	530	512	548
Grade crossing only	[R]833	582	698	579	488	461	431	402	425	419
Motor vehicles	[R]748	521	614	508	415	419	369	345	361	343
Nonmotor vehicles	[R]85	61	84	71	73	42	62	57	64	76
Total	**1,417**	**1,036**	**1,297**	**1,146**	**1,039**	**1,063**	**1,008**	**932**	**937**	**967**

KEY: N = data do not exist; R = revised.

[a] Beginning in 1997, nontrespassers off railroad property are also included.

[b] The NTS 2001 report grouped contractor employees and nontrespassers together for 1980-1992. A breakdown of this data is now available and was used to separate the two categories.

NOTES

"Railroad only" includes fatalities from train accidents, train incidents, and nontrain incidents (excludes highway-rail grade crossings). This table includes information for both freight and passenger railroad operations.

SOURCES

1980-90: U.S. Department of Transportation, Federal Railroad Administration, *Highway-Rail Crossing Accident/Incident and Inventory Bulletin* (Washington, DC: Annual issues), and the Accident/Incident Bulletin (Washington DC: Annual issues).

1995-2001: Ibid. Internet site http://safetydata.fra.dot.gov/OfficeofSafety/Query/Default.asp as of July 25, 2002.

TABLE 2-36: Railroad and Grade-Crossing Injured Persons by Victim Class

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Passengers on trains	**593**	**657**	**473**	**573**	**513**	**601**	**535**	**481**	**658**	**715**
Railroad only	569	646	462	543	489	558	516	438	648	689
Grade crossing only	24	11	11	30	24	43	19	43	10	19
Employees on duty	**56,331**	**29,822**	**20,970**	**10,777**	**9,199**	**8,295**	**8,398**	**8,622**	**8,423**	**7,769**
Railroad only	R56,186	29,667	20,801	10,654	9,120	8,184	8,276	8,482	8,323	7,674
Grade crossing only	R145	155	169	123	79	111	122	140	100	95
Employees not on duty	**671**	**419**	**326**	**252**	**228**	**263**	**219**	**216**	**286**	**206**
Railroad only	R669	418	324	248	226	260	216	215	283	205
Grade crossing only	R2	1	2	4	2	3	3	1	3	1
Contractor employees	**b74**	**b110**	**b242**	**269**	**208**	**334**	**380**	**384**	**368**	**383**
Railroad only	b74	b109	b240	268	208	333	379	384	367	380
Grade crossing only	b0	b1	b2	1	0	1	1	0	1	3
Nontrespassers[a]	**R,b3,849**	**R,b2,562**	**R,b2,339**	**1,869**	**1,660**	**1,540**	**1,236**	**1,342**	**1,294**	1,189
Railroad only	R,b384	R,b285	R,b349	372	431	370	243	335	381	374
Grade crossing only	R,b3,465	R,b2,277	R,b1,990	1,497	1,229	1,170	993	1,007	913	815
Trespassers	**728**	**734**	**793**	**700**	**750**	**728**	**677**	**650**	**606**	**627**
Railroad only	R474	492	560	461	474	516	513	445	414	405
Grade crossing only	R254	242	233	239	276	212	164	205	192	222
Volunteer employees	**N**	**N**	**N**	**N**	**N**	**6**	**14**	**5**	**8**	**4**
Railroad only	N	N	N	N	N	6	13	5	8	4
Grade crossing only	N	N	N	N	N	0	1	0	0	0
Railroad only	R58,356	31,617	22,736	12,546	10,948	10,227	10,156	10,304	10,424	9,731
Grade crossing only	R3,890	2,687	2,407	1,894	1,610	1,540	1,303	1,396	1,219	1,155
Motor vehicles	R3,739	2,561	2,332	1,825	1,545	1,494	1,257	1,338	1,169	1,108
Nonmotor vehicles	R151	126	75	69	65	46	46	58	50	47
Total	**62,246**	**34,304**	**25,143**	**14,440**	**12,558**	**11,767**	**11,459**	**11,700**	**11,643**	**10,886**

KEY: N = data do not exist; R = revised.

[a] Beginning in 1997, nontrespassers off railroad property are also included.

[b] The NTS 2001 report grouped contractor employees and nontrespassers together for 1980-1992. A breakdown of this data is now available and was used to separate the two categories.

NOTES

"Railroad only" includes fatalities from train accidents, train incidents, and nontrain incidents (excludes highway-rail grade crossings). This table includes information for both freight and passenger railroad operations.

SOURCES

1980-90: U.S. Department of Transportation, Federal Railroad Administration, *Highway-Rail Crossing Accident/Incident and Inventory Bulletin* (Washington, DC: Annual issues), and Accident/Incident Bulletin (Washington, DC: Annual Issues).

1995-2001: Ibid., Internet site http://safetydata.fra.dot.gov/OfficeofSafety/Query/Default.asp as of July 25, 2002.

TABLE 2-37: Train Fatalities, Injuries, and Accidents by Type of Accident[a]

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Fatalities										
Derailments	8	2	2	2	6	2	1	1	2	1
Collisions	20	6	8	7	16	10	1	7	1	4
Other	1	0	0	5	3	6	2	1	7	1
Total	**29**	**8**	**10**	**14**	**25**	**18**	**4**	**9**	**10**	**6**
Injuries										
Derailments	286	197	272	90	98	111	61	41	121	110
Collisions	341	223	139	151	146	55	32	62	89	141
Other	38	56	40	53	37	19	36	26	65	52
Total	**665**	**476**	**451**	**294**	**281**	**185**	**129**	**129**	**275**	**303**
Accidents										
Derailments	6,442	2,495	2,146	1,742	1,816	1,741	1,757	1,961	2,112	2,200
Collisions	1,201	366	315	235	205	202	168	205	238	219
Other	562	414	418	482	422	454	650	602	633	546
Total	**8,205**	**3,275**	**2,879**	**2,459**	**2,443**	**2,397**	**2,575**	**2,768**	**2,983**	**2,965**

[a] Excludes highway-rail grade crossing accidents.

NOTE
Train accidents only. This table includes information for both freight and passenger railroad operations.

SOURCES
1980-96: U.S. Department of Transportation, Federal Railroad Administration, *Highway-Rail Crossing Accident/Incident and Inventory Bulletin* (Washington, DC: Annual issues), tables 1-1, 1-3.
1997-98: Ibid., *Railroad Safety Statistics Annual Report 1998* (Washington, DC: September 1998), table 1-1, 1-3, 5-6.
1999-2001: Ibid., http://safetydata.fra.dot.gov/officeofsafety/Query/Default.asp as of July 30, 2002.

TABLE 2-38: Railroad Passenger Safety Data

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Passenger fatalities	**3**	**8**	**3**	**58**	**5**	**0**	**12**	**6**	**4**	**14**	**4**	**3**
Injured persons	**473**	**382**	**411**	**559**	**497**	**573**	**513**	**601**	**535**	**481**	**658**	**715**
Train-miles, passenger trains (millions)	**72**	**74**	**74**	**75**	**75**	**76**	**77**	**78**	**78**	**82**	**84**	**88**
Fatalities per 100 million passenger train-miles	4	11	4	77	7	0	16	8	5	17	5	3
Injuries per 100 million passenger train-miles	660	520	560	750	660	750	663	770	683	584	781	813

NOTE
A train-mile is the movement of a train (which can consist of many cars) the distance of 1 mile. A train-mile differs from a vehicle-mile, which is the movement of 1 car (vehicle) the distance of 1 mile. A 10-car (vehicle) train traveling 1 mile would be measured as 1 train-mile and 10 vehicle-miles. Caution should be used when comparing train-miles to vehicle miles.

SOURCES
Fatalities and injuries:
1991-2001: U.S. Department of Transportation, Federal Railroad Administration,Office of Policy and Program Development, *Railroad Safety Statistics Annual Report 2001* (Washington, DC: August 2002), table 1-2.

Train-miles, passenger trains:
1990-96: U.S. Department of Transportation, Bureau of Transportation Statistics calculations (sum of all commuter rail train-miles reported to USDOT, Federal Transit Administration, plus Amtrak train-miles).
1997-2001: U.S. Department of Transportation, Federal Railroad Administration,Office of Policy and Program Development, *Railroad Safety Statistics Annual Report 2001* (Washington, DC: August 2002), table 2-4.

TABLE 2-39: Railroad System Safety and Property Damage Data (Excludes highway-rail grade-crossing accidents)

	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Fatalities	**785**	**575**	**584**	**454**	**599**	**567**	**551**	**602**	**577**	**530**	**512**	**548**
Injured persons	**[d]17,934**	**50,138**	**58,696**	**31,617**	**22,736**	**12,546**	**10,948**	**10,227**	**10,156**	**10,304**	**10,424**	**9,739**
Accidents[a]	**8,095**	**8,041**	**8,205**	**3,275**	**2,879**	**2,459**	**2,443**	**2,397**	**2,575**	**2,768**	**2,983**	**2,987**
Train-miles (millions)[b,c]	**839**	**755**	**718**	**571**	**609**	**670**	**671**	**677**	**683**	**712**	**723**	**712**
Rate per 100 million train-miles												
Fatalities	94	76	81	80	98	85	82	89	84	74	71	77
Injuries	N	6,640	8,180	5,540	3,740	1,870	1,630	1,511	1,487	1,446	1,442	1,368
Accidents	R965	R1,065	R1,143	R574	R473	R367	R364	354	377	389	413	420
Property damage (current $ millions)	**121.6**	**177.4**	**267.4**	**179.3**	**198.7**	**189.2**	**212.3**	**210.7**	**233.9**	**245.1**	**263.2**	**311.9**

KEY: N = data do not exist; R = revised.

[a] Train accidents only; excludes highway-rail grade-crossing accidents.

[b] Train-miles in this table differ from train-miles in the vehicle-miles table in Chapter 1. Train-miles reported in Chapter 1 include only Class I rail (see glossary for definition), while this table includes Class I rail, Group II rail, and other rail. For example, in 1999 Group II rail accounted for 75 million train-miles, and other rail for 25 million train-miles. Moreover, the vehicle-miles table in Chapter 1 includes only train-miles between terminals and/or stations, thus excluding yard and switching miles. In 1999, Class I yard/switching train-miles totaled 70 million train-miles. Note that commuter rail safety data are reported in the rail mode and the transit mode. Commuter rail train-miles are included in Class I rail and Group II rail in this table.

[c] A train-mile is the movement of a train (which can consist of many cars) the distance of 1 mile. A train-mile differs from a vehicle-mile, which is the movement of 1 car (vehicle) the distance of 1 mile. A 10-car (vehicle) train traveling 1 mile would be measured as 1 train-mile and 10 vehicle-miles. Caution should be used when comparing train-miles to vehicle-miles

[d] 1970 injuries not comparable to later years due to change in reporting system.

NOTE
This table includes information for both freight and passenger railroad operations.

SOURCES
Fatalities, injuries, accidents, and property damage:
1970-90: U.S. Department of Transportation, Federal Railroad Administration, Office of Policy and Program Development, *Accident/Incident Bulletin* (Washington, DC: annual issues), tables 14 and 15.
1995-2001: Ibid., *Railroad Safety Statistics Annual Report 2000* (Washington, DC: July 2001), tables 1-1 and 3-1.

Train-miles:
1970-90: U.S. Department of Transportation, Federal Transit Administration, *National Transit Database* (Washington, DC: annual issues), form 406.
1995-2000: U.S. Department of Transportation, Federal Railroad Administration, Internet site http://safetydata.fra.dot.gov/OfficeofSafety/Forms/Default.asp as of Aug. 22, 2002.
2001: Ibid., *Railroad Safety Statistics Annual Report 2001* (Washington, DC: August 2002), table 2-4.

TABLE 2-40: Fatalities and Injuries of On-Duty Railroad Employees

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Employee fatalities												
Accidents/incidents, total	**40**	**35**	**34**	**47**	**31**	**34**	**33**	**37**	**27**	**31**	**24**	**22**
Grade-crossing accidents and incidents	5	1	2	3	1	2	1	0	4	2	2	1
Train accidents and incidents only (grade-crossing excluded)	35	34	32	44	30	32	32	37	23	29	22	21
Employees injured												
Accidents/incidents, total	**20,970**	**19,626**	**17,755**	**15,363**	**13,080**	**10,777**	**9,199**	**8,295**	**8,398**	**8,622**	**8,423**	**7,771**
Grade-crossing accidents and incidents	169	147	157	143	126	123	79	111	122	140	100	96
Train accidents and incidents only (grade-crossing excluded)	20,801	19,479	17,598	15,220	12,954	10,654	9,120	8,184	8,276	8,482	8,323	7,675
Employee hours (millions)	**553.6**	**530.7**	**517.0**	**519.7**	**518.6**	**510.3**	**504.6**	**503.9**	**514.9**	**510.0**	**490.9**	**475.4**
Fatality rates per million employee hours												
All accidents/incidents	0.07	0.07	0.07	0.09	0.06	0.07	0.07	0.07	0.05	0.06	0.05	0.05
Grade-crossing accidents and incidents	0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Train accidents and incidents only (grade-crossing excluded)	0.06	0.06	0.06	0.08	0.06	0.06	0.06	0.07	0.04	0.06	0.04	0.04
Injury rates per million employee hours												
All accidents/incidents	37.9	37.0	34.3	29.6	25.2	21.1	18.2	16.5	16.3	16.9	17.2	16.3
Grade-crossing accidents and incidents	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2
Train accidents and incidents only (grade-crossing excluded)	37.6	36.7	34.0	29.3	25.0	20.9	18.1	16.2	16.1	16.6	17.0	16.1

TABLE 2-40: Fatalities and Injuries of On-Duty Railroad Employees (Continued)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Train-miles (millions)[a,b]	**609**	**577**	**594**	**614**	**655**	**670**	**671**	**677**	**683**	**712**	**723**	**712**
Fatality rates per million train-miles												
All accidents/incidents	0.07	0.06	0.06	0.08	0.05	0.05	0.05	0.05	0.04	0.04	0.03	0.03
Grade-crossing accidents and incidents	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Train accidents and incidents only (grade-crossing excluded)	0.06	0.06	0.05	0.07	0.05	0.05	0.05	0.05	0.03	0.04	0.03	0.03
Injury rates per million train-miles												
All accidents/incidents	34.4	34.0	29.9	25.0	20.0	16.1	13.7	12.3	12.3	12.1	11.7	10.9
Grade-crossing accidents and incidents	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.1	0.1
Train accidents and incidents only (grade-crossing excluded)	34.2	33.8	29.6	24.8	19.8	15.9	13.6	12.1	12.1	11.9	11.5	10.8

[a] Train-miles in this table differ from train-miles in the vehicle-miles table in Chapter 1. Train-miles reported in Chapter 1 include only Class I rail (see glossary for definition), while this table includes Class I rail, Group II rail, and other rail. In 1999, Group II rail accounted for 75 million train-miles, and other rail for 25 million train-miles. Moreover, the vehicle-miles table in Chapter 1 includes only train-miles between terminals and/or stations, thus excluding yard and switching miles. In 1999, Class I yard/switching train miles totaled 70 million train-miles. Note that commuter rail safety data are reported in the rail mode and in the transit mode. Commuter rail train-miles are included in Class I rail and Group II rail in this table.

[b] A train-mile is the movement of a train (which can consist of many cars) the distance of 1 mile. A train-mile differs from a vehicle-mile, which is the movement of 1 car (vehicle) the distance of 1 mile. A 10-car (vehicle) train traveling 1 mile would be measured as 1 train-mile and 10 vehicle-miles.Caution should be used when comparing train-miles to vehicle miles.

NOTE
This table includes information for both freight and passenger railroad operations.

SOURCES
1990-95: U.S. Department of Transportation, Federal Railroad Administration, *Highway-Rail Crossing Accident/Incident and Inventory Bulletin* (Washington, DC: annual issues).
1996-2001: Ibid., *Railroad Safety Statistics Annual Report* (Washington, DC: annual issues), tables 1-3, 2-4, and 3-1.

Section F
Water

TABLE 2-41: Waterborne Transportation Safety and Property Damage Data Related to Vessel Casualties

	1970	1975	1980	1985	1990	R1995	R1996	R1997	R1998	R1999	2000
Fatalities[a]	178	243	206	131	85	51	52	50	71	57	32
Injuried persons	105	97	180	172	175	145	223	121	135	131	125
Accidents[b]	2,582	3,310	4,624	3,439	3,613	4,298	4,264	4,198	4,374	4,036	3,791
Vessels[c]	4,063	5,685	7,694	5,694	5,494	6,724	6,694	6,464	6,400	5,732	5,400
Property damage (current $ millions)	U	U	U	U	U	157.8	190.1	156.4	223.3	155.2	146.9

KEY: R = revised; U = data are not available.

[a] Fatalities include the number of people who died or were declared missing subsequent to a marine accident.

[b] Accidents in this table include the number of "marine casualty cases" reported to the U.S. Coast Guard in accordance with 46 U.S.C. 4.05.

[c] More than one vessel may be involved in a marine accident.

NOTES

All deaths and injuries cited result from vessel casualties, such as groundings, collisions, fires, or explosions. The data are for all commercial vessels under U.S. jurisdiction, including U.S. flag vessels anywhere in the world and foreign flag vessels within the jurisdiction of the United States (within 12 miles, or having an interaction with a U.S. entity, such as a platform within 200 miles, or a collision with a U.S. ship). Includes commercial fishing vessels.

1995-2000 data come from the Marine Safety Management Information System. Data for prior years may not be directly comparable.

SOURCE

U.S. Department of Transportation, U.S. Coast Guard, Data Administration Division (G-MRI-1), personal communication, May 15, 2002.

TABLE 2-42: Waterborne Transportation Safety Data Not Related to Vessel Casualties

	1970	1975	1980	1985	1990	R1995	R1996	R1997	R1998	R1999	2000
Fatalities[a]	420	330	281	130	101	95	95	88	95	86	87
Injuries	U	U	U	U	U	1,833	1,327	1,037	540	500	564
Vessels[b]	U	321	274	128	98	1,941	1,434	1,135	647	593	658

KEY: R = revised; U = data are not available.

[a] Fatalities include people who were declared missing.

[b] Figures represent the number of vessels involved in nonvessel casualties. These vessels were not part of the accident, but the accident may have occurred on the vessel (e.g., crewmembers swept overboard by a wave).

NOTES

Figures reflect the number of deaths and injuries to people on commercial vessels not resulting from a casualty to the vessel. These injuries and fatalities result from such incidents as slips, falls, or electrocutions. Deaths and injuries from disease, homocides, suicides, fights, and diving accidents have been excluded. The data reflect deaths and injuries to people on both U.S. and foreign flag vessels within the jurisdiction of the United States (within 12 miles of U.S. coast) and on U.S. flag vessels anywhere in the world. 1992-2000 data come from the Marine Safety Management Information System. Data for prior years may not be directly comparable.

SOURCE

U.S. Department of Transportation, U.S. Coast Guard, Data Administration Division (G-MRI-1), personal communication, Dec. 12, 2001.

TABLE 2-43: Recreational Boating Safety, Alcohol Involvement, and Property Damage Data

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Fatalities	739	1,360	1,418	1,466	1,360	1,116	865	829	709	821	815	734	[b]701
Injuries	929	927	780	2,136	2,650	2,757	3,822	4,141	4,442	4,555	4,612	4,315	4,355
Accidents	2,738	3,752	3,803	6,308	5,513	6,237	6,411	8,019	8,026	8,047	8,061	7,931	7,740
Vessels involved	[a]3,562	[a]4,778	4,762	8,002	6,954	8,305	8,591	11,534	11,306	11,396	11,368	11,190	10,984
Numbered boats (thousands)	[E]2,500	[R]4,138	[R]5,128	7,303	8,577	9,589	10,996	11,734	11,877	12,312	12,565	12,738	12,782
Rates per 100,000 numbered boats													
Fatalities	32.8	[R]32.9	[R]27.7	20.1	[R]15.9	11.6	[R]7.9	7.1	[R]6.0	6.7	6.5	5.8	5.5
Injuries	37.1	[R]22.4	[R]15.2	[R]29.2	[R]30.9	[R]28.8	[R]34.8	[R]35.3	[R]37.4	37.0	[R]36.7	33.9	[R]34.1
Accidents	109.5	[R]90.7	[R]74.2	86.4	[R]64.3	65.0	58.3	[R]68.3	[R]67.6	65.4	[R]64.2	62.3	[R]60.6
Accident reports citing alcohol involvement	N	N	N	N	N	279	568	472	601	698	704	633	696
Property damage (current $ millions)	3.2	4.7	8.2	10.4	16.4	20.0	23.8	[a]21.5	23.2	29.0	31.0	28.9	34.7

KEY: E = estimate; N = data do not exist; R = revised.

[a] U.S. Department of Transportation, U.S. Coast Guard (CG), Office of Boating Safety, personal communication, May 15, 2002.

[b] The numbers for recreational boating safety fatalities are raw numbers—CG reports a 6% addition as instructed by the DOT Inspector General because it found a discrepancy in a review of the Search and Rescue Management Information System (SARMIS) and BARD data. (See the discussion found in the DOT FY2003 Performance Plan/Report on pg. 135 under data details of recreational boating fatalities).

NOTE
Only a small fraction of property damages and nonfatal accidents are reported to the U.S. Coast Guard.

SOURCE
U.S. Department of Transportation, U.S. Coast Guard, Office of Boating Safety, *Boating Statistics* (Washington, DC: Annual issues) and personal communication.

TABLE 2-44: Personal Watercraft Safety Data

	1990	1995	1996	1997	1998	1999	2000	2001
Fatalities	28	68	57	84	78	66	68	U
Injured persons	532	1,617	1,837	1,812	1,743	1,614	1,580	U
Accidents[a]	1,162	3,986	4,099	4,070	3,607	3,374	3,268	U
Sales	72,000	200,000	191,000	176,000	130,000	106,000	92,000	83,000
Number in use	241,376	760,000	900,000	1,000,000	1,100,000	1,096,000	1,078,400	1,053,560

KEY: U = data are not available.

[a] Total vessels involved

NOTES

Personal watercraft are less than 13 feet in length and are designed to be operated by a person or persons sitting, standing, or kneeling on the craft rather than within the confines of the hull.

Data on personal watercraft sales and number in use are estimates.

SOURCES

Fatalities, injuries, and accidents:

U.S. Department of Transportation, United States Coast Guard, Office of Boating Safety, *Boating Statistics - 2000* (Washington, DC: 2001), Internet site http://www.uscgboating.org/saf/pdf/Boating_Statistics_2000.pdf as of Feb. 25, 2001.

Sales:

1990: Personal Watercraft Industry Association, Internet site http://www.pwia.org/ Abo_PWC.htm as of June 19, 2000.

1995-2001: Ibid., Internet site http://www.nmma.org/facts/boatingstats/2001/Files/ unitsales.asp as of Sept. 10, 2002.

Use:

1990-96: National Marine Manufacturers Association, data compiled by the United States Coast Guard, personal communications.

1997-98: Ibid., Internet site http://www.nmma.org/facts/boatingstats/statistic98.html as of June 19, 2000.

1999-2001: Ibid., Internet site http://www.nmma.org/facts/boatingstats/2001/files/populationestimates.asp as of Sept. 10, 2002.

TABLE 2-45: U.S. Coast Guard Search and Rescue Statistics, Fiscal Year

	1985	1990	1995	1996	1997	1998	1999	2000	2001
Cases	60,775	53,097	49,704	43,553	41,096	37,218	39,844	40,214	39,475
Responses[a]	70,237	64,971	63,679	55,710	52,141	46,602	50,622	48,226	49,344
Sorties[a]	88,449	84,033	110,267	98,423	91,722	83,307	89,635	57,697	58,854
Search and Rescue resource hours[b]	U	108,282	93,984	85,150	80,507	80,116	84,635	80,533	85,008
Lives saved	6,497	4,407	4,453	5,047	3,897	3,194	3,743	3,400	4,009
Lives lost before notification[c]	259	622	468	611	454	418	353	[f]779	413
Lives lost after notification[d]	1,076	463	304	367	290	188	180	239	297
Total lives lost	**1,335**	**1,085**	**772**	**978**	**744**	**606**	**533**	**1,018**	**710**
Persons otherwise assisted	138,791	117,327	101,357	85,869	75,357	66,138	70,255	54,866	65,158
Value of property lost ($ million)[e]	424.3	368.5	222.6	273.8	414.8	84.3	262.3	415.2	441.0
Value of property assisted ($ million)	2,376.8	2,044.9	4,467.2	3,494.2	1,762.1	1,288.2	1,235.0	778.8	1,501.0
Property loss prevented ($ million)	905.4	1,673.4	3,882.8	3,087.3	1,353.5	996.8	1,019.0	84.3	73.0

KEY: U = data are not available.

[a] Responses are the number of U.S. Coast Guard units involved. Sorties are the number of trips made by boat, aircraft, or cutter.

[b] Search and Rescue resource hours represent the time that Coast Guard assets (i.e., aircraft, boats, and cutters) perform Search and Rescue operations.

[c] Those persons whose lives were lost before the U.S. Coast Guard was notified of an incident.

[d] Those persons whose lives were lost in an incident to which the U.S. Coast Guard was responding, but who were alive at the time the U.S. Coast Guard was notified of the incident.

[e] Includes several out of the normal high cost incidents.

[f] The Egypt Air (217 fatalities) and Alaska Air (88 fatalities) crashes account for the increase.

SOURCES

All data except Search and Rescue resource hours:

1985-2001: U.S. Department of Transportation, U.S. Coast Guard, Search and Rescue Management Information Systems (SARMIS II) Database, available at http://www.uscg.mil/hq/g-o/g-opr/92-01summary.htm as of Aug. 8, 2002.

Search and Rescue resource hours:

1990-2001: U.S. Department of Transportation, U.S. Coast Guard, Office of Command and Control Architecture, personal communication, Aug. 21, 2002.

Section G
Pipeline

TABLE 2-46: Hazardous Liquid and Natural Gas Pipeline Safety

	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Fatalities												
Total hazardous liquid	4	7	4	5	3	3	5	0	2	4	1	0
Total gas	26	8	15	28	6	18	48	10	18	21	37	7
Transmission	U	U	1	6	0	2	1	1	1	2	15	2
Distribution	U	U	14	22	6	16	47	9	17	19	22	5
Injured persons												
Total hazardous liquid	21	17	15	18	7	11	13	5	6	20	4	10
Total gas	233	214	177	108	69	53	114	72	76	93	77	46
Transmission	U	U	13	12	17	10	5	5	11	8	18	3
Distribution	U	U	164	96	52	43	109	67	65	85	59	43
Incidents												
Total hazardous liquid	351	254	246	183	180	188	194	171	153	168	147	129
Total gas	1,077	1,338	1,524	334	198	161	187	175	236	173	234	207
Transmission	U	U	389	129	89	64	77	73	99	54	80	85
Distribution	U	U	1,135	205	109	97	110	102	137	119	154	122
Property damage (current $ millions)												
Total hazardous liquid	1.2	2.2	5.7	5.1	15.7	32.5	81.4	42.8	62.9	87.1	R179.5	25.3
Total gas	3.3	5.0	10.0	22.9	18.9	R20.9	R29.3	24.6	R63.5	43.6	41.3	37.2
Transmission	U	U	8.8	13.4	11.3	10.0	13.1	12.1	R44.5	17.7	17.9	23.1
Distribution	U	U	1.2	9.5	7.6	11.0	16.3	12.5	19.1	25.9	23.4	14.1

KEY: R = revised; U = data are not available.

NOTES

Beginning with 1985 data, pipeline incidents are credited to the year in which they occurred, not the year in which the report was received. Gas numbers represent sum of transmission and gathering and distribution operators.

Property damage includes, but is not limited to, damage to the operator's facilities and to the property of others; gas lost; restoration of service and relighting; facility repair and replacement; leak locating; right-of-way cleanup; and environmental cleanup and damage.

Numbers for property damage may not add due to rounding.

SOURCES

1970-85: U.S. Department of Transportation, Research and Special Programs Administration, Office of Pipeline Safety, personal communication, 1999.

1990-2001: Ibid., Internet site http://ops.dot.gov/stats.htm as of Nov. 15, 2002.

Chapter 3

Transportation and the Economy

Section A
Transportation and the Total Economy

TABLE 3-1a: U.S. Gross Domestic Product (GDP) Attributed to For-Hire Transportation Services (Current $ billions)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
TOTAL U.S. GDP	**5,803.2**	**5,986.2**	**6,318.9**	**6,642.3**	**7,054.3**	**7,400.5**	**7,813.2**	**8,318.4**	**8,781.5**	**9,268.6**	**9,872.9**
For-hire transportation services GDP											
Trucking and warehousing	69.4	70.9	74.5	79.2	86.4	89.0	92.1	99.4	114.1	122.0	126.0
Air	45.3	47.0	50.3	56.4	62.5	67.7	70.8	78.6	85.8	90.2	93.0
Railroad	19.8	22.0	21.6	22.0	23.3	23.6	23.4	23.0	24.3	23.2	22.9
Transportation services[a]	18.2	19.5	19.9	20.8	22.6	23.5	25.7	27.1	28.0	29.9	32.3
Local and interurban passenger transit	9.1	10.2	10.9	11.3	11.6	12.4	13.4	14.9	16.8	17.6	18.7
Water	10.0	11.1	10.7	10.7	11.5	11.6	12.2	13.1	13.6	13.7	14.8
Pipelines, except natural gas	5.5	5.5	5.5	5.6	5.5	5.5	5.7	5.8	6.1	6.1	6.2
Total	**177.4**	**186.1**	**193.4**	**206.0**	**223.2**	**233.4**	**243.4**	**261.8**	**288.7**	**302.7**	**313.9**
Percent of U.S. GDP											
Trucking and warehousing	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.3
Air	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	1.0	1.0	0.9
Railroad	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2
Transportation services[a]	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Local and interurban passenger transit	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Water transportation	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2
Pipelines, except natural gas	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total	**3.1**	**3.1**	**3.1**	**3.1**	**3.2**	**3.2**	**3.1**	**3.1**	**3.3**	**3.3**	**3.2**
Percent of for-hire transportation services GDP											
Trucking and warehousing	39.1	38.1	38.5	38.4	38.7	38.1	37.8	38.0	39.5	40.3	40.1
Air	25.5	25.3	26.0	27.4	28.0	29.0	29.1	30.0	29.7	29.8	29.6
Railroad	11.2	11.8	11.2	10.7	10.4	10.1	9.6	8.8	8.4	7.7	7.3
Transportation services[a]	10.3	10.5	10.3	10.1	10.1	10.1	10.6	10.4	9.7	9.9	10.3
Local and interurban passenger transit	5.1	5.5	5.6	5.5	5.2	5.3	5.5	5.7	5.8	5.8	6.0
Water transportation	5.6	6.0	5.5	5.2	5.2	5.0	5.0	5.0	4.7	4.5	4.7
Pipelines, except natural gas	3.1	3.0	2.8	2.7	2.5	2.4	2.3	2.2	2.1	2.0	2.0
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

[a] Defined as services incidental to transportation such as forwarding and packing and arranging passenger travel and freight transportation.

NOTES
Percentages based on the revised estimates have been recalculated but may appear unchanged due to the number of significant digits shown.
Numbers may not add to totals due to rounding.

SOURCES
1990-1995: U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business* (Washington, DC, June 2000), pp. 41-42.
1996: Ibid. (Washington, DC, December 2000), p. 29.
1997-2000: Ibid. (Washington, DC, November 2001), p. 26.

TABLE 3-1b: U.S. Gross Domestic Product (GDP) Attributed to For-Hire Transportation Services (Chained 1996 $ billions)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
TOTAL U.S. GDP	**6,707.9**	**6,676.4**	**6,880.0**	**7,062.6**	**7,347.7**	**7,543.8**	**7,813.2**	**8,159.5**	**8,508.9**	**8,856.5**	**9,224.0**
For-hire transportation services GDP											
Trucking and warehousing	68.1	71.6	75.7	79.1	85.3	86.6	92.1	90.5	95.5	100.3	105.7
Air	46.9	45.0	49.2	51.9	59.6	62.9	70.8	75.2	76.8	80.9	85.0
Railroad	18.1	20.9	20.8	21.0	22.1	22.7	23.4	22.8	22.8	22.5	23.2
Transportation services[a]	19.5	19.8	19.6	20.4	22.1	23.4	25.7	26.4	27.8	29.8	30.6
Local and interurban passenger transit	12.8	12.5	12.4	12.7	12.8	13.2	13.4	14.7	15.5	16.6	18.2
Water	10.2	10.5	10.3	10.5	11.3	11.3	12.2	13.2	13.2	11.8	11.7
Pipelines, except natural gas	5.7	6.2	5.9	6.0	5.5	5.0	5.7	6.2	6.4	6.4	6.4
Total	**180.6**	**185.9**	**193.6**	**201.2**	**218.6**	**225.1**	**243.4**	**248.9**	**257.9**	**268.6**	**281.1**
Percent of U.S. GDP											
Trucking and warehousing	1.0	1.1	1.1	1.1	1.2	1.1	1.2	1.1	1.1	1.1	1.1
Air	0.7	0.7	0.7	0.7	0.8	0.8	0.9	0.9	0.9	0.9	0.9
Railroad	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Transportation services[a]	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Local and interurban passenger transit	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Water	0.2	0.2	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.1	0.1
Pipelines, except natural gas	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total	**2.7**	**2.8**	**2.8**	**2.8**	**3.0**	**3.0**	**3.1**	**3.1**	**3.0**	**3.0**	**3.0**
Percent of for-hire transportation services GDP											
Trucking and warehousing	37.7	38.5	39.1	39.3	39.0	38.5	37.8	36.4	37.0	37.3	37.6
Air	26.0	24.2	25.4	25.8	27.3	27.9	29.1	30.2	29.8	30.1	30.2
Railroad	10.0	11.2	10.7	10.4	10.1	10.1	9.6	9.2	8.8	8.4	8.3
Transportation services[a]	10.8	10.7	10.1	10.1	10.1	10.4	10.6	10.6	10.8	11.1	10.9
Local and interurban passenger transit	7.1	6.7	6.4	6.3	5.9	5.9	5.5	5.9	6.0	6.2	6.5
Water	5.6	5.6	5.3	5.2	5.2	5.0	5.0	5.3	5.1	4.4	4.2
Pipelines, except natural gas	3.2	3.3	3.0	3.0	2.5	2.2	2.3	2.5	2.5	2.4	2.3
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

[a] Defined as services incidental to transportation such as forwarding and packing and arranging passenger travel and freight transportation.

NOTES
For-hire transportation numbers may not equal total due to the nature of the chained dollar calculations.
Percentages based on the revised estimates have been recalculated but may appear unchanged due to the number of significant digits shown.
Numbers may not add to totals due to rounding.

SOURCES
1990-95: U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business* (Washington, DC, June 2000), p. 46.
1996: Ibid. (Washington, DC, December 2000), p. 31.
1997-2000: Ibid. (Washington, DC, November 2001), p. 29.

TABLE 3-2a: U.S. Gross Domestic Product (GDP) Attributed to Transportation-Related Final Demand (Current $ billions)

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Personal consumption of transportation										
Motor vehicles and parts	87.0	175.7	206.4	249.3	256.3	264.2	288.8	R319.1	R336.6	361.3
Gasoline and oil	86.7	97.2	107.3	113.3	124.2	128.1	114.8	R129.3	R164.4	162.1
Transport services	64.7	100.0	141.8	197.7	214.2	234.4	246.3	R259.4	R267.8	271.4
Total	**238.4**	**372.9**	**455.5**	**560.3**	**594.7**	**626.7**	**649.9**	**R707.8**	**R768.8**	**794.8**
Gross private domestic investment										
Transportation structures	3.7	4.3	3.0	4.4	5.4	5.9	7.0	6.2	R5.3	5.0
Transportation equipment	48.4	69.7	75.7	126.1	138.9	151.4	168.2	R194.7	R189.7	165.8
Total	**52.1**	**74.0**	**78.7**	**130.5**	**144.3**	**157.3**	**175.2**	**R200.9**	**R195.0**	**170.8**
Exports (+)										
Civilian aircraft, engines, and parts	14.1	13.5	32.2	26.1	30.8	41.4	53.5	52.9	48.1	52.6
Automotive vehicles, engines, and parts	17.4	24.9	36.5	61.8	65.0	74.0	72.4	R75.3	R80.4	75.4
Passenger fares	2.6	4.4	15.3	18.9	20.4	20.9	20.1	19.8	R20.8	18.0
Other transportation	11.6	14.7	22.0	26.1	26.1	27.0	25.6	26.9	R30.1	28.3
Total	**45.7**	**57.5**	**106.0**	**132.9**	**142.3**	**163.3**	**171.6**	**R174.9**	**R179.4**	**174.3**
Imports (-)										
Civilian aircraft, engines, and parts	3.1	5.3	10.5	10.7	12.7	16.6	21.8	23.8	26.4	31.4
Automotive vehicles, engines, and parts	28.3	64.9	88.5	123.8	128.9	139.8	148.7	179.0	195.9	189.8
Passenger fares	3.6	6.4	10.5	14.7	15.8	18.1	20.0	21.3	R24.3	22.4
Other transportation	11.8	15.6	25.0	27.0	27.4	29.0	30.4	34.1	R41.6	38.8
Total	**46.8**	**92.2**	**134.5**	**176.2**	**184.8**	**203.5**	**220.9**	**258.2**	**R288.2**	**282.4**
Net exports of transportation-related goods and services[a]	**-1.1**	**-34.7**	**-28.5**	**-43.3**	**-42.5**	**-40.2**	**-49.3**	**R-83.3**	**R-108.8**	**-108.1**

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TABLE 3-2a: U.S. Gross Domestic Product (GDP) Attributed to Transportation-Related Final Demand (Current $ billions) (Continued)

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Government transportation-related purchases										
Federal purchases[b]	7.0	10.0	12.9	16.3	17.2	17.6	18.3	18.6	19.5	U
State and local purchases[b]	48.8	67.5	90.1	109.8	115.2	123.6	130.0	140.7	147.6	U
Defense-related purchases[c]	4.2	6.2	R8.8	8.4	8.8	8.3	8.3	8.9	R9.0	9.1
Total	**60.0**	**83.7**	**R111.8**	**134.5**	**141.2**	**149.5**	**156.6**	**168.2**	**R176.1**	**U**
Gross Domestic Product	**2,795.6**	**4,213.0**	**5,803.2**	**7,400.5**	**7,813.2**	**8,318.4**	**8,781.5**	**R9,274.3**	**R9,824.6**	**10,082.2**
Total transportation-related final demand[d]	**349.4**	**495.9**	**R617.5**	**782.0**	**837.7**	**893.3**	**932.4**	**R993.6**	**R1,031.1**	**U**
Total transportation in GDP (percent)	**12.5%**	**11.8%**	**10.6%**	**10.6%**	**10.7%**	**10.7%**	**10.6%**	**R10.7%**	**R10.5%**	**U**

KEY: R = revised; U = data are not available.

[a] Sum of exports and imports.

[b] Federal purchases and state and local purchases are the sum of consumption expenditures and gross investment.

[c] Defense-related purchases are the sum of transportation of material and travel.

[d] Sum of total personal consumption of transportation, total gross private domestic investment, net exports of transportation-related goods and services, and total government transportation-related purchases.

SOURCES

Federal, state, and local government transportation-related purchases:
1980-2000: U.S. Department of Commerce, Bureau of Economic Analysis, Internet site http://www.bea.doc.gov/ as of Oct. 22, 2001, table 3.15.

GDP:
U.S. Department of Commerce, Bureau of Economic Analysis, Internet site http://www.bea.doc.gov/ as of Aug. 12, 2002, table 1.1.

All other data:
U.S. Department of Commerce, Bureau of Economic Analysis, Internet site http://www.bea.doc.gov/ as of Aug. 12, 2002, tables 2.2, 3.10, 4.3, 5.4, and 5.6.

TABLE 3-2b: U.S. Gross Domestic Product (GDP) Attributed to Transportation-Related Final Demand (Chained 1996 $ billions)

	e1980	e1985	1990	1995	1996	1997	1998	1999	2000	2001
Personal consumption of transportation										
Motor vehicles and parts	142.7	236.9	246.1	253.4	256.3	264.8	292.0	R322.1	R338.4	361.9
Gasoline and oil	R94.9	104.8	113.1	120.2	124.2	128.1	131.8	R136.4	R135.7	138.8
Transport services	124.7	152.6	173.4	201.0	214.2	226.4	234.7	R246.2	R253.0	251.1
Total	**R362.3**	**494.3**	**532.6**	**574.6**	**594.7**	**619.3**	**658.5**	**R704.7**	**R727.1**	**751.8**
Gross private domestic investment										
Transportation structures	R6.4	R5.7	3.7	4.6	5.4	5.7	6.7	6.1	5.1	5.0
Transportation equipment	R77.6	93.9	87.4	128.2	138.9	150.5	168.2	R193.2	R186.6	163.6
Total	**R84.0**	**R99.6**	**91.1**	**132.8**	**144.3**	**156.2**	**174.9**	**R199.3**	**R191.7**	**168.6**
Exports (+)										
Civilian aircraft, engines, and parts	26.9	19.5	40.9	27.2	30.8	40.0	51.1	49.4	R43.2	44.8
Automotive vehicles, engines, and parts	28.3	30.5	39.8	62.5	65.0	73.4	71.7	R74.1	R78.5	73.4
Passenger fares	4.5	7.1	19.1	18.9	20.4	21.6	21.1	19.3	R19.8	17.0
Other transportation	16.5	18.9	23.9	26.8	26.1	26.9	26.4	27.6	R28.0	26.6
Total	**76.2**	**76.0**	**123.7**	**135.4**	**142.3**	**161.9**	**170.3**	**R170.4**	**R169.5**	**161.8**
Imports (-)										
Civilian aircraft, engines, and parts	6.0	7.7	13.5	11.2	12.7	16.0	20.7	22.1	23.9	27.3
Automotive vehicles, engines, and parts	52.5	R95.8	101.6	124.6	128.9	139.5	148.2	R177.1	192.5	186.7
Passenger fares	5.5	9.3	12.7	14.9	15.8	17.1	18.6	19.4	R20.9	17.7
Other transportation	R17.2	19.3	27.2	27.8	27.4	29.6	31.6	31.8	R35.4	33.6
Total	**R81.2**	**R132.1**	**155.0**	**178.5**	**184.8**	**202.2**	**219.1**	**R250.4**	**R272.7**	**265.3**
Net exports of transportation-related goods and services[a]	**R-5.0**	**R-56.1**	**-31.3**	**-43.1**	**-42.5**	**-40.3**	**-48.8**	**R-80.0**	**R-103.2**	**-103.5**

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TABLE 3-2b: U.S. Gross Domestic Product (GDP) Attributed to Transportation-Related Final Demand (Chained 1996 $ billions) (Continued)

	[e]1980	[e]1985	1990	1995	1996	1997	1998	1999	2000	2001
Government transportation-related purchases										
Federal purchases[b]	13.3	13.9	16.1	17.2	17.2	17.9	18.1	18.5	19.4	U
State and local purchases[b]	77.3	83.5	101.1	112.6	115.2	119.8	123.9	128.7	132.8	U
Defense-related purchases[c]	5.8	8.1	10.3	8.7	8.8	8.3	8.2	8.8	[R]8.7	8.7
Total	**96.4**	**105.5**	**[R]127.5**	**138.5**	**141.2**	**146.0**	**150.2**	**156.0**	**[R]160.9**	**U**
Gross Domestic Product	**4,900.9**	**5,717.1**	**6,707.9**	**7,543.8**	**7,813.2**	**8,159.5**	**8,508.9**	**[R]8,859.0**	**[R]9,191.4**	**9,214.5**
Total transportation-related final demand[d]	**[R]537.7**	**643.3**	**[R]719.9**	**802.8**	**837.7**	**881.2**	**934.8**	**[R]980.0**	**[R]976.5**	**U**
Total transportation in GDP (percent)	**11.0%**	**11.3%**	**10.7%**	**10.6%**	**10.7%**	**10.8%**	**11.0%**	**[R]11.1%**	**[R]10.6%**	**U**

KEY: R = revised; U = data are not available.

[a] Sum of exports and imports.

[b] Federal and state purchases are the sum of consumption expenditures and gross investment. Chained 1996 $ value = (year n current dollar value/year n quantity index) x 100.

[c] Defense-related purchases are the sum of transportation of material and travel.

[d] Sum of total personal consumption of transportation, total gross private domestic investment, net exports of transportation-related goods and services and total government transportation-related purchases.

[e] Data are estimated using the appropriate chain-type quantity index.

NOTE
Chained 1996 $ value = (Quantity index for year n x 1996 current $ value)/100.

SOURCES
Federal, state, and local government transportation-related purchases:
U.S. Department of Commerce, Bureau of Economic Analysis, Internet site http://www.bea.doc.gov/bea/dn/nipaweb/ as of Nov. 15, 2001, table 3.15 and table 7.11 (chain-type quantity indices for federal nondefense and state and local).

GDP:
U.S. Department of Commerce, Bureau of Economic Analysis, Internet site http://www.bea.doc.gov/bea/dn/nipaweb/ as of Aug. 12, 2002, table 1.2.

All other data:
U.S. Department of Commerce, Bureau of Economic Analysis, Internet site http://www.bea.doc.gov/bea/dn/nipaweb/ as of Aug. 12, 2002, tables 2.3, 3.11, 4.4, 5.7, and 5.9.

Chain-Type Quantity Indices (for computing 1980-1985 values):
U.S. Department of Commerce, Bureau of Economic Analysis, Internet site http://www.bea.doc.gov/bea/dn/nipaweb/ as of Aug. 12, 2002, tables 7.4, 7.7, 7.8, 7.10, and 7.12.

TABLE 3-3a: U.S. Gross Domestic Demand (GDD) Attributed to Transportation-Related Final Demand (Current $ billions)

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Gross Domestic Demand	**2,810.5**	**4,327.2**	**5,874.6**	**7,484.7**	**7,902.1**	**8,407.8**	**8,933.3**	**R9,816.2**	**R10,506.2**	**10,731.7**
Total domestic transportation-related final demand[a]	**350.5**	**530.6**	**R642.4**	**825.3**	**880.2**	**933.5**	**981.7**	**R1,076.9**	**R1,139.9**	**U**
Total transportation in GDD (percent)	**12.5%**	**12.3%**	**R10.9%**	**11.0%**	**11.1%**	**11.1%**	**11.0%**	**R11.0%**	**R10.8%**	**U**
Personal consumption of transportation										
Motor vehicles and parts	87.0	175.7	206.4	249.3	256.3	264.2	288.8	R319.1	R336.6	361.3
Gasoline and oil	86.7	97.2	107.3	113.3	124.2	128.1	114.8	R129.3	R164.4	162.1
Transportation services	64.7	100.0	141.8	197.7	214.2	234.4	246.3	R259.4	R267.8	271.4
Total	**238.4**	**372.9**	**455.5**	**560.3**	**594.7**	**626.7**	**649.9**	**R707.8**	**R768.8**	**794.8**
Gross private domestic investment										
Transportation structures	3.7	4.3	3.0	4.4	5.4	5.9	7.0	6.2	R5.3	5.0
Transportation equipment	48.4	69.7	75.7	126.1	138.9	151.4	168.2	R194.7	R189.7	165.8
Total	**52.1**	**74.0**	**78.7**	**130.5**	**144.3**	**157.3**	**175.2**	**R200.9**	**R195.0**	**170.8**
Government transportation-related purchases										
Federal purchases[b]	7.0	10.0	12.9	16.3	17.2	17.6	18.3	18.6	19.5	U
State and local purchases[b]	48.8	67.5	90.1	109.8	115.2	123.6	130.0	140.7	147.6	U
Defense-related purchases[c]	4.2	6.2	R5.2	8.4	8.8	8.3	8.3	8.9	R9.0	9.1
Total	**60.0**	**83.7**	**R108.2**	**134.5**	**141.2**	**149.5**	**156.6**	**168.2**	**R176.1**	**U**

KEY: R = revised; U = data are not available.

[a] Sum of total personal consumption of transportation, total gross private domestic investment, and total government-related purchases.

[b] Federal purchases and state and local purchases are the sum of consumption expenditures and gross investment.

[c] Defense-related purchases are the sum of the transportation of material and travel.

SOURCES

Gross Domestic Demand:
U.S. Department of Commerce, Bureau of Economic Analysis, **Internet site http://www.bea.doc.gov/ as of Aug. 12, 2002, tables 1.1 and 4.3.**

Federal, state, and local government purchases:
1980-2000: U.S. Department of Commerce, Bureau of Economic Analysis, Internet site http://www.bea.doc.gov/bea/dn/nipaweb/ as of Nov. 15, 2001, table 3.15.

All other data:
U.S. Department of Commerce, Bureau of Economic Analysis, Internet site http://www.bea.doc.gov/ as of Aug. 12, 2002, tables 2.2, 3.10, 5.6, and 5.8.

TABLE 3-3b: U.S. Gross Domestic Demand (GDD) Attributed to Transportation-Related Final Demand (Chained 1996 $ billions)

	[d]1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Personal consumption of transportation										
Motor vehicles and parts	142.7	236.9	246.1	253.4	256.3	264.8	292.0	R322.1	R338.4	361.9
Gasoline and oil	R94.9	104.8	113.1	120.2	124.2	128.1	131.8	R136.4	R135.7	138.8
Transportation services	124.7	152.6	173.4	201.0	214.2	226.4	234.7	R246.2	R253.0	251.1
Total	**R362.3**	**494.3**	**532.6**	**574.6**	**594.7**	**619.3**	**658.5**	**R704.7**	**R727.1**	**751.8**
Gross private domestic investment										
Transportation structures	R6.4	R5.7	3.7	4.6	5.4	5.7	6.7	6.1	5.1	5.0
Transportation equipment	R77.6	93.9	87.4	128.2	138.9	150.5	168.2	R193.2	R186.6	163.6
Total	**R83.8**	**R99.6**	**91.1**	**132.8**	**144.3**	**156.2**	**174.9**	**R199.3**	**R191.7**	**168.6**
Government transportation-related purchases										
Federal purchases[a]	13.3	13.9	16.1	17.2	17.2	17.9	18.1	18.5	19.4	U
State and local purchases	77.3	83.5	101.1	112.6	115.2	119.8	123.9	128.7	132.8	U
Defense-related purchases[b]	5.8	8.1	10.3	8.7	8.8	8.3	8.2	8.8	R8.7	8.7
Total	**96.4**	**105.5**	**127.5**	**138.5**	**141.2**	**146.0**	**150.2**	**156.0**	**R160.9**	**U**
Gross Domestic Demand	**4,890.9**	**5,866.2**	**6,764.4**	**7,622.2**	**7,902.1**	**8,272.8**	**8,730.0**	**R9,179.5**	**R9,590.2**	**9,630.4**
Total domestic transportation-related final demand[c]	**R542.5**	**R699.4**	**751.2**	**845.9**	**880.2**	**921.5**	**983.6**	**1,060.0**	**1,079.7**	**U**
Total transportation in GDD (percent)	**11.1**	**11.9**	**11.1**	**11.1**	**11.1**	**11.1**	**11.3**	**11.5**	**11.3**	**U**

KEY: R = revised; U = data are not available.

[a] Federal purchases and state and local purchases are the sum of consumption expenditures and gross investments.

[b] Defense-related purchases are the sum of the transportation of material and travel.

[c] Sum of total personal consumption of transportation, total gross private domestic investment, and total government-related purchases.

[d] Data are estimated using the appropriate chain-type quantity index.

NOTE
Chained 1996 $ value = (Quantity index for year n x 1996 current $ value)/100.

SOURCES
Federal, state, and local government transportation-related purchases:
1980-2000: U.S. Department of Commerce, Bureau of Economic Analysis, Internet site http://www.bea.doc.gov/bea/dn/nipaweb/ as of Nov. 15, 2001, tables 3.15 and 7.11 (chain-type quantity indices for federal nondefense and state and local).

All other data:
1980-2001: Ibid., Internet site http://www.bea.doc.gov/bea/dn/nipaweb/ as of Aug. 12, 2002, tables 1.2, 2.3, 3.11, 4.4, 5.7, and 5.9.

Chain-Type Quantity Indices (for computing 1980-1985 values):
U.S. Department of Commerce, Bureau of Economic Analysis, Internet site http://www.bea.doc.gov/bea/dn/nipaweb/ as of Aug. 12, 2002, tables 7.4, 7.7, 7.8, 7.10, and 7.12.

TABLE 3-4a: Contributions to Gross Domestic Product (GDP): Selected Industries (Current $ billions)

	1990	1995	1996	1997	1998	1999	2000
GDP by industry							
Services	1,072	1,462	1,564	1,692	1,830	1,981	2,165
Health care	314	433	459	472	491	516	547
Education	40	56	58	61	68	72	79
Finance, insurance, and real estate	1,010	1,347	1,437	1,570	1,709	1,811	1,936
Manufacturing	1,041	1,289	1,316	1,380	1,432	1,497	1,567
Durable goods	587	730	748	791	831	866	902
Nondurable goods	454	559	568	588	601	631	665
Government	807	990	1,020	1,065	1,103	1,152	1,216
Federal	300	342	347	355	360	370	387
State and local	506	647	674	710	743	782	830
Retail trade	508	647	687	741	790	835	894
Wholesale trade	376	501	530	567	608	634	674
Construction	249	290	316	338	381	426	464
For-hire transportation	177	233	243	262	289	303	314
Electric, gas, and sanitary services	165	207	208	206	205	216	230
Communications	148	202	215	221	239	259	281
Agriculture, forestry, and fishing	108	110	130	130	128	127	136
Mining	112	96	113	119	100	103	127
Total GDP	**5,803**	**7,401**	**7,813**	**8,318**	**8,782**	**9,269**	**9,873**
Statistical discrepancy[a]	31	27	33	30	-31	-73	-130
Percent of GDP							
Services	18%	20%	20%	20%	21%	21%	22%
Health care	5%	6%	6%	6%	6%	6%	6%
Education	1%	1%	1%	1%	1%	1%	1%
Finance, insurance, and real estate	17%	18%	18%	19%	19%	20%	20%
Manufacturing	18%	17%	17%	17%	16%	16%	16%
Durable goods	10%	10%	10%	10%	9%	9%	9%
Nondurable goods	8%	8%	7%	7%	7%	7%	7%
Government	14%	13%	13%	13%	13%	12%	12%
Federal	5%	5%	4%	4%	4%	4%	4%
State and local	9%	9%	9%	9%	8%	8%	8%
Retail trade	9%	9%	9%	9%	9%	9%	9%
Wholesale trade	6%	7%	7%	7%	7%	7%	7%
Construction	4%	4%	4%	4%	4%	5%	5%
For-hire transportation	3%	3%	3%	3%	3%	3%	3%
Electric, gas, and sanitary services	3%	3%	3%	2%	2%	2%	2%
Communications	3%	3%	3%	3%	3%	3%	3%
Agriculture, forestry, and fishing	2%	1%	2%	2%	1%	1%	1%
Mining	2%	1%	1%	1%	1%	1%	1%

[a] Equals gross domestic product measured as the sum of expenditures less gross domestic income.

NOTES

Data for 1997 and 1998 have been revised by the Bureau of Economic Analysis. Percentages based on the revised estimates have been recalculated but may appear unchanged due the number of significant digits shown.

Numbers may not add to totals due to rounding.

SOURCE

1990-2000: U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business* (Washington, DC: November 2001), p. 26.

TABLE 3-4b: Contributions to Gross Domestic Product (GDP): Selected Industries (Chained 1996 $ billions)

	1990	1995	1996	1997	1998	1999	2000
GDP by industry							
Services	1,362	1,510	1,564	1,632	1,699	1,775	1,865
Health services	423	444	459	460	461	471	485
Educational services	50	59	58	59	61	62	65
Finance, insurance, and real estate	1,251	1,393	1,437	1,521	1,622	1,714	1,810
Manufacturing	1,102	1,285	1,316	1,387	1,444	1,532	1,595
Durable goods	585	715	748	813	893	965	1,034
Nondurable goods	520	570	568	575	556	574	574
Government	1,008	1,017	1,020	1,036	1,047	1,061	1,085
Federal	385	354	347	347	348	347	353
State and local	624	663	674	688	700	714	732
Retail trade	560	641	687	745	800	844	906
Wholesale trade	395	483	530	584	663	689	708
Construction	291	300	316	325	349	370	379
For-hire transportation	181	225	243	249	258	269	281
Electric, gas, and sanitary services	190	207	208	202	194	213	218
Communications	155	202	215	218	231	257	284
Agriculture, forestry, and fishing	119	123	130	144	146	153	166
Mining	106	113	113	117	120	112	95
Total GDP	**6,708**	**7,544**	**7,813**	**8,160**	**8,509**	**8,857**	**9,224**
Statistical discrepancy[a]	35	27	33	29	-30	-70	-123
Percent of GDP							
Services	20%	20%	20%	20%	20%	20%	20%
Health services	6%	6%	6%	6%	5%	5%	5%
Educational services	1%	1%	1%	1%	1%	1%	1%
Finance, insurance, and real estate	19%	18%	18%	19%	19%	19%	20%
Manufacturing	16%	17%	17%	17%	17%	17%	17%
Durable goods	9%	9%	10%	10%	10%	11%	11%
Nondurable goods	8%	8%	7%	7%	7%	6%	6%
Government	15%	13%	13%	13%	12%	12%	12%
Federal	6%	5%	4%	4%	4%	4%	4%
State and local	9%	9%	9%	8%	8%	8%	8%
Retail trade	8%	9%	9%	9%	9%	10%	10%
Wholesale trade	6%	6%	7%	7%	8%	8%	8%
Construction	4%	4%	4%	4%	4%	4%	4%
For-hire transportation	3%	3%	3%	3%	3%	3%	3%
Electric, gas, and sanitary services	3%	3%	3%	2%	2%	2%	2%
Communications	2%	3%	3%	3%	3%	3%	3%
Agriculture, forestry, and fishing	2%	2%	2%	2%	2%	2%	2%
Mining	2%	1%	1%	1%	1%	1%	1%

[a] Equals the current dollar statistical discrepancy deflated by the implicit price deflator for gross domestic business product.

NOTES

Data for 1997 and 1998 have been revised by the Bureau of Economic Analysis.

Percentages based on the revised estimates have been recalculated but may appear unchanged due to the number of significant digits shown.

Numbers may not add to totals due to rounding.

SOURCES

1990-95: U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business*, (Washington, DC, June 2000), p. 46.

1996: Ibid., (Washington, DC, December 2000), p. 31.

1997-2000: Ibid., (Washington, DC, November 2001), p. 29.

TABLE 3-5: Gross Domestic Product (GDP) by Major Social Function (Current $ billions)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
TOTAL GDP	**5,986**	**6,319**	**6,642**	**7,054**	**7,401**	**7,813**	**8,318**	**8,782**	**9,269**	**9,873**
Housing	**1,388**	**1,473**	**1,570**	**1,686**	**1,766**	**1,874**	**1,974**	**2,103**	**2,243**	**2,386**
Percent of total	23.2	23.0	23.6	23.9	23.9	24.0	23.7	23.9	24.2	24.2
Healthcare	**827**	**903**	**969**	**1,026**	**1,086**	**1,142**	**1,208**	**1,281**	**1,353**	**1,444**
Percent of total	13.8	14.3	14.6	14.5	14.7	14.6	15.0	14.6	14.6	15.0
Food	**798**	**828**	**850**	**903**	**926**	**985**	**1,011**	**1,059**	**1,126**	**1,201**
Percent of total	13.3	13.1	12.8	12.8	12.5	12.6	12.2	12.1	12.2	12.2
Transportation[a]	**613**	**658**	**701**	**755**	**788**	**840**	**898**	**936**	**1,014**	**1,063**
Percent of total	10.2	10.4	10.6	10.7	10.6	10.8	10.8	10.7	10.9	10.8
Education	**413**	**432**	**452**	**478**	**511**	**541**	**578**	**614**	**650**	**693**
Percent of total	6.9	6.8	6.8	6.8	6.9	6.9	6.9	7.0	7.0	7.0
Other	**1,947**	**2,026**	**2,101**	**2,207**	**2,324**	**2,431**	**2,650**	**2,788**	**2,882**	**3,085**
Percent of total	32.5	32.1	31.6	31.0	31.4	31.1	31.9	31.8	31.0	31.3

[a] Transportation-related final demand.

NOTE
Numbers and percents may not add to totals due to rounding.

SOURCE
U.S. Department of Transportation, Bureau of Transportation Statistics, calculated from data in the U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business* (Washington, DC: Various issues from 1991 to October 2001).

TABLE 3-6: National Transportation and Economic Trends

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Passenger-miles (billions)	**1,327**	**1,630**	**2,170**	**2,561**	**2,895**	**3,326**	**3,946**	**4,333**	**4,483**	**4,623**	**4,749**	**4,904**	**U**	**U**
Index (1980 = 100)	46	56	75	88	100	115	136	150	155	160	164	169	U	U
Ton-miles (billions)	**1,562**	**1,854**	**2,207**	**2,285**	**2,989**	**2,949**	**3,196**	**3,648**	**3,725**	**3,682**	**3,710**	**3,814**	**U**	**U**
Index (1980 = 100)	52	62	74	76	100	99	107	122	125	123	124	128	U	U
Population[a] (millions)	**181**	**194**	**205**	**216**	**228**	**238**	**250**	**263**	**266**	**268**	**270**	**273**	**R282**	**285**
Index (1980 = 100)	79	85	90	95	100	R105	110	116	117	118	119	120	R124	125
Industrial Production Index[b] (1992 = 100)	**37**	**50**	**59**	**63**	**80**	**88**	**99**	**114**	**120**	**128**	**R135**	**R139**	**R146**	**P140**
Gross Domestic Product														
Current $ (billions)	527	720	1,040	1,635	2,796	4,213	5,803	7,401	7,813	8,318	8,782	R9,274	R9,825	10,082
Index (1980 = 100)	19	26	37	58	100	151	208	265	279	R297	R313	R332	R351	361
Chained 1996 $ (billions)	2,377	3,029	3,578	4,084	4,901	5,717	6,708	7,544	7,813	8,160	8,509	R8,859	R9,191	9,215

KEY: P = preliminary; R = revised; U = data are not available.

[a] Annual estimates as of July 1. Includes Armed Forces abroad.

[b] Industrial Production Index covers manufacturing, mining, and utilities.

SOURCES

Passenger-miles:
1960-99: Summation of all modes from the passenger-miles table in chapter 1.

Ton-miles:
1960-99: Summation of all modes from the ton-miles table in chapter 1.

Population:
1960-99: U.S. Department of Commerce, Census Bureau, *Statistical Abstract of the United States, 2000* (Washington, DC: 2001), table 2.
2000-01: U.S. Department of Commerce, Census Bureau, *USA Statistics in Brief, supplement to Statistical Abstract of the United States*, available at Internet site http://www.census.gov/statab/www/part1.html as of April 2001.

Industrial Production Index:
1960-2001: Council of Economic Advisors, *Economic Report of the President* (Washington, DC: February 2002), table B-51.

Gross Domestic Product:
1960-97: U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business* (Washington, DC: August 1998), table 1, pp. 147-148 and table 2A, pp. 151-152.
1998-2001: Ibid., http://www.bea.gov/bea/dn/gdplev.xls as of Sept. 20, 2002.

Section B
Transportation and Consumer Expenditures

TABLE 3-7: Passenger and Freight Transportation Expenditures (Current $ millions)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999
TOTAL passenger and freight transportation expenditures	**107,461**	**146,523**	**195,871**	**299,221**	**569,879**	**780,232**	**992,946**	**1,201,545**	**1,266,959**	**1,341,638**	**1,396,238**	**1,498,672**
Passenger transportation												
Highway												
Auto purchases and ownership[a]	51,610	71,064	94,978	152,238	297,128	426,796	507,308	631,653	672,416	706,064	722,484	787,407
Local												
Bus and transit[b]	1,337	1,454	1,841	4,697	9,297	13,548	16,721	21,647	21,318	21,932	21,445	21,702
Taxi	1,107	1,113	1,740	2,900	2,755	3,770	4,030	4,960	5,425	5,735	6,355	6,200
School bus	486	707	1,219	2,174	3,833	5,722	8,031	9,889	9,082	10,353	10,326	10,340
Intercity, bus	559	629	799	1,016	1,709	1,989	1,750	1,481	1,497	1,642	1,757	1,819
Total highway	**55,099**	**74,967**	**100,577**	**163,025**	**314,722**	**451,825**	**537,840**	**669,630**	**709,738**	**745,726**	**762,367**	**827,468**
Air total[c]	3,555	5,682	10,565	18,851	38,135	50,319	73,045	81,155	82,331	93,268	97,358	101,750
Rail total[d]	759	598	464	1,212	2,976	3,875	4,521	6,693	5,895	5,763	5,691	5,611
Water total (includes international)	281	345	287	294	310	601	1,391	1,716	1,843	1,974	2,029	2,088
Total passenger transportation expenditures	**59,694**	**81,592**	**111,893**	**183,382**	**356,143**	**506,620**	**641,996**	**759,193**	**799,807**	**846,732**	**867,445**	**936,917**
Freight transportation expenditures												
Highway												
Local, truck	14,289	23,779	28,819	37,287	60,545	82,200	108,350	128,352	132,973	138,727	144,276	152,067
Intercity												
Bus	42	70	122	156	235	245	126	130	132	134	141	151
Truck	17,958	23,628	33,553	47,400	94,551	123,200	162,300	219,627	235,440	257,807	282,814	304,563
Total highway	**32,289**	**47,477**	**62,494**	**84,843**	**155,331**	**205,645**	**270,776**	**348,109**	**368,545**	**396,668**	**427,231**	**456,781**
Air total (domestic and international)	354	708	1,171	1,838	4,013	6,817	13,706	18,755	20,448	22,831	24,222	25,277
Rail total	9,028	9,923	11,869	16,509	27,858	29,150	30,067	34,360	35,059	35,349	35,294	35,893
Water total	3,487	3,903	5,257	8,221	15,498	18,448	20,121	22,709	24,564	21,031	22,503	24,494
Oil pipeline total	895	1,051	1,396	2,220	7,548	8,910	8,506	9,077	8,637	8,632	8,579	9,067
Other total[e]	1,714	1,869	1,791	2,208	3,488	4,642	7,774	10,307	9,950	10,554	10,601	10,243
Total freight transportation expenditures	**47,767**	**64,931**	**83,978**	**115,839**	**213,736**	**273,612**	**350,950**	**443,317**	**467,203**	**495,065**	**528,430**	**561,755**

[a] Includes business expenditures for passenger cars.

[b] Includes federal / state operating subsidies, and federal capital grants. Beginning in 1994, includes taxes levied directly by transit agencies and local subsidies such as bridge and tunnel tolls, and nontransit parking lot funds.

[c] Air includes aircraft and operating costs, plus domestic and international air passenger federal excise taxes.

[d] Data from 1980 include federal / state / local operating subsidies and capital grants.
Figures also include federal operating subsidies and capital grants for Amtrak and the Northeast Corridor.

[e] Domestic freight forwarder's revenues after payment to live-haul carriers plus other shipper costs such as loading and unloading freight cars.

SOURCE
Passenger and freight:
1960-99: Eno Transportation Foundation, Inc., *Transportation in America, 2001* (Washington, DC: 2000), pp. 4-11.

TABLE 3-8: Sales Price of Transportation Fuel to End-Users (Current ¢/gallon)

	1980	1985	1990	1995	1996	1997	1998	1999	2000	P2001
Aviation fuel (excluding taxes)										
Aviation gasoline[a]	108.4	120.1	112.0	100.5	111.6	112.8	97.5	105.9	R130.6	132.2
Jet fuel kerosene[a]	86.8	79.6	76.6	54.0	65.1	61.3	45.2	54.3	R89.9	77.6
Highway fuel										
Gasoline (including taxes)										
Premium[b]	N	134.0	134.9	133.6	141.3	141.6	125.0	135.7	169.3	165.7
Regular[b]	124.5	120.2	116.4	114.7	123.1	123.4	105.9	116.5	151.0	146.1
All types	122.1	119.6	121.7	120.5	128.8	129.1	111.5	122.1	156.3	153.1
Diesel no. 2 (excluding taxes)[a]	81.8	78.9	72.5	56.0	68.1	64.2	49.4	58.4	R93.5	84.2
Railroad fuel										
Diesel	82.6	77.8	69.2	60.0	67.7	67.8	57.0	55.5	87.5	85.4

KEY: N = data do not exist; P = preliminary; R = revised.

[a] Sales to end-users (those sales made directly to the ultimate consumer, including bulk customers in agriculture, industry, and utility).

[b] Average retail price.

SOURCES

All data except railroad fuel:
U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review* (Washington, DC: August 2002), tables 9.4 and 9.7.

Railroad fuel:
Association of American Railroads, *Railroad Facts* (Washington, DC: 2001), p. 61, and personal communication, Aug. 12, 2002.

TABLE 3-9: Price Trends of Gasoline v. Other Consumer Goods and Services

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Retail price of regular grade gasoline (¢/gallon)														
Service station price (excluding taxes)[a]	21.0	20.7	24.6	44.8	105.3	89.5	88.0	74.3	82.4	82.6	65.0	75.0	108.8	106.4
State and federal taxes[b]	10.1	10.5	11.1	12.4	13.8	22.0	26.9	40.4	40.7	40.8	41.0	41.5	42.2	42.0
Service station price (including taxes)														
Leaded	31.1	31.2	35.7	56.7	119.1	111.5	114.9	NA	NA	NA	NA	NA	NA	NA
Unleaded	N	N	N	N	124.5	120.2	116.4	114.7	123.1	123.4	106.0	116.5	151.0	[c]148.4
Consumer price indices (1982-84 = 100)														
All items	30	32	39	54	82	108	131	152	157	161	163	167	172	177
Food	30	32	39	60	87	106	132	148	153	157	161	164	168	173
Shelter	25	27	36	49	81	110	140	166	171	176	182	187	193	200
Apparel and upkeep	46	48	59	73	91	105	124	132	132	133	133	131	130	127
Motor fuel	24	25	28	45	97	99	101	100	106	106	92	101	129	125
Medical care	22	25	34	48	75	114	163	221	228	235	242	251	261	273

KEY: N = data do not exist; NA = not applicable.

[a] Calculated by subtracting state and federal taxes from service station price (including taxes).

[b] State and federal taxes are weighted averages computed by the American Petroleum Institute, based on gasoline sold in the 50 states.

[c] Includes only data from January to April.

SOURCES

Retail price of regular grade gasoline except service station prices (including taxes):
1960-65: American Petroleum Institute, Basic Petroleum Data Book (Washington, DC: Annual issues), section VI, table 5, and similar tables in earlier editions.
1970-2001: American Petroleum Institute, How Much We Pay for Gasoline (May 2001) table 2.

Service station price (including taxes):
1960-2001: American Petroleum Institute, How Much We Pay for Gasoline (May 2001) table 3.

Consumer price indices:
1960-2001: Council of Economic Advisors, Economic Report of the President (Washington, DC: January 2001), tables B-60 and B-61. Also available at Internet site http://w3.access.gpo.gov/eop/.

TABLE 3-10: Producer Price Indices for Transportation Services (Base date = 100)

	Base date	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Railroads, line-haul operating (SIC 4011)	12/84	107.5	109.3	109.9	110.9	111.8	111.7	111.5	112.1	113.4	113.0	114.5	116.6
Motor freight transportation and warehousing (SIC 42)	06/93	U	U	U	99.9	101.9	104.5	106.3	108.9	111.6	114.8	119.4	123.1
Water transportation (SIC 44)	12/92	U	U	100.0	99.7	100.0	103.0	103.7	104.2	105.6	113.0	122.6	129.8
Air transportation (SIC 45)	12/92	U	U	100.0	105.6	108.5	113.7	121.1	125.3	124.5	130.8	147.7	157.2
Pipelines, except natural gas (SIC 46)	12/86	95.8	96.1	96.4	96.6	102.6	110.8	104.6	98.8	99.2	98.3	102.3	110.3
Travel agencies (SIC 4724)	12/89	107.3	113.6	113.4	115.3	115.3	111.3	109.9	114.5	112.1	112.0	121.8	123.3
Freight transportation arrangement (SIC 4731)	12/94	U	U	U	U	100.0	99.8	101.5	101.4	99.7	99.2	100.3	100.3

KEY: SIC = Standard Industrial Classification; U = data are not available.

NOTE
Data are reported monthly from January to December. The monthly indices, however, are available for fewer than 12 months for some years. In both cases, a simple average of the available monthly indices is reported for each year. Data are not seasonally adjusted.

SOURCE
U.S. Department of Labor, Bureau of Labor Statistics, Internet site www.bls.gov/data/sa.htm as of July 29, 2002.

TABLE 3-11: Producer Price Indices for Transportation Equipment (Base date = 100)

	Base date	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Transportation equipment (SIC 37)	12/84	115.6	119.8	123.0	126.3	130.1	132.2	134.2	134.1	133.6	134.5	136.8	137.9
Motor vehicles and motor vehicle equipment (SIC 371)	12/84	113.0	117.4	120.5	123.8	127.5	129.1	130.4	129.0	127.7	128.3	129.2	128.5
Motor vehicles and passenger car bodies (SIC 3711)	06/82	119.9	125.3	129.1	133.2	138.0	139.1	140.4	138.7	136.8	137.6	138.7	137.6
Truck and bus bodies (SIC 3713)	12/82	125.4	128.1	131.1	132.8	136.8	145.5	149.9	153.5	155.3	157.0	160.3	163.3
Motor vehicle parts and accessories (SIC 3714)	12/82	108.9	110.3	111.0	111.7	112.0	113.5	114.0	113.1	112.6	112.0	111.6	111.5
Truck trailers (SIC 3715)	12/79	125.6	128.1	131.2	134.2	138.6	148.6	147.8	147.7	152.2	153.6	156.6	156.1
Motor homes built on purchased chassis (SIC 3716)	06/84	125.8	128.7	131.8	133.9	134.5	137.8	141.6	143.1	145.0	147.6	149.4	151.8
Aircraft (SIC 3721)	12/85	116.0	120.4	124.3	128.6	132.9	137.3	140.5	142.3	142.7	144.1	150.5	155.7
Aircraft engines and engine parts (SIC 3724)	12/85	112.6	117.9	123.6	125.7	129.0	130.9	133.4	134.8	135.8	136.8	139.7	144.0
Aircraft parts and auxiliary equipment, NEC (SIC 3728)	06/85	116.3	120.3	124.9	128.0	130.7	131.7	136.3	139.0	140.8	142.2	143.3	146.6
Shipbuilding and repairing (SIC 3731)	12/85	114.0	116.2	118.3	123.3	126.8	127.6	130.1	133.3	134.8	135.4	137.6	140.1
Boatbuilding and repairing (SIC 3732)	12/81	136.0	140.1	144.9	147.7	150.2	154.6	159.6	165.0	168.6	172.7	179.4	186.3
Railroad equipment (SIC 3743)	06/84	114.2	117.3	118.7	119.8	122.6	127.6	129.6	127.4	127.5	128.1	128.6	128.2
Motorcycles, bicycles, and parts (SIC 3751)	12/84	109.9	111.8	114.4	116.9	119.0	122.2	123.3	123.3	124.2	125.5	127.7	127.9
Travel trailers and campers (SIC 3792)	06/84	118.1	120.1	122.2	123.2	124.7	127.2	129.0	129.6	130.3	132.0	133.2	134.2
Transportation equipment, NEC (SIC 3799)	06/85	112.5	114.9	116.1	117.2	119.1	123.3	126.6	128.7	131.3	132.2	135.5	138.1

KEY: NEC = not elsewhere classified; SIC = Standard Industrial Classification.

NOTE
Bureau of Labor Statistics data are reported monthly from January to December. The monthly indices, however, are available for fewer than 12 months for some years. In both cases, a simple average of the available monthly indices is reported for each year. Data are not seasonally adjusted.

SOURCE
U.S. Department of Labor, Bureau of Labor Statistics, Producer Price Index Revision-Current Series, Internet site www.bls.gov/data/sa.htm as of July 30, 2002.

TABLE 3-12: Personal Expenditures by Category (Current $ millions)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	R2000	2001
TOTAL expenditures	**332,300**	**444,300**	**648,900**	**1,030,300**	**1,762,900**	**2,712,600**	**3,831,500**	**4,969,000**	**5,237,500**	**5,529,300**	**5,856,000**	**R6,246,500**	**6,683,700**	**6,987,000**
Transportation	42,900	59,100	81,100	130,200	238,400	372,800	455,400	560,300	594,600	626,700	649,900	R707,800	768,900	794,800
Transportation as a % of total	12.9	13.3	12.5	12.6	13.5	13.7	11.9	11.3	11.4	11.3	11.1	R11.3	11.5	11.4
Food and tobacco	89,200	108,800	154,600	238,300	376,800	498,500	677,900	802,500	834,100	862,000	906,900	R964,700	1,027,200	1,068,700
Clothing, accessories, and jewelry	32,700	41,400	57,600	85,600	132,300	188,300	261,700	317,300	333,300	348,000	367,200	R391,200	409,800	412,600
Personal care	5,600	8,100	11,500	16,100	25,500	37,600	53,700	67,400	71,600	76,100	79,900	R84,000	87,800	89,100
Housing	48,200	65,400	94,000	147,000	255,100	406,800	585,600	740,800	772,500	810,500	859,700	R912,600	960,000	1,014,500
Household operation	46,700	62,100	85,000	136,000	233,800	344,000	433,600	555,000	589,200	617,800	642,900	R677,700	723,900	747,300
Medical care	22,100	34,100	60,000	107,700	206,500	367,400	619,700	888,600	932,300	984,400	1,041,700	R1,097,900	1,171,100	1,270,200
Personal business	14,600	20,700	32,600	54,000	103,600	188,100	284,700	406,800	435,100	489,000	529,800	R575,200	632,500	634,300
Recreation	18,500	26,900	43,100	70,500	116,700	187,600	284,900	401,600	429,600	456,600	489,100	R526,500	564,700	593,900
Education and research	4,400	7,000	12,700	20,600	33,500	53,800	83,700	114,500	122,300	130,500	140,200	R152,100	164,000	174,900
Religious and welfare activities	5,300	7,800	12,200	19,800	37,200	60,400	97,100	134,900	146,800	149,500	163,900	R172,900	190,100	199,600
Foreign travel and other, net	2,100	2,900	4,500	4,400	3,500	7,500	-6,300	-20,700	-24,100	-21,800	-15,100	-16,000	-16,100	-12,900
Disposable Personal Income (DPI)	366,200	498,900	736,500	1,181,400	2,019,800	3,086,500	4,293,600	5,422,600	5,677,700	5,968,200	6,355,600	R6,627,400	7,120,200	7,393,200
Transportation as a % of DPI	11.7	11.8	11.0	11.0	11.8	12.1	10.6	10.3	10.5	10.5	10.2	R10.7	10.8	10.8

KEY: R = revised.

SOURCES

DPI: 1960-2001: U.S. Department of Commerce, Bureau of Economic Analysis, *National Income and Product Accounts Tables*, table 2.9, Internet site http://www.bea.doc.gov, as of Aug. 9, 2002.

All but DPI: 1960-2001: Ibid., *National Income and Product Accounts Tables*, table 2.4, Internet site http://www.bea.doc.gov as of Aug. 9, 2002.

TABLE 3-13: Personal Consumption Expenditures on Transportation by Subcategory (Current $ millions)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
TOTAL transportation	**42,900**	**59,100**	**81,100**	**130,200**	**238,400**	**372,800**	**455,400**	**560,300**	**594,600**	**626,700**	**649,900**	**R707,800**	**R768,900**	**794,800**
User-operated transportation														
New cars and net purchases of used cars	16,600	25,200	R26,700	R36,700	57,200	110,700	119,000	132,200	133,300	135,600	142,800	R156,100	R164,900	166,500
New and used trucks and RVs	610	1,280	2,700	7,700	11,800	40,800	57,500	80,200	84,300	89,000	104,500	R118,700	R125,900	149,000
Tires, tubes, accessories, and parts	2,500	3,500	6,100	10,300	17,900	24,300	29,900	36,900	38,700	39,600	41,500	44,400	R45,900	45,800
Repair and rental	5,500	R7,600	12,300	19,800	34,000	60,500	84,900	122,200	134,200	146,300	153,600	R165,100	R175,500	181,600
Gasoline and oil	12,000	14,800	21,900	39,700	86,700	97,200	107,300	113,300	124,200	128,100	114,800	R129,300	R164,400	162,100
Tolls	310	460	650	820	1,100	1,500	2,300	3,400	3,700	4,000	4,000	R4,400	R4,600	4,900
Insurance premiums, less claims paid	2,000	2,400	3,800	3,800	9,400	10,000	18,100	29,700	31,800	36,300	38,000	36,800	R30,700	32,100
Total	**39,500**	**55,100**	**74,200**	**118,900**	**218,300**	**344,900**	**419,000**	**517,800**	**550,200**	**578,900**	**599,200**	**R654,700**	**R711,900**	**742,000**
Purchased intercity transportation														
Railroad	310	280	210	270	300	480	700	600	600	700	700	700	800	900
Intercity bus	290	380	530	740	1,400	1,300	1,300	1,600	1,800	1,800	1,900	2,000	R1,500	1,500
Airline	680	1,300	3,100	5,900	12,800	17,600	22,700	25,500	26,200	29,000	30,800	R32,700	R36,700	32,400
Other	35	54	182	390	910	1,700	3,300	4,300	4,700	4,700	4,900	5,300	R5,200	4,800
Total	**1,310**	**2,000**	**4,000**	**7,300**	**15,400**	**21,100**	**28,100**	**32,100**	**33,300**	**36,200**	**38,400**	**R40,700**	**R44,300**	**39,700**
Purchased local transportation														
Mass transit system	1,400	1,400	1,800	2,100	2,900	4,200	5,800	7,100	7,700	7,800	8,300	8,600	R9,100	9,500
Taxi	600	600	1,200	2,000	1,900	2,600	2,600	3,200	3,500	3,700	4,100	3,800	R3,600	3,700
Total	**2,000**	**2,100**	**3,000**	**R4,000**	**4,800**	**6,800**	**8,400**	**10,400**	**11,200**	**11,600**	**12,300**	**12,400**	**R12,700**	**13,200**

KEY: R = revised; RVs = recreational vehicles.

NOTE
Numbers may not add to totals due to rounding.

SOURCE
1960-2001: Ibid., National Income and Product Accounts Tables, table 2.4, Internet site http://www.bea.doc.gov as of Aug. 9, 2002.

TABLE 3-14: Average Cost of Owning and Operating an Automobile[a] (Assuming 15,000 Vehicle-Miles per Year)

	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Average total cost per mile (current ¢)	14.4	21.2	23.2	33.0	41.2	42.6	44.8	46.1	49.1	51.0	50.2
Gas and oil	4.8	5.9	5.6	5.4	5.8	5.6	6.6	6.2	6.9	7.9	5.9
Gas and oil as a percent of total cost	33.4%	27.8%	24.1%	16.4%	14.1%	13.1%	14.7%	13.4%	14.1%	15.5%	11.8%
Maintenance	1.0	1.1	1.2	2.1	2.6	2.8	2.8	3.1	3.6	3.9	4.1
Tires	0.7	0.6	0.7	0.9	1.2	1.2	1.4	1.4	1.7	1.8	1.8
Average total cost per 15,000 miles (current $)	2,154	3,176	3,484	4,954	6,185	6,389	6,723	6,908	7,363	7,654	7,533
Variable cost	968	1,143	1,113	1,260	1,440	1,440	1,620	1,605	1,829	2,040	1,770
Fixed cost[b]	1,186	2,033	2,371	3,694	4,745	4,949	5,103	5,303	5,534	5,614	5,764

[a] All figures reflect the average cost of operating a vehicle 15,000 miles per year in stop and go conditions.

[b] Fixed costs (ownership costs) include insurance, license, registration, taxes, depreciation, and finance charges.

NOTES

Changes in the way costs were calculated make it difficult to compare pre-1985 data with more recent years.

Prior to 1985, the cost figures are for a mid-sized, current model, American car equipped with a variety of standard and optional accessories. After 1985, the cost figures represent a composite of three current model American cars. The 2000 fuel costs are based on a fourth quarter average price of $1.595 per gallon of regular unleaded gasoline, weighted 20 percent full-serve and 80 percent self-serve. Insurance figures are based on personal use of vehicles driven less than 10 miles to or from work, with no drivers under 25 years old. Normal depreciation costs are based on the vehicle's trade-in value at the end of 4 years or 60,000 miles. American Automobile Association analysis covers vehicles equipped with standard and optional accessories including automatic transmission, air conditioning, power steering, power disc brakes, AM/FM stereo, driver- and passenger-side air bags, anti-lock brakes, cruise control, tilt steering wheel, tinted glass, emissions equipment, and rear-window defogger.

SOURCE

American Automobile Association, *Your Driving Costs* (Heathrow, FL: Annual issues).

TABLE 3-15a: Average Passenger Fares (Current $)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Air carrier, domestic, scheduled service	33.01	34.13	40.65	53.64	84.60	92.53	107.86	106.66	110.37	114.10	114.34	R114.98	121.27
Class I bus, intercity[a]	2.46	2.73	3.81	5.46	10.57	11.98	20.22	20.10	22.85	20.71	23.00	25.43	29.46
Transit, all modes[b] (unlinked)	0.14	0.16	0.22	0.27	0.30	0.53	0.67	0.88	0.93	R0.90	R0.91	0.90	0.93
Commuter rail	0.64	0.71	0.84	1.04	1.41	2.85	2.90	3.13	3.25	3.30	3.29	R3.30	3.33
Intercity / Amtrak[c]	4.22	3.92	3.19	12.96	17.72	26.15	38.51	39.03	42.54	44.31	43.98	45.72	U

KEY: R = revised

[a] Regular route intercity service.

[b] Prior to 1984, excludes commuter railroad, automated guideway, urban ferryboat, demand responsive, and most rural and smaller systems.

[c] Amtrak began operations in 1971.

SOURCES

Air carrier, domestic, scheduled service:

1960: Civil Aeronautics Board, *Handbook of Airline Statistics, 1969* (Washington, DC: February 1970), part III, table 2 (enplanements); part IV, table 2 (passenger revenue).

1965-70: Ibid. *Handbook of Airline Statistics, 1973* (Washington, DC: March 1974), part III, table 2 (enplanements); part IV, table 2 (passenger revenue).

1975-80: Ibid. *Air Carrier Financial Statistics* (Washington, DC: Annual December issues), p. 1, line 3; and *Air Carrier Traffic Statistics* (Washington, DC: Annual December issues), p. 2, line 16 (passenger revenue / revenue passenger enplanements).

1985-2000: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, *Air Carrier Financial Statistics* (Washington, DC: Annual December issues), p. 1, line 3 (passenger revenues); *Air Carrier Traffic Statistics* (Washington, DC: Annual December issues), p. 2, line 16 (passenger revenue / revenue passenger enplanements).

Class I bus, intercity:

1960-90: Interstate Commerce Commission, *Transport Statistics in the United States, Motor Carriers* (Washington, DC: Annual issues), part 2.

1995-2000: U.S. Department of Transportation, Bureau of Transportation Statistics, *Selected Earnings Data, Class I Motor Carriers of Passengers* (Washington, DC: Annual issues).

Transit and commuter rail:

1960-2000: American Public Transit Association, *Public Transportation Fact Book* (Washington, DC: Annual issues) (passenger fares / passenger trips).

Intercity / Amtrak:

1960-70: Association of American Railroads, *Railroad Facts* (Washington, DC: Annual issues).

1975-80: Amtrak, State and Local Affairs Department and Public Affairs Department, personal communication.

1985-99: Amtrak, *Amtrak Annual Report*, Statistical Appendix (Washington, DC: Annual issues) (transportation revenues / Amtrak system passenger trips).

TABLE 3-15b: Average Passenger Fares (Chained 1996 $)[a]

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Air carrier, domestic, scheduled service	123.13	122.52	122.86	120.02	109.15	99.62	104.51	101.65	110.37	107.56	109.35	R111.44	110.43
Class I bus, intercity[b]	15.62	16.38	18.05	16.50	19.97	14.44	20.57	20.49	22.85	20.62	21.72	R23.47	26.02
Transit, all modes[c] (unlinked)	1.03	1.00	0.97	0.93	0.70	0.85	0.86	0.97	0.93	R0.89	R0.91	R0.91	0.92
Commuter rail	4.20	4.59	4.61	4.42	3.63	4.66	3.48	3.33	3.25	3.30	3.22	R3.11	3.04
Intercity / Amtrak[d]	27.68	25.33	17.50	55.08	45.56	42.80	46.21	41.58	42.54	44.36	42.99	43.10	U

KEY: R = revised.

[a] All data in this table have been revised using newly available chain-type indexes for transportation services from the Bureau of Economic Analysis.

[b] Regular route intercity service.

[c] Prior to 1984, excludes commuter railroad, automated guideway, urban ferryboat, demand responsive, and most rural and smaller systems.

[d] Amtrak began operations in 1971.

SOURCES

Air carrier, domestic, scheduled service:

1960: Civil Aeronautics Board, *Handbook of Airline Statistics, 1969* (Washington, DC: February 1970), part III, table 2 (enplanements); part IV, table 2 (passenger revenue).
1965-70: Ibid., *Handbook of Airline Statistics, 1973* (Washington, DC: March 1974), part III, table 2 (enplanements); part IV, table 2 (passenger revenue).
1975-80: Ibid., *Air Carrier Financial Statistics* (Washington, DC: Annual December issues), p. 1, line 3; and *Air Carrier Traffic Statistics* (Washington, DC: Annual December issues), p. 2, line 16 (passenger revenue / revenue passenger enplanements).
1985-2000: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, *Air Carrier Financial Statistics* (Washington, DC: Annual December issues), p. 1, line 3 (passenger revenues); *Air Carrier Traffic Statistics* (Washington, DC: Annual December issues), p. 2, line 16 (passenger revenue / revenue passenger enplanements).

Class I bus, intercity:

1960-90: Interstate Commerce Commission, *Transport Statistics in the United States, Motor Carriers* (Washington, DC: Annual issues), part 2.
1995-2000: U.S. Department of Transportation, Bureau of Transportation Statistics, *Selected Earnings Data, Class I Motor Carriers of Passengers* (Washington, DC: Annual issues).

Transit and commuter rail:

1960-2000: American Public Transit Association, *Transit Fact Book* (Washington, DC: Annual issues) (passenger fares / passenger trips).

Intercity / Amtrak:

1960-70: Association of American Railroads, *Railroad Facts* (Washington, DC: Annual issues).
1975-80: Amtrak, State and Local Affairs Department and Public Affairs Department, personal communication.
1985-99: Amtrak, *Amtrak Annual Report*, Statistical Appendix (Washington, DC: Annual issues) (transportation revenues / Amtrak system passenger trips).

Section C
Transportation Revenues, Employment, and Productivity

TABLE 3-16: Average Passenger Revenue per Passenger-Mile (Current ¢)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Air carrier, domestic, scheduled service	**6.1**	**6.1**	**6.0**	**7.7**	**11.5**	**12.2**	**13.4**	**13.5**	**13.8**	**14.0**	**14.1**	**14.0**	**14.6**
Index (1980 = 100)	53	53	52	67	100	106	117	117	120	121	122	121	127
Class I bus, intercity[a]	**2.7**	**2.9**	**3.6**	**4.9**	**7.3**	**9.9**	**11.6**	**12.2**	**12.3**	**12.6**	**12.8**	**12.8**	**U**
Index (1990 = 100)	23	25	31	42	63	86	100	106	106	109	110	110	U
Commuter rail	**2.9**	**3.3**	**3.8**	**4.6**	**6.7**	**12.1**	**13.5**	**13.1**	**13.7**	**14.7**	**14.7**	**15.0**	**U**
Index (1990 = 100)	22	25	28	34	50	90	100	97	102	109	109	111	U
Intercity / Amtrak[b]	**3.0**	**3.1**	**4.0**	**5.7**	**8.2**	**11.3**	**14.1**	**14.6**	**16.6**	**17.3**	**17.5**	**18.4**	**U**
Index (1990 = 100)	21	22	28	40	58	80	100	103	118	123	124	130	U
Consumer Price Index (1982-84 = 100)	**30**	**32**	**39**	**54**	**82**	**108**	**131**	**152**	**157**	**161**	**[c]163**	**[d]167**	**172**

KEY: U = data are not available.

[a] Regular route intercity service.

[b] Amtrak began operations in 1971.

[c] **Beginning in 1998, data reflect changes in series composition and renaming.**

[d] Beginning in 1999, data reflect changes in the formula used for calculating the basic components of the Consumer Price Index.

SOURCES

Air carrier, domestic, scheduled service:

1960: Civil Aeronautics Board, *Handbook of Airline Statistics, 1969* (Washington, DC: February 1970), part III, table 2 (passenger-miles); part IV, table 2 (passenger revenues).

1965-70: Ibid., *Handbook of Airline Statistics, 1973* (Washington, DC: March 1974), part III, table 2 (passenger-miles); part IV, table 2 (passenger revenues).

1975-80: Ibid., *Air Carrier Financial Statistics* (Washington, DC: Annual December issues), p. 2, line 3.

Ibid., *Air Carrier Traffic Statistics* (Washington, DC: Annual December issues), p. 4, line 9.

1985-2001: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, *Air Carrier Financial Statistics* (Washington, DC: Annual December issues), p. 1, line 3.

Ibid., *Air Carrier Traffic Statistics* (Washington, DC: Annual December issues), p. 2, line 9 (total passenger operating revenues / total revenue passenger-miles).

Intercity class I bus and commuter rail:

1960-99: Eno Transportation Foundation, Inc., *Transportation in America, 2000* (Washington, DC: 2001), p. 18.

Intercity / Amtrak:

1960-70: Association of American Railroads, *Railroad Facts* (Washington, DC: Annual issues).

1975-80: Eno Transportation Foundation, Inc., *Transportation in America, 1994* (Lansdowne, VA: 1994), p. 50.

1985-99: Amtrak. *Amtrak Annual Report*, Statistical Appendix (Washington, DC: Annual issues) (transportation revenues / passenger-miles).

Consumer Price Index:

1960-2000: Council of Economic Advisors, *Economic Report of the President, 2002* (Washington, DC: 2002), table B-60.

TABLE 3-17: Average Freight Revenue Per Ton-mile (Current ¢)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Air carrier, domestic, scheduled service	**22.8**	**20.5**	**21.9**	**28.2**	**46.3**	**48.8**	**64.6**	**76.5**	**81.5**	**79.8**	**R82.7**	**80.9**	**78.0**	**78.0**
Index (1980 = 100)	49	44	47	61	100	105	140	165	176	172	R179	175	168	168
Truck[a]	**6.3**	**6.5**	**8.5**	**11.6**	**18.0**	**22.9**	**24.4**	**25.1**	**26.0**	**26.1**	**26.2**	**26.2**	**U**	**U**
Index (1990 = 100)	26	26	35	48	74	94	100	103	107	107	107	107	U	U
Class I rail	**1.40**	**1.27**	**1.43**	**2.04**	**2.87**	**3.04**	**2.66**	**2.40**	**2.35**	**2.40**	**2.34**	**2.28**	**2.26**	**U**
Index (1990 = 100)	53	48	54	77	108	114	100	90	88	90	88	86	85	U
Barge	**N**	**0.35**	**0.30**	**0.52**	**0.77**	**0.80**	**0.76**	**0.73**	**0.73**	**0.74**	**0.74**	**0.74**	**U**	**U**
Index (1990 = 100)	N	46	40	68	102	106	100	97	96	97	98	98	U	U
Oil pipeline	**0.32**	**0.28**	**0.27**	**0.37**	**[c]1.33**	**1.57**	**1.46**	**1.51**	**1.40**	**1.40**	**1.38**	**1.46**	**U**	**U**
Index (1990 = 100)	22	19	19	25	91	107	100	104	96	96	95	100	U	U
Producer Price Index (1982 = 100)[b]	**33**	**34**	**39**	**58**	**88**	**105**	**119**	**128**	**131**	**132**	**131**	**133**	**138**	**141**

KEY: N = data do not exist; R = revised; U = data are unavailable.

[a] General freight common carriers, most of which are LTL (less-than-truckload) carriers.

[b] Total finished goods.

[c] Reflects entrance of Alaska pipeline moving crude petroleum to U.S. refineries between 1975 and 1980.

SOURCES

Air carrier, domestic, scheduled service:
1960: Civil Aeronautics Board, *Handbook of Airline Statistics, 1969* (Washington, DC: 1970), part III, tables 2 and 13.
1965-70: Ibid., *Handbook of Airline Statistics, 1973* (Washington, DC: 1974), part III, tables 2 and 13.
1975-80: Ibid., *Air Carrier Traffic Statistics* (Washington, DC: 1976, 1981), pp. 4 and 14 (December 1976) and pp. 2 and 3 (December 1981).
1985-2001: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, *Air Carrier Financial Statistics* (Washington, DC: Annual December issues), p. 1, line 4.
Ibid., *Air Carrier Traffic Statistics* (Washington, DC: Annual December issues), p. 2, line 18 (freight operating revenues/freight revenue ton-miles).

Truck, barge, and oil pipeline:
1960-99: Eno Transportation Foundation, Inc., *Transportation in America, 2000* (Washington, DC: 2000), p. 17.

Class I rail:
1960-2000: Association of American Railroads, *Railroad Facts* (Washington, DC: 2001), p. 30.

Producer Price Index:
1960-2001: Council of Economic Advisors, *Economic Report of the President, 2000* (Washington, DC: August 2002), table B-65.

TABLE 3-18: Total Operating Revenues (Current $ millions)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Air carrier, domestic, all services	2,178	3,691	7,180	12,020	26,440	37,629	57,961	70,885	76,891	82,250	86,494	90,931	98,896
Trucking[a]	N	N	N	N	N	N	127,314	161,806	174,743	183,153	195,706	209,438	224,464
Class I bus, intercity	463	607	722	955	1,397	1,233	943	917	912	996	999	1,268	1,088
Transit[b]	1,407	1,444	1,707	3,451	6,510	12,195	16,053	18,241	19,151	19,515	21,062	22,220	P24,243
Class I rail	9,514	10,208	11,992	16,402	28,258	27,586	28,370	32,279	32,693	33,118	33,151	33,521	34,102
Intercity / Amtrak[c]	N	N	N	253	454	832	1,308	1,490	1,550	1,669	2,244	2,011	2,111
Water transportation (domestic)[d]	1,722	1,822	2,070	3,293	7,219	7,703	7,940	7,712	7,283	6,940	6,824	6,795	U
Oil pipeline[e]	895	1,051	1,396	2,220	7,548	8,910	8,506	9,077	8,637	8,632	8,579	9,067	U
Gas pipeline (investor-owned)[f]	8,700	11,500	16,400	30,551	85,918	103,945	66,027	58,435	72,025	U	57,548	R59,142	72,712
Transmission companies	3,190	4,088	5,928	11,898	41,604	45,738	21,756	12,092	12,050	10,339	9,450	R9,555	11,140
Distribution companies	N	N	N	5,938	14,013	21,510	18,750	19,421	30,407	30,864	28,182	R28,135	34,761
Integrated companies	N	N	N	6,962	17,300	17,396	10,117	10,899	11,941	12,125	2,974	R3,086	3,760
Combination companies	N	N	N	5,753	13,001	19,301	15,404	16,023	17,627	U	16,942	R18,366	23,051

KEY: N = data do not exist; P = preliminary; R = revised; U = data are not available.

[a] Data from 1990 through 1997 include local trucking (4212), trucking, except local (4213), local trucking, without storage (4214), and courier services, except air (4215) based on SIC (Standard Industrial Classification). For 1998 and later, data includes truck transportation (484) and couriers and messengers (492) based on NAICS (North American Industry Classification System). Therefore, data from 1998 onward are not directly comparable with data prior to 1998.

[b] Excludes commuter rail, automated guideway, urban boat, demand responsive, and most rural and smaller systems prior to 1984. Includes operating assistance.

[c] Amtrak began operations in 1971.

[d] Includes foreign traffic moving on domestic inland waterways.

[e] Oil pipeline revenues are much smaller than gas pipeline revenues because oil pipeline companies are common carriers that include transportation costs only.

[f] Data are not directly comparable from year to year due to acquisition and mergers. Prior to 1975, pipeline companies are not categorized by distribution, integrated, or combination. Total numbers for these companies are 1960 = 5,505; 1965 = 7,437; 1970 = 10,542. In 1997, the American Gas Association revised the database that identifies companies by type (distribution, integrated, or transmission). This reclassification of companies has resulted in numerous additions to the distribution company sample, in particular from the integrated company sample.

Continued next page

TABLE 3-18: Total Operating Revenues (Current $ millions) (Continued)

NOTE
In January 2000, the American Public Transit Association changed its name to the American Public Transportation Association (APTA). The APTA Transit Fact Book is now referred to as the Public Transportation Fact Book.

SOURCES
Air carrier, domestic, all services:
1960-70: Civil Aeronautics Board, *Handbook of Airline Statistics, 1973* (Washington, DC: March 1974).
1975-80: Ibid., *Air Carrier Financial Statistics* (Washington, DC: Annual issues), p. 1.
1985-2000: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, *Air Carrier Financial Statistics* (Washington, DC: Annual December issues), p. 1.

Trucking:
1990-97: U.S. Department of Commerce, Bureau of the Census, Transportation *Annual Survey, 1998* (Washington, DC: January 2000), table 1.
1998-2000: Ibid., *Service Annual Survey, 2000* (Washington, DC: July 2001), table 2.2.

Intercity Class I bus:
1960-90: Interstate Commerce Commission, *Annual Report of the Interstate Commerce Commission* (Washington, DC: Annual issues).
1995-2000: U.S. Department of Transportation, Bureau of Transportation Statistics, *Selected Earnings Data, Class 1 Motor Carriers of Passengers* (Washington, DC: Annual issues).

Transit:
1960-2000: American Public Transportation Association, *Public Transportation Fact Book* (Washington, DC: February 2002), table 17, and similar tables in earlier editions of the APTA Transit Fact Book.

Class I rail:
1960-2000: Association of American Railroads, *Railroad Facts* (Washington, DC: 2000), p. 12.

Intercity/Amtrak:
1975-80: Amtrak, State and Local Affairs Department and Public Affairs Department, personal communication.
1985-2000: Ibid., *Amtrak Annual Report*, Statistical Appendix (Washington, DC: Annual issues).

Water transportation:
1960-99: Eno Transportation Foundation, Inc., *Transportation in America* (Washington, DC: 2000), p. 4-7.

Oil pipeline:
1960-99: Eno Transportation Foundation, Inc., *Transportation in America* (Washington, DC: 2000), p. 4-7.

Gas pipeline:
1960-2000: American Gas Association, *Gas Facts* (Arlington, VA: Annual issues), tables 12-1, 12-2, 12-3, and 12-4.

TABLE 3-19: Employment in For-Hire Transportation and Selected Transportation-Related Industries[a] (Thousands)

SIC		1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
	Total U.S. labor force[b]	**54,189**	**60,763**	**70,880**	**76,945**	**90,406**	**97,387**	**109,403**	**117,191**	**119,608**	**122,690**	**125,865**	**128,916**	**R131,720**	**131,922**
	For-hire transportation industry														
45	Air	191	229	352	363	453	522	968	1,068	1,107	1,134	1,181	1,227	R1,280	1,266
42	Trucking and warehousing	856	964	1,083	1,108	1,280	1,361	1,395	1,587	1,637	1,677	1,744	1,810	R1,847	1,848
41	**Local and interurban passenger transit**														
413	Intercity and rural bus	41	42	43	40	38	35	26	24	24	22	24	24	R25	25
411	Local and suburban	U	U	U	69	79	92	141	203	218	229	236	238	233	236
415	School bus[c]	N	N	N	65	80	91	111	131	132	137	141	146	147	148
412	Taxi	121	110	106	85	53	38	32	31	31	31	31	32	32	32
	Other local and interurban[d]	123	118	131	11	16	22	28	31	33	34	36	38	R40	38
40	Railroad	885	735	634	548	532	359	279	238	231	227	231	235	R237	234
44	Water	N	228	212	194	211	185	177	175	174	179	181	186	R194	192
46	Liquid pipeline	23	20	18	18	21	19	19	15	15	14	14	13	R14	15
492	**Natural gas pipeline[e]**														
	Distribution	N	N	N	51	52	62	65	62	80	75	71	R71	70	U
	Transmission	31	30	32	37	45	46	37	28	32	28	28	R29	26	U
	Integrated	N	N	N	55	53	43	40	36	13	12	12	6	6	U
	Combination	N	N	N	52	52	53	50	R43	39	31	31	R26	23	U
	Noninvestor-owned	N	N	N	11	13	12	12	11	16	9	12	R11	11	U
47	Transportation services[f]	N	85	115	134	198	275	336	401	418	441	454	463	R470	463
	Total for-hire transportation	**2,271**	**2,560**	**2,726**	**2,841**	**3,175**	**3,214**	**3,715**	**R4,084**	**4,199**	**4,278**	**4,427**	**R4,555**	**4,653**	**U**
37	**Equipment manufacturing**														
372	Aircraft and parts	605	601	644	499	633	616	712	451	458	501	525	496	R464	461
371	Motor vehicles and equipment	724	843	799	792	789	883	812	971	967	986	995	1,018	R1,017	947
374	Railroad equipment	43	56	51	57	71	33	33	38	36	34	37	38	36	30
373	Ship and boat building and repairing	141	160	172	194	221	187	188	160	159	158	167	167	R168	161
301	Tires and inner tubes	105	102	116	124	115	94	84	80	80	78	80	79	79	75
	Other[g]	155	193	167	157	167	241	244	172	165	167	168	168	R168	161
	Total equipment manufacturing	**1,773**	**1,955**	**1,949**	**1,824**	**1,995**	**2,054**	**2,073**	**1,870**	**1,864**	**1,923**	**1,973**	**1,967**	**R1,931**	**1,835**
	Related industries														
553	Automotive and home supply stores	U	U	U	212	261	304	337	369	380	392	397	404	R408	410
75	Automotive repair, services, and parking	U	U	U	439	571	730	914	1,020	1,080	1,120	1,145	1,196	R1,234	1,257

Continued next page

TABLE 3-19: Employment in For-Hire Transportation and Selected Transportation-Related Industries[a] (Thousands) (Continued)

SIC		1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
554	Gasoline service stations	461	522	613	622	561	588	647	649	669	676	680	660	R652	648
161	Highway and street construction	U	U	U	U	U	264	239	228	236	243	257	280	R281	289
501	Motor vehicles, parts, and supplies	U	U	U	382	434	454	456	492	503	513	517	524	R517	502
551	New and used car dealers	U	U	U	731	745	856	924	996	1,031	1,046	1,047	1,080	R1,112	1,121
	Other automotive retail[h]	N	N	N	112	122	140	155	176	187	197	208	223	R239	246
	Total related industries	**461**	**522**	**613**	**2,498**	**2,694**	**3,336**	**3,672**	**3,930**	**4,086**	**4,186**	**4,251**	**4,368**	**R4,442**	**4,473**
	Government employment[i]														
	U.S. DOT[j]	N	N	104	112	112	100	104	101	99	98	99	100	100	102
	State and local highway[k]	532	577	607	604	559	549	569	543	[l]N	531	530	543	546	552
	Total government employment	**532**	**577**	**711**	**716**	**671**	**649**	**673**	**644**	**99**	**629**	**629**	**643**	**646**	**654**
	TOTAL transportation-related labor force	**5,036**	**5,614**	**5,999**	**7,880**	**8,535**	**9,252**	**10,133**	**R10,528**	**10,248**	**11,016**	**11,279**	**R11,533**	**11,672**	**U**

KEY: N = data do not exist; SIC = standard industry classification; R = revised; U = data are not available.

[a] Annual averages.

[b] Excludes farm employment.

[c] Does not include drivers employed by school districts.

[d] Difference between the total of SIC 41 and the sum of 411, 412, 413, and 415.

[e] In 1997, the American Gas Association revised the database that identifies companies by type (e.g., distribution, integrated, or transmission). This reclassification has resulted in additions to the distribution and reductions to the integrated company categories beginning with the revised data in 1996. Additionally, data by company type are not directly comparable from year to year due to acquisitions and mergers.

[f] Transportation services are defined as services incidental to transportation, such as forwarding and packing; motor vehicle inspections; and freight broker, tour operator, and travel agency services, etc.

[g] The difference between the total of SIC 37 and the sum of 371, 372, 373, and 374.

[h] The difference between the total of SIC 55 and the sum of 551, 553, and 554.

[i] Not all government agencies are included (e.g., the National Transportation Safety Board).

[j] U.S. Department of Transportation was created in 1966. Data are for fiscal year and include permanent civilians as well as temporary employees and military.

[k] Full-time equivalent employment. Data prior to 1986 are not directly comparable to data from later years due to a change in the way full-time equivalent was calculated. Full-time equivalent was not calculated for 1985.

[l] Due to a change in the reference period, from October to March, the October 1996 Annual Survey of Government Employment and Payroll was not conducted.

TABLE 3-19: Employment in For-Hire Transportation and Selected Transportation-Related Industries[a] (Thousands) (Continued)

NOTE

The employment totals in tables 3-19 and 3-20 differ. Table 3-19 shows employment in transportation and selected transportation-related industries. Table 3-20 shows employment by transportation occupation. Some employees of transportation industries have nontransportation jobs (e.g., a bookkeeper in a trucking firm), and some people with transportation occupations do not work in the transportation industry (e.g., a truck driver for a construction firm). Beginning in January 1999, data are not strictly comparable with data for 1998 and earlier years because of revisions in the population controls used in the household survey.

SOURCES

All data, except as noted:

1960-85: U.S. Department of Labor, Bureau of Labor Statistics, *Employment, Hours and Earnings, United States, 1909-1994* (Washington, DC: September 1994).

1990-2001: Ibid., Internet site www.bls.gov/datahome.htm, database query for individual series as of July 24, 2002.

Natural gas pipeline:

1975-2000: American Gas Association, *Gas Facts* (Arlington, VA: Annual issues), table 14-2 and similar tables in earlier editions.

Government employment:

USDOT:

1970-75: U.S. Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States, 1976* (Washington, DC: 1976), table 409, and U.S. Department of Transportation, U.S. Coast Guard, G-WPM, Office of Military Personnel, personal communication.

1980-85: U.S. Department of Transportation, Office of the Secretary of Transportation, *DOT Employment Facts, A Report to Management* (Washington, DC: Annual issues).

1990-2001: Ibid., *DOT Workforce Demographics* (Washington, DC: Annual issues).

State and local highway:

1960-90: U.S. Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States, 1993* (Washington, DC: 1993), table 500 and similar tables in earlier editions.

1995-2001: Ibid., Internet site http://www.census.gov/pub/govs/www/apesstl.html as of July 24, 2002.

TABLE 3-20: Employment in Transportation Occupations (Thousands)

	1985	1990	1995	1996	1997	1998	1999	2000	2001
Total workers, 16 years and over	107,150	118,793	124,900	126,708	129,558	131,463	133,488	135,208	135,073
Total workers in transportation occupations	3,681	4,039	4,308	4,451	4,534	4,499	4,643	4,684	4,824
Transportation occupation as percent of total workers, 16 years and over	3.4%	3.4%	3.4%	3.5%	3.5%	3.4%	3.5%	3.5%	3.6%
Motor vehicle operators									
Supervisors	51	76	87	85	95	88	86	77	88
Truck drivers	2,412	2,627	2,860	3,018	3,075	3,012	3,116	3,088	3,156
Drivers-sales workers	214	201	158	156	150	159	160	167	166
Bus drivers	394	443	526	512	472	471	490	539	571
Taxicab drivers and chauffeurs	180	213	211	203	248	273	271	280	305
Parking lot attendants	45	53	50	46	46	62	68	60	61
Motor transportation occupations, NEC	2	5	8	4	4	3	11	11	9
Total	**3,298**	**3,618**	**3,900**	**4,024**	**4,090**	**4,069**	**4,202**	**4,222**	**4,356**
Rail transportation									
Railroad conductors and yardmasters	36	36	33	45	48	50	45	48	42
Locomotive operating occupations	59	46	51	49	53	41	45	63	61
Railroad brake, signal, and switch operators	46	28	17	15	14	7	9	11	7
Rail vehicle operators, NEC	7	8	3	7	6	6	7	5	2
Total	**148**	**118**	**104**	**116**	**121**	**104**	**106**	**127**	**112**
Water transportation									
Ship captains and mates, except fishing boats	32	27	33	32	24	22	31	38	34
Sailors and deckhands	18	18	26	25	21	30	16	14	20
Marine engineers	1	2	3	8	2	3	5	2	4
Bridge, lock, and lighthouse tenders	8	6	4	5	5	8	5	3	1
Total	**59**	**53**	**66**	**70**	**52**	**63**	**57**	**56**	**59**

TABLE 3-20: Employment in Transportation Occupations (Thousands) (Continued)

	1985	1990	1995	1996	1997	1998	1999	2000	2001
Air transportation									
Airplane pilots and navigators	77	114	114	114	120	113	143	129	136
Air traffic controllers	34	36	30	32	36	26	24	23	28
Total	**111**	**150**	**144**	**146**	**156**	**139**	**167**	**152**	**164**
Public transportation attendants	**65**	**100**	**94**	**95**	**115**	**124**	**111**	**127**	**133**

KEY: NEC = not elsewhere classified.

NOTES

Beginning in January 2000, data are not comparable with data for earlier years due to new composite estimation procedures and revised controls used in the household survey for population. See source for additional information.

The employment totals in tables 3-19 and 3-20 differ. Table 3-19 shows employment in transportation and related industries; table 3-20 shows employment by transportation occupation. Some employees of transportation industries have nontransportation jobs (e.g., a bookkeeper in a trucking firm), and some people in transportation occupations do not work in the transportation industry (e.g., a truck driver for a construction firm).

SOURCES

All data except total workers, 16 years and over:

1985, 1990-99: U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings* (Washington, DC: Annual January issues), table 11 of the Household Data Annual Averages Tables, Internet site http://stats.bls.gov/pdf/cpsaatab.htm as of May 31, 2000.

2000: Ibid., personal communication, Aug. 6, 2001.

2001: Ibid., personal communication, Aug. 23, 2002.

Total workers, 16 years and over:

1985, 1990-2000: U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings* (Washington, DC: January 2001), revised totals, table 1, Internet site http://stats.bls.gov/pdf/cpsaat1.pdf as of Aug. 3, 2001.

2001: Ibid., personal communication, Aug. 23, 2002.

TABLE 3-21: Average Wage[a] and Salary Accruals per Full-Time Equivalent Employee by Transportation Industry (Current $)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	R2000	2001
Wages, U.S. labor force	4,822	5,807	7,743	10,808	15,790	21,293	26,257	30,996	32,040	33,429	35,109	R36,677	38,759	39,784
Transportation industry	**5,835**	**6,989**	**9,396**	**13,550**	**20,818**	**25,324**	**28,900**	**32,349**	**33,197**	**34,429**	**35,924**	**R37,201**	**38,429**	**39,607**
Air	6,929	8,495	12,027	17,035	25,649	32,131	32,747	36,365	37,238	38,693	40,402	R42,520	43,817	45,715
Trucking and warehousing	5,396	6,623	8,672	12,765	19,204	22,383	26,180	29,591	30,351	31,740	32,948	R33,977	35,014	35,744
Local and interurban passenger transit	4,877	5,553	6,996	9,462	13,530	15,706	17,517	20,112	20,811	21,201	22,086	R22,785	23,663	24,439
Railroad	6,241	7,460	10,110	14,987	25,049	36,611	43,614	51,236	54,706	56,519	59,725	R60,555	61,766	64,495
Water	6,212	7,402	10,302	14,136	22,746	28,531	33,855	37,856	38,934	40,524	42,260	R43,114	44,751	46,883
Pipelines, except natural gas	6,957	8,053	10,765	16,765	26,227	37,316	46,167	57,867	58,286	59,071	64,923	R65,385	66,538	66,071
Transportation services[b]	5,380	6,239	8,232	11,430	16,005	20,530	26,058	30,869	31,523	32,796	34,581	36,178	38,549	39,641

KEY: R = revised.

[a] Wages do not include supplements to wages and salaries such as pension, profit-sharing, and other retirement plans, and health, life, and unemployment insurance compensation.

[b] Establishments furnishing services incidental to transportation, such as forwarding and packing services and the arrangement of passenger and freight transportation.

NOTES

Use care in comparing the data in this table with those in table 3-22. This table includes weighted part-time employees' salaries. Table 3-22 covers only full-time employees. 1960-85 data are based on the 1972 SIC codes; 1990-98 data are based on the 1987 SIC codes.

Wage and salary accruals consist of the monetary remuneration of employees, including compensation of corporate officers; commissions, tips and bonuses; voluntary employee contributions to certain deferred compensation plans, such as 401(k) plans; and receipts in kind that represent income. In other words, accruals are wage and salary earned, not wage and salary paid. For example, wage and salary earned in 1999 but not paid until 2000 are included in accruals for 1999. However, the difference between wage and salary earned and wage and salary paid is usually very small.

SOURCE

1960-2001: U.S. Department of Commerce, Bureau of Economic Analysis, National Income and Products Accounts, tables 6.6b and 6.6c, Internet site http://www.bea.doc.gov/bea/dn1.htm as of Aug. 12, 2002.

TABLE 3-22: Median Weekly Earnings of Full-Time Wage and Salary Workers in Transportation by Detailed Occupation (Current $)

	1985	1990	1995	1996	1997	1998	1999	2000	2001
16 years and over, all[a]	**343**	**412**	**479**	**490**	**503**	**523**	**549**	**576**	**597**
Airplane pilots and navigators	738	910	956	1,138	1,079	1,383	1,048	1,283	1,150
Public transportation attendants	N	635	450	417	521	524	604	568	552
Motor vehicle operators	343	400	475	473	496	503	514	543	575
Supervisors, motor vehicle operators	N	520	549	583	589	595	585	688	609
Truck drivers	N	N	481	481	506	516	527	564	593
Drivers-sales workers	399	439	517	506	524	526	534	558	630
Bus drivers	344	355	419	396	405	428	428	460	457
Taxicab drivers and chauffeurs	262	307	352	374	405	379	427	468	487
Nonmotor vehicle operators	559	687	711	691	761	834	761	816	911
Rail transportation operators	599	717	741	740	814	849	816	863	947
Water transportation	463	547	624	586	641	812	604	778	794

KEY: N = data do not exist.

[a] Earnings for all full-time workers, not just transportation related.

NOTES
Use care in comparing the figures in this table with those in table 3-21. This table does not include part-time employees.
Table 3-21 includes weighted part-time employees' salaries.

SOURCES
Water transportation:
1985–2000: U.S. Department of Labor, Bureau of Labor Statistics, unpublished data, Mar. 1, 1999, Mar. 11, 1999, and Apr. 25, 2000.
2001: Ibid., unpublished table A-26, personal communication, Aug. 23, 2002.

Other Data:
1985-2000: U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings* (Washington, DC: Annual January issues), table 39 of the Household Data Annual Averages Tables. Available at http://www.bls.gov/cps/cpsaat39.pdf.
2001: Ibid., unpublished table A-26, personal communication, Aug. 23, 2002.

TABLE 3-23: Total Wage[a] and Salary Accruals by Transportation Industry (Current $ millions)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	R2000	2001
TOTAL wage and salary accruals (All industries)	R272,823	R363,707	R551,472	R814,690	R1,377,416	R1,995,186	R2,754,605	3,441,060	3,630,142	3,885,977	4,192,105	R4,475,588	4,836,329	4,950,605
Transportation														
Air	1,268	1,852	4,029	5,894	11,029	15,744	29,440	36,183	38,839	41,092	45,129	R49,281	52,887	54,721
Trucking and warehousing	4,592	6,265	9,123	13,786	23,755	29,725	34,715	44,830	47,074	50,688	54,694	R58,645	61,625	62,623
Local and interurban passenger transit	1,307	1,427	1,868	2,375	3,423	4,272	5,658	7,723	8,366	8,862	9,541	R10,185	10,814	11,291
Railroad	5,498	5,446	6,268	8,108	12,850	11,862	10,729	11,272	11,543	11,756	12,602	R12,656	12,415	12,383
Water	1,379	1,584	2,112	2,601	4,572	5,050	5,620	6,322	6,463	6,889	7,311	R7,588	8,100	8,392
Pipeline, except natural gas	160	153	183	285	577	709	831	868	816	827	844	R850	865	925
Transportation services[b]	425	549	922	1,463	3,041	5,420	8,521	11,977	12,483	13,643	14,939	15,810	17,270	17,442
Total	**14,629**	**17,276**	**24,505**	**34,512**	**59,247**	**72,782**	**95,514**	**119,175**	**125,584**	**133,757**	**145,060**	**R155,015**	**163,976**	**167,777**

KEY: R = revised.

[a] Wages do not include compensation (supplements to wages and salaries such as pension, profit-sharing, and other retirement plans, and health, life, and unemployment insurance).

[b] Defined as services incidental to transportation, such as forwarding and packing services and arranging passenger travel and freight transportation.

SOURCE

1960-2001: U.S. Department of Commerce, Bureau of Economic Analysis, National Income and Products Accounts, tables 6.3b and 6.3c, Internet site http://www.bea.doc.gov/bea/dn1.htm as of Aug. 12, 2002.

TABLE 3-24: Labor Productivity Indices for Selected Transportation Industries

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Output per hour[a] worked													
Air[b]	N	N	N	N	N	N	93	109	111	112	R108	R109	111
Bus, Class I[c]	106	128	118	107	111	96	96	110	106	125	105	R135	112
Railroad	22	32	36	43	55	82	119	156	167	170	173	R183	196
Trucking, except local[b]	N	N	N	N	N	N	111	125	131	132	130	132	131
Petroleum pipelines[c]	31	49	76	91	89	100	103	116	131	134	137	R145	141
Output per employee[d]													
Air	22	35	45	56	71	92	93	109	111	112	R108	R109	111
Bus, Class I[c]	108	129	119	103	99	93	96	105	103	121	104	R133	110
Railroad	25	36	42	46	55	79	120	162	172	177	176	182	195
Trucking, except local	48	56	60	64	78	94	111	125	131	132	130	132	131
Petroleum pipelines[c]	30	48	75	89	89	98	102	121	139	141	146	R150	141

KEY: N = data do not exist; R = revised.

[a] Based on the number of paid hours.

[b] The average weekly hours were assumed to be constant for these industries; therefore, the output per hour worked and the output per employee measures are identical in the years for which data are given for both measures.

[c] Data did not meet the publication standards for the Bureau of Labor Statistics and are considered less reliable than the published series.

[d] Full-time and part-time employees are counted equally. Hence, these data do not reflect output per full-time equivalent employee.

NOTE
Index, 1987 = 100.

SOURCES
U.S. Department of Labor, Bureau of Labor Statistics, Industry Productivity, Internet site http://www.bls.gov/lpc/iprdata1.htm as of Aug. 12, 2002.
Ibid., personal communication, Aug. 19, 2002 (unpublished data).

Section D
Government Finance

TABLE 3-25a: Federal, State, and Local Government Transportation-Related Revenues and Expenditures, Fiscal Year (Current $ millions)

	1980	1985	1990	1995	1996	1997	1998	1999	2000
Total government revenues	**32,977**	**52,140**	**69,753**	**93,659**	**96,419**	**100,516**	**111,234**	**126,895**	**U**
Federal	10,312	18,404	21,384	30,166	30,742	31,440	38,934	51,996	46,756
State and local	22,665	33,735	48,369	63,493	65,677	69,076	72,300	74,898	U
Total government expenditures	**56,329**	**77,230**	**100,629**	**130,542**	**133,359**	**138,361**	**145,659**	**154,845**	**U**
State and local expenditures less federal grants[a]	31,592	48,939	69,770	89,772	92,585	96,596	104,355	110,871	U
Federal grants	14,581	18,146	19,689	24,950	25,061	26,073	25,125	27,959	U
Federal expenditures, less grants	**10,156**	**10,144**	**11,170**	**15,819**	**15,712**	**15,693**	**16,178**	**16,016**	**15,885**

KEY: R = revised; U = data are not available.

[a] Based on data from the U.S. Department of Commerce, Census Bureau, which uses different definitions and accounting methods than those used by some modal administrations of the U.S. Department of Transportation. For example, highway expenditures in this table do not include traffic control activities by police or public safety activities; while the highway expenditure statistics published by the U.S. Department of Transportation, Federal Highway Administration do include these items.

NOTE
Numbers may not add to totals due to rounding.

SOURCES
1980: U.S. Department of Transportation, Bureau of Transportation Statistics, unpublished data.
1985–2000: U.S. Department of Transportation, Bureau of Transportation Statistics, *Government Transportation Financial Statistics 2001* (Washington, DC: 2002), tables 3-A, 13-A, and 14-A.

TABLE 3-25b: Federal, State, and Local Government Transportation-Related Revenues and Expenditures, Fiscal Year (Chained 1996 $ millions)

	1980	1985	1990	1995	1996	1997	1998	1999	2000
Total government revenues	**60,135**	**72,568**	**82,229**	**95,754**	**96,419**	**98,144**	**106,994**	**118,888**	**U**
Federal	18,410	25,758	26,091	30,813	30,742	30,805	37,661	48,928	42,610
State and local	41,725	46,809	56,138	64,941	65,677	67,339	69,333	69,959	U
Total government expenditures	**102,324**	**R107,281**	**R117,458**	**R133,498**	**R133,359**	**R134,959**	**R139,816**	**R144,745**	**U**
State and local expenditures less federal grants[a]	58,159	R67,686	R79,807	R91,854	R92,585	R94,037	R99,863	R103,365	U
Federal grants	26,033	25,397	24,022	25,485	25,061	25,547	24,304	26,309	U
Federal expenditures, less grants	18,133	14,198	13,629	16,159	15,712	15,376	15,649	15,071	14,477

KEY: R = revised; U = data are not available.

[a] Figures for state and local expenditures less federal grants were determined by adding the total number of federal grants and federal expenditures, less grants and subtracting the sum from the total government expenditures.

NOTE
Numbers may not add to totals due to rounding.

SOURCES
1980: U.S. Department of Transportation, Bureau of Transportation Statistics, unpublished data.
1985–2000: U.S. Department of Transportation, Bureau of Transportation Statistics, *Government Transportation Financial Statistics 2001* (Washington, DC: 2002), 3-b, 13-b, and 14-b.
Constant dollar deflator: U.S. Department of Commerce, Bureau of Economic Analysis, *National Income and Product Accounts*, Washington, DC, table 7.1, "Chain-Type Price Index."

TABLE 3-26: Summary of Transportation Revenues and Expenditures from Own Funds and User Coverage, Fiscal Year (Current and chained 1996 $ millions)

	1980	1985	1990	1995	1996	1997	1998	1999	2000
Federal revenues									
Current	10,312	18,404	21,384	30,166	30,742	31,440	38,934	51,996	46,756
Chained	18,410	25,758	26,091	30,813	30,742	30,805	37,661	48,928	42,610
Federal expenditures									
Current	24,737	28,291	30,859	40,769	40,774	41,766	41,303	43,975	48,401
Chained	44,165	39,595	37,651	41,644	40,774	40,923	39,953	41,380	44,109
Federal user coverage (percent)	**42%**	**65%**	**69%**	**74%**	**75%**	**75%**	**94%**	**118%**	**97%**
State and local revenues									
Current	22,665	33,735	48,369	63,493	65,677	69,076	72,300	74,898	U
Chained	41,725	46,809	56,138	64,941	65,677	67,339	69,333	69,959	U
State and local expenditures									
Current	31,592	48,939	69,770	89,772	92,585	96,596	104,355	110,871	U
Chained	58,966	67,905	80,978	91,820	92,585	94,166	100,072	103,559	U
State and local user coverage (percent)	**72%**	**69%**	**69%**	**71%**	**71%**	**72%**	**69%**	**68%**	**U**

KEY: U = data are not available.

NOTE
Numbers may not add to totals due to rounding.

SOURCES
1980: U.S. Department of Transportation, Bureau of Transportation Statistics, unpublished data.
1985–2000: U.S. Department of Transportation, Bureau of Transportation Statistics, *Government Transportation Financial Statistics 2001* (Washington, DC: 2002), tables 2-a, 2-b, 4-a, and 4-b.
Constant dollar deflator: U.S. Department of Commerce, Bureau of Economic Analysis, *National Income and Product Accounts*, Washington, DC, table 7.1, "Chain-Type Price Index."

TABLE 3-27a: Transportation Revenues by Mode and Level of Government, Fiscal Year (Current $ millions)

	1980	1985	1990	1995	1996	1997	1998	1999	2000
TOTAL, all modes	**32,977**	**52,140**	**69,753**	**93,659**	**96,419**	**100,516**	**111,234**	**126,895**	**U**
Federal	10,312	18,404	21,384	30,166	30,742	31,440	38,934	51,996	46,756
State	17,088	24,442	34,629	44,846	45,966	47,729	50,009	51,584	U
Local	5,577	9,294	13,740	18,647	19,711	21,348	22,291	23,315	U
Highway, total	**25,268**	**38,166**	**49,945**	**66,743**	**71,179**	**71,814**	**77,299**	**88,668**	**U**
Federal: Highway Trust Fund-Highway Account[a]	7,647	12,906	13,453	19,377	22,692	21,314	24,307	33,823	30,347
State	16,287	22,960	32,644	42,415	43,353	45,034	47,214	48,784	U
Local	1,334	2,300	3,848	4,952	5,133	5,466	5,779	6,061	U
Air, total	**4,100**	**6,711**	**10,119**	**13,954**	**11,298**	**13,544**	**18,176**	**21,079**	**U**
Federal: Airport and Airways Trust Fund[b]	2,274	3,593	4,945	6,291	3,128	4,488	8,654	11,089	10,544
State	190	299	556	695	705	765	768	744	U
Local	1,636	2,818	4,617	6,968	7,465	8,291	8,754	9,246	U
Transit, total	**2,397**	**5,636**	**7,193**	**9,352**	**10,171**	**11,417**	**11,872**	**13,186**	**U**
Federal: Highway Trust Fund- Mass Transit Account	RZ	1,420	1,977	2,813	3,282	3,996	4,326	5,478	4,625
State	362	847	1,074	1,257	1,308	1,339	1,384	1,404	U
Local	2,035	3,369	4,142	5,283	5,581	6,082	6,162	6,304	U
Water, total	**1,211**	**1,626**	**2,487**	**3,567**	**3,733**	**3,704**	**3,850**	**3,923**	**U**
Federal: Water Receipts[c]	391	485	999	1,644	1,602	1,605	1,611	1,568	1,175
State	249	335	355	479	600	590	643	651	U
Local	572	807	1,133	1,444	1,531	1,509	1,597	1,704	U
Pipeline, total	**RZ**	**RZ**	**10**	**35**	**31**	**30**	**29**	**30**	**40**
Federal: Pipeline Safety Fund	RZ	RZ	10	35	31	30	29	30	40
General support, total	**RZ**	**RZ**	**RZ**	**7**	**7**	**7**	**8**	**8**	**25**
Federal: Emergency Preparedness Fund	RZ	RZ	RZ	7	7	7	8	8	25

KEY: RZ = no activity or a value of zero; U = data are not available.

[a] Beginning in 1983, a portion of the fuel tax credited to the Highway Trust Fund is earmarked for transit.

[b] The tax requirement that allows for the 10% passenger ticket tax and certain other taxes paid by airport and airway users to be transferred to the Airport and Airway Trust Fund expired on Dec. 31, 1995; it was reenacted in August 1996; but expired again in December 1996.

[c] Water receipts include the Harbor Maintenance Trust Fund, St. Lawrence Seaway tolls, the Inland Waterway Trust Fund, Panama Canal receipts, Oil Spill Liability Trust Fund, Offshore Oil Pollution Fund, Deep Water Port Liability Fund, and excise taxes of the Boat Safety Program.

NOTE
Numbers may not add to totals due to rounding.

SOURCES
1980: U.S. Department of Transportation, Bureau of Transportation Statistics, unpublished data.
1985–2000: U.S. Department of Transportation, Bureau of Transportation Statistics, *Government Transportation Financial Statistics 2001* (Washington, DC: 2002), table 2-a.

TABLE 3-27b: Transportation Revenues by Mode and Level of Government, Fiscal Year (Chained 1996 $ millions)

	1980	1985	1990	1995	1996	1997	1998	1999	2000
TOTAL, all modes	**60,135**	**72,568**	**82,229**	**95,754**	**96,419**	**98,144**	**106,994**	**118,888**	**U**
Federal	18,410	25,758	26,091	30,813	30,742	30,805	37,661	48,928	42,610
State	31,458	33,914	40,192	45,868	45,966	46,528	47,956	48,182	U
Local	10,266	12,895	15,947	19,072	19,711	20,811	21,376	21,777	U
Highway, total	**46,093**	**53,112**	**58,768**	**68,239**	**71,179**	**70,114**	**74,329**	**83,056**	**U**
Federal: Highway Trust Fund-Highway Account[a]	13,653	18,064	16,414	19,792	22,692	20,884	23,512	31,828	27,656
State	29,984	31,858	37,888	43,382	43,353	43,902	45,276	45,567	U
Local	2,455	3,191	4,466	5,065	5,133	5,328	5,542	5,661	U
Air, total	**7,421**	**9,355**	**12,038**	**14,264**	**11,298**	**13,225**	**17,502**	**19,766**	**U**
Federal: Airport and Airways Trust Fund[b]	4,060	5,029	6,034	6,426	3,128	4,397	8,371	10,435	9,609
State	349	416	646	711	705	745	737	695	U
Local	3,012	3,910	5,359	7,127	7,465	8,083	8,395	8,636	U
Transit, total	**4,413**	**7,838**	**8,466**	**9,562**	**10,171**	**11,150**	**11,421**	**12,354**	**U**
Federal: Highway Trust Fund- Mass Transit Account	RZ	1,987	2,412	2,873	3,282	3,915	4,185	5,155	4,215
State	667	1,176	1,247	1,285	1,308	1,306	1,327	1,312	U
Local	3,746	4,675	4,807	5,403	5,581	5,929	5,909	5,888	U
Water, total	**2,209**	**2,263**	**2,946**	**3,646**	**3,733**	**3,619**	**3,706**	**3,675**	**U**
Federal: Water Receipts[c]	697	678	1,219	1,679	1,602	1,573	1,558	1,475	1,071
State	458	465	412	490	600	576	616	608	U
Local	1,053	1,119	1,315	1,477	1,531	1,471	1,531	1,592	U
Pipeline, total	**RZ**	**RZ**	**12**	**36**	**31**	**29**	**28**	**28**	**36**
Federal: Pipeline Safety Fund	RZ	RZ	12	36	31	29	28	28	36
General support, total	**RZ**	**RZ**	**RZ**	**7**	**7**	**7**	**8**	**8**	**23**
Federal: Emergency Preparedness Fund	RZ	RZ	RZ	7	7	7	8	8	23

KEY: E = estimate; RZ = no activity or a value of zero; U = data are not available.

[a] Beginning in 1983, a portion of the fuel tax credited to the Highway Trust Fund is earmarked for transit.

[b] The tax requirement that allows for the 10% passenger ticket tax and certain other taxes paid by airport and airway users to be transferred to the Airport and Airway Trust Fund expired on Dec. 31, 1995; it was reenacted in August 1996; but expired again in December 1996.

[c] Water receipts include the Harbor Maintenance Trust Fund, St. Lawrence Seaway tolls, the Inland Waterway Trust Fund, Panama Canal receipts, Oil Spill Liability Trust Fund, Offshore Oil Pollution Fund, Deep Water Port Liability Fund, and excise taxes of the Boat Safety Program.

NOTE
Numbers may not add to totals due to rounding.

SOURCES
1980: U.S. Department of Transportation, Bureau of Transportation Statistics, unpublished data.
1985–2000: U.S. Department of Transportation, Bureau of Transportation Statistics,*Government Transportation Financial Statistics 2001* (Washington, DC: 2002), table 2-b.
Constant dollar deflator: U.S. Department of Commerce, Bureau of Economic Analysis, *National Income and Product Accounts*,Washington, DC, table 7.1, "Chain-Type Price Index."

TABLE 3-28: Cash Balances of the Transportation-Related Federal Trust Funds, Fiscal Year ($ millions)

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Airport / Airway Trust Fund										
Current $	5,442	7,426	14,355	11,365	7,692	6,358	9,411	12,446	13,934	14,485
Chained 1996 $	9,473	9,814	17,133	11,691	7,692	6,256	9,170	R11,844	12,874	13,157
Highway Trust Fund										
Highway account										
Current $	10,999	10,361	9,629	9,421	11,658	12,575	8,519	19,226	22,553	20,372
Chained 1996 $	19,146	13,692	11,493	9,691	11,658	12,374	8,301	R18,297	20,838	18,505
Transit account										
Current $	N	2,524	7,155	9,579	9,525	9,857	10,051	9,753	8,547	7,368
Chained 1996 $	N	3,336	8,540	9,854	9,525	9,699	9,793	9,281	7,897	6,693
Harbor Maintenance Trust Fund										
Current $	N	N	30	621	865	1,106	1,246	1,736	1,621	1,777
Chained 1996 $	N	N	36	639	865	1,088	1,214	1,652	1,498	1,614
Inland Waterway Trust Fund										
Current $	N	172	281	238	275	300	327	357	364	389
Chained 1996 $	N	227	335	245	275	295	319	340	336	353
Oil Spill Liability Trust Fund										
Current $	N	N	345	1,121	1,124	1,110	1,083	1,017	1,156	1,143
Chained 1996 $	N	N	412	1,153	1,124	1,092	1,055	968	1,068	1,038
TOTAL all funds										
Current $	**16,441**	**20,483**	**31,795**	**32,345**	**31,139**	**31,306**	**30,637**	**44,535**	**48,175**	**45,534**
Chained 1996 $	**28,619**	**27,069**	**37,949**	**33,273**	**31,139**	**30,805**	**29,852**	**R42,382**	**44,512**	**41,361**

KEY: N = data do not exist; R = revised.

SOURCES

1980-90: U.S. Department of Transportation, Bureau of Transportation Statistics, *Transportation Receipts and Outlays in the Federal Budget*, Fiscal Years 1977-94 (Washington, DC: April 1997), table 1-3.

1995-99: U.S. Executive Office of the President, Office of Management and Budget, *Budget of the United States Government, Appendix* (Washington, DC: Annual issues).

Constant dollar deflator

1980-97: U.S. Department of Commerce, Bureau of Economic Analysis, Historical data for chain-type indexes accurate to 3 decimal places, table 7-11, "Chain Type Price Indexes-Federal," Internet site http://www.bea.doc.gov/bea/dn1.htm as of Sept. 20, 2002.

1998-2001: U.S. Department of Commerce, Bureau of Economic Analysis, *Interactive Access to National Income and Product Accounts Tables*, table 7-11, "Chain Type Price Indexes-Federal," Internet site http://www.bea.doc.gov/bea/dn/nipaweb as of Sept. 20, 2002.

TABLE 3-29a: Transportation Expenditures by Mode and Level of Government from Own Funds, Fiscal Year (Current $ millions)[a]

	1980	1985	1990	1995	1996	1997	1998	1999	2000
TOTAL, all modes	**56,329**	**77,230**	**100,629**	**130,542**	**133,359**	**138,361**	**145,659**	**154,845**	**U**
Federal	24,737	28,291	30,859	40,769	40,774	41,766	41,303	43,975	48,401
State and local	31,592	48,939	69,770	89,772	92,585	96,596	104,355	110,871	U
Highways, total	**34,553**	**46,604**	**62,563**	**79,309**	**81,550**	**84,212**	**89,454**	**95,494**	**U**
Federal	11,706	15,030	15,452	20,078	20,622	21,347	20,652	23,589	27,657
State and local	22,847	31,574	47,112	59,232	60,927	62,865	68,802	71,905	U
Air, total	**5,673**	**7,903**	**12,568**	**16,960**	**17,273**	**18,776**	**19,593**	**21,789**	**U**
Federal	3,762	4,947	7,305	10,389	10,135	10,137	10,622	10,722	9,556
State and local	1,911	2,955	5,263	6,571	7,138	8,639	8,971	11,067	U
Transit, total	**8,949**	**16,333**	**19,261**	**26,162**	**26,346**	**26,875**	**28,108**	**29,027**	**U**
Federal	3,307	3,427	3,832	4,474	4,375	4,583	4,302	4,265	5,337
State and local	5,642	12,906	15,429	21,688	21,971	22,292	23,806	24,762	U
Water, total	**4,477**	**5,124**	**5,480**	**6,628**	**6,775**	**6,996**	**7,137**	**7,682**	**U**
Federal	3,308	3,642	3,537	4,380	4,238	4,212	4,384	4,565	4,810
State and local	1,168	1,481	1,943	2,247	2,538	2,783	2,753	3,117	U
Rail, total	**2,419**	**1,072**	**541**	**1,043**	**1,015**	**1,148**	**1,099**	**565**	**U**
Federal	2,395	1,057	534	1,034	1,004	1,131	1,076	546	755
State and local	23	15	7	9	11	17	23	19	U
Pipeline, total[b]	**RZ**	**8**	**26**	**43**	**U**	**U**	**U**	**U**	**U**
Federal	RZ	RZ	9	19	33	29	32	30	27
State and local	RZ	8	17	24	U	U	U	U	U
Federal-general support, total[c]	**259**	**187**	**191**	**396**	**367**	**327**	**236**	**258**	**259**

KEY: E = estimate; RZ = no activity or a value of zero; U = data are not available.

[a] All data have been revised.

[b] Includes gas and liquid pipeline.

[c] General support represents administrative and operating expenditures of the U.S. Department of Transportation, the Interstate Commerce Commission (terminated at the end 1995), and the National Transportation Safety Board.

NOTE
Numbers may not add to totals due to rounding.

SOURCES
1980: U.S. Department of Transportation, Bureau of Transportation Statistics, unpublished data.
1985–2000: U.S. Department of Transportation, Bureau of Transportation Statistics, *Government Transportation Financial Statistics 2001* (Washington, DC: 2002).

TABLE 3-29b: Transportation Expenditures by Mode and Level of Government from Own Funds, Fiscal Year (Chained 1996 $ millions)[a]

	1980	1985	1990	1995	1996	1997	1998	1999	2000
TOTAL, all modes	**102,324**	**107,500**	**118,629**	**133,464**	**133,359**	**135,089**	**140,025**	**144,939**	**U**
Federal	44,165	39,595	37,651	41,644	40,774	40,923	39,953	41,380	44,109
State and local	58,159	67,905	80,978	91,820	92,585	94,166	100,072	103,559	U
Highways, total	**62,960**	**64,845**	**73,532**	**81,091**	**81,550**	**82,200**	**85,955**	**89,361**	**U**
Federal	20,899	21,035	18,853	20,508	20,622	20,916	19,976	22,197	25,204
State and local	42,060	43,810	54,680	60,583	60,927	61,284	65,978	67,164	U
Air, total	**10,234**	**11,025**	**15,021**	**17,333**	**17,273**	**18,354**	**18,878**	**20,427**	**U**
Federal	6,717	6,924	8,912	10,612	10,135	9,932	10,275	10,089	8,709
State and local	3,517	4,100	6,109	6,721	7,138	8,422	8,603	10,337	U
Transit, total	**16,291**	**22,704**	**22,583**	**26,753**	**26,346**	**26,221**	**26,990**	**27,143**	**U**
Federal	5,903	4,796	4,675	4,570	4,375	4,490	4,161	4,013	4,864
State and local	10,387	17,908	17,908	22,183	21,971	21,731	22,829	23,129	U
Water, total	**8,058**	**7,153**	**6,570**	**6,773**	**6,775**	**6,841**	**6,881**	**7,207**	**U**
Federal	5,907	5,098	4,316	4,474	4,238	4,127	4,241	4,296	4,384
State and local	2,151	2,055	2,255	2,299	2,538	2,713	2,640	2,911	U
Rail, total	**4,320**	**1,501**	**659**	**1,066**	**1,015**	**1,124**	**1,063**	**531**	**U**
Federal	4,277	1,480	652	1,056	1,004	1,108	1,041	514	688
State and local	43	21	8	10	11	16	22	18	U
Pipeline, total[b]	**RZ**	**11**	**31**	**44**	**U**	**U**	**U**	**U**	**U**
Federal	RZ	RZ	11	19	33	28	31	28	25
State and local	RZ	11	19	25	U	U	U	U	U
Federal-general support, total[c]	**462**	**261**	**233**	**404**	**367**	**320**	**228**	**243**	**236**

KEY: RZ = no activity or a value of zero; U = data are not available.

[a] All data have been revised.

[b] Includes gas and liquid pipeline.

[c] General support represents administrative and operating expenditures of the U.S. Department of Transportation, the Interstate Commerce Commission (terminated at the end 1995), and the National Transportation Safety Board.

NOTE
Numbers may not add to totals due to rounding.

SOURCES
1980: U.S. Department of Transportation, Bureau of Transportation Statistics, unpublished data.
1985–2000: U.S. Department of Transportation, Bureau of Transportation Statistics, *Government Transportation Financial Statistics 2001* (Washington, DC: 2002).
Constant dollar deflator: U.S. Department of Commerce, Bureau of Economic Analysis, *National Income and Product Accounts*, Washington, DC, table 7.1, "Chain-Type Price Index."

TABLE 3-30a: Federal Transportation Grants to State and Local Governments by Mode, Fiscal Year (Current $ millions)[a]

	1980	1985	1990	1995	1996	1997	1998	1999	2000
Total	**14,581**	**18,146**	**19,689**	**24,950**	**25,061**	**26,073**	**25,125**	**27,959**	**32,516**
Highway	10,807	14,007	14,695	18,677	19,039	20,008	19,294	22,127	26,061
Air	590	789	1,220	1,826	1,655	1,489	1,511	1,565	1,896
Transit	3,129	3,304	3,728	4,353	4,291	4,499	4,221	4,188	4,476
Water[b]	RZ	12	26	62	40	26	32	21	9
Rail	54	35	16	22	25	39	54	44	61
Pipeline	RZ	RZ	4	10	11	12	13	14	13

KEY: RZ = no activity or a value of zero.

[a] All data have been revised.

[b] Includes only federal grants for Boat Safety Program.

NOTE
Numbers may not add to totals due to rounding.

SOURCES
1980: U.S. Department of Transportation, Bureau of Transportation Statistics, unpublished data.
1985-2000: U.S. Department of Transportation, Bureau of Transportation Statistics, *Government Transportation Financial Statistics 2001* (Washington, DC: 2002).

TABLE 3-30b: Federal Transportation Grants to State and Local Governments by Mode, Fiscal Year (Chained 1996 $ millions)[a]

	1980	1985	1990	1995	1996	1997	1998	1999	2000
Total	**26,033**	**25,397**	**24,022**	**25,485**	**25,061**	**25,547**	**24,304**	**26,309**	**29,632**
Highway	19,295	19,604	17,929	19,077	19,039	19,604	18,664	20,821	23,750
Air	1,054	1,104	1,489	1,865	1,655	1,459	1,462	1,473	1,728
Transit	5,586	4,624	4,549	4,446	4,291	4,408	4,083	3,941	4,079
Water[b]	RZ	17	31	63	40	25	31	20	8
Rail	97	49	19	22	25	38	52	41	56
Pipeline	RZ	RZ	5	10	11	12	13	13	12

KEY: RZ = no activity or a value of zero.

[a] All data have been revised.

[b] Includes only federal grants for Boat Safety Program.

NOTE
Numbers may not add to totals due to rounding.

SOURCES
1980: U.S. Department of Transportation, Bureau of Transportation Statistics, unpublished data.
1985–2000: U.S. Department of Transportation, Bureau of Transportation Statistics, *Government Transportation Financial Statistics 2001* (Washington, DC: 2002).
Constant dollar deflator: U.S. Department of Commerce, Bureau of Economic Analysis, *National Income and Product Accounts*, Washington, DC, table 7.1, "Chain-Type Price Index."

Chapter 4

Transportation, Energy, and the Environment

Section A
U.S. and Transportation Section Energy Consumption

TABLE 4-1: Overview of U.S. Petroleum Production, Imports, Exports, and Consumption (Million barrels per day)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	P2001
Domestic production														
Crude oil[a]	7.04	7.80	9.64	R8.38	8.60	8.97	7.36	6.56	R6.47	6.45	6.25	5.88	R5.82	5.80
Natural gas plant liquids	0.93	1.21	1.66	1.63	1.57	1.61	1.56	1.76	1.83	1.82	1.76	1.85	1.91	1.87
Total[b]	**7.96**	**9.01**	**11.30**	**10.05**	**10.21**	**10.64**	**8.99**	**8.63**	**8.61**	**8.61**	**8.39**	**8.11**	**R8.11**	**8.05**
Gross imports														
Crude oil[c]	1.02	1.24	1.32	R4.11	5.26	3.20	5.89	7.23	7.51	8.23	8.71	8.73	R9.07	9.33
Petroleum products[d]	0.80	1.23	2.10	1.95	1.65	1.87	2.12	1.61	1.97	1.94	2.00	2.12	R2.39	2.54
Total	**1.81**	**2.47**	**3.42**	**6.06**	**6.91**	**5.07**	**8.02**	**R8.84**	**9.48**	**10.16**	**10.71**	**10.85**	**R11.46**	**11.87**
Exports	**0.20**	**0.19**	**0.26**	**0.21**	**0.54**	**0.78**	**0.86**	**0.95**	**0.98**	**1.00**	**R0.95**	**0.94**	**1.04**	**0.97**
U.S. net imports[e]	**1.61**	**2.28**	**3.16**	**5.85**	**6.37**	**4.29**	**7.16**	**7.89**	**8.50**	**9.16**	**9.76**	**9.91**	**R10.42**	**10.90**
U.S. petroleum consumption	**9.80**	**11.51**	**14.70**	**16.32**	**17.06**	**15.73**	**16.99**	**R17.73**	**18.31**	**18.62**	**18.92**	**19.52**	**19.70**	**19.65**
By the transportation sector	5.14	6.04	7.78	8.95	9.55	9.85	10.97	11.73	11.96	12.13	12.48	12.89	12.99	U
Transportation petroleum use as Percent of domestic petroleum production	64.6	67.0	68.8	89.1	93.5	92.6	122.0	R136.0	R139.0	140.9	148.7	R159.0	R160.2	U
Transportation petroleum use as Percent of domestic petroleum consumption	52.4	52.5	52.9	54.8	56.0	62.6	64.6	66.2	65.3	65.1	66.0	66.0	65.9	U
World petroleum consumption	**21.34**	**31.14**	**46.81**	**56.20**	**63.07**	**R60.09**	**R66.09**	**R70.04**	**R71.60**	**73.06**	**R73.79**	**R75.30**	**R76.02**	**76.01**
U.S. petroleum consumption as Percent of world petroleum consumption	45.9	37.0	31.4	29.0	R27.0	26.2	R25.7	R25.3	25.6	25.5	R25.6	R25.9	R25.9	25.9

KEY: P = preliminary; R = revised; U = data are not available.

[a] Includes lease condensate.

[b] Includes crude oil, natural gas plant liquids, and other liquids.

[c] Includes imports for the Strategic Petroleum Reserve, which began in 1977.

[d] Beginning in 1985, motor gasoline blending components and aviation gasoline blending components are included.

[e] Net imports = imports minus exports.

NOTE
Numbers may not add to totals due to rounding.

SOURCES
Domestic production, imports, exports, and U.S. petroleum consumption:
1960-70: U.S. Department of Energy, Energy Information Administration, *Annual Energy Review 2000*, DOE/EIA-0384(2000) (Washington, DC: August 2001), table 5.1.
1975-2001: Ibid., *Monthly Energy Review* (Washington, DC: August 2002), tables 3.1a and 3.1b.
World petroleum consumption:
1960-70: Ibid., *Annual Energy Review 2000*, DOE/EIA-0384(2000) (Washington, DC: August 2001), table 11.9.
1975-2001: Ibid., Monthly Energy Database, available at http://www.eia.doe.gov/emeu/mer/ as of Sept. 3, 2002.
U.S. petroleum consumption by transportation sector:
1960-2000: Ibid., *Annual Energy Review 2000*, DOE/EIA-0384(2000) (Washington, DC: August 2001), table 5.12c.

TABLE 4-2: U.S. Consumption of Energy from Primary Sources by Sector (Quadrillion Btu)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Energy consumption														
Transportation	10.56	12.40	16.06	18.21	19.66	20.02	22.49	23.92	24.47	24.77	25.34	R26.16	R26.92	26.90
Percent of total	24.1	23.5	24.2	25.3	25.1	26.1	26.7	26.3	26.0	26.3	26.8	R27.0	27.3	27.9
Industrial	16.26	19.24	21.92	21.42	22.64	19.51	21.11	22.96	23.72	23.89	R23.57	24.05	R24.39	23.60
Percent of total	37.1	36.5	33.0	29.7	28.9	25.4	25.0	25.2	25.2	25.3	24.9	R24.9	24.7	24.5
Residential and commercial	8.75	10.00	12.14	12.03	11.60	10.70	10.24	11.02	11.73	11.29	10.38	10.78	R11.30	11.08
Percent of total	20.0	19.0	18.3	16.7	14.8	13.9	12.1	12.1	12.5	12.0	11.0	11.1	R11.4	11.5
Energy input at electric utilities	8.19	11.01	16.27	20.38	24.54	26.55	30.50	33.03	34.01	34.39	R35.34	35.77	R36.18	34.75
Percent of total	18.7	20.9	24.5	28.3	31.3	34.6	36.2	36.3	36.2	36.5	R37.3	R37.0	R36.6	36.1
Total	**43.80**	**52.68**	**66.43**	**72.04**	**78.44**	**76.78**	**84.34**	**90.94**	**93.93**	**94.34**	**R94.62**	**R96.77**	**R98.78**	**96.32**
Percentage of primary demand met by petroleum														
Transportation	96.0	95.7	95.3	96.7	96.7	97.4	97.0	97.0	97.0	96.9	97.4	R97.4	R97.5	97.7
Industrial	35.4	35.3	35.5	38.0	42.1	40.0	39.4	37.5	38.2	38.9	R38.6	39.1	R37.5	38.3
Residential and commercial	39.8	38.6	35.4	31.6	26.2	23.6	21.2	18.8	19.1	19.2	19.2	19.7	R19.6	19.8
Electric utilities	6.7	6.7	13.0	15.5	10.7	4.1	4.1	2.0	2.1	2.4	3.3	2.6	2.2	2.4

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

NOTES

The data for residential, commercial, and industrial sectors include only fossil fuels consumed directly. Most renewable fuels are not included. The data for the transportation sector includes only fossil and renewable fuels consumed directly. The data for electric utilities includes all fuels (fossil, nuclear, geothermal, hydro, and other renewables) used by electric utilities. Due to a lack of consistent monthly historical data, some renewable energy resources are not included in this table. The totals in table 4-4 are the best numbers for total U.S. energy consumption from all sources.

Numbers may not add to totals due to rounding.

SOURCES

1960-70: U.S. Department of Energy, Energy Information Administration, *Annual Energy Review 1990*, DOE/EIA-0394(90) (Washington, DC: May 1991), table 4.

1975-2001: Ibid., *Monthly Energy Review*, DOE/EIA-0035(2002/07) (Washington, DC: July 2002), tables 2.1, 2.2, 2.3, 2.4, 2.5, and 2.6.

TABLE 4-3: Domestic Demand for Refined Petroleum Products by Sector (Quadrillion Btu)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Transportation	10.13	11.87	15.31	17.61	19.01	19.50	21.81	23.20	23.74	23.99	24.68	25.49	26.25	26.27
Industrial	5.75	6.79	7.79	8.15	9.53	7.81	8.32	8.62	9.06	9.29	9.10	9.40	9.16	9.04
Residential and commercial	3.49	3.87	4.31	3.81	3.04	2.52	2.17	2.08	2.24	2.16	1.99	2.13	2.22	2.20
Electric utilities	0.55	0.73	2.12	3.17	2.63	1.09	1.25	0.66	0.73	0.82	1.17	0.94	0.78	0.83
Total petroleum demand	**19.92**	**23.26**	**29.53**	**32.73**	**34.20**	**30.92**	**33.55**	**34.55**	**35.76**	**36.27**	**36.93**	**37.96**	**38.40**	**38.33**
Transportation as percent of total	50.9	51.0	51.8	53.8	55.6	63.1	65.0	67.1	66.4	R66.2	66.8	67.2	68.4	68.5

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

NOTE
Transportation's share of U.S. petroleum demand in this table differs slightly from table 4-1 because this table takes into account differences within sectors in the use of various grades of petroleum-based fuel that have different Btu content per unit volume.

SOURCES
1960-70: U.S. Department of Energy, Energy Information Administration, *Annual Energy Review 1997*, DOE/EIA-0384(97) (Washington, DC: July 1998), tables 2.1, 5.12b, and A3.
1975-2001: Ibid., *Monthly Energy Review*, DOE/EIA-0035(2002/07) (Washington, DC: July 2002), tables 1.4, 2.2, 2.3, 2.4, 2.5, and 2.6.

Section B
Transportation Energy Consumption by Mode

TABLE 4-4: U.S. Energy Consumption by the Transportation Sector (Quadrillion Btu)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	P2001
Energy consumption (all sectors)	**45.12**	**54.02**	**67.86**	**72.04**	**78.44**	**76.78**	**84.34**	**90.94**	**93.93**	**94.34**	**R94.62**	**R96.77**	**R98.78**	**96.34**
Total transportation consumption[a]	10.60	12.43	16.10	18.24	19.70	20.07	22.54	23.98	24.52	24.82	25.39	R26.22	R26.90	26.90
Percent of total energy consumption	23.5	23.0	23.7	25.3	25.1	26.1	26.7	26.4	26.1	26.3	26.8	R27.1	R27.2	27.9
Total primary consumption[b]	10.56	12.40	16.06	18.21	19.66	20.02	22.49	23.92	24.47	24.77	25.34	R26.16	R26.84	26.84
Coal	0.074	0.017	0.007	0.001	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]
Million short tons	3.0	0.7	0.3	<0.05	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]
Natural gas[c]	0.36	0.52	0.75	0.60	0.65	0.52	0.68	0.72	0.73	0.78	0.66	R0.67	R0.67	0.63
Trillion cubic feet	0.35	0.50	0.72	0.58	0.64	0.50	0.66	0.70	0.71	R0.76	0.64	R0.65	R0.65	U
Petroleum products[d]	10.13	11.87	15.31	17.61	19.01	R19.50	21.81	23.20	23.74	23.99	24.68	25.49	R26.17	26.21
Million barrels	1,881	2,205	2,840	3,267	3,495	3,595	4,004	4,281	4,377	4,431	E4,552	E4,654	E4,754	U
Electricity	0.010	0.010	0.011	0.010	0.011	0.014	0.016	0.017	0.017	0.017	0.017	0.017	0.018	0.019
Electrical system energy losses[e]	0.026	0.024	0.026	0.025	0.027	0.033	R0.037	R0.038	R0.037	R0.037	R0.037	R,g 0.038	R0.038	0.038

KEY: Btu = British thermal unit; E = estimated; P = preliminary; R = revised; U = data are not available.

[a] Sum of primary consumption, electricity, and electrical system energy losses categories.

[b] Sum of coal, natural gas, and petroleum categories.

[c] Consumed in the operation of pipelines, primarily in compressors, and small amounts consumed as vehicle fuel.

[d] Includes most nonutility use of fossil fuels to produce electricity and small amounts (about 0.1 quadrillion Btu per year since 1990) of renewable energy in the form of ethanol blended into motor gasoline.

[e] Incurred in the generation, transmission, and distribution of electricity plus plant use and unaccounted for electrical system energy losses.

[f] From 1980, small amounts of coal consumed for transportation are included in industrial sector consumption.

[g] There is a discontinuity in this time series between 1998 and 1999; beginning in 1999, nonutility consumption of fossil fuels is included in electric power sector consumption and the calculation of electrical system energy losses.

NOTES
Energy consumption (all sectors) differs from totals in table 4-2 for 1990 and subsequent years.
Table 4-2 includes primary energy consumption only.
One quadrillion = 10^{14}.

Continued next page

TABLE 4-4: U.S. Energy Consumption by the Transportation Sector (Quadrillion Btu) (Continued)

SOURCES

Energy consumption (all sectors), total transportation consumption and total primary consumption:
1960-70: U.S. Department of Energy, Energy Information Administration, *Annual Energy Review 2000*, DOE/EIA-0384 (2000) (Washington DC: August 2001) table 2.1a.
1975-2001: Ibid., *Monthly Energy Review* (Washington DC: August 2002), table 2.1.

Coal:
Btu:
1960-70: Ibid., *Annual Energy Review 2000*, DOE/EIA-0384 (2000) (Washington DC: August 2001) table 2.1e.
1975-2001: Ibid., *Monthly Energy Review* (Washington DC: August 2002), table 2.5.
Short tons:
1960-70: Ibid., *Annual Energy Review 2000*, DOE/EIA-0384 (2000) (Washington DC: August 2001) table 7.3.
1975-2001: Ibid., *Monthly Energy Review* (Washington DC: August 2002), table 6.2.

Natural gas:
Btu:
1960-70: Ibid., *Annual Energy Review 2000*, DOE/EIA-0384 (2000) (Washington DC: August 2001) table 2.1e.
1975-2001: Ibid., *Monthly Energy Review* (Washington DC: August 2002), table 2.5.
Cubic feet:
1960-70: Ibid., *Annual Energy Review 2000*, DOE/EIA-0384 (2000) (Washington DC: August 2001) table 6.5.
1975-2001: Ibid., *Monthly Energy Review* (Washington DC: August 2002), table 4.4.

Petroleum products:
Btu:
1960-70: Ibid., *Annual Energy Review 2000*, DOE/EIA-0384 (2000) (Washington DC: August 2001) table 2.1e.
1975-2001: Ibid., *Monthly Energy Review* (Washington DC: August 2002), table 2.5.
Barrels:
1960-2000: Ibid., *Annual Energy Review 2000*, DOE/EIA-0384 (2000) (Washington DC: August 2001) table 5.12c. (barrels/day x 365 or 366 for leap years).

Electricity and electrical system energy losses:
1960-70: Ibid., *Annual Energy Review 2000*, DOE/EIA-0384 (2000) (Washington DC: August 2001) table 2.1e.
1975-2001: Ibid., *Monthly Energy Review* (Washington DC: August 2002), table 2.5.

TABLE 4-5: Fuel Consumption by Mode of Transportation

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Air													
Certificated carriers[a]													
Jet fuel (million gallons)	1,954	3,889	7,857	7,558	8,519	10,115	12,429	12,812	13,187	13,660	13,877	14,402	14,845
General aviation[b]													
Aviation gasoline (million gallons)	242	292	551	412	520	421	353	287	289	292	311	345	337
Jet fuel (million gallons)	N	56	208	453	766	691	663	560	608	642	815	967	998
Highway													
Gasoline, diesel and other fuels (million gallons)													
Passenger car and motorcycle	41,171	49,723	67,879	74,253	70,186	71,700	69,759	68,268	69,419	70,094	71,901	73,495	73,125
Other 2-axle 4-tire vehicle	N	[e]	12,313	19,081	23,796	27,363	35,611	45,605	47,354	49,388	50,462	52,859	52,832
Single-unit 2-axle 6-tire or more truck	N	13,848	3,968	5,420	6,923	7,399	8,357	9,216	9,409	9,576	6,817	9,372	9,548
Combination truck	N	6,658	7,348	9,177	13,037	14,005	16,133	19,777	20,193	20,302	25,158	24,537	25,645
Bus	827	875	820	1,053	1,018	834	895	968	990	1,027	1,040	1,148	1,110
Transit[c]													
Electricity (million kWh)	2,908	2,584	2,561	2,646	2,446	4,216	4,837	5,068	5,007	4,988	5,073	5,237	P5,510
Motor fuel (million gallons)													
Diesel	208	248	271	365	431	609	651	678	693	717	740	763	P786
Gasoline and other nondiesel fuels[d]	192	124	68	8	11	46	34	61	61	59	53	49	P48
Compressed natural gas	N	N	N	N	N	N	N	11	15	24	37	44	P55
Rail, Class I (in freight service)													
Distillate / diesel fuel (million gallons)	3,463	3,592	3,545	3,657	3,904	3,110	3,115	3,480	3,579	3,575	3,583	3,715	3,700
Amtrak													
Electricity (million kWh)	N	N	N	180	254	295	330	304	293	282	275	283	350
Distillate / diesel fuel (million gallons)	N	N	N	63	64	65	82	66	71	75	75	74	76
Water													
Residual fuel oil (million gallons)	3,952	3,093	3,774	4,060	8,952	4,590	6,326	5,886	5,701	5,010	5,620	5,838	6,410
Distillate / diesel fuel oil (million gallons)	787	652	819	1,098	1,478	1,699	2,065	2,339	2,491	2,574	2,595	2,419	2,261
Gasoline (million gallons)	N	N	598	730	1,052	1,053	1,300	1,060	994	987	956	1,098	1,124
Pipeline													
Natural gas (million cubic feet)	347,075	500,524	722,166	582,963	634,622	503,766	659,816	700,335	711,446	751,470	635,477	645,319	644,444

KEY: kWh = kilowatt-hour; N = data do not exist; P = preliminary.

[a] Domestic operations only.

[b] Includes fuel used in air taxi operations, but not commuter operations. Data for 1996 are estimated using new information on nonrespondents and are therefore not comparable to earlier years. See the accuracy statement in the appendix for more detailed information.

[c] Prior to 1984, excludes commuter rail, automated guideway, ferryboat, demand responsive vehicles, and most rural and small systems.

[d] Gasoline and all other nondiesel fuels such as liquefied natural gas, methanol, and propane, except compressed natural gas.

Continued next page

TABLE 4-5: Fuel Consumption by Mode of Transportation (Continued)

[e] Included in single-unit 2-axle 6-tire or more truck category.

SOURCES

Air:

Certificated air carriers:

1960-2000: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, Internet site http://www.bts.gov/oai/fuel/fuelyearly.html as of Aug. 1, 2002.

General aviation:

1960-70: U.S. Department of Transportation, Federal Aviation Administration, *FAA Statistical Handbook of Aviation - 1972 edition* (Washington, DC: 1973), table 9.12.

1975-90: Ibid., *General Aviation and Air Taxi Activity Survey* (Washington, DC: Annual issues), table 5.1, and similar tables in earlier editions.

1995-2000: lbid., *FAA Aerospace Forecasts Fiscal Years 2002-2013* (Washington, DC: March 2002), table 30.

Highway:

1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics, Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A. (Revised data obtained from Internet site http://www.fhwa.dot.gov/ohim/ohimstat.htm as of August 2001).

1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

Transit:

Electricity / motor fuel / compressed natural gas:

1960-2000: American Public Transit Association, *Public Transportation Fact Book* (Washington, DC: March 2002), tables 65, 66, 67, and similar tables in earlier editions.

Rail:

1960-2000: Association of American Railroads, *Railroad Facts* (Washington, DC: October 2001), p. 40 and personal communication Aug. 12, 2002.

Amtrak:

1975-2000: Amtrak, Energy Management Department, personal communication.

Water:

Residual and distillate / diesel fuel oil:

1960-80: American Petroleum Institute, *Basic Petroleum Data Book* (Washington, DC: Annual issues), tables 10, 10a, 12, and 12a.

1985-2000: U.S. Department of Energy, Energy Information Administration, *Fuel Oil and Kerosene Sales* (Washington, DC: Annual issues), tables 1, 2, and similar tables in earlier editions.

Gasoline:

1970-2000: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues), table MF-24 and similar tables in earlier editions.

Pipeline:

1960-2000: U.S. Department of Energy, *Natural Gas Annual 2000*, DOE/EIA-0131(00) (Washington, DC: November 2001), table 95.

TABLE 4-6: Energy Consumption by Mode of Transportation (Trillion Btu)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Air													
Certificated carriers[a]													
Jet fuel	264	525	1,061	1,020	1,150	1,366	1,678	1,730	1,780	1,844	1,873	1,944	2,004
General aviation[b]													
Aviation gasoline	29	35	66	50	63	51	42	35	35	35	37	42	40
Jet fuel	N	8	28	61	103	93	90	76	82	87	110	131	135
Highway													
Gasoline, diesel and other fuels													
Passenger car and motorcycle	5,146	6,215	8,485	9,282	8,773	8,963	8,720	8,534	8,677	8,762	8,988	9,187	9,141
Other 2-axle 4-tire vehicle	N	[e]	1,539	2,385	2,975	3,420	4,451	5,701	5,919	6,173	6,308	6,607	6,604
Single-unit 2-axle 6-tire or more truck	N	1,921	550	752	960	1,026	1,159	1,278	1,305	1,328	946	1,300	1,324
Combination truck	N	923	1,019	1,273	1,808	1,942	2,238	2,743	2,801	2,816	3,489	3,403	3,557
Bus	115	121	114	146	141	116	124	134	137	142	144	159	154
Transit[c]													
Electricity	10	9	9	9	8	14	17	17	17	17	17	18	P19
Motor fuel													
Diesel	29	34	38	51	60	84	90	94	96	99	103	106	P109
Gasoline and other nondiesel fuels[d]	24	16	9	1	1	6	4	8	8	7	7	6	P6
Compressed natural gas	N	N	N	N	N	N	N	1	2	3	5	6	P8
Rail, Class I (in freight service)													
Distillate / diesel fuel	480	498	492	507	541	431	432	483	496	496	497	515	513
Amtrak													
Electricity	N	N	N	1	1	1	1	1	1	1	1	1	1
Distillate / diesel fuel	N	N	N	9	9	9	11	9	10	10	10	10	11
Water													
Residual fuel oil	592	463	565	608	1,340	687	947	881	853	750	841	874	960
Distillate / diesel fuel oil	109	90	114	152	205	236	286	324	345	357	360	336	314
Gasoline	N	N	75	91	132	132	163	133	124	123	120	137	141
Pipeline													
Natural gas	358	516	745	601	654	519	680	722	734	775	655	665	664

KEY: Btu = British thermal unit; kWh = kilowatt-hour; N = data do not exist; P = preliminary.

[a] Domestic operations only.

Continued next page

TABLE 4-6: Energy Consumption by Mode of Transportation (Trillion Btu) (Continued)

[b] Includes fuel used in air taxi operations, but not commuter operations.

[c] Prior to 1984, excludes commuter rail, automated guideway, ferryboat, demand responsive vehicles, and most rural and smaller systems.

[d] Gasoline and all other nondiesel fuels such as liquefied natural gas, methanol, and propane, except compressed natural gas.

[e] Included in other single-unit 2-axle 6-tire or more truck category.

NOTES

The following conversion rates were used:

Jet fuel = 135,000 Btu/gallon	Compressed natural gas = 138,700 Btu/gallon
Aviation gasoline = 120,200 Btu/gallon	Distillate fuel = 138,700 Btu/gallon
Automotive gasoline = 125,000 Btu/gallon	Residual fuel = 149,700 Btu/gallon
Diesel motor fuel = 138,700 Btu/gallon	Natural gas = 1,031 Btu/ft3

Electricity 1kWh = 3,412 Btu, negating electrical system losses. To include approximate electrical system losses, multiply this conversion factor by 3.

SOURCES

Air:

Certificated air carriers:

1960-2000: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information Internet site http://www.bts.gov/oai/fuel/fuelyearly.html as of Aug. 1, 2002.

General aviation:

1960-80: U.S. Department of Transportation, Federal Aviation Administration, Office of Aviation Policy, Plans, and Management Analysis, *FAA Statistical Handbook of Aviation* (Washington, DC: Annual issues).

1985-90: Ibid., *General Aviation and Avionics Survey* (Washington, DC: Annual issues), table 5.1 and similar tables in earlier editions.

1995-2000: lbid., *FAA Aerospace Forecasts Fiscal Years 2002-2013* (Washington, DC: March 2002), table 30.

Highway:

1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics, Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A (revised data obtained from internet site http://www.fhwa.dot.gov/ohim/ohimstat.htm as of Aug. 2, 2001).

1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

Transit:

Electricity / motor fuel / compressed natural gas:

1960-2000: American Public Transit Association, *Public Transportation Fact Book* (Washington, DC: March 2002), tables 65, 66, 67, and similar tables in earlier editions.

Rail:

1960-2000: Association of American Railroads, *Railroad Facts* (Washington, DC: October 2001), p. 40.

2000: Ibid., personal communication, Aug. 12, 2002.

Amtrak:

1975-2000: Amtrak, Energy Management Department, personal communication.

Water:

Residual and distillate / diesel fuel oil:

1960-80: American Petroleum Institute, *Basic Petroleum Data Book* (Washington, DC: Annual issues), tables 10, 10a, 12, and 12a.

1985-2000: U.S. Department of Energy, Energy Information Administration, *Fuel Oil and Kerosene Sales* (Washington, DC: Annual issues), tables 2, 4, and similar tables in earlier editions.

Gasoline:

1970-2000: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues), table MF-24 and similar tables in earlier editions.

Pipeline:

1960-98: U.S. Department of Energy, *Natural Gas Annual 1999*, DOE/EIA-0131(99) (Washington, DC: October 2000), table 94.

1999-2000: Ibid., *Natural Gas Annual 2000*, DOE/EIA-0131(00) (Washington DC: November 2001), table 95.

TABLE 4-7: Domestic Demand for Gasoline (Million gallons) by Mode

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
TOTAL demand	**60,761**	**71,187**	**89,601**	**102,996**	**104,838**	**107,550**	**113,606**	**120,253**	**122,595**	**124,235**	**127,978**	**131,781**	**131,891**
Highway	**55,429**	**66,979**	**85,598**	**99,354**	**101,183**	**103,545**	**109,529**	**117,061**	**119,515**	**120,938**	**124,694**	**128,743**	**128,884**
Nonhighway													
Agriculture	2,292	1,963	1,932	1,565	1,059	1,081	681	927	918	984	907	703	652
Aviation[a]	1,324	501	393	410	413	382	361	367	344	335	351	322	296
Marine	61	96	598	730	1,052	1,053	1,300	1,060	994	987	956	1,098	1,124
Other[b]	1,656	1,647	1,080	938	1,131	1,490	1,733	838	825	990	1,070	915	934
Total nonhighway	**5,332**	**4,208**	**4,003**	**3,642**	**3,655**	**4,005**	**4,076**	**3,192**	**3,081**	**3,297**	**3,284**	**3,038**	**3,007**

[a] Does not include aviation jet fuel.

[b] Includes state, county, and municipal use, industrial and commercial use, construction use, and miscellaneous.

NOTES
All nonhighway uses of gasoline were estimated by the U.S. Department of Transportation, Federal Highway Administration.
These estimates may not be comparable to data for prior years due to revised estimation procedures.
Numbers may not add to totals due to rounding.

SOURCES
Highway:
1960-95: U.S. Department of Transportation, Federal Highway Administration, *Highway Statististics, Summary to 1995* (Washington, DC: 1996), table MF-221.
1996-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table MF-21.

Nonhighway:
1960-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table MF-24, and unpublished revisions.

TABLE 4-8: Certificated Air Carrier Fuel Consumption and Travel[a]

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Number of aircraft	**2,135**	**2,125**	**2,679**	**2,495**	**3,808**	**4,678**	**6,083**	**7,411**	**7,478**	**7,616**	**8,111**	**8,228**	**7,935**	**U**
Average miles flown per aircraft (thousands)	**487**	**667**	**949**	**932**	**768**	**740**	**776**	**759**	**783**	**R791**	**768**	**R797**	**875**	**U**
Aircraft-miles (millions)														
Domestic operations	858	1,134	2,068	1,948	2,523	3,046	3,963	4,629	4,811	R4,911	R5,035	R5,332	R5,664	5,550
International operations	182	284	475	377	401	415	760	998	1,043	R1,114	R1,192	R1,225	R1,282	1,258
Fuel consumption (million gallons)														
Domestic operations	1,954	3,889	7,857	7,558	R8,519	10,115	12,429	12,812	13,187	13,660	13,877	14,402	14,845	14,017
International operations	566	1,280	2,243	1,949	R1,747	2,488	3,963	4,511	4,658	4,964	5,186	5,250	5,475	5,237
Aircraft-miles flown per gallon														
Domestic operations	0.44	0.29	0.26	0.26	R0.30	0.30	0.32	0.36	0.36	0.36	0.36	0.37	0.38	0.40
International operations	0.32	0.22	0.21	0.19	R0.23	0.17	0.19	0.22	0.22	0.22	0.23	0.23	0.23	0.24

KEY: R = revised; U = data are unavailable.

[a] Aircraft operating under 14 CFR 121 and 14 CFR 135.

SOURCES

Number of aircraft:

1960-65: U.S. Department of Transportation, Federal Aviation Administration, *FAA Statistical Handbook of Aviation, 1970 edition* (Washington, DC: 1970), table 5.3.
1970-75: Ibid., *FAA Statistical Handbook of Aviation, Calendar Year 1979* (Washington, DC: 1979), table 5.1.
1980-85: Ibid., *FAA Statistical Handbook of Aviation, Calendar Year 1986* (Washington, DC: 1986), table 5.1.
1990-97: Ibid., *FAA Statistical Handbook of Aviation, Calendar Year 1997* (Washington, DC: unpublished), personal communication, Mar. 19, 1999.
1998-2001: Aerospace Industries Association, Aerospace Facts and Figures (Washington DC: Annual Issues), "Active U.S. Air Carrier Fleet."

Aircraft-miles flown:

1960: Civil Aeronautics Board, *Handbook of Airline Statistics 1969* (Washington, DC: 1970), part III, tables 2 and 13.
1965-70: Ibid., *Handbook of Airline Statistics 1973* (Washington, DC: 1974), part III, tables 2 and 13.
1975-80: Ibid., *Air Carrier Traffic Statistics* (Washington, DC: December 1976), pp. 4 and 14; and (December 1981), pp. 2 and 3.
1985-2001: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, *Air Carrier Traffic Statistics* (Washington, DC: Annual issues, December), pp. 2 and 3, line 27 plus line 50.

Fuel consumption:

1960-2001: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, Internet site http://www.bts.gov/programs/oai/fuel/fuelyearly.html as of Aug. 1, 2002.

TABLE 4-9: Motor Vehicle Fuel Consumption and Travel

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Vehicles registered (thousands)[a]	73,858	90,358	111,242	137,913	161,490	177,133	193,057	205,427	210,441	211,580	215,496	220,461	225,821
Vehicle-miles traveled (millions)	R718,762	R887,812	R1,109,724	R1,327,664	R1,527,295	R1,774,826	R2,144,362	R2,422,696	R2,485,848	2,561,695	R2,631,522	2,691,056	2,749,803
Fuel consumed (million gallons)	57,880	71,104	92,329	108,984	114,960	121,301	130,755	143,834	147,365	150,386	R155,379	161,411	162,260
Average miles traveled per vehicle (thousands)	9.7	9.8	10.0	9.6	9.5	10.0	11.1	11.8	11.8	12.1	12.2	12.2	12.2
Average miles traveled per gallon	12.4	12.5	12.0	12.2	13.3	14.6	16.4	16.8	16.9	17.0	R16.9	16.7	16.9
Average fuel consumed per vehicle (gallons)	784	787	830	790	712	685	677	700	700	711	R721	732	719

KEY: R = revised.

[a] Includes personal passenger vehicles, buses, and trucks.

NOTE
See tables 4-11, 4-12, 4-13, 4-14, and 4-15 for individual highway vehicles.

SOURCES
1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

TABLE 4-10: Estimated Consumption of Alternative and Replacement Fuels for Highway Vehicles (Thousand gasoline-equivalent gallons)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	PP2001
Total fuel consumption[a]	**134,230,631**	**135,913,334**	**140,718,152**	**144,774,643**	**148,179,616**	**151,597,859**	**156,839,186**	**161,247,140**	**161,784,100**	**164,231,341**
Alternative fuels										
Liquefied petroleum gases	208,142	264,655	248,467	232,701	239,158	238,356	241,583	242,141	242,695	243,196
Compressed natural gas	16,823	21,603	24,160	35,162	46,923	65,192	73,251	86,286	97,568	107,476
Liquefied natural gas	585	1,901	2,345	2,759	3,247	3,714	5,343	5,828	6,847	7,566
Methanol, 85%[b]	1,069	1,593	2,340	2,023	1,775	1,554	1,212	1,073	996	918
Methanol, neat	2,547	3,166	3,190	2,150	347	347	449	447	437	406
Ethanol, 85%[b]	21	48	80	190	694	1,280	1,727	2,075	3,344	4,575
Methanol, 95%[b]	85	80	140	995	2,699	1,136	59	59	54	51
Electricity	359	288	430	663	773	1,010	1,202	1,431	1,819	2,143
Total	**229,631**	**293,334**	**281,152**	**276,643**	**295,616**	**312, 589**	**324,826**	**339,340**	**353,760**	**366,331**
Oxygenates										
Methyl-tertiary-butyl-ether[c]	1,175,000	2,069,200	2,018,800	2,691,200	2,749,700	3,104,200	2,915,600	3,331,000	3,104,200	2,937,500
Ethanol in gasohol	701,000	760,000	845,900	910,700	660,200	830,700	916,000	956,900	1,011,800	1,066,000
Traditional fuels										
Gasoline[d]	110,135,000	111,323,000	113,144,000	115,943,000	117,783,000	119,336,000	122,849,000	125,111,000	124,651,000	126,284,000
Diesel	23,866,000	24,296,630	27,293,370	28,555,040	30,101,430	31,949,270	33,665,360	35,796,800	36,779,340	37,581,010
Total	**134,001,000**	**135,620,000**	**140,437,000**	**144,498,000**	**147,884,000**	**151,285,270**	**156,514,360**	**160,907,800**	**161,430,340**	**163,865,010**

KEY: PP = based on plans or projections.

[a] Total fuel consumption is the sum of alternative fuels, gasoline, and diesel. Oxygenate consumption is included in gasoline consumption.

[b] The remaining portion of 85% methanol, 85% ethanol, and 95% ethanol fuels is gasoline. Consumption data include the gasoline portion of the fuel.

[c] Includes a very small amount of other ethers, primarily tertiary-amyl-methyl-ether and ethyl-tertiary-butyl-ether.

[d] Gasoline consumption includes ethanol in gasohol and methyl-tertiary-butyl-ether.

NOTE
Numbers may not add to totals due to rounding.

SOURCE
U.S. Department of Energy, Energy Information Administration, *Alternatives to Traditional Transportation Fuels 1999*, available at www.eia.doe.gov as of Sept. 20, 2002.

TABLE 4-11: Passenger Car and Motorcycle Fuel Consumption and Travel

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Vehicles registered (thousands)													
Passenger cars	61,671	75,258	89,244	106,706	121,601	127,885	133,700	128,387	129,728	129,749	131,839	132,432	133,621
Motorcycles	574	1,382	2,824	4,964	5,694	5,444	4,259	3,897	3,872	3,826	3,879	4,152	4,346
Vehicle-miles traveled (millions)													
Passenger cars	587,000	723,000	917,000	1,034,000	1,112,000	1,247,000	1,408,000	1,438,000	1,470,000	1,502,556	R1,549,577	1,569,100	1,601,914
Motorcycles	a	a	3,000	5,600	10,200	9,100	9,600	9,800	9,900	10,081	R10,283	10,584	10,479
Fuel consumed (million gallons)													
Passenger cars	41,171	49,723	67,819	74,140	69,982	71,518	69,568	68,072	69,221	69,892	R71,695	73,283	72,916
Motorcycles	a	a	60	113	204	182	191	196	198	202	R206	212	210
Average miles traveled per vehicle (thousands)													
Passenger cars	9.5	9.6	10.3	9.7	9.1	9.8	10.5	11.2	11.3	11.6	11.7	11.8	12.0
Motorcycles	a	a	1.1	1.1	1.8	1.7	2.2	2.5	2.6	2.6	2.6	2.5	2.4
Average miles traveled per gallon													
Passenger cars	14.3	14.5	13.5	13.9	15.9	17.4	20.2	21.1	21.2	21.5	R21.6	21.4	22
Motorcycles	a	a	50	50	50	50	50	50	50	50	50	50	50
Average fuel consumed per vehicle (gallons)													
Passenger cars	668	661	760	695	576	559	520	530	534	539	R544	553	546
Motorcycles	a	a	21	23	36	33	45	50	51	53	53	51	48

KEY: R = revised.

[a] Included in passenger car.

NOTE
See table 4-12 for other 2-axle 4-tire vehicles.

SOURCES
Passenger car:
Number registered:
1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table MV-201.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.
All other categories:
1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A. For 1970-94, the unrevised motorcycle vehicle-miles and fuel consumed are subtracted from the combined passenger car and motorcycle vehicle-miles and fuel consumed from VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.
Motorcycle:
Number registered:
1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table MV-201.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.
All other categories:
1970-85: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1985*, table VM-201A.
1990-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.
Average miles traveled per vehicle, average miles traveled per gallon, average fuel consumed per vehicle: derived by calculation.

TABLE 4-12: Other 2-Axle 4-Tire Vehicle Fuel Consumption and Travel

	1970	1975	1980	1985	1990	1995	1996	1997	1998[R]	1999	2000
Number registered (thousands)	14,211	20,418	27,876	37,214	48,275	65,738	69,134	70,224	71,330	75,356	79,085
Vehicle-miles traveled (millions)	123,000	201,000	291,000	391,000	575,000	790,000	817,000	850,000	868,275	901,022	924,018
Fuel consumed (million gallons)	12,313	19,081	23,796	27,363	35,611	45,605	47,354	49,370	50,462	52,859	52,832
Average miles traveled per vehicle (thousands)	8.7	9.8	10.4	10.5	11.9	12.0	11.8	12.1	12.2	12.0	11.7
Average miles traveled per gallon	10.0	10.5	12.2	14.3	16.1	17.3	17.2	17.2	17.2	17.0	17.5
Average fuel consumed per vehicle (gallons)	866	934	854	735	738	694	685	703	707	701	668

KEY: R = revised.

NOTE

Nearly all vehicles in this category are light trucks, which include vans, pickup trucks, and sport utility vehicles. In 1995, the U.S. Department of Transportation, Federal Highway Administration revised its vehicle categories beginning with 1993 data. They are passenger car, other 2-axle 4-tire vehicle, single-unit 2-axle 6-tire or more truck, and combination truck. Prior to 1993, some minivans and sport utility vehicles were included under the passenger car category.

SOURCES

1970-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.

1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

TABLE 4-13: Single-Unit 2-Axle 6-Tire or More Truck Fuel Consumption and Travel[a]

	1970	1975	1980	1985	1990	1995	1996	1997	R1998	1999	2000
Number registered (thousands)	3,681	4,232	4,374	4,593	4,487	5,024	R5,266	5,293	5,735	5,763	5,926
Vehicle-miles (millions)	27,100	34,600	39,800	45,400	51,900	62,705	R64,072	66,893	68,021	70,304	70,583
Fuel consumed (million gallons)	3,968	5,420	6,923	7,399	8,357	9,216	R9,408	9,576	6,817	9,372	9,548
Average miles traveled per vehicle (thousands)	7.4	8.2	9.1	9.9	11.6	12.5	12.2	12.6	11.9	12.2	11.9
Average miles traveled per gallon	6.8	6.4	5.8	6.1	6.2	6.8	6.8	7.0	10.0	7.5	7.4
Average fuel consumed per vehicle (gallons)	1,078	1,281	1,583	1,611	1,862	1,835	R1,787	1,809	1,189	1,626	1,611

KEY: R = revised.

[a] Beginning in 1998, the Federal Highway Administration (FHWA) used the Census Bureau's *1997 Vehicle Inventory and Use Survey* (VIUS) for its baseline estimate of single-unit 2-axle 6-tire or more trucks. Prior to 1998, the FHWA used the Census Bureau's *1992 Transportation Inventory and Use Survey* (TIUS) for its baseline estimates. Therefore, post-1997 data may not be comparable to 1997 and earlier years.

NOTE

In 1995, the U.S. Department of Transportation, Federal Highway Administration revised its vehicle categories beginning with 1993 data to include passenger cars, other 2-axle 4-tire vehicles, single-unit 2-axle 6-tire or more trucks, and combination trucks. Single-unit 2-axle 6-tire or more trucks are on a single frame with at least 2 axles and 6 tires. Pre-1993 data have been reassigned to the most appropriate category.

SOURCES

1970-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.

1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

TABLE 4-14: Combination Truck Fuel Consumption and Travel[a]

	1965	1970	1975	1980	1985	1990	1995	1996	1997	R1998	1999	2000
Number registered (thousands)	787	905	1,131	1,417	1,403	1,709	1,696	1,747	1,790	1,997	2,029	2,097
Vehicle-miles traveled (millions)	31,700	35,100	46,700	68,700	78,100	94,300	115,500	118,900	124,584	128,359	132,384	135,208
Fuel consumed (million gallons)	6,658	7,348	9,177	13,037	14,005	16,133	19,777	20,193	R20,301	25,158	24,537	25,645
Average miles traveled per vehicle (thousands)	40.3	38.8	41.3	48.5	55.7	55.2	68.1	68.1	69.6	64.3	65.3	64.5
Average miles traveled per gallon	4.8	4.8	5.1	5.3	5.6	5.8	5.8	5.9	6.1	5.1	5.4	5.3
Average fuel consumed per vehicle (gallons)	8,465	8,119	8,116	9,201	9,980	9,441	11,663	11,561	R11,342	12,596	12,096	12,232

KEY: R = revised.

[a] Beginning in 1998, the Federal Highway Administration (FHWA) used the Census Bureau's 1997 *Vehicle Inventory and Use Survey* (VIUS) for its baseline estimate of combination trucks. Prior to 1998, the FHWA used the Census Bureau's *1992 Transportation Inventory and Use Survey* (TIUS) for its baseline estimates. Therefore, post-1997 data may not be comparable to 1997 and earlier years.

SOURCES

1965-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.

1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

TABLE 4-15: Bus Fuel Consumption and Travel

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Number registered (thousands)	272	314	378	462	529	593	627	686	695	698	716	729	746
Vehicle-miles traveled (millions)	4,300	4,700	4,500	6,100	6,100	4,500	5,700	6,400	6,600	6,842	R7,007	7,662	7,601
Fuel consumed (million gallons)	827	875	820	1,053	1,018	834	895	968	990	1,027	R1,040	1,148	1,110
Average miles traveled per vehicle (thousands)	16.0	14.9	12.0	13.1	11.5	7.5	9.1	9.4	9.4	9.8	9.8	10.5	10
Average miles traveled per gallon	5.3	5.3	5.5	5.8	6.0	5.4	6.4	6.6	6.6	6.7	6.7	6.7	7
Average fuel consumed per vehicle (gallons)	3,039	2,784	2,172	2,279	1,926	1,405	1,428	1,412	1,425	1,471	R1,454	1,576	1,488

KEY: R = revised.

NOTE
Includes both publicly and privately owned school, transit, and other commercial buses.

SOURCES
1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

TABLE 4-16: Transit Industry Electric Power and Primary Energy Consumption[a] and Travel

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	P2000
Number of vehicles	65,292	61,717	61,298	62,183	75,388	94,368	92,961	115,874	122,362	126,360	123,855	128,516	131,493
Vehicle-miles traveled	2,143	2,008	1,883	2,176	2,287	2,791	3,242	3,550	3,650	3,746	3,794	3,972	4,081
Electric power consumed (million kWh hours)	2,908	2,584	2,561	2,646	2,446	4,216	4,837	5,068	5,007	4,988	5,073	5,237	5,510
Primary energy consumed (thousand gallons)													
Diesel	208,100	248,400	270,600	365,060	431,400	608,738	651,030	678,286	692,714	716,952	739,621	763,369	786,025
Gasoline and other nondiesel fuels[b]	191,900	124,200	68,200	7,576	11,400	45,704	33,906	60,730	61,213	59,463	52,615	48,694	48,284
Compressed natural gas	N	N	N	N	N	N	N	10,740	15,092	23,906	37,268	44,398	54,794

KEY: Btu = British thermal unit; kWh = kilowatt hour; N = data do not exist; P = preliminary.

[a] Prior to 1985, excludes commuter rail, automated guideway, urban ferryboat, demand responsive vehicles, and most rural and smaller systems.

[b] For 1995-96, includes propane, liquid petroleum gas, liquefied natural gas, kerosene, and all other nondiesel fuels except compressed natural gas. 1960 to 1990 data include propane. Series not continuous between 1991 and 1992.

NOTES

The heat equivalent factors used in Btu conversions are: diesel = 138,700 Btu/gallon; electric = 3,412 Btu/kWh, negating electrical system loses (to include electrical system loses, multiply this conversion factor by approximately three) gasoline = 125,000 Btu/gallon.

In January 2000, the American Public Transit Association changed its name to the American Public Transportation Association (APTA). *The Transit Fact Book* is now referred to as the *Public Transportation Fact Book*.

SOURCE

American Public Transportation Association, *Public Transportation Fact Book* (Washington, DC: February 2002), tables 42, 46, 65, 66, 67, and similar tables in earlier editions of the APTA Transit Fact Book.

TABLE 4-17: Class I Rail Freight Fuel Consumption and Travel

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Number in use													
Locomotives[a]	29,031	27,780	27,077	27,846	28,094	22,548	18,835	18,812	19,269	19,684	20,261	20,256	20,028
Cars[b]	1,965,486	1,800,962	1,784,181	1,723,605	1,710,827	1,421,686	1,212,261	1,218,927	1,240,573	1,270,419	1,315,667	1,368,836	1,380,796
Miles traveled (millions)													
Freight train-miles[c]	404	421	427	403	428	347	380	458	469	475	475	490	504
Locomotive unit-miles	N	N	N	1,479	1,531	1,228	1,280	1,445	1,465	1,423	1,440	1,504	1,503
Car-miles	28,170	29,336	29,890	27,656	29,277	24,920	26,159	30,383	31,715	31,660	32,657	33,851	34,590
Average miles traveled per vehicle (thousands)													
Locomotives	N	N	N	53.1	54.5	54.5	68.0	76.8	76.0	72.3	71.1	74.2	75.0
Cars	14.3	16.3	16.8	16.0	17.1	17.5	21.6	24.9	25.6	24.9	24.8	24.7	25.1
Average miles traveled per gallon													
Trains	0.12	0.12	0.12	0.11	0.11	0.11	0.12	0.13	0.13	0.13	0.13	0.13	0.14
Cars	8.13	8.17	8.43	7.56	7.50	8.01	8.40	8.73	8.86	8.86	9.11	9.11	9.35
Fuel consumed (million gallons)	3,463	3,592	3,545	3,657	3,904	3,110	3,115	3,480	3,579	3,575	3,583	3,715	3,700
Average fuel consumed per locomotive[a] (thousand gallons)	119.3	129.3	130.9	131.3	139.0	137.9	165.4	185.0	185.7	181.6	176.8	183.4	184.7

KEY: N = data do not exist; U = data are not available.

[a] For 1960-80, the total includes a small number of steam and electric units, which are not included in the per locomotive fuel consumption figure.

[b] Includes cars owned by Class I railroads, other railroads, and car companies and shippers.

[c] Based on the distance run between terminals and / or stations; does not include yard or passenger train-miles.

SOURCES

All data except for locomotive unit-miles:
Association of American Railroads, *Railroad Facts* (Washington, DC: October 2000), pp. 33, 34, 40, 49, and 51.

Locomotive unit-miles:
1975-90: Ibid., *Railroad Ten-Year Trends* (Washington, DC: Annual issues).
1995-2000: Ibid., *Analysis of Class I Railroads* (Washington, DC: Annual issues), p. 29.

TABLE 4-18: Amtrak Fuel Consumption and Travel

	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Number in use										
Locomotives	355	419	291	318	313	299	332	345	329	378
Cars	1,913	2,128	1,854	1,863	1,722	1,730	1,728	1,962	1,992	1,894
Miles traveled (millions)										
Train-miles	30	30	30	33	32	30	32	33	34	35
Car-miles	253	235	251	301	292	276	288	312	342	368
Locomotive fuel consumed										
Electric (million of kWh hours)	180	254	295	330	304	293	282	275	283	350
Diesel (million gallons)	63	64	65	82	66	71	75	75	74	76
Average miles traveled per car	132,000	110,000	135,000	162,000	170,000	160,000	167,000	159,000	172,000	194,000

KEY: Btu = British thermal unit; kWh = kilowatt hour.

NOTE
The heat equivalent factors used in Btu conversions are: diesel = 138,700 Btu/gallon; electric = 3,412 Btu/kWh, negating electrical system loses (to include electrical system loses, multiply this conversion factor by approximately three).

SOURCES
Number of locomotives and cars:
1975–80: Amtrak, State and Local Affairs Department, personal communication.
1985–2000: Ibid., *Amtrak Annual Report*, Statistical Appendix (Washington, DC: Annual issues).

Miles traveled:
Train-miles:
1975–2000: Amtrak, *Amtrak Annual Report*, Statistical Appendix (Washington, DC: Annual issues).
Car-miles:
1975: Association of American Railroads, *Yearbook of Railroad Facts 1975* (Washington, DC: 1976), p. 40.
1980–85: Amtrak, State and Local Affairs Department and Public Affairs Department, personal communication.
1990–2000: Ibid., Amtrak Corporate Reporting, Route Profitability System, personal communication, Aug. 22, 2001.

Locomotive fuel consumed:
1975–2000: Amtrak, State and Local Affairs Department, personal communication.

TABLE 4-19: U.S. Government Energy Consumption by Agency and Source (Trillion Btu)

	Petroleum								
	Motor gasoline	Distillate and residual fuel oil	Jet fuel and aviation gas	Other[c]	Total	Electricity	Natural gas	Coal and other[d]	Total
FY 1990									
Agriculture	4.6	0.8	0.1	0.2	5.7	2.0	1.7	0.1	9.5
Defense	12.5	218.0	723.9	4.4	958.9	120.6	114.5	47.7	1,241.7
Energy	1.2	2.9	0.4	0.2	4.8	19.1	9.6	10.0	43.5
GSA	0.1	0.7	0.0	0.0	0.8	9.1	2.4	1.9	14.2
Health and Human Services	0.0	2.1	0.0	0.0	2.1	3.4	2.2	0.2	8.0
Interior	2.1	1.2	0.3	1.1	4.6	1.4	1.2	0.2	7.4
Justice	1.8	0.4	0.2	0.0	2.5	1.9	2.2	0.4	7.0
NASA	0.2	0.9	1.5	0.0	2.6	6.6	2.8	0.3	12.3
Postal Service	8.9	4.5	0.0	0.2	13.6	11.8	4.6	0.6	30.6
Transportation	1.8	6.5	5.5	0.1	13.8	3.9	1.1	0.1	19.0
Veterans Affairs	0.4	2.3	0.0	0.0	2.7	7.9	13.0	1.2	24.9
Other[a]	3.5	4.2	1.0	0.0	8.7	8.1	2.4	0.5	19.6
Total	**37.2**	**244.5**	**732.9**	**6.3**	**1,020.9**	**195.8**	**157.8**	**63.1**	**1,437.6**
FY 2000[P]									
Agriculture	3.3	0.2	0.0	0.1	3.6	2.0	1.9	0.3	7.8
Defense	13.5	154.4	439.1	1.6	608.6	103.2	81.7	30.9	824.4
Energy	1.0	1.2	0.2	0.1	2.6	15.9	5.9	4.3	28.7
GSA	0.1	0.1	0.0	0.0	0.2	9.8	6.1	1.5	17.6
Health and Human Services	0.4	0.6	0.0	0.1	1.2	2.9	3.3	0.4	7.8
Interior	2.8	0.9	0.2	1.1	5.0	1.7	1.3	0.1	8.1
Justice	4.8	0.4	1.5	0.0	6.7	4.3	5.3	0.5	16.7
NASA	0.2	0.4	1.1	0.0	1.8	6.0	3.1	0.3	11.1

Continued next page

TABLE 4-19: U.S. Government Energy Consumption by Agency and Source (Trillion Btu) (Continued)

	Petroleum								
	Motor gasoline	Distillate and residual fuel oil	Jet fuel and aviation gas	Other[c]	Total	Electricity	Natural gas	Coal and other[d]	Total
Postal Service	10.4	5.0	0.0	0.0	15.4	18.6	7.4	0.4	41.9
Transportation	0.8	7.3	4.0	0.1	12.1	8.0	0.9	0.0	21.1
Veterans Affairs	1.2	1.2	0.0	0.0	2.4	9.3	14.2	1.5	27.5
Other[b]	2.4	2.8	0.9	0.0	6.2	10.2	3.9	0.6	20.9
Total	**41.1**	**174.4**	**447.1**	**3.3**	**665.9**	**191.8**	**134.9**	**40.9**	**1,033.5**

KEY: Btu = British thermal unit; FY = fiscal year; GSA = General Services Administration; NASA = National Aeronautics and Space Administration; P = preliminary.

[a] Includes U.S. Department of Commerce, Panama Canal Commission, Tennessee Valley Authority, U.S. Department of Labor, U.S. Department of Housing and Urban Development, Federal Communications Commission, Office of Personnel Management, U.S. Department of State, Small Business Administration, National Science Foundation, U.S. Department of Treasury, and Environmental Protection Agency.

[b] Includes National Archives and Records Administration, U.S. Department of Commerce, U.S. Department of Labor, U.S. Department of State, Environmental Protection Agency, Federal Communications Commission, Federal Trade Commission, Panama Canal Commission, Equal Employment Opportunity Commission, Nuclear Regulatory Commission, Office of Personnel Management, U.S. Department of Housing and Urban Development, U.S. Department of Treasury, Tennessee Valley Authority, Railroad Retirement Board, U.S. Information Agency, and Federal Emergency Management Agency.

[c] Includes liquefied petroleum gases.

[d] Includes purchased steam, coal, and other.

NOTES

Numbers may not add to totals due to rounding.These data include energy consumed at foreign installations and in foreign operations, including aviation and ocean bunkering, primarily by the U.S. Department of Defense. U.S. government energy use for electricity generation and uranium enrichment is excluded. Other energy used by U.S. agencies that produce electricity or enriched uranium is included. The U.S. government's fiscal year runs from October 1 through September 30.

This table uses a conversion factor for electricity of 3,412 Btu per kilowatt-hour, and a conversion factor for purchased steam of 1,000 Btu per pound.

SOURCE

U.S. Department of Energy, Energy Information Administration, *Annual Energy Review 2000, DOE/EIA-0384(2000)* (Washington, DC: August 2001), table 1.13. Internet site http://www.eia.doe.gov/emeu/aer/ as of Aug. 30, 2002.

Section C
Transportation Energy Intensity and Fuel Efficiency

TABLE 4-20: Energy Intensity of Passenger Modes (Btu per passenger-mile)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Air, certificated carrier													
Domestic operations	8,633	10,118	10,185	7,746	5,727	5,047	4,932	4,382	4,183	4,166	4,123	4,049	R3,942
International operations	9,199	10,292	10,986	8,465	4,339	5,103	4,546	4,173	4,108	4,168	4,278	4,123	4,009
Highway[a]													
Passenger car	4,495	4,455	4,841	4,743	4,348	4,267	3,812	3,721	3,688	3,657	3,637	3,672	3,578
Other 2-axle 4-tire vehicle	N	N	6,810	6,571	5,709	4,971	4,451	4,538	4,541	4,564	4,569	4,612	4,495
Motorcycle	[b]	[b]	2,500	2,354	2,125	1,896	1,990	2,274	2,271	2,273	2,273	2,273	2,273
Transit motor bus	N	N	N	N	2,742	3,396	3,723	4,155	4,196	4,228	4,133	4,044	P4,147
Amtrak	N	N	N	2,383	2,164	2,094	2,064	1,838	2,148	2,200	2,138	2,107	2,134

KEY: Btu = British thermal unit; N = data do not exist; P = preliminary; R = revised; U = data are not available.

[a] For 1995 and subsequent years, highway passenger-miles were taken directly from *Highway Statistics* rather than derived from vehicle-miles and average occupancy, as is the case for 1960-1994.

[b] Included in passenger car.

NOTES

To calculate total Btu, multiply fuel consumed (see tables 4-21, 4-22, 4-24, 4-25) by 135,000 Btu/gallon for air carrier, 125,000 Btu/gallon for passenger car, other 2-axle 4-tire vehicle, and motorcycle, 138,700 Btu/gallon for transit motor bus and Amtrak diesel consumption, and 3,412 Btu/KwH for Amtrak electric consumption.

SOURCES

Air:

Certificated air carriers:

Passenger-miles:

Air Transport Association, Internet site http://www.air-transport.org/public/industry as of Aug. 30, 2002.

Fuel consumed:

U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, Internet site http://www.bts.gov/oai/fuel/fuelyearly.html as of Aug. 30, 2002.

Highway:

Passenger car:

1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.

1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

Other 2-axle 4-tire vehicle:

1970-90: Ibid., *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.

1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

Motorcycle:

1970-85: Ibid., *Highway Statistics Summary to 1985*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.

1990-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

Transit motor bus:

American Public Transportation Association, *Public Transportation Fact Book* (Washington, DC: February 2002), tables 30 and 65.

Amtrak:

Amtrak, State and Local Affairs Department, personal communication.

TABLE 4-21: Energy Intensity of Certificated Air Carriers, All Services[a]

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Aircraft-miles (millions)														
Domestic operations	858	1,134	2,068	1,948	2,523	3,046	3,963	4,629	4,811	R4,911	R5,035	R5,332	R5,664	5,550
International operations	182	284	475	377	401	415	760	998	1,043	1,114	R1,192	R1,225	R1,282	1,258
Available seat-miles (millions)														
Domestic operations	52,220	94,787	213,160	241,282	346,028	445,826	563,065	603,917	626,389	R651,918	R662,313	R699,330	R727,033	704,756
International operations	13,347	29,533	51,960	61,724	86,507	101,963	170,310	203,160	208,682	R228,689	R237,538	R242,981	R254,048	245,776
Passenger-miles (millions)														
Domestic operations	30,557	51,887	104,147	131,728	200,289	270,584	340,231	394,708	425,596	R450,612	R463,262	R488,357	R516,129	486,459
International operations	8,306	16,789	27,563	31,082	54,363	65,819	117,695	145,948	153,067	R169,356	R172,255	R180,269	R192,798	178,382
Fuel consumed (million gallons)														
Domestic operations	1,954	3,889	7,857	7,558	8,519	10,115	12,429	12,812	13,187	13,660	13,877	14,402	14,845	14,017
International operations	566	1,280	2,243	1,949	1,747	2,488	3,963	4,511	4,658	4,964	5,186	5,250	5,475	5,237
Seats per aircraft														
Domestic operations	60.9	83.6	103.1	123.9	137.1	146.4	142.1	130.5	130.2	R132.7	R131.5	R131.1	R128.4	127.0
International operations	73.3	104.0	109.4	163.7	215.7	245.7	224.1	203.6	200.1	R205.3	R199.2	R198.3	R198.2	195.4
Seat-miles per gallon														
Domestic operations	27	24	27	32	41	44	45	47	48	R48	R48	R49	R49	50
International operations	24	23	23	32	50	41	43	45	45	R46	R46	R46	R46	47
Energy intensity (Btu/passenger-mile)[b]														
Domestic operations	8,633	10,118	10,185	7,746	5,742	5,047	4,932	4,382	4,183	R4,092	R4,044	R3,981	R3,883	3,890
International operations	9,199	10,292	10,986	8,465	4,339	5,103	4,546	4,173	4,108	R3,957	R4,064	R3,932	R3,833	3,964
Load factor (%)														
Domestic operations	58.5	54.7	48.9	54.6	58.0	60.7	60.4	65.4	67.9	69.1	R69.9	69.8	R71.0	69.0
International operations	62.2	56.8	53.0	R50.4	62.8	64.6	69.1	71.8	73.3	74.1	R72.5	R74.2	R75.9	72.6

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

[a] U.S. owned carriers only. Operation of foreign-owned carriers in or out of the United States not included.

[b] Calculation based on unrounded figures not shown here.

TABLE 4-21: Energy Intensity of Certificated Air Carriers, All Services[a] (Continued)

NOTES

Aircraft-miles includes all four air-carrier groups (majors, nationals, large regionals, and medium regionals), scheduled and charter, passenger, and all-cargo. Fuel consumed includes majors, nationals, and large regionals, scheduled and charter, passenger, and all-cargo.

Passenger-miles includes all four air-carrier groups, scheduled and charter, passenger service only.

International operations include operations outside the United States, including those between the United States and foreign countries and the United States and its territories or possessions.

Heat equivalent factor used for Btu conversion is 135,000 Btu/gallon.

SOURCES

Aircraft-miles, available seat-miles, passenger-miles, and load factor:

1960-80: Air Transport Association, Internet site http://www.air-transport.org/public/industry, as of July 31, 2002.

1985-2001: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, *Air Carrier Traffic Statistics* (Washington DC: Annual December issues).

Fuel consumed:

1960-2000: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, Internet site http://www.bts.gov/oai/fuel/fuelyearly.html as of Aug. 12, 2002.

Seats per aircraft, seat-miles per gallon, and energy intensiveness:

Derived by calculation.

TABLE 4-22: Energy Intensity of Passenger Cars, Other 2-Axle 4-Tire Vehicles, and Motorcycles

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Vehicle-miles (millions)													
Passenger car	587,000	723,000	917,000	1,034,000	1,112,000	1,247,000	1,408,000	1,438,000	1,470,000	1,503,000	R1,550,000	1,569,000	1,602,000
Other 2-axle 4-tire vehicle	N	N	123,000	201,000	291,000	391,000	575,000	790,000	817,000	851,000	R868,000	901,000	924,000
Motorcycle	c	c	3,000	5,600	10,200	9,100	9,600	9,800	9,900	10,100	R10,300	10,600	10,500
Passenger-miles (millions)[a]													
Passenger car	1,145,000	1,395,000	1,751,000	1,954,000	2,012,000	2,094,000	2,282,000	2,287,000	2,337,000	2,389,000	R2,464,000	2,495,000	2,547,000
Other 2-axle 4-tire vehicle	N	N	226,000	363,000	521,000	688,000	1,000,000	1,256,000	1,298,000	1,353,000	R1,381,000	1,433,000	1,469,000
Motorcycle	c	c	3,000	6,000	12,000	12,000	12,000	11,000	11,000	11,000	11,000	12,000	12,000
Fuel consumed (million gallons)													
Passenger car	41,171	49,723	67,819	74,140	69,982	71,518	69,568	68,072	69,221	69,892	R71,695	73,283	72,916
Other 2-axle 4-tire vehicle	N	N	12,313	19,081	23,796	27,363	35,611	45,605	47,354	49,388	R50,462	52,859	52,832
Motorcycle	c	c	60	113	204	182	191	196	198	202	R206	212	210
Energy intensity (Btu/passenger-mile)[b]													
Passenger car	4,495	4,455	4,841	4,743	4,348	4,269	3,811	3,721	3,702	3,657	R3,637	3,671	3,579
Other 2-axle 4-tire vehicle	N	N	6,810	6,571	5,709	4,971	4,451	4,539	4,560	4,563	R4,568	4,611	4,496
Motorcycle	a	a	2,500	2,354	2,125	1,896	1,990	2,227	2,250	2,295	R2,341	2,205	2,188

KEY: Btu = British thermal unit; N = data do not exist; R = revised.

[a] Passenger-miles are derived by multiplying vehicle-miles by an average occupancy rate for that vehicle type based on data provided by the Federal Highway Administration, Nationwide Personal Transportation Survey, 1977, 1983, 1995. Average vehicle occupancy rates are as follows:
passenger car (1960-97): 1.95, 1.93, 1.91, 1.89, 1.81, 1.68, 1.62, 1.62, 1.61, 1.61, 1.60, 1.59, 1.59, 1.59;
other 2-axle 4-tire vehicle (1960-97): 1.87, 1.85, 1.83, 1.81, 1.79, 1.76, 1.74, 1.72, 1.70, 1.68, 1.66, 1.64, 1.64, 1.64;
motorcycle (1960-97): 1.1, 1.1, 1.1, 1.1, 1.2, 1.3, 1.3, 1.27, 1.25, 1.23, 1.21, 1.18, 1.18, 1.18.

[b] Energy Intensity (Btu/passenger-mile) is calculated by converting the fuel consumption in gallons to the energy equivalent Btu units and dividing by the passenger-miles. The heat equivalent factor used for Btu conversion is 125,000 Btus/gallon.

[c] Included in passenger car.

NOTES

In 1995, the U.S. Department of Transportation, Federal Highway Administration revised its vehicle type categories for 1993 and later data.
These new categories include passenger car, other 2-axle 4-tire vehicle, single-unit 2-axle 6-tire or more truck, and combination truck.
Other 2-axle 4-tire vehicle includes vans, pickup trucks, and sport utility vehicles. In previous years, some minivans and sport utility vehicles were included in the passenger car category. Single-unit 2-axle 6-tire or more trucks are on a single frame with at least 2 axles and 6 tires. Pre-1993 data have been reassigned to the closest available category.
Data for vehicle-miles and passenger-miles have been rounded to the nearest billion miles to accommodate the uncertainties associated with these estimates.

SOURCES

Vehicle-miles:
Passenger car:
1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

TABLE 4-22: Energy Intensity of Passenger Cars, Other 2-Axle 4-Tire Vehicles, and Motorcycles (Continued)

Other 2-axle 4-tire vehicle:
1960-90: Ibid., *Highway Statistics, Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.
Motorcycle:
1970-85: Ibid., *Highway Statistics, Summary to 1985* (Washington, DC: 1986), table VM-201A.
For 1970-90, the unrevised motorcycle vehicle-miles are subtracted from the combined passenger car and motorcycle vehicle-miles from VM-201A.
1990-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

Passenger-miles:
1960-97: Vehicle-miles multiplied by vehicle occupancy rates.
1998-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

Fuel consumed:
1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.
For 1970-90, the unrevised motorcycle fuel consumed is subtracted from the combined passenger car and motorcycle fuel consumed from VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

TABLE 4-23: Average Fuel Efficiency of U.S. Passenger Cars and Light Trucks

	1980	1985	1990	1995	1996	1997	1998	1999	2000
Average U.S. passenger car fuel efficiency (mpg) (calendar year)									
Passenger car[a]	16.0	17.5	20.3	21.1	21.2	21.5	21.6	21.4	22.0
Other 2-axle 4-tire vehicle	12.2	14.3	16.1	17.3	17.2	17.2	17.2	[R]17.0	17.5
New vehicle fuel efficiency (mpg)[b] (model year)									
Light-duty vehicle									
Passenger car	24.3	27.6	28.0	28.6	28.5	28.7	28.8	28.3	28.5
Domestic	22.6	26.3	26.9	27.7	28.1	27.8	28.6	28.0	28.5
Imported	29.6	31.5	29.9	30.3	29.6	30.1	29.2	29.0	28.3
Light truck (<8,500 lbs GVWR)[c]	18.5	20.7	20.8	20.5	20.8	20.6	21.1	20.9	21.2
CAFE standards (mpg)[b] (model year)									
Passenger car	20.0	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
Light truck	[d]16.0/14.0	19.5	20.0	20.6	20.7	20.7	20.7	20.7	20.7

KEY: CAFE = Corporate Average Fuel Economy; GVWR = gross vehicle weight rating; mpg = miles per gallon; N = data do not exist; R = revised.

[a] From 1980 to 1994, passenger car fuel efficiency includes motorcycles.

[b] Assumes 55% city and 45% highway-miles. The source calculated average miles per gallon for light-duty vehicles by taking the reciprocal of the sales-weighted average of gallons per mile. This is called the harmonic average.

[c] Beginning with FY 1999, the total light truck fleet ceased to be categorized by either domestic or import fleets.

[d] 2 Wheel Drive/4 Wheel Drive. No combined figure available for this year.

NOTE
The fuel efficiency figures for light duty vehicles represent the sales-weighted harmonic average of the combined passenger car and light truck fuel economies.

SOURCES
Average U.S. passenger car fuel efficiency:
1980-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A (Revised data obtained from Internet site http://www.fhwa.dot.gov/ohim/ohimstat.htm as of Aug. 2, 2001).
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

New vehicle fuel efficiency (based on model year production):
1980-2000: U.S. Department of Transportation, National Highway Traffic Safety Administration, *Automotive Fuel Economy Program, Annual Update Calendar Year 2000,* table II-6, Internet site www.nhtsa.dot.gov/cars/problems/studies/fuelecon/index.html as of Aug. 2, 2002.

CAFE standards:
1980-2000: U.S. Department of Transportation, National Highway Traffic Safety Administration, *Automotive Fuel Economy Program, Annual Update Calendar Year 2000*, table I-1, Internet site www.nhtsa.dot.gov/cars/problems/studies/fuelecon/index.html as of Aug. 2, 2002.

TABLE 4-24: Energy Intensity of Transit Motor Buses

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	P2000
Vehicle-miles (millions)	1,576	1,528	1,409	1,526	1,677	1,863	2,130	2,184	R2,221	R2,245	R2,175	2,276	2,315
Passenger-miles (millions)	N	N	N	N	21,800	21,200	R20,981	R18,818	R19,096	R19,604	R20,360	21,205	21,241
Fuel consumed (million gallons diesel)	208	248	271	365	431	518	563	564	578	R598	607	618	635
Energy intensity (Btu/passenger-mile)	N	N	N	N	2,742	3,389	R3,723	R4,155	R4,196	R4,228	R4,133	R4,044	4,147

KEY: Btu = British thermal unit; N = data do not exist; P = preliminary; R = revised.

NOTES

Heat equivalent factor used for Btu conversion is 138,700 Btu/gallon.

In January 2000, the American Public Transit Association changed its name to the American Public Transportation Association. The *Transit Fact Book* is now referred to as the *Public Transportation Fact Book*.

SOURCE

American Public Transportation Association, *Public Transportation Fact Book* (Washington, DC: February 2001), tables 30, 42 and 65, and similar tables in earlier editions of the *Transit Fact Book*.

TABLE 4-25: Energy Intensity of Class I Railroad[a] Freight Service

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001[P]
Revenue freight ton-miles (millions)	572,309	697,878	764,809	754,252	918,958	876,984	1,033,969	1,305,688	1,355,975	1,348,926	1,376,802	1,433,461	1,465,960	1,473,957
Car-miles (millions)	28,170	29,336	29,890	27,656	29,277	24,920	26,159	30,383	31,715	31,660	32,657	33,851	34,590	34,243
Tons per car load	44	49	55	61	67	68	67	65	67	63	64	63	63	U
Fuel consumed (million gallons)	3,463	3,592	3,545	3,657	3,904	3,110	3,115	3,480	3,579	3,575	3,583	3,715	3,700	3,633
Energy intensity (Btu/revenue freight ton-mile)	839	714	643	672	589	492	418	370	366	368	361	359	350	342
Energy intensity (Btu/car-mile)	17,051	16,983	16,450	18,341	18,495	17,310	16,516	15,886	15,652	15,662	15,218	15,222	14,836	14,715

KEY: Btu = British thermal unit; P = preliminary; U = data are not available.

[a] Class I railroads are those that have operating revenues of $267 million or more.

NOTE
The heat equivalent factor used for Btu conversion is 138,700 Btu/gallon.

SOURCE
Association of American Railroads, *Railroad Facts* (Washington, DC: November 2001), pp. 34, 37, and 40, and personal communication, Aug. 12, 2002.

TABLE 4-26: Energy Intensity of Amtrak Services

	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Revenue passenger-miles (millions)	3,931	4,503	4,785	6,057	5,545	5,050	5,166	5,304	5,330	5,498	U
Locomotive fuel consumed											
Total fuel consumed (billion Btu)[a]	9,367	9,673	9,995	12,512	10,191	10,875	11,365	11,341	11,229	11,735	11,674
Electric (millions of kWh)[a]	180	254	295	330	304	293	282	275	283	350	377
Diesel (million gallons)	63	64	65	82	66	71	75	75	74	76	75
Energy intensity (Btu/revenue passenger-mile)[a]	2,383	2,148	2,089	2,066	1,838	2,153	2,200	2,138	2,107	2,134	U

KEY: Btu = British thermal unit; kWh = kilowatt hour; U = data are not available.

[a] Does not include electric power generation and distribution losses, which, if included, would triple the electric conversion factor given below and increase the numbers in this row by about 20 percent.

NOTE
The heat equivalent factors used in Btu conversion are: diesel = 138,700 Btu/gallon; electric = 3,412 Btu/kWh.

SOURCES
Revenue passenger-miles:
Amtrak, *Amtrak Annual Report*, Statistical Appendix (Washington, DC: Annual issues).

Locomotive fuel consumed:
1975-2001: Ibid., State and Local Affairs Department, personal communication.

TABLE 4-27: Annual Wasted Fuel Due to Congestion[a]

Population Group	Urban area	Gallons wasted (millions)									Percent change			
											Short-term 1994-2000		Long-term 1982-2000	
		1982	1985	1990	1995	1996	1997	1998	1999	2000	Percent	Rank	Percent	Rank
Medium	Albany-Schenectady-Troy, NY	R0	R0	R2	4	R4	R4	R4	R5	5	67	33	NM	57
Medium	Albuquerque, NM	2	R4	R6	R14	R17	R20	R21	R23	19	58	35	850	21
Small	Anchorage, AK	0	0	0	0	0	0	0	0	0	NM	68	NM	57
Large	Atlanta, GA	R16	R28	R42	R111	R125	R138	R156	R144	166	71	29	938	19
Medium	Austin, TX	R3	R7	R8	R17	R22	R29	R25	R30	35	133	6	1,067	13
Small	Bakersfield, CA	0	0	R0	R1	R2	R2	R2	R2	3	NM	68	NM	57
Large	Baltimore, MD	R11	R18	R49	R61	R65	R69	R64	R67	75	32	51	582	28
Small	Beaumont, TX	0	R0	R0	R0	R0	R0	R1	R1	1	NM	68	NM	57
Medium	Birmingham, AL	2	3	5	10	12	13	15	15	17	70	31	750	24
Very large	Boston, MA	R40	R54	R90	R111	R115	R122	R123	R130	136	23	58	240	50
Small	Boulder, CO	0	0	0	0	0	0	0	0	0	NM	68	NM	57
Small	Brownsville, TX	0	0	0	0	0	0	0	0	0	NM	68	NM	57
Large	Buffalo-Niagara Falls, NY	R2	R2	R5	R5	R5	R5	R5	R7	9	80	24	350	39
Small	Charleston, SC	2	4	6	6	6	6	7	8	9	50	42	350	39
Medium	Charlotte, NC	R2	R5	R7	R12	R13	R17	R18	R20	24	118	8	1,100	12
Very large	Chicago, IL-Northwestern, IN	R76	R130	R220	R261	R341	R321	R351	R347	345	53	38	354	38
Large	Cincinnati, OH-KY	R3	R6	R15	R26	R31	R38	R39	R40	44	63	34	1,367	8
Large	Cleveland, OH	R2	R2	R9	R27	R33	R38	R30	R31	29	53	40	1,350	9
Small	Colorado Springs, CO	0	R0	R0	R4	R5	R5	R7	R8	9	200	3	NM	57
Large	Columbus, OH	R2	R4	R13	R26	R28	R33	R33	R36	31	35	50	1,450	6
Small	Corpus Christi, TX	R0	R0	R0	R0	R0	R1	R1	R1	1	NM	68	NM	57
Very large	Dallas-Fort Worth, TX	R24	R59	R93	R137	R146	R143	R175	R242	228	84	22	850	21
Large	Denver, CO	R16	R20	R31	R64	R74	R84	R92	R96	105	106	9	556	31
Very large	Detroit, MI	R40	R46	R127	R168	R168	R174	R176	R171	166	-6	65	315	44
Medium	El Paso, TX-NM	R0	R0	R2	R5	R4	R5	R6	R7	10	100	10	NM	57
Small	Eugene-Springfield, OR	0	0	0	R0	R0	R0	R0	R2	2	NM	68	NM	57
Large	Fort Lauderdale-Hollywood-Pompano Bch, FL	R6	R7	R18	R31	R37	R43	R44	R53	68	152	4	1,033	15
Small	Fort Myers-Cape Coral, FL	0	0	0	2	2	3	3	4	4	100	10	NM	57
Medium	Fresno, CA	2	R2	R6	R5	R5	R6	R7	R8	10	150	5	400	35
Medium	Hartford-Middletown, CT	R3	R7	R7	R6	R7	R8	R9	R11	12	100	10	300	47
Medium	Honolulu, HI	R5	R6	R16	R17	R17	R15	R17	R17	13	-24	67	160	54

TABLE 4-27: Annual Wasted Fuel Due to Congestion[a] (Continued)

Population Group	Urban area	Gallons wasted (millions)									Percent change: Short-term 1994-2000		Percent change: Long-term 1982-2000	
		1982	1985	1990	1995	1996	1997	1998	1999	2000	Percent	Rank	Percent	Rank
Very large	Houston, TX	R78	R132	R115	R134	R151	R187	R182	R214	199	52	41	155	55
Large	Indianapolis, IN	R2	R3	R6	R32	R38	R41	R33	R32	35	25	54	1,650	4
Medium	Jacksonville, FL	R4	R5	R11	R24	R24	R25	R21	R21	21	11	63	425	33
Large	Kansas City, MO-KS	R1	R3	R7	R15	R17	R19	R21	R26	23	35	49	2,200	2
Small	Laredo, TX	0	0	0	0	0	0	R0	R0	0	NM	68	NM	57
Large	Las Vegas, NV	R2	R4	R13	R19	R23	R26	R29	R31	34	89	19	1,600	5
Very large	Los Angeles, CA	R355	R474	R1,078	R1,018	R1,130	R1,096	R1,182	R1,166	1,188	25	57	235	51
Medium	Louisville, KY-IN	R5	R6	R7	R17	R24	R26	R27	R31	31	48	44	520	32
Medium	Memphis, TN-AR-MS	R2	R2	R7	R17	R17	R21	R21	R22	25	79	26	1,150	11
Large	Miami-Hialeah, FL	R24	R31	R62	R86	R88	R95	R92	R95	115	31	52	379	37
Large	Milwaukee, WI	R5	R7	R12	R24	R25	R26	R29	R32	34	79	25	580	29
Large	Minneapolis-St. Paul, MN	R5	R10	R29	R63	R65	R90	R94	R104	108	93	17	2,060	3
Medium	Nashville, TN	R5	R6	R9	R15	R17	R19	R18	R22	24	85	21	380	36
Large	New Orleans, LA	R7	R9	R12	R20	R20	R20	R20	R20	19	-14	66	171	53
Very large	New York, NY-Northeastern, NJ	R157	R180	R472	R484	R507	R558	R584	R631	658	53	39	319	42
Large	Norfolk-Newport News-Virginia Beach, VA	R9	R14	R20	R27	R31	R31	R35	R37	30	20	60	233	52
Large	Oklahoma City, OK	R1	R2	R3	R7	R8	R10	R12	R14	11	120	7	1,000	17
Medium	Omaha, NE-IA	R1	R2	R5	R6	R8	R8	R10	R11	11	83	23	1,000	17
Large	Orlando, FL	R6	R11	R16	R32	R36	R40	R47	R47	58	87	20	867	20
Small	Pensacola, FL	0	0	2	4	4	4	4	4	5	25	54	NM	57
Very large	Philadelphia, PA-NJ	R31	R40	R61	R91	R94	R98	R112	R116	115	40	47	271	48
Large	Phoenix, AZ	R17	R20	R43	R57	R75	R84	R79	R105	115	92	18	576	30
Large	Pittsburgh, PA	R11	R12	R18	R21	R21	R21	R22	R24	20	18	61	82	56
Large	Portland-Vancouver, OR-WA	R5	R6	R17	R36	R43	R48	R49	R53	57	78	27	1,040	14
Medium	Providence-Pawtucket, RI-MA	R2	R6	R12	R16	R20	R17	R22	R26	29	93	16	1,350	9
Medium	Richmond, VA	0	2	5	10	11	11	12	12	11	57	37	NM	57
Medium	Rochester, NY	R0	R0	R1	R3	R4	R4	R3	R4	4	100	10	NM	57
Large	Sacramento, CA	R6	R10	R27	R30	R37	R34	R36	R38	46	39	48	667	25
Small	Salem, OR	0	0	R0	R0	R1	R2	R2	R2	2	100	10	NM	57
Medium	Salt Lake City, UT	R1	R2	R6	R13	R13	R12	R12	R13	15	25	54	1,400	7
Large	San Antonio, TX	R6	R12	R12	R20	R20	R22	R28	R38	42	250	2	600	26

Continued next page

TABLE 4-27: Annual Wasted Fuel Due to Congestion[a] (Continued)

Population Group	Urban area	Gallons wasted (millions)									Percent change			
											Short-term 1994-2000		Long-term 1982-2000	
		1982	1985	1990	1995	1996	1997	1998	1999	2000	Percent	Rank	Percent	Rank
Large	San Bernardino-Riverside, CA	R6	R12	R39	R46	R50	R53	R62	R60	68	58	36	1,033	15
Large	San Diego, CA	R12	R23	R68	R64	R68	R81	R78	R96	112	78	28	833	23
Very large	San Francisco-Oakland, CA	R67	R130	R220	R198	R201	R186	R213	R223	270	71	30	303	46
Large	San Jose, CA	R22	R45	R93	R67	R67	R63	R72	R83	89	46	45	305	45
Large	Seattle-Everett, WA	R22	R38	R72	R97	R109	R115	R115	R121	112	20	59	409	34
Small	Spokane, WA	R0	R0	R0	R2	R2	R2	R3	R3	3	50	42	NM	57
Large	St. Louis, MO-IL	R17	R25	R29	R56	R56	R61	R63	R66	71	42	46	318	43
Medium	Tacoma, WA	R2	R2	R8	R12	R12	R12	R12	R16	14	17	62	600	26
Large	Tampa-St Petersburg-Clearwater, FL	R17	R21	R37	R61	R61	R59	R58	R63	62	0	64	265	49
Medium	Tucson, AZ	R0	R2	R4	R7	R9	R11	R12	R12	12	100	10	NM	57
Medium	Tulsa, OK	0	2	4	5	5	6	7	8	11	267	1	NM	57
Large	W Palm Bch-Boca Raton-Delray Bch, FL	1	3	10	20	23	22	29	32	34	70	31	3,300	1
Very large	Washington, DC-MD-VA	R46	R67	R113	R162	R177	R175	R202	R211	198	29	53	330	41
	75-Area Average	R16	R24	R47	R57	R63	R65	R69	R73	a75	43		361	
	Very Large Area Average	R91	R131	R259	R276	R303	R306	R330	R345	a350	38		283	
	Large Area Average	R9	R14	R28	R42	R46	R50	R52	R56	a61	57		595	
	Medium Area Average	R2	R3	R7	R11	R13	R14	R14	R16	a17	66		761	
	Small Area Average	0	R0	1	R1	2	R2	R2	R3	a3	117		1,850	

KEY: NM = not meaningful; R = revised. Very large urban areas - over 3 million population. Large urban areas - over 1 million and less than 3 million population. Medium urban areas - over 500,000 and less than 1 million population. Small urban areas - less than 500,000 population.

[a] The wasted fuel for each urban area category for 2000 was obtained from table A-6 of TTI's *The 2002 Annual Urban Mobility Report* referenced below. The wasted fuel for all other years was calculated using raw data obtained from internet site http://mobility.tamu.edu as of Aug. 5, 2002, where the total annual wasted fuel for each year and urban area was divided by the number of cities in that particular urban area.

NOTES

"Wasted" fuel is the difference between the fuel consumed under estimated existing conditions and the fuel consumed if all traffic was moving at free-flow conditions. Calculations are made for peak period speeds and for free-flow speeds on both the freeway and principal arterial systems.

For a more detailed description of the formulas used, see the source document.

The cities shown represent the 50 largest metropolitan areas, as well as others chosen by the states sponsoring the study.

Percent changes for area averages were calculated before rounding.

SOURCE

1982-2000: Texas Transportation Institute, *The 2002 Annual Urban Mobility Report* (College Station, TX: 2002).

TABLE 4-28: Wasted Fuel Per Person

Population group	Urban area	Gallons wasted									Percent change			
											Short-term 1994-2000		Long-term 1982-2000	
		1982	1985	1990	1995	1996	1997	1998	1999	2000	Percent	Rank	Percent	Rank
Medium	Albany-Schenectady-Troy, NY	R0	R0	R4	8	R8	R8	R8	R10	10	67	16	NM	57
Medium	Albuquerque, NM	5	R9	R12	R25	R30	R35	R36	R39	32	45	37	540	18
Small	Anchorage, AK	0	0	0	0	0	0	0	0	0	NM	68	NM	57
Large	Atlanta, GA	R10	R17	R20	R45	R51	R53	R56	R50	56	40	42	460	26
Medium	Austin, TX	R7	R15	R15	R28	R35	R43	R36	R43	48	92	7	586	16
Small	Bakersfield, CA	0	0	R0	R3	R5	R5	R5	R5	7	NM	68	NM	57
Large	Baltimore, MD	R6	R10	R25	R29	R30	R32	R30	R31	35	30	49	483	24
Small	Beaumont, TX	0	R0	R0	R0	R0	R0	R7	R7	7	NM	68	NM	57
Medium	Birmingham, AL	3	5	8	15	18	20	23	23	25	56	28	733	13
Very large	Boston, MA	R14	R20	R30	R37	R38	R40	R41	R43	45	22	53	221	46
Small	Boulder, CO	0	0	0	0	0	0	0	0	0	NM	68	NM	57
Small	Brownsville, TX	0	0	0	0	0	0	0	0	0	NM	68	NM	57
Large	Buffalo-Niagara Falls, NY	R2	R2	R5	R5	R5	R5	R5	R6	8	60	25	300	33
Small	Charleston, SC	6	11	15	14	14	14	16	18	20	43	40	233	44
Medium	Charlotte, NC	R6	R14	R16	R22	R23	R29	R29	R32	37	76	12	517	20
Very large	Chicago, IL-Northwestern, IN	R11	R18	R29	R34	R43	R40	R44	R43	43	48	35	291	34
Large	Cincinnati, OH-KY	R3	R5	R13	R21	R25	R30	R31	R31	34	55	30	1,033	9
Large	Cleveland, OH	R1	R1	R5	R15	R18	R20	R16	R16	15	50	32	1,400	6
Small	Colorado Springs, CO	0	R0	R0	R10	R13	R12	R16	R18	19	138	3	NM	57
Large	Columbus, OH	R2	R5	R15	R26	R27	R32	R32	R35	30	30	48	1,400	6
Small	Corpus Christi, TX	R0	R0	R0	R0	R0	R3	R3	R3	3	NM	68	NM	57
Very large	Dallas-Fort Worth, TX	R10	R21	R30	R42	R41	R40	R48	R65	60	58	26	500	22
Large	Denver, CO	R12	R13	R20	R37	R42	R47	R50	R52	55	83	10	358	31
Very large	Detroit, MI	R10	R12	R32	R42	R42	R43	R44	R43	41	-7	64	310	32
Medium	El Paso, TX-NM	R0	R0	R4	R8	R7	R8	R9	R11	15	67	16	NM	57
Small	Eugene-Springfield, OR	0	0	R0	R0	R0	R0	R0	R9	9	NM	68	NM	57
Large	Fort Lauderdale-Hollywood-Pompano Bch, FL	R6	R6	R14	R22	R26	R29	R30	R35	44	120	5	633	14
Small	Fort Myers-Cape Coral, FL	0	0	0	8	8	11	11	15	14	75	13	NM	57
Medium	Fresno, CA	6	R5	R13	R10	R9	R11	R13	R15	18	125	4	200	49
Medium	Hartford-Middletown, CT	R5	R12	R11	R10	R11	R13	R14	R17	19	90	8	280	37
Medium	Honolulu, HI	R9	R10	R24	R24	R24	R21	R24	R24	19	-21	67	111	54

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TABLE 4-28: Wasted Fuel Per Person (Continued)

Population group	Urban area	Gallons wasted									Percent change			
											Short-term 1994-2000		Long-term 1982-2000	
		1982	1985	1990	1995	1996	1997	1998	1999	2000	Percent	Rank	Percent	Rank
Very large	Houston, TX	R33	R55	R40	R45	R49	R60	R57	R65	59	31	47	79	56
Large	Indianapolis, IN	R2	R3	R6	R32	R38	R40	R33	R31	34	17	55	1,600	1
Medium	Jacksonville, FL	R7	R8	R15	R30	R29	R30	R25	R25	24	0	63	243	41
Large	Kansas City, MO-KS	R1	R3	R6	R11	R13	R14	R15	R19	16	23	51	1,500	4
Small	Laredo, TX	0	0	0	0	0	0	R0	R0	0	NM	68	NM	57
Large	Las Vegas, NV	R4	R8	R19	R20	R23	R25	R26	R27	28	40	42	600	15
Very large	Los Angeles, CA	R36	R45	R94	R84	R92	R89	R95	R93	94	18	54	161	51
Medium	Louisville, KY-IN	R6	R8	R9	R21	R29	R31	R33	R37	37	48	36	517	20
Medium	Memphis, TN-AR-MS	3	R3	R8	R18	R18	R22	R22	R23	26	73	14	767	12
Large	Miami-Hialeah, FL	R14	R17	R34	R43	R43	R46	R44	R45	51	13	57	264	40
Large	Milwaukee, WI	R4	R6	R10	R19	R20	R20	R22	R24	25	67	16	525	19
Large	Minneapolis-St. Paul, MN	R3	R6	R14	R28	R29	R39	R41	R45	44	69	15	1,367	8
Medium	Nashville, TN	R10	R11	R16	R24	R26	R29	R27	R32	34	62	24	240	42
Large	New Orleans, LA	R7	R9	R11	R18	R18	R18	R18	R18	17	-15	66	143	53
Very large	New York, NY-Northeastern, NJ	R10	R12	R30	R30	R31	R34	R36	R38	39	44	38	290	35
Large	Norfolk-Newport News-Virginia Beach, VA	R8	R12	R15	R19	R22	R22	R24	R25	20	11	59	150	52
Large	Oklahoma City, OK	R2	R3	R4	R8	R8	R10	R12	R13	10	67	16	400	27
Medium	Omaha, NE-IA	R2	R4	R9	R11	R14	R14	R17	R18	18	64	22	800	11
Large	Orlando, FL	R10	R16	R19	R31	R34	R36	R42	R41	48	55	29	380	28
Small	Pensacola, FL	0	0	8	14	14	14	14	13	16	7	62	NM	57
Very large	Philadelphia, PA-NJ	R8	R10	R14	R20	R21	R22	R25	R25	25	39	45	213	47
Large	Phoenix, AZ	R12	R12	R23	R26	R32	R35	R32	R41	44	57	27	267	39
Large	Pittsburgh, PA	R6	R7	R10	R12	R12	R12	R12	R13	11	10	60	83	55
Large	Portland-Vancouver, OR-WA	R4	R5	R14	R27	R32	R33	R33	R36	38	52	31	850	10
Medium	Providence-Pawtucket, RI-MA	R2	R7	R14	R18	R22	R19	R24	R29	32	88	9	1,500	4
Medium	Richmond, VA	0	4	9	16	18	18	19	19	17	42	41	NM	57
Medium	Rochester, NY	R0	R0	R2	R5	R6	R6	R5	R6	6	100	6	NM	57
Large	Sacramento, CA	R7	R11	R25	R24	R29	R26	R27	R28	33	22	52	371	29
Small	Salem, OR	0	0	R0	R0	R6	R11	R11	R11	10	67	16	NM	57
Medium	Salt Lake City, UT	R1	R3	R8	R16	R15	R14	R13	R15	17	13	57	1,600	1
Large	San Antonio, TX	R6	R12	R10	R16	R16	R18	R23	R31	34	240	2	467	25

TABLE 4-28: Wasted Fuel Per Person (Continued)

Population group	Urban area	Gallons wasted									Percent change			
											Short-term 1994-2000		Long-term 1982-2000	
		1982	1985	1990	1995	1996	1997	1998	1999	2000	Percent	Rank	Percent	Rank
Large	San Bernardino-Riverside, CA	R7	R13	R32	R34	R37	R39	R44	R43	48	50	32	586	16
Large	San Diego, CA	R7	R12	R30	R25	R27	R31	R29	R36	41	64	21	486	23
Very large	San Francisco-Oakland, CA	R20	R39	R60	R51	R52	R47	R53	R55	67	63	23	235	43
Large	San Jose, CA	R17	R34	R66	R43	R42	R39	R44	R50	53	33	46	212	48
Large	Seattle-Everett, WA	R15	R25	R42	R50	R56	R59	R58	R61	56	14	56	273	38
Small	Spokane, WA	R0	R0	R0	R6	R6	R6	R9	R9	9	50	32	NM	57
Large	St. Louis, MO-IL	R9	R13	R15	R28	R28	R31	R32	R33	35	40	42	289	36
Medium	Tacoma, WA	R5	R4	R15	R21	R20	R20	R20	R27	23	10	61	360	30
Large	Tampa-St Petersburg-Clearwater, FL	R12	R14	R22	R33	R33	R32	R31	R33	32	-9	65	167	50
Medium	Tucson, AZ	R0	R4	R8	R11	R14	R17	R18	R18	18	80	11	NM	57
Medium	Tulsa, OK	0	4	6	7	7	8	9	10	14	250	1	NM	57
Large	W Palm Bch-Boca Raton-Delray Bch, FL	2	4	13	23	26	24	30	32	33	43	39	1,550	3
Very large	Washington, DC-MD-VA	R17	R23	R36	R47	R51	R50	R58	R60	56	27	50	229	45
	75-Area Average	R6	R9	R16	R21	R23	R25	R26	R28	[a]43	114		612	
	Very Large Area Average	R17	R26	R40	R43	R46	R47	R50	R53	a55	36		225	
	Large Area Average	R7	R10	R19	R26	R28	R30	R31	R33	a37	52		452	
	Medium Area Average	R4	R6	R11	R17	R18	R20	R20	R23	a24	58		555	
	Small Area Average	R0	R1	R2	R4	R5	R5	R7	R8	a10	146		2,233	

KEY: NM = not meaningful; R = revised. Very large urban areas - over 3 million population. Large urban areas - over 1 million and less than 3 million population. Medium urban areas - over 500,000 and less than 1 million population. Small urban areas - less than 500,000 population.

[a] The average of the wasted fuel per person for each urban area category for 2000 was obtained from table A-6 of TTI's *The 2002 Annual Urban Mobility Report* referenced below. For all other years it was calculated using raw data obtained from internet site http://mobility.tamu.edu as of Aug. 5, 2002, where the total annual wasted fuel per person for each year and urban area was divided by the number of cities in that particular urban area.

NOTES

"Wasted" fuel is the difference between the fuel consumed under estimated existing conditions and the fuel consumed if all traffic was moving at free-flow conditions.

Calculations are made for peak period speeds and for free-flow speeds on both the freeway and principal arterial system.

For a more detailed description of the formulas used, see the source document.

The cities shown represent the 50 largest metropolitan areas, as well as others chosen by the states sponsoring the study.

Percent changes for area averages were calculated before rounding.

SOURCE

1982 - 2000: Texas Transportation Institute, *The 2001 Annual Urban Mobility Report* (College Station, TX: 2001) from Internet site http://mobility.tamu.edu as of Aug. 5, 2002.

Section D
Air Pollution

TABLE 4-29: Federal Exhaust Emission Certification Standards for Newly Manufactured Gasoline- and Diesel-Powered Light-Duty Vehicles[a,b] (Grams per mile)

Engine type and pollutant	Prior to control[e]	1968-1969	1970-1971	1972	1973-1974	1975-1976	1977-1979	1980	1981	1982-1986	1987-1993	Tier 1[i] 1994-2003[b]	Interim Tier 2[i] 2004-2006	Tier 2[i] 2007+
Gasoline														
HC (total)	11	g	2.2	3.4		1.5		0.41				0.41 ([h])	h	
NMHC	f	h										0.25 (0.31)	h	
NMOG	f	h											0.125 (0.156)	0.100 (0.125)
CO	80	g	23	39		15		7.0	3.4			3.4 (4.2)		
Cold-temp. CO[c]	f	h										10 ([h])		
NO_x	4	h			3.0	3.1	2.0		1.0			0.4 (0.6)		0.14 (0.20)
Particulates	f	h										0.08 (0.10)	0.08 (0.08)	0.02 (0.02)
Formaldehyde	f	h											0.015 (0.018)	
Diesel														
HC (total)	11	h				1.5		0.41				0.41 ([h])	h	
NMHC	f	h										0.25 (0.31)	h	
NMOG	f	h										h	(0.156)	0.100 (0.125)
CO	80	h				15		7.0	3.4			3.4 (4.2)	h (4.2)	3.4 (4.2)
NO_x	4	h				3.1	2.0		1.0			1.0 (1.25)	h (0.6)	0.14 (0.20)
Particulates	f	h								0.60	0.20	0.08 (0.10)	h (0.10)	0.02 (0.02)
Formaldehyde	f	h										h	(0.018)	0.015 (0.018)
Test procedure		7-mode		CVS-72		CVS-75								
Useful life (intermediate)[b,d]		h										5 years/50,000 miles		
(full)		5 years/50,000 miles										10 years/100,000 miles		10 years/ 120,000 miles

KEY: CO = carbon monoxide; CVS = constant volume sampler; HC = hydrocarbons; NMHC = nonmethane hydrocarbons; NMOG = nonmethane organic gases; NO_x = nitrogen oxides.

[a] The test procedure for measuring exhaust emissions has changed several times over the course of vehicle emissions regulations. The 7-mode procedure was used through model year 1971 and was replaced by the CVS-72 procedure beginning in model year 1972. The CVS-75 procedure became the test procedure as of model year 1975. While it may appear that the total HC and CO standards were relaxed in 1972-74, these standards were actually more stringent due to the more stringent nature ofthe CVS-72 test procedure. Additional standards for CO and composite standards for NMHC and NO_x tested under the new Supplemental Federal Test Procedure will be phased-in beginning with model year 2000; these standards are not shown in this table.

[b] All emissions standards must be met for a useful life of 5 years/50,000 miles. Beginning with model year 1994, a second set of emissions standards must also be met for a full useful life of 10 years/100,000 miles; these standards are shown in parentheses. Tier 1 exhaust standards were phased-in during 1994-96 at a rate of 40%, 80%, and 100%, respectively.

[c] The cold CO emissions standard is measured at 20 °F (rather than 75 °F) and is applicable for a 5-year/50,000-mile useful life.

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TABLE 4-29: Federal Exhaust Emission Certification Standards for Newly Manufactured Gasoline- and Diesel-Powered Light-Duty Vehicles[a,b] (Grams per mile) (Continued)

[d] Manufacturers can opt to certify vehicles for a full useful life of 15 years/150,000 miles and have either 1) intermediate useful life standards waived or 2) receive additional NO_x credits.

[e] The "Prior to control" column reports emissions estimates of a typical newly manufactured car in the years before exhaust emissions certification standards were implemented.

[f] No estimate available.

[g] In 1968-69, exhaust emissions standards were issued in parts per million rather than grams per mile and are, therefore, incompatible with this table.

[h] No standard has been set.

[i] The term "tier" refers to a level of standards and is associated with specific years. Interim Tier 2 refers to an intermediate level of standards that move manufacturers toward compliance with Tier 2 standards. Interim Tier 2 and Tier 2 standards are established as "bins." Each bin is a set of standards for NO_x, CO, NMOG, formaldehyde, and particulate matter; HC and NMHC standards are dropped for Tier 2 and Interim Tier 2. Manufacturers may certify any given vehicle family to any of the bins available for that vehicle class as long as the resulting sales-weight corporate average NO_x standard is met for the full useful life of the vehicle. The Tier 2 corporate average NO_x standard is 0.07 grams/mile. Interim corporate-based average NO_x standards are based on vehicle type. The interim sales-weighted average for light-duty vehicles (LDVs) is 9.3 grams/mile. For LDVs, Tier 2 standards will be phased in at a rate of 25% in 2004, 50% in 2005, 75% in 2006, and 100% in 2007. During this period, all LDVs not meeting the Tier 2 standards must meet Interim Tier 2 standards.

SOURCES
40 CFR 86, Subpart A (July 1, 2000).
Federal Register, Vol. 65, No. 28, pp. 6851-6858.

TABLE 4-30a: Federal Exhaust Emission Certification Standards for Newly Manufactured Gasoline- and Diesel-Powered Light-Duty Trucks (Category LDT1)[a,b,c] (Grams per mile)

Engine type and pollutant	Prior to control[g]	1968-1969	1970-1971	1972	1973-1974	1975	1976-1978	1979-1981	1982-1983	1984	1985-1986	1987	1988-1993	Tier 1[k] 1994	Tier 1[k] 1995-2003	Interim Tier 2[k] 2004-2006	Tier 2[k] 2007+
Gasoline																	
HC (total)	11	[i]	2.2	3.4		2.0		1.7		0.80				[j]	[R](0.80)	[j]	
NMHC	[h]	[j]												0.25	(0.31)	[j]	
NMOG	[h]	[j]														0.125 (0.156)	0.100 (0.125)
CO	80	[i]	23	39		20		18		10				3.4	(4.2)		
Cold-temp. CO[d]	[e]	[j]												10	[j]		
NO_x	4	[j]			3.0	3.1		2.3					1.2	0.4	(0.6)		0.14 (0.20)
Particulates	[h]	[j]													0.08 (0.10)	0.08 (0.08)	0.02 (0.02)
Formaldehyde	[h]	[j]														0.015 (0.018)	
Diesel																	
HC (total)	11	[j]					2.0	1.7		0.80				[j]	(0.80)	[j]	
NMHC	[h]	[j]												0.25	(0.31)	[j]	
NMOG	[h]	[j]														[j] (0.156)	0.100 (0.125)
CO	80	[j]					20	18		10				3.4	(4.2)	[j] (4.2)	3.4 (4.2)
NO_x	4	[j]					3.1	2.3					1.2	1.0	(1.25)	[j] (0.6)	0.14 (0.20)
Particulates	[h]	[j]							0.60		0.26				0.08 (0.10)	[j] (0.10)	0.02 (0.02)
Formaldehyde	[h]	[j]														[j] (0.018)	0.015 (0.018)
LDT1 weight critera[e]		GVWR up through 6,000 pounds						GVWR up through 8,500 pounds						GVWR up through 6,000 lbs; LVW up through 3,750 pounds			
Test procedure[b]		7-mode		CVS-72		CVS-75											
Useful life (intermediate)[c,f]		[j]												5 years/50,000 miles		5 years/50,000 miles	
(full)		5 years/50,000 miles									11 years/120,000 miles			10 years/100,000 miles			10 years/ 20,000 miles

KEY: CO = carbon monoxide; CVS = constant volume sampler; GVWR = gross vehicle weight rating; HC = hydrocarbons; LVW = loaded vehicle weight; NMHC = nonmethane hydrocarbons; NMOG = nonmethane organic gases; NO_x = nitrogen oxides.

[a] Light-duty truck categories LDT1-LDT4 were not created until 1994. From 1968 to 1978, all trucks with a GVWR up to 6,000 pounds were classified as light-duty trucks and were required to meet the same standards. As of 1979, the maximum weight was raised to 8,500 pounds GVWR. During 1988-93, light duty trucks were divided into two subcategories that coincide with the current LDT1-LDT4 categories. The standards for LDT2, LDT3, and LDT4 are shown in tables 4-30b through 4-30d.

[b] The test procedure for measuring exhaust emissions has changed several times over the course of vehicle emissions regulation. The 7-mode procedure was used through model year 1971 and was replaced by the CVS-72 procedure beginning in model year 1972. The CVS-75 procedure became the test procedure as of model year 1975. While it may appear that total HC and CO standards were relaxed in 1972-74, these standards were actually more stringent due to the more stringent nature of the CVS-72 test procedure. Additional standards for CO and composite standards for NMHC and NO_x tested over the new Supplemental Federal Test Procedure will be phased-in beginning with model year 2000. These standards are not shown in this table.

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TABLE 4-30a: Federal Exhaust Emission Certification Standards for Newly Manufactured Gasoline- and Diesel-Powered Light-Duty Trucks (Category LDT1)[a,b,c] (Grams per mile) (Continued)

[c] Emissions standards had to be met for a useful life of 5 years/50,000 miles through model year 1983, and a full useful life of 11 years/120,000 miles was defined for 1985-93 (several useful life options were available for 1984). Beginning in model year 1994, emissions standards were established for an intermediate useful life of 5 years/50,000 miles as well as a full useful life (full useful life standards are shown in parentheses). HC standards, however, were established only for full useful life. Tier 1 exhaust standards, except particulates standards, were phased in during 1994-96 at a rate of 40%, 80%, and 100%, respectively. Particulate matter standards were phased-in at a rate of 40%, 80%, and 100% during 1995-97.

[d] The cold CO emissions standard is measured at 20 °F (rather than 75 °F) and is applicable for a 5-year/50,000-mile useful life.

[e] GVWR is the maximum design loaded weight. LVW is the curb weight (nominal vehicle weight) plus 300 pounds.

[f] Manufacturers can opt to certify vehicles for a full useful life of 15 years/150,000 miles and either have (1) intermediate useful life standards waived or (2) receive additional NO_x credits.

[g] The "Prior to controls" column reports emissions estimates of a typical newly manufactured car in the years before exhaust emissions certification standard were implemented.

[h] No estimate available.

[i] In 1968-69, exhaust emissions standards were issued in parts per million rather than grams per mile and are, therefore, incompatible with this table.

[j] No standard has been set.

[k] The term "tier" refers to a level of standards for specific years. Interim Tier 2 refers to an intermediate level of standards that move manufacturers toward compliance with Tier 2 standards. Interim Tier 2 and Tier 2 standards are established as "bins." Each bin is a set of standards for NO_x, CO, NMOG, formaldehyde, and particulates (HC and NMHC standards are dropped for Tier 2 and Interim Tier 2). Manufacturers may certify any given vehicle family to any of the bins available for that vehicle class as long as the resulting sales-weighted corporate average NO_x standard is met for the full useful life. The Tier 2 corporate average NO_x standard is 0.07 grams/mile. Interim corporate-based average NO_x standards are based on vehicle type. The interim corporate sales-weighted average for LDT1 vehicles is 0.3 grams/mile. Tier 2 standards will be phased in at a rate of 25% in 2004, 50% in 2005, 75% in 2006, and 100% in 2007. During this period, all LDT1 vehicles not meeting the Tier 2 standards must meet Interim Tier 2 standards.

SOURCES
40 CFR 86, Subpart A (July 1, 2000).
Federal Register, Vol. 65, No. 28, pp. 6851-6858.

TABLE 4-30b: Federal Exhaust Emission Certification Standards for Newly Manufactured Gasoline- and Diesel-Powered Light-Duty Trucks (Category LDT1)[a,b,c] (Grams per mile)

Engine type and pollutant	Prior to control[g]	1968-1969	1970-1971	1972	1973-1974	1975	1976-1978	1979-1981	1982-1983	1984	1985-1986	1987	1988-1990	1991-1993	Tier 1[k] 1994	1995-2003	Interim Tier 2[k] 2004-2006	Tier 2[k] 2007+
Gasoline																		
HC (total)	11	i	2.2	3.4		2.0		1.7		0.80					j (0.80)		j	
NMHC	h	j													j (0.40)		j	
NMOG	h	j															0.125 (0.156)	0.100 (0.125)
CO	80	i	23	39		20		18		10					4.4 (5.5)		3.4 (4.2)	
Cold-temp. CO[d]	h	j													12.5 (l)			
NO_x	4	j			3.0	3.1		2.3					1.7		0.7 (0.97)		0.4 (0.6)	0.14 (0.20)
Particulates	h	j														0.08 (0.10)	0.08 (0.08)	0.02 (0.02)
Formaldehyde	h	j															0.015 (0.018)	
Diesel																		
HC (total)	11	j					2.0	1.7		0.80					j (0.80)		j	
NMHC	h	j													0.32 (0.40)		j	
NMOG	h	j															j (0.156)	0.100 (0.125)
CO	80	j					20	18		10					4.4 (5.5)		j (4.2)	3.4 (4.2)
NO_x	4	j					3.1	2.3					1.7		j (0.97)		j (0.6)	0.14 (0.20)
Particulates	h	j							0.60			0.50	0.45	0.13		0.08 (0.10)	j (0.10)	0.02 (0.02)
Formaldehyde	h	j															j (0.018)	0.015 (0.018)
LDT2 weight criteria[e]		GVWR up through 6,000 pounds						GVWR up through 8,500 pounds					GVWR up through 6,000 pounds; LVW over 3,750 pounds					
Test procedure[b]		7-mode		CVS-72		CVS-75												
Useful life (intermediate)[c,f]		j													5 years/50,000 miles		5 years/50,000 miles	
(full)		5 years/50,000 miles									11 years/120,000 miles				10 years/100,000 miles			10 years/ 120,000 miles

KEY: CO = carbon monoxide; GVWR = gross vehicle weight rating; HC = hydrocarbons; LVW = loaded vehicle weight; NMHC = nonmethane hydrocarbons; NMOG = nonmethane organic gases; NO_x = nitrogen oxides.

[a] Light-duty truck categories LDT1-LDT4 were not created until 1994. From 1968 to 1978 all trucks with a GVWR up to 6,000 pounds were classified as light-duty trucks and were required to meet the same standards. As of 1979, the maximum weight was raised to 8,500 pounds GVWR. During 1988-93, light-duty trucks were divided into two subcategories that coincide with the current LDT1-LDT4 categories. The standards for LDT1, LDT2, and LDT4 are given in tables 4-30a, 4-40b, and 4-30d.

[b] The test procedure for measuring exhaust emissions has changed several times over the course of vehicle emissions regulation. The 7-mode procedure was used through model year 1971 and was replaced by the CVS-72 procedure beginning in model year 1972. The CVS-75 procedure became the test procedure as of model year 1975. While it may appear that the total HC and CO standards were relaxed in 1972-74, these standards were actually more stringent due to the more stringent nature of the CVS-72 test procedure. Additional standards for CO and composite standards for NMHC and NO_x tested over the new Supplemental Federal Test Procedure will be phased-in beginning with model year 2000. These standards are not shown in this table.

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TABLE 4-30b: Federal Exhaust Emission Certification Standards for Newly Manufactured Gasoline- and Diesel-Powered Light-Duty Trucks (Category LDT1)[a,b,c] (Grams per mile) (Continued)

[c] Emissions standards had to be met for a useful life of 5 years/50,000 miles through model year 1983, and a full useful life of 11 years/120,000 miles was defined for 1985-93 (several useful life options were available for 1984). Beginning in model year 1994, emissions standards were established for an intermediate useful life of 5 years/50,000 miles as well as a full useful life (full useful life standards are shown in parentheses). HC standards, however, were established only for full useful life. Tier 1 exhaust standards, except particulates standards, were phased-in during 1994-96 at a rate of 40%, 80%, and 100%, respectively. Particulates standards were phased-in at a rate of 40%, 80%, and 100% during 1995-97.

[d] The cold CO emissions standard is measured at 20 °F (rather than 75 °F) and is applicable for a 5-year/50,000-mile useful life.

[e] GVWR is the maximum design loaded weight. LVW is the curb weight (nominal vehicle weight) plus 300 pounds.

[f] Manufacturers can opt to certify vehicles for a full useful life of 15 years/150,000 miles and either have (1) intermediate useful life standards waived or (2) receive additional NO_x credits.

[g] The "Prior to controls" reports emissions estimates of a typical newly manufactured car in the years before exhaust emissions certification standards were implemented.

[h] No estimate available.

[i] In 1968-69, exhaust emissions standards were issued in parts per million rather than grams per mile and are, therefore, incompatible with this table.

[j] No standard has been set.

[k] The term "tier" refers to a level of standards for specific years. Interim 2 refers to an intermediate level of standards that move manufacturers toward compliance with Tier 2 standards. Interim Tier 2 and Tier 2 standards are established as "bins." Each bin is a set of standards for NO_x, CO, NMOG, formaldehyde, and particulates (HC and NMHC standards are dropped for Tier 2 and Interim Tier 2). Manufacturers may certify any given vehicle family to any of the bins available for that vehicle class as long as the resulting sales-weighted corporate average NO_x standard is met for the full useful life. The Tier 2 corporate average NO_x standard is 0.07 grams/mile. Interim corporate-based average NO_x standards are based on vehicle type. The interim corporate sales-weighted average for LDT2 vehicles is 0.3 grams/mile. Tier 2 standards will be phased in at a rate of 25% in 2004, 50% in 2005, 75% in 2006, and 100% in 2007. During this period all LDT2 vehicles not meeting the Tier 2 standards must meet Interim Tier 2 standards.

SOURCES
40 CFR 86, Subpart A (July 1, 2000).
Federal Register, Vol. 65, No. 28, pp. 6851-6858.

TABLE 4-30c: Federal Exhaust Emission Certification Standards for Newly Manufactured Gasoline- and Diesel-Powered Light-Duty Trucks (Category LDT1)[a,b,c] (Grams per mile)

Engine type and pollutant	Prior to control[g]	1968-1969	1970-1971	1972	1973-1974	1975	1976-1978	1979-1981	1982-1983	1984	1985-1986	1987	1988-1989	1990	1991-1995	Tier 1[k] 1996-2007	Interim Tier 2[k] 2008	Tier 2[k] 2009+
Gasoline																		
HC (total)	11	i	2.2	3.4		2.0		1.7		0.80						j (0.80)	j	
NMHC	h	j														0.32 (0.46)	j	
NMOG	h	j															0.160 (0.230)	0.125 (0.156)
CO	80	i	23	39		20		18		10						4.4 (6.4)		3.4 4.2
Cold-temp. CO[d]	h	j														12.5 (j)		
NO_x	4	j			3.0	3.1		2.3					2.3	1.7		0.7 (0.98)	0.4 (0.6)	0.14 (0.20)
Particulates	h	j														j (0.10)	0.08 (0.08)	0.02 (0.02)
Formaldehyde	h	j															0.018 (0.027)	0.015 (0.018)
Diesel																		
HC (total)	11	j					2.0	1.7		0.80						j (0.80)	j	
NMHC	h	j														0.32 (0.46)	j	
NMOG	h	j															j (0.230)	0.125 (0.156)
CO	80	j					20	18		10						4.4 (6.4)	j	3.4 4.2
NO_x	4	j					3.1	2.3					2.3	1.7		j (0.98)	j (0.6)	0.14 (0.20)
Particulates	h	j							0.60		0.50		0.45		0.13	j (0.10)	j (0.08)	0.02 (0.02)
Formaldehyde	h	j															j (0.027)	0.015 (0.018)
LDT3 weight criteria[e]		GVWR up through 6,000 pounds						GVWR up through 8,500 pounds					Any ALVW			ALVW up through 5,750 pounds		
													GVWR 6,001-8,500 pounds					
Test procedure[b]		7-mode		CVS-72		CVS-75												
Useful life (intermediate)[c,f]		j														5 years/50,000 miles		
(full)		5 years/50,000 miles									11 years/120,000 miles							

KEY: CO = carbon monoxide; GVWR = gross vehicle weight rating; HC = hydrocarbons; LVW = loaded vehicle weight; NMHC = nonmethane hydrocarbons; NMOG nonmethane organic gases; NO_x = nitrogen oxides.

[a] Light-duty truck categories LDT1-LDT4 were not created until 1994. From 1968 to 1978 all trucks with a GVWR up to 6,000 pounds were classified as light-duty trucks and were required to meet the same standards. As of 1979, the maximum weight was raised to 8,500 pounds GVWR. During 1988-93, light-duty trucks were divided into two subcategories that coincide with the current LDT1-LDT4 categories. The standards for LDT1, LDT2, and LDT4 are given in tables 4-30a, 4-40b, and 4-30d.

[b] The test procedure for measuring exhaust emissions has changed several times over the course of vehicle emissions regulation. The 7-mode procedure was used through model year 1971 and was replaced by the CVS-72 procedure beginning in model year 1972. The CVS-75 procedure became the test procedure as of model year 1975. While it may appear that the total HC and CO standards were relaxed in 1972-74, these standards were actually more stringent due to the more stringent nature of the CVS-72 test procedure. Additional standards for CO and composite standards for NMHC and NO_x tested over the new Supplemental Federal Test Procedure will be phased-in beginning with model year 2002. These standards are not shown in this table.

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TABLE 4-30c: Federal Exhaust Emission Certification Standards for Newly Manufactured Gasoline- and Diesel-Powered Light-Duty Trucks (Category LDT1)[a,b,c] (Grams per mile) (Continued)

[c] Emissions standards had to be met for a full useful life of 5 years/50,000 miles through model year 1983, and a full useful life of 11 years/120,000 miles was defined for 1985-93 (several useful life options were available for 1984). Beginning in model year 1996, emissions standards were established for an intermediate useful life of 5 years/50,000 miles as well as a full useful life of 11 years/120,000 miles (intermediate and full useful life standards are shown in parentheses). This applied to all pollutants except HC and particulates for all LDT3 vehicles and NO_x for diesel-powered LDT3 vehicles, which were only required to meet full useful life standards. Tier 1 exhaust standards were phased-in during 1996-97 at a rate of 50% and 100%, respectively.

[d] The cold CO emissions standard is measured at 20 °F (rather than 75 °F) and is applicable for a 5-year/50,000-mile useful life.

[e] GVWR is the maximum design loaded weight. ALVW is the numerical average of the GVWR and the curb weight.

[f] Manufacturers can opt to certify vehicles for a full useful life of 15 years/150,000 miles and either have (1) intermediate useful life standards waived or (2) receive additional NO_x credits.

[g] The "Prior to controls" column reports emissions estimates of a typical newly manufactured car in the years before exhaust emissions certifcation standards were implemented.

[h] No estimate available.

[i] In 1968-69, exhaust emissions standards were issued in parts per million rather than grams per mile and are, therefore, incompatible with this table.

[j] No standard has been set.

[k] The term "tier" refers to a level of standards for specific years. Interim 2 refers to an intermediate level of standards that moves manufacturers toward compliance with Tier 2 standards. Interim Tier 2 and Tier 2 standards are established as "bins." Each bin is a set of standards for NO_x, CO, NMOG, formaldehyde, and particulates (HC and NMHC standards are dropped for Tier 2 and Interim Tier 2). Manufacturers may certify any given vehicle family to any of the bins available for that vehicle class as long as the resulting sales-weighted corporate average NO_x standard is met for full useful life. The Tier 2 corporate average NO_x standard is 0.07 grams/mile. Interim corporate-based average NO_x standards are based on vehicle type. The interim corporate sales-weighted average for LDT3 vehicles is 0.6 grams/mile. Tier 2 LDT3 standards will be phased in during 2008 and 2009. In 2008, 50% of LDT3 vehicles must meet Tier 2 standards; the others must meet Interim Tier 2 standards. Beginning in 2009, all LDT3 vehicles must meet Tier 2 standards.

SOURCES
40 CFR 86, Subpart A (July 1, 2000).
Federal Register, Vol. 65, No. 28, pp. 6851-6858.

TABLE 4-30d: Federal Exhaust Emission Certification Standards for Newly Manufactured Gasoline- and Diesel-Powered Light-Duty Trucks (Category LDT1)[a,b,c] (Grams per mile)

Engine type and pollutant	Prior to control[g]	1968-1969	1970-1971	1972	1973-1974	1975	1976-1978	1979-1981	1982-1983	1984	1985-1986	1987	1988-1989	1990	1991-1995	Tier 1[k] 1996-2007	Interim Tier 2[k] 2008	Tier 2[k] 2009+
Gasoline																		
HC (total)	11	i	2.2	3.4		2.0		1.7		0.80						j (0.80)	j	
NMHC	h	j														0.39 (0.56)	j	
NMOG	h	j															0.160 (0.230)	0.125 (0.156)
CO	80	i	23	39		20		18		10						5.0 (7.3)	4.4 (6.4)	3.4 (4.2)
Cold-temp. CO[d]	h	j														12.5 (j)		
NO_x	4	j			3.0	3.1		2.3					2.3	1.7		1.1 (1.53)	0.4 (0.6)	0.14 (0.20)
Particulates	h	j														j (0.12)	0.08 (0.08)	0.02 (0.02)
Formaldehyde	h	j															0.018 (0.027)	0.015 (0.018)
Diesel																		
HC (total)	11	j					2.0	1.7		0.80						j (0.80)	j	
NMHC	h	j														0.39 (0.56)	j	
NMOG	h	j															j (0.230)	0.125 (0.156)
CO	80	j					20	18		10						5.0 (7.3)	j (6.4)	3.4 (4.2)
NO_x	4	j					3.1	2.3					2.3	1.7		(1.53)	j (0.6)	0.14 (0.20)
Particulates	h	j							0.60		0.50		0.45		0.13	(0.12)	j (0.08)	0.02 (0.02)
Formaldehyde	h	j															j (0.027)	0.015 (0.018)
LDT4 weight criteria[e]		GVWR up through 6,000 pounds						GVWR up through 8,500 pounds					Any ALVW			ALVW over 5,750 pounds		
													GVWR 6,001-8,500 pounds					
Test procedure[b]		7-mode		CVS-72		CVS-75												
Useful life (intermediate)[c,f]		j														5 years/50,000 miles		
(full)		5 years/50,000 miles									11 years/120,000 years							

KEY: ALVW = adjusted loaded vehicle weight; CO = carbon monoxide; GVWR = gross vehicle weight rating; HC = hydrocarbons; NMHC = nonmethane hydrocarbons; NMOG = nonmethane organic gases; NO_x = nitrogen oxides.

[a] Light-duty truck categories LDT1-LDT4 were not created until 1994. From 1968 to 1978 all trucks with a GVWR up to 6,000 pounds were classified as light-duty trucks and were required to meet the same standards. As of 1979, the maximum weight was raised to 8,500 pounds GVWR. During 1988-93, light-duty trucks were divided into two subcategories that coincide with the current LDT1-LDT4 categories. The standards for LDT1, LDT2, and LDT3 are given in tables 4-30a, 4-40b, and 4-30c.

[b] The test procedure for measuring exhaust emissions has changed several times over the course of vehicle emissions regulation. The 7-mode procedure was used through model year 1971 and was replaced by the CVS-72 procedure beginning in model year 1972. The CVS-75 procedure became the test procedure as of model year 1975. While it may appear that the total HC and CO standards were relaxed in 1972-74, these standards were actually more stringent due to the more stringent nature of the CVS-72 test procedure.

Additional standards for CO and composite standards for NMHC and NO_x tested over the new Supplemental Federal Test Procedure will be phased-in beginning with model year 2002. These standards are not shown in this table.

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TABLE 4-30d: Federal Exhaust Emission Certification Standards for Newly Manufactured Gasoline- and Diesel-Powered Light-Duty Trucks (Category LDT1)[a,b,c] (Grams per mile) (Continued)

[c] Emissions standards had to be met for a full useful life of 5 years/50,000 miles through model year 1983, and a full useful life of 11 years/120,000 miles was defined for 1985-93 (several useful life options were available for 1984). Beginning in model year 1996, emissions standards were established for an intermediate useful life of 5 years/50,000 miles as well as a full useful life of 11 years/120,000 miles (intermediate and full useful life standards are shown in parentheses). This applied to all pollutants except HC and particulates for all LDT4 vehicles and NO_x for diesel-powered LDT4 vehicles, which were only required to meet full useful life standards. Tier 1 exhaust standards were phased-in during 1996-97 at a rate of 50% and 100%, respectively.

[d] The cold CO emissions standard is measured at 20 °F (rather than 75 °F) and is applicable for a 5-year/50,000-mile useful life.

[e] GVWR is the maximum design loaded weight. ALVW is the numerical average of the GVWR and the curb weight.

[f] Manufacturers can opt to certify vehicles for a full useful life of 15 years/150,000 miles and either have (1) intermediate useful life standards waived or (2) receive additional NO_x credits.

[g] The "Prior to control" column reports emissions estimates of a typical newly manufactured car in the years before exhaust emissions certification standards were implemented.

[h] No estimate available.

[i] In 1968-69, exhaust emissions standards were issued in parts per million rather than grams per mile and are, therefore, incompatible with this table.

[j] No standard has been set.

[k] The term "tier" refers to a level of standards for specific years. Interim 2 refers to an intermediate level of standards that moves manufacturers toward compliance with Tier 2 standards. Interim Tier 2 and Tier 2 standards are established as "bins." Each bin is a set of standards for NO_x, CO, NMOG, formaldehyde, and particulate matter (HC and non-methane HC standards are dropped for Tier 2 and interim Tier 2). Manufacturers may certify any given vehicle family to any of the bins available for that vehicle class as long as the resulting sales-weighted corporate average NO_x standard is met for full useful life. The Tier 2 corporate average NO_x standard is 0.07 grams/mile. Interim corporate-based average NO_x standards are based on vehicle type. The interim corporate sales-weighted average for LDT4 vehicles is 0.6 grams/mile. Tier 2 standards will be phased in during 2008 and 2009. In 2008, 50% of LDT4 vehicles must meet Tier 2 standards; the others must meet Interim Tier 2 standards. Beginning in 2009, all LDT4 vehicles must meet Tier 2 standards.

SOURCES
40 CFR 86, Subpart A (July 1, 2000).
Federal Register, Vol. 65, No. 28, pp. 6851-6858.

TABLE 4-31: Federal Exhaust Emission Certification Standards for Newly Manufactured Gasoline- and Diesel-Powered Medium-Duty Passenger Vehicles (MDPV)[a,b] (Grams per mile)

	Interim Tier 2[f]		Tier 2[f]	
Engine type and pollutant	**2004**	**2008**	**2009+**	
Gasoline				
NMOG	0.195	(0.280)	0.125	(0.156)
CO	5.0	(7.3)	3.4	(4.2)
Cold-temp. CO[c]	12.5			
NO_x	0.6	(0.9)	0.14	(0.20)
Particulates	0.12	(0.12)	0.02	(0.02)
Formaldehyde	0.022	(0.032)	0.015	(0.018)
Diesel				
HC	1.3 g/bhp-hr			
NMHC + NO_x	2.4 g/bhp-hr			
NMOG		g (0.280)	0.125	(0.156)
CO	15.5 g/bhp-hr	g (7.3)	3.4	(4.2)
NO_x	4.0 g/bhp-hr	g (0.9)	0.14	(0.20)
Particulates	0.10 g/bhp-hr	g (0.12)	0.02	(0.02)
Formaldehyde		g (0.032)	0.015	(0.018)
Smoke opacity (acceleration/lugging/peak)[d]	20/15/50			
Weight Criteria	Greater than 8,500 pounds GVWR; less than 10,000 pounds GVWR			
Test procedure-gasoline	CVS-75			
-diesel	EPA Transient	CVS-75		
Useful life-gasoline (intermediate)[b,e]	5 years/50,000 miles			
(full)	11 years/120,000 miles			
Useful life-diesel (intermediate)[b,e]	g		5 years/50,000 miles	
(full)	8 years/110,000 miles	11 years/120,000 miles		

KEY: CO = carbon monoxide; g/bhp-hr = grams per brake horsepower/hour; GVWR = gross vehicle weight rating; HC = hydrocarbons; NMHC = nonmethane hydrocarbon; NMOG = nonmethane organic gases; NO_x = nitrogen oxides.

[a] The MDPV category was created for the Interim Tier 2 and Tier 2 vehicle emissions standards. This category was specifically designed to help bring passenger vehicles (such as large sport utility vehicles and passenger vans) over 8,500 pounds GVWR into the Tier 2 program. MDPVs are defined as any complete heavy-duty vehicle less than 10,000 pounds GVWR designed primarily for transportation of persons, including conversion vans (i.e., vans which are intended to be converted to vans used primarily for transporting people). This does not include vehicles that have 1) a capacity of more than 12 persons total, or 2) are designed to accommodate more than 9 persons seated rearward of the driver's seat, or 3) have a cargo box (i.e., a pickup-bed or box) of six feet or more in interior length. Prior to Tier 2 standards, these vehicles would have been regulated as light heavy-duty trucks.

[b] Diesel MDPVs can continue to use light heavy-duty truck standards for new vehicle certification until 2008. Note that these standards are measured in grams per brake horsepower-hour (g/bhp-hr). Beginning in 2008, MDPVs must use the same on-chassis testing procedure as heavy light-duty trucks (catgories LDT3 and LDT4) and must meet standards for MDPVs. Beginning in 2009, MDPVs must meet the same standards as light heavy-duty trucks, except MDPVs are not required to meet Supplemental Federal Test Procedure standards.

[c] The cold CO emissions standard is measured at 20 °F (rather than 75 °F) and is applicable for a full useful life of 5-years/50,000-miles.

[d] Smoke opacity is expressed as a percentage for acceleration, lugging, and peak operation modes. Lugging occurs when a vehicle is carrying a load.

[e] Manufacturers can opt to certify vehicles for a useful life of 15 years/150,000 miles and have either 1) intermediate useful life standards waived or 2) receive additional NO_x credits.

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TABLE 4-31: Federal Exhaust Emission Certification Standards for Newly Manufactured Gasoline- and Diesel-Powered Medium-Duty Passenger Vehicles (MDPV)[a,b] (Grams per mile) (Continued)

[f] The term "tier" refers to a level of standards for specific years. Interim 2 refers to an intermediate level of stndards that moves manufacturers toward compliance with Tier 2 standards. Tier 2 and interim Tier 2 standards are established as "bins." Each bin is a set of standards for NO_x, CO, NMOG, formaldehyde, and particulates (HC and NMHC standards are dropped for Tier 2 and Interim Tier 2). Manufacturers may certify any given vehicle family to any of the bins available for that vehicle class as long as the resulting sales-weighted corporate average NO_x standard is met for full useful life. The Tier 2 corporate average NO_x standard is 0.07 grams/mile. Interim corporate-based average NO_x standards are based on vehicle type. The interim corporate sales-weighted average for MDPVs is 0.6 grams/mile. Tier 2 MDPV standards will be phased in during 2008 and 2009. In 2008, 50% of MDPVs must meet Tier 2 standards; the other 50% of MDPVs must meet interim Tier 2 standards. Beginning in 2009, all MDPVs must meet Tier 2 standards.

[g] Diesel MDPVs are not required to meet intermediate life standards during this time period.

SOURCE
40 CFR 86, Subpart A (July 1, 2000) *Federal Register*, Vol. 65, No. 28, pp. 6851-6858.

TABLE 4-32a: Federal Exhaust Emissions Certification Standards for Newly Manufactured Gasoline- and Diesel-Powered Light Heavy-Duty Trucks (Grams per brake horsepower-hour)

Engine type and pollutant	1970-73	1974-78	1979-83	1984	1985-86	1987	1988-89	1990	1991-93	1994-97	1998-2003	2004	2005-06	2007	2008+
Gasoline															
HC + NO_x	[j]	16	10		[j]										
NO_x + NMHC	[j]												1.0		[j]
NMHC	[j]														0.14
HC	[k]	[j]	1.5		1.9	1.1							[j]		
NO_x	[j]				10.6			6.0		5.0		4.0	[j]		0.20
CO	[k]	40	25		37.1	14.4									
Particulates	[j]														0.01
Diesel															
HC + NO_x	[j]	16	10	[j]											
HC	[k]	[j]	1.5	1.3								[j]			
NO_x	[j]			10.7				6.0		5.0		4.0	[j]		0.20
NO_x + NMHC	[j]												[2.4][l]		[j]
NMHC	[j]														0.14
CO	[k]	40	25	15.5											
Particulates	[j]						0.60		0.25		0.10				0.01
Smoke opacity (acceleration/lugging/peak)[a]	40/20/[i]	20/15/50													
Weight criteria for light heavy-duty trucks[b]	GVWR over 6,000 lbs		GVWR over 8,500 lbs			GVWR 8,501 through 14,000 lbs									
Test procedure (gasoline)[c]	9-mode steady-state				MVMA transient										
(diesel)[c]	13-mode steady-state			EPA transient											
Useful life (gasoline)[d]	5 years/50,000 miles				8 years/110,000 miles							10 years/110,000 miles			

Continued next page

TABLE 4-32a: Federal Exhaust Emissions Certification Standards for Newly Manufactured Gasoline- and Diesel-Powered Light Heavy-Duty Trucks (Grams per brake horsepower-hour) (Continued)

Complete Vehicles - (Grams per mile)[e,f]

Weight range and pollutant	2005-06	2007	2008+
GVWR 8,500 through 10,000 lbs			
NMOG[g]	0.28		j
NMHC[h]	j		0.195
CO	7.3		
NO_x	0.9		0.2
Particulates	j		0.02
HCHO	j		0.032
GVWR 10,001 lbs through 14,000 lbs			
NMOG[g]	0.33		j
NMHC[h]	j		0.230
CO	8.1		
NO_x	1.0		0.4
Particulates	j		0.02
HCHO	j		0.040
Test procedure[i]	EPA HD-UDDS		

KEY: CO = carbon monoxide; HC = hydrocarbon; NO_x = nitrogen oxides; NMHC = nonmethane hydrocarbons; NMOG = nonmethane organic gas; HCHO = formaldeyhyde.

[a] Smoke opacity is expressed in percentage for acceleration, lugging, and peak modes (acceleration/lugging/peak). Lugging is when a vehicle is carrying a load.

[b] Gross vehicle weight rating (GVWR) is the maximum design loaded weight.

[c] Several testing procedures have been used during the course of exhaust emissions control. A steady-state 9-mode test procedure (13-mode for diesel) was used for 1970-83 standards. For 1984, either the steady-state tests or the U.S. Environmental Protection Agency (EPA) transient test procedure could be used. For diesels, the EPA transient test was required from 1985 to the present. For gasoline-powered vehicles, either the EPA or the Motor Vehicle Manufacturers Association (MVMA) transient test procedure could be used during 1985-86, and the MVMA procedure was required thereafter.

[d] Emissions standards apply to the useful life of the vehicle. Useful life was 5 years/50,000 miles through 1983 and became 8 years/110,000 miles beginning in model year 1985. 1984 was a transitional year in which vehicles could meet the older standard (and test procedure) or the newer one. Useful life requirement for gasoline-powered trucks meeting NO_x standards for 1998 and after is 10 years/110,000 miles. Starting in 2004, the useful life will be 10 years/110,000 miles. The useful life requirements for heavy-duty diesel truck standards are more complex and vary by vehicle weight, pollutant, test procedure, and year. Consult the U.S. Code of Federal Regulations for further information.

[e] Starting in 2005, complete gasoline heavy-duty vehicles of 14,000 lbs GVWR or below will have to be chassis certified.

[f] Required for complete gasoline heavy-duty vehicles only.

[g] The manufacturer has the option of satisfying this standard by measurement of nonmethane hydrocarbons or total hydrocarbons.

[h] The manufacturer has the option of satisfying this standard by measurement of nonmethane organic gas or total hydrocarbons.

[i] This test procedure currently exists to test complete vehicles that have been optionally chassis certified. However, chassis certification is not required until 2005.

TABLE 4-32a: Federal Exhaust Emissions Certification Standards for Newly Manufactured Gasoline- and Diesel-Powered Light Heavy-Duty Trucks (Grams per brake horsepower-hour) (Continued)

[j] No standard set.

[k] Although emissions standards for HC and CO were in effect for these years, they were not measured in grams per brake horsepower-hour and are, therefore, incompatible with the engine certification section of this table.

[l] Vehicles can meet a NMHC + NO_x standard of 2.5 g/bhp-h, given they meet a NMHC standard of no more than 0.5 g/bhp-h.

NOTE
Tables 4-32a and 4-32b are identical for heavy-duty diesel engines.

SOURCES
40 CFR 86, Electronic Code of Federal Regulations, Internet site at http://www.access.gpo.gov/nara/cfr/cfrhtml_00/Title_40/40cfr86_00.html as of Oct. 9, 2001.
U.S. Environmental Protection Agency, Office of Transportation and Air Quality, personal communication, October 2001.

TABLE 4-32b: Federal Exhaust Emissions Certification Standards for Newly Manufactured Gasoline- and Diesel-Powered Heavy-Duty Trucks (Grams per brake horsepower-hour)

Engine type and pollutant	1970-73	1974-78	1979-83	1984	1985-86	1987	1988-89	1990	1991-93	1994-97	1998-2003	2004	2005-2006	2007	2008+
Gasoline															
HC + NO_x	[e]	16	10		[e]										
NO_x + NMHC	[e]												1.0		[e]
NMHC	[e]														0.14
HC	[f]	[e]	1.5		1.9								[e]		
NO_x	[e]				10.6			6.0		5.0		4.0	[e]		0.20
CO	[f]	40	25		37.1										14.4
Particulates	[e]														0.01
Diesel															
HC + NO_x	[e]	16	10	[e]											
HC	[f]	[e]	1.5	1.3								[e]			
NO_x	[e]			10.7				6.0		5.0		4.0	[e]	0.20	
NO_x + NMHC	[e]											[2.4][g]		[e]	
NMHC														0.14	
CO	[f]	40	25	15.5											
Particulates	[e]						0.60		0.25		0.10			0.01	
Smoke opacity (acceleration/lugging/peak)[a]	40/20[e]	20/15/50													
Weight criteria for heavy heavy-duty trucks[b]	GVWR over 6,000 lbs		GVWR over 8,500 lbs			GVWR over 14,000 lbs									
Test procedure (gasoline)[c]	13-mode steady-state				MVMA transient										
(diesel)[c]	13-mode steady-state			EPA transient											
Useful life (gasoline)[d]	5 years/50,000 miles				8 years/110,000 miles							10 years/110,000 miles			

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

[a] Smoke opacity is expressed in percentage for acceleration, lugging, and peak modes (acceleration/lugging/peak). Lugging is when a vehicle is carrying a load

[b] Gross vehicle weight rating (GVWR) is the maximum design loaded weight.

[c] Several testing procedures have been used during the course of exhaust emissions control. A steady-state 9-mode test procedure (13-mode for diesel) was used for 1970-83 standards. For 1984, either the steady-state tests or the U.S. Environmental Protection Agency (EPA) transient test procedure could be used. For diesels, the EPA transient test was required from 1985 to the present. For gasoline-powered vehicles, either the EPA or the Motor Vehicle Manufacturers Association (MVMA) transient test procedure could be used during 1985-86, and the MVMA procedure was required thereafter.

TABLE 4-32b: Federal Exhaust Emissions Certification Standards for Newly Manufactured Gasoline- and Diesel-Powered Heavy-Duty Trucks (Grams per brake horsepower-hour) (Continued)

[d] Emissions standards apply to the useful life of the vehicle. Useful life was 5 years/50,000 miles through 1983 and became 8 years/110,000 miles beginning in model year 1985. 1984 was a transitional year in which vehicles could meet the older standard (and test procedure) or the newer one. Useful life requirement for gasoline-powered trucks meeting NO_X standards for 1998 and after is 10 years/110,000 miles. Starting in 2004, the useful life will be 10 years/110,000 miles. The useful life requirements for heavy-duty diesel truck standards are more complex and vary by vehicle weight, pollutant, test procedure, and year. Consult the U.S. Code of Federal Regulations for further information.

[e] No standard set.

[f] Although emissions standards for HC and CO were in effect for these years, they were not measured in grams per brake horsepower-hour and are, therefore, incompatible with this table.

[g] Vehicles can meet a NMHC + NO_X standard of 2.5 g/bhp-h, given they meet a NMHC standard of no more than 0.5 g/bhp-h.

NOTES
Tables 4-32a and 4-32b are identical for heavy-duty diesel engines.

SOURCES
40 CFR 86, Electronic Code of Federal Regulations, internet site at http://www.access.gpo.gov/nara/cfr/cfrhtml_00/Title_40/40cfr86_00.html as of Oct. 9, 2001.
U.S. Environmental Protection Agency, Office of Transportation and Air Quality, personnal communication, Oct. 2001.

TABLE 4-33: Federal Exhaust Emissions Standards for Newly Manufactured Motorcycles[a] (g/km)[b]

Pollutant	Engine displacement	Emissions prior to controls[c]	1978-79	1980-89	1990-96	1997+
Gasoline-powered						
HC	50-169 cc	1.0-13.8	5			
	170-749 cc		5 + 0.0155(D-170)	5.0		
	750 cc and greater		14	5.0		
CO	50 cc and greater	11.0-31.0	17	12		
Methanol-powered						
Total HC equivalent	50 cc and greater				5.0	
CO	50 cc and greater				12	
Natural gas and LPG-powered						
HC	50 cc and greater					5.0
CO	50 cc and greater					12
Useful life (Class 1)	50-169 cc		5 years or 12,000 km (7,456 mi), whichever comes first			
(Class 2)	170-279 cc		5 years or 18,000 km (11,185 mi), whichever comes first			
(Class 3)	280 cc and greater		5 years or 30,000 km (18,641 mi), whichever comes first			

KEY: cc = cubic centimeters; D = engine displacement in cubic centimeters (cc); g = gram; h = hour; HC = hydrocarbon; kg = kilogram; km = kilometer; lb = pound; LPG = liquefied petroleum gas; mi = miles; mph = miles per hour.

[a] A motorcycle is any motor vehicle with a headlight, taillight, and stoplight, and having two or three wheels and a curb mass less than or equal to 793 kg (1,749 lb). (The limit was 680 kg, or 1,499 lb prior to the 1998 model year.) A motorcycle is excluded from the standards if it has a displacement of less than 50 cc (3.1 cubic inches) or if with a 80 kg (176 lb) driver it cannot start from a dead stop using only the engine or exceed a speed of 40 km/h (25 mph) on a level, paved surface.

[b] Readers who wish to compare motorcycle regulations with passenger car and truck regulations should note that 5.0 g/km = 8.0 g/mi and 12 g/km = 19 g/mi. The formula for 1978-79 HC emissions by motorcycles 170-749 cc becomes, in g/mi., approximately 8.0 + 0.025(D-170).

[c] Estimates of emissions rates prior to controls are ranges of emissions for all engine displacements. Not available for motorcycles powered by fuels other than gasoline.

SOURCE
40 CFR 86 Subpart E (July 1, 2000). U.S. Environmental Protection Agency, Office of Air and Radiation, personal communication, Aug. 28, 2001.

TABLE 4-34: Federal Exhaust Emissions Standards for Newly Manufactured and In-Use Aircraft Engines[a,b]

Engine type[c]	Pollutant	Year of engine manufacture						
		1974-75	1976-77	1978-82	1983	1984-96	1997-99	2000+
Turboprop								
	Smoke					[g]$187(rO)^{-0.168}$		
Class T3 turbojet								
	CO (g/kN)[d]						118	
	HC (g/kN)[d]					19.6		
	NO_x (g/kN)[d]						[i]40 + 2(rPR)	[j]32 + 1.6(rPR)
	Smoke			25		[h]$83.6(rO)^{-0.274}$		
Class T8 turbojet								
	CO (g/kN)[d]						118	
	HC (g/kN)[d]					19.6		
	NO_x (g/kN)[d]						[i]40 + 2(rPR)	[j]32 + 1.6(rPR)
	Smoke	30				[h]$83.6(rO)^{-0.274}$		
Turbofan and turbojet engines other than Classes T3, T8, and TSS								
	CO (g/kN)[d]						118	
	HC (g/kN)[d]					19.6		
	NO_x (g/kN)[d]						[i]40 + 2(rPR)	[j]32 + 1.6(rPR)
	Smoke		[e]$83.6(rO)^{-0.274}$		[f]$83.6(rO)^{-0.274}$	[h]$83.6(rO)^{-0.274}$		
TSS engines (supersonic aircraft engines)								
	HC (g/kN)					$140(0.92)^{rPR}$		
	Smoke					[h]$83.6(rO)^{-0.274}$		

KEY: CO = carbon monoxide; g = gram; g/kN = grams of pollutant per kilonewtons of thrust; HC = hydrocarbon, kN = kilonewtons; kW = kilowatt; NO_x = nitrogen oxides; rO = rated output, which is the maximum power or thrust available for takeoff; rPR = rated pressure ratio.

[a] Federal standards apply to all planes operating in the United States, regardless of where they were manufactured. This table primarily displays exhaust emissions standards for newly manufactured aircraft engines. Unless otherwised noted, emissions in this table apply to new aircraft engines only.

[b] HC, CO, and NO_x are measured using the International Civil Aviation Organization (ICAO) Gaseous Emissions Test Procedure. Smoke is measured using the ICAO Smoke Emission Test Procedure. There is no useful life or warranty period for purposes of compliance with emissions standards.

[c] Examples of commercial aircraft that use each engine type include the following:
Class T3 turbojet–Boeing 707-320s (Class T3 engines are currently out of production, though some are still in use).
Class T8 turbojet–Boeing 727s and 737-200s, and McDonnell-Douglas MD-80s and DC-9s.
Turbofans and turbojets other than T3, T8, and TSS–Boeing 747-400s, 757s, 767-200s and 777s, and McDonnell-Douglas MD-11s; Canadair Regional Jets.
Turboprops–Used mostly in regional airliners such as ATR 72, Dornier 328, and Saab SF 340.
TSS–British Aircraft Corp./Aerospatiale Concorde (the only supersonic aircraft currently used in commercial civil aviation).

[d] Applies to engines with rO>26.7 kN.

Continued next page

TABLE 4-34: Federal Exhaust Emissions Standards for Newly Manufactured and In-Use Aircraft Engines[a,b] (Continued)

[e] Engines with rated output rO>=129 kN. This is also the in-use standard for all such aircraft engines.

[f] Engines with rO>=1,000 kW.

[g] Engines with rO<26.7 kN. Smoke number may not exceed 50.

[h] Engines manufactured on or after Jan. 1, 1984 and with rO>=26.7 kN. Smoke number may not exceed 50.

[i] Effective as of July 7, 1997. This standard applies only to those engines of a type or model for which the date of manufacture of the first individual production model was on or before Dec. 31, 1995 and for which the date of manufacture of the individual engine was on or before Dec. 31, 1999.

[j] Effective as of July 7, 1997. This standard also applies to engines of a type or model for which the date of manufacture of the first individual production model was after Dec. 31, 1995 and for which the date of manufacture of the individual engine was after Dec. 31, 1999.

SOURCE
40 CFR 87, Subparts A-D (July 1, 2000), and U.S. Environmental Protection Agency, Office of Air and Radiation, personal communication, Aug. 28, 2001.

TABLE 4-35: Federal Exhaust Emissions Standards for Locomotives[a] (g/bhph except where noted)

Pollutant	Duty-cycle[f]	Tier 0 1973-2001[h]	Tier 1 2002-2004	Tier 2 2005+
Total HC[b]	Line-haul	1.00	0.55	0.30
	Switch	2.10	1.20	0.60
Nonmethane HC[c]	Line-haul	1.00	0.55	0.30
	Switch	2.10	1.20	0.60
Total HC equivalent[d]	Line-haul	1.00	0.55	0.30
	Switch	2.10	1.20	0.60
CO	Line-haul	5.0	2.2	1.5
	Switch	8.0	2.5	2.4
	Line-haul (optional standard)[g]	10.0	10.0	10.0
	Switch (optional standard)[g]	12.0	12.0	12.0
NO_x	Line-haul	9.5	7.4	5.5
	Switch	14.0	11.0	8.1
Particulates	Line-haul	0.60	0.45	0.20
	Switch	0.72	0.54	0.24
	Line-haul (optional standard)[g]	0.30	0.22	0.10
	Switch (optional standard)[g]	0.36	0.27	0.12
Smoke opacity (% opacity-normalized)[e]	Steady-state	30%	25%	20%
	30-second peak	40%	40%	40%
	3-second peak	50%	50%	50%
Useful life		7.5 MWh per hp or 10 years[i,j]		

KEY: bhp = brake horsepower; bhph = brake horsepower hour; CO = carbon monoxide; g = gram; h = hour; HC = hydrocarbon; MW = megawatt; MWh = megawatt hour; NO_x = nitrogen oxides; PM = particulate matter.

[a] Locomotive standards apply to both new and remanufactured locomotives, except as noted

[b] Total HC standards apply to locomotives powered by any fuel except alcohol or natural gas or fuels primarily composed of alcohol or natural gas.

[c] Nonmethane HC standards apply to locomotives powered by natural gas or fuels that are primarily composed of natural gas.

[d] Total HC equivalent standards apply to locomotives powered by alcohol or fuels that are primarily composed of alcohol.

[e] Smoke opacity values are normalized to be equivalent to a 1 meter path length

[f] The line-haul duty-cycle is weighted toward operation in the higher power notches and is typical of line-haul applications. The switch duty-cycle is typical of switch operations, with more emphasis on idle and low power notch emissions. Locomotives generally are required to meet the standards for both duty-cycles. However, Tier 0 dedicated switch locomotives rated at 2,300 hp or less are only required to meet the switch duty-cycle standard.

[g] Manufacturers and remanufacturers can elect to comply with the alternate CO and PM standards. However, a manufacturer or remanufacturer using the alternate standards must meet both the CO and the PM standards. This allows locomotives to have higher CO emissions in exchange for meeting more stringent PM standards.

[h] Tier 0 standards apply to all new production locomotives in the 2001 model year, as well as for any 1994 through 2001 model year freight locomotives remanufactured on or after Jan. 1, 2001. They also apply to all other 1973 through 2001 model year locomotives remanufactured on or after Jan. 1, 2002. Other phase-in options are also available for manufacturers (see 40 CFR 92 for more detail on phase-in options).

[i] For Tier 0 locomotives not equipped with MW/h meters, the minimum useful life is 750,000 miles or 10 years, whichever comes first.

[j] This is a minimum standard. The certifying manufacturer or remanufacturer must specify a longer useful life if the locomotive or locomotive engine is designed to last longer than the applicable minimum useful life.

SOURCE
40 CFR 92, July 1, 2000, and U.S. Environmental Protection Agency, Office of Air and Radiation, personal communication, Aug. 28, 2001.

TABLE 4-36: Federal Exhaust Emissions Standards for Newly Manufactured Marine Spark-Ignition Outboard, Personal Watercraft,[a] and Jet-Boat Engines[b] (g/kWh)

Year	HC + NO_x (g/kWh)		Warranty period	Useful life[c]
	Rated power < 4.3 kW	Rated power >= 4.3 kW[c,d]		
1998	278.00	(0.917 x (151 + 557/$P^{0.9}$)) + 2.44	1 yr for all emissions-related components	Outboard engines: 350 hr/10 yr Personal watercraft: 350 hr/5 yr
1999	253.00	(0.833 x (151 + 557/$P^{0.9}$)) + 2.89		
2000	228.00	(0.750 x (151 + 557/$P^{0.9}$)) + 3.33		
2001	204.00	(0.667 x (151 + 557/$P^{0.9}$)) + 3.78	1 yr for all emission-related components; 3 yr/200 hr for specified major emissions control components	
2002	179.00	(0.583 x (151 + 557/$P^{0.9}$)) + 4.22		
2003	155.00	(0.500 x (151 + 557/$P^{0.9}$)) + 4.67		
2004	130.00	(0.417 x (151 + 557/$P^{0.9}$)) + 5.11	2 yr/200 hr for all emissions-related components; 3 yr/200 hr for specified major emissions control components	
2005	105.00	(0.333 x (151 + 557/$P^{0.9}$)) + 5.56		
2006+	81.00	(0.250 x (151 + 557/$P^{0.9}$)) + 6.00		

KEY: g = gram; hr = hour; HC = hydrocarbon; hp = horsepower; kW = kilowatt; kWh = kilowatt hour; NO_x = nitrogen oxide; P = average power; yr = year.

[a] The standards for personal watercraft did not go into effect until 1999, although the standard went into effect for outboard engines in 1998.

[b] The standards apply to marine spark-ignition outboard, personal watercraft, and jet-boat engines only. There are currently no federal standards for marine spark-ignition sterndrive/inboard engines (previously proposed standards have not been finalized). Marine compression-ignition engines under 50 hp are covered under the proposed nonroad compression-ignition engine standards. Federal standards are in development for marine compression-ignition engines over 50 hp.

[c] As an example, the standards for an outboard engine of 125 hp (just over 93 kW) would be 149.53 g/kWh in 1998, 123.63 g/kWh in 2000, 97.74 g/kWh in 2002, 72.00 g/kWh in 2004, and 46.10 g/kWh in 2006.

[d] All emissions standards must be met for the useful life of the engine.

NOTE
P = the average power of the engine family in kilowatts (sales-weighted).

SOURCE
40 CFR 91 July 1, 2000 edition, pp. 301-302, 398, and U.S. Environmental Protection Agency, Office of Air and Radiation, personal communication, Aug. 28, 2001.

TABLE 4-37: Tier 2 Federal Exhaust Emissions Standards for Newly Manufactured Commercial Marine Compression-Ignition Engines[a,b]

Engine category[c]	Displacement (liters/cylinder)	Rated power (kW)	Year	NO_x + THC (g/kW-hr)	PM (g/kW-hr)	CO (g/kW-hr)	Useful life[d]	Warranty period
1	< 0.9		2005	7.5	0.40	5.0	10 yrs or 10,000 hrs operation	5 yrs or 5,000 hrs operation
	0.9 to < 1.2		2004	7.2	0.30			
	1.2 to < 2.5	37 kW and above	2004	7.2	0.20			
	2.5 to < 5.0		2007	7.2	0.20			
2	5.0 to < 15.0	37 kW and above		7.8	0.27	5.0	10 yrs or 20,000 hrs operation	5 yrs or 10,000 hrs operation
	15.0 to < 20.0	37 kW to < 3,300 kW		8.7	0.50			
	15.0 to < 20.0	3,300 kW and above	2007	9.8	0.50			
	20.0 to < 25.0	37 kW and above		9.8	0.50			
	25.0 to < 30.0	37 kW and above		11.0	0.50			
3	30 and above	37 kW and above	No Tier 2 emissions standards have been set for Category 3 commercial marine vessels.					

KEY: CO = carbon monoxide; g/kW-hr = gram per kilowatt-hour; hrs = hours; kW = kilowatt; NO_x = nitrogen oxides; PM = particulate matter; THC = total hydrocarbons; yrs = years.

[a] Tier 2 emissions standards established by Congress apply to commercial compression-ignition (diesel) engines with a power rating of at least 37 kW. Both propulsion and auxiliary engines are covered under these standards, but land-based engines used in portable auxiliary equipment must meet standards for land-based engines. Smaller compression-ignition engines are covered under a separate rule. The U.S. Environmental Protection Agency (EPA) also intends to regulate recreational marine diesel engine emissions under a separate rule and is establishing provisions to allow exemptions for category 1 and 2 engines used as auxiliary engines in U.S.-flagged vessels engaged in foreign trade or overseas operations at least 75 percent of the time (i.e., operation will occur more than 320 nautical kilometers outside the United States, not including trips between U.S. ports in Alaska, Hawaii, the continental United States, or its territories).

[b] MARPOL Annex VI nitrogen oxide (NO_x) standards (international standards adopted by the International Maritime Convention on the Prevention of Pollution from Ships) are referred to as Tier 1 emissions standards. These standards apply to any diesel engine over 130 kW installed on a vessel constructed on or after Jan. 1, 2000 and to any engine that undergoes major conversion after that date. MARPOL standards are currently voluntary for ships engaged in domestic travel but will be required for ships engaged in foreign trade with countries that ratify MARPOL standards. Although they have not yet been ratified by the United States, the EPA encourages engine manufacturers to make compliant engines and encourages owners to purchase them. If ratified by the United States, MARPOL Annex VI NO standards will be retroactively effective Jan. 1, 2000.

[c] Emissions standards are based on displacement/cylinder and rated power. The three standards categories are as follows:
Category 1 (< 5 liters displacement/cylinder and rated power >=37 kW): These engines are typically used as propulsion engines on relatively small commercial vessels (fishing vessels, tugboats, crewboats, etc.). They are also used as auxiliary engines on vessels of all sizes and applications.
Category 2 (>= 5 liters displacement/cylinder to < 30 liters displacement/cylinder and rated power >=37 kW): The largest engines that are widely used as propulsion engines in harbor and coastal vessels in U.S. waters. These engines also provide auxiliary power on very large vessels. Many of these engines are of similar size and configuration as locomotive engines or use comparable emissions control technologies.
Category 3 (>= 30 liters displacement/cylinder and rated power .=37kW): These are very large high-power engines that are used almost exclusively for propulsion on vessels engaged in international trade.

[d] Manufacturers must demonstrate that the engine or engine family will meet all standards for its useful life. Certification for useful life is accomplished by testing a sample of engines. The warranty period applies to each engine manufactured. The manufacturer of each engine must provide a warranty to the ultimate purchaser or owner (and each subsequent purchaser or owner) that the engine is designed, built, and equipped so as to conform at the time of sale with Tier 2 standards and is free from defects in materials and workmanship that would cause the engine to fail to conform to these standards for the warranty period. Furthermore, this warranty cannot be shorter than any mechanical warranty on the engine and must be at least one half of the useful life period.

SOURCE

Federal Register, Vol. 64, No. 249, Dec. 29, 1999, pp 73,299 to 73,373, and U.S. Environmental Protection Agency, Office of Air and Radiation, personal communication, Aug. 28, 2001.

TABLE 4-38: Estimated National Average Vehicle Emissions Rates by Vehicle Type and Fuel (Grams per mile)[R]

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
GASOLINE (assuming zero RFG)													
Light-duty vehicles													
Exhaust HC	2.79	2.50	2.23	1.98	1.77	1.57	1.39	1.25	1.14	1.05	0.97	0.89	0.81
Nonexhaust HC	1.21	1.16	1.12	1.09	1.07	1.05	1.03	1.01	0.98	0.95	0.92	0.88	0.84
Total HC	3.99	3.66	3.35	3.07	2.84	2.62	2.41	2.26	2.12	2.00	1.89	1.77	1.65
Exhaust CO	42.89	39.15	35.54	32.23	29.32	26.60	24.18	22.38	20.86	19.54	18.53	18.03	17.58
Exhaust NO_x	2.70	2.47	2.27	2.09	1.94	1.78	1.64	1.55	1.46	1.35	1.29	1.25	1.20
Light-duty trucks													
Exhaust HC	3.68	3.33	3.00	2.71	2.45	2.21	1.96	1.80	1.65	1.54	1.45	1.35	1.24
Nonexhaust HC	1.36	1.29	1.20	1.16	1.12	1.10	1.07	1.04	1.02	0.99	0.97	0.94	0.89
Total HC	5.04	4.62	4.20	3.87	3.58	3.31	3.03	2.85	2.67	2.53	2.42	2.29	2.13
Exhaust CO	56.23	51.99	47.93	44.34	40.77	37.51	34.47	32.20	30.23	28.28	26.81	25.61	24.32
Exhaust NO_x	2.62	2.42	2.26	2.11	1.98	1.84	1.73	1.65	1.59	1.55	1.54	1.53	1.50
Heavy-duty vehicles													
Exhaust HC	3.66	3.34	3.03	2.76	2.39	2.16	1.94	1.73	1.51	1.35	1.22	1.09	0.98
Nonexhaust HC	2.74	2.60	2.34	2.25	2.16	2.07	1.97	1.87	1.79	1.69	1.62	1.54	1.48
Total HC	6.40	5.94	5.37	5.00	4.55	4.24	3.91	3.60	3.29	3.04	2.84	2.63	2.46
Exhaust CO	85.61	78.64	72.12	65.92	60.01	54.16	48.52	43.26	38.82	34.54	31.08	27.59	24.73
Exhaust NO_x	7.19	6.96	6.72	6.52	6.35	6.11	5.89	5.73	5.56	5.40	5.26	5.13	5.01
Motorcycles													
Exhaust HC	2.01	1.88	1.82	1.75	1.72	1.69	1.63	1.63	1.62	1.61	1.61	1.61	1.61
Nonexhaust HC	0.74	0.73	0.72	0.72	0.71	0.71	0.70	0.69	0.70	0.70	0.70	0.70	0.70
Total HC	2.74	2.60	2.54	2.46	2.43	2.40	2.34	2.32	2.32	2.31	2.31	2.31	2.31
Exhaust CO	15.15	14.78	14.77	14.76	14.76	14.67	14.59	14.59	14.59	14.59	14.59	14.59	14.59
Exhaust NO_x	1.26	1.28	1.28	1.28	1.28	1.26	1.25	1.25	1.25	1.25	1.25	1.25	1.25
DIESEL													
Light-duty vehicles													
Exhaust HC	0.68	0.69	0.71	0.73	0.75	0.77	0.79	0.81	0.81	0.82	0.80	0.76	0.73
Exhaust CO	1.49	1.52	1.56	1.60	1.64	1.69	1.73	1.76	1.78	1.79	1.78	1.75	1.73
Exhaust NO_x	1.83	1.85	1.86	1.87	1.89	1.89	1.89	1.88	1.86	1.85	1.81	1.72	1.62
Light-duty trucks													
Exhaust HC	1.59	1.60	1.64	1.64	1.68	1.67	1.69	1.63	1.51	1.42	1.02	0.88	0.96
Exhaust CO	2.67	2.70	2.76	2.77	2.85	2.85	2.89	2.79	2.60	2.44	1.77	1.54	1.66
Exhaust NO_x	2.71	2.66	2.62	2.56	2.53	2.46	2.42	2.31	2.17	2.07	1.76	1.64	1.67
Heavy-duty vehicles													
Exhaust HC	2.21	1.97	1.74	1.55	1.38	1.23	1.10	1.00	0.92	0.85	0.79	0.74	0.69
Exhaust CO	10.06	9.22	8.43	7.71	7.00	6.32	5.73	5.23	4.80	4.43	4.10	3.82	3.58
Exhaust NO_x	23.34	22.14	21.47	21.10	20.75	20.49	20.24	20.04	19.84	19.14	18.05	16.68	15.52

TABLE 4-38: Estimated National Average Vehicle Emissions Rates by Vehicle Type and Fuel (Grams per mile)[R] (Continued)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
AVERAGE OF ALL VEHICLES, GASOLINE AND DIESEL													
Exhaust HC	2.98	2.70	2.42	2.18	1.96	1.76	1.56	1.43	1.32	1.23	1.15	1.08	0.99
Nonexhaust HC	1.21	1.15	1.09	1.06	1.03	1.01	0.99	0.96	0.94	0.91	0.88	0.85	0.81
Total HC	4.19	3.85	3.52	3.24	2.99	2.77	2.55	2.40	2.25	2.14	2.04	1.93	1.80
Exhaust CO	45.07	41.43	37.93	34.76	31.84	29.12	26.65	24.90	23.40	22.00	20.94	20.20	19.42
Exhaust NO_x	4.15	3.92	3.75	3.61	3.49	3.36	3.24	3.18	3.12	3.02	2.91	2.78	2.65

KEY: CO = carbon monoxide; HC = hydrocarbon; NO_x = nitrogen oxide; R = revised; RFG = reformulated gasoline.

NOTES

As of July 1 of each year, vehicle types are defined as follows: light-duty vehicles (passenger cars up to 6,000 lb gross vehicle weight rating GVWR); light-duty trucks (pickups and minivans up to 8,500 lb GVWR); heavy-duty vehicles (8,501 lbs or more GVWR); motorcycle (highway only). This table is based on MOBILE6, the U.S. Environmental Protection Agency's (EPA) latest highway vehicle emissions factor model. Interested readers can learn more about the MOBILE6 model at the following USEPA Internet site http://www.epa.gov/otaq/m6.htm.

Emissions factors are national averages based on the following assumptions: ambient temperature 75 ºF, daily temperature range 60-84 ºF, average traffic speed 27.6 mph (representative of overall traffic in urban areas), standard operating mode (cold-start, hot-start, stabilized), vehicle-miles traveled fractions, no inspection/maintenance or antitampering programs, and gasoline volatility 9.0 per square inch RVP (Reid vapor pressure).

See Table 4-39 for emissions from vehicles operating on reformulated gasoline.

Data for nonexhaust HC is negligible for diesel light-duty vehicles, light-duty trucks, and heavy-duty vehicles.

SOURCE

U.S. Environmental Protection Agency, National Vehicle and Fuel Emissions Laboratory, personal communication, July 31, 2002.

TABLE 4-39: Estimated National Average Vehicle Emissions Rates by Vehicle Type Using Reformulated Gasoline (Grams per mile)

	R1995	R1996	R1997	R1998	R1999	R2000	R2001	2002
Light-duty vehicles								
Exhaust HC	1.45	1.28	1.15	1.04	0.97	0.84	0.76	0.68
Nonexhaust HC	0.89	0.87	0.86	0.84	0.82	0.65	0.63	0.61
Total HC	**2.34**	**2.15**	**2.01**	**1.88**	**1.78**	**1.48**	**1.39**	**1.29**
Exhaust CO	22.78	20.84	19.43	18.25	17.21	15.36	14.85	14.31
Exhaust NO_x	1.78	1.64	1.55	1.46	1.35	1.24	1.19	1.12
Light-duty trucks								
Exhaust HC	2.09	1.85	1.69	1.55	1.44	1.28	1.18	1.07
Nonexhaust HC	0.92	0.90	0.88	0.86	0.84	0.67	0.66	0.63
Total HC	**3.01**	**2.74**	**2.58**	**2.41**	**2.28**	**1.95**	**1.84**	**1.71**
Exhaust CO	31.86	29.46	27.70	26.19	24.63	22.25	21.23	20.08
Exhaust NO_x	1.84	1.73	1.65	1.59	1.55	1.47	1.45	1.41
Heavy-duty vehicles								
Exhaust HC	2.14	1.91	1.70	1.48	1.32	1.16	1.03	0.92
Nonexhaust HC	1.72	1.64	1.56	1.50	1.43	1.12	1.07	1.03
Total HC	**3.86**	**3.55**	**3.26**	**2.98**	**2.75**	**2.28**	**2.10**	**1.96**
Exhaust CO	46.02	41.15	36.62	32.80	29.12	25.87	22.88	20.41
Exhaust NO_x	6.13	5.90	5.74	5.57	5.41	5.18	5.01	4.86
Motorcycles								
Exhaust HC	1.69	1.63	1.63	1.62	1.61	1.61	1.61	1.61
Nonexhaust HC	0.55	0.54	0.53	0.53	0.53	0.43	0.43	0.43
Total HC	**2.24**	**2.17**	**2.16**	**2.16**	**2.14**	**2.04**	**2.04**	**2.04**
Exhaust CO	12.64	12.56	12.56	12.56	12.56	12.56	12.56	12.56
Exhaust NO_x	1.26	1.25	1.25	1.25	1.25	1.25	1.25	1.25

TABLE 4-39: Estimated National Average Vehicle Emissions Rates by Vehicle Type Using Reformulated Gasoline (Grams per mile) (Continued)

	R1995	R1996	R1997	R1998	R1999	R2000	R2001	2002
Average of all RFG and diesel vehicles								
Exhaust HC	1.65	1.46	1.34	1.23	1.15	1.02	0.94	0.86
Nonexhaust HC	0.85	0.84	0.82	0.80	0.78	0.62	0.60	0.58
Total HC	**2.50**	**2.30**	**2.16**	**2.03**	**1.93**	**1.64**	**1.54**	**1.44**
Exhaust CO	24.92	22.93	21.56	20.38	19.27	17.44	16.76	15.99
Exhaust NO_x	3.36	3.24	3.18	3.12	3.02	2.85	2.71	2.58

KEY: CO = carbon monoxide; HC = hydrocarbon; NO_x = nitrogen oxide; R = revised; RFG = reformulated gasoline.

NOTES

As of July 1 of each year, vehicle types are defined as follows: light-duty vehicles (passenger cars up to 6,000 lb gross vehicle weight rating GVWR) ; light-duty trucks (pickups and minivans up to 8,500 lb GVWR); heavy-duty vehicles (8,501 lb or more GVWR); motorcycle (on-highway only). The data in this table are based on MOBILE6, and reflect the introduction of RFG starting in 1995. Emissions factors are national averages based on the following assumptions: ambient temperature 75 ºF, daily temperature range 60 -84 ºF, average traffic speed 27.6 mph (representative of overall traffic in urban areas), standard operating mode (cold-start, hot-start, stabilized), vehicle-miles traveled fractions, and no inspection/maintenance or antitampering programs.

Emissions estimates in this table assume 100% RFG.

SOURCE

U.S. Environmental Protection Agency, National Vehicle and Fuel Emissions Laboratory, personal communication, July 31, 2002.

TABLE 4-40: Estimated National Emissions of Carbon Monoxide (Million short tons)

	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
TOTAL all sources	**129.44**	**116.76**	**117.43**	**117.01**	**99.12**	**94.06**	**R104.64**	**R105.51**	**R101.29**	**R102.40**	**109.34**
Transportation											
On-road vehicles	88.03	83.13	78.05	77.39	58.44	54.81	54.39	53.32	52.36	R49.74	48.47
Off-road											
Aircraft	0.51	0.60	0.74	0.83	0.90	0.94	R0.36	R0.36	R0.36	R0.36	0.37
Railroads	0.07	0.08	0.10	0.11	0.12	0.11	0.12	0.12	0.12	0.12	0.12
Marine vessels	0.02	0.03	0.06	0.07	0.13	0.13	R0.14	0.14	0.14	0.14	0.14
Other off-road[a]	2.04	2.17	2.30	2.43	2.50	2.56	R7.05	R7.06	R7.08	R6.98	6.96
Total transportation	**90.67**	**86.01**	**81.25**	**80.83**	**62.10**	**58.55**	**R62.05**	**R61.00**	**R60.06**	**R57.34**	**56.06**
Nontransportation											
Fuel combustion	4.63	4.48	7.30	8.49	5.51	5.93	R4.35	R4.34	R4.34	R4.35	4.59
Industrial processes[b]	9.84	7.54	6.95	5.28	4.77	R4.61	3.64	3.80	3.81	R3.79	3.91
Waste disposal and recycling	7.06	3.23	2.30	1.94	1.08	1.19	R3.54	R3.55	R3.55	R3.55	3.61
Miscellaneous[c]	17.25	15.50	19.63	20.49	25.66	23.78	R31.06	R32.83	R29.53	R33.38	41.18
Total nontransportation	**38.78**	**30.75**	**36.18**	**36.20**	**37.02**	**35.51**	**R42.59**	**R44.51**	**R41.23**	**R45.07**	**R53.29**

KEY: R = revised.

[a] Other off-road comprises nonroad gasoline- and diesel-powered recreational, airport service and railway maintenance vehicles, and recreational marine vessels.

[b] Industrial processes comprise chemical and allied product manufacturing, metals processing, petroleum and related industries, and other industrial processes; and solvent utilization, storage, and transport.

[c] Miscellaneous comprises nonroad gasoline- and diesel-powered construction, industrial, lawn and garden, farm, light-commercial, logging vehicles and other nonroad sources; health services, cooling towers, fugitive dust; and other combustion sources that could not be accurately allocated to specific source categories.

NOTES

The methodologies used to estimate emissions constantly evolve and undergo major changes. These improved methods are often used to revise estimates for previous years. Therefore, some estimates in this table may not match estimates produced in previous reports, and some trends may not be consistent across years in which major changes in methodology have occurred.

Numbers may not add to totals due to rounding.

SOURCES

1970 and 1975: U.S. Environmental Protection Agency, *National Air Quality and Emissions Trends Report: 1999* (EPA-454/R-01-004) (Research Triangle Park, NC: March 2001), table A-2; available at Internet website http://www.epa.gov/oar/aqtrnd99/toc.html as of Sept. 5, 2001.

1980, 1985 and 1989-2000: Ibid, Current Emission Trends Summaries, available at internet website http://www.epa.gov/ttn/chief/trends/trends00/trends2000.pdf as of Oct. 17, 2002.

1986-87: Ibid, National Emission Trends Source Reports Database, available at Internet website www.epa.gov/air/data/nettier.html as of Sept. 5, 2001.

1988: Ibid, *National Air Pollutant Emission Trends: 1900-1998* (EPA-454/R-00-002) (Research Triangle Park, NC: March 2000), table A-1; available at Internet website http://www.epa.gov/ttn/chief/trends/trends98/browse.html as of Sept. 5, 2001.

TABLE 4-41: Estimated National Emissions of Nitrogen Oxides (Million short tons)

	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
TOTAL all sources	**20.93**	**22.63**	**24.38**	**23.20**	**24.17**	**25.05**	**R26.07**	**R26.36**	**R26.01**	**R25.44**	**24.90**
Transportation											
On-road vehicles	7.39	8.65	8.62	8.09	7.21	7.96	8.79	8.92	8.82	R8.61	8.15
Off-road											
Aircraft	0.07	0.09	0.11	0.12	0.16	R0.17	R0.08	R0.08	R0.08	R0.08	0.08
Railroads	0.50	0.59	0.73	0.81	0.93	0.99	1.18	1.22	1.22	R1.24	1.23
Marine vessels	0.17	0.21	0.47	0.56	0.94	0.94	R1.08	R1.08	R1.08	R1.08	1.09
Other off-road[a]	0.04	0.04	0.04	0.06	0.08	0.08	R0.11	R0.11	R0.12	R0.11	0.11
Total transportation	**8.17**	**9.58**	**9.97**	**9.64**	**9.32**	**R10.13**	**R11.25**	**R11.43**	**R11.31**	**R11.13**	**10.66**
Nontransportation											
Fuel combustion	10.06	10.49	11.32	10.05	10.89	10.83	R10.50	R10.56	R10.39	R9.96	9.65
Industrial processes[b]	0.78	0.54	0.56	0.80	0.80	0.77	0.80	0.84	0.85	0.85	0.88
Waste disposal and recycling	0.44	0.16	0.11	0.09	0.09	0.10	R0.09	R0.09	R0.09	0.09	0.09
Miscellaneous[c]	1.49	1.88	2.43	2.62	3.07	3.22	3.42	3.45	3.38	R3.42	3.62
Total nontransportation	**12.77**	**13.07**	**14.42**	**13.56**	**14.85**	**14.92**	**R14.81**	**R14.93**	**R14.70**	**R14.31**	**14.24**

KEY: R = revised.

[a] Other off-road comprises nonroad gasoline- and diesel-powered recreational, airport service and railway maintenance vehicles, and recreational marine vessels.

[b] Industrial processes comprise chemical and allied product manufacturing, metals processing, petroleum and related industries, and other industrial processes; and solvent utilization, storage, and transport.

[c] Miscellaneous comprises nonroad gasoline- and diesel-powered construction, industrial, lawn and garden, farm, light-commercial, logging vehicles, and other nonroad sources; health services, cooling towers, fugitive dust; and other combustion sources that could not be accurately allocated to specific source categories.

NOTES

The methodologies used to estimate emissions constantly evolve and undergo major changes. These improved methods are often used to revise estimates for previous years. Therefore, some estimates in this table may not match estimates produced in previous reports, and some trends may not be consistent across years in which major changes in methodology have occurred.

Numbers may not add to totals due to rounding.

SOURCES

1970, 1975: U.S. Environmental Protection Agency, *National Air Quality and Emissions Trends Report: 1999* (EPA-454/R-01-004) (Research Triangle Park, NC: March 2001), table A-2; available at Internet website http://www.epa.gov/oar/aqtrnd99/toc.html as of Sept. 5, 2001.

1980, 1985 and 1989-2000: Ibid, Current Emission Trends Summaries, available at internet website http://www.epa.gov/ttn/chief/trends/trends00/trends2000.pdf as of Oct. 17, 2002.

1986-87: Ibid, National Emission Trends source reports database; available at Internet website www.epa.gov/air/data/nettier.html as of Sept. 5, 2001.

1988: Ibid, *National Air Pollutant Emission Trends: 1900-1998* (EPA-454/R-00-002) (Research Triangle Park, NC: March 2000), table A-2; available at Internet website http://www.epa.gov/ttn/chief/trends/trends98/browse.html as of Sept. 5, 2001.

TABLE 4-42: Estimated National Emissions of Volatile Organic Compounds (Million short tons)

	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
TOTAL all sources	**30.98**	**26.08**	**R26.34**	**24.43**	**R21.05**	**R20.92**	**R19.92**	**R20.33**	**R19.28**	**R19.44**	**20.38**
Transportation											
On-road vehicles	12.97	10.55	8.98	9.38	6.44	5.82	5.54	5.44	5.44	R5.33	5.04
Off-road											
Aircraft	0.10	0.12	0.15	R0.17	0.18	0.18	R0.03	R0.03	R0.03	R0.03	0.03
Railroads	0.02	0.03	0.03	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Marine vessels	0.01	0.01	0.02	0.02	0.03	0.03	R0.04	R0.04	R0.04	R0.04	0.04
Other off-road[a]	0.87	0.93	0.98	1.03	0.92	R0.93	R1.53	R1.54	R1.54	R1.50	1.49
Total transportation	**13.97**	**11.64**	**10.16**	**10.64**	**7.63**	**7.00**	**R7.19**	**R7.09**	**R7.10**	**R6.95**	**6.64**
Nontransportation											
Fuel combustion	0.72	0.66	1.05	1.57	R1.01	1.07	R1.13	R1.12	R1.12	R1.14	1.21
Industrial processes[b]	12.33	11.10	12.10	9.50	9.01	9.71	8.12	8.34	7.88	R7.43	7.45
Waste disposal and recycling	1.98	0.98	0.76	0.98	0.99	1.07	R0.56	R0.56	R0.57	R0.57	0.58
Miscellaneous[c]	1.98	1.71	2.26	1.75	R2.42	R2.07	R2.92	R3.21	R2.61	R3.35	4.51
Total nontransportation	**17.01**	**14.45**	**16.17**	**13.80**	**R13.43**	**R13.92**	**R12.73**	**R13.23**	**R12.18**	**R12.49**	**13.75**

KEY: R = revised.

[a] Other off-road comprises nonroad gasoline- and diesel-powered recreational, airport service and railway maintenance vehicles, and recreational marine vessels.

[b] Industrial processes comprise chemical and allied product manufacturing, metals processing, petroleum and related industries, and other industrial processes; and solvent utilization, storage, and transport.

[c] Miscellaneous comprises nonroad gasoline- and diesel-powered construction, industrial, lawn and garden, farm, light-commercial, logging vehicles, and other nonroad sources; geogenic sources, catastrophic and accidental releases, health services, cooling towers, nontransportation-related fugitive dust, agriculture and forestry, structural fires, agriculture fires, slash/prescribed burning, forest wildfires, and other combustion sources that could not be accurately allocated to specific source categories.

NOTES

The methodologies used to estimate emissions constantly evolve and undergo major changes. These improved methods are often used to revise estimates for previous years. Therefore, some estimates in this table may not match estimates produced in previous reports, and some trends may not be consistent across years in which major changes in methodology have occurred.

Numbers may not add to totals due to rounding.

SOURCES

1970, 1975: U.S. Environmental Protection Agency, *National Air Quality and Emissions Trends Report: 1999* (EPA-454/R-01-004) (Research Triangle Park, NC: March 2001), table A-2; available at Internet website http://www.epa.gov/oar/aqtrnd99/toc.html as of Sept. 5, 2001.

1980, 1985 and 1989-2000: Ibid, Current Emission Trends Summaries, available at internet website http://www.epa.gov/ttn/chief/trends/trends00/trends2000.pdf as of Oct. 17, 2002.

1986-87: Ibid, National Emission Trends source reports database; available at Internet website www.epa.gov/air/data/nettier.html as of Sept. 5, 2001.

1988: Ibid, *National Air Pollutant Emission Trends: 1900-1998* (EPA-454/R-00-002) (Research Triangle Park, NC: March 2000), table A-2; available at Internet website http://www.epa.gov/ttn/chief/trends/trends98/browse.html as of Sept. 5, 2001.

TABLE 4-43: Estimated National Emissions of Particulate Matter (PM-10)[a] (Million short tons)

	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
TOTAL all sources	**13.04**	**7.67**	**7.12**	**R41.40**	**R27.88**	**R25.93**	**R23.25**	**R24.10**	**R23.72**	**R24.04**	**24.88**
Transportation											
On-road vehicles	0.44	0.47	0.40	0.36	0.35	0.30	0.35	0.33	0.31	0.30	0.27
Off-road											
Aircraft	0.02	0.03	0.03	0.04	0.04	0.04	0.01	R0.01	R0.01	R0.01	0.01
Railroads	0.03	0.03	0.04	0.04	0.05	0.03	0.03	0.03	0.03	0.03	0.03
Marine vessels	0.01	0.01	0.02	0.03	0.04	0.04	R0.07	R0.07	R0.07	R0.07	0.07
Other off-road[b]	<0.01	0.03	0.03	0.03	0.04	0.04	0.05	0.05	0.05	0.05	0.05
Total transportation-fuel-related	**R0.49**	**0.57**	**0.52**	**0.50**	**0.53**	**0.45**	**R0.49**	**R0.48**	**R0.46**	**R0.45**	**0.42**
Transportation-related fugitive dust											
Unpaved highways	N	N	N	11.64	11.23	10.36	9.07	9.46	9.33	R9.16	9.15
Paved highways	N	N	N	5.08	2.25	2.41	2.40	2.60	2.66	R2.77	2.74
Total transportation	**R0.49**	**0.57**	**0.52**	**17.22**	**14.01**	**13.22**	**R11.97**	**R12.54**	**R12.45**	**R12.37**	**12.32**
Nontransportation											
Fuel combustion	2.87	2.25	2.45	1.54	1.20	1.18	R0.98	R0.98	R0.91	R0.95	1.00
Industrial processes[c]	7.67	3.70	2.75	1.06	R1.04	R0.94	0.65	0.67	0.67	0.68	0.70
Waste disposal and recycling	1.00	0.37	0.27	0.28	0.27	0.29	R0.53	R0.53	R0.53	R0.53	0.54
Miscellaneous[d]	1.00	0.78	1.13	R21.29	R11.37	R10.30	R9.13	R9.38	R9.15	R9.51	10.32
Total nontransportation	**12.54**	**7.10**	**6.60**	**R24.17**	**R13.87**	**R12.71**	**R11.29**	**R11.56**	**R11.27**	**R11.67**	**12.56**

KEY: N = data do not exist; R = revised.

[a] Fine particulate matter less than 10 microns.

[b] Other off-road comprises nonroad gasoline- and diesel-powered recreational, airport service and railway maintenance vehicles, and recreational marine vessels.

[c] Industrial processes comprise chemical and allied product manufacturing, metals processing, petroleum and related industries, and other industrial processes; solvent utilization; and storage and transport.

[d] Miscellaneous comprises nonroad gasoline- and diesel-powered construction, industrial, lawn and garden, farm, light-commercial, logging vehicles and other non-road sources; geogenic sources; agriculture and forestry, cooling towers, nontransportation-related fugitive dust, wildfires, managed burning, and other combustion sources that could not be accurately allocated to specific source categories.

NOTES

The methodologies used to estimate emissions constantly evolve and undergo major changes. These improved methods are often used to revise estimates for previous years. Therefore, some estimates in this table may not match estimates produced in previous reports, and some trends may not be consistent across years in which major changes in methodology have occurred.

Numbers may not add to totals due to rounding.

SOURCE

1970, 1975: U.S. Environmental Protection Agency, personal communication, Sept. 5, 2002.

1980, 1985 and 1989-2000: Ibid, Current Emission Trends Summaries, available at internet website http://www.epa.gov/ttn/chief/trends/trends00/trends2000.pdf as of Oct. 17, 2002.

1986-87: Ibid, National Emission Trends Source Reports Database; available at Internet website www.epa.gov/air/data/nettier.html as of Sept. 5, 2001.

1988: *National Air Pollutant Emission Trends: 1900-1998* (EPA-454/R-00-002) (Research Triangle Park, NC: March 2000), table A-2, available at Internet website http://www.epa.gov/ttn/chief/trends/trends98/browse.html as of Sept. 5, 2001.

TABLE 4-44: Estimated National Emissions of Particulate Matter (PM-2.5)[a] (Million short tons)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
TOTAL all sources[R]	**7.65**	**7.43**	**7.32**	**7.25**	**7.65**	**7.01**	**6.72**	**7.04**	**6.74**	**7.08**	**7.75**
Transportation											
On-road vehicles	0.29	0.29	0.28	0.26	0.26	0.24	0.28	0.26	0.25	0.23	0.21
Aircraft	0.03	0.03	0.03	0.03	0.03	0.03	R<0.01	R<0.01	R<0.01	R<0.01	<0.01
Railroads	0.05	0.05	0.05	0.05	0.05	R0.03	0.03	0.03	0.03	0.03	0.03
Marine vessels	0.03	0.03	0.03	0.03	0.03	0.03	R0.06	R0.06	R0.06	R0.06	0.06
Other off-road[b]	0.03	0.03	0.03	R0.04	R0.04	R0.04	R0.05	R0.05	R0.05	0.04	0.04
Transportation-related fugitive dust											
Unpaved roads	1.69	1.68	1.64	1.72	1.71	1.56	1.37	1.43	1.41	R1.38	1.38
Paved roads	0.56	0.60	0.61	0.62	0.63	R0.58	0.60	0.65	0.67	R0.69	0.69
Total transportation	**2.68**	**R2.72**	**R2.68**	**R2.75**	**R2.75**	**2.50**	**2.38**	**2.48**	**2.46**	**R2.44**	**2.41**
Nontransportation											
Fuel combustion	0.91	0.89	0.93	0.85	0.84	0.90	R0.74	R0.74	R0.71	R0.72	0.76
Industrial processes[c]	0.56	0.57	0.58	0.50	0.50	0.50	0.37	0.38	0.39	0.39	0.40
Waste disposal and recycling	0.23	0.24	0.24	0.29	0.27	0.25	R0.50	R0.50	R0.50	R0.50	0.51
Miscellaneous[R,d]	3.27	3.00	2.89	R2.87	3.30	R2.86	2.73	R2.94	2.69	3.03	3.66
Total nontransportation	**4.97**	**4.71**	**4.64**	**4.52**	**4.91**	**4.51**	**4.34**	**4.57**	**4.29**	**4.64**	**5.34**

KEY: R = revised.

[a] Particulate matter less than 2.5 microns in size.

[b] Other off-road comprises nonroad gasoline- and diesel-powered recreational, airport service and railway maintenance vehicles and recreational marine vessels.

[c] Industrial processes comprise chemical and allied product manufacturing, metals processing, petroleum and related industries, and other industrial processes; solvent utilization; and storage and transportation.

[d] Miscellaneous comprises nonroad gasoline- and diesel-powered construction, industrial, lawn and garden, farm, light-commercial, logging vehicles and other non-road sources; geogenic sources, agriculture and forestry, cooling towers, nontransportation-related fugitive dust, wildfires, managed burning, and other fugitive dust and combustion that could not accurately be allocated to specific source categories.

NOTES

The emissions estimates shown here are those that are directly emitted, which represent only a portion of the total PM-2.5 emissions found in the air. Secondary formation of fine particulates resulting from emissions of nitrogen oxide, sulfur dioxide, volatile organic compounds, and other substances is also a significant source of PM-2.5.

Numbers may not add to totals due to rounding.

The methodologies used to estimate emissions constantly evolve and undergo major changes. Improved methods are often used to revise estimates for previous years. Therefore, some estimates in this table may not match estimates produced in previous reports, and some trends may not be consistent across years in which major changes in methodology have occurred.

SOURCE

1990-2000: U.S. Environmental Protection Agency, Current Emission Trends Summaries, available at internet website http://www.epa.gov/ttn/chief/trends/trends00/trends2000.pdf as of Oct. 17, 2002.

TABLE 4-45: Estimated National Emissions of Sulfur Dioxide (Million short tons)

	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
TOTAL all sources	**31.16**	**28.01**	**25.91**	**23.66**	**23.68**	**19.19**	**R19.45**	**R19.94**	**R20.06**	**R19.35**	**18.20**
Transportation											
On-road vehicles	0.41	0.50	0.52	0.52	0.56	0.31	0.34	0.35	0.36	R0.37	0.31
Off-road											
Aircraft	<0.01	<0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Railroads	0.04	0.04	0.05	0.06	0.12	0.11	R0.06	R0.06	R0.06	R0.06	0.06
Marine vessels	0.04	0.05	0.12	0.14	0.25	0.24	R0.89	R0.89	R0.89	R0.89	0.87
Total transportation	**0.49**	**0.59**	**0.70**	**0.73**	**0.94**	**0.67**	**1.29**	**1.30**	**1.31**	**1.32**	**1.25**
Nontransportation											
Fuel combustion	23.46	22.66	21.39	20.02	20.29	16.23	16.23	16.65	16.75	R16.03	14.88
Industrial processes[a]	7.09	4.68	3.77	2.43	1.86	1.59	1.38	1.43	1.43	R1.42	1.46
Waste disposal and recycling	0.01	0.05	0.03	0.03	0.04	0.05	R0.03	R0.03	R0.03	R0.03	0.04
Miscellaneous[b]	0.11	0.02	0.01	0.44	R0.54	R0.64	0.51	R0.52	R0.54	0.55	0.57
Total nontransportation	**30.67**	**27.41**	**25.20**	**22.92**	**22.74**	**R18.51**	**R18.15**	**R18.63**	**18.75**	**R18.03**	**16.95**

KEY: R = revised.

[a] Industrial processes comprise chemical and allied product manufacturing, metals processing, petroleum and related industries, and other industrial processes; solvent utilization; and storage and transport.

[b] Miscellaneous comprises nontransportation-related fugitive dust, nonroad gasoline, nonroad diesel, other nonroad sources and other miscellaneous combustion that could not be accurately allocated to specific source categories.

NOTES

The methodologies used to estimate emissions constantly evolve and undergo major changes. These improved methods are often used to revise estimates for previous years. Therefore, some estimates in this table may not match estimates produced in previous reports, and some trends may not be consistent across years in which major methodology changes have occurred.

Numbers may not add to totals due to rounding.

SOURCES

1970, 1975: U.S. Environmental Protection Agency, *National Air Quality and Emissions Trends Report: 1999* (EPA-454/R-01-004) (Research Triangle Park, NC: March 2001), table A-2; available at Internet website http://www.epa.gov/oar/aqtrnd99/toc.html as of Sept. 5, 2001.

1980, 1985 and 1990-2000: Ibid, Current Emission Trends Summaries, available at internet website http://www.epa.gov/ttn/chief/trends/trends00/trends2000.pdf as of Oct. 17, 2002.

1986-89: Ibid, National Emission Trends Source Reports Database, available at Internet website www.epa.gov/air/data/nettier.html as of Sept. 5, 2001.

TABLE 4-46: Estimated National Emissions of Lead (Thousand short tons)

	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
TOTAL all sources	**220.87**	**159.66**	**74.15**	**22.89**	**4.98**	**3.93**	**4.08**	**4.14**	**4.06**	**4.20**	**4.23**
Transportation											
Highway vehicles	171.96	130.21	60.50	18.05	0.42	0.02	0.02	0.02	0.02	0.02	0.02
Aircraft	1.40	1.12	0.89	0.69	0.62	0.54	0.51	0.50	0.50	R0.52	0.55
Total transportation	**173.36**	**131.33**	**61.39**	**18.74**	**1.04**	**0.56**	**R0.52**	**0.52**	**0.52**	**0.54**	**0.56**
Fuel combustion	10.62	10.35	4.30	0.52	0.50	0.49	0.49	0.49	0.49	0.50	0.50
Industrial processes[a]	26.36	11.38	3.94	2.53	R2.48	2.27	2.27	2.32	R2.24	2.35	2.35
Waste disposal and recycling	2.20	1.60	1.21	0.87	0.80	0.60	0.79	0.80	0.81	0.81	0.81
Miscellaneous[b]	8.34	5.01	3.32	0.23	0.16	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total nontransportation	**47.52**	**28.34**	**12.77**	**4.15**	**3.94**	**3.37**	**3.55**	**3.61**	**3.54**	**3.66**	**3.66**

KEY: R = revised.

[a] Industrial processes comprise chemical and allied product manufacturing, metals processing, and other industrial processes.

[b] Miscellaneous comprises other nonroad gasoline, engines and vehicles that could not be accurately allocated to specific source categories.

NOTES

Total lead emissions decreased sharply from 1970 to 1995 as a result of regulatory actions. The lead content of leaded gasoline was reduced dramatically in 1985. In addition, unleaded gasoline was introduced in 1975 for use in automobiles equipped with catalytic control devices. By 1995, unleaded gasoline sales accounted for 99 percent of the gasoline market.

The methodologies used to estimate emissions constantly evolve and undergo major changes. Improved methods are often used to revise estimates for previous years. Therefore, some estimates in this table may not match estimates produced in previous reports, and some trends may not be consistent across years in which major changes in methodology have occurred.

Numbers may not add to totals due to rounding.

SOURCES

1970, 1975: U.S. Environmental Protection Agency, *National Air Quality and Emissions Trends Report: 1999* (EPA-454/R-01-004) (Research Triangle Park, NC: March 2001), table A-2; available at Internet website http://www.epa.gov/oar/aqtrnd99/toc.html as of Sept. 5, 2001.

1980, 1985 and 1989-2000: Ibid, Current Emission Trends Summaries, available at internet website http://www.epa.gov/ttn/chief/trends/trends00/trends2000.pdf as of Oct. 17, 2002.

1986-87: Ibid, National Emission Trends source reports database; available at Internet website www.epa.gov/air/data/nettier.html as of Sept. 5, 2001.

1988: Ibid, *National Air Pollutant Emission Trends: 1900-1998* (EPA-454/R-00-002) (Research Triangle Park, NC: March 2000), table A-2; available at Internet website http://www.epa.gov/ttn/chief/trends/trends98/browse.html as of Sept. 5, 2001.

TABLE 4-47: Air Pollution Trends in Selected Metropolitan Statistical Areas (Number of days with AQI values greater than 100 at trend sites and all monitoring sites)

	All sites		Trend sites										
	Total number of sites[R]	AQI days > 100 (2001)	Number of trend sites[R]	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Akron, OH	2	12	2	8	10	8	12	11	6	14	20	4	12
Albany-Schenectady-Troy, NY	3	11	3	5	5	6	3	4	3	2	6	1	11
Albuquerque, NM	1	1	1	0	0	1	0	0	0	0	1	0	1
Allentown-Bethlehem-Easton, PA	3	15	2	3	6	3	9	6	13	18	20	5	9
Atlanta, GA	12	18	3	20	36	15	35	25	31	50	61	26	8
Austin-San Marcos, TX	1	1	0	1	2	4	10	0	0	5	8	6	0
Bakersfield, CA	8	33	7	100	97	R104	R107	R110	R58	76	R94	82	33
Baltimore, MD	8	26	7	23	48	R40	36	28	30	51	40	16	26
Baton Rouge, LA	6	5	6	R6	R13	R10	R21	R11	R16	R16	R23	29	5
Bergen-Passaic, NJ	2	5	0	R0	R0	R0	R0	R0	R0	R1	0	0	0
Birmingham, AL	6	12	6	12	10	6	32	15	8	R22	27	22	12
Boston, MA-NH	5	18	3	R6	R2	R6	R7	R4	R7	R8	R8	1	14
Buffalo-Niagara Falls, NY	2	13	2	3	1	4	6	3	1	13	8	5	13
Charleston-North Charleston, SC	0	0	0	0	2	2	1	3	3	3	5	4	0
Charlotte-Gastonia-Rock Hill, NC-SC	7	26	6	11	R29	R15	R19	R23	R30	R49	R40	22	23
Chicago, IL	19	16	19	R6	3	R9	R24	R7	9	R10	R14	0	15
Cincinnati, OH-KY-IN	8	12	5	1	R5	16	19	10	11	R13	12	4	6
Cleveland-Lorain-Elyria, OH	9	24	8	11	R16	R25	R27	R19	R13	R22	R21	5	17
Columbus, OH	7	9	4	5	R8	R12	R18	R19	R13	R21	R22	6	7
Dallas, TX	8	24	2	R8	R13	R26	R28	R10	20	R26	23	20	14
Dayton-Springfield, OH	5	5	4	2	11	14	11	18	R10	19	19	6	4
Denver, CO	6	2	6	11	R6	R3	R5	R1	0	R9	R4	2	2
Detroit, MI	7	16	7	7	5	11	14	13	R11	17	15	3	16
El Paso, TX	4	8	4	10	7	R9	R7	R5	R3	6	R1	3	5
Fort Lauderdale, FL	2	2	2	2	4	1	1	1	0	1	1	1	2
Fort Worth-Arlington, TX	7	25	2	7	9	31	28	14	14	17	19	16	17
Fresno, CA	7	85	6	69	59	55	61	70	75	67	81	78	85
Gary, IN	4	10	2	5	0	6	17	11	R11	9	10	5	9
Grand Rapids-Muskegon-Holland, MI	5	11	4	R5	3	R14	R18	R9	R10	R19	R21	3	11

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TABLE 4-47: Air Pollution Trends in Selected Metropolitan Statistical Areas (Number of days with AQI values greater than 100 at trend sites and all monitoring sites) (Continued)

	All sites		Trend sites										
	Total number of sites[R]	AQI days > 100 (2001)	Number of trend sites[R]	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Greensboro-Winston-Salem-High Pt., NC	7	20	4	2	[R]22	7	[R]13	[R]7	[R]14	25	[R]24	12	12
Greenville-Spartanburg-Anderson, SC	4	13	4	5	[R]8	5	[R]7	7	[R]9	28	19	11	13
Harrisburg-Lebanon-Carlisle, PA	3	17	3	1	15	12	13	3	9	22	17	5	17
Hartford, CT	3	16	3	15	14	18	14	5	16	10	18	7	16
Honolulu, HI	0	0	0	0	0	0	0	0	0	0	0	0	0
Houston, TX	16	37	9	32	[R]27	[R]41	66	[R]28	47	[R]29	[R]52	41	28
Indianapolis, IN	11	10	7	[R]6	9	22	[R]21	[R]16	12	19	[R]24	4	8
Jacksonville, FL	2	1	2	2	3	2	1	1	4	[R]2	3	0	1
Jersey City, NJ	1	3	1	11	19	17	18	5	9	7	17	3	3
Kansas City, MO-KS	4	4	4	1	[R]3	10	[R]21	[R]7	[R]16	[R]14	5	10	4
Knoxville, TN	7	17	7	7	25	16	[R]26	[R]21	[R]37	54	[R]62	36	17
Las Vegas, NV-AZ	6	5	3	[R]3	[R]3	[R]3	0	[R]4	0	[R]3	0	0	1
Little Rock-North Little Rock, AR	2	4	2	0	2	2	7	1	1	[R]3	[R]5	16	4
Los Angeles-Long Beach, CA	14	36	14	175	134	139	113	94	60	56	27	48	30
Louisville, KY-IN	6	10	6	2	23	[R]28	[R]24	11	[R]18	[R]29	[R]44	10	10
Memphis, TN-AR-MS	4	13	4	14	15	10	21	19	17	[R]26	[R]35	24	13
Miami, FL	4	1	4	3	6	1	2	1	3	[R]6	5	0	1
Middlesex-Somerset-Hunterdon, NJ	2	11	2	8	13	9	[R]20	[R]15	[R]19	[R]22	[R]26	11	11
Milwaukee-Waukesha, WI	9	12	9	3	4	[R]12	14	5	[R]5	[R]12	[R]18	4	12
Minneapolis-St. Paul, MN-WI	3	3	2	1	0	2	5	0	0	1	0	0	2
Monmouth-Ocean, NJ	2	13	2	11	24	13	20	17	21	31	27	11	13
Nashville, TN	6	7	6	6	[R]19	21	26	[R]23	20	30	33	16	7
Nassau-Suffolk, NY	3	9	2	7	17	15	10	8	12	11	18	5	3
New Haven-Meriden, CT	2	13	2	10	[R]13	[R]13	14	8	19	10	16	6	11
New Orleans, LA	6	5	6	5	6	8	20	8	7	[R]4	18	17	5
New York, NY	8	20	4	[R]4	[R]11	[R]16	[R]20	[R]14	23	[R]16	[R]25	11	16
Newark, NJ	2	10	2	10	13	13	20	12	13	23	21	7	10
Norfolk-VA Beach-Newport News, VA-NC	3	6	3	8	19	6	6	4	17	15	16	5	6
Oakland, CA	7	4	7	[R]4	4	3	12	11	0	[R]12	[R]6	3	3

TABLE 4-47: Air Pollution Trends in Selected Metropolitan Statistical Areas (Number of days with AQI values greater than 100 at trend sites and all monitoring sites) (Continued)

	All sites		Trend sites										
	Total number of sites[R]	AQI days > 100 (2001)	Number of trend sites[R]	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Oklahoma City, OK	4	2	4	2	2	5	13	2	4	[R]6	6	6	2
Omaha, NE-IA	1	1	1	0	1	1	1	[R]0	0	[R]1	5	1	1
Orange County, CA	4	4	4	35	25	15	9	9	3	6	1	4	2
Orlando, FL	4	3	4	4	4	3	1	1	[R]5	[R]9	4	3	3
Philadelphia, PA-NJ	12	25	12	[R]27	[R]62	[R]37	[R]38	[R]38	[R]38	37	32	18	22
Phoenix-Mesa, AZ	12	18	7	[R]11	[R]15	[R]9	22	[R]15	12	[R]14	[R]10	10	6
Pittsburgh, PA	13	20	9	9	[R]15	[R]21	[R]26	11	[R]20	39	[R]24	4	18
Ponce, PR	0	0	0	0	0	0	0	0	0	0	0	0	0
Portland-Vancouver, OR-WA	3	2	3	6	0	2	2	6	0	3	2	0	2
Providence-Fall River-Warwick, RI-MA	2	13	1	[R]0	[R]0	[R]5	[R]7	[R]2	[R]3	[R]2	[R]2	2	10
Raleigh-Durham-Chapel Hill, NC	6	9	6	0	[R]17	[R]15	[R]12	[R]13	[R]21	[R]37	[R]29	12	8
Richmond-Petersburg, VA	4	14	4	8	30	13	19	5	21	28	25	5	12
Riverside-San Bernardino, CA	20	97	20	174	168	[R]150	124	[R]118	105	[R]94	[R]96	100	94
Rochester, NY	2	5	2	2	0	1	6	0	6	4	9	1	5
Sacramento, CA	11	25	10	[R]50	20	[R]37	41	[R]44	[R]17	[R]29	[R]39	29	17
St. Louis, MO-IL	15	15	15	15	9	[R]33	[R]36	20	15	23	29	14	15
Salt Lake City-Ogden, UT	6	6	6	[R]8	[R]4	[R]10	[R]5	[R]14	[R]2	[R]19	[R]4	2	4
San Antonio, TX	1	1	0	[R]0	3	[R]3	[R]17	[R]2	3	[R]4	9	0	0
San Diego, CA	9	17	9	66	[R]59	46	48	31	14	33	16	14	17
San Francisco, CA	0	0	0	0	0	0	2	0	0	0	0	0	0
San Jose, CA	6	3	6	3	4	2	[R]14	[R]8	0	[R]8	[R]4	1	3
San Juan-Bayamon, PR	0	0	0	0	0	0	0	[R]0	[R]0	[R]0	[R]0	0	0
Scranton-Wilkes Barre-Hazleton, PA	4	10	4	3	10	7	12	4	11	7	12	1	10
Seattle-Bellevue-Everett, WA	2	1	0	[R]5	0	3	[R]2	6	1	3	1	1	0
Springfield, MA	4	13	4	12	13	12	9	5	10	7	10	2	13
Syracuse, NY	2	4	2	2	4	1	5	0	2	3	4	1	4
Tacoma, WA	0	0	0	2	0	2	0	1	0	4	0	0	0
Tampa-St. Petersburg-Clearwater, FL	9	6	7	2	1	3	2	3	4	[R]6	9	6	4
Toledo, OH	4	11	2	2	7	[R]8	9	11	4	5	4	2	9

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TABLE 4-47: Air Pollution Trends in Selected Metropolitan Statistical Areas (Number of days with AQI values greater than 100 at trend sites and all monitoring sites) (Continued)

	All sites		Trend sites										
	Total number of sites[R]	AQI days > 100 (2001)	Number of trend sites[R]	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Tucson, AZ	0	0	0	1	1	0	3	0	1	0	[R]1	0	0
Tulsa, OK	5	7	3	1	4	12	21	14	7	9	14	7	4
Ventura, CA	6	23	6	54	43	63	66	62	45	29	22	27	18
Washington, DC-MD-VA-WV	20	23	16	14	52	[R]22	[R]32	18	[R]30	47	39	11	22
West Palm Beach-Boca Raton, FL	2	1	2	0	3	0	0	0	0	2	1	0	1
Wilmington-Newark, DE-MD	5	20	4	12	29	24	27	13	[R]22	[R]28	21	18	19
Youngstown-Warren, OH	3	12	3	10	10	5	12	8	10	22	12	2	12

KEY: AQI = Air Quality Index; R = revised.

NOTES

The Air Quality Index (AQI) integrates information on 5 major pollutants (particulate matter less than 10 microns in diameter, sulfur dioxide, carbon monoxide, ozone, and nitrogen dioxide) across an entire monitoring network into a single number that represents the worst daily air quality experienced in an urban area. An AQI greater than 100 indicates that at least 1 criteria pollutant exceeded air quality standards on a given day; therefore, air quality would be in the unhealthful range on that day. In 1999, 4,184 monitoring sites reported air quality data. Air quality monitoring sites are selected as "trend sites" if they have complete data for at least 8 of the 10 years between 1992 and 2001.

SOURCE

U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, *National Air Quality and Emissions Trends Report, 2000* (Research Triangle Park, NC: 2002), table A-16.

TABLE 4-48: Areas in Nonattainment of National Ambient Air Quality Standards for Criteria Pollutants (Condensed nonattainment area list as of September 2001)

Ref. no.	States	Consolidated nonattainment area name[b]	Number of areas in nonattainment[c,d]						Area population, in 1,000s[j]					
			O_3[e]	CO	SO_2	PM-10	Pb	NO^2	O_3	CO	SO_2	PM-10	Pb	Total exposed
1	AK	Anchorage	.	1	.	1	.	.		255		195		255
2	AK	Fairbanks	.	1	.	.	.	.		39				39
3	AK	Juneau	.	.	.	1	.	.				13		13
4	AL	Birmingham	1	.	.	.	.	.	805					805
5	AZ	Ajo	.	.	1	1	.	.			7	7		7
6	AZ	Bullhead City	.	.	.	1	.	.				8		8
7	AZ	Douglas	.	.	1	1	.	.			15	15		15
8	AZ	Miami-Hayden	.	.	2	1	.	.			4	4		4
9	AZ	Morenci	.	.	1	.	.	.			8			8
10	AZ	Nogales	.	.	.	1	.	.				24		24
11	AZ	Paul Spur	.	.	.	1	.	.				1		1
12	AZ	Payson	.	.	.	1	.	.				5		5
13	AZ	Phoenix	1	1	.	1	.	.	3,028	3,028		3,111		3,111
14	AZ	Rillito	.	.	.	1	.	.				0		0
15	AZ	San Manuel	.	.	1	.	.	.			7			7
16	AZ	Yuma	.	.	.	1	.	.				82		82
17	CA	Imperial Valley	.	.	.	1	.	.				119		119
18	CA	Los Angeles-South Coast Air Basin	1	1	.	1	.	.	14,943	14,943		14,943		14,943
19	CA	Mono Basin (in Mono Co.)	.	.	.	1	.	.				0		0
20	CA	Owens Valley	.	.	.	1	.	.				7		7
21	CA	Sacramento Metro	1	.	.	1	.	.	1,978			1,223		1,978
22	CA	San Diego	1	.	.	.	.	.	2,813					2,813
23	CA	San Francisco-Oakland-San Jose	1	.	.	.	.	.	6,541					6,541
24	CA	San Joaquin Valley	2	.	.	1	.	.	3,302			3,080		3,302
25	CA	Santa Barbara-Santa Maria-Lompoc	1	.	.	.	.	.	399					399
26	CA	Searles Valley	.	.	.	1	.	.				22		22
27	CA	Southeast Desert Modified AQMA	1	.	.	2	.	.	534			424		534
28	CA	Ventura Co.	1	.	.	.	.	.	753					753
29	CO	Aspen	.	.	.	1	.	.				5		5
30	CO	Denver-Boulder	.	1	.	1	.	.		2,256		2,389		2,389
31	CO	Fort Collins	.	1	.	.	.	.		143				143
32	CO	Lamar	.	.	.	1	.	.				8		8
33	CO	Steamboat Springs	.	.	.	1	.	.				9		9
34	CT	Greater Connecticut	1	.	.	1	.	.	2,532			123		2,532
35	DC-MD-VA	Washington	1	.	.	.	.	.	4,544					4,544
36	DE	Sussex County	1	.	.	.	.	.	156					156
37	GA	Atlanta	1	.	.	.	.	.	3,698					3,698
38	GU[a]	Piti Power Plant	.	.	1	.	.	.			1			1
39	GU[a]	Tanguisson Power Plant	.	.	1	.	.	.			1			1

Continued next page

TABLE 4-48: Areas in Nonattainment of National Ambient Air Quality Standards for Criteria Pollutants (Condensed nonattainment area list as of September 2001) (Continued)

Ref. no.	States	Consolidated nonattainment area name[b]	Number of areas in nonattainment[c,d]						Area population, in 1,000s[j]					
			O_3[e]	CO	SO_2	PM-10	Pb	NO^2	O_3	CO	SO_2	PM-10	Pb	Total exposed
40	ID	Bonner Co. (Sandpoint)	.	.	.	1	.	.				36		36
41	ID	Pocatello Area	.	.	.	2	.	.				66		66
42	ID	Shoshone Co.	.	.	.	2	.	.				12		12
43	IL-IN	Chicago-Gary-Lake County	1	.	1	3	.	.	8,757		484	322		8,757
44	KY	Boyd Co. (Ashland)	.	.	[g]1	.	.	.			49			49
45	KY-IN	Louisville	1	.	.	.	.	.	883					883
46	LA	Baton Rouge	1	.	.	.	.	.	636					636
47	MA	Boston-Lawrence	1	.	.	.	.	.	5,883					5,883
48	MA	Springfield (W. Mass)	1	.	.	.	.	.	814					814
49	MD	Baltimore	1	.	.	.	.	.	2,512					2,512
50	MD	Kent and Queen Anne Cos.	1	.	.	.	.	.	59					59
51	ME	Knox/Lincoln County	1	.	.	.	.	.	73					73
52	ME	Lewiston-Auburn	1	.	.	.	.	.	220					220
53	ME	Portland	1	.	.	.	.	.	487					487
54	MN	Minneapolis-St. Paul	.	.	.	1	.	.				286		286
55	MO	Liberty-Arcadia	.	.	.	.	1	.					5	5
56	MO-IL	St. Louis	1	.	.	.	[h]1	.	2,482				2	2,482
57	MT	Butte	.	.	.	1	.	.				34		34
58	MT	Columbia Falls	.	.	.	1	.	.				3		3
59	MT	Kalispell	.	.	.	1	.	.				15		15
60	MT	Lame Deer	.	.	.	1	.	.				0		0
61	MT	Lewis & Clark (E. Helena)	.	.	1	.	[i]1	.			2		2	2
62	MT	Libby	.	.	.	1	.	.				3		3
63	MT	Missoula	.	1	.	1	.	.		52		52		52
64	MT	Polson	.	.	.	1	.	.				3		3
65	MT	Ronan	.	.	.	1	.	.				2		2
66	MT	Thompson Falls	.	.	.	1	.	.				1		1
67	MT	Whitefish	.	.	.	1	.	.				5		5
68	MT	Yellowstone Co. (Laurel)	.	.	1	.	.	.			5			5
69	NH	Manchester	1	.	.	.	.	.	364					364
70	NH	Portsmouth-Dover-Rochester	1	.	.	.	.	.	192					192
71	NJ	Atlantic City	1	.	.	.	.	.	354					354
72	NM	Anthony	.	.	.	1	.	.				2		2
73	NM	Grant Co.	.	.	1	.	.	.			31			31
74	NM	Sunland Park	[f]1	.	.	.	.	.	10					10
75	NV	Central Steptoe Valley	.	.	1	.	.	.			1			1
76	NV	Las Vegas	.	1	.	1	.	.		478		1,375		1,375
77	NV	Reno	1	1	.	1	.	.	339	178		339		339

TABLE 4-48: Areas in Nonattainment of National Ambient Air Quality Standards for Criteria Pollutants (Condensed nonattainment area list as of September 2001) (Continued)

Ref. no.	States	Consolidated nonattainment area name[b]	Number of areas in nonattainment[c,d]						Area population, in 1,000s[j]					
			O_3[e]	CO	SO_2	PM-10	Pb	NO^2	O_3	CO	SO_2	PM-10	Pb	Total exposed
78	NY	Albany-Schenectady	1	.	.	.	.	.	892					892
79	NY	Buffalo-Niagara Falls	1	.	.	.	.	.	1,170					1,170
80	NY	Essex City, Whiteface	1	.	.	.	.	.	0					0
81	NY	Jefferson Co.	1	.	.	.	.	.	111					111
82	NY	Poughkeepsie	1	.	.	.	.	.	600					600
83	NY-NJ-CT	New York-N. New Jersey-Long Island	1	1	.	1	.	.	19,171	13,371		1,537		19,171
84	OH	Cleveland-Akron-Lorain	.	.	1		.	.			1,095			1,095
85	OH	Lucas Co. (Toledo)	.	.	1	.	.	.			455			455
86	OH-KY	Cincinnati-Hamilton	1	.	.	.	.	.	1,514					1,514
87	OH-PA	Youngstown-Warren	1	.	.	.	.	.	120					120
88	OR	Grants Pass	.	.	.	1	.	.				20		20
89	OR	Klamath Falls	.	1	.	1	.	.		19		19		19
90	OR	LaGrande	.	.	.	1	.	.				12		12
91	OR	Lakeview	.	.	.	1	.	.				3		3
92	OR	Medford	.	1	.	1	.	.		76		78		78
93	OR	Oakridge	.	.	.	1	.	.				3		3
94	OR	Springfield-Eugene	.	.	.	1	.	.				179		179
95	PA	Altoona	1	.	.	.	.	.	129					129
96	PA	Erie	1	.	.	.	.	.	280					280
97	PA	Harrisburg-Lebanon	1	.	.	.	.	.	629					629
98	PA	Johnstown	1	.	.	.	.	.	232					232
99	PA	Lancaster	1	.	.	.	.	.	470					470
100	PA	Pittsburgh-Beaver Valley	1	.	2	1	.	.	2,431		410	19		2,431
101	PA	Scranton-Wilkes-Barre	1	.	.	.	.	.	763					763
102	PA	Warren Co	.	.	2	.	.	.			20			20
103	PA	York	1	.	.	.	.	.	473					473
104	PA-DE-NJ-MD	Philadelphia-Wilmington-Trenton	1	.	.	.	.	.	6,311					6,311
105	PA-NJ	Allentown-Bethlehem	1	.	1				740		102			740
106	PR	Guaynabo Co.	.	.	.	1	.	.				92		92
107	RI	Providence (all of RI)	1	.	.	.	.	.	1,048					1,048
108	TX	Beaumont-Port Arthur	1	.	.	.	.	.	385					385
109	TX	Dallas-Fort Worth	1	.	.	.	.	.	4,589					4,589
110	TX	El Paso	1	1	.	1	.	.	679	62		563		679
111	TX	Houston-Galveston-Brazoria	1	.	.	.	.	.	4,669					4,669
112	UT	Ogden	.	.	.	1	.	.				77		77
113	UT	Salt Lake City	.	.	1	1	.	.			898	898		898
114	UT	Tooele Co.	.	.	1	.	.	.			40			40
115	UT	Utah Co. (Provo)	.	1	.	1	.	.		118		368		368
116	VA	Smyth Co., White Top	1	.	.	.	.	.	0					0

Continued next page

TABLE 4-48: Areas in Nonattainment of National Ambient Air Quality Standards for Criteria Pollutants (Condensed nonattainment area list as of September 2001) (Continued)

Ref. no.	States	Consolidated nonattainment area name[b]	Number of areas in nonattainment[c,d]						Area population, in 1,000s[j]					
			O_3[e]	CO	SO_2	PM-10	Pb	NO^2	O_3	CO	SO_2	PM-10	Pb	Total exposed
117	WA	Spokane	.	1	.	1	.	.		322		204		322
118	WA	Wallula	.	.	.	1	.	.				0		0
119	WA	Yakima	.	.	.	1	.	.				63		63
120	WI	Door Co.	1	.	.	.	.	.	27					27
120	WI	Manitowoc Co.	1	.	.	.	.	.	82					82
121	WI	Marathon Co. (Wausau)	.	.	1	.	.	.			125			125
122	WI	Milwaukee-Racine	1	.	.	.	.	.	1,839					1,839
124	WV	Follansbee	.	.	.	1	.	.				2		2
125	WV	New Manchester Gr. (in Hancock Co)	.	.	1	.	.	.			9			9
126	WV	Wier.-Butler-Clay (in Hancock Co)	.	.	1	1	.	.			16	15		16
127	WY	Sheridan	.	.	.	1	.	.				15		15
National totals (127 areas)[c]			58	15	26	68	3	0	119,445	35,340	3,785	32,540	9	128,599

KEY: CO = carbon monoxide; NO_2 = nitrogen dioxide; O_3 = ozone; Pb = lead; PM-10 = particulate matter smaller than 10 microns; SO_2 = sulfur dioxide; . = all areas in attainment for a particle or pollutant.

[a] Guam (U.S. territory)

[b] This is a simplified listing of classified nonattainment areas. Unclassified and Section 185a (transitional) nonattainment areas are not included. Names of nonattainment areas are listed alphabetically within each state. Note that several smaller nonattainment areas may be inside one larger nonattainment area. In these cases, the smaller nonattainment areas are listed on the same line as the larger one, and the number of nonattainment areas are indicated under each pollutant.

[c] National total includes Guam (U.S. territory).

[d] The number of nonattainment areas for each of the criteria pollutants is listed. A dot (.) indicates that all areas are in attainment for that pollutant. Note that there are no areas in nonattainment for NO_2.

[e] 1-hour ozone standard.

[f] Ozone nonattainment area is a portion of Dona Ana County, New Mexico.

[g] SO_2 nonattainment area is a portion of Boyd County, Kentucky.

[h] Lead nonattainment area is Herculaneum, Missouri in Jefferson County.

[i] Lead nonattainment area is a portion of Lewis and Clark County, Montana.

[j] Population figures were obtained from the 1990 census data. For nonattainment areas defined as only partial counties, population figures for just the nonattainment area were used when these were available. Otherwise, whole county population figures were used. When a larger nonattainment area encompasses a smaller one, double counting the population in the "Total exposed" column is avoided by only counting the population of the larger nonattainment area. The "Total exposed" values represent estimated population living in areas that are in nonattainment for at least one pollutant.

NOTE
Reference numbers 1-127 do not indicate ranking.

SOURCE
U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, *National Air Quality and Emissions Trends Report, 2000* (Research Triangle Park, NC: 2002), table A-18. Internet website http://www.epa.gov/airtrends/ as of Sept. 16, 2002.

TABLE 4-49: U.S. Carbon Dioxide Emissions from Energy Use by Sector (Million metric tons of carbon)

Sector	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000[P]
Industrial	**452.7**	**439.8**	**455.1**	**452.9**	**463.3**	**461.1**	**476.1**	**481.5**	**469.5**	**465.8**	**465.7**
Residential	**257.0**	**261.6**	**261.8**	**278.4**	**275.8**	**277.9**	**293.9**	**292.8**	**293.7**	**298.8**	**313.4**
Commercial	**210.3**	**210.4**	**210.8**	**217.2**	**220.4**	**224.6**	**233.1**	**245.4**	**250.4**	**253.1**	**267.8**
Transportation	**431.8**	**424.2**	**431.1**	**436.4**	**449.3**	**457.8**	**468.9**	**473.6**	**481.5**	**499.4**	**514.8**
Motor gasoline	260.5	259.2	263.0	268.9	273.3	279.0	284.0	286.5	292.5	299.7	301.5
Liquid petroleum gas	0.4	0.3	0.3	0.3	0.6	0.3	0.3	0.2	0.3	0.2	0.2
Jet fuel	60.1	58.1	57.6	58.1	60.4	60.0	62.7	63.3	64.2	66.3	68.5
Distillate fuel	75.7	72.6	75.3	77.3	82.5	85.1	89.7	93.5	96.4	101.9	106.6
Residual fuel	21.9	22.0	23.0	19.4	19.1	19.7	18.4	15.5	15.2	17.0	23.1
Lubricants	1.8	1.6	1.6	1.6	1.7	1.7	1.6	1.7	1.8	1.8	1.8
Aviation gas	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Total petroleum	421.2	414.6	421.6	426.4	438.2	446.5	457.4	461.5	471.2	487.6	2.5
Natural gas	9.8	9.0	8.8	9.3	10.2	10.4	10.6	11.3	9.5	11.0	11.4
Electricity	0.7	0.7	0.7	0.7	0.9	0.8	0.8	0.8	0.9	0.9	0.9
Total CO_2 emissions from end-use sector energy consumption	**1,351.7**	**1,336.0**	**1,358.7**	**1,384.8**	**1,408.8**	**1,421.3**	**1,471.9**	**1,493.3**	**1,495.2**	**1,517.1**	**1,561.7**
Total U.S. CO_2 emissions	**1,355.3**	**1,341.2**	**1,367.2**	**1,399.2**	**1,424.8**	**1,438.2**	**1,487.7**	**1,509.0**	**1,510.9**	**1,535.7**	**1,583.3**

KEY: CO_2 = carbon dioxide; P = preliminary.

NOTES
Electric utility emissions are distributed across end-use sectors. Previously, the emissions due to nonutility electricity consumption used to be allocated to the industrial sector. Starting in 2000, the nonutility electric emissions were distributed across sectors for all the years reported.
Numbers may not add to totals due to rounding.
Tons of carbon can be converted to tons of carbon dioxide gas by multiplying by 3.667. One ton of carbon equals 3.667 tons of carbon dioxide gas.

SOURCE
U.S. Department of Energy, Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2000*, personal communication.

Section E
Water Pollution, Noise, and Solid Waste

TABLE 4-50: Petroleum Oil Spills Impacting Navigable U.S. Waterways

	1985		1990		1995		1996		1997		1998		1999		2000	
Source	Incidents	Gallons spilled	Incidents	Gallons spilled	Incidents	Gallons spilled	Incidents	Gallons spilled	Incidents	Gallons spilled	Incidents	Gallons spilled	Incidents	Gallons spilled	Incidents	Gallons spilled
Vessel sources																
Tankship	164	732,397	249	4,977,251	148	125,491	122	219,311	124	22,429	104	56,673	92	8,414	111	608,176
Tank barge	385	3,683,548	457	992,025	353	1,101,938	313	1,163,258	252	165,649	220	248,089	227	158,977	229	133,540
Other vessels[a]	1,113	446,966	1,779	417,882	4,977	396,724	5,151	298,451	4,971	192,801	4,848	316,473	5,361	409,084	5,220	291,927
Total vessel sources	**1,662**	**4,862,911**	**2,485**	**6,387,158**	**5,478**	**1,624,153**	**5,586**	**1,681,020**	**5,347**	**380,879**	**5,172**	**621,235**	**5,680**	**576,475**	**5,560**	**1,033,643**
Nonvessel sources																
Offshore pipelines	23	17,977	73	46,228	7	1,143	4	386	13	810	10	843	5	35,707	4	17
Onshore pipelines	362	759,040	76	270,700	23	10,751	13	978,006	19	223,312	35	47,020	20	433	21	17,004
Other[b]	2,417	2,473,212	2,435	1,091,544	1,086	946,328	1,061	429,911	1,324	277,143	1,508	198,853	1,590	515,241	1,620	356,740
Total nonvessel sources	**2,802**	**3,250,229**	**2,584**	**1,408,472**	**1,116**	**958,222**	**1,078**	**1,408,303**	**1,356**	**501,265**	**1,553**	**246,716**	**1,615**	**551,381**	**1,645**	**373,761**
Mystery[c]	**1,705**	**323,108**	**3,108**	**119,377**	**2,444**	**55,854**	**2,671**	**28,508**	**1,921**	**60,430**	**1,590**	**17,352**	**1,244**	**44,593**	**1,149**	**23,966**
Total all spills	**6,169**	**8,436,248**	**8,177**	**7,915,007**	**9,038**	**2,638,229**	**9,335**	**3,117,831**	**8,624**	**942,574**	**8,315**	**885,303**	**8,539**	**1,172,449**	**8,354**	**1,431,370**

KEY: R = revised.

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

[b] Other nonvessel sources include designated waterfront facilities, nonmarine land facilities, fixed offshore and inshore platforms, mobile facility, municipal facility, aircraft, land vehicles, railroad equipment, bridges, factories, fleeting areas, industrial facilities, intakes, locks, marinas, MARPOL reception facilities, nonvessel common carrier facilities, outfalls, sewers, drains, permanently moored facilities, shipyards, ship repair facilities.

[c] Mystery spills are spills from unknown or unidentified sources. U.S. Coast Guard investigators are unable to identify the vessel or facility that spilled the oil into U.S. navigable waters.

SOURCE
U.S. Coast Guard, Oil Spill Compendium 2000, personal communication, Sept. 12, 2001.

TABLE 4-51: Leaking Underground Storage Tank Releases and Cleanups

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Total confirmed releases	**87,528**	**R126,816**	**184,457**	**237,022**	**270,567**	**303,635**	**317,488**	**341,773**	**371,387**	**397,821**	**412,392**	**418,918**
Cleanups initiated	51,770	79,506	129,074	171,082	209,797	238,671	252,615	292,446	314,965	346,300	367,603	379,243
Cleanups not initiated	35,758	R47,310	55,383	65,940	60,770	64,964	64,873	49,327	56,422	51,521	44,789	39,675
Cleanups completed	16,905	R58,258	R99,496	87,065	107,448	131,272	152,683	178,297	203,247	228,925	249,759	268,833
Releases not cleaned up	70,623	R68,558	R84,961	149,957	163,119	172,363	164,805	163,476	168,140	168,896	162,633	150,085

KEY: R = revised.

NOTES
All numbers are cumulative.
Data represent fiscal year, October 1 through September 30.

SOURCES
1990: U.S. Environmental Protection Agency, Office of Underground Storage Tanks, personal communications, Nov. 17 and 18, 1998.
1991-2001: Ibid., Internet site http://www.epa.gov/swerust1/cat/camarchv.htm as of July 31, 2002.

TABLE 4-52: Highway Noise Barrier Construction (Miles)

	Unknown	1970-79	1980-89	1990	1991	1992	1993	1994	1995	1996	1997	1998	Total 1970-98
Type I barriers[a]	[d]6	102	419	44	78	113	62	48	87	34	47	114	1,147
Type II barriers[b]	0	70	128	19	18	18	22	16	32	15	31	22	391
All other types[c]	N	2	28	0	2	11	3	25	6	0	1	1	79
Total length	**6**	**175**	**575**	**63**	**R98**	**R142**	**R86**	**R89**	**125**	**49**	**78**	**137**	**1,623**
Cost (1998 $ millions)	N	134	656	89	144	186	118	112	152	60	111	169	1,931

KEY: N = data do not exist; R = revised.

[a] A Type I barrier is built on a highway project to construct a new highway or to physically alter an existing highway.

[b] A Type II barrier is built to abate noise along an existing highway (often referred to as retrofit abatement) and is not mandatory.

[c] All other types of barriers are nonfederally funded.

[d] Have not been assigned a year of construction or a cost.

NOTES
Miles have been converted from kilometers.
Totals may not match the sum of yearly estimates due to rounding and converting from metric. Twenty-four miles of barriers, while assigned a year of construction, cannot be assigned a cost. Data are produced on a 3-year cycle.

SOURCE
U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, *Highway Traffic Noise Barrier Construction Trends* (Washington, DC: 2000), tables 1 and 3.

TABLE 4-53: Number of People Residing in High Noise Areas Around U.S. Airports[a,b,c] (Within 65 dB DNL noise-level contours)

Year	Exposure		U.S. resident population (millions)
	People (thousands)[R]	Percent of U.S. resident population	
1975	7,000	3.25	215.5
1980	5,200	2.29	227.2
1985	3,400	1.43	237.9
1990	2,700	1.08	[R]249.5
1995	1,700	0.65	262.8
1996	[R]1,500	0.57	265.2
1997	1,300	0.49	267.8
1998	[R]1,100	[R]0.41	270.2
1999	[R]680	0.25	272.7
2000	[R]440	[R]0.16	[d]282.1
2001	446	0.16	[d]284.8

KEY: dB = decibels; DNL = day-night sound level; R = revised.

[a] Noise-level contours are graphical representations of noise levels on a map, similar to elevation contours on a topographic map. Noise-level contours are lines that join points of equal sound levels. Areas between given noise-level contour lines would have a noise level between the two contour values. The U.S. Department of Transportation, Federal Aviation Administration (FAA) has identified DNL 65 dB as the highest threshold of airport noise exposure that is normally compatible with indoor and outdoor activity associated with a variety of land uses, including residential, recreational, schools, and hospitals.

[b] Estimates are for areas surrounding airport property of 250 of the largest civil airports with jet operations in the United States. They exclude exposure to aircraft noise within an airport boundary.

[c] 1975 exposure estimates were made by the U.S. Environmental Protection Agency. 1980–2001 estimates were made by FAA. See the source and accuracy statement for more details on how exposure estimates are made.

[d] Population estimates for 2000 and 2001 reflect the results of the 2000 census. Data prior to 2000 is still based on data from the 1990 census, but will be updated to reflect the 2000 census in the 2002 edition of the Statistical Abstract of the United States. Therefore, population estimates for 2000 and 2001 may not be comparable to data that does not reflect the 2000 census.

SOURCES

Exposure:

1975-2001: U.S. Department of Transportation, Federal Aviation Administration, Office of Environment and Energy (AEE-12), personal communication, Sept. 19, 2002.

Population:

1975-99: U.S. Department of Commerce, Census Bureau, *Statistical Abstract of the United States 2001* (Washington, DC: 2001), table 2.

2000-2001: Ibid., table US-2001EST-01 ("Time Series of National Population Estimates: Apr. 1, 2000 to July 1, 2001").

TABLE 4-54: Motor Vehicles Scrapped[a] (Thousands)

	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Passenger cars	7,461	5,669	8,405	7,729	8,897	7,414	7,527	8,244	6,819	7,216	8,085	7,650
Trucks	837	908	1,732	2,100	2,177	2,918	3,284	4,265	4,846	4,447	6,214	6,472
Total motor vehicles	**8,298**	**6,576**	**10,137**	**9,829**	**11,073**	**10,332**	**10,811**	**12,509**	**11,665**	**11,664**	**14,299**	**14,122**

KEY: R = revised.

[a] Data are for the period July 1 to June 30 of the given year.

NOTES
Figures represent vehicles that are not re-registered.
Numbers may not add due to rounding.

SOURCE
The Polk Co., personal communication, July 31, 2002.

Modal Profiles

Air Carrier Profile of Reporting U.S. Carriers

Financial	1960	1970	1980	1990	1995	1996	1997	1998	1999	R2000	P2001
Operating revenues ($ thousands), total[a]	2,884,877	9,289,658	32,882,441	75,950,863	94,318,533	101,937,346	109,567,602	113,465,078	119,038,452	130,299,258	115,019,000
Domestic total[a,b,c]	2,178,339	7,180,161	26,440,297	57,960,508	70,885,050	76,890,526	82,249,568	86,493,789	90,931,479	98,895,837	86,208,701
Majors, all services	[3]1,942,635	[3]6,272,775	[7]23,012,073	[14]53,333,552	[14]64,317,169	[14]70,036,709	[14]74,942,391	[14]77,650,810	[14]82,615,015	[14]89,290,585	[14]78,610,562
Nationals, all services	146,481	736,831	3,182,418	[15] 4,167,552	[15]5,935,773	[15] 5,990,391	[15] 6,163,458	[15] 8,113,690	[15]7,789,636	[15] 9,104,701	[15] 7,147,710
Large regionals, all services	N	N	245,806	[16]459,404	[16] 632,108	[16]863,426	[16]1,143,719	[16]729,289	[16]526,828	[16] 500,551	[16]450,429
International total[c]	705,938	2,109,497	6,442,144	17,990,355	23,433,483	25,046,820	27,318,034	26,971,289	28,106,973	31,403,421	28,810,299
Majors, all services	705,938	2,109,497	[8]5,976,221	[14]16,761,376	[14]19,892,111	[14] 21,524,274	[14] 23,608,853	[14] 23,356,233	[14]24,671,152	[14] 28,100,884	[14]25,872,642
Nationals, all services	N	N	465,923	[15] 901,352	[15]3,282,606	[15]3,326,467	[15] 3,376,014	[15]3,161,212	[15]3,142,217	[15] 2,909,590	[15]2,483,359
Large regionals, all services	N	N	N	[16] 327,627	[16] 258,766	[16]196,079	[16]333,166	[16]453,844	[16]293,604	[16]392,947	[16]454,298
Operating expenses ($ thousands), total[a]	2,717,754	9,067,273	33,108,094	77,867,566	88,454,956	95,728,276	100,980,807	104,137,267	110,635,417	123,314,280	125,058,578
Domestic total[a,c]	2,052,094	7,001,668	26,465,999	58,953,086	66,119,699	71,573,073	75,731,215	78,388,515	84,328,320	93,578,562	94,302,619
Majors, all services	1,907,785	6,256,039	[7] 23,150,527	[14]54,209,401	[14]59,721,080	[14] 64,793,763	[14] 68,307,270	[14] 70,114,852	[14] 76,506,077	[14] 84,208,514	[14]86,375,906
Nationals, all services	144,309	745,629	3,058,289	[15] 4,297,823	[15]5,750,372	[15] 5,847,797	[15] 6,163,923	[15] 7,500,451	[15] 7,299,934	[15]8,824,795	[15]7,441,752
Large regionals, all services	N	N	257,183	[16]445,862	[16] 648,247	[16] 931,513	[16] 1,260,021	[16] 773,212	[16] 522,309	[16]545,253	[16]484,961
International total[c]	665,660	2,065,605	6,642,095	18,914,480	22,335,257	24,155,203	25,249,593	25,748,752	26,307,097	29,735,718	30,755,959
Majors, all services	665,660	2,065,605	[8] 6,171,366	[14]17,746,006	[14]19,061,258	[14] 20,807,517	[14] 21,688,642	[14] 22,321,441	[14] 23,218,938	[14] 26,645,342	[14]27,655,517
Nationals, all services	N	N	470,729	[15]853,361	[15] 3,025,707	[15] 3,166,097	[15] 3,253,249	[15] 3,014,282	[15] 2,815,341	[15]2,659,021	[15]2,622,724
Large regionals, all services	N	N	N	[16]315,113	[16] 248,292	[16] 181,589	[16] 307,702	[16] 413,029	[16] 272,819	[16]431,355	[16]477,718
Inventory[d]											
Large carriers, total[e,1]	55	39	66	59	89	90	82	80	82	R76	69
Majors	N	N	14	12	11	12	13	13	13	14	15
Nationals	N	N	18	15	27	31	31	27	31	R33	27
Regionals	N	N	34	32	51	47	38	40	38	29	27
Large carriers[2] available for service	2,135	2,690	2,818	4,727	5,567	5,961	5,770	6,144	6,254	6,522	6,081
Majors	N	N	2,071	3,854	4,039	4,422	4,352	4,605	4,711	5,118	4,996
Nationals	N	N	432	650	1,143	1,167	967	1,113	1,319	1,182	952
Regionals	N	N	315	223	385	372	451	426	224	222	133
Large carrier[1] employees	169,872	304,690	354,264	588,926	610,363	634,866	656,243	696,408	728,495	732,049	653,488
Majors	118,189	214,021	318,973	549,100	533,313	564,631	597,953	623,389	650,267	672,294	607,857
Nationals	12,470	24,913	29,922	32,077	59,444	56,586	47,662	59,620	68,138	56,056	41,865
Regionals	N	N	5,369	7,749	17,606	13,649	10,628	13,399	10,090	3,699	3,766

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Air Carrier Profile of Reporting U.S. Carriers (Continued)

Performance	1960	1970	1980	1990	1995	1996	1997	1998	1999	R2000	P2001
Aircraft revenue-miles (thousands), total[a]	1,040,056	2,542,264	2,924,346	4,723,601	5,627,052	5,854,766	6,024,764	6,227,180	6,557,701	7,056,534	6,807,928
Domestic[b]											
Large carriers, all services[a]	[4]858,451	[4]2,067,598	[9]2,523,375	[17]3,963,263	[17]4,629,394	[17]4,811,453	[17]4,910,948	[17]5,034,691	[17]5,332,483	[17]5,664,281	[17]5,549,881
Major, all services[a]	716,961	1,778,065	2,113,669	[18]3,547,339	[18]3,953,287	[18]4,083,664	[18]4,191,113	[18]4,260,052	[18]4,598,092	[18]4,784,663	[18]4,676,556
Nationals, all services[a]	94,794	247,055	330,528	[19]351,946	[19]569,641	[19]614,519	[19]594,241	[19]702,913	[19]668,646	[19]813,061	[19]815,036
Large regionals, all services[a]	N	N	56,995	[20]60,542	[20]85,363	[20]96,573	[20]112,682	[20]51,199	[20]47,438	[20]52,941	[20]33,365
International											
Large carriers, all services[a]	181,605	474,666	[10]400,971	[21]760,338	[21]997,658	[21]1,043,313	[21]1,113,816	[21]1,192,489	[21]1,225,218	[21]1,281,706	[21]1,258,047
Major, all services[a]	N	N	330,391	[22]666,231	[22]822,283	[22]859,483	[22]917,109	[22]1,003,726	[22]1,053,219	[22]1,117,712	[22]1,117,172
Nationals, all services[a]	N	N	66,499	[23]48,812	[23]141,870	[23]150,147	[23]145,821	[23]145,494	[23]138,135	[23]132,497	[23]115,150
Large regionals, all services[a]	N	N	2,948	[24]60,542	[24]27,761	[24]22,519	[24]47,138	[24]40,398	[24]29,474	[24]27,890	[24]21,298
Medium regionals, all services, domestic and international[a]	N	N	23,204	[11]9,017	[11]28,847	[11]27,861	[11]16,660	[11]21,024	[11]22,697	[11]17,223	[11]29,351
Aircraft revenue-hours, total[a]	4,281,636	6,110,486	7,190,724	11,298,194	13,399,194	13,985,353	14,295,694	14,839,578	15,547,999	16,501,365	16,066,192
Domestic[b]											
Large carriers, all services[a]	3,672,900	5,133,161	[9]6,247,795	[17]9,717,375	[17]11,378,134	[17]11,871,886	[17]12,060,253	[17]12,445,483	[17]13,091,273	[17]13,905,472	[17]13,510,365
Major, all services[a]	2,802,317	4,066,480	4,941,327	[18]8,524,236	[18]9,257,260	[18]9,584,525	[18]9,828,418	[18]9,957,390	[18]10,863,178	[18]11,308,820	[18]11,019,406
Nationals, all services[a]	606,146	908,935	919,187	[19]1,016,491	[19]1,839,835	[19]1,981,219	[19]1,882,975	[19]2,299,916	[19]2,053,335	[19] 2,419,285	[19]2,314,886
Large regionals, all services[a]	N	N	267,522	[20]167,826	[20]223,007	[20]260,985	[20] 315,506	[20]143,197	[20]126,602	[20]142,900	[20]94,600
International											
Large carriers, all services[a]	608,736	977,325	[10]819,518	[21]1,556,760	[21]2,021,060	[21]2,113,467	[21]2,235,441	[21]2,394,095	[21]2,456,726	[21]2,595,893	[21]2,555,827
Major, all services[a]	N	N	668,199	[22]1,351,349	[22]1,634,465	[22]1,712,416	[22]1,819,583	[22]1,992,776	[22]2,090,817	[22] 2,229,167	[22]2,234,964
Nationals, all services[a]	N	N	140,329	[23]101,533	[23]314,066	[23]329,311	[23]309,948	[23]311,540	[23]290,582	[23]299,259	[23]265,463
Large regionals, all services[a]	N	N	7,583	[24]88,641	[24]59,572	[24]48,619	[24]97,304	[24]83,437	[24]62,658	[24]60,381	[24]46,005
Medium regionals, all services, domestic and international[a]	N	N	123,411	[11]24,059	[11]70,989	[11]68,278	[11]41,960	[11]51,322	[11]60,827	[11]41,553	[11]90,868
Revenue passenger-miles (thousands), total[a]	40,049,616	148,137,370	267,972,557	472,566,495	558,757,051	596,163,697	619,968,582	635,517,395	668,625,907	708,926,283	664,841,301
Domestic[b]											
Large carriers, all services	31,098,944	108,441,978	[9]204,367,599	[17]34,872,950	[17]403,887,802	[17]434,651,687	[17]450,612,482	[17]463,262,198	[17]488,356,869	[17]516,128,630	[17]486,459,389
Majors, all services	29,430,428	99,903,229	182,984,795	[18]327,112,620	[18]368,701,100	[18]395,099,254	[18]410,906,050	[18]421,217,665	[18]451,399,646	[18]472,284,794	[18]440,400,186
Nationals, all services	1,170,779	7,642,071	20,466,712	[19]16,756,818	[19] 29,255,179	[19]33,000,546	[19]33,241,082	[19]37,699,063	[19]33,267,469	[19]40,549,113	[19]43,522,761
Large regionals, all services	N	N	711,868	[20]1,752,615	[20]4,381,267	[20]5,443,071	[20]5,778,338	[20]3,124,802	[20]2,627,816	[20] 2,527,254	[20]1,709,092
International											
Large carriers, all services	[4]8,950,672	[4]39,695,392	[10]63,354,387	[21]126,362,697	[21]154,869,249	[21]161,512,010	[21]169,356,100	[21]172,255,197	[21]180,269,038	[21]192,797,653	[21]178,381,912
Majors, all services	N	N	54,318,160	[22]118,268,507	[22]137,986,520	[22]145,330,811	[22]153,564,956	[22]157,398,986	[22]168,175,060	[22]181,585,899	[22]169,325,350

Air Carrier Profile of Reporting U.S. Carriers (Continued)

Performance (continued)	1960	1970	1980	1990	1995	1996	1997	1998	1999	R2000	P2001
Nationals, all services	N	N	8,659,592	[23]6,794,533	[23]16,128,695	[23]14,681,127	[23]13,616,245	[23] 13,471,798	[23]9,649,710	[23] 8,447,916	[23] 7,759,741
Large regionals, all services	N	N	330,288	[24]1,219,706	[24]676,925	[24]505,337	[24] 2,148,486	[24]1,097,330	[24]2,145,931	[24] 2,675,654	[24]1,185,896
Medium regionals, all services, domestic and international[a]	N	N	250,571	[11]330,848	[11]1,627,365	[11]2,103,551	[11]713,425	[11]1,507,751	[11]1,360,275	[11]855,653	[11]938,275
Average passenger revenue / passenger-mile[c]											
(Domestic, scheduled service)	6.09	6.00	11.49	13.43	13.48	13.76	13.97	14.08	13.72	14.35	13.15
Average passenger fare[c]											
(Domestic, scheduled service)	30.01	40.65	84.60	107.86	106.66	110.37	114.10	R114.08	R114.99	121.27	112.17
Revenue passenger enplanements (thousands), total[a]	62,256	169,922	302,821	475,193	559,653	592,909	605,502	624,710	646,872	677,606	631,539
Domestic[b]											
Large carriers, all services[a]	[4]56,352	[4]153,662	[9] 275,182	[17]428,767	[17]506,789	[17]538,394	[17]548,735	[17]566,951	[17]589,170	[17]616,778	[17]574,868
Major, all services[a]	48,678	122,866	223,237	[18]393,927	[18]441,650	[18]466,743	[18] 478,253	[18]486,903	[18]519,760	[18] 537,379	[18]496,453
Nationals, all services[a]	5,949	26,726	47,145	[19] 32,015	[19] 55,656	[19] 62,183	[19]61,316	[19]74,281	[19] 65,072	[19] 76,092	[19] 75,600
Large regionals, all services[a]	N	N	3,748	[20] 2,566	[20] 7,136	[20] 7,887	[20]8,203	[20]4,352	[20]3,152	[20]2,226	[20]1,343
International											
Large carriers, all services[a]	5,904	16,620	[10]26,514	[21]46,126	[21]52,864	[21]54,515	[21]56,767	[21]57,759	[21]57,702	[21]60,828	[21]56,671
Major, all services[a]	N	N	23,949	[22]42,207	[22]44,155	[22]46,302	[22]48,614	[22]49,610	[22]50,604	[22]53,157	[22]50,077
Nationals, all services[a]	N	N	2,343	[23]2,632	[23]8,114	[23]7,401	[23]6,896	[23] 7,038	[23]5,446	[23]5,788	[23]5,686
Large regionals, all services[a]	N	N	149	[24]1,246	[24]556	[24]405	[24]1,231	[24]940	[24]1,404	[24]1,810	[24]806
Medium regionals, all services, domestic and international[a]	N	N	1,125	[11]300	[11]2,386	[11]1,988	[11]989	[11]1,586	[11]1,434	[11]1,154	[11]1,574
Revenue passenger											
Load factor (percent) (scheduled service)											
Domestic[b]											
Large carriers	58.5	48.9	[9] 58.0	[17]60.4	[17]65.4	[17]67.9	[17]69.1	[17]70.0	[17]69.8	[17]71.2	[17]69.1
Majors	59.5	49.3	58.1	[18]60.6	[18]65.7	[18]68.5	[18]69.7	[18]70.4	[18]70.3	[18]71.6	[18]69.3
Nationals	41.9	43.6	58.4	[19]56.6	[19]61.9	[19]61.5	[19]63.2	[19]65.1	[19]64.7	[19]66.5	[19]67
Large regionals	N	N	47.7	[10]48.7	[20]56	[20]60.4	[20]60.7	[20]58.8	[20]42.4	[20]59.2	[20]70.4
International											
Large carriers	62.2	53.0	[10] 62.8	[21]69.1	[21]71.8	[21]73.3	[21]74.1	[21]72.8	[21]74.4	[21]76.0	[21]72.8
Majors	N	N	62.8	[22]69.1	[22]72.1	[22]73.7	[22] 74.4	[22]72.9	[22]74.5	[22]76.1	[22]72.9
Nationals	N	N	65.5	[23]73.4	[23]67.7	[23]67.8	[23]69.6	[23]70.9	[23]73.7	[23]73.4	[23]70
Large regionals	N	N	73.9	[24]66.5	[24]44.5	[24]0.0	[24]64.9	[24]46.0	[24]U	[24]58.0	[24]67
Medium regionals, all services, domestic and international[a]	N	N	[11]46.7	[11]0.0	[11]59.3	[11]66.7	[11]49.7	[11]58.2	[11]58.3	[11]35.5	[11]51.6

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Air Carrier Profile of Reporting U.S. Carriers (Continued)

Performance (continued)	1960	1970	1980	1990	1995	1996	1997	1998	1999	R2000	P2001
U.S. international passenger travel by flag of carrier											
Total passenger-arrivals (thousands)											
United States	[5]1,332	[5]5,531	[12]10,031	[12] 19,145	[25]24,582	[12] 25,148	[12] 26,744	[12]27,390	[12] 27,462	[12]29,837	[12] 27,985
Foreign	1,234	4,343	10,231	17,269	22,328	24,704	27,571	28,791	30,324	32,380	28,715
Total passenger-departures (thousands)											
United States	1,200	4,949	9,369	17,628	22,231	22,901	24,302	24,513	25,457	27,431	25,483
Foreign	1,136	4,147	9,886	16,418	20,795	22,884	25,382	26,350	28,399	30,068	27,111
Total revenue ton-miles (thousands), totals[a,f]	5,024,285	20,185,503	34,682,153	63,770,534	79,205,765	84,504,471	89,603,186	91,650,972	95,842,858	101,756,635	94,377,089
Domestic[b]											
Large carriers, all services	[4]3,732,949	[4]13,876,802	[9]24,964,907	[17]43,651,162	[17]52,910,081	[17]56,326,750	[17]58,658,887	[17]60,199,459	[17]63,032,722	[17]66,595,204	[17]61,945,030
Majors, all services	3,332,483	12,589,057	21,427,534	[18]39,107,033	[18]47,015,642	[18]50,096,661	[18]52,254,323	[18]53,424,349	[18]56,696,427	[18]59,095,406	[18]54,678,441
Nationals, all services	121,157	850,477	3,336,057	[19]3,561,283	[19]4,996,345	[19]231,398	[19] 5,317,576	[19]6,012,665	[19]5,705,158	[19]6,799,198	[19]6,519,158
Large regionals, all services	N	N	180,042	[20]945,929	[20]718,659	[20]863,449	[20]971,942	[20]508,172	[20]507,053	[20]588,975	[20]512,007
International											
Large carriers, all services	1,291,336	6,308,701	[10]9,689,067	[21]19,975,915	[21] 26,295,684	[21]28,177,721	[21]30,944,299	[21]31,481,513	[21]32,810,136	[21]35,161,431	[21]32,432,059
Majors, all services	N	N	7,377,733	[22]17,803,825	[22] 21,517,789	[22]22,880,295	[22]24,971,379	[22] 25,794,344	[22]27,949,876	[22]30,683,564	[22]28,311,386
Nationals, all services	N	N	2,261,534	[23]1,229,849	[23]4,116,380	[23]4,603,920	[23]4,657,365	[23]4,376,654	[23]4,257,520	[23] 3,815,162	[23]3,469,902
Large regionals, all services	N	N	44,438	[24]835,701	[24]513,476	[24]396,142	[24]1,240,303	[24]1,269,602	[24]566,689	[24] 565,198	[24]495,968
Medium regionals, all services, domestic and international[a]	N	N	28,178	[11]143,457	[11]327,474	[11]432,606	[11]190,298	[11]265,186	[11]160,135	[11]209,132	[11]390,227
Revenue ton-miles of freight (thousands), totals[a,f]	820,907	3,755,436	7,884,811	16,513,896	23,374,677	24,892,479	27,610,097	28,101,978	28,984,164	30,863,039	27,881,623
Domestic[b]											
Large carriers, all services	552,756	2,708,900	[9]4,528,316	[17]9,063,864	[17]12,520,057	[17]12,860,845	[17]13,601,412	[17]13,839,605	[17]14,201,933	[17]14,982,615	[17]13,287,603
Majors, all services	321,176	U	3,129,087	[18]6,395,767	[18]10,145,537	[18]10,586,741	[18]11,163,518	[18]11,302,583	[18]11,556,463	[18]11,866,926	[18]10,630,939
Nationals, all services	3,850	U	1,289,510	[19]1,885,600	[19]2,070,570	[19]1,931,201	[19]1,993,498	[19]2,239,140	[19]2,378,206	[19] 2,744,086	[19]2,166,601
Large regionals, all services	N	N	108,864	[20]770,670	[20]280,512	[20]318,542	[20]398,153	[20]195,791	[20]249,706	[20]337,068	[20]341,096
International											
Large carriers, all services	[4]268,156	[4]1,566,105	[10]3,353,371	[21]7,339,660	[21]10,854,620	[21]12,031,634	[21]14,008,685	[21]14,262,373	[21]14,782,231	[21]15,880,424	[21]14,594,020
Majors, all services	N	N	1,945,660	[22]5,976,973	[22]7,719,138	[22]8,347,214	[22]9,614,881	[22]10,054,448	[22]11,132,370	[22]12,524,977	[22]11,378,851
Nationals, all services	N	N	1,395,575	[23]550,409	[23]2,549,371	[23]3,140,921	[23] 3,295,738	[23]3,035,853	[23] 3,291,549	[23] 2,970,370	[23]2,693,927
Large regionals, all services	N	N	11,409	[24]713,733	[24]445,783	[24]345,609	[24] 1,025,455	[24]1,159,869	[24] 352,095	[24] 296,387	[24]377,380
Medium regionals, all services, domestic and international[a]	N	N	3,124	[11]110,372	[11]163,766	[11]222,251	[11]118,854	[11]114,294	[11]23,775	[11]123,225	[11]292,829

Air Carrier Profile of Reporting U.S. Carriers (Continued)

Safety	1960	1970	1980	1990	1995	1996	1997	1998	1999	R2000	P2001
Air carrier fatalities, total[a]	[6]499	[6]146	143	R96	229	457	93	46	62	168	604
Operating under 14 CFR 121 (airlines)											
Scheduled services	N	N	[13]0	[13]39	[13]166	[13]342	[13]3	1	12	[13]92	531
Nonscheduled services	N	N	1	0	2	38	5	0	0	0	0
Operating under 14 CFR 135											
Scheduled services (commuters)	N	N	37	R6	9	14	46	0	12	5	13
Nonscheduled services (on–demand air taxis)	N	N	105	51	52	63	39	45	38	71	60
Air carrier accidents, total[a]	[6]90	[6]55	228	146	123	138	147	135	138	R150	119
Operating under 14 CFR 121 (airlines)											
Scheduled services	N	N	15	22	34	32	44	43	R47	R51	36
Nonscheduled services	N	N	4	2	2	5	5	7	R5	R6	4
Operating under 14 CFR 135											
Scheduled services (commuters)	N	N	38	15	12	11	16	8	13	12	7
Nonscheduled services (on–demand air taxis)	N	N	171	107	75	90	82	77	73	R81	72
Fatal air carrier accidents, total[a]	[6]17	[6]8	55	R38	29	35	24	18	19	26	26
Operating under 14 CFR 121 (airlines)											
Scheduled services	N	N	0	6	2	3	3	1	2	3	6
Nonscheduled services	N	N	1	0	1	2	1	0	0	0	0
Operating under 14 CFR 135											
Scheduled services (commuters)	N	N	8	R3	2	1	5	0	5	1	2
Nonscheduled services (on–demand air taxis)	N	N	46	29	24	29	15	17	12	22	18

KEY: N = data do not exist; P = preliminary; R = revised; U = data are not available.

[a] Totals include data not in table; thus totals may not equal sum of table data.

[b] Domestic encompasses operations within and between the 50 states of the United States, the District of Columbia, Puerto Rico, and the Virgin Islands. It also encompasses Canadian and Mexican transborder operations (U.S. airlines only). All other operations are considered international.

[c] Total includes major, nationals, and large regionals.

[d] Includes scheduled and nonscheduled (charter) operators. By Sec. 2 of the Airline Deregulation Act of 1978 "charter air carrier" and "charter air transportation" replaced supplemental air carriers and supplemental air transportation, which were formerly Sec. 101(36) and (37) of the Act. The 24 pre-deregulation supplemental carriers now have scheduled service authority.

[e] Total includes only those carriers who have reported employment statistics to BTS' Office of Airline Information.

[f] Total Revenue Ton-Miles includes passenger, freight, express, and mail.

Continued next page

Air Carrier Profile of Reporting U.S. Carriers (Continued)

SOURCES

Unless otherwise noted, refer to chapter tables for sources.

[1] U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, http://www.bts.gov/oai/employees/employcov.html as of Sept. 4, 2002.

[2] Ibid., personal communication, Sept. 10, 2002.

[3] Civil Aeronautics Board, *Handbook of Airline Statistics, 1969 and 1973* (Washington, DC), pp. 69 and 71.

[4] Ibid., 1973, (Washington, DC), Part III, tables 2, 4, 7, and 13.

[5] U.S. Department of Justice, Immigration and Naturalization Service, *Report of Passenger Travel Between the U.S. and Foreign Countries, 1960, 1970* (Washington, DC).

[6] National Transportation Safety Board, Internet site http://www.ntsb.gov/aviation/stats.htm as of August 2002, personal communication.

[7] Civil Aeronautics Board, *Air Carrier Financial Statistics*, December 1981 (Washington, DC), pp. 3/28, 44.

[8] Ibid., pp. 42 and 44.

[9] Civil Aeronautics Board, *Air Carrier Traffic Statistics*, December 1981 (Washington, DC), pp. 2, 5, 46, and 84.

[10] Ibid., pp. 3, 6, 85, and 115.

[11] U.S. Department of Transportation, Bureau of Transportation Statistics, (pre-1995, U.S. Department of Transportation, Research and Special Programs Administration), *Air Carrier Traffic Statistics*, (Washington, DC: Annual December issue), p. 187 and similar pages in earlier editions.

[12] U.S. Department of Transportation, Research and Special Programs Administration, *U.S. International Air Travel Statistics* (Washington, DC: Annual issues), tables IIa and IId.

[13] National Transportation Safety Board, Internet site http://www.ntsb.gov/aviation/stats.htm as of August 2002, tables 6-9.

[14] U.S. Department of Transportation, Bureau of Transportation Statistics, (pre-1995, U.S. Department of Transportation, Research and Special Programs Administration), *Air Carrier Financial Statistics*, (Washington, DC: Annual December issue) p. 3.

[15] Ibid., p. 37 and similar pages in earlier editions.

[16] Ibid., pp. 72-73 and similar pages in earlier editions.

[17] U.S. Department of Transportation, Bureau of Transportation Statistics, (pre-1995, U.S. Department of Transportation, Research and Special Programs Administration), *Air Carrier Traffic Statistics*, (Washington, DC: Annual December issue), p. 2.

[18] Ibid., p. 5.

[19] Ibid., p. 67 and similar pages in earlier editions

[20] Ibid., p. 148 and similar pages in earlier editions.

[21] U.S. Department of Transportation, Bureau of Transportation Statistics, (pre-1995, U.S. Department of Transportation, Research and Special Programs Administration), *Air Carrier Traffic Statistics*, (Washington, DC: Annual December issue), p. 3.

[22] Ibid., p. 6

[23] Ibid., p. 68 and similar pages in earlier editions.

[24] Ibid., p. 149 and similar pages in earlier editions.

[25] U.S. Department of Commerce, International Trade Administration, *U.S. International Air Passenger Statistics Report, Calendar Year 1995*, (Washington, DC), tables IIa and IId.

General Aviation Profile

Financial	1960	1970	1980	1990	1995	1996	1997	1998	1999	2000
Expenditures ($ millions)										
Aircraft[1]	202	339	2,853	3,398	4,260	5,298	7,174	9,573	11,262	U
Operating costs	693	1,696	5,200	6,509	6,119	6,307	6,623	6,799	6,291	U
Total	**895**	**2,035**	**8,053**	**9,907**	**10,379**	**11,605**	**13,797**	**16,372**	**17,553**	**U**
Inventory										
Number of active aircraft by primary use										
Corporate[2]	N	6,835	14,860	10,100	9,800	9,300	10,411	11,250	10,804	11,003
Business	N	26,900	49,391	33,100	26,200	28,200	27,716	32,611	24,543	25,169
Instructional	N	10,727	14,862	18,600	14,800	14,300	14,663	11,375	16,081	14,883
Personal	N	65,398	96,222	112,600	109,300	109,600	115,630	124,347	147,085	148,192
Aerial application	N	5,455	7,294	6,200	5,100	5,400	4,858	4,550	4,254	4,294
Aerial observation	N	N	N	4,900	4,700	3,200	3,311	3,242	3,240	5,093
External load	N	N	N	N	200	400	186	313	190	234
Other work[a]	N	2,054	2,813	1,400	1,100	1,100	579	1,116	2,363	1,787
Air taxi / air tours[b]	N	N	N	5,800	4,100	3,900	4,948	5,190	4,569	4,019
Sightseeing[c]	N	N	N	N	900	900	677	679	832	881
Other[d]	N	8,249	17,045	4,100	6,300	6,700	5,250	6,010	1,200	1,952
Public use	N	N	N	N	N	4,200	4,130	4,029	4,138	[k]N
Total	**76,549**	**131,743**	**211,045**	**196,800**	**188,100**	**187,200**	**192,359**	**204,712**	**219,299**	**217,533**
Performance										
Number of flight hours by actual use (thousands)										
Corporate[3]	N	N	5,332	2,913	2,869	2,718	2,878	3,213	3,616	3,458
Business	[3]5,699	[3]7,204	8,434	4,417	3,191	3,152	3,006	3,523	3,598	3,670
Instructional	1,828	6,791	5,748	7,244	4,106	4,425	4,956	3,961	5,893	5,369
Personal	3,172	6,896	8,894	9,276	9,320	8,893	9,644	9,781	11,294	11,699
Aerial application	N	N	2,044	1,872	1,557	1,787	1,562	1,306	1,415	1,401
Aerial observation	N	N	N	1,745	1,385	1,036	1,261	812	1,243	1,632
External load	N	N	N	N	118	203	112	153	128	171
Other work[a]	N	N	1,053	572	268	262	139	286	613	506
Air taxi / air tours[b]	N	N	N	2,249	1,527	1,773	2,120	2,583	2,043	2,196
Sightseeing[c]	N	N	N	N	206	186	127	169	220	198
Other[d]	2,422	5,139	4,925	475	1,121	644	819	940	581	675
Public use[e]	N	N	N	N	N	1,021	1,096	1,373	1,111	[k]N
Total	**13,121**	**26,030**	**36,430**	**30,763**	**25,667**	**26,100**	**27,713**	**28,100**	**31,756**	**30,975**

Continued next page

General Aviation Profile (Continued)

Performance (continued)	1960	1970	1980	1990	1995	1996	1997	1998	1999	2000
Vehicle-miles[f] (millions)	[5]1,769	[5]3,207	[5]5,204	[5]4,548	[5]3,795	[5]3,524	[5]3,877	U	U	U
Passenger-mile[f,1] (millions)	2,300	9,100	14,700	13,000	10,800	12,000	12,500	13,100	13,500	U
Fuel consumed[f] (million gallons)	[6]242	[6]759	[6]1,286	[6]1,016	[9]847	[9]896	[9]934	[9]1,126	[9]1,313	[9]1,335
Aviation gasoline	242	551	520	353	287	289	292	311	345	337
Jet fuel	N	208	766	663	560	608	642	815	967	998
Safety										
Fatalities[g]										
Corporate	N	[7]28	[8]66	[8]21	[10]15	[10]20	[10]3	[10]0	[10]30	[10]13
Business	N	148	126	80	73	44	45	42	55	43
Instructional	N	93	73	62	44	40	38	38	38	64
Personal	N	726	808	492	488	413	432	432	[R]383	386
Aerial application	N	41	32	17	15	10	17	6	14	19
Other	N	174	134	95	[R]112	[R]119	106	[R]112	[R]105	87
Total fatalities[h]	**[7]787**	**1,310**	**1,239**	**767**	**[R]735**	**[R]636**	**[R]631**	**[R]624**	**[R]619**	**[R]593**
Accidents										
Fatal[4]	429	641	618	443	[R]413	[R]361	[R]350	[R]364	[R]340	343
Total accidents	**4,793**	**4,712**	**3,590**	**[R]2,241**	**[R]2,056**	**[R]1,908**	**[R]1,845**	**[R]1,904**	**[R]1,906**	**1,838**
Accident rate[i,j] (per 100,000 flight hours)										
Fatal	3.3	2.5	1.7	1.4	1.6	1.4	1.3	1.3	1.1	1.1
Total rate	**36.5**	**18.1**	**9.9**	**[R]7.3**	**8.0**	**7.3**	**6.7**	**6.8**	**6.0**	**5.9**

KEY: N = data do not exist; R = revised; U = data are not available.

[a] In 1960, 1970, 1980, classified as "Industrial."

[b] Includes air tours done under 14 CFR 135: air taxi operators and commercial operators.

[c] Includes sightseeing done under 14 CFR 91: general operating and flight rules.

[d] Significant decrease in "Other" can be attributed to a redefining of the category to only include "Aerial Other" and "Medical Use."

[e] Federal, state or local government-owned or leased aircraft used for the purpose of fulfilling a government position.

[f] Includes air taxi operations. Nautical miles in source multiplied by 1.151 to convert from nautical miles.

[g] Sum of fatalities does not necessarily equal total. Differences are due to methodology used to count collisions involving aircraft in different categories.

[h] Sum of fatalities does not necessarily equal total. Differences are due to doublecounting.

[i] Suicide/sabotage cases are included in accidents and fatalities data but are excluded from accident rates.

[j] Accident rates are calculated by BTS using the formula: Accident Rates (per 100,000 flight hours) = Fatalities/Flight Hours*100.

[k] Beginning in 2000, "Public Use" was included in "Other Work."

General Aviation Profile (Continued)

NOTES

Numbers may not add to totals due to rounding.

Total fatalities in this profile may not match those in table 2-14, due to when the total fatalities data were received and the data breakdown by type of flying. NTSB constantly updates and reclassifies accident and fatality data.

1994-95 data for active aircraft by use, and flight hours, have been revised to reflect changes in adjustment for nonresponse bias with 1996 telephone survey factors. 1996 vehicle-miles and fuel consumption data are estimated using new information on nonrespondents and are not comparable to earlier years.

SOURCES

Unless otherwise noted, refer to chapter tables for sources.

[1] Eno Transportation Foundation, Inc., Transportation in America, Annual Issues (Washington, DC), pp. 8-11, 14-15.

[2] United States. Federal Aviation Administration, General Aviation and Air Taxi Activity and Avionics Survey (Washington, DC: 1990-2000 issues), table 1.1.

[3] Ibid., table 1.6 and similar tables in earlier editions.

[4] National Transportation Safety Board, RE-50, personal communication. *Annual Review of Aircraft Accident Data, U.S. General Aviation, Calendar Year 1998* (Washington, DC: July 2000). Internet site http://www.ntsb.gov/aviation/ as of Sept. 9, 2002, table 10.

[5] United States. Federal Aviation Administration, General Aviation and Air Taxi Activity and Avionics Survey (Washington, DC: 1990-2000 issues), table 3.3 and similar tables in earlier editions.

[6] Ibid., table 5.1.

[7] National Transportation Safety Board, RE-50, personal communication.

[8] Ibid., *Annual Review of Aircraft Accident Data, U.S. General Aviation, Calendar Year 1998* (Washington, DC: July 2000), charts 27, 39, 40, 41, 42 and 43.

[9] U.S. Department of Transportation, Federal Aviation Administration, F*AA Aerospace Forecasts, Fiscal Years 2002-2013* (Washington, DC: March 2002), table 30.

[10] National Transportation Safety Board, RE-50, personal communication. *Annual Review of Aircraft Accident Data, U.S. General Aviation, Calendar Year 1998* (Washington, DC: July 2000), personal communication, Sept. 10, 2002.

Highway Profile

Financial	1960	1970	1980	1990	1995	1996	1997	1998	1999	2000
Government receipts ($ millions), total	11,193	21,763	39,834	75,444	96,347	102,771	107,421	111,581	121,650	128,745
Federal										
Highway trust fund[a]	[3]2,531	[3]5,464	[3]7,615	[3]13,380	[17]18,835	[17]22,036	[17]20,500	[17]23,396	[17]25,085	[17]29,701
Other	240	696	2,334	1,196	1,016	1,160	1,148	1,113	923	1,349
State and local										
State and D.C.	6,055	11,737	19,666	40,026	50,064	52,808	58,087	58,806	63,274	66,441
Local	2,367	3,866	10,219	20,842	26,432	26,767	27,686	28,266	32,368	31,254
Government expenditures ($ millions), total	10,757	20,829	41,763	75,408	93,478	98,082	101,953	107,975	116,011	127,459
Federal										
Highway trust fund[a]	27	83	315	358	1,092	1,384	1,103	1,170	1,249	1,881
Other[b]	170	342	559	306	310	214	212	205	179	396
State and local										
State and D.C.	7,125	14,100	25,936	45,609	56,981	59,709	61,534	65,507	71,415	77,899
Local	3,435	6,304	14,953	29,135	35,095	36,775	39,104	41,093	43,168	47,283
State highway user tax revenues[c] ($ millions), total	5,323	10,284	17,177	35,944	47,424	49,756	51,381	54,507	56,269	56,454
Motor fuel tax	[4]3,374	[4]6,433	[4]9,485	[4]19,658	[4]26,881	[19]27,555	[19]28,477	[19]29,803	[19]30,753	[19]31,291
Other motor fuel receipts[d]	22	44	92	220	108	63	55	58	134	179
Motor vehicle registration fees	[5]1,514	[5]2,873	[5]5,173	[5]10,257	[5]11,942	[20]13,234	[20]13,631	[20]14,552	[20]14,882	[20]13,704
Other motor vehicle fees[e]	235	577	1,490	3,353	4,416	4,689	4,704	5,068	5,350	5,696
Motor carrier taxes[f]	110	176	323	695	770	726	729	861	740	784
Miscellaneous fees	68	181	615	1,761	3,307	3,489	3,785	4,165	4,410	4,800
Inventory										
Rural / urban mileage by ownership										
Rural mileage										
Under state control	[6]658,896	[6]707,002	[12]750,479	[12]702,486	[12]690,924	[21]691,156	[21]692,767	[21]660,834	[21]660,682	[21]661,798
Under federal control[g]	111,912	187,696	246,130	178,188	170,568	168,938	167,369	118,369	116,846	116,698
Under local control	2,345,317	2,274,714	2,234,327	2,241,608	2,231,029	2,232,793	2,248,357	2,285,447	2,293,653	2,305,504
County roads	1,742,404	1,732,981	1,542,984	1,616,634	1,626,927	1,627,639	1,642,468	1,647,025	1,649,291	1,656,906
Town, township and municipal roads[h]	538,651	510,174	458,231	437,460	424,529	426,170	426,433	426,340	590,206	592,623
Other local roads[h]	64,262	31,559	233,112	187,514	179,573	178,984	179,456	212,082	54,156	55,975
Total rural mileage	3,116,125	3,169,412	3,230,936	3,122,282	3,092,520	3,092,887	3,108,493	3,064,650	3,071,181	3,084,000
Urban mileage										
Under state control	50,158	74,103	97,287	95,778	111,766	111,924	112,226	110,017	109,956	110,195
Under federal control[g]	N	N	1,495	1,024	1,509	1,470	1,464	1,485	1,503	1,484
Under local control	N	N	530,119	647,842	706,431	713,371	722,418	730,152	734,605	740,562
County roads	N	N	71,357	95,929	117,518	117,181	117,487	117,016	117,105	116,918
Town and township roads[h]	N	N	37,583	42,752	60,561	60,926	74,402	75,195	605,255	611,473

Highway Profile (Continued)

Inventory (continued)	1960	1970	1980	1990	1995	1996	1997	1998	1999	2000
Other local roads[h]	379,410	486,567	421,179	509,161	528,352	535,264	530,529	537,941	12,245	12,171
Total urban mileage	429,568	560,670	628,901	744,644	819,706	826,765	836,108	841,654	846,064	852,241
Total rural and urban mileage	3,545,693	3,730,082	3,859,837	3,866,926	3,912,226	3,919,652	3,944,601	3,906,304	3,917,245	3,936,241
Rural / urban mileage by functional system										
Rural mileage										
Interstate	N	N	[13] 31,905	[13] 33,547	[13] 32,580	[22] 32,820	[22] 32,817	[22] 32,813	[22] 32,974	[22] 33,048
Other principal arterial	N	N	82,569	83,802	97,948	98,131	98,257	98,852	98,856	98,911
Minor arterial	N	N	149,057	144,774	137,151	137,359	137,497	137,308	137,463	137,574
Major collector	N	N	439,000	436,352	431,712	432,117	432,714	432,408	432,954	433,121
Minor collector	N	N	299,613	293,922	274,081	273,198	272,362	272,140	271,690	271,815
Local	N	N	2,228,792	2,129,885	2,119,048	2,119,262	2,135,485	2,091,127	2,097,244	2,109,519
Total rural mileage	[7] 3,116,125	[7] 3,169,412	3,230,936	3,122,282	3,092,520	3,092,887	3,109,132	3,064,648	3,071,181	3,083,988
Urban mileage										
Interstate	N	N	9,215	11,527	13,164	13,217	13,247	13,312	13,343	13,379
Other freeways and expressways	N	N	6,774	7,668	8,970	9,027	9,063	9,127	9,125	9,140
Other principal arterial	N	N	44,155	51,968	52,796	52,983	53,223	53,132	53,206	53,312
Minor arterial	N	N	66,377	74,659	88,510	89,020	89,185	89,496	89,399	89,789
Collector	N	N	68,387	78,254	87,331	87,790	88,049	88,071	88,008	88,200
Local	N	N	433,993	520,568	568,935	574,728	583,973	588,504	592,978	598,421
Total urban mileage	429,568	560,670	628,901	744,644	819,706	826,765	836,740	841,642	846,059	852,241
Total rural and urban mileage	3,545,693	3,730,082	3,859,837	3,866,926	3,912,226	3,919,652	3,945,872	3,906,290	3,917,240	3,936,229
U.S. roads and streets by surface										
Paved mileage										
Rural	919,082	1,188,080	[7] 1,490,050	[7] 1,550,283	[7] 1,591,334	[23] 1,582,166	[23] 1,605,804	[23] 1,612,251	[23] 1,641,877	[23] 1,684,922
Urban	311,387	470,341	582,642	704,539	786,934	798,484	804,131	808,093	809,549	819,572
Total	1,230,469	1,658,421	2,072,692	2,254,822	2,378,268	2,380,650	2,409,935	2,420,344	2,451,426	2,504,494
Percent paved	34.7%	44.5%	53.7%	58.3%	60.8%	60.5%	60.9%	61.3%	62.4%	63.4%
Unpaved mileage										
Rural	[7] 2,197,043	[7] 1,981,332	[7] 1,740,886	[7] 1,571,999	[7] 1,501,186	[23] 1,518,310	[23] 1,510,330	[23] 1,490,488	[23] 1,436,969	[23] 1,406,508
Urban	118,181	90,329	46,259	40,105	32,772	35,227	38,019	38,061	42,008	39,040
Total	2,315,224	2,071,661	1,787,145	1,612,104	1,533,958	1,553,537	1,548,349	1,528,549	1,478,977	1,445,548
Percent unpaved	65.3%	55.5%	46.3%	41.7%	39.2%	39.5%	39.1%	38.7%	37.6%	36.6%
Number of employees										
State and local govt. streets and highways[1]	532,000	607,000	559,000	569,000	543,000	U	531,000	530,000	543,000	546,000
Highway and street construction[2]	U	U	U	238,700	227,900	236,100	242,800	256,500	[R] 280,100	[R] 281,200
Performance										
Vehicle-miles of travel by functional system (millions)[i]										
Rural mileage										
Interstate	[8] 10,514	[8] 79,516	[8] 135,084	[8] 200,173	[18] 223,382	[18] 232,565	[18] 240,255	[18] 251,520	[18] 260,204	[18] 268,960
Other principal arterial	N	N	132,958	175,133	215,567	221,403	228,716	237,704	243,950	248,686

Continued next page

Highway Profile (Continued)

Performance (continued)	1960	1970	1980	1990	1995	1996	1997	1998	1999	2000
Minor arterial	N	N	129,816	155,733	153,028	157,444	163,342	165,780	169,378	171,883
Major collector	N	N	150,186	190,512	186,212	190,923	201,790	203,580	206,936	209,561
Minor collector	N	N	39,282	49,948	49,936	50,107	52,574	54,278	57,617	57,960
Local	N	N	84,704	97,379	105,164	107,752	114,673	120,595	125,545	127,911
Total rural	400,463	539,472	672,030	868,878	933,289	960,194	1,001,350	1,033,457	1,063,630	1,084,961
Urban										
Interstate	13,365	81,532	161,242	278,901	341,515	351,579	361,401	374,622	382,986	393,580
Other freeways and expressways	N	N	79,690	127,465	151,509	157,502	159,622	165,626	171,563	177,142
Other principal arterial	N	N	229,469	335,543	370,365	377,776	385,125	388,073	392,721	398,652
Minor arterial	N	N	175,030	236,225	293,228	299,345	301,912	309,295	313,936	324,367
Collector	N	N	83,043	106,297	126,883	129,310	130,143	131,919	131,613	135,371
Local	N	N	126,791	191,053	205,907	208,374	222,142	228,530	234,886	235,730
Total urban	318,299	570,252	855,265	1,275,484	1,489,407	1,523,886	1,560,345	1,598,065	1,627,705	1,664,842
Total rural and urban	718,762	1,109,724	1,527,295	2,144,362	2,422,696	2,484,080	2,561,695	2,631,522	2,691,335	2,749,803
Highway demand for petroleum (thousand barrels)										
Motor fuel	[9]1,378,095	[9]2,198,310	[9]2,737,143	[9]3,113,214	[16]3,424,616	[16] 3,492,285	[16]3,580,620	[16]3,699,500	[16]3,843,128	[16]3,863,338
Asphalt and road oil	[10]110,000	[10]163,000	[10]145,000	[14]176,340	[14]177,543	[14]177,206	[14]184,383	[14]190,258	[14]199,580	[14]192,236
Total	1,488,095	2,361,310	2,882,143	3,289,554	3,602,159	3,669,491	3,765,003	3,889,758	4,042,708	4,055,574
Safety										
Fatalities	[11]36,399	[11]52,627	[11]51,091	[15]44,599	[15]41,817	[15]42,065	[15]42,013	[15]41,501	[15]41,717	[R,24]41,945
Injured persons	N	N	N	3,231,000	3,465,000	3,483,000	3,348,000	3,192,000	3,236,000	[15]3,189,000
Crashes	N	N	N	6,471,000	6,699,000	6,770,000	6,624,000	6,335,000	6,279,000	6,394,000

KEY: N = data do not exist; R = revised; U = data are not available.

[a] The Federal Highway Trust Fund was created with the enactment of the Highway Revenue Act of 1956. The total receipts shown for 1995 are overstated by approximately $1.59 billion due to a fiscal year (FY) 1994 error by the Treasury Department in reconciling estimated deposits to the actual tax revenue. The correction was made after the close of FY1994 and is shown in FY1995 receipts.

[b] Figures obtained by addition/subtraction and may not appear directly in data source.

[c] Gross amounts collected by state governments from highway users. Does not include tolls. Not all revenues allocated to highway expenditures.

[d] Includes distributors and dealers licenses, inspection fees, fines and penalties, and miscellaneous receipts.

[e] Includes drivers licenses, title fees, special title taxes, fines and penalties; estimated service charges and local collections.

[f] Includes carrier gross receipt taxes; mileage, ton-mile and passenger-mile taxes; special license fees and franchise taxes; and certificate or permit fees.

[g] Mileage in federal parks, forests, and reservations that are not a part of the state and local highway system.

[h] Prior to 1999, mileage for municipal roads was included with the "other local roads" jurisdiction. Mileage for municipal roads was included in "Town, Township and Municipal Road" jurisdiction after 1999.

[i] Highway category classifications changed several times before 1980. Actual 1960 data categories were: Main Rural Roads, Local Rural Roads and Urban Streets; 1970 data categories were: Rural Interstate, Rural Other Arterial, Other Rural, Urban Interstate and Other Urban.

Highway Profile (Continued)

NOTES

Motor vehicle injury and crash data in this profile come from the National Highway Traffic Safety Administration's General Estimates System (GES). The data from GES, which began operation in 1988, are obtained from a nationally representative probability sample selected from all police-reported crashes, and the GES sample includes only crashes where a police accident report was completed and the crash resulted in property damage, injury, or death. The resulting figures do not take into account crashes which were not reported to the police or which did not result in at least property damage.

Earlier editions of NTS, particularly the 1993 Historical Compendium, used crash and injury figures estimated by the National Safety Council, which employed a different set of methods to arrive at its figures. Thus, the injury and crash figures in this edition of NTS may not be comparable with those found in earlier editions.

In 1998, FHWA instituted a new method of creating mileage based tables derived from the Highway Performance Monitoring System (HPMS). See Chapter 1 accuracy profiles for more information about the HPMS.

SOURCES

Unless otherwise noted, please refer to chapter tables for sources.

[1] U.S. Department of Commerce, *Statistical Abstract of the United States*, various years, State and Local Government Section.

[2] Ibid., Internet site http://stats.bls.gov/sahome.html as of Aug. 2, 2001.

[3] U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics, Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table HF-210.

[4] Ibid., *Highway Statistics, Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table MF-201.

[5] Ibid., *Highway Statistics, Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table MV-202.

[6] Ibid., *Highway Statistics, Summary to 1985*, FHWA-PL-97-009 (Washington, DC: July 1997), table M-203.

[7] Ibid., *Highway Statistics, Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table HM-212.

[8] Ibid., *Highway Statistics, Summary to 1985* (Washington, DC: April 1987), table VM-201.

[9] Ibid., *Highway Statistics, Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A (total fuel consumed in thousands of gallons divided by 42).

[10] U.S. Department of Energy, Energy Information Administration, *State Energy Data Report, 1960-1980* (Washington, DC), p. 13.

[11] U.S. Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, NRD-30, personal communication.

[12] U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics, Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table HM-210.

[13] Ibid., *Highway Statistics, Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table HM-220.

[14] U.S. Department of Energy, Energy Information Administration, Petroleum Supply Annual: Volume 1 (Washington, DC: Annual issues), table 2.

[15] U.S. Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, *Traffic Safety Facts 2000* (Washington, DC: 2001).

[16] U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues), table VM-1 (total fuel consumed in thousands of gallons divided by 42).

[17] Ibid., *Highway Statistics* (Washington, DC: 1996, 1997, 1998, 1999, 2000), tables HF-10A and HF-10.

[18] Ibid., *Highway Statistics* (Washington, DC: various years), tables VM-2 and VM-2A.

[19] Ibid., *Highway Statistics* (Washington, DC: 1996, 1997, 1998, 1999, 2000), table MF-1.

[20] Ibid., *Highway Statistics* (Washington, DC: 1996, 1997, 1998, 1999, 2000), table MV-2.

[21] Ibid., *Highway Statistics* (Washington, DC: 1996, 1997, 1998, 1999, 2000), table HM-10.

[22] Ibid., *Highway Statistics* (Washington, DC: 1996, 1997, 1998, 1999, 2000), table HM-20.

[23] Ibid., *Highway Statistics* (Washington, DC: 1996, 1997, 1998, 1999, 2000), table HM-12.

[24] U.S. Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, Fatality Analysis Reporting System (FARS) Query, Sept. 6, 2002.

Automobile Profile

FINANCIAL	1960	1970	1980	1990	1995	1996	1997	1998	1999	2000	2001
Personal auto expenditures, total[a] ($ millions)	39,886	73,390	209,563	368,192	445,566	474,491	498,928	R504,247	543,629	599,852	U
New and used cars[a,1]	16,600	26,700	57,200	119,000	132,200	133,300	135,600	142,800	R156,100	R164,900	166,500
Tires, tubes, accessories, and parts[1]	2,500	6,100	17,900	29,900	36,900	38,700	39,600	41,500	44,400	R45,900	45,800
Gasoline and oil[1]	12,000	21,900	86,700	107,300	113,300	124,200	128,100	114,800	R129,300	R164,400	162,100
Tolls[1]	300	700	1,100	2,300	3,400	3,700	4,000	4,000	R4,400	R4,600	4,900
Insurance premiums less claims paid[1]	2,000	3,800	9,400	18,100	29,700	31,800	36,300	38,000	36,800	R30,700	32,100
Repair, greasing, washing, parking, storage, rental, and leasing[1]	5,500	12,300	34,000	84,900	122,200	134,200	146,300	153,600	R165,100	R175,500	181,600
Auto registration fees	[4]867	[4]1,668	[4]2,893	[4]6,054	[4]7,043	[10]7,698	[10]8,163	[10]8,630	[10]8,625	[10]7,607	U
Driver's license fees	[4]119	[4]222	[4]370	[4]638	R,[10]823	[10]893	[10]865	[10]917	[10]904	[10]745	U
Taxi expenditures ($ millions)[1]	600	1,200	1,900	2,600	3,200	3,500	3,700	4,100	3,800	R3,600	3,700

INVENTORY	1960	1970	1980	1990	1995	1996	1997	1998	1999	2000	2001
Number of vehicle registrations											
Passenger car and motorcycle	[5]62,245,422	[5]92,067,655	127,294,783	137,959,958	132,283,966	133,599,578	133,575,077	135,717,988	136,584,477	137,967,488	U
Other 2-axle 4-tire vehicle	[5]e	[5]14,210,591	[5]27,875,934	[5]48,274,555	[9]65,738,322	I,[9]68,933798	[9]70,224,082	[9]71,330,205	[9]75,356,376	[9]79,084,979	U
Motorcycle	[6]574,032	[6]2,824,098	[6]5,693,940	[6]4,259,462	[9]3,897,191	R,[9]3,871,237	[9]3,826,373	[9]3,879,450	[9]4,152,433	[9]4,346,068	U
Motor vehicle licensed drivers	[7]87,252,563	111,542,787	145,295,036	167,015,250	176,628,482	179,539,340	182,709,204	184,860,969	187,170,420	190,625,023	U
Number of employees											
Taxicabs[2]	120,700	106,400	52,500	32,400	30,700	30,500	30,600	31,200	31,600	R31,900	31,800
Automotive dealers and service stations[2]	1,267,200	1,617,400	1,688,500	2,063,100	2,189,600	2,266,700	2,310,800	2,332,300	2,368,100	R2,409,600	2,424,800
Motor vehicles, parts, and supplies[2]	N	N	434,300	456,000	492,100	502,800	513,000	516,600	523,700	R516,800	502,100
Auto repair, services, and parking[2]	N	N	570,900	913,700	1,020,100	1,080,000	1,119,600	1,145,200	1,196,400	R1,234,200	1,257,200

PERFORMANCE	1960	1970	1980	1990	1995	1996	1997	1998	1999	2000	2001
Vehicle-miles (millions)											
Passenger car and motorcycle, total[a]	[8]587,012	[8]919,679	[8]1,121,810	R,[8]1,417,823	[9]1,448,091	R,[9]1,478,767	[9]1,512,637	[9]1,559,860	[9]1,579,684	R,[9]1,610,756	U
Rural highway, total	[8]313,623	[8]424,088	[8]450,659	[8]547,910	[9]527,932	R,[9]540,021	[9]555,227	[9]579,258	[9]589,213	R,[9]597,898	U
Rural interstate	N	[8]62,342	[8]89,488	[8]117,519	[9]115,991	R,[9]120,324	[9]121,095	[9]128,447	[9]131,956	R,[9]135,630	U
Rural other arterial	[8]233,452	[8]182,213	[8]180,857	[8]211,066	[9]212,063	R,[9]217,574	[9]221,732	[9]230,435	[9]232,779	R,[9]236,423	U
Other rural roads	[8]80,171	[8]179,533	[8]180,314	[8]219,325	[9]199,878	R,[9]202,122	[9]212,400	[9]220,376	[9]224,478	R,[9]225,845	U
Urban highway[b], total	[8]273,389	[8]495,591	[8]671,151	[8]869,912	[9]920,159	R,[9]938,746	[9]957,410	[9]980,602	[9]990,471	R,[9]1,012858	U
Urban interstate	N	[8]69,369	[8]124,480	[8]184,783	[9]205,489	R,[9]211,818	[9]215,525	[9]222,066	[9]225,822	R,[9]232,202	U
Other urban	N	[8]426,222	[8]546,671	[8]685,129	[9]714,670	[9]726,928	[9]741,885	[9]758,536	[9]764,649	R,[9]780,656	U
Other 2-axle 4-tire vehicle, total	[8]e	[8]123,286	[8]290,935	[8]574,571	[9]790,029	R,[9]815,936	[9]850,739	[9]868,275	[9]901,022	R,[9]923,059	U
Rural highway, total	[8]e	[8]73,591	[8]149,560	[8]227,831	[9]295,472	R,[9]306,891	[9]327,316	[9]334,806	[9]351,658	R,[9]360,355	U
Rural interstate	[8]e	[8]6,766	[8]19,952	[8]46,298	[9]63,329	[9]65,779	[9]69,030	[9]72,343	[9]76,190	R,[9]79,088	U
Rural other arterial	[8]e	[8]29,808	[8]56,137	[8]87,474	[9]118,305	R,[9]122,211	[9]129,890	[9]132,043	[9]138,475	R,[9]141,257	U
Other rural roads	[8]e	[8]37,017	[8]73,471	[8]94,059	[9]113,838	R,[9]118,901	[9]128,396	[9]130,420	[9]136,993	R,[9]140,010	U
Urban highway[c], total	[8]e	[8]49,695	[8]141,375	[8]346,739	[9]494,557	[9]509,045	[9]523,423	[9]533,469	[9]549,364	R,[9]562,704	U
Urban interstate	[8]e	[8]6,252	[8]23,067	[8]71,500	[9]109,807	[9]112,908	[9]116,680	[9]121,700	[9]124,399	R,[9]128,291	U
Other urban	[8]e	[8]43,443	[8]118,308	[8]275,239	[9]384,750	R,[9]396,136	[9]406,743	[9]411,769	[9]424,965	R,[9]434,413	U
Vehicle-miles, total (millions)	[5]587,012	[5]1,042,965	[5]1,412,745	[5]1,992,394	[9]2,238,120	R,[9]2,294,703	[9]2,363,376	[9]2,428,135	[9]2,480,706	R,[9]2,533,815	U

Passenger cars	[f,5] 587,012	[f,5] 919,679	[f,5] 1,121,810	[f,5] 1,417,823	[9] 1,438,294	[R,9] 1,468,854	[9] 1,502,556	[9] 1,549,577	[9] 1,569,100	[R,9] 1,600,287	U
Other 2-axle 4-tire vehicle	[5] e	[5] 123,286	[5] 290,935	[5] 574,571	[9] 790,029	[R,9] 815,936	[9] 850,739	[9] 868,275	[9] 901,022	[R,9] 923,059	U
Motorcycle	[5] g	[5] g	[5] g	[5] g	[9] 9,797	[R,9] 9,913	[9] 10,081	[9] 10,283	[9] 10,584	[R,9] 10,469	U
Passenger-miles[c], total (millions)	[5] 1,145,000	[5] 1,979,787	[5] 2,545,020	[5] 3,037,244	[9] 3,553,810	[R,9] 3,643,719	[9] 3,752,829	[9] 3,855,696	[9] 3,939,137	[R,9] 4,023,637	U
Passenger cars	[↓,f,5] 1,145,000	[↓,f,5] 1,754,174	[↓,f,5] 2,024,246	[f,5] 2,140,913	[9] 2,286,887	[R,9] 2,335,478	[9] 2,389,065	[9] 2,463,828	[9] 2,494,870	[R,9] 2,544,457	U
Other 2-axle 4-tire vehicle	[5] e	[5] 225,613	[5] 520,774	[5] 896,331	[9] 1,256,146	[R,9] 1,297,337	[9] 1,352,675	[9] 1,380,557	[9] 1,432,625	[R,9] 1,467,664	U
Motorcycle	[5] g	[5] g	[5] g	[5] g	[9] 10,777	[R,9] 10,904	[9] 11,089	[9] 11,311	[9] 11,642	[R,9] 11,516	U
Average miles traveled per vehicle											
Passenger car	[f,5] 9,518	[f,5] 9,989	[f,5] 8,813	[f,5] 10,277	[9] 11,203	[R,9] 11,323	[9] 11,581	[9] 11,754	[9] 11,848	[R,9] 11,976	U
Other 2-axle 4-tire vehicle	[5] e	[5] 8,676	[5] 10,437	[5] 11,902	[9] 12,018	[R,9] 11,837	[9] 12,115	[9] 12,173	[9] 11,957	[R,9] 11,672	U
Motorcycle	[5] g	[5] g	[5] g	[5] g	[9] 2,514	[R,9] 2,561	[9] 2,635	[9] 2,651	[9] 2,549	[R,9] 2,409	U
Fuel consumed (million gallons)											
Passenger cars	[f,5] 41,171	[f,5] 67,879	[f,5] 70,186	[f,5] 69,759	[9] 68,072	[R,9] 68,897	[9] 69,892	[9] 71,695	[9] 73,283	[R,9] 73,065	U
Other 2-axle 4-tire vehicle	[5] e	[5] 12,313	[5] 23,796	[5] 35,611	[9] 45,605	[R,9] 47,133	[9] 49,388	[9] 50,462	[9] 52,859	[R,9] 52,939	U
Motorcycle	[5] g	[5] g	[5] g	[5] g	[9] 196	[9] 198	[9] 202	[9] 206	[9] 212	[R,9] 209	U
Average fuel consumption per vehicle (gallons)											
Passenger cars	[f,5] 668	[f,5] 737	[f,5] 551	[f,5] 506	[9] 530	[R,9] 531	[9] 539	[9] 544	[9] 553	[R,9] 547	U
Other 2-axle 4-tire vehicle	[5] e	[5] 866	[5] 854	[5] 738	[9] 694	[R,9] 684	[9] 703	[9] 707	[9] 701	[R,9] 669	U
Motorcycle	[5] g	[5] g	[5] g	[5] g	[9] 50	[9] 51	[9] 53	[9] 53	[9] 51	[9] 48	U
Average miles traveled per gallon of fuel consu											
Passenger cars	[f,5] 14.3	[f,5] 13.5	[5] 16.0	[5] 20.3	[9] 21.1	[R,9] 21.3	[9] 21.5	[9] 21.6	[9] 21.4	[R,9] 21.9	U
Other 2-axle 4-tire vehicle	[5] e	[5] 10.0	[5] 12.2	[5] 16.1	[9] 17.3	[R,9] 17.3	[9] 17.2	[9] 17.2	[9] 17.0	[R,9] 17.4	U
Motorcycle	[5] g	[5] g	[5] g	[5] g	[9] 50	[9] 50	[9] 50	[9] 50	[9] 50	[9] 50	U

SAFETY	1960	1970	1980	1990	1995	1996	1997	1998	1999	2000	2001
Number of occupants and nonoccupant fatalities											
Passenger car[3]	N	N	27,449	24,092	22,423	22,505	22,199	21,194	20,862	[R] 20,699	20,233
Motorcycle[3]	790	2,280	5,144	3,244	2,227	2,161	2,116	2,294	2,483	[R] 2,897	3,181
Bicycle[d,3]	490	760	965	859	833	765	814	760	754	[R] 693	728
Pedestrian[d,3]	7,210	8,950	8,070	6,482	5,584	5,449	5,321	5,228	4,939	[R] 4,763	4,882
Occupant fatality rates											
Per 100 million vehicle-miles											
Passenger car[3]	4.7	3.8	2.5	1.7	1.5	1.5	1.5	1.4	1.3	1.3	U
Motorcycle[3]	N	76.5	50.4	33.9	22.7	21.8	21.0	22.3	23.5	[R] 27.7	U
Per 10,000 registered vehicles											
Passenger car[3]	5.1	3.9	2.6	[R] 2.0	1.8	1.8	1.8	1.7	1.6	1.6	U
Motorcycle[3]	13.8	8.1	9.0	7.6	5.7	5.6	5.5	5.9	6.0	[R] 6.7	U
Vehicle involvement rate (fatal crashes)											
Per 100 million vehicle-miles											
Passenger car[3]	N	5.6	3.5	2.4	2.1	2.0	2.0	1.9	1.8	[R] 1.8	U
Motorcycle[3]	N	22.9	50.9	34.3	23.1	21.9	21.4	22.7	[R] 23.9	[R] 28.4	U
Per 10,000 registered vehicles											
Passenger car[3]	N	5.6	3.7	2.8	2.5	2.5	2.4	2.3	2.2	2.2	2.1
Motorcycle[3]	N	8.2	9.1	7.7	5.8	5.6	5.6	6.0	6.1	6.8	6.6

KEY: E = estimate; N = data do not exist; R = revised; U = data are not available.

NOTES

[a] Figures obtained by addition / subtraction and may not appear directly in data source.

[b] Urban consists of travel on all roads and streets in urban places of 5,000 or greater population.

[c] In July 1997, the USDOT, Federal Highway Administration published revised passenger-miles data for the highway modes for many years. The major change reflected the reassignment of some vehicles from the passenger car category to the other 2 axle 4-tire vehicle category.

[d] Involvement only with motor vehicle.

[e] Included in single-unit 2-axle 6-tire or more truck category.

[f] Includes motorcycle data.

[g] Included in passenger cars.

SOURCES

Unless otherwise noted, refer to chapter tables for sources.

[1] U.S. Department of Commerce, Bureau of Economic Analysis, *National Income and Product Accounts Tables,* table 2.4 available at http://www.bea.doc.gov/bea/dn/nipaweb/AllTables.asp as of January 2003.

[2] U.S. Department of Labor, Bureau of Labor Statistics, *BLS Database,* Internet site http://www.bls.gov/data/sa.htm as of January 2003; codes “414120 Taxicabs,” “605500 Automotive Dealers and Service Stations,” “525010 Motor Vehicle Parts, and Supplies” and “807500 Auto Repair, Services, and Parking."

[3] U.S. Department of Transportation, National Highway Traffic Safety Administration (NHTSA),*Traffic Safety Facts 2001,* DOT HS 809 484, (Washington, DC: December 2002), tables 3, 4, 7, and 10.

[4] U.S. Department of Transportation, Federal Highway Administration (FHWA), *Highway Statistics Summary to 1995,* FHWA-97-009 (Washington, DC: July 1997), table MV-202.

[5] Ibid., *Highway Statistics Summary to 1995* , FHWA-97-009 Washington, DC: July 1997), table VM–201A, table revised in June 1999.

[6] Ibid., *Highway Statistics Summary to 1995,* FHWA-PL-97-009 (Washington, DC: July 1997), table MV-201.

[7] Ibid., *Highway Statistics Summary to 1995,* FHWA-Pl-97-009 (Washington, DC: July 1997), table DL-201.

[8] Ibid., *Highway Statistics Summary to 1995,* FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201.

[9] Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1 (revised tables used when applicable).

[10] Ibid., *Highway Statistics* (Washington, DC: Annual issues), table MV-2 (revised tables used when applicable).

[11] Ibid., *Highway Statistics* (Washington, DC: Annual issues), table DL-22 (revised tables used when applicable).

Truck Profile

Financial	1960	1970	1980	1990	1995	1996	1997	1998	1999	2000
Operating revenues, total[a,1] (based on SIC) $ millions)	N	N	N	127,314	161,806	172,743	183,153	N	N	N
Local trucking	N	N	N	31,397	43,830	46,589	49,972	N	N	N
Trucking, except local	N	N	N	74,465	91,675	97,586	103,847	N	N	N
Local trucking with storage	N	N	N	4,115	5,154	5,502	5,860	N	N	N
Courier services, except by air	N	N	N	17,337	21,147	23,066	23,474	N	N	N
Operating expenses, total (based on SIC) ($ millions)	N	N	N	118,968	151,628	162,825	170,998	N	N	N
Local trucking	N	N	N	28,049	38,695	41,325	43,871	N	N	N
Trucking, except local	N	N	N	70,965	88,061	94,390	98,570	N	N	N
Local trucking with storage	N	N	N	3,885	4,817	5,121	5,439	N	N	N
Courier services, except by air	N	N	N	16,069	20,055	21,989	23,118	N	N	N
Operating revenues, total[b,2] (based on NAICS) ($ millions)	N	N	N	N	N	N	N	195,706	209,438	224,464
Truck transportation	N	N	N	N	N	N	N	150,816	162,083	171,691
Couriers messengers	N	N	N	N	N	N	N	44,890	47,355	52,773
Truck highway-user taxes ($ millions)										
State[3]	1,709	3,429	6,731	12,691	13,844	U	15,750	15,611	16,266	U
Federal	1,121	2,203	3,157	6,665	11,273	U	12,260	13,086	14,236	U
Total[c]	2,830	5,632	9,888	19,356	25,117	U	28,010	28,697	30,502	U
Inventory										
Number of truck registrations										
Single-unit truck	N	[10]3,681,405	[10]4,373,784	[10]4,486,981	[12]5,023,670	[12]5,266,029	[12]5,293,358	[12]5,734,925	[12]5,762,864	[12]5,926,030
Combination truck	N	905,082	1,416,869	1,708,895	1,695,751	1,746,586	1,789,968	1,997,345	2,028,562	2,096,619
Total	[5]11,914,249	905,082	1,416,869	1,708,895	1,695,751	7,012,615	1,789,968	1,997,345	7,791,426	8,022,649
Number of employees										
Trucking and courier services, except air	N	[11]998,500	[11]1,182,000	[11]1,273,900	[13]1,440,000	[13]1,482,100	[13]1,514,200	[13]1,568,800	[13]1,613,700	[13]1,630,500
Truck drivers and deliverymen[4]	1,477,000	1,565,000	1,931,000	2,148,000	2,861,000	2,542,000	2,602,000	3,012,000	3,116,000	U
Number of trucking and courier establishments[,5]	N	64,756	69,796	90,709	112,887	116,861	121,111	119,572	120,687	122,713
Performance										
Vehicle-miles (millions)										
Rural highway										
Rural interstate	N	[9]10,069	[9]25,111	[9]35,789	[12]43,351	[12]45,721	[12]49,336	[12]49,896	[12]51,049	[12]52,637
Rural other arterial	N	17,625	24,789	31,331	37,056	37,875	39,193	39,724	40,691	41,646
Other rural roads	N	11,550	18,876	22,572	25,624	25,884	26,169	25,522	26,201	26,348
All rural roads	[9]84,508	29,175	43,665	53,903	62,680	109,480	114,698	115,142	117,941	120,631

Continued next page

Truck Profile (Continued)

Performance (continued)	1960	1970	1980	1990	1995	1996	1997	1998	1999	2000
Urban highway[d]										
Urban interstate	N	5,634	13,135	22,163	25,639	26,256	28,549	30,193	32,286	32,191
Other urban streets	N	17,337	26,580	34,387	46,486	47,235	48,230	51,045	52,461	52,969
All urban streets	42,896	22,971	39,715	56,550	72,125	73,491	76,779	81,238	84,747	85,160
Total rural and urban highway	127,405	52,146	83,380	110,453	134,805	182,971	191,477	196,380	202,688	205,791
Passenger-miles[e] (millions)										
Single-unit truck[f]	98,551	27,081	39,813	51,901	62,705	64,072	66,893	68,021	70,304	70,583
Combination truck	28,854	35,134	68,678	94,341	115,451	118,899	124,584	128,359	132,384	135,208
All trucks	127,405	62,215	108,491	146,242	178,156	182,971	191,477	196,380	202,688	205,791
Ton-miles, intercity 6 (millions)	285,000	412,000	555,000	735,000	921,000	972,000	996,000	1,027,000	1,093,000	U
Fuel consumed (million gallons)										
Single-unit truck	N	[10]3,968	[10]6,923	[10]8,357	[12]9,216	[12]9,409	[12]9,576	[12]6,817	[12]9,372	[12]9,548
Combination truck	N	7,348	13,037	16,133	19,777	20,192	20,302	25,158	24,537	25,645
All trucks	[4]15,882	11,316	19,960	24,490	28,993	29,601	29,878	31,975	33,909	35,193
Average fuel consumption per vehicle (gallons)										
Single-unit truck	N	1,078	1,583	1,862	1,835	1,787	1,809	1,189	1,626	1,611
Combination truck	N	8,119	9,201	9,441	11,663	11,561	11,342	12,596	12,096	12,232
All trucks	1,333	2,467	3,447	3,953	4,315	4,221	4,218	4,135	4,352	4,387
Average miles traveled per gallon of fuel consumed										
Single-unit truck	N	6.8	5.8	6.2	6.8	6.8	7.0	10.0	7.5	7.4
Combination truck	N	4.8	5.3	5.8	5.8	5.9	6.1	5.1	5.4	5.3
All trucks	8.0	5.5	5.4	6.0	6.1	6.2	6.4	6.1	6.0	5.8
Average miles traveled per vehicle										
Single-unit truck	N	7,356	9,103	11,567	12,482	12,167	12,637	11,861	12,199	11,911
Combination truck	N	38,819	48,472	55,206	68,083	68,075	69,601	64,265	65,260	64,489
All trucks	10,693	13,565	18,736	23,603	26,514	26,092	27,032	25,397	26,014	25,651
Average length of haul (domestic freight) [7] (miles)	272	263	363	391	416	426	435	442	458	U
Safety										
Occupant fatalities										
Light truck[8]	N	N	7,486	8,601	9,568	9,932	10,249	10,705	11,265	11,526
Large truck	N	N	1,262	705	648	621	723	742	759	754
All trucks	N	N	8,748	9,306	10,216	10,553	10,972	11,447	12,024	12,280

Truck Profile (Continued)

Safety (continued)	1960	1970	1980	1990	1995	1996	1997	1998	1999	2000
Occupant fatality rate										
Per 100 million vehicle-miles										
Light truck	N	N	2.5	1.5	1.3	1.3	1.2	1.2	1.2	1.2
Large truck	N	N	1.2	0.5	0.4	0.3	0.4	0.4	0.4	0.4
All trucks	N	N	2.2	1.3	1.1	1.1	1.1	1.1	1.1	1.1
Per 10,000 registered vehicles										
Light truck	N	N	2.5	1.7	1.5	1.5	1.5	1.5	1.5	1.5
Large truck	N	N	2.2	1.1	1.0	0.9	1.0	1.0	1.0	0.9
All trucks	N	N	2.4	1.7	1.5	1.5	1.5	1.5	1.5	1.5
Vehicle involvement rate (fatal crashes)										
Per 100 million vehicle-miles										
Light truck	N	N	4.3	2.8	2.3	2.3	2.3	2.2	2.2	2.2
Large truck	N	N	5.0	3.3	2.5	2.6	2.6	2.5	2.4	2.4
All trucks	N	N	4.5	2.9	2.4	2.4	2.3	2.3	2.2	2.2
Per 10,000 registered vehicles										
Light truck	N	N	4.2	3.1	2.8	2.8	2.8	2.8	2.7	2.7
Large truck	N	N	9.3	7.7	6.7	6.8	6.9	6.4	6.3	6.1
All trucks	N	N	5.0	3.6	3.2	3.2	3.2	3.2	3.1	3.0

KEY: N = data do not exist; U = data are not available.

[a] **Local trucking (SIC 4212)** - Establishments primarily engaged in furnishing trucking or transfer services without storage for freight generally weighing more than 100 pounds.
Trucking, except local (SIC 4213) - Establishments primarily engaged in furnishing "over-the-road" trucking services or trucking services and storage services, including household goods either as common carriers or under special or individual contracts or agreements, for freight generally weighing more than 100 pounds.
Local trucking, without storage (SIC 4214) - Establishments primarily engaged in furnishing both trucking and storage services, including household goods.
Courier services, except by air (SIC 4215) - Establishments primarily engaged in the delivery of individually addressed letters, parcels, and packages (generally under 100 pounds).

[b] **Truck transportation (NAICS 484)** - Industries primarily engaged in over-the-road transportation of cargo using motor vehicles, truck-tractors, and trailers.
Couriers and messengers (NAICS 492) - Establishments primarily engaged in providing air, surface, or combined courier delivery services of parcels or primarily engaged in furnishing local messenger and delivery services of small items within a single metropolitan area or urban center.

[c] Numbers may not equal totals due to rounding.

[d] Urban consists of travel on all roads and streets in urban places of 5,000 or greater population.

[e] Highway passenger-miles are calculated by multiplying vehicle-miles of travel as cited by the Federal Highway Administration (FHWA) by the average number of occupants for each vehicle type as estimated by the FHWA using the Nationwide Personal Transportation Survey.

[f] Includes other 2-axle 4-tire vehicle in 1960.

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Truck Profile (Continued)

NOTE

In 1995, FHWA revised its vehicle type categories. These new categories include passenger car, other 2-axle 4-tire vehicle, single-unit 2-axle 6-tire or more truck, and combination truck. Other 2-axle 4-tire vehicles include vans, pickup trucks, and sport/utility vehicles. In previous years, some minivans and sport/utility vehicles were included in the passenger car category. Single-unit 2-axle 6-tire or more trucks are on a single frame with at least 2 axles and 6 tires.

SOURCES

Unless otherwise noted, refer to chapter tables for sources.

[1] U.S. Census Bureau, *Transportation Annual Survey* (Washington, DC: December 1998), table 1.

[2] Ibid., *Service Annual Survey, 2000* (Washington, DC: December 2001), table 2.2.

[3] American Trucking Association, *American Trucking Trends* (Washington, DC: Annual issues).

[4] Eno Transportation Foundation, Inc., *Transportation in America, 2000* (Washington, DC: 2001), p. 35.

[5] U.S. Bureau of the Census, *County Business Patterns* (Washington, DC: Annual issues), table 2 (NAICS 484 and 492/SIC 421), and similar tables in earlier editions.

[6] Eno Transportation Foundation, Inc., *Transportation in America, 2000* (Washington, DC: 2001), p. 12.

[7] Ibid, p. 51.

[8] U.S. Department of Transportation, National Highway Traffic Safety Administration, *Traffic Safety Facts 2000*, DOT HS 809 337 (Washington, DC: December 2000), tables 8 and 9, and Fatality Analysis Reporting System (FARS) Query, Sept. 10, 2002.

[9] U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201.

[10] Ibid., table VM-201A.

[11] U.S. Department of Labor, Bureau of Labor Statistics, *Employment, Hours and Earnings, United States, 1909-1994* (Washington, DC: September 1994), SIC 421.

[12] U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

[13] Ibid., Internet site www.bls.gov as of Aug. 17, 2001. (Code: 414210).

Bus Profile

Financial	1960	1970	1980	1990	1995	1996	1997	1998	1999	2000
Expenditures ($ thousands)										
School bus	[1]486,000	[1]1,219,000	[1]3,833,000	[1]8,031,000	[1]9,889,000	[1]9,082,000	[1]10,353,000	[1]10,326,000	[1]10,340,000	U
Operating revenues ($ thousands)										
Intercity bus, Class I	[2]463,100	[2]721,700	[2]1,397,378	[2]943,268	[9]1,189,235	[R,9]985,537	[9]1,080,083	[9]1,074,582	[9]1,326,909	1,133,822
Operating expenses ($ thousands)										
Intercity bus, Class I	405,400	639,000	1,318,372	1,026,213	1,253,537	[R]941,014	1,022,680	1,016,208	1,313,900	1,078,386
Inventory										
Number of operating companies										
Intercity bus, Class I	143	71	61	31	[9]24	[9]20	22	[9]20	[9]18	[9]15
Number of vehicles										
All buses	[3]272,129	[3]377,562	[3]528,789	[3]626,987	[3]685,503	[3]694,781	[3]697,548	[3]715,540	[3]728,777	[3]746,125
Number of employees										
Intercity and rural bus	[4]40,500	[4]43,400	[4]37,900	[4]26,100	[10]23,800	[10]23,800	[10]22,200	[10]24,400	[10]23,800	[10]24,700
School bus	N	N	79,900	111,200	131,100	132,200	136,500	141,000	146,100	146,700
Performance										
Vehicle-miles (millions)										
All buses										
Rural highway										
Interstate rural	N	[5]339	[5]533	[5]567	[6]711	[6]742	[6]794	[6]834	[6]971	981
Other arterial rural	N	944	991	995	1,171	1,186	1,243	1,282	1,375	1,270
Other rural	N	1,266	1,511	1,882	1,972	2,005	2,072	2,135	[R]2,321	2,247
All rural	[5]2,332	2,549	3,035	3,444	3,854	3,933	4,109	4,251	[R]4,667	4,498
Urban highway[a]										
Interstate urban	N	277	560	455	580	598	647	663	[R]752	791
Other urban	N	1,718	2,464	1,828	1,986	2,007	2,086	2,093	[R]2,243	2,312
All urban	2,014	1,995	3,024	2,283	2,566	2,605	2,733	2,756	2,995	3,103
Total rural and urban highway	4,346	4,544	6,059	5,726	6,420	6,538	6,842	7,007	[R]7,662	7,601

Continued next page

Bus Profile (Continued)

Performance (continued)	1960	1970	1980	1990	1995	1996	1997	1998	1999	2000
Passenger-miles (millions)										
All buses	N	N	N	121,398	136,104	138,613	145,060	148,558	[R]162,445	161,152
Number of revenue passengers (thousands)										
Intercity bus, total	[1]366,000	[1]401,000	[1]370,000	[1]334,000	[1]366,500	[1]347,900	[1]350,600	[1]357,600	[1]358,900	U
Average miles traveled per vehicle										
All buses	[6]15,970	[6]12,035	[6]11,458	[6]9,133	[6]9,365	[6]9,386	[6]9,809	[6]9,793	[6]10,515	[6]10,187
Fuel consumed (million gallons)										
All buses	827	820	1,018	895	968	985	1,027	1,040	1,148	1,110
Average fuel consumption per vehicle (gallons)										
All buses	3,039	2,172	1,925	1,427	1,412	1,414	1,472	1,454	[R]1,576	1,488
Average miles traveled per gallon of fuel consumed										
All buses	5.3	5.5	6.0	6.4	6.6	6.6	6.7	6.7	6.7	6.8
Average revenue per passenger-mile (cents) (intercity)	[1]2.71	[1]3.60	[1]7.26	[1]11.55	[1]12.19	[1]12.30	[1]12.56	[1]12.75	[1]12.76	U
Safety										
Number of fatalities										
School bus-related	N	N	[7]150	[7]115	[7]123	[7]136	[7]131	[7]128	[11]167	[11]144
School bus										
Occupants	N	N	9	11	13	10	8	6	10	20
Other vehicle										
Occupants	N	N	88	64	72	101	99	91	127	98
Nonoccupants	N	N	53	40	38	25	24	31	30	26
Occupant fatalities										
All buses	N	N	46	32	33	21	18	38	[12]59	[12]22
School buses	N	N	14	13	12	10	8	6	8	16
Cross country buses	N	N	23	2	6	3	5	13	32	3
Transit buses	N	N	6	3	1	5	3	2	6	1
Other and unknown	N	N	3	14	14	3	2	17	13	2
Fatalities in vehicular accidents[b]										
All buses	N	N	[8]390	[8]340	[8]311	[8]367	[8]339	[8]328	[8]373	U

Bus Profile (Continued)

Safety (continued)	1960	1970	1980	1990	1995	1996	1997	1998	1999	2000
Occupant fatality rate										
Per 100 million vehicle-miles										
All buses	N	N	0.8	0.6	0.5	0.3	0.3	0.5	0.8	0.3
Per 10,000 registered vehicles										
All buses	N	N	0.9	0.5	0.5	0.3	0.3	0.5	0.8	0.3
Vehicle involvement rate										
Per 100 million vehicle-miles										
All buses	N	N	6.4	5.9	4.8	5.6	5.0	4.7	4.1	U
Per 10,000 registered vehicles										
All buses	N	N	7.4	5.4	4.5	5.3	4.9	4.6	4.4	U

KEY: N = data do not exist; P = preliminary; R = revised; U = data are not available.

[a] Urban consists of travel on all roads and streets in urban places of 5,000 or greater population.

[b] Includes all fatalities that occurred in an accident in which a bus was involved.

NOTE
See transit profile for transit bus data.

SOURCES
Unless otherwise noted, refer to chapter tables for sources.

[1] Eno Transportation Foundation, Inc., *Transportation In America, 2000* (Washington, DC: 2001), p. 11, 16, and 18.

[2] Interstate Commerce Commission, *Annual Report of the ICC* (Washington, DC: Annual issues), Appendix F, tables 1 and 6.

[3] U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues), table MV-10.

[4] U.S. Department of Labor, Bureau of Labor Statistics, *Employment, Hours and Earnings, United States, 1909-1994* (Washington, DC: September 1994), SIC codes 413 and 415.

[5] Ibid., *Highway Statistics, Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.

[6] Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

[7] Ibid., National Highway Traffic Safety Administration, *Traffic Safety Facts 1998*, DOT HS 808 983 (Washington, DC: October 1999), tables 74 and 93.

[8] Ibid., Fatality Analysis Reporting System (FARS) Query, Internet site, http://www-fars.nhtsa.dot.gov as of Sept. 27, 2002.

[9] U.S. Department of Transportation, Bureau of Transportation Statistics, *Selected Earnings Data, Class I Motor Carriers of Passengers* (Washington, DC: Annual issues).

[10] U.S. Department of Labor, Bureau of Labor Statistics, *Employment, Hours and Earnings, United States, 1909-1994* (Washington, DC: September 1994), Internet site www.bls.gov as of Sept. 27, 2002.

[11] Ibid., National Highway Traffic Safety Administration, *2000 Traffic Safety Fact Sheets*, DOT HS 809 332 (Washington, DC: December 2001).

[12] Ibid., National Highway Traffic Safety Administration, personal communication, May 2002.

Transit Profile

Financial	1960	1970	1980	1990	1995	1996	1997	1998	1999	P2000
Passenger operating revenues ($ millions), total	1,407	1,707	6,510	16,053	18,256	19,151	19,515	21,062	22,220	24,243
Passenger fares[1]	1,335	1,639	2,556	5,891	6,816	7,416	7,546	7,970	8,282	8,746
Motor bus	N	N	N	2,967	3,287	3,515	3,558	3,991	4,175	4,376
Heavy rail	N	N	N	1,741	2,018	2,322	2,351	2,297	2,323	2,483
Light rail	N	N	N	83	127	144	139	150	164	181
Trolley bus	N	N	N	46	54	55	57	55	60	60
Demand responsive	N	N	N	41	146	157	170	142	159	172
Ferryboat[a]	N	N	N	56	60	54	51	41	48	60
Commuter rail	N	N	N	952	1,078	1,146	1,178	1,255	1,309	1,375
Other[b]	N	N	N	26	46	24	42	38	46	41
Other operating revenue[2]	72	68	248	895	2,812	2,928	3,308	3,685	3,648	4,217
Total operating revenues	1,407	1,707	2,805	6,786	9,628	10,345	10,854	11,654	11,930	12,963
Operating assistance[c]										
State and local	N	N	2,611	8,297	7,811	8,210	8,014	8,656	9,418	10,286
Federal	N	N	1,093	970	817	596	647	751	872	994
Total operating assistance	N	N	3,705	9,267	8,628	8,807	8,661	9,408	10,290	11,280
Operating expenses ($ millions), total	1,377	1,996	6,711	17,979	21,540	22,260	23,159	24,318	25,538	28,194
Motor bus[3]	N	N	N	8,903	10,321	10,575	10,944	11,429	11,714	12,966
Heavy rail	N	N	N	3,825	3,523	3,402	3,474	3,530	3,693	3,931
Light rail	N	N	N	237	376	442	473	500	546	606
Trolley bus	N	N	N	109	139	135	140	147	167	178
Demand responsive	N	N	N	518	1,000	1,187	1,285	1,405	1,419	1,805
Ferryboat[a]	N	N	N	171	210	183	221	214	238	268
Commuter rail	N	N	N	1,939	2,211	2,294	2,278	2,361	2,575	2,685
Other[b]	N	N	N	41	67	124	122	154	160	206
Total operating expenses[d]	N	N	6,247	15,742	17,849	18,341	18,936	19,739	20,512	22,646
Depreciation and amortization[4]	N	N	278	1,593	2,601	2,885	3,106	3,435	3,692	4,076
Other reconciling items	N	N	186	644	1,091	1,034	1,117	1,145	1,333	1,472
Average passenger revenue per passenger-mile ($)										
Motor bus[5]	N	N	N	0.14	0.17	0.18	0.18	0.20	0.20	0.21
Heavy rail	N	N	N	0.15	0.19	0.20	0.20	0.19	0.18	0.18
Light rail	N	N	N	0.15	0.15	0.15	0.13	0.13	0.14	0.13

Transit Profile (Continued)

Financial (continued)	1960	1970	1980	1990	1995	1996	1997	1998	1999	P2000
Trolley bus	N	N	N	0.24	0.29	0.30	0.30	0.30	0.32	0.31
Demand responsive	N	N	N	0.10	0.29	0.24	0.23	0.19	0.20	0.21
Ferryboat[a]	N	N	N	0.20	0.23	0.21	0.17	0.14	0.16	0.18
Commuter rail	N	N	N	0.14	0.13	0.14	0.15	0.14	0.15	0.15
Other[b]	N	N	N	0.21	0.17	0.07	0.11	0.09	0.10	0.09
All modes	N	N	N	0.14	0.17	0.18	0.18	0.18	0.18	0.18
Average passenger fare, per unlinked trip ($)										
Motor bus[6]	N	N	N	0.52	0.66	0.70	0.70	0.74	0.74	0.77
Heavy rail	N	N	N	0.74	0.99	1.08	0.97	0.96	0.92	0.94
Light rail	N	N	N	0.47	0.50	0.55	0.53	0.54	0.56	0.57
Trolley bus	N	N	N	0.36	0.45	0.47	0.47	0.47	0.50	0.49
Demand responsive	N	N	N	0.60	2.26	2.21	1.83	1.49	1.59	1.64
Ferryboat[a]	N	N	N	1.11	1.31	1.12	0.99	0.80	0.91	1.13
Commuter rail	N	N	N	2.90	3.13	3.24	3.30	3.29	3.31	3.32
Other[b]	N	N	N	0.90	1.57	1.33	0.66	1.02	0.76	0.66
All modes	0.14	0.22	0.30	0.67	0.87	0.93	0.89	0.91	0.90	0.93
Inventory										
Number of systems										
Motor bus[7]	1,236	1,075	1,022	2,685	2,250	2,250	2,250	2,262	2,262	2,262
Heavy rail	31	15	11	12	14	14	14	14	14	14
Light rail	~	~	9	17	22	22	22	23	24	25
Trolley bus	19	6	5	5	5	5	5	5	5	5
Demand responsive	N	N	N	3,193	5,214	5,214	5,214	5,254	5,252	5,252
Ferryboat[a]	N	N	16	27	25	25	25	28	30	33
Commuter rail	N	N	18	14	16	16	18	18	20	19
Other[b]	N	N	5	35	69	69	70	72	81	81
Total[e]	1,286	1,096	1,055	5,078	5,973	5,973	5,975	6,000	6,000	6,000
Number of vehicles										
Motor bus[8]	49,600	49,700	59,411	58,714	67,107	71,678	72,770	72,142	74,228	75,013
Heavy rail	9,010	9,286	9,641	10,419	10,157	10,201	10,242	10,301	10,306	10,591
Light rail	2,856	1,262	1,013	913	999	1,140	1,229	1,220	1,297	1,577
Trolley bus	3,826	1,050	823	832	885	871	859	880	859	951
Demand responsive	N	N	N	16,471	29,352	30,804	32,509	29,646	31,884	33,080

Continued next page

Transit Profile (Continued)

Inventory (continued)	1960	1970	1980	1990	1995	1996	1997	1998	1999	P2000
Ferryboat[a]	N	N	N	108	110	109	134	113	112	119
Commuter rail	N	N	4,500	4,415	4,565	4,665	4,943	4,963	4,883	5,073
Other[b]	N	N	N	1,089	2,699	2,894	3,674	4,590	4,947	5,089
Total	65,292	61,298	75,388	92,961	115,874	122,362	126,360	123,855	128,516	131,493
Number of employees[f]										
Motor bus[9]	121,300	101,598	N	162,189	181,973	190,152	196,861	198,644	204,179	211,095
Heavy rail	35,100	36,442	N	46,102	45,644	45,793	45,935	45,163	46,311	47,087
Light rail	+	+	N	4,066	4,935	5,728	5,940	6,024	6,058	6,572
Trolley bus	+	+	N	1,925	1,871	2,084	2,037	2,053	2,140	2,223
Demand responsive	N	N	N	22,740	39,882	44,667	44,029	48,406	51,186	52,021
Ferryboat[a]	N	N	N	2,813	2,697	2,830	3,166	3,894	4,024	2,682
Commuter rail	N	N	N	21,443	22,320	22,604	21,651	22,488	22,896	23,518
Other[b]	N	N	N	898	1,169	1,086	1,140	1,080	1,091	1,217
Total	156,400	138,040	189,300	262,176	300,491	314,944	320,759	327,752	337,885	346,415
Performance										
Vehicle-miles (millions)										
Motor bus[10]	1,576	1,409	1,677	2,130	2,184	2,221	2,245	2,175	2,276	2,315
Heavy rail	391	407	385	537	537	543	558	566	578	595
Light rail	75	34	18	24	35	38	41	44	49	53
Trolley bus	101	33	13	14	14	14	14	14	14	15
Demand responsive	N	N	N	306	507	548	585	671	718	759
Ferryboat[a]	N	N	2	2	3	3	3	3	3	3
Commuter rail	N	N	179	213	238	242	251	260	266	271
Other[b]	N	N	13	16	33	43	50	63	69	71
Total	2,143	1,883	2,287	3,242	3,550	3,650	3,746	3,794	3,972	4,081
Unlinked passenger trips (millions)										
Motor bus[11]	N	5,034	5,837	5,677	4,848	4,887	5,013	5,399	5,648	5,678
Heavy rail	N	1,881	2,108	2,346	2,033	2,157	2,430	2,393	2,521	2,632
Light rail	N	124	133	175	251	261	262	276	292	320
Trolley bus	N	182	142	126	119	117	121	117	120	122
Demand responsive	N	N	N	68	88	93	99	95	100	105
Ferryboat[a]	N	N	63	50	47	48	51	52	53	53

Transit Profile (Continued)

Performance (continued)	1960	1970	1980	1990	1995	1996	1997	1998	1999	P2000
Commuter rail	N	N	280	328	344	352	357	381	396	413
Other[b]	N	N	4	29	33	33	41	37	38	40
Total	N	7,332	8,567	8,799	7,763	7,948	8,374	8,750	9,168	9,363
Passenger-miles (millions)										
Motor bus[12]	N	N	21,790	20,981	18,818	19,096	19,604	20,360	21,205	21,241
Heavy rail	N	N	10,558	11,475	10,559	11,530	12,056	12,284	12,902	13,844
Light rail	N	N	381	571	860	957	1,035	1,128	1,206	1,356
Trolley bus	N	N	219	193	187	184	189	182	186	192
Demand responsive	N	N	N	431	607	656	754	735	813	839
Ferryboat[a]	N	N	N	286	260	256	294	294	310	330
Commuter rail	N	N	6,516	7,082	8,244	8,351	8,038	8,704	8,766	9,402
Other[b]	N	N	390	124	273	348	369	441	469	462
Total	N	N	39,854	41,143	39,808	41,378	42,339	44,128	45,857	47,666
Average trip length (miles)										
Motor bus[13]	N	N	N	N	4	4	4	4	4	4
Heavy rail	N	N	N	N	5	5	5	5	5	5
Light rail	N	N	N	N	3	4	4	4	4	4
Trolley bus	N	N	N	N	2	2	2	2	2	2
Demand responsive	N	N	N	N	8	9	10	8	8	8
Ferryboat[a]	N	N	N	N	6	5	6	6	6	6
Commuter rail	N	N	N	N	24	24	23	23	22	23
Vanpool	N	N	N	N	35	34	33	36	34	35
Other[g]	N	N	N	N	1	1	1	1	1	1
All modes	N	N	N	N	5	5	5	5	5	5
Average vehicle speed (miles per hour)										
Motor bus[14]	N	N	N	N	13	13	13	13	13	13
Heavy rail	N	N	N	N	21	21	21	21	21	21
Light rail	N	N	N	N	14	14	16	16	15	15
Trolley bus	N	N	N	N	8	8	8	8	7	7
Demand responsive	N	N	N	N	15	15	15	17	15	15
Ferryboat[a]	N	N	N	N	6	7	7	8	8	8
Commuter rail	N	N	N	N	34	33	34	32	33	29

Continued next page

Transit Profile (Continued)

Performance (continued)	1960	1970	1980	1990	1995	1996	1997	1998	1999	P2000
Vanpool	N	N	N	N	35	37	36	37	38	31
Other[9]	N	N	N	N	6	7	7	7	7	8
All modes	N	N	N	N	15	15	15	15	15	15
Energy consumption, diesel (million gallons)										
Motor bus[15]	N	N	N	563	564	578	598	607	618	635
Heavy rail	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Light rail	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trolley bus	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Demand responsive	N	N	N	15	29	31	32	38	43	48
Ferryboat[a]	N	N	N	20	22	22	24	25	29	32
Commuter rail	N	N	N	53	63	62	63	69	73	71
Other[b]	N	N	N	<1	< 1	< 1	< 1	<1	<1	<1
Total	[15]208	[15]271	[15]431	651	678	693	717	740	763	786
Energy consumption, other (million gallons)										
Gasoline and other nondiesel fuels[h,16]	192	68	11	33	61	61	59	53	49	48
Compressed natural gas	U	U	U	U	11	15	24	37	44	55
Total	192	69	11	34	71	76	83	90	93	103
Energy consumption (million kWh)										
Motor bus	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heavy rail[17]	N	N	N	3,284	3,401	3,332	3,253	3,280	3,385	3,549
Light rail	N	N	N	239	288	321	361	381	416	463
Trolley bus	N	N	N	69	100	69	78	74	75	77
Demand responsive	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferryboat[a]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Commuter rail	N	N	N	1,226	1,253	1,255	1,270	1,299	1,322	1,370
Other[b]	N	N	N	19	26	30	26	39	39	51
Total	[17]2,908	[17]2,561	[17]2,446	4,837	5,068	5,007	4,988	5,073	5,237	5,510

Transit Profile (Continued)

Safety[18]	1960	1970	1980	1990	1995	1996	1997	1998	1999	P2000
Fatalities, all modes	N	N	N	339	274	264	275	286	299	295
Injured persons, all modes	N	N	N	54,556	57,196	55,288	56,132	55,990	55,325	56,697
Incidents, all modes	N	N	N	90,163	62,471	59,392	61,561	60,094	58,703	59,898

KEY: ~ = included in heavy rail figure; + = included in motor bus figure; kWh = kilowatt hours; N = data do not exist; NA = not applicable; P = preliminary; U = data are not available.

[a] Excludes international, rural, rural interstate, island and urban park ferries.

[b] Includes cable car, inclined plane, aerial tramway, monorail, vanpool, and automated guideway.

[c] Beginning in 1992, local operating assistance and other revenue declined by about $500 million due to change in accounting procedures at the New York City Transit Authority. Beginning in 1992, total operating expense declined by about $400 million due to a change in accounting procedures at the New York City Transit Authority.

[d] Included in other.

[e] The total figure represents the number of transit agencies. It is not the sum of all modes since many agencies operate more than one mode.

[f] Based on employee equivalents of 2,080 hours equals one employee; beginning in 1993, based on number of actual employees.

[g] Includes cable car, inclined plane, aerial tramway, monorail, and automated guideway.

[h] Liquefied natural gas, liquefied petroleum gas, methanol, propane, and other nondiesel fuels, except compressed natural gas.

SOURCES

Unless otherwise noted, refer to chapter tables for sources.

[1] American Public Transit Association, *2002 Transportation Fact Book*, (Washington, DC: 2002), 2001 edition, tables 18, 84, and similar tables in earlier years.
[2] Ibid., 2001 edition table 17 and similar tables in earlier years.
[3] Ibid., 2001 edition tables 25, 84, and similar tables in earlier years.
[4] Ibid., 2001 edition table 23 and similar tables in earlier years.
[5] Ibid., 2002 edition tables 18, 30, and 84, and similar tables for prior years.
[6] Ibid., 2001 edition table 20 and similar tables in earlier years.
[7] Ibid., 2001 edition table 1 and similar tables in earlier years.
[8] Ibid., 2001 edition tables 46, 84, and similar tables in earlier years.
[9] Ibid., 2001 edition tables 62, 84, and similar tables in earlier years.
[10] Ibid., 2001 edition tables 42, 84, and similar tables in earlier years.
[11] Ibid., 2001 edition tables 26, 84, and similar tables in earlier years.
[12] Ibid., 2001 edition tables 30, 84, and similar tables in earlier years.
[13] Ibid., 2001 edition table 39 and similar tables in earlier years.
[14] Ibid., 2001 edition table 44 and similar tables in earlier years.
[15] Ibid., 2001 edition table 65 and similar tables in earlier years.
[16] Ibid., 2001 edition table 66 and similar tables in earlier years.
[17] Ibid., 2001 edition table 67 and similar tables in earlier years.
[18] U.S. Department of Transportation, Federal Transit Administration, Safety Management Information Statistics (SAMIS), (Washington, DC: Annual reports).

Rail Profile

Financial	1960	1970[e]	1980	1990	1994	1995	1996	1997	1998	1999	2000
Class I[a]											
Operating revenues ($ millions)											
Passenger[1]	640	421	446	94	88	89	59	60	61	61	62
Freight	8,025	10,922	26,350	27,471	29,931	31,356	31,889	32,322	32,247	32,680	33,083
Other	849	649	1,462	805	790	835	745	736	843	780	957
Total	9,514	11,992	28,258	28,370	30,809	32,279	32,693	33,118	33,151	33,521	34,102
Operating expenses ($ millions)[b]	8,775	11,478	26,355	24,652	25,511	27,897	26,331	27,291	27,916	28,011	29,040
Amtrak											
Total revenue ($ millions)	N	162	429	[9] 1,308	1,413	[9] 1,490	[9] 1,550	[9] 1,669	[9] 2,244	[9] 2,011	[9] 2,111
Total expenses ($ millions)	N	301	1,103	2,012	2,246	2,257	2,258	2,359	2,548	2,660	[9] 2,876
Inventory											
Class I[a]											
Number of vehicles											
Class I freight cars	1,658,292	[1] 1,423,921	[1] 1,168,114	[1] 658,902	590,930	[1] 583,486	[1] 570,865	[1] 568,493	[1] 575,604	[1] 579,140	[1] 560,154
Other nonclass I freight cars	307,194	360,260	542,713	553,359	601,482	635,441	669,708	701,926	740,063	789,696	820,642
Freight cars, total	1,965,486	1,784,181	1,710,827	1,212,261	1,192,412	1,218,927	1,240,573	1,270,419	1,315,667	1,368,836	1,380,796
Locomotives	29,031	27,077	28,094	18,835	18,505	18,812	19,269	19,684	20,261	20,256	20,028
Number of companies	106	71	38	14	12	11	10	9	9	9	8
Number of employees	780,494	566,282	458,994	216,424	189,962	188,215	181,809	177,981	178,222	177,557	168,360
Miles of road owned	207,334	196,479	164,822	119,758	109,332	108,264	105,779	102,128	100,570	99,430	99,250
Amtrak											
Number of vehicles											
Passenger											
Train-cars	N	[4] 1,569	[4] 2,128	[9] 1,863	1,852	[9] 1,722	[9] 1,730	[9] 1,728	[9] 1,962	[9] 1,992	[9] 1,894
Locomotives	N	185	419	318	338	313	299	332	345	329	378
Number of employees	N	[5] 1,500	[5] 21,416	[5] 24,000	25,049	23,646	[4] 23,278	[4] 23,555	[1] 24,528	[1] 25,291	[1] 25,624
System route mileage	N	N	8 24,000	8 24,000	25,000	24,000	[9] 25,000	[9] 25,000	[9] 22,000	[9] 23,000	[9] 23,000
Performance											
Class I[a]											
Car mileage, freight (thousands)[1]	28,170,000	29,890,000	29,277,000	26,159,000	28,485,000	30,383,000	31,715,000	31,660,000	32,657,000	33,851,000	34,590,000
Train mileage, freight (thousands)	404,464	427,065	428,498	379,582	440,896	458,271	468,792	474,954	474,947	490,442	504,001
Locomotive mileage (thousands)											
Freight[2]	421,900	1,278,200	1,319,010	1,144,559	1,261,482	1,293,851	1,311,351	1,281,768	1,285,706	1,349,580	1,354,590
Train and yard switching	N	N	212,040	135,806	143,224	150,840	153,798	141,461	153,997	154,367	148,229
Total	N	N	1,531,050	1,280,365	1,404,706	1,444,691	1,465,149	1,423,229	1,439,703	1,503,947	1,502,819

Rail Profile (Continued)

Peformance (continued)	1960	1970	1980	1990	1994	1995	1996	1997	1998	1999	2000
Revenue ton-miles of freight (millions)[1]	572,309	764,809	918,958	1,033,969	1,200,701	1,305,688	1,355,975	1,348,926	1,376,802	1,433,461	1,465,960
Average length of haul, freight (miles)	461	515	616	726	817	843	842	851	835	835	843
Fuel consumed in freight service (million gallons)	3,463	3,545	3,904	3,115	3,334	3,480	3,579	3,575	3,583	3,715	3,700
Average miles traveled per vehicle											
Locomotive	N	N	54,497	67,978	75,910	76,796	76,037	72,304	71,058	74,247	75,036
Car	14,332	16,753	17,113	21,579	23,889	24,926	25,565	24,921	24,822	24,730	25,051
Average miles traveled per gallon											
Train	0.12	0.12	0.11	0.12	0.13	0.13	0.13	0.13	0.13	0.13	0.14
Car	8.13	8.43	7.50	8.40	8.54	8.73	8.86	8.86	9.11	9.11	9.35
Amtrak											
Passenger train car-miles (millions)	N	[6] 213	[6] 235	[6] 301	304	[10] 292	[10] 276	[10] 288	[10] 312	[10] 342	U
Passenger train-miles (millions)	N	26	30	33	34	32	30	32	33	34	35
Passenger locomotive-miles (millions)	N	N	41	49	51	48	U	U	U	U	U
Revenue passengers carried (millions)	N	17	21	22	21	21	20	20	21	22	23
Revenue passenger-miles (millions)	N	3,039	4,503	[9] 6,057	5,921	[9] 5,545	[9] 5,050	[9] 5,166	[9] 5,304	[9] 5,330	[9] 5,498
Average passenger fare (dollars)	N	[7] 8.3	17.7	38.5	38.2	39.0	42.5	44.3	44.0	45.7	U
Average passenger revenue / passenger-mile (cents)	N	4.5	8.2	14.1	13.7	14.6	16.6	17.3	17.5	18.4	U
Average passenger trip length (miles)	N	182.6	217.0	273.0	271.1	267.6	256.9	255.8	251.5	247.8	U
Locomotive fuel consumed											
Diesel (million gallons)	N	N	64	82	75	[11] 66	[11] 71.2	[11] 75	[11] 75	[11] 74	U
Electric kWh (millions)	N	N	254	330	309	304	293	282	275	283	U
Safety[c,3]											
Number of fatalities, railroads and grade crossings											
Passengers on trains	34	10	4	3	5	0	12	6	4	14	4
Employees on duty	215	179	97	40	31	34	33	37	27	31	24
Employees not on duty	N	N	4	0	0	2	0	0	2	0	1
Trespassers	637	607	566	700	682	660	620	646	644	[R]570	570
Nontrespassers	1,459	1,535	746	554	505	443	365	[R]362	[R]324	[R]304	332
Contractor employees	N	N	7	3	3	7	9	11	5	12	3
Railroad and grade crossing, total	2,345	2,331	1,424	1,300	1,226	1,146	1,039	1,062	1,006	931	934
Grade crossing only	1,421	1,440	772	698	615	579	488	461	431	402	425
Railroad only[d]	924	785	645	599	611	567	551	[R]602	577	530	509

KEY: kWh = kilowatt-hour; N = data do not exist; R = revised; U = data are not available.

[a] Excluding Amtrak and all non-Class I railroads, except for Section IV.

[b] Operating expenses include equipment, joint facility rents, leased roads and equipment, and all taxes except Federal income.

[c] Safety figures from U.S. Department of Transportation, Federal Railroad Administration are for all railroads.

[d] Figures may not appear directly in data source.

[e] Amtrak data in this column are for 1972, Amtrak's first full year of operation.

Continued next page

Rail Profile (Continued)

NOTE
Amtrak figures are based on Amtrak fiscal year (October 1-September 30).

SOURCES
Unless otherwise noted, refer to chapter tables for sources.

[1] Association of American Railroads (AAR), *Railroad Facts*, Annual issues, pp. 3, 10, 12, 13, 14, 27, 33, 34, 36, 40, 44, 48, 50, and 77.

[2] Ibid., *Analysis of Class 1 Railroads*, Annual issues.

[3] 1960-1980: U.S. Department of Transportation, Federal Railroad Administration, Systems Support Division, RRS-22, personal communication.
1990-1994: Ibid., *Accident / Incident Bulletin*, Annual issues, tables 7 and 9.
1995-2001: Ibid., *Railroad Safety Statistics, Annual Report 2001*, table 1-3.

[4] Amtrak, *National Railroad Passenger Corporation Annual Report*, 1972, 1980, 1990, and 1993-95.

[5] Ibid., Public Affairs, personal communication.

[6] Amtrak, *Train Information System Reports*.

[7] Ibid., *Train Earnings Reports*.

[8] Ibid., Route Miles by Railroad, Corp. Planning & Development.

[9] Amtrak, *National Railroad Passenger Corporation Annual Report, Statistical Appendix to Amtrak Annual Report*, Annual issues.

[10] Amtrak Corporate Reporting, Route Profitability System, Washington DC, personal communication, August 2001.

[11] Amtrak General Accounting, Pennsylvania, personal communication, June 1999.

Water Transport Profile

Financial	1960	1970	1980	1990	1995	1996	1997	1998	1999	2000
Operating revenues ($ millions)										
Domestic freight[1]	1,722	2,070	7,219	7,940	7,712	7,283	6,940	6,824	6,795	U
Coastal waterways	747	834	3,155	3,066	2,774	2,571	2,169	1,952	1,828	U
Inland waterways	461	621	2,395	2,956	2,964	2,861	2,899	2,904	2,811	U
Great Lakes	227	239	513	615	585	572	615	610	549	U
Locks, channels	287	376	1,156	1,303	1,389	1,279	1,257	1,358	1,607	U
International freight[a]	1,765	3,187	8,279	12,181	14,997	17,281	14,091	15,679	17,699	U
Passenger, total	281	287	310	1,391	1,716	1,843	1,974	2,029	2,088	U
Domestic passenger, intercity	14	12	27	100	129	140	141	146	152	U
International passenger[b]	267	275	283	1,291	1,587	1,703	1,833	1,883	1,936	U
Revenues of U.S. commercial fishing fleet-domestic landings ($ millions)[2]	354	613	2,237	3,522	3,770	3,487	3,448	3,128	3,467	3,549
Inventory										
Number of domestic inland vessel operators[c,3]	228	380	403	565	557	554	U	U	U	U
Number of employees										
Ships, boat building, and repairing	[8] 141,200	[8] 171,800	[8] 220,500	[11] 187,700	[12] 159,600	[12] 158,800	[12] 158,300	[12] 166,600	[12] 167,400	167,900
Water transportation[d]	N	212,300	211,200	176,600	174,500	174,100	178,700	181,300	185,500	193,900
Number of employees[e,f]										
Passenger / combo[4]	8,560	2,178	618	642	642	321	321	321	321	U
Cargo	28,668	22,257	9,878	7,019	5,400	4,964	4,831	4,924	4,757	U
Tankers	12,053	10,567	8,722	4,471	4,261	3,965	3,785	3,711	3,958	U
Total	49,281	35,000	19,218	12,132	10,303	9,250	8,937	8,956	9,036	U
Mileage of commercially navigable channels[1]	25,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	U
Number of vessels										
Total nonself-propelled	[9] 16,777	[9] 19,377	[9] 31,662	[9] 31,017	[9] 31,360	[9] 32,811	[9] 33,011	[9] 33,509	[14] 33,387	[14] 33,152
Dry cargo barges and scows	14,025	15,890	27,426	27,091	27,342	28,743	29,006	29,526	29,383	29,107
Tankers	2,429	3,281	4,166	3,913	3,985	4,036	3,971	3,952	3,973	4,011
Railroad car floats	323	206	70	13	33	32	34	31	31	34
Total self-propelled	6,519	6,457	7,126	8,236	8,281	8,293	8,408	8,523	8,379	8,202
Dry cargo / passenger	1,796	1,761	2,036	2,678	2,804	2,782	2,905	2,938	2,910	2,780
Ferries, railroad car	31	17	67	135	172	173	183	213	229	292
Tankers	489	421	330	213	178	161	147	135	142	135
Towboats / tugs	4,203	4,248	4,693	5,210	5,127	5,177	5,173	5,237	5,098	4,995
U.S. merchant marine ships (over 1,000 gross tons)										
Total U. S. flag[5]	2,926	1,579	864	636	509	495	477	470	463	454
Passenger / cargo	309	171	65	10	13	15	14	12	11	11
Freighters	2,138	1,076	471	367	295	292	288	289	284	286
Bulk carriers	57	38	20	26	20	15	14	15	14	15
Tankers	422	294	308	233	181	173	161	154	154	142

Continued next page

Water Transport Profile (Continued)

Inventory (continued)	1960	1970	1980	1990	1995	1996	1997	1998	1999	2000
Privately owned	1,008	U	578	408	319	302	285	281	277	U
Government owned	1,918	U	286	228	190	193	192	189	186	U
Number of recreational boats (thousands)[g,6]	2,500	7,400	8,905	10,996	11,735	11,878	12,313	12,566	12,738	12,782
Performance										
Ton-miles (thousands)[h]										
Domestic water freight										
Coastwise[7]	N	359,784,000	631,149,200	479,133,600	440,345,100	408,086,100	349,843,000	314,863,900	292,730,000	283,871,600
Internal	N	155,816,000	227,343,000	292,393,300	306,329,100	296,790,600	294,023,000	294,896,400	304,724,100	302,558,400
Lakewise	N	79,416,000	61,747,100	60,929,900	59,703,800	58,335,300	62,165,900	61,654,300	57,045,200	57,879,100
Intraport	N	1,179,000	1,596,400	1,087,000	1,349,600	1,474,500	1,378,100	1,380,700	1,362,200	1,490,200
Total	N	596,195,000	921,835,800	R833,543,800	807,727,700	764,686,500	707,409,900	672,795,300	655,861,500	645,799,300
Tons of freight hauled (thousands)										
Domestic										
Coastwise	209,197	238,440	329,609	298,637	266,612	267,389	263,146	249,633	228,802	226,938
Internal	291,057	472,123	534,979	622,595	620,324	622,081	630,558	625,028	624,575	628,445
Lakewise	155,109	157,059	115,124	110,159	116,127	114,870	122,734	122,156	113,887	114,352
Intraport	104,193	81,475	94,184	86,378	83,104	89,011	89,816	90,077	88,650	94,558
Intraterritory	1,017	1,630	3,588	4,529	6,868	7,327	6,273	7,217	5,873	5,505
Total	760,573	950,727	1,077,483	1,122,299	1,093,035	1,100,679	1,112,527	1,094,112	1,061,787	1,069,798
Exports										
Great Lakes ports	23,150	35,932	45,077	32,898	32,968	31,855	33,209	36,876	40,233	40,131
Coastal ports	104,810	205,698	358,806	408,688	441,732	418,940	399,104	367,831	359,763	374,911
Total	127,961	241,629	403,883	441,586	474,700	450,794	432,313	404,708	399,996	415,042
Imports										
Great Lakes ports	12,851	26,406	15,515	17,558	18,897	24,503	24,532	25,558	22,196	23,918
Coastal ports	198,466	312,934	502,006	582,412	653,760	708,090	763,771	815,122	838,579	952,866
Total	211,316	339,340	517,521	599,970	672,657	732,592	788,303	840,680	860,775	976,784
Average haul, domestic system (miles)[h]										
Coastwise	1,496	1,509	1,915	1,604	1,652	1,526	1,330	1,261	1,279	1,251
Internal	282	330	405	470	494	477	466	472	488	481
Lakewise	522	506	536	553	514	508	507	505	501	506
Cargo capacity (short tons)										
Total nonself-propelled vessels	[9]16,355,657	[9]24,026,024	[9]44,875,116	[9]48,946,785	[9]51,140,530	[9]54,086,973	[9]54,974,961	[9]55,999,952	[14]56,566,140	56,581,364
Dry cargo barges	12,147,006	17,695,275	34,486,851	38,189,490	39,971,443	42,748,644	43,710,093	44,718,691	45,049,209	44,814,696
Tankers	4,208,651	6,330,749	10,388,265	10,757,295	11,169,087	11,338,329	11,264,868	11,281,261	11,418,856	11,678,593
Total self-propelled vessels	15,905,881	19,284,050	23,906,346	19,723,788	15,783,399	14,850,253	14,161,739	12,970,167	13,892,574	13,458,519
Dry cargo / passenger	12,188,956	10,815,977	8,011,587	7,042,263	6,484,707	6,208,011	6,685,719	6,371,425	6,928,684	6,740,153
Tankers	3,716,925	8,468,073	15,894,753	12,681,525	9,298,692	8,642,242	7,476,020	6,598,742	6,963,890	6,718,366

Water Transport Profile (Continued)

Performance (continued)	1960	1970	1980	1990	1995	1996	1997	1998	1999	2000
Fuel consumption (thousand barrels)										
Diesel fuel and distillate[1]	18,730	19,503	35,201	52,310	47,098	51,848	50,180	50,609	49,157	U
Residual fuel oil	94,084	89,850	213,131	148,764	153,125	138,214	114,044	110,480	133,301	U
Gasoline	9,200	14,238	25,048	30,962	25,247	23,659	23,505	22,767	26,146	U
Total	122,014	123,591	273,380	232,036	225,470	213,721	187,729	183,856	208,604	U
Safety										
Fatalities in waterborne transport (vessel casualties only)[i]										
Freight ship	N	[10] 30	[10] 8	[10] 0	[13] 0	[13] 1	[13] 2	[13] 2	[13] 0	U
Tank ship	N	4	4	5	0	0	0	1	0	U
Passenger vessel	N	1	5	3	4	8	1	3	14	U
Tug / towboat	N	22	14	13	1	1	3	0	6	U
Offshore supply	N	N	N	2	2	2	0	6	0	U
Fishing vessel	N	77	60	47	23	37	22	33	25	U
Recreational vessel	N	N	N	3	22	3	7	7	9	U
MODU[j]	N	N	N	0	0	0	4	0	0	U
Platform	N	N	N	1	U	U	U	U	U	U
Freight barge	N	N	N	0	0	0	2	1	0	U
Tank barge	N	N	N	0	0	0	0	0	1	U
Miscellaneous	N	44	56	11	0	3	7	14	3	U
Total[i]	N	178	206	85	52	55	48	67	58	U
Injuries in waterborne transport										
Freight ship	N	14	8	10	1	7	3	3	2	U
Tank ship	N	19	9	13	8	1	5	6	1	U
Passenger vessel	N	10	10	51	47	142	36	39	76	U
Tug / towboat	N	10	27	19	19	16	21	12	15	U
Offshore supply	N	N	N	9	10	7	3	5	1	U
Fishing vessel	N	13	28	31	41	36	25	35	25	U
Recreational vessel	N	N	N	2	20	9	6	9	12	U
MODU[j]	N	N	N	13	0	0	3	0	2	U
Platform	N	N	N	9	U	U	U	U	U	U
Freight barge	N	N	N	3	0	0	5	1	1	U
Tank barge	N	N	N	3	5	2	0	0	1	U
Miscellaneous	N	N	98	12	1	9	12	20	9	U
Total[i]	N	105	180	175	152	229	119	130	145	U
Fatalities in recreational boating (vessel casualties only)										
Air thrust[6]	N	N	N	N	4	1	6	11	2	4
Propeller	N	N	N	N	475	363	436	462	421	439
Inboard	N	[6] 119	[6] 100	[6] 50	N	N	N	N	50	48
Outboard	N	774	609	454	N	N	N	N	326	328
Inboard / outboard	N	28	47	53	N	N	N	N	35	49
Jet	N	N	10	25	68	61	83	82	75	70

Continued next page

Water Transport Profile (Continued)

Safety (continued)	1960	1970	1980	1990	1995	1996	1997	1998	1999	2000
Sail	N	44	43	20	4	8	15	5	7	14
Manual (oars, paddle)	N	205	272	182	148	109	150	151	114	137
Other	N	29	14	5	8	8	10	0	N	N
Propulsion unknown	N	219	265	76	122	159	121	104	115	37
Total	6 739	1,418	1,360	865	829	709	821	815	734	701

KEY: N = data do not exist; R = revised; U = data are not available.

[a] The international water freight operating revenues data was revised in Transportation in America 1998 for all years except 1994 and 1996. Therefore, the international water freight data for years 1994 and 1996 may not be comparable to other years.

[b] Revenues paid by American travelers to U.S. and foreign flag carriers.

[c] Does not include vessel operators whose primary area of operation is fishing, towing, passenger transport, ferrying, or crew boat utility service.

[d] Includes commercial port, marina, and other employees; excludes employees of not-for-hire private businesses.

[e] Estimate based on established active jobs for licensed and unlicensed personnel aboard oceangoing ships of 1,000 gross-tons and over, privately owned and operated, government-owned ships under bare boat charters, ship managers and General Agency Agreement, supplemented by Military Sealift Command employment totals for ships with Civil Service crews.

[f] Data is current as of January 1 of the following year with the exception of 1999 data, which is current as of Apr. 1, 1999. Due to a change in the source's periodicity, the data for 1999 is not comparable to the data from years prior to 1999.

[g] The U.S. Coast Guard changed its methodology for counting the number of recreational boats. Figures cited represent number of numbered boats, not estimates as previously noted for 1960 and 1970.

[h] Does not include intraterritorial traffic (traffic between ports in Puerto Rico and the Virgin Islands, which are considered a single unit).

[i] 1992-2000 data come from the Marine Safety Management Information System. Data for prior years may not be directly comparable.

[j] Mobile Offshore Drilling Units.

SOURCES

Unless otherwise noted, refer to chapter tables for sources.

[1] Eno Transportation Foundation Inc., *Transportation in America, 2000* (Washington, DC: 2001), pp. 7, 10-11, 27, and 44.

[2] U.S. Department of Commerce, National Marine Fisheries Services, *Fisheries of the United States* (Washington, DC: Annual issues), p. 4 and similar tables in earlier editions.

[3] U.S. Department of Transportation, Maritime Administration, MAR-450, personal communication.

[4] Ibid., *U.S. Merchant Marine Data Sheet* (Washington, DC: Annual issues).

[5] Ibid., *Merchant Fleets of the World* (Washington, DC: Annual issues).

[6] U.S. Coast Guard, *Boating Statistics* (Washington, DC: Annual issues).

[7] U.S. Army Corps of Engineers, *Waterborne Commerce of the United States* (New Orleans, LA: Annual issues), part 5, section 1, tables 2, 3, and 4.

[8] U.S. Department of Labor, Bureau of Labor Statistics, *Employment, Hours and Earnings, United States, 1909-1994* (Washington, DC: September 1994), SICs 373 and 44.

[9] U.S. Army Corps of Engineers, *Summary of U.S. Flag Passenger & Cargo Vessels* (New Orleans, LA: Annual issues).

[10] U.S. Coast Guard, Office of Investigations and Analysis, G-MAO-2, personal communication.

[11] U.S. Department of Labor, Bureau of Labor Statistics, *Employment, Hours and Earnings, 1988-1996* (Washington, DC: August 1996), SICs 373 and 44.

[12] Ibid., Internet website www.bls.gov as of Sept. 16, 2002.

[13] U.S. Department of Transportation, U.S. Coast Guard, Data Administration Division (G-MRI-1), personal communication, Feb. 13, 2002.

[14] U.S. Army Corps of Engineers, *Waterborne Transportation Lines of the United States* (New Orleans, LA: Annual issues) part 1, section 1, table 1.

Oil Pipeline Profile

Financial	1960	1970	1980	1990	1995	1996	1997	1998	1999
Operating revenues ($ millions)									
FERC-regulated	[4] 770	[4] 1,188	[4] 6,340	[4] 7,164	7,751	7,310	[4] 7,278	[4] 7,212	[4] 7,645
Nonregulated	125	208	1,208	1,342	1,326	1,327	1,354	1,367	1,422
Total	895	1,396	7,548	8,506	9,077	8,637	8,632	8,579	9,067
Inventory									
Number of FERC-regulated companies	[5] 87	[5] 101	[5] 130	[5] 150	[5] 161	[5] 160	U	U	[12] 184
Number of employees, pipeline companies[a]	[6] 23,100	[6] 17,600	[6] 21,300	[10] 18,500	[11] 15,100	[11] 14,500	[11] 14,200	[11] 13,800	[13] 13,060
Miles of pipeline (statute miles)[b]									
Crude lines[1]	141,085	146,275	129,831	118,805	97,029	92,610	91,523	87,663	86,369
Product lines	49,859	72,396	88,562	89,947	84,883	84,925	88,350	90,985	91,094
All lines	190,944	218,671	218,393	208,752	181,912	177,535	179,873	178,648	177,463
Performance									
Intercity ton-miles (millions)									
Crude oil[2]	N	N	362,600	334,800	335,900	338,300	337,400	334,100	336,200
Petroleum products	N	N	225,600	249,300	265,200	280,900	279,100	285,700	286,800
Total	[7] 229,000	[7] 431,000	588,200	584,100	601,100	619,200	616,500	619,800	623,000
Tons transported (millions)	[2] 468.0	[2] 790.2	921.0	1,057.4	1,080.6	1,114.1	1,108.0	1,116.3	1,125.2
Average length of haul (statute miles)									
Crude oil	[8] 325	[8] 300	[9] 871	[9] 812	[9] 797	[9] 779	[9] 781	[9] 767	[9] 766
Petroleum products	269	357	414	387	402	413	413	420	418
Safety									
Fatalities[3]	N	4	4	3	3	5	0	2	4
Injured persons	N	21	15	7	11	13	5	6	20
Incidents	N	351	246	180	188	194	171	153	168

KEY: FERC = Federal Energy Regulatory Commission; N = data do not exist; U = data are not available.

[a] Includes companies whose pipelines carry crude petroleum, petroleum products, and nonpetroleum pipeline liquids.

[b] Regulated plus unregulated mileage of crude oil trunk and gathering lines, plus refined oil trunk lines.

Continued next page

Oil Pipeline Profile (Continued)

NOTE
The Interstate Commerce Committee regulated oil pipelines in the 1960s and 1970s.

SOURCES
Unless otherwise noted, refer to chapter tables for sources.

[1] Eno Transportation Foundation, Inc., *Transportation In America 2000, with historical compendium 1939-1999* (Washington, DC: 2000), p. 44.

[2] Ibid., pp. 28 and 29.

[3] U.S. Department of Transportation, Research and Special Programs Administration, Office of Pipeline Safety, available at Internet site http://ops.dot.gov/stats/lq_sum.htm as of May 31, 2002.

[4] Eno Transportation Foundation, Inc., *Transportation In America 2000, with historical compendium 1939-1999* (Washington, DC: 2000), pp. 4-7.

[5] Federal Energy Regulatory Commission, personal communication.

[6] U.S. Department of Labor, Bureau of Labor Statistics, *Employment, Hours and Earnings, United States, 1909-94* (Washington, DC: September 1994), SIC 46.

[7] Eno Transportation Foundation, Inc., *Transportation in America, 1998* (Washington, DC: 1998), p. 44 and Transportation in America, Supplement, 1999 (Washington, DC: 1999).

[8] Ibid., p. 71.

[9] Ibid.,*Transportation In America 2000, with historical compendium 1939-1999* (Washington, DC: 2000), p. 51.

[10] U.S. Department of Labor, Bureau of Labor Statistics, *Employment, Hours and Earnings, United States, 1988-1996* (Washington, DC: July 1996), SIC 46.

[11] Ibid., Internet site www.bls.gov as of Apr. 19, 1999.

[12] Federal Energy Regulatory Commission, Internet site www.ferc.fed.us/oil/oil_list.htm as of June 21, 2001.

[13] U.S. Department of Labor, Bureau of Labor Statistics, Internet site http://www.bls.gov/oes/1999/ oesi2_46.htm as of July 3, 2001.

Natural Gas Pipeline Profile

Financial ($ millions)	1960	1970	1980	1990	1995	1996	1997	1998	1999	2000
Transmission pipeline companies										
Total operating revenues[a]	[2]3,190	[2]5,928	[7]41,604	[7]21,756	[7]12,092	[7]12,050	[7]10,339	[7]9,450	[R,7]9,555	[7]11,140
Total operating expenses[a]	2,698	5,088	39,709	19,484	9,534	9,603	7,862	6,875	[R]6,897	8,412
Operation and maintenance	2,095	4,203	36,480	17,058	6,680	6,802	5,381	4,260	[R]4,148	5,538
Operation expenses	2,031	4,094	36,075	16,429	6,121	6,314	4,975	3,909	[R]3,823	5,226
Maintenance expenses	64	109	405	629	558	488	406	351	[R]325	312
Taxes (federal, state, local)[b]	319	376	1,991	1,245	1,582	1,643	1,531	1,560	[R]1,645	1,681
Federal taxes	223	202	1,327	768	1,048	1,085	1,076	1,035	[R]1,109	1,102
State and local taxes	96	174	664	477	534	558	455	525	[R]536	579
Distribution pipeline companies										
Total operating revenues[a]	N	N	[2]14,013	[10]18,750	[10]19,421	[10]30,407	[10]30,864	[10]28,182	[R,10]28,135	[10]34,761
Total operating expenses[a]	N	N	13,263	17,125	17,402	27,917	27,445	25,668	[R]24,564	32,163
Operation and maintenance	N	N	11,791	14,544	14,170	23,301	23,155	21,396	[R]20,226	27,144
Operation expenses	N	N	11,539	14,020	13,575	22,433	22,388	20,710	[R]18,270	26,321
Maintenance expenses	N	N	252	524	596	868	767	687	[R]1,956	823
Taxes (federal, state, local)[b]	N	N	1,136	1,625	1,888	2,668	2,415	2,524	[R]2,355	2,921
Federal taxes	N	N	351	581	720	1,041	849	1,250	[R]883	1,035
State and local taxes	N	N	785	1,045	1,168	1,627	1,566	1,274	[R]1,472	1,886
Investor-owned, total industry[c]										
Total operating revenues	N	N	[8]85,918	[8]66,027	[R,8]58,435	[8]63,600	[14]62,660	[16]57,548	[R,16]59,142	[16]72,712
Total operating expenses[a]	N	N	81,789	60,137	[R]50,594	56,695	55,422	51,075	[R]51,331	65,424
Operation and maintenance	N	N	74,508	51,628	40,041	45,785	44,851	41,360	[R]41,415	54,910
Operation expenses	N	N	73,288	49,718	37,998	43,742	43,258	39,971	[R]38,752	53,398
Maintenance expenses	N	N	1,220	1,910	2,043	2,043	1,593	1,390	[R]2,664	1,512
Taxes (federal, state, local)[b]	N	N	4,847	4,957	[R]5,981	6,362	6,384	5,293	[R]5,605	6,213
Federal taxes	N	N	2,327	2,038	[R]2,511	2,932	3,066	2,631	[R]2,626	2,761
State and local taxes	N	N	2,520	2,919	[R]3,470	3,430	3,318	2,662	[R]2,979	3,452
Inventory										
Pipeline mileage										
Transmission	[3]183,700	[3]252,200	[9]266,500	[9]280,100	[R,9]263,900	[9]259,300	[9]251,100	[9]255,800	[R,9]254,000	[9]250,600
Distribution	391,400	594,800	701,800	837,300	936,800	959,500	957,100	999,000	[R]1,094,500	1,110,000
Field and gathering	55,800	66,300	83,500	89,500	60,400	57,500	43,000	40,200	[R]40,400	39,800
Total	630,950	913,267	1,051,774	1,206,894	1,262,152	1,276,315	1,251,199	1,294,962	[R]1,388,942	1,400,386
Number of employees										
Gas utility industry totals[d]	[4]206,400	[4]211,700	[4]215,400	[11]204,200	[11]179,000	[11]179,000	[11]154,600	[11]154,200	[R,11]143,600	[11]135,600
Investor-owned companies[d]	N	N	202,700	192,100	168,900	163,400	145,400	142,400	[R]133,100	125,100
Transmission pipeline companies	31,400	32,400	45,200	37,400	28,000	32,300	27,500	28,400	[R]29,400	26,400
Distribution pipeline companies	N	N	52,100	64,700	61,600	79,700	75,000	71,300	[R]71,400	69,500

Continued next page

Natural Gas Pipeline Profile (Continued)

Inventory (continued)	1960	1970	1980	1990	1995	1996	1997	1998	1999	2000
Integrated pipeline companies	N	N	53,200	39,900	36,400	12,700	12,300	12,000	R6,200	6,000
Combination pipeline companies	N	N	52,200	50,100	R42,900	38,700	30,600	30,700	R26,100	23,200
Number of interstate natural gas pipeline companies	[5]87	[5]89	[5]91	[5]132	[12]133	[12]138	[15]86	[15]86	[17]184	U
Performance (million cubic ft.)										
Marketed production, total	[6]12,771,038	[6]21,920,642	[6]20,179,724	[6]18,593,792	[6]19,506,474	[13]19,812,241	[13]19,866,093	[13]19,961,348	[13]19,804,848	[13]20,002,287
Delivered to consumers, total	10,382,681	19,018,462	18,216,233	16,818,882	19,660,161	20,005,508	20,004,012	19,469,047	19,895,308	20,772,291
Consumed, total	11,966,537	21,139,386	19,877,293	18,715,090	21,580,665	21,966,616	21,958,660	21,277,205	21,619,616	22,546,944
Gas used as a pipeline fuel, total	347,075	722,166	634,622	659,816	700,335	711,446	751,470	635,477	645,319	644,444
Safety										
Fatalities[1]	N	26	15	6	18	48	10	18	R21	37
Injured persons	N	233	177	69	53	114	72	76	93	77
Incidents	N	1,077	1,524	198	161	187	175	236	173	234

KEY: N = data do not exist; R = revised; U = data are not available.

[a] Does not add due to omission of line from source table for depreciation and other noncash expenses.

[b] Figures obtained by addition / subtraction and may not appear directly in data source.

[c] Industry total includes integrated and combination company totals in addition to distribution and transmission company totals.

[d] Number of employees in investor-owned companies is the sum of employees in distribution, transmission, integrated and combination companies.

NOTES
Numbers may not add to totals due to rounding.
Gas utility industry totals include employees in privately owned companies.

SOURCES
[1] U.S. Department of Transportation, Research and Special Programs Administration, Office of Pipeline Safety, DPS-35, Internet site http://ops.dot.gov/stats.htm as of Sept. 9, 2002.
[2] American Gas Association, *Gas Facts*, 1979 (Arlington, VA), table 134.
[3] Ibid., table 44.
[4] Ibid., table 153.
[5] U.S. Department of Energy, Energy Information Administration, *Statistics of Interstate Natural Gas Pipeline Companies* (Washington, DC: Annual issues), preface.
[6] Ibid., Natural *Gas Annual, 1998* (Washington, DC: October 1999), table 98.
[7] American Gas Association, *Gas Facts*, (Arlington, VA: Annual issues), table 12-2 and similar tables in earlier editions.
[8] Ibid., table 12-1.
[9] Ibid., tables 5-1, 5-2, and similar tables in earlier editions.
[10] Ibid., table 12-1 and similar tables in earlier editions.
[11] Ibid., table 14–2 and similar tables in earlier editions.
[12] Federal Energy Regulatory Commission, personal communication.
[13] U.S. Department of Energy, Energy Information Administration, *Natural Gas Annual, 2000*, table 1.
[14] American Gas Association, *Gas Facts,* 1979 (Arlington, VA), unpublished data and personal communication, Aug. 17, 2000.
[15] American Gas Association, personal communication, Aug. 17, 2000.
[16] Ibid., *Gas Facts*, 2000, tables 12-1, 12-2, 12-3, and 12-4.
[17] Federal Energy Regulatory Commission, http://www.ferc.gov/gas/pipecomp.htm as of Jan. 2, 2002.

Metric Conversion Tables

TABLE 1-1M: System Kilometers Within the United States (Statute kilometers)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Highway[a]	5,706,240	5,937,942	6,002,985	6,176,897	6,211,806	6,218,364	6,223,214	6,296,117	6,308,068	6,350,265	6,286,564	6,304,192	6,334,747
Class I rail[b,c]	333,672	321,544	316,202	308,222	265,255	234,584	192,732	174,234	170,235	164,359	161,852	160,017	159,727
Amtrak[c]	N	N	N	N	38,624	38,624	38,624	38,624	40,234	40,234	35,406	37,015	37,015
Transit[d]													
Commuter rail[c]	N	N	N	N	N	5,752	6,649	6,695	5,926	7,108	8,324	8,354	8,383
Heavy rail	N	N	N	N	N	2,081	2,174	2,346	2,379	2,457	2,457	2,478	2,507
Light rail	N	N	N	N	N	618	777	913	1,027	1,061	1,088	1,291	1,343
Navigable channels[e]	40,234	40,234	41,843	41,843	41,843	41,843	41,843	41,843	41,843	41,843	41,843	41,843	41,843
Oil pipeline[f]	307,295	339,358	351,917	363,533	351,469	343,764	335,954	292,759	285,715	289,478	287,506	285,599	U
Gas pipeline[g]	1,015,416	1,235,204	1,469,761	1,575,971	1,692,666	1,800,655	1,942,308	2,031,237	2,054,030	2,013,610	2,082,913	R2,235,285	2,253,703

KEY: N = data do not exist; R = revised; U = data are not available.

[a] All public road and street kilometers in the 50 states and the District of Columbia. For years prior to 1980, some kilometers of nonpublic roadways are included. No consistent data on private road kilometers are available. Beginning in 1998, approximately 69,200 kilometers of Bureau of Land Management Roads are excluded.

[b] Data represent kilometers of road owned (aggregate length of road, excluding yard tracks, sidings, and parallel lines).

[c] Portions of Class I freight railroads, Amtrak, and commuter rail networks share common trackage. Amtrak data represent kilometers of track operated.

[d] Transit system kilometers is measured in directional route-kilometers. A directional route-kilometers is the kilometers in each direction over which public transportation vehicles travel while in revenue service. Directional route-kilometers are computed with regard to direction of service, but without regard to the number of traffic lanes or rail tracks existing in the right-of-way.

[e] The St. Lawrence Seaway is not included in this number because 3 of the 5 subsections are solely in Canadian waters, and the others are in international boundary waters. Of the 41,843 kilometers of navigable waterways, 17,489 kilometers are commercially significant shallow-draft inland waterways subject to fuel taxes.

[f] Includes trunk and gathering lines for crude-oil pipeline.

[g] Excludes service pipelines. Data not adjusted to common diameter equivalent. Kilometers as of the end of each year. Includes field and gathering, transmission, and distribution mains. See table 1-8 for a more detailed breakout of oil and gas pipeline kilometers.

NOTE

1.609344 kilometers = 1 mile.

SOURCES

Highway:

1960-95: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: Annual issues), table HM-212.

1996-98,2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table HM-20.

1999: Ibid., personal communication, May 2002.

Class I rail:

1960-2000: Association of American Railroads, *Railroad Facts* (Washington, DC: 2001), p. 45.

Amtrak:

1980: Amtrak, Corporate Planning and Development, personal communication (Washington, DC).

1985-2000: Amtrak, Corporate Planning and Development, *Amtrak Annual Report*, Statistical Appendix (Washington, DC: Annual issues).

Transit:

1985-99: U.S. Department of Transportation, Federal Transit Administration, *National Transit Database* (Washington, DC: Annual issues), table 20 and similar tables in earlier editions.

Navigable channels:

1960-96: U.S. Army Corps of Engineers, Ohio River Division, Huntington District, *Ohio River Navigation System Report, 1996, Commerce on the Ohio River and its Tributaries* (Fort Belvoir, VA: 1996), p. 2.

1997-99: Waterborne Commerce Statistics Center Databases, personal communication, Aug. 3, 2001.

Oil pipeline:

1960-99: Eno Transportation Foundation, Inc., *Transportation in America, 2000* (Washington, DC: 2001), p. 44.

Gas pipeline:

1960-2000: American Gas Association, *Gas Facts* (Arlington, VA: Annual issues), table 5-2 and similar tables in earlier editions.

TABLE 1-6M: Estimated U.S. Roadway Lane-Kilometers by Functional System[a]

	1980	1985	1990	1995	1996	1997	1998[R,d]	1999[R]	2000
TOTAL lane-kilometers	**12,749,503**	**12,903,711**	**12,956,959**	**13,129,436**	**13,162,268**	**13,264,917**	**13,133,628**	**13,161,188**	**13,234,268**
Urban									
Interstates	77,986	92,207	100,124	114,870	115,535	116,286	117,492	117,954	118,955
Other arterials[b]	536,995	598,111	642,733	717,491	723,368	730,035	730,739	724,866	733,631
Collectors	233,561	261,320	270,000	297,780	300,823	303,925	301,805	299,876	303,471
Local	1,396,888	1,530,515	1,675,546	1,831,224	1,849,870	1,879,627	1,894,212	1,908,598	1,926,127
Total urban	**2,245,429**	**2,482,154**	**2,688,403**	**2,961,365**	**2,989,596**	**3,029,873**	**3,044,248**	**3,051,294**	**3,082,183**
Rural									
Interstates	210,792	212,284	218,663	212,298	213,983	214,308	214,415	215,971	216,597
Other arterials[b]	816,095	820,773	832,581	854,089	857,549	864,200	865,816	867,908	868,914
Collectors[c]	2,303,401	2,360,568	2,361,876	2,281,129	2,279,896	2,283,075	2,278,467	2,275,537	2,276,683
Local	7,173,786	7,027,931	6,855,435	6,820,554	6,821,243	6,873,460	6,730,682	6,750,479	6,789,892
Total rural	**10,504,074**	**10,421,557**	**10,268,556**	**10,168,070**	**10,172,671**	**10,235,043**	**10,089,380**	**10,109,894**	**16,338,197**

KEY: R = revised.

[a] Includes the 50 States and the District of Columbia.

[b] For urban: the sum of other freeways and expressways, other principal arterials, and minor arterials. For rural: the sum of other principal arterials and minor arterials.

[c] Includes minor and major collectors.

[d] Beginning in 1998, approximately 138,400 lane-kilometers of Bureau of Land Management roads are excluded.

NOTES

In estimating rural and urban lane kilometers, the U.S. Department of Transportation, Federal Highway Administration assumed that rural minor collectors and urban/rural local roads are two lanes wide.

1.609344 kilometers = 1 mile.

SOURCES

1980-95: U.S. Department of Transportation, Federal Highway Administration, Office of Highway Information Management, table HM-260 (unpublished).

1996-1998, 2000: U.S. Department of Transportation, *Highway Statistics* (Washington, DC: Annual issues), table HM-60. Internet address www.fhwa.dot.gov/ohim.ohimstat.htm as of Dec. 27, 2001.

1999: Ibid., personal communication, June 5, 2002.

TABLE 1-32M: U.S. Vehicle-Kilometers (Millions)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Air													
Air carrier, large certificated, domestic, all services	1,381	1,825	3,328	3,135	4,060	4,902	6,378	11,989	7,743	7,903	8,103	8,582	R9,115
General aviation[a]	2,847	4,123	5,161	6,820	8,375	7,520	7,319	9,829	5,671	6,239	N	N	N
Highway													
Passenger car[b,c]													
Motorcycle[b]	944,704	1,163,066	1,475,286	1,663,981	1,788,940	2,006,527	2,266,384	3,725,164	2,365,501	2,418,129	2,493,802	2,525,222	2,578,031
Other 2-axle 4-tire vehicle[c]	h	h	4,794	9,059	16,438	14,622	15,381	25,374	15,965	16,224	16,549	17,033	16,864
Truck	h	h	198,410	322,995	468,214	629,191	924,682	2,046,166	1,314,094	1,369,132	1,397,353	1,450,054	1,487,063
Single-unit 2-axle 6-tire or more truck	158,602	207,234	43,583	55,693	64,073	73,130	83,527	162,405	103,114	107,654	109,469	113,143	113,592
Combination truck	46,436	50,960	56,543	75,195	110,527	125,630	151,827	299,017	191,349	200,499	206,574	213,051	217,596
Bus	6,994	7,533	7,313	9,745	9,751	7,207	9,215	16,628	10,562	11,011	11,277	12,331	12,233
Total highway[c]	**R1,156,735**	**R1,428,795**	**1,785,928**	**2,136,668**	**2,457,943**	**R2,856,306**	**3,451,016**	**3,898,951**	**4,000,585**	**4,122,648**	**4,235,024**	**4,330,835**	**4,425,379**
Transit													
Motor bus[d]	2,537	2,460	2,268	2,456	2,699	2,998	3,428	3,514	3,574	3,612	3,500	3,663	P3,726
Light rail	120	67	54	38	28	27	39	56	61	66	70	78	P85
Heavy rail	629	636	655	681	619	725	864	865	874	898	910	930	P958
Trolley bus	162	69	53	25	21	25	22	22	22	23	22	23	P24
Commuter rail	N	N	N	278	288	295	342	383	389	403	418	428	P436
Demand responsive[d]	N	N	N	N	N	398	492	815	882	942	1,080	1,156	P1,221
Ferry boat	N	N	N	N	i	i	4	5	4	5	5	5	P5
Other	N	N	N	24	25	24	26	55	69	80	101	111	P114
Total transit[e]	**3,449**	**3,232**	**3,030**	**3,502**	**3,681**	**4,492**	**5,217**	**5,713**	**5,875**	**6,028**	**6,105**	**6,393**	**P6,568**

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TABLE 1-32M: U.S. Vehicle-Kilometers (Millions) (Continued)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Rail													
Class I freight, train-kilometers	650	678	687	649	689	558	612	737	754	764	764	789	811
Class I freight, car-kilometers	45,335	47,212	48,103	44,508	47,117	40,105	42,099	48,897	51,040	50,952	52,556	54,478	55,667
Intercity/Amtrak[f], train-kilometers	336	277	150	48	48	48	53	51	48	51	53	55	56
Intercity/Amtrak[f], car-kilometers	3,554	2,857	1,110	407	378	404	484	470	444	463	502	550	592
Total train-kilometers[g]	**987**	**954**	**837**	**697**	**737**	**607**	**665**	**789**	**803**	**816**	**818**	**843**	**867**

KEY: N = data do not exist; P = preliminary; R = revised.

[a] All operations other than those operating under 14 CFR 121 and 14 CFR 135. Data for 1996 are estimated using new information on nonrespondents and are not comparable to earlier years. Mileage in source is multiplied by 1.151 to convert to nautical-miles for 1985-1997. These numbers were then converted to kilometers.

[b] U.S. Department of Transportation, Federal Highway Administration (FHWA), provides data separately for passenger car and motorcycle in its annual *Highway Statistics* series. However, the 1995 summary report provides updated data for passenger car and motorcycle combined. Passenger car figures in this table were computed by U.S. Department of Transportation, Bureau of Transportation Statistics, by subtracting the most current motorcycle figures from the aggregate passenger car and motorcycle figures.

[c] In July 1997, the FHWA published revised vehicle-kilometers data for the highway modes for many years. The major change reflected the reassignment of some vehicles from the passenger car category to the other 2-axle 4-tire vehicle category. This ca tegory was calculated prior to rounding.

[d] Motor bus and demand responsive figures are also included in the bus figure for highway.

[e] Prior to 1985, excludes demand responsive and most rural and smaller systems funded via Sections 18 and 16(b)2, Federal Transit Act. The series is not continuous between 1980 and 1985. Transit rail modes are measured in car-kilometers. Car-kilometers measure individual vehicle-kilometers in a train. A 10-car train traveling 1 kilometer would equal 1 train-kilometer and 10 car-kilometers.

[f] Amtrak began operations in 1971.

[g] Although both train-kilometers and car-kilometers are shown for rail, only train-kilometers are included in the total. A train-kilometer is the movement of a train, which can consist of multiple vehicles (cars), the distance of 1 kilometer. This differs from a vehicle-kilometer, which is the movement of 1 vehicle the distance of 1 kilometer. A 10-vehicle train traveling 1 kilometer would be measured as 1 train-mile and 10 vehicle-kilometers. Caution should be used when comparing train-kilometers with vehicle kilometers.

[h] 1960–65, motorcycle data are included in passenger car, and other 2-axle 4-tire vehicle data included in single-unit 2-axle 6-tire or more truck.

[i] Ferry boat included with other.

TABLE 1-32M: U.S. Vehicle-Kilometers (Millions) (Continued)

NOTE
1.609344 kilometers = 1 mile.

SOURCES
Air:
Air carrier:
1960: Civil Aeronautics Board, *Handbook of Airline Statistics 1969* (Washington, DC: 1970), part III, table 2.
1965-70: Ibid., *Handbook of Airline Statistics 1973* (Washington, DC: 1974), part III, table 2.
1975-80: Ibid., *Air Carrier Traffic Statistics* (Washington, DC: 1976, 1981), p. 4 (December 1976) and p. 2 (December 1981).
1985-2000: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, *Air Carrier Traffic Statistics* (Washington, DC: Annual December issues), p. 2, line 27 plus line 50.
General aviation:
1960-65: U.S. Department of Transportation, Federal Aviation Administration, *FAA Statistical Handbook of Aviation 1972* (Washington, DC: 1973), table 9.10.
1970-75: U.S. Department of Transportation, Federal Aviation Administration, *FAA Statistical Handbook of Aviation 1976* (Washington, DC: 1976), table 8-5.
1980: U.S. National Transportation Safety Board estimate, personal communication, Dec. 7, 1998.
1985-90: Ibid., *General Aviation Activity and Avionics Survey* (Washington, DC: Annual issues,) table 3.3.
1995-97: Ibid., *General Aviation and Air Taxi Activity and Avionics Survey* (Washington, DC: Annual issues), table 3.3.

Highway:
Passenger car and motorcycle:
1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, Internet site http://www.fhwa.dot.gov/ohim/summary95/index.html, as of July 28, 2000, table VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1, and Internet site www.fhwa.dot.gov/ohim/ohimstat.htm.
Motorcycle:
1970-80: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics, Summary to 1985* (Washington, DC: 1986), table VM-201A.
1985-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1, and Internet site www.fhwa.dot.gov/ohim/ohimstat.htm.
Other 2-axle 4-tire vehicle:
1970-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, Internet site http://www.fhwa.dot.gov/ohim/summary95/index.html, as of July 28, 2000, table VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1, and Internet site www.fhwa.dot.gov/ohim/ohimstat.htm.
Single-unit 2-axle 6-tires or more truck, combination truck, and bus:
1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, Internet site http://www.fhwa.dot.gov/ohim/summary95/index.html, as of July 28, 2000, table VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1, and Internet site www.fhwa.dot.gov/ohim/ohimstat.htm.

Transit:
1960-2000: American Public Transit Association, *Public Transportation Fact Book* (Washington, DC: 2002), table 42, 84, and similar tables in earlier editions.

Rail:
Class I rail freight train- and car-kilometers:
1960-2000: Association of American Railroads, *Railroad Facts 2000* (Washington, DC: 2001), p. 33 (train-miles) and p. 34 (car-miles).
Intercity/Amtrak train-kilometers:
1960-70: Association of American Railroads, *Yearbook of Railroad Facts* (Washington, DC: 1975), p. 39.
1975-2000: Amtrak, *Amtrak Annual Report*, Statistical Appendix (Washington, DC: Annual issues).
Intercity/Amtrak car-kilometers:
1960-75: Association of American Railroads, *Yearbook of Railroad Facts* (Washington, DC: 1975), p. 40.
1980-2000: Amtrak, Amtrak Corporate Reporting, Route Profitability System, personal communication, 2001.

TABLE 1-33M: Roadway Vehicle-Kilometers Traveled (VKT) and VKT per Lane-Kilometer by Functional Class

	1980	1985	1990	1995	1996	1997	1998	1999	2000
VKT (millions)									
Urban									
Interstate	259,494	347,921	448,848	R549,636	565,812	581,619	602,896	616,545	633,148
Other arterials[a]	779,227	930,635	1,125,306	R1,311,889	1,343,196	1,362,566	1,388,854	1,412,675	1,448,078
Collector	133,645	144,162	171,068	R204,272	208,104	209,445	212,303	211,708	217,770
Local	204,050	257,595	307,470	331,375	335,345	357,503	367,783	377,403	379,216
Total urban	**1,376,416**	**1,680,313**	**2,052,693**	**R2,397,173**	**2,452,457**	**2,511,132**	**2,571,836**	**2,618,331**	**2,678,212**
Rural									
Interstate	217,397	248,414	322,147	359,498	374,277	386,653	404,782	418,526	432,673
Other arterials[a]	422,894	455,127	532,477	593,196	609,695	630,956	649,345	664,903	676,564
Collector[b]	304,919	332,602	386,983	380,043	387,900	409,359	414,982	425,423	430,358
Local	136,318	139,850	156,716	169,245	173,410	184,548	194,079	202,576	205,769
Total rural	**1,081,527**	**1,175,993**	**1,398,324**	**1,501,983**	**1,545,282**	**1,611,517**	**1,663,188**	**1,711,428**	**1,745,364**
VKT per lane-kilometer (thousands)									
Urban									
Interstate	5,354	6,072	7,215	R7,699	7,881	R8,050	R8,258	8,415	8,569
Other arterials[a]	2,335	2,504	2,818	R2,943	2,989	R3,003	R3,059	3,138	3,182
Collector	921	888	1,020	1,104	1,114	1,109	1,131	1,137	1,155
Local	235	271	295	291	291	306	312	319	317
Total urban	**987**	**1,089**	**1,229**	**R1,304**	**1,320**	**R1,334**	**1,360**	**1,381**	**1,399**
Rural									
Interstate	1,660	1,883	2,371	2,725	2,815	2,903	R3,038	3,120	3,216
Other arterials[a]	834	892	1,029	1,118	R1,144	R1,175	R1,207	1,233	1,254
Collector[b]	213	227	264	268	274	288	293	301	304
Local	31	32	37	40	40	43	46	48	49
Total rural	**166**	**182**	**219**	**238**	**R245**	**253**	**266**	**272**	**277**

KEY: R = revised.

[a] For urban: the sum of other freeways and expressways, other principal arterials, and minor arterials. For rural: the sum of other principal arterials and minor arterials.

[b] Collector is the sum of major and minor collectors (rural only).

NOTE
See table 1-6 for estimated highway lane-kilometers by functional class.
1.609344 kilometers = 1 mile.

SOURCES
1980-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-202.
1995-1998, 2000: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, D7C: Annual issues), table VM-2 and VM-2A.
1999: U.S. Department of Transportation, Federal Highway Administration, personal communication, June 5, 2002.

Lane-kilometers:
1980-95: U.S. Department of Transportation, Federal Highway Administration, Office of Highway Information Management, unpublished data, 1997, table HM-260.
1996-98, 2000: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues), table HM-60.
1999: U.S. Department of Transportation, Federal Highway Administration, personal communication, June 5, 2002.

TABLE 1-34M: U.S. Passenger-Kilometers (Millions)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Air													
Air carrier, certificated, domestic, all services	50,049	85,659	174,520	218,871	328,898	447,134	556,629	649,995	699,505	725,190	745,548	785,934	R830,629
General aviation[a]	3,701	7,081	14,645	18,347	23,657	19,795	20,921	17,381	19,312	20,117	21,082	21,726	U
Total	**53,750**	**92,740**	**189,166**	**237,217**	**352,556**	**466,929**	**577,550**	**667,376**	**718,817**	**745,307**	**766,630**	**807,661**	**U**
Highway													
Passenger car[b,c]	1,842,173	2,244,718	2,817,796	3,144,925	3,237,982	3,370,965	3,671,543	R3,680,388	3,761,146	R3,844,827	R3,965,147	4,015,104	4,099,070
Motorcycle[b,c]	g	g	5,274	9,965	19,725	19,009	19,995	R17,344	R17,561	R17,846	R18,203	18,736	18,551
Other 2-axle 4-tire vehicle[c]	h	h	363,090	584,622	838,104	1,107,376	1,608,947	R2,021,571	R2,089,410	R2,176,919	R2,221,791	2,305,586	2,364,431
Truck													
Single-unit 2-axle 6-tire or more truck	158,602	207,234	43,583	55,693	64,073	73,130	83,527	100,914	103,114	107,654	109,469	113,143	113,592
Combination truck	46,436	50,960	56,543	75,195	110,527	125,630	151,827	185,800	191,349	200,499	206,574	213,051	217,596
Bus[d]	N	N	N	N	N	152,767	195,371	219,038	R223,918	233,451	239,081	261,430	259,349
Total[c]	**2,047,212**	**2,502,912**	**3,286,284**	**3,870,399**	**4,270,411**	**4,848,878**	**5,731,210**	**R6,225,055**	**R6,386,498**	**R6,581,197**	**R6,760,267**	**6,927,051**	**7,072,589**
Transit													
Motor bus[d]	N	N	N	N	35,068	34,055	33,766	30,285	30,732	31,550	32,766	34,126	P34,184
Light rail	N	N	N	N	613	563	919	1,384	1,540	1,666	1,815	1,941	P2,182
Heavy rail	N	N	N	N	16,991	16,781	18,467	16,993	18,556	19,402	19,769	20,764	P22,280
Trolley bus	N	N	N	N	352	492	311	301	296	304	293	299	P309
Commuter rail	6,754	6,643	7,390	7,263	10,486	10,515	11,397	13,267	13,440	12,936	14,008	14,108	P15,131
Demand responsive[d]	N	N	N	N	N	586	694	977	1,056	1,213	1,183	1,308	P1,350
Ferry boat	N	N	N	N	j	j	460	418	426	473	473	499	P531
Other	N	N	N	N	628	707	200	439	546	594	710	755	P744
Total[e]	**i6,754**	**i6,643**	**i7,390**	**i7,263**	**64,139**	**63,699**	**66,213**	**64,065**	**66,591**	**68,138**	**71,017**	**73,800**	**P76,711**
Rail													
Intercity / Amtrak[f]	27,462	21,340	9,944	6,326	7,247	7,765	9,748	8,924	8,127	8,314	8,536	8,578	8,848

KEY: N = data do not exist; P = preliminary; R = revised; U = data are not available.

[a] All operations other than those operating under 14 CFR 121 and 14 CFR 135.

[b] U.S. Department of Transportation, Federal Highway Administration (FHWA), provides data separately for passenger car and motorcycle in its annual Highway Statistics series. However, the 1995 summary report provides updated data for passenger car and motorcycle combined. Passenger car figures in this table were computed by U.S. Department of Transportation, Bureau of Transportation Statistics by subtracting the most current motorcycle figures from the aggregate passenger car and motorcycle figures.

[c] In July 1997, FHWA published revised passenger-kilometers data for the highway modes for a number of years. The major change reflected the reassignment of some vehicles from the passenger car category to the other 2-axle 4-tire vehicle category. Passenger-kilometers for passenger car, motorcycle, and other 2-axle 4-tire vehicles were derived by multiplying vehicle-kilometers for these vehicles by average vehicle occupancy rates, provided by the Nationwide Personal Transportation Survey, 1977, 1983, and 1995.

[d] Motor bus and demand responsive figures are also included in the bus figure for highway.

[e] Prior to 1985, excludes demand responsive and most rural and smaller systems funded via Sections 18 and 16(b)2, Federal Transit Act. The series is not continuous between 1980 and 1985. Transit rail modes are measured in car-kilometers. Car-kilometers measure individual vehicle-kilometers in a train. A 10-car train traveling 1 kilometer would equal 1 train-kilometer and 10 car-kilometers.

Continued next page

TABLE 1-34M: U.S. Passenger-Kilometers (Millions) (Continued)

[f] Amtrak began operations in 1971. Does not include contract commuter passengers.

[g] Included in passenger car.

[h] Included in other single-unit 2-axle 6-tire or more truck.

[i] Includes commuter rail figures only.

[j] Ferryboat included in other.

NOTES

Air carrier passenger-kilometers are computed by summing the products of the aircraft-kilometers flown on each interairport segment multiplied by the number of passengers carried on that segment. Highway passenger-kilometers from 1960 to 1994 are calculated by multiplying vehicle-kilometers of travel as cited by FHWA by the average number of occupants for each vehicle type. Average vehicle occupancy rates are based on various sources, such as the Nationwide Personal Transportation Survey, conducted by the Federal Highway Administration, and the Truck Inventory and Use Survey, conducted by the Bureau of the Census. Transit passenger-miles are the cumulative sum of the distances ridden by each passenger. Rail passenger-kilometers represent the movement of 1 passenger for 1 mile.
1.609344 kilometers = 1 mile.

SOURCES

Air:

Air carrier, domestic, all services:
1960: Civil Aeronautics Board, *Handbook of Airline Statistics, 1969* (Washington, DC: 1970), part III, table 2.
1965-70: Ibid., *Handbook of Airline Statistics, 1973* (Washington, DC: 1974), part III, table 2.
1975-80: Ibid., *Air Carrier Traffic Statistics* (Washington, DC: 1976, 1981), p. 4 (December 1976) and p. 2 (December 1981).
1985-2000: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, *Air Carrier Traffic Statistics* (Washington, DC: Annual December issues), page 2, line 1.
General aviation:
1960-99: Eno Transportation Foundation, Inc., *Transportation in America, 2000* (Washington, DC: 2001), pp. 14-15.

Highway:

Passenger car and motorcycle:
1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, Internet site http://www.fhwa.dot.gov/ohim/summary95/index.html as of July 28, 2000, table VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1 and Internet site www.fhwa.dot.gov/ohim/ohimstat.htm.
Motorcycle:
1970-80: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1985* (Washington, DC: 1986), table VM-201A.
1985-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1 and Internet site www.fhwa.dot.gov/ohim/ohimstat.htm.
Other 2-axle 4-tire vehicle:
1970-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, Internet site http://www.fhwa.dot.gov/ohim/summary95/index.html as of July 28, 2000, table VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1 and Internet site www.fhwa.dot.gov/ohim/ohimstat.htm.
Single-unit 2-axle 6-tires or more truck, combination truck, and bus:
1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, Internet site http://www.fhwa.dot.gov/ohim/summary95/index.html as of July 28, 2000, table VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1, and Internet site www.fhwa.dot.gov/ohim/ohimstat.htm.

Transit:

Ferryboat and other:
1996-99: American Public Transit Association, personal communication, Aug. 13, 2001.
2000: Ibid., *Public Transportation Fact Book* (Washington, DC: 2002), table 84.
All other data:
1960-2000: American Public Transit Association, *Public Transportation Fact Book* (Washington, DC: 2002), table 30 and similar tables in earlier editions.

Rail, Intercity / Amtrak:

1960-80: Association of American Railroads, *Railroad Facts* (Washington, DC: Annual issues).
1985: Amtrak, *Amtrak FY95 Annual Report* Statistical Appendix (Washington, DC: 1996), p. 4.
1990-2000: Ibid., *Amtrak FY00 Annual Report* Statistical Appendix (Washington, DC: 2001), p. 46.

TABLE 1-44M: U.S. Tonne-Kilometers of Freight (Millions)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
TOTAL U.S. tonne-kilometers of freight (millions)	**U**	**2,706,838**	**3,221,739**	**3,335,607**	**4,363,158**	**4,306,056**	**4,665,599**	**5,326,030**	**5,437,991**	**5,376,255**	**5,416,842**	**5,568,662**	**U**
Air carrier, domestic all services[a]	**807**	**1,975**	**3,955**	**5,066**	**6,611**	**7,528**	**13,233**	**18,279**	**18,777**	**19,857**	**20,206**	**20,735**	**21,874**
Intercity truck[b]	**416,092**	**524,130**	**601,508**	**662,827**	**810,284**	**890,583**	**1,073,079**	**1,344,634**	**1,419,093**	**1,454,132**	**1,499,391**	**P1,595,749**	**U**
Class I rail[c]	**835,555**	**1,018,882**	**1,116,600**	**1,101,187**	**1,341,653**	**1,280,372**	**1,509,566**	**1,906,268**	**1,979,686**	**1,969,394**	**2,010,092**	**2,092,813**	**2,140,261**
Domestic water transportationn[d]	**U**	**715,099**	**870,428**	**826,321**	**1,345,855**	**1,303,711**	**1,216,951**	**1,179,260**	**1,116,422**	**1,032,799**	**982,262**	**957,540**	**942,849**
Coastwise	U	441,708	525,275	461,126	[e] 921,460	892,009	699,522	642,891	595,794	510,761	459,693	427,378	414,445
Lakewise	U	110,838	115,946	100,033	90,149	70,347	88,956	87,166	85,167	90,761	90,013	83,284	84,502
Internal	U	160,161	227,487	263,378	331,914	339,747	426,886	447,232	433,307	429,265	430,540	444,889	441,727
Intraport	U	2,392	1,721	1,785	2,331	1,609	1,587	1,971	2,153	2,012	2,016	1,988	2,176
Oil pipeline[b]	**334,334**	**446,751**	**629,248**	**740,206**	**858,756**	**823,862**	**852,770**	**877,589**	**904,015**	**900,073**	**904,891**	**901,825**	**842,842**

KEY: P = preliminary; U = data are not available.

[a] Includes freight, express, and mail revenue tonne-kilometers as reported on U.S. DOT Form 41.

[b] Intercity truck and oil pipeline estimates are reported in billions. The U.S. Department of Transportation, Bureau of Transportation Statistics converted these estimates to millions.

[c] Revenue tonne-kilometers.

[d] Excludes intraterritorial traffic, for which ton-miles were not compiled.

[e] Reflects startup between 1975 and 1980 of Alaska pipeline and consequent water transportation of crude petroleum from Alaskan ports to mainland United States for refining.

NOTES
Domestic water transportation numbers may not add to totals due to rounding.
1.459972 tonne-kilometers = 1 ton-mile.

SOURCES
Air carrier, domestic, all services:
1960-65: Civil Aeronautics Board, *Handbook of Airline Statistics, 1969* (Washington, DC: 1970).
1970-80: Ibid., *Air Carrier Traffic Statistics* (Washington, DC: Annual issues), p. 2, line 3.
1985-2000: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, *Air Carrier Traffic Statistics* (Washington, DC: Annual issues), p. 2, line 3.

Intercity truck:
1960-99: Eno Transportation Foundation, Inc., *Transportation in America, 2000* (Washington, DC: 2001), p. 12.

Class I rail:
1960-2000: Association of American Railroads, *Railroad Facts* (Washington, DC: 2001), p. 27.

Domestic water transportation:
1965-2000: U.S. Army Corps of Engineers, *Waterborne Commerce of the U.S.* (New Orleans, LA: Annual issues), part 5, section 1, table 1-4, and similar tables in earlier editions.

Oil pipeline:
1960-70: Eno Transportation Foundation, Inc., *Transportation in America, 1998* (Washington, DC: 1998), p. 44.
1975: Association of Oil Pipe Lines, *Shifts in Petroleum Transportation* (Washington, DC: Annual issues), table 4.
1980-2000: Ibid., *Shifts in Petroleum Transportation* (Washington, DC: Annual issues), table 1.

TABLE 1-45M: Average Length of Haul, Domestic Freight and Passenger Modes (Kilometers)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Freight													
Air carrier	1,534	1,518	1,632	1,741	1,693	1,862	2,235	1,867	1,901	1,733	1,735	1,611	U
Truck[a]	438	417	423	460	584	589	629	669	686	700	711	737	U
Class I rail	742	810	829	871	991	1,070	1,168	1,357	1,355	1,370	1,344	1,344	1,357
Water													
Coastwise	2,408	2,416	2,429	2,192	3,082	3,174	2,581	2,659	2,456	2,140	2,029	2,058	2,013
Lakewise	840	795	814	853	863	843	890	827	818	816	813	806	814
Internal	454	478	531	576	652	700	756	795	768	750	760	785	775
Intraport	U	U	U	26	27	24	21	26	27	24	24	24	25
Oil pipeline													
Crude	523	515	483	1,019	1,402	1,250	1,307	1,283	1,254	1,257	1,234	1,233	U
Petroleum products	433	539	575	830	666	629	623	647	665	665	676	673	U
Passenger													
Air carrier, domestic, scheduled	938	988	1,091	1,123	1,184	1,220	1,292	1,273	1,291	1,315	1,307	1,326	1,340
Bus, intercity	127	151	171	182	201	195	227	225	230	232	232	230	U
Commuter rail	33	34	36	37	37	38	35	39	39	37	37	37	U
Amtrak[b]	N	N	N	380	348	372	439	431	414	412	406	399	393

KEY: N = data do not exist; U = data are not available.

[a] Total Class I and Class II motor carriers of freight (less-than-truckload, specialized carrier for truckload, and others).

[b] Amtrak began operations in 1971. Data are reported for fiscal years.

NOTES

Average length of haul for freight is calculated by dividing ton-miles in the previous table by estimates of tonnage from the various data sources. The calculation of average length of haul for passenger trips varies by mode: for air carrier it is calculated by dividing revenue passenger-miles by revenue passenger enplanements; for commuter rail, intercity bus, and Amtrak it is calculated by dividing passenger-miles by number of passengers. These numbers were then converted to kilometers.

1.609344 kilometers = 1 mile.

SOURCES

Freight:

Air carrier, truck:

Eno Transportation Foundation, Inc., *Transportation In America, 2000* (Washington, DC: 2001), p. 51.

Class I rail:

Association of American Railroads, *Railroad Facts* (Washington, DC: 2001), p. 36.

Water:

U.S. Army Corps of Engineers, *Waterborne Commerce of the United States, Part 5* (New Orleans, LA: Annual issues), section 1, table 1-4

Oil pipeline:

1960-70: Transportation Policy Associates, Washington, DC, personal communication.

1975-99: Eno Transportation Foundation, Inc., *Transportation in America, 2000* (Washington, DC: 2001), p. 51.

Passenger:

Air carrier:

U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, *Air Carrier Traffic Statistics* (Washington, DC: Annual issues).

Intercity bus and commuter rail:

Eno Transportation Foundation, Inc., *Transportation in America, 2000* (Washington, DC: 2001), p. 50.

Amtrak:

1970-85: Amtrak, corporate communication, Jan. 26, 1999.

1990-2000: Amtrak, *Amtrak Annual Report* (Washington, DC: 2001), Statistical Appendix, pp. 23-25.

TABLE 1-49M: U.S. Waterborne Freight (Million metric tonnes)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
TOTAL	**997.8**	**1,154.8**	**1,389.5**	**1,537.7**	**1,813.4**	**1,622.4**	**1,963.0**	**2,032.5**	**2,072.1**	**2,116.6**	**2,122.4**	**2,107.0**	**2,233.1**
Foreign	307.8	402.5	527.0	679.2	835.9	702.5	944.9	1,040.9	1,073.6	1,107.3	1,129.8	1,143.8	1,262.6
Imports	191.7	244.8	307.8	432.3	469.5	374.4	544.3	610.2	664.6	715.1	762.7	780.9	886.1
Exports	116.1	157.8	219.2	246.9	366.4	328.1	400.6	430.6	409.0	392.2	367.1	362.9	376.5
Domestic	690.0	752.2	862.5	858.5	977.5	920.0	1,018.1	991.6	998.5	1,009.3	992.6	963.2	970.5
Inland	264.0	335.3	428.3	457.2	485.3	485.0	564.8	562.7	564.3	572.0	567.0	566.6	570.1
Coastal	189.8	182.8	216.3	210.4	299.0	281.0	270.9	241.9	242.6	238.7	226.4	207.6	205.8
Great Lakes	140.7	139.4	142.5	117.3	104.4	83.4	99.9	105.3	104.2	111.3	110.9	103.3	103.8
Intraport	94.5	93.3	73.9	71.0	85.4	67.4	78.4	75.4	80.7	81.5	81.7	80.5	85.8
Intraterritory	0.9	1.3	1.5	2.6	3.3	3.1	4.1	6.2	6.6	5.7	6.5	5.4	5.0

NOTES
Beginning in 1996, shipments of fish are excluded from domestic tonnage totals.
Numbers may not add to totals due to rounding.
0.9071847 tonne = 1 ton.

SOURCES
1960-2000: U.S. Army Corps of Engineers, *Waterborne Commerce of the United States* (New Orleans, LA: March 2002), part 5, tables 1-3 and 1-6.

TABLE 1-54M: Crude Oil and Petroleum Products Transported in the United States by Mode

	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Crude oil										
Ton-miles (billions)										
Pipelines[a]	420.5	529.4	488.2	488.8	490.4	493.9	492.6	487.8	468.8	413.8
Water carriers	59.3	[c]566.0	655.8	425.1	361.6	295.5	215.1	172.1	146.0	132.9
Motor carriers[b]	2.0	3.6	2.6	2.2	2.5	2.5	2.5	2.3	2.0	1.8
Railroads	2.2	0.7	1.2	1.0	1.2	1.2	0.7	0.7	0.7	0.6
Total	**484.0**	**1,099.4**	**1,147.8**	**917.2**	**855.5**	**793.1**	**1,037.8**	**663.0**	**617.6**	**548.9**
Percent of total										
Pipelines[a]	86.9	48.2	42.5	53.3	57.3	62.3	69.3	73.6	75.9	75.4
Water carriers	12.2	51.4	57.2	46.4	42.3	37.3	30.3	26.0	23.6	24.2
Motor carriers[b]	0.4	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3
Railroads	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Refined petroleum products										
Tonne-kilometers (billions)										
Pipelines[a]	319.7	329.4	335.6	364.0	387.2	410.1	407.5	417.1	433.0	429.1
Water carriers	375.8	336.4	206.1	230.4	223.7	225.0	216.5	214.8	215.3	224.0
Motor carriers[b]	38.3	35.5	39.3	41.2	35.9	40.9	38.0	39.0	40.3	43.9
Railroads	18.4	17.5	16.5	19.4	23.2	23.4	23.7	23.7	26.6	29.1
Total	**752.2**	**718.7**	**597.6**	**654.9**	**670.0**	**1,021.0**	**1,001.0**	**1,014.0**	**715.2**	**726.0**
Percent of total										
Pipelines[a]	[R]42.5	[R]45.8	[R]56.2	[R]55.6	[R]57.8	[R]58.6	[R]59.4	[R]60.1	60.5	59.1
Water carriers	[R]50.0	[R]46.8	[R]34.5	[R]35.2	[R]33.4	[R]32.2	[R]31.6	[R]30.9	30.1	30.8
Motor carriers[b]	[R]5.1	5.0	[R]6.6	[R]6.3	5.3	5.9	[R]5.5	[R]5.6	5.6	6.1
Railroads	[R]2.4	[R]2.4	2.7	[R]2.9	[R]3.5	[R]3.3	3.5	3.4	3.7	4.0
Combined crude and petroleum products										
Tonne-kilometers (billions)										
Pipelines[a]	740.2	858.8	823.9	852.8	877.6	904.0	900.1	904.9	901.8	842.8
Water carriers	435.1	[c]902.0	862.0	655.5	585.3	520.5	431.6	386.9	361.3	356.8
Motor carriers[b]	40.3	39.1	41.9	43.4	38.4	43.4	40.4	41.3	42.3	45.7
Railroads	20.6	18.2	17.7	20.4	24.2	24.5	24.4	24.4	27.3	29.6
Total	**1,236.2**	**1,818.1**	**1,745.4**	**1,572.1**	**1,525.5**	**2,178.8**	**2,038.8**	**1,981.9**	**1,332.8**	**1,275.0**
Percent of total										
Pipelines[a]	59.9	47.2	47.2	54.2	57.5	60.6	64.5	66.7	67.7	66.1
Water carriers	35.2	49.6	49.4	41.7	38.4	34.9	30.9	28.5	27.1	28.0
Motor carriers[b]	3.3	2.2	2.4	2.8	2.5	2.9	2.9	3.0	3.2	3.6
Railroads	1.7	1.0	1.0	1.3	1.6	1.6	1.8	1.8	2.1	2.3

KEY: R = revised.

[a] The amount carried by pipeline is based on tonne-kilometers of crude and petroleum products transported through federally regulated pipelines (84%), plus estimated tonne-kilometers of crude and petroleum products transported through nonfederally regulated pipelines (16%).

[b] The amount carried by motor carriers is estimated.

[c] Reflects the entrance between 1975 and 1980 of the Alaska pipeline, moving crude petroleum for water transportation to U.S. refineries.

NOTE
1.459972 tonne-kilometer = 1 ton-mile.

SOURCES
1975: Association of Oil Pipe Lines, *Shifts in Petroleum Transportation* (Washington, DC), table 6.
1980-2000: Ibid., (Annual issues), tables 1, 2, and 3.

TABLE 4-3M: Domestic Demand for Refined Petroleum Products by Sector (Petajoules)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Transportation	10,688	12,524	16,153	18,584	20,055	20,578	23,009	24,476	25,042	25,314	26,034	26,898	27,697	27,721
Industrial	6,067	7,164	8,219	8,595	10,049	8,235	8,778	9,096	9,557	9,799	9,605	9,912	9,662	9,534
Residential and commercial	3,682	4,083	4,547	4,015	3,203	2,661	2,294	2,190	2,362	2,282	2,099	2,245	2,337	2,316
Electric utilities	579	771	2,237	3,340	2,779	1,150	1,319	694	765	867	1,230	995	822	874
Total petroleum demand	**21,016**	**24,541**	**31,156**	**34,533**	**36,085**	**32,625**	**35,400**	**36,455**	**37,726**	**38,263**	**38,968**	**40,050**	**40,519**	**40,444**
Transportation as percent of total	50.9	51.0	51.8	53.8	55.6	63.1	65.0	67.1	66.4	R66.2	66.8	67.2	68.4	68.5

KEY: R = revised.

NOTES

Transportation's share of U.S. petroleum demand in this table differs slightly from table 4-1 because this table takes into account differences within sectors in the use of various grades of petroleum-based fuel that have different Btu content per unit volume.

1,055.06 petajoules = 1 quadrillion Btu.

SOURCES

1960-70: U.S. Department of Energy, Energy Information Administration, *Annual Energy Review 1997*, DOE/EIA-0384(97) (Washington, DC: July 1998), tables 2.1, 5.12b, and A3.

1975-2001: Ibid., *Monthly Energy Review*, DOE/EIA-0035(2002/07) (Washington, DC: July 2002), tables 1.4, 2.2, 2.3, 2.4, 2.5, and 2.6.

TABLE 4-5M: Fuel Consumption by Mode of Transportation

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Air													
Certificated carriers[a]													
Jet fuel (million liters)	7,397	14,721	29,742	28,610	32,249	38,289	47,050	48,498	49,919	51,707	52,530	54,518	56,193
General aviation[b]													
Aviation gasoline (million liters)	916	1,105	2,086	1,560	1,968	1,594	1,336	1,086	1,092	1,106	1,178	1,307	1,275
Jet fuel (million liters)	N	212	787	1,715	2,900	2,616	2,510	2,120	2,300	2,430	3,084	3,662	3,778
Highway													
Gasoline, diesel and other fuels (million liters)													
Passenger car and motorcycle	155,849	188,222	256,950	281,078	265,683	271,414	264,067	258,424	262,781	265,335	272,175	278,207	276,809
Other 2-axle 4-tire vehicle	N	e	46,610	72,229	90,078	103,580	134,802	172,632	179,255	186,953	191,019	200,093	199,991
Single-unit 2-axle 6-tire or more truck	N	52,420	15,021	20,517	26,206	28,008	31,635	34,887	35,617	36,249	25,805	35,477	36,144
Combination truck	N	25,203	27,815	34,739	49,350	53,015	61,070	74,865	76,437	76,850	95,233	92,884	97,077
Bus	3,131	3,312	3,104	3,986	3,854	3,157	3,388	3,663	3,747	3,886	3,937	4,347	4,203
Transit[c]													
Electricity (million kWh)	2,908	2,584	2,561	2,646	2,446	4,216	4,837	5,068	5,007	4,988	5,073	5,237	P5,510
Motor fuel (million liters)													
Diesel	787	939	1,026	1,382	1,632	2,304	2,464	2,568	2,622	2,714	2,800	2,890	P2,975
Gasoline and other nondiesel fuels[d]	727	469	257	30	42	174	129	230	232	225	199	184	P182
Compressed natural gas	N	N	N	N	N	N	N	41	57	90	141	168	P208
Rail, Class I (in freight service)													
Distillate / diesel fuel (million liters)	13,109	13,597	13,419	13,843	14,778	11,773	11,792	13,173	13,548	13,533	13,563	14,063	14,006
Amtrak													
Electricity (million kWh)	N	N	N	180	254	295	330	304	293	282	275	283	350
Distillate / diesel fuel (million liters)	N	N	N	238	242	246	310	250	269	284	284	280	288
Water													
Residual fuel oil (million liters)	14,960	11,708	14,286	15,369	33,887	17,375	23,947	22,282	21,582	18,965	21,276	22,100	24,264
Distillate / diesel fuel oil (million liters)	2,979	2,468	3,100	4,156	5,595	6,431	7,817	8,854	9,429	9,743	9,823	9,158	8,559
Gasoline (million liters)	N	N	2,264	2,763	3,982	3,986	4,921	4,014	3,761	3,737	3,620	4,157	4,255
Pipeline													
Natural gas (million cubic meters)	10,412	15,016	21,665	17,489	19,039	15,113	19,794	21,010	21,343	22,544	19,064	19,360	19,333

KEY: kWh = kilowatt-hour; N = data do not exist; P = preliminary.

[a] Domestic operations only.

[b] Includes fuel used in air taxi operations, but not commuter operations. Data for 1996 are estimated using new information on nonrespondents and are therefore not comparable to earlier years. See the accuracy statement in the appendix for more detailed information.

[c] Prior to 1984, excludes commuter rail, automated guideway, ferryboat, demand responsive vehicles, and most rural and small systems.

[d] Gasoline and all other nondiesel fuels such as liquefied natural gas, methanol, and propane, except compressed natural gas.

TABLE 4-5M: Fuel Consumption by Mode of Transportation (Continued)

[e] Included in single-unit 2-axle 6-tire or more truck category.

NOTES
3.785412 liters = 1 gallon.
0.03 cubic meters = 1 cubic foot.

SOURCES
Air:
Certificated air carriers:
1960-2000: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, Internet site http://www.bts.gov/oai/fuel/fuel-yearly.html as of Aug. 1, 2002.
General aviation:
1960-70: U.S. Department of Transportation, Federal Aviation Administration, *FAA Statistical Handbook of Aviation - 1972 edition* (Washington, DC: 1973), table 9.12.
1975-90: Ibid., *General Aviation and Air Taxi Activity Survey* (Washington, DC: Annual issues), table 5.1, and similar tables in earlier editions.
1995-2000: lbid., *FAA Aerospace Forecasts Fiscal Years 2002-2013* (Washington, DC: March 2002), table 30.

Highway:
1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics, Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A. (Revised data obtained from Internet site http://www.fhwa.dot.gov/ohim/ohimstat.htm as of August 2001).
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

Transit:
Electricity / motor fuel / compressed natural gas:
1960-2000: American Public Transit Association, *Public Transportation Fact Book* (Washington, DC: March 2002), tables 65, 66, 67, and similar tables in earlier editions.

Rail:
1960-2000: Association of American Railroads, *Railroad Facts* (Washington, DC: October 2001), p. 40 and personal communication Aug. 12, 2002.

Amtrak:
1975-2000: Amtrak, Energy Management Department, personal communication.

Water:
Residual and distillate / diesel fuel oil:
1960-80: American Petroleum Institute, *Basic Petroleum Data Book* (Washington, DC: Annual issues), tables 10, 10a, 12, and 12a.
1985-2000: U.S. Department of Energy, Energy Information Administration, *Fuel Oil and Kerosene Sales* (Washington, DC: Annual issues), tables 1, 2, and similar tables in earlier editions.
Gasoline:
1970-2000: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues), table MF-24 and similar tables in earlier editions.

Pipeline:
1960-2000: U.S. Department of Energy, *Natural Gas Annual 2000*, DOE/EIA-0131(00) (Washington, DC: November 2001), table 95.

TABLE 4-6M: Energy Consumption by Mode of Transportation (Petajoules)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Air													
Certificated carriers[a]													
Jet fuel	278	554	1,119	1,077	1,213	1,441	1,770	1,825	1,878	1,946	1,977	2,051	2,114
General aviation[b]													
Aviation gasoline	31	37	70	52	66	53	45	36	37	37	39	44	43
Jet fuel	N	8	30	65	109	98	94	80	87	91	116	138	142
Highway													
Gasoline, diesel and other fuels													
Passenger car and motorcycle	5,430	6,558	8,952	9,793	9,256	9,456	9,200	9,003	9,155	9,244	9,482	9,693	9,644
Other 2-axle 4-tire vehicle	N	[e]	1,624	2,516	3,138	3,609	4,696	6,014	6,245	6,513	6,655	6,971	6,967
Single-unit 2-axle 6-tire or more truck	N	2,026	581	793	1,013	1,083	1,223	1,349	1,377	1,401	998	1,371	1,397
Combination truck	N	974	1,075	1,343	1,908	2,049	2,361	2,894	2,955	2,971	3,682	3,591	3,753
Bus	121	128	120	154	149	122	131	142	145	150	152	168	162
Transit[c]													
Electricity	10	9	9	10	9	15	17	18	18	18	18	19	P20
Motor fuel													
Diesel	30	36	40	53	63	89	95	99	101	105	108	112	P115
Gasoline and other nondiesel fuels[d]	25	16	9	1	1	6	4	8	8	8	7	6	P6
Compressed natural gas	N	N	N	N	N	N	N	2	2	3	5	6	P8
Rail, Class I (in freight service)													
Distillate / diesel fuel	507	526	519	535	571	455	456	509	524	523	524	544	541
Amtrak													
Electricity	N	N	N	1	1	1	1	1	1	1	1	1	1
Distillate / diesel fuel	N	N	N	9	9	10	12	10	10	11	11	11	11
Water													
Residual fuel oil	624	489	596	641	1,414	725	999	930	900	791	888	922	1,012
Distillate / diesel fuel oil	115	95	120	161	216	249	302	342	364	377	380	354	331
Gasoline	N	N	79	96	139	139	171	140	131	130	126	145	148
Pipeline													
Natural gas	378	544	786	634	690	548	718	762	774	817	691	702	701

KEY: kWh = kilowatt-hour; N = data do not exist; P = preliminary.

[a] Domestic operations only.

TABLE 4-6M: Energy Consumption by Mode of Transportation (Petajoules) (Continued)

[b] Includes fuel used in air taxi operations, but not commuter operations.

[c] Prior to 1984, excludes commuter rail, automated guideway, ferryboat, demand responsive vehicles, and most rural and smaller systems.

[d] Gasoline and all other nondiesel fuels such as liquefied natural gas, methanol, and propane, except compressed natural gas.

[e] Included in other single-unit 2-axle 6-tire or more truck category.

NOTES

The following conversion rates were used:

Jet fuel = 135,000 joules/liter	Compressed natural gas = 138,700 joules/liter
Aviation gasoline = 120,200 joules/liter	Distillate fuel = 138,700 joules/liter
Automotive gasoline = 125,000 joules/liter	Residual fuel = 149,700 joules/liter
Diesel motor fuel = 138,700 joules/liter	Natural gas = 1,031 joules/m3

Electricity 1kWh = 3,412 joules/kWh, negating electrical system losses. To include approximate electrical system losses, multiply this conversion factor by 3.

SOURCES

Air:

Certificated air carriers:

1960-2000: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information Internet site http://www.bts.gov/oai/fuel/fuelyearly.html as of Aug. 1, 2002.

General aviation:

1960-80: U.S. Department of Transportation, Federal Aviation Administration, Office of Aviation Policy, Plans, and Management Analysis, *FAA Statistical Handbook of Aviation* (Washington, DC: Annual issues).

1985-90: Ibid., *General Aviation and Avionics Survey* (Washington, DC: Annual issues), table 5.1 and similar tables in earlier editions.

1995-2000: lbid., *FAA Aerospace Forecasts Fiscal Years 2002-2013* (Washington, DC: March 2002), table 30.

Highway:

1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics, Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A (revised data obtained from internet site http://www.fhwa.dot.gov/ohim/ohimstat.htm as of Aug. 2, 2001).

1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

Transit:

Electricity / motor fuel / compressed natural gas:

1960-2000: American Public Transit Association, *Public Transportation Fact Book* (Washington, DC: March 2002), tables 65, 66, 67, and similar tables in earlier editions.

Rail:

1960-2000: Association of American Railroads, *Railroad Facts* (Washington, DC: October 2001), p. 40.

2000: Ibid., personal communication, Aug. 12, 2002.

Amtrak:

1975-2000: Amtrak, Energy Management Department, personal communication.

Water:

Residual and distillate / diesel fuel oil:

1960-80: American Petroleum Institute, *Basic Petroleum Data Book* (Washington, DC: Annual issues), tables 10, 10a, 12, and 12a.

1985-2000: U.S. Department of Energy, Energy Information Administration, *Fuel Oil and Kerosene Sales* (Washington, DC: Annual issues), tables 2, 4, and similar tables in earlier editions.

Gasoline:

1970-2000: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* (Washington, DC: Annual issues), table MF-24 and similar tables in earlier editions.

Pipeline:

1960-98: U.S. Department of Energy, *Natural Gas Annual 1999*, DOE/EIA-0131(99) (Washington, DC: October 2000), table 94.

1999-2000: Ibid., *Natural Gas Annual 2000*, DOE/EIA-0131(00) (Washington DC: November 2001), table 95.

TABLE 4-7M: Domestic Demand for Gasoline (Million liters) by Mode

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
TOTAL demand	**230,005**	**269,471**	**339,178**	**389,882**	**396,854**	**407,121**	**430,044**	**455,209**	**464,074**	**470,279**	**484,449**	**498,845**	**499,261**
Highway	**209,820**	**253,541**	**324,025**	**376,094**	**383,019**	**391,960**	**414,614**	**443,125**	**452,412**	**457,800**	**472,018**	**487,345**	**487,879**
Nonhighway													
Agriculture	8,675	7,432	7,313	5,924	4,009	4,091	2,579	3,508	3,475	3,727	3,433	2,661	2,469
Aviation[a]	5,011	1,898	1,488	1,551	1,563	1,444	1,366	1,389	1,301	1,267	1,329	1,219	1,120
Marine	230	365	2,264	2,762	3,983	3,986	4,923	4,014	3,761	3,737	3,619	4,156	4,256
Other[b]	6,270	6,235	4,087	3,551	4,280	5,639	6,562	3,172	3,124	3,749	4,050	3,464	3,537
Total nonhighway	**20,185**	**15,930**	**15,152**	**13,788**	**13,834**	**15,160**	**15,430**	**12,083**	**11,662**	**12,479**	**12,431**	**11,500**	**11,382**

[a] Does not include aviation jet fuel.

[b] Includes state, county, and municipal use, industrial and commercial use, construction use, and miscellaneous.

NOTES
All nonhighway uses of gasoline were estimated by the U.S. Department of Transportation, Federal Highway Administration.
These estimates may not be comparable to data for prior years due to revised estimation procedures.
Numbers may not add to totals due to rounding.
3.785412 liters = 1 gallon.

SOURCES
Highway:
1960-95: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics, Summary to 1995* (Washington, DC: 1996), table MF-221.
1996-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table MF-21.

Nonhighway:
1960-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table MF-24, and unpublished revisions.

TABLE 4-8M: Certificated Air Carrier Fuel Consumption and Travel[a]

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Number of aircraft	**2,135**	**2,125**	**2,679**	**2,495**	**3,808**	**4,678**	**6,083**	**7,411**	**7,478**	**7,616**	**8,111**	**8,228**	**7,935**	**U**
Average kilometers flown per aircraft (thousands)	**784**	**1,074**	**1,528**	**1,500**	**1,236**	**1,191**	**1,250**	**1,222**	**1,260**	**R1,273**	**1,236**	**R1,283**	**1408.176**	**U**
Aircraft-kilometers (millions)														
Domestic operations	1,381	1,825	3,328	3,135	4,060	4,902	6,378	7,450	7,743	R7,903	R8,103	R8,581	R9,115	8,932
International operations	293	457	764	607	645	668	1,223	1,606	1,679	R1,793	R1,918	R1,971	R2,063	2,025
Fuel consumption (million liters)														
Domestic operations	7,397	14,721	29,742	28,610	R32,248	38,289	47,049	48,499	49,918	51,709	52,530	54,518	56,194	53,060
International operations	2,143	4,845	8,491	7,378	R6,613	9,418	15,002	17,076	17,632	18,791	19,631	19,873	20,725	19,824
Aircraft-kilometers flown per liter														
Domestic operations	0.19	0.12	0.11	0.11	R0.13	0.13	0.14	0.15	0.16	0.15	0.15	0.16	0.16	0.17
International operations	0.14	0.09	0.09	0.08	R0.10	0.07	0.08	0.09	0.10	0.10	0.10	0.10	0.10	0.10

KEY: R = revised; U = data are unavailable.

[a] Aircraft operating under 14 CFR 121 and 14 CFR 135.

NOTES
1 mile =1.609344 kilometers.
1 gallon = 3.785412 liters.

SOURCES
Number of aircraft:
1960-65: U.S. Department of Transportation, Federal Aviation Administration, *FAA Statistical Handbook of Aviation, 1970 edition* (Washington, DC: 1970), table 5.3.
1970-75: Ibid., *FAA Statistical Handbook of Aviation, Calendar Year 1979* (Washington, DC: 1979), table 5.1.
1980-85: Ibid., *FAA Statistical Handbook of Aviation, Calendar Year 1986* (Washington, DC: 1986), table 5.1.
1990-97: Ibid., *FAA Statistical Handbook of Aviation, Calendar Year 1997* (Washington, DC: unpublished), personal communication, Mar. 19, 1999.
1998-2001: Aerospace Industries Association, Aerospace Facts and Figures (Washington DC: Annual Issues), "Active U.S. Air Carrier Fleet."

Aircraft-kilometers flown:
1960: Civil Aeronautics Board, *Handbook of Airline Statistics 1969* (Washington, DC: 1970), part III, tables 2 and 13.
1965-70: Ibid., *Handbook of Airline Statistics 1973* (Washington, DC: 1974), part III, tables 2 and 13.
1975-80: Ibid., *Air Carrier Traffic Statistics* (Washington, DC: December 1976), pp. 4 and 14; and (December 1981), pp. 2 and 3.
1985-2001: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, *Air Carrier Traffic Statistics* (Washington, DC: Annual issues, December), pp. 2 and 3, line 27 plus line 50.

Fuel consumption:
1960-2001: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, Internet site http://www.bts.gov/programs/oai/fuel/fuelyearly.html as of Aug. 1, 2002.

TABLE 4-9M: Motor Vehicle Fuel Consumption and Travel

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Vehicles registered (thousands)[a]	73,858	90,358	111,242	137,913	161,490	177,133	193,057	205,427	210,441	211,580	215,496	220,461	225,821
Vehicle-kilometers traveled (millions)	1,156,735	1,428,795	1,785,928	2,136,668	2,457,943	2,856,306	3,451,016	3,898,951	4,000,585	4,122,648	4,235,024	4,330,835	4,425,379
Fuel consumed (million liters)	219,100	269,158	349,503	412,549	435,171	459,174	494,962	544,471	557,837	569,273	588,174	611,007	614,221
Average kilometers traveled per vehicle (thousands)	15.6	15.8	16.1	15.4	15.3	16.1	17.9	19.0	19.0	19.5	19.6	31.6	31.5
Average kilometers traveled per liter	5.3	5.3	5.1	5.2	5.7	6.2	7.0	7.1	7.2	7.2	7.0	3.0	3.1
Average fuel consumed per vehicle (liters)	2,968	2,979	3,142	2,990	2,695	2,593	2,563	2,650	2,650	2,691	2,729	2,771	2,720

[a] Includes personal passenger vehicles, buses, and trucks.

NOTES
See tables 4-11, 4-12, 4-13, 4-14, and 4-15 for individual highway vehicles.
1.609344 kilometers = 1 mile.
3.785412 liter = 1 gallon.

SOURCES
1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

TABLE 4-11M: Passenger Car and Motorcycle Fuel Consumption and Travel

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Vehicles registered (thousands)													
Passenger cars	61,671	75,258	89,244	106,706	121,601	127,885	133,700	128,387	129,728	129,749	131,839	132,432	133,621
Motorcycles	574	1,382	2,824	4,964	5,694	5,444	4,259	3,897	3,872	3,826	3,879	4,152	4,346
Vehicle-kilometers traveled (millions)													
Passenger cars	944,685	1,163,556	1,475,768	1,664,062	1,789,591	2,006,852	2,265,956	2,314,237	2,365,736	2,418,129	R2,493,802	2,525,222	2,578,031
Motorcycles	a	a	4,828	9,012	16,415	14,645	15,450	15,772	15,933	16,224	R16,549	17,033	16,864
Fuel consumed (million liters)													
Passenger cars	155,849	188,222	256,723	280,650	264,911	270,725	263,344	257,681	262,030	264,570	R271,395	277,406	276,015
Motorcycles	a	a	227	428	772	689	723	742	750	765	R780	803	793
Average kilometers traveled per vehicle (thousands)													
Passenger cars	15.3	15.5	16.5	15.6	14.7	15.7	16.9	18.0	18.2	18.7	18.8	19.1	19.3
Motorcycles	a	a	1.7	1.8	2.9	2.7	3.5	4.0	4.2	4.2	4.2	4.1	3.9
Average kilometers traveled per liter													
Passenger cars	6.1	6.2	5.7	5.9	6.8	7.4	8.6	9.0	9.0	9.1	R9.2	9.1	9.4
Motorcycles	a	a	21	21	21	21	21	21	21	21	21	21	21
Average fuel consumed per vehicle (liters)													
Passenger cars	2,527	2,501	2,877	2,630	2,179	2,117	1,970	2,007	2,021	2,040	R2,059	2,093	2,067
Motorcycles	a	a	80	86	136	127	170	190	194	200	201	193	182

KEY: R = revised.

[a] Included in passenger car.

NOTES
See table 4-12 for other 2-axle 4-tire vehicles.
1 mile = 1.609344 kilometers.
3.785412 liters = 1 gallon.
Average kilometers traveled per vehicle, average kilometers traveled per liter, average fuel consumed per vehicle: derived by calculation.

SOURCES
Passenger car:
Number registered:
1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table MV-201.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.
All other categories:
1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A. For 1970-94, the unrevised motorcycle vehicle-miles and fuel consumed are subtracted from the combined passenger car and motorcycle vehicle-miles and fuel consumed from VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.
Motorcycle:
Number registered:
1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table MV-201.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.
All other categories:
1970-85: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1985*, table VM-201A.
1990-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

TABLE 4-13M: Single-Unit 2-Axle 6-Tire or More Truck Fuel Consumption and Travel[a]

	1970	1975	1980	1985	1990	1995	1996	1997	R1998	1999	2000
Number registered (thousands)	3,681	4,232	4,374	4,593	4,487	5,024	R5,266	5,293	5,735	5,763	5,926
Vehicle-kilometers (millions)	43,613	55,683	64,052	73,064	83,525	100,914	R103,114	107,654	109,469	113,143	113,592
Fuel consumed (million liters)	15,021	20,517	26,206	28,008	31,635	34,886	R35,613	36,249	25,805	35,477	36,143
Average kilometers traveled per vehicle (thousands)	11.8	13.2	14.6	15.9	18.6	20.1	19.6	20.3	19.2	19.6	19.2
Average kilometers traveled per liter	2.9	2.7	2.4	2.6	2.6	2.9	2.9	3.0	4.2	3.2	3.1
Average fuel consumed per vehicle (liters)	4,080	4,848	5,992	6,098	7,050	6,944	R6,765	6,848	4,501	6,155	6,098

KEY: R = revised.

[a] Beginning in 1998, the Federal Highway Administration (FHWA) used the Census Bureau's *1997 Vehicle Inventory and Use Survey* (VIUS) for its baseline estimate of single-unit 2-axle 6-tire or more trucks. Prior to 1998, the FHWA used the Census Bureau's *1992 Transportation Inventory and Use Survey* (TIUS) for its baseline estimates. Therefore, post-1997 data may not be comparable to 1997 and earlier years.

NOTES

In 1995, the U.S. Department of Transportation, Federal Highway Administration revised its vehicle categories beginning with 1993 data to include passenger cars, other 2-axle 4-tire vehicles, single-unit 2-axle 6-tire or more trucks, and combination trucks. Single-unit 2-axle 6-tire or more trucks are on a single frame with at least 2 axles and 6 tires. Pre-1993 data have been reassigned to the most appropriate category.

1 mile = 1.609344 kilometers.

3.785412 liters = 1 gallon.

SOURCES

1970-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.

1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

TABLE 4-14M: Combination Truck Fuel Consumption and Travel[a]

	1965	1970	1975	1980	1985	1990	1995	1996	1997	R1998	1999	2000
Number registered (thousands)	787	905	1,131	1,417	1,403	1,709	1,696	1,747	1,790	1,997	2,029	2,097
Vehicle-kilometers traveled (millions)	51,016	56,488	75,156	110,562	125,690	151,761	185,879	191,351	200,499	206,574	213,051	217,596
Fuel consumed (million liters)	25,203	27,815	34,739	49,350	53,015	61,070	74,864	76,439	R76,848	95,233	92,883	97,077
Average kilometers traveled per vehicle (thousands)	64.9	62.4	66.5	78.0	89.6	88.8	109.6	109.5	112.0	103.5	105.1	103.8
Average kilometers traveled per liter	2.0	2.0	2.2	2.2	2.4	2.5	2.5	2.5	2.6	2.2	2.3	2.3
Average fuel consumed per vehicle (liters)	32,044	32,044	32,044	32,044	32,044	32,044	32,044	32,044	R32,044	32,044	32,044	32,044

KEY: R = revised.

[a] Beginning in 1998, the Federal Highway Administration (FHWA) used the Census Bureau's 1997 *Vehicle Inventory and Use Survey* (VIUS) for its baseline estimate of combination trucks. Prior to 1998, the FHWA used the Census Bureau's *1992 Transportation Inventory and Use Survey* (TIUS) for its baseline estimates. Therefore, post-1997 data may not be comparable to 1997 and earlier years.

NOTES
1 mile = 1.609344 kilometers.
3.785412 liters = 1 gallon.

SOURCES
1965-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

TABLE 4-15M: Bus Fuel Consumption and Travel

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Number registered (thousands)	272	314	378	462	529	593	627	686	695	698	716	729	746
Vehicle-kilometers traveled (millions)	6,920	7,564	7,242	9,817	9,817	7,242	9,173	10,300	10,622	11,011	R11,277	12,331	12,233
Fuel consumed (million liters)	3,131	3,312	3,104	3,986	3,854	3,157	3,388	3,664	3,748	3,888	R3,937	4,346	4,202
Average kilometers traveled per vehicle (thousands)	25.7	24.0	19.4	21.1	18.4	12.1	14.6	15.1	15.1	15.8	15.8	16.9	16.4
Average kilometers traveled per liter	2.2	2.3	2.4	2.4	2.5	2.3	2.7	2.8	2.8	2.8	2.8	2.8	2.9
Average fuel consumed per vehicle (liters)	11,504	10,539	8,221	8,627	7,291	5,319	5,406	5,345	5,394	5,568	R5,504	5,966	5,633

KEY: R = revised.

NOTES
Includes both publicly and privately owned school, transit, and other commercial buses.
1 mile = 1.609344 kilometers.
3.785412 liters = 1 gallon.

SOURCES
1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

TABLE 4-16M: Transit Industry Electric Power and Primary Energy Consumption[a] and Travel

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	P2000
Number of vehicles	65,292	61,717	61,298	62,183	75,388	94,368	92,961	115,874	122,362	126,360	123,855	128,516	131,493
Vehicle-kilometers traveled	3,449	3,232	3,030	3,502	3,681	4,492	5,217	5,713	5,874	6,029	6,106	6,392	6,567
Electric power consumed (million kWh hours)	2,908	2,584	2,561	2,646	2,446	4,216	4,837	5,068	5,007	4,988	5,073	5,237	5,510
Primary energy consumed (thousand liters)													
Diesel	787,744	940,296	1,024,332	1,381,903	1,633,027	2,304,324	2,464,417	2,567,592	2,622,208	2,713,959	2,799,770	2,889,666	2,975,428
Gasoline and other nondiesel fuels[b]	726,421	470,148	258,165	28,678	43,154	173,008	128,348	229,888	231,716	225,092	199,169	184,327	182,775
Compressed natural gas	N	N	N	N	N	N	N	40,655	57,129	90,494	141,075	168,065	207,418

KEY: kWh = kilowatt hour; N = data do not exist; P = preliminary.

[a] Prior to 1985, excludes commuter rail, automated guideway, urban ferryboat, demand responsive vehicles, and most rural and smaller systems.

[b] For 1995-96, includes propane, liquid petroleum gas, liquefied natural gas, kerosene, and all other nondiesel fuels except compressed natural gas. 1960 to 1990 data include propane. Series not continuous between 1991 and 1992.

NOTES

The heat equivalent factors used in joule conversions are: diesel = 38,657,950 joules/liter; electric = 3,600,000 joules/kWh, negating electrical system loses (to include electrical system loses, multiply this conversion factor by approximately three); gasoline = 34,839,537 joules/liter.

In January 2000, the American Public Transit Association changed its name to the American Public Transportation Association (APTA). *The Transit Fact Book* is now referred to as the *Public Transportation Fact Book*.

1 mile = 1.609344 kilometers.

3.785412 liters = 1 gallon.

SOURCE

American Public Transportation Association, *Public Transportation Fact Book* (Washington, DC: February 2002), tables 42, 46, 65, 66, 67, and similar tables in earlier editions of the APTA Transit Fact Book.

TABLE 4-17M: Class I Rail Freight Fuel Consumption and Travel

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Number in use													
Locomotives[a]	29,031	27,780	27,077	27,846	28,094	22,548	18,835	18,812	19,269	19,684	20,261	20,256	20,028
Cars[b]	1,965,486	1,800,962	1,784,181	1,723,605	1,710,827	1,421,686	1,212,261	1,218,927	1,240,573	1,270,419	1,315,667	1,368,836	1,380,796
Kilometers traveled (millions)													
Freight train-kilometers[c]	651	677	687	648	690	559	611	738	754	764	764	789	811
Locomotive unit-kilometers	N	N	N	2,380	2,464	1,976	2,060	2,326	2,358	2,290	2,317	2,420	2,419
Car-kilometers	45,335	47,212	48,103	44,508	47,117	40,105	42,099	48,897	51,040	50,952	52,556	54,478	55,667
Average kilometers traveled per vehicle (thousands)													
Locomotives	N	N	N	85.5	87.7	87.6	109.4	123.6	122.4	116.3	114.4	119.5	120.8
Cars	23.1	26.2	27.0	25.8	27.5	28.2	34.7	40.1	41.1	40.1	39.9	39.8	40.3
Average kilometers traveled per liter													
Trains	0.05	0.05	0.19	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06
Cars	3.46	3.47	13.57	3.22	3.19	3.41	3.57	3.71	3.77	3.77	3.87	3.87	3.97
Fuel consumed (million liters)	13,109	13,597	13,419	13,843	14,778	11,773	11,792	13,173	13,548	13,533	13,563	14,063	14,006
Average fuel consumed per locomotive[a] (thousand liters)	451.5	489.5	495.6	497.1	526.0	522.1	626.0	700.3	703.1	687.5	669.4	694.3	699.3

KEY: N = data do not exist.

[a] For 1960-80, the total includes a small number of steam and electric units, which are not included in the per locomotive fuel consumption figure.

[b] Includes cars owned by Class I railroads, other railroads, and car companies and shippers.

[c] Based on the distance run between terminals and / or stations; does not include yard or passenger train-kilometers.

NOTES
1 mile = 1.609344 kilometers.
3.785412 liters = 1 gallon.

SOURCES
All data except for locomotive unit-kilometers:
Association of American Railroads, *Railroad Facts* (Washington, DC: October 2000), pp. 33, 34, 40, 49, and 51.

Locomotive unit-kilometers:
1975-90: Ibid., *Railroad Ten-Year Trends* (Washington, DC: Annual issues).
1995-2000: Ibid., *Analysis of Class I Railroads* (Washington, DC: Annual issues), p. 29.

TABLE 4-19M: U.S. Government Energy Consumption by Agency and Source (Petajoules)

	Petroleum								
	Motor gasoline	Distillate and residual fuel oil	Jet fuel and aviation gas	Other[c]	Total	Electricity	Natural gas	Coal and other[d]	Total
FY 1990									
Agriculture	4.9	0.8	0.1	0.2	6.0	2.1	1.8	0.1	10.0
Defense	13.2	230.0	763.8	4.6	1,011.7	127.2	120.8	50.3	1,310.1
Energy	1.3	3.1	0.4	0.2	5.1	20.2	10.1	10.6	45.9
GSA	0.1	0.7	0.0	0.0	0.8	9.6	2.5	2.0	15.0
Health and Human Services	0.0	2.2	0.0	0.0	2.2	3.6	2.3	0.2	8.4
Interior	2.2	1.3	0.3	1.2	4.9	1.5	1.3	0.2	7.8
Justice	1.9	0.4	0.2	0.0	2.6	2.0	2.3	0.4	7.4
NASA	0.2	0.9	1.6	0.0	2.7	7.0	3.0	0.3	13.0
Postal Service	9.4	4.7	0.0	0.2	14.3	12.4	4.9	0.6	32.3
Transportation	1.9	6.9	5.8	0.1	14.6	4.1	1.2	0.1	20.0
Veterans Affairs	0.4	2.4	0.0	0.0	2.8	8.3	13.7	1.3	26.3
Other[a]	3.7	4.4	1.1	0.0	9.2	8.5	2.5	0.5	20.7
Total	**39.2**	**258.0**	**773.3**	**6.6**	**1,077.1**	**206.6**	**166.5**	**66.6**	**1,516.7**
FY 2000[P]									
Agriculture	3.5	0.2	0.0	0.1	3.8	2.1	2.0	0.3	8.2
Defense	14.2	162.9	463.3	1.7	642.1	108.9	86.2	32.6	869.8
Energy	1.1	1.3	0.2	0.1	2.7	16.8	6.2	4.5	30.3
GSA	0.1	0.1	0.0	0.0	0.2	10.3	6.4	1.6	18.6
Health and Human Services	0.4	0.6	0.0	0.1	1.3	3.1	3.5	0.4	8.2
Interior	3.0	0.9	0.2	1.2	5.3	1.8	1.4	0.1	8.5
Justice	5.1	0.4	1.6	0.0	7.1	4.5	5.6	0.5	17.6
NASA	0.2	0.4	1.2	0.0	1.9	6.3	3.3	0.3	11.7

Continued next page

TABLE 4-19M: U.S. Government Energy Consumption by Agency and Source (Petajoules) (Continued)

	Petroleum								
	Motor gasoline	Distillate and residual fuel oil	Jet fuel and aviation gas	Other[c]	Total	Electricity	Natural gas	Coal and other[d]	Total
Postal Service	11.0	5.3	0.0	0.0	16.2	19.6	7.8	0.4	44.2
Transportation	0.8	7.7	4.2	0.1	12.8	8.4	0.9	0.0	22.3
Veterans Affairs	1.3	1.3	0.0	0.0	2.5	9.8	15.0	1.6	29.0
Other[b]	2.5	3.0	0.9	0.0	6.5	10.8	4.1	0.6	22.1
Total	**43.4**	**184.0**	**471.7**	**3.5**	**702.6**	**202.4**	**142.3**	**43.2**	**1,090.4**

KEY: FY = fiscal year; GSA = General Services Administration; NASA = National Aeronautics and Space Administration; P = preliminary.

[a] Includes U.S. Department of Commerce, Panama Canal Commission, Tennessee Valley Authority, U.S. Department of Labor, U.S. Department of Housing and Urban Development, Federal Communications Commission, Office of Personnel Management, U.S. Department of State, Small Business Administration, National Science Foundation, U.S. Department of Treasury, and Environmental Protection Agency.

[b] Includes National Archives and Records Administration, U.S. Department of Commerce, U.S. Department of Labor, U.S. Department of State, Environmental Protection Agency, Federal Communications Commission, Federal Trade Commission, Panama Canal Commission, Equal Employment Opportunity Commission, Nuclear Regulatory Commission, Office of Personnel Management, U.S. Department of Housing and Urban Development, U.S. Department of Treasury, Tennessee Valley Authority, Railroad Retirement Board, U.S. Information Agency, and Federal Emergency Management Agency.

[c] Includes liquefied petroleum gases.

[d] Includes purchased steam, coal, and other.

NOTES

Numbers may not add to totals due to rounding.These data include energy consumed at foreign installations and in foreign operations, including aviation and ocean bunkering, primarily by the U.S. Department of Defense. U.S. government energy use for electricity generation and uranium enrichment is excluded. Other energy used by U.S. agencies that produce electricity or enriched uranium is included. The U.S. government's fiscal year runs from October 1 through September 30.

This table uses a conversion factor for electricity of 3,600,000 joules per kilowatt-hour, and a conversion factor for purchased steam of 2,326 kilojoules per kilogram.

SOURCE

U.S. Department of Energy, Energy Information Administration, *Annual Energy Review 2000, DOE/EIA-0384(2000)* (Washington, DC: August 2001), table 1.13. Internet site http://www.eia.doe.gov/emeu/aer/ as of Aug. 30, 2002.

TABLE 4-20M: Energy Intensity of Passenger Modes (Kilojoule per passenger-kilometer)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Air, certificated carrier													
Domestic operations	5,659	6,633	6,677	5,078	3,755	3,308	3,233	2,873	2,742	2,731	2,703	2,655	R2,584
International operations	6,031	6,748	7,202	5,550	2,845	3,345	2,980	2,736	2,693	2,733	2,804	2,703	2,628
Highway[a]													
Passenger car	2,947	2,921	3,174	3,109	2,850	2,797	2,499	2,439	2,418	2,397	2,384	2,407	2,346
Other 2-axle 4-tire vehicle	N	N	4,465	4,308	3,743	3,259	2,918	2,975	2,977	2,992	2,995	3,024	2,947
Motorcycle	[b]	[b]	1,639	1,543	1,393	1,243	1,305	1,491	1,489	1,490	1,490	1,490	1,490
Transit motor bus	N	N	N	N	1,798	2,226	2,441	2,724	2,751	2,772	2,710	2,651	P2,719
Amtrak	N	N	N	1,562	1,419	1,373	1,353	1,205	1,408	1,442	1,402	1,381	1,399

KEY: N = data do not exist; P = preliminary; R = revised.

[a] For 1995 and subsequent years, highway passenger-miles were taken directly from *Highway Statistics* rather than derived from vehicle-miles and average occupancy, as is the case for 1960-1994. Passenger-miles were then converted to passenger-kilometers.

[b] Included in passenger car.

NOTES

To calculate total joules, multiply fuel consumed (see tables 4-21, 4-22, 4-24, 4-25) by 37,626,700 joules/liter for air carrier, 34,839,537 joules/liter for passenger car, other 2-axle 4-tire vehicle, and motorcycle, and 38,657,950 joules/liter for transit motor bus and Amtrak.
1.609344 kilometers = 1 mile.

SOURCES

Air:
Certificated air carriers:
Passenger-kilometers:
Air Transport Association, Internet site http://www.air-transport.org/public/industry as of Aug. 30, 2002.
Fuel consumed:
U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, Internet site http://www.bts.gov/oai/fuel/fuelyearly.html as of Aug. 30, 2002.

Highway:
Passenger car:
1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.
Other 2-axle 4-tire vehicle:
1970-90: Ibid., *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.
Motorcycle:
1970-85: Ibid., *Highway Statistics Summary to 1985*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.
1990-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

Transit motor bus:
American Public Transportation Association, *Public Transportation Fact Book* (Washington, DC: February 2002), tables 30 and 65.

Amtrak:
Amtrak, State and Local Affairs Department, personal communication.

TABLE 4-21M: Energy Intensity of Certificated Air Carriers, All Services[a]

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001
Aircraft-kilometers (millions)														
Domestic operations	1,381	1,825	3,328	3,135	4,060	4,902	6,378	7,450	7,743	R7,903	R8,103	R8,581	R9,115	8,932
International operations	293	457	764	607	645	668	1,223	1,606	1,679	1,793	R1,918	R1,971	R2,063	2,025
Available seat-kilometers (millions)														
Domestic operations	84,040	152,545	343,048	388,306	556,878	717,487	906,165	971,910	1,008,075	R1,049,160	R1,065,889	R1,125,463	R1,170,046	1,134,195
International operations	21,480	47,529	83,622	99,335	139,220	164,094	274,087	326,954	335,841	R368,039	R382,280	R391,040	R408,851	395,538
Passenger-kilometers (millions)														
Domestic operations	49,177	83,504	167,608	211,996	322,334	435,463	547,549	635,221	684,930	R725,190	R745,548	R785,934	R830,629	782,880
International operations	13,367	27,019	44,358	50,022	87,489	105,925	189,412	234,881	246,337	R272,552	R277,218	R290,115	R310,278	287,078
Fuel consumed (million liters)														
Domestic operations	7,397	14,721	29,742	28,610	32,249	38,289	47,050	48,498	49,919	51,707	52,530	54,518	56,193	53,062
International operations	2,143	4,845	8,491	7,378	6,614	9,418	15,002	17,078	17,633	18,791	19,629	19,875	20,724	19,826
Seats per aircraft														
Domestic operations	60.9	83.6	103.1	123.9	137.1	146.4	142.1	130.5	130.2	R132.7	R131.5	R131.1	R128.4	127.0
International operations	73.3	104.0	109.4	163.7	215.7	245.7	224.1	203.6	200.1	R205.3	R199.2	R198.3	R198.2	195.4
Seat-kilometers per liter														
Domestic operations	11	10	12	14	17	19	19	20	20	R20	R20	R21	R21	21
International operations	10	10	10	13	21	17	18	19	19	R20	R20	R20	R20	20
Energy intensity (kilojoule/passenger-kilometer)[b]														
Domestic operations	5,659	6,633	6,677	5,078	3,764	3,308	3,233	2,873	2,742	R2,683	R2,651	R2,610	R2,546	2,550
International operations	6,031	6,748	7,202	5,550	2,845	3,345	2,980	2,735	2,693	R2,594	R2,664	R2,578	R2,513	2,599
Load factor (%)														
Domestic operations	58.5	54.7	48.9	54.6	58.0	60.7	60.4	65.4	67.9	69.1	R69.9	69.8	R71.0	69.0
International operations	62.2	56.8	53.0	R50.4	62.8	64.6	69.1	71.8	73.3	74.1	R72.5	R74.2	R75.9	72.6

KEY: R = revised.

[a] U.S. owned carriers only. Operation of foreign-owned carriers in or out of the United States not included.

[b] Calculation based on unrounded figures not shown here.

TABLE 4-21M: Energy Intensity of Certificated Air Carriers, All Services[a] (Continued)

NOTES

Aircraft-kilometers includes all four air-carrier groups (majors, nationals, large regionals, and medium regionals), scheduled and charter, passenger, and all-cargo. Fuel consumed includes majors, nationals, and large regionals, scheduled and charter, passenger, and all-cargo.

Passenger-kilometers includes all four air-carrier groups, scheduled and charter, passenger service only.

International operations include operations outside the United States, including those between the United States and foreign countries and the United States and its territories or possessions.

Heat equivalent factor used for joule conversion is 37,626,700 joules/liter.

1.609344 kilometers = 1 mile.

3.785412 liters = 1 gallon.

SOURCES

Aircraft-kilometers, available seat-kilometers, passenger-kilometers, and load factor:

1960-80: Air Transport Association, Internet site http://www.air-transport.org/public/industry, as of July 31, 2002.

1985-2001: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, *Air Carrier Traffic Statistics* (Washington DC: Annual December issues).

Fuel consumed:

1960-2000: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, Internet site http://www.bts.gov/oai/fuel/fuelyearly.html as of Aug. 12, 2002.

Seats per aircraft, seat-kilometers per liter, and energy intensiveness:

Derived by calculation.

TABLE 4-22M: Energy Intensity of Passenger Cars, Other 2-Axle 4-Tire Vehicles, and Motorcycles

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
Vehicle-kilometers (millions)													
Passenger car	944,685	1,163,556	1,475,768	1,664,062	1,789,591	2,006,852	2,265,956	2,314,237	2,365,736	2,418,844	R2,494,483	2,525,061	2,578,169
Other 2-axle 4-tire vehicle	N	N	197,949	323,478	468,319	629,254	925,373	1,271,382	1,314,834	1,369,552	R1,396,911	1,450,019	1,487,034
Motorcycle	c	c	4,828	9,012	16,415	14,645	15,450	15,772	15,933	16,254	R16,576	17,059	16,898
Passenger-kilometers (millions)[a]													
Passenger car	1,842,699	2,245,035	2,817,961	3,144,658	3,238,000	3,369,966	3,672,523	3,680,570	3,761,037	3,844,723	R3,965,424	4,015,313	4,098,999
Other 2-axle 4-tire vehicle	N	N	363,712	584,192	838,468	1,107,229	1,609,344	2,021,336	2,088,929	2,177,442	R2,222,504	2,306,190	2,364,126
Motorcycle	c	c	4,828	9,656	19,312	19,312	19,312	17,703	17,703	17,703	17,703	19,312	19,312
Fuel consumed (million liters)													
Passenger car	155,849	188,222	256,723	280,650	264,911	270,725	263,344	257,681	262,030	264,570	R271,395	277,406	276,017
Other 2-axle 4-tire vehicle	N	N	46,610	72,229	90,078	103,580	134,802	172,634	179,254	186,954	R191,019	200,093	199,991
Motorcycle	c	c	227	428	772	689	723	742	750	765	R780	801	795
Energy intensity (kilojoule/passenger-kilometers)[b]													
Passenger car	2,947	2,921	3,174	3,109	2,850	2,799	2,498	2,439	2,427	2,397	R2,384	2,407	2,346
Other 2-axle 4-tire vehicle	N	N	4,465	4,308	3,743	3,259	2,918	2,975	2,990	2,991	R2,995	3,023	2,947
Motorcycle	a	a	1,639	1,543	1,393	1,243	1,304	1,460	1,475	1,505	R1,535	1,446	1,434

KEY: N = data do not exist; R = revised.

[a] Passenger-kilometers are derived by multiplying vehicle-kilometers by an average occupancy rate for that vehicle type based on data provided by the Federal Highway Administration, Nationwide Personal Transportation Survey, 1977, 1983, 1995. Average vehicle occupancy rates are as follows:
passenger car (1960-97): 1.95, 1.93, 1.91, 1.89, 1.81, 1.68, 1.62, 1.62, 1.61, 1.61, 1.60, 1.59, 1.59, 1.59;
other 2-axle 4-tire vehicle (1960-97): 1.87, 1.85, 1.83, 1.81, 1.79, 1.76, 1.74, 1.72, 1.70, 1.68, 1.66, 1.64, 1.64, 1.64;
motorcycle (1960-97): 1.1, 1.1, 1.1, 1.1, 1.2, 1.3, 1.3, 1.27, 1.25, 1.23, 1.21, 1.18, 1.18, 1.18.

[b] Energy Intensity (kilojoule/passenger-kilometers) is calculated by converting the fuel consumption in gallons to the energy equivalent kilojoule units and dividing by the passenger-kilometers. The heat equivalent factor used for kilojoule conversion is 34,839,537 joules/liter.

[c] Included in passenger car.

NOTES

In 1995, the U.S. Department of Transportation, Federal Highway Administration revised its vehicle type categories for 1993 and later data.
These new categories include passenger car, other 2-axle 4-tire vehicle, single-unit 2-axle 6-tire or more truck, and combination truck.
Other 2-axle 4-tire vehicle includes vans, pickup trucks, and sport utility vehicles. In previous years, some minivans and sport utility vehicles were included in the passenger car category. Single-unit 2-axle 6-tire or more trucks are on a single frame with at least 2 axles and 6 tires. Pre-1993 data have been reassigned to the closest available category.
Data for vehicle-miles and passenger-miles have been rounded to the nearest billion miles to accommodate the uncertainties associated with these estimates.
1.609344 kilometers = 1 mile.
3.785412 liters = 1 gallon.

SOURCES:

Vehicle-kilometers:
Passenger car:
1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

TABLE 4-22M: Energy Intensity of Passenger Cars, Other 2-Axle 4-Tire Vehicles, and Motorcycles (Continued)

Other 2-axle 4-tire vehicle:
1960-90: Ibid., *Highway Statistics, Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.
Motorcycle:
1970-85: Ibid., *Highway Statistics, Summary to 1985* (Washington, DC: 1986), table VM-201A.
For 1970-90, the unrevised motorcycle vehicle-miles are subtracted from the combined passenger car and motorcycle vehicle-miles from VM-201A. These numbers were then converted to kilometers.
1990-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

Passenger-kilometers:
1960-97: Vehicle-miles multiplied by vehicle occupancy rates. These numbers were then converted to kilometers.
1998-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

Fuel consumed:
1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.
For 1970-90, the unrevised motorcycle fuel consumed is subtracted from the combined passenger car and motorcycle fuel consumed from VM-201A.
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

TABLE 4-23M: Average Fuel Efficiency of U.S. Passenger Cars and Light Trucks

	1980	1985	1990	1995	1996	1997	1998	1999	2000
Average U.S. passenger car fuel efficiency (kmpl) (calendar year)									
Passenger car[a]	6.8	7.4	8.6	9.0	9.0	9.1	9.2	9.1	9.4
Other 2-axle 4-tire vehicle	5.2	6.1	6.8	7.4	7.3	7.3	7.3	R7.2	7.4
New vehicle fuel efficiency (kmpl)[b] (model year)									
Light-duty vehicle									
Passenger car	10.3	11.7	11.9	12.2	12.1	12.2	12.2	12.0	12.1
Domestic	9.6	11.2	11.4	11.8	11.9	11.8	12.2	11.9	12.1
Imported	12.6	13.4	12.7	12.9	12.6	12.8	12.4	12.3	12.0
Light truck (<8,500 lbs GVWR)[c]	7.9	8.8	8.8	8.7	8.8	8.8	9.0	8.9	9.0
CAFE standards (kmpl)[b] (model year)									
Passenger car	8.5	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
Light truck	[d]6.8 / 6.0	8.3	8.5	8.8	8.8	8.8	8.8	8.8	8.8

KEY: CAFE = Corporate Average Fuel Economy; GVWR = gross vehicle weight rating; kmpl = kilometers per liter; R = revised.

[a] From 1980 to 1994, passenger car fuel efficiency includes motorcycles.

[b] Assumes 55% city and 45% highway-miles. The source calculated average miles per gallon for light-duty vehicles by taking the reciprocal of the sales-weighted average of gallons per mile. This is called the harmonic average. These data were then converted to metric units.

[c] Beginning with FY 1999, the total light truck fleet ceased to be categorized by either domestic or import fleets.

[d] 2 Wheel Drive/4 Wheel Drive. No combined figure available for this year.

NOTES
The fuel efficiency figures for light duty vehicles represent the sales-weighted harmonic average of the combined passenger car and light truck fuel economies.
1 mile = 1.609344 kilometers.
3.785412 liters= 1 gallon.

SOURCES
Average U.S. passenger car fuel efficiency:
1980-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A (Revised data obtained from Internet site http://www.fhwa.dot.gov/ohim/ohimstat.htm as of Aug. 2, 2001).
1995-2000: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

New vehicle fuel efficiency (based on model year production):
1980-2000: U.S. Department of Transportation, National Highway Traffic Safety Administration, *Automotive Fuel Economy Program, Annual Update Calendar Year 2000*, table II-6, Internet site www.nhtsa.dot.gov/cars/problems/studies/fuelecon/index.html as of Aug. 2, 2002.

CAFE standards:
1980-2000: U.S. Department of Transportation, National Highway Traffic Safety Administration, *Automotive Fuel Economy Program, Annual Update Calendar Year 2000*, table I-1, Internet site www.nhtsa.dot.gov/cars/problems/studies/fuelecon/index.html as of Aug. 2, 2002.

TABLE 4-24M: Energy Intensity of Transit Motor Buses

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	P2000
Vehicle-kilometers (millions)	2,536	2,459	2,268	2,456	2,699	2,998	3,428	3,515	R3,574	R3,613	R3,500	3,663	3,725
Passenger-kilometers (millions)	N	N	N	N	35,084	34,118	R33,766	R30,285	R30,732	R31,550	R32,766	34,126	34,184
Fuel consumed (million liters diesel)	787	939	1,026	1,382	1,632	1,961	2,132	2,134	2,187	R2,264	2,296	2,340	2,404
Energy intensity (kilojoules/passenger-kilometer)	N	N	N	N	4,229	5,226	R2,441	R2,724	R2,751	R2,772	R2,710	R2,651	2,719

KEY: N = data do not exist; P = preliminary; R = revised.

NOTES

Heat equivalent factor used for joule conversion is 38,657,950 joules/liter.

In January 2000, the American Public Transit Association changed its name to the American Public Transportation Association. The *Transit Fact Book* is now referred to as the *Public Transportation Fact Book*.

1.609344 kilometers = 1 mile.

3.785412 liters = 1 gallon.

SOURCE

American Public Transportation Association, *Public Transportation Fact Book* (Washington, DC: February 2001), tables 30, 42 and 65, and similar tables in earlier editions of the *Transit Fact Book*.

TABLE 4-25M: Energy Intensity of Class I Railroad[a] Freight Service

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001[P]
Revenue freight tonne-kilometers (millions)	835,555	1,018,882	1,116,600	1,101,187	1,341,653	1,280,372	1,509,566	1,906,268	1,979,686	1,969,394	2,010,092	2,092,813	2,140,261	P2,151,936
Car-kilometers (millions)	45,335	47,212	48,103	44,508	47,117	40,105	42,099	48,897	51,040	50,952	52,556	54,478	55,667	P55,109
Tonnes per car load	40	44	50	55	61	61	60	59	60	58	58	58	57	U
Fuel consumed (million liters)	13,109	13,597	13,419	13,843	14,778	11,773	11,792	13,173	13,548	13,533	13,563	14,063	14,006	P13,752
Energy intensity (kilojoule/revenue freight tonne-kilometer)	606	516	465	486	426	355	302	267	265	266	261	260	253	P247
Energy intensity (kilojoule /car-kilometer)	11,178	11,134	10,784	12,024	12,125	11,348	10,828	10,415	10,261	10,268	9,976	9,979	9,726	P9,647

KEY: P = preliminary; U = data are not available.

[a] Class I railroads are those that have operating revenues of $267 million or more.

NOTES
The heat equivalent factor used for joule conversion is 38,655,900 joules/liter.
1.459972 tonne-kilometer = 1 ton-mile.
1.609344 kilometers = 1 mile.
3.785412 liters = 1 gallon.

SOURCE
Association of American Railroads, *Railroad Facts* (Washington, DC: November 2001), pp. 34, 37, and 40, and personal communication, Aug. 12, 2002.

Source and Accuracy Statements

Data Source and Accuracy Statements

Chapter 1 Extent, Condition, and Performance

TABLE 1-1. System Mileage Within the United States

Highway

The Highway Performance Monitoring System (HPMS) is the source of road mileage data and is considered reliable. (See box 1-1 for detailed information about the HPMS.) The Federal Highway Administration (FHWA) of the U.S. Department of Transportation (USDOT) collects and reviews state-reported HPMS data for completeness, consistency, and adherence to specifications. Some inaccuracy may arise from variations across states in their adherence to federal guidelines in the Traffic Monitoring Guide and the *Highway Performance Monitoring System Field Manual for the Continuing Analytical and Statistical Database*.

Beginning with the 1997 issue of *Highway Statistics,* FHWA instituted a new method for creating mileage-based tables derived from the HPMS. Previously, adjustments to tables developed from sample data were made using area-wide mileage information provided by states. These adjustments are now being made using universe totals from the HPMS dataset. In addition, FHWA has discontinued the process of spreading rounding and other differences across table cells. Thus, users may note minor differences in table-to-table totals. FHWA considers mileage totals from table HM-20, "Public Road Length, Miles by Functional System" to be the controlling totals should a single value be required.

Reliability may be diminished for comparisons with pre-1980 data, which were collected via different methods and special national studies. For instance, pre-1980 mileage data included some nonpublic roadways (95,000 miles in 1979) while post-1980 data reports only public road mileage (roads or streets governed and maintained by a public authority and open to public travel).

Class I Rail

These data are from *Railroad Facts,* published annually by the Association of American Railroads (AAR). AAR data are based on 100-percent reporting by Class I railroads to the Surface Transportation Board (STB) via Schedule 700 of the *R1 Annual Report*. The STB defines Class I railroads as having operating revenues at or above a threshold indexed to a base of $250 million (1991) and adjusted annually in concert with changes in the Railroad Freight Rate Index published by the Bureau of Labor Statistics. In 1999, the adjusted threshold for Class I railroads was $258.5 million. Declassification from Class I status occurs when a railroad falls below the applicable threshold for three consecutive years. Although Class I railroads encompasses only 2 percent of the number of railroads in the country, they account for over 71 percent of the industry's mileage operated.

To obtain railway mileage, AAR subtracts trackage rights from miles of rail traveled on line 57 in the Schedule 700 report. Historical reliability may vary due to changes in the railroad industry, including bankruptcies, mergers, and declassification by the STB. Small data errors may also exist because of because of independent rounding of this series by AAR.

Amtrak

These statistics originate from the Statistical Appendix to *Amtrak's Annual Report*. Amtrak estimates track mileage based on point-to-point city timetables that railroad companies provide for engineers. The figures are estimates, but are considered reliable.

Box 1-1.
Highway Performance Monitoring System

Sampling Frame Construction

The Highway Performance Monitoring System (HPMS) sample is a stratified simple random sample of highway links (small sections of roadway) selected from state inventory files. The 1997 sample consists of about 120,000 samples. Each state maintains an independent inventory of highway road links for those roads that the state is responsible for (in some cases this can be a low percentage of total road miles within the state). Lower jurisdictions (MPO's, counties, cities, national parks, Indian reservations, etc.) may also maintain inventories of highway links under their jurisdiction. The HPMS sample was originally selected in 1978 based on guidelines provided by the FHWA for sampling highway systems excluding those roads functionally classified as local. The sampling frame for the state systems were the state inventories. The estimates represent the highway systems of each state. The HPMS sample was designed as a fixed sample to minimize data collection costs but adjustments to maintain representativeness are carried out periodically. The HPMS also consists of universe reporting (a complete census) for the Interstate and the National Highway System, and tabular summary reporting of limited information. A small number of data items (about 30) are reported for the complete universe. The universe information contains no sampling error. There are 4 tables reported as part of the summary.

Stratification

The HPMS sample (and universe) is stratified by state, type of area (rural, urban, and individual urbanized areas), highway functional classification, and traffic (annual average daily traffic (AADT) volume groups). Complete information is provided in the HPMS *Field Manual*.

Weighting

The HPMS sample expansion factors are the ratio of universe mileage to sample mileage in each strata.

Data Collection

Data are collected independently by the 50 states, metropolitan planning organizations (MPOs), and lower jurisdictions. Many of the geometric data items rarely change, such as number of lanes. Others change frequently, such as traffic. Typically, the states maintain data inventories that are the repositories of a wide variety of data items. The HPMS data items are extracted from these inventories. For example, each State has a traffic volume counting program. Typically, equipment is installed or placed on the roads to measure traffic. The counts are then converted to annual average daily traffic (AADT) and stored in the state databases. AADT is one of the sample and universe items extracted from the inventories and reported to the HPMS. The FHWA provides guidelines for data collection in the HPMS *Field Manual*, which the states follow to varying extents depending on issues such as staff, resources, state perspective, uses of the data, state/MPO/local needs for data, etc. Traffic data collection, for example, is an expensive and dangerous undertaking, particularly in high volume urban areas.

State departments of transportation report HPMS data annually to the FHWA. There are about 80 data items reported for the sample component. The reporting deadline is June 15. Except for special cases where major problems occur, data items are reported for each sample. There is no provision for nonresponse since a number is available for each section in the state inventories; however, states do leave items blank to indicate that no data collection has taken place for a specific item (e.g., if no system to measure pavement has been implemented in the state, the pavement condition item may be left blank). The HPMS has gone through a major restructuring effort, and major data item reductions, modifications, and other changes will begin to be implemented with the 1999 data reported by June 15, 2000.

Sampling Error

The sample size is estimated based on traffic volume (AADT) within each stratum. Traffic volume is the most variable data item. Sampling error can be estimated directly based on the sample design for each stratum and aggregated by stratified random sample methods to total values. This exercise was done originally in 1980 for some of the most variable data items including vehicle-miles traveled. It has not been repeated since due to the work involved and the limited impact of sampling error as compared to nonsampling error.

Nonsampling Error

This is a major item of concern for the HPMS. For some of the most variable and important data items, such as AADT, guidelines for measurement and data collection have been produced. States have the option of using the guidelines or using their own procedures. Many data items are difficult and costly to collect and are reported as estimates not based on direct measurement. The data are collected and reported by many entities and individuals within the responsible organizations. Most do a reasonably good job, but staff turnover, cost, equipment issues, etc., can create difficulties identifying data problems. As mentioned before, a response is usually provided for each link as included in state inventories. For highway links not the responsibility of states, metropolitan planning organizations and lower jurisdictions using a wide variety of methods may collect the data. This is a major area of concern and efforts are underway within States to standardize data collection. The major effort with the HPMS is to ensure the collection and reporting of reliable annual data. The FHWA field offices in each state conduct annual verification of the data reported. Computer software is provided to build the database and conduct logic edits prior to submittal. The reported data are subjected to intense editing and comparison with previous reporting and a written annual report is provided to each state to document problems found and encourage correction. Data resubmittal is requested in cases where major problems are found. The process involves many people and substantial resources, but it provides extensive quality assurance. Complete information on data items, edits, processing, expansion, sample design, definitions, data reporting, etc., is included in the HPMS *Field Manual*.

Transit

These data are based on information in the U.S. Department of Transportation, Federal Transit Administration (FTA), National Transit Database (NTD). The legislative requirement for the NTD is found in Title 49 U.S.C. 5335(a). Transit agencies receiving funds through the Urbanized Area Formula Program are generally required to report financial and operating data, including vehicle inventories and directly operated mileage. Transit operators that do not report to FTA are those that do not receive Urbanized Area Formula Funding, typically private, small, and rural operators. The data are generally considered accurate because FTA reviews and validates information submitted by individual transit agencies. Reliability may vary because some transit agencies cannot obtain accurate information or may misinterpret certain data definitions.

Navigable Channels

These statistics originate from a mid-1950s U.S. Army Corps of Engineers (USACE) estimate that there were approximately 25,000 miles of commercially important navigable channels in the United States. That number has been adjusted from time to time, for example, by addition of the 234-mile Tennessee-Tombigbee Waterway in the early 1980s. The 25,000 plus mile number has been universally quoted for decades, but has definitional and methodological uncertainties. USACE is currently developing a rigorous, Global Information System (GIS)-based approach to facilitate tabulation of the lengths of shallow and deep-draft commercially navigable waterways in the United States; this calculation will be available in several years.

Oil Pipeline

The data are from *Transportation in America*, published by the Eno Transportation Foundation, Inc. (Eno). The numbers reprinted here for 1960, 1965, 1970, and 1975 are Eno estimates from the U.S. Department of Energy (DOE) *Energy Data Report* issues labeled "Crude-oil and Refined Products Mileage in the United States." Eno estimated the 1980 number based on the assumption that refinement of old, less profitable, and smaller lines exceeded in mileage the construction of new, larger, and more profitable lines. Post-1985 data were calculated using a base figure reported in a 1982 USDOT study entitled *Liquid Pipeline Director* and then combined with data from the Association of Oil Pipe Lines and the Oil Pipeline Research Institute. Lack of additional information raises definitional and methodological uncertainties for the data's reliability. Moreover, the three different information sources introduce data discontinuities, making time comparisons unreliable.

Gas Pipeline

These statistics originate from annual editions of *Gas Facts,* published by the American Gas Association (AGA). The data reported by the AGA are based on gas utilities participation and reporting to the *Uniform Statistical Report*. Utilities reporting represented 98 percent of gas utility industry sales while the remaining 2 percent was estimated for nonreporting companies based on recent historical experience. Varying percentages of nonreporters from year to year introduce minor reliability problems for time-series comparisons.

TABLE 1-2. Number of Air Carriers, Railroads, Interstate Motor Carriers, Marine Operators, and Pipeline Operators

Air Carriers

The data are from the *Air Carrier Financial Statistics Quarterly,* published by the Office of Airline Information of the U.S. Department of Transportation, Bureau of Transportation Statistics (BTS). The Alphabetical List of Air Carriers by Carrier Group at the beginning of each fourth quarter edition is used to determine the number of major air carriers and other air carriers in operation at the end of each calendar year. The publication draws its data from the T-100 and T-100(f) databases maintained by BTS. These databases include data obtained from a 100-percent census of BTS Form 41 schedule submissions by large certificated air carriers, which are carriers that hold a certificate issued under section 401 of the Federal Aviation Act of 1958 and that (1) operate aircraft designed to have a maximum passenger seating capacity of more than 60 seats or a maximum payload capacity of more than 18,000 pounds or (2) that conduct international operations. Carriers are grouped as major, national, large regional, or medium regional based on their annual operating revenues. The thresholds were last adjusted July 1, 1999 and the threshold for major air carriers is currently $1 billion. The table combines the number of national, large regional, and medium regional air carriers into the other air carrier category.

Railroads

The Association of American Railroads (AAR)'s *Railroad Ten-Year Trends* series is the source for the number of railroads. The number of Class I railroads is based on 100-percent reporting by Class I railroads to the Surface Transportation Board (STB) via Schedule 700 of the *R1 Annual Report*. The STB defines Class I railroads as having operating revenues at or above a threshold indexed to a base of $250 million (1991) and adjusted annually in concert with changes in the Railroad Freight Rate Index published by the Bureau of Labor Statistics. In 2000, the adjusted threshold for Class I railroads was $261.9 million. Declassification from Class I status occurs when a railroad falls below the applicable threshold for three consecutive years. Although Class I railroads encompasses only 1 percent of the number of railroads in the country, they account for over 71 percent of the industry's mileage operated.

The Association of American Railroads determines the number of non-Class I railroads through an annual survey sent to every U.S. freight railroad. By following up with nonrespondents, the AAR obtains essentially a census of railroads. Use of the current survey instrument began in 1986.

Interstate Motor Carriers

The Motor Carrier Management Information System (MCMIS), maintained by the U.S. Department of Transportation, Federal Motor Carrier Safety Administration, contains information on the safety of all commercial interstate motor carriers and hazardous material (HM) shippers subject to the Federal Motor Carrier Safety Regulations and the Hazardous Materials Regulations. All carriers operating in interstate or foreign commerce within 90 days of beginning operations must submit a Form MCS-150, Motor Carrier Identification Report. Carriers may also use the form to update their information. The Motor Carrier Safety Improvement Act of 1999 requires that reports be periodically updated, but not more than once every two years. MCMIS is updated as soon as information is provided and verified, and periodic archives are made. Historical data are available from summary information previously prepared, including tables and reports. MCMIS began operations in 1980. Safety data since 1990 are available to the public.

Marine Vessel Operators

The U.S. Army Corps of Engineers (USACE) provides the data for marine vessel operators

through the *Waterborne Transportation Lines of the United States*. Data are collected by the USACE's Navigation Data Center (NDC) by various means, including the U.S. Coast Guard's registry, maritime service directories, and waterway sector publications. However, an annual survey of companies that operate inland waterway vessels is the principle source of data. More than 3,000 surveys are sent to these companies and response rates are typically above 90 percent. However, a USACE official did report that less than 10 percent of the total number of companies operating inland water vessels either did not receive or respond to the annual survey.

Pipeline Operators

The Office of Pipeline Safety (OPS) in the U.S. Department of Transportation's Research and Special Programs Administration collects annual report data from natural gas transmission and distribution operators as required by 49 CFR 191.17 and 191.11, respectively. Annual data must be submitted by March 15 of the following calendar year. No annual report is required for hazardous liquid pipeline operators. However, information is available through the pipeline safety program. Since 1986, the program has been funded by fees assessed to each OPS-regulated pipeline operator based on per-mile of hazardous pipeline operated. Data for each operator and each mile of pipeline are stored in the OPS user-fee database, which is revised annually as updated fees are assessed.

Totals for pipeline operators in this table will differ from those in other tables due to differences in the regulatory authority of USDOT and the Federal Energy Regulatory Commission (FERC). FERC regulates only interstate pipelines, whereas DOT regulates both interstate and intrastate pipelines, except for rural gathering lines and some offshore pipelines, which fall under jurisdiction of the U.S. Coast Guard or the U.S. Department of the Interior's Minerals Management Service. An OPS official stated that FERC regulates about two-thirds the amount of pipeline mileage that USDOT regulates.

TABLE 1-3. Number of U.S. Airports

The Federal Aviation Administration (FAA), Office of Airport Safety and Standards *Administrator's Fact Book* (annual issues) furnished the data shown in this table and includes airports certified for air carrier operations with aircraft that seat 30 or more passengers. These airports include civil and joint civil-military use airports, heliports, STOLports (short takeoff and landing), and seaplane facilities. The FAA obtained this data via physical inspections and mail solicitations of all federally regulated landing facilities. Since this is a census of all U.S. airports, reliability should be high. Data, however, may be subject to reporting errors typical of administrative recordkeeping.

TABLE 1-4. Public Road and Street Mileage in the United States by Type of Surface

TABLE 1-5. U.S. Public Road and Street Mileage by Functional System

TABLE 1-6. Estimated U.S. Roadway Lane-Miles by Functional Class

The Highway Performance Monitoring System (HPMS) is the source of road mileage data and is considered reliable. (See box 1-1 for detailed information about the HPMS.) The U.S. Department of Transportation, Federal Highway Administration collects and reviews state-reported HPMS data for completeness, consistency, and adherence to specifications. Some inaccuracy may arise from variations across states in their adherence to federal guidelines in the Traffic Monitoring Guide and the *Highway Performance Monitoring System Field Manual for the Continuing Analytical and Statistical Database*.

Beginning with the 1997 issue of *Highway Statistics,* FHWA instituted a new method for creating mileage-based tables derived from the HPMS. Previously, adjustments to tables developed from sample data were made using area-wide mileage information provided by states. These adjustments are now being made using universe totals from the HPMS dataset. In addition, FHWA has discontinued the process of spreading rounding and other differences across table cells. Thus, users may note minor differences in table-to-table totals. FHWA considers mileage totals from table HM-20, "Public Road Length, Miles by Functional System" to be the controlling totals should a single value be required.

Lane-miles are calculated by multiplying the centerline length by the number of through lanes. Because the HPMS requires that the number of lanes be reported for all principal arterials, other National Highway System (NHS) roads, and all standard

samples, lane length can be computed for the Interstate, other principal arterials, and the NHS on a 100-percent basis. For minor arterials, rural major collectors, and urban collectors, lane length is calculated based on standard sample sections using the reported number of through lanes, length of section, and an expansion factor. FHWA uses the expanded sample to check that the centerline length of a state's functional system matches the universe functional system length. If the centerline length and functional system length do not match, FHWA may ask a state to make adjustments.

Reliability may be diminished for comparisons with pre-1980 data, which were collected via different methods and special national studies. For instance, pre-1980 mileage data included some nonpublic roadways (95,000 miles in 1979) while post-1980 data reports only public road mileage (roads or streets governed and maintained by a public authority and open to public travel).

TABLE 1-7. Number of Stations Served by Amtrak and Rail Transit, Fiscal Year

These numbers originate from Amtrak's Statistical Appendix to *Amtrak's Annual Report* and the U.S. Department of Transportation, Federal Transit Administration's National Transit Database.

Amtrak maintains a computer database with a record of every station, locomotive, and car it operates. Those records include for each vehicle the year built, its service status (operating or not on a daily basis), and location. These data should be considered very reliable.

TABLE 1-8. ADA Accessible Rail Transit Stations by Agency

TABLE 1-9. ADA Lift- or Ramp-Equipped Transit Buses

These data are based on information in the U.S. Department of Transportation, Federal Transit Administration (FTA), National Transit Database (NTD). The legislative requirement for the NTD is found in Title 49 U.S.C. 5335(a). Transit agencies receiving funds through the Urbanized Area Formula Program are generally required to report financial and operating data, including certain aspects of station and vehicle accessibility. Transit operators that do not report to FTA are those that do not receive Urbanized Area Formula Funding, typically private, small, and rural operators. The data are generally considered accurate because FTA reviews and validates information submitted by individual transit agencies. Reliability may vary because some transit agencies cannot obtain accurate information or may misinterpret certain data definitions.

TABLE 1-10. U.S. Oil and Gas Pipeline Mileage

Oil Pipeline

The data are from *Transportation in America,* published by the Eno Transportation Foundation, Inc. (Eno). The numbers reprinted here for 1960, 1965, 1970, and 1975 are Eno estimates from the U.S. Department of Energy's *Energy Data Report* issues labeled "Crude-oil and Refined Products Mileage in the United States." Eno estimated the 1980 number based on the assumption that refinement of old, less profitable, and smaller lines exceeded in mileage the construction of new, larger, and more-profitable lines. Figures from 1985 and later years are calculated from a base figure that Eno obtained from the 1982 U.S. Department of Transportation study *Liquid Pipeline Director* and then incorporated that figure with data from the Association of Oil Pipe Lines and the Oil Pipeline Research Institute. Lack of additional information raises definitional and methodological uncertainties for the data's reliability. Moreover, the three different information sources introduce data discontinuities making time comparisons less reliable.

Gas Pipeline

These statistics originate from annual editions of *Gas Facts* published by the American Gas Association (AGA). The data reported by AGA are based on gas utilities participation and reporting to the Uniform Statistical Report. Utilities reporting in 1991 represented 98 percent of total gas utility industry sales while the remaining 2 percent was estimated for the nonreporting companies based on recent historical experience. Varying percentages of nonreporters from year to year introduce minor reliability problems for time-series comparisons.

TABLE 1-11. Number of U.S. Aircraft, Vehicles, Vessels, and Other Conveyances

TABLE 1-12. Sales or Deliveries of New Aircraft, Vehicles, Vessels, and Other Conveyances

Civilian Aircraft

The Aerospace Industries Association (AIA) provided this data in their annual issues *Aerospace Facts and Figures,* "Civil Aircraft Shipments." AIA collects their data from aircraft company reports, the General Aviation Manufacturers Association (GAMA), and the U.S. Department of Commerce's (DOC) International Trade Administration. DOC data provide total number of shipments and exports, and the difference computed by AIA equals domestic shipments. DOC collects shipments data separately for individual factories or establishments and not at the company level. A potential limitation of this approach is when a factory producing aircraft for shipment also makes aircraft parts. If the establishment has 80 percent of its production in aircraft and 20 percent in parts, all of the output is attributed to aircraft shipments.

Transport

The Aerospace Industries Association (AIA) is the source of these data. AIA obtains quarterly data from Boeing Corp., now the sole U.S. manufacturer of transport aircraft, and publicly available financial disclosure information filed with the U.S. Securities and Exchange Commission (SEC) via Form 10-k. SEC requires a publicly traded company to file an annual report 90 days after the end of the company's fiscal year to provide an overview of that business.

Helicopters

AIA surveyed and received data from all 10 major helicopter manufacturers on their sales and deliveries.

General Aviation

The general aviation figures are taken from the *General Aviation Statistical Databook* published by the GAMA. General aviation refers usually to the small aircraft industry in the United States. GAMA collects quarterly data from the 10 to 14 manufacturers who nearly equal a census of the general aviation sector.

Passenger Car, Truck, Bus, and Recreational Vehicles

Ward's *Motor Vehicle Facts and Figures* is the source of these data. Ward's obtains sales data directly from manufacturers. Readers should note that automobile manufacturers have inflated sales figures in the past, but Ward's does contact companies to verify numbers that appear too high or low.

Motorcycle

The Motorcycle Industry Council, Inc. (MIC) publishes the *Motorcycle Statistical Annual*, which is the source for these data. MIC derived the estimate for new retail motorcycle sales for each state from the *MIC Retail Sales Report*, and adjusted for total retail sales. Motorcycle company reports provided sales data. Prior to 1985, all-terrain vehicles (ATVs) were included in the motorcycle total. In 1995, the Motorcycle Industry Council revised its data for the years 1985 to present to exclude all terrain vehicles from its totals.

Bicycle

The National Bicycle Dealers Association (NBDA) reported these data, which are based on Bicycle Manufacturers Association (BMA) information through 1996. BMA stopped reporting members' shipments in 1996. Moreover, BMA represents the largest bicycle manufacturers (Huffy, Roadmaster, and Murray), and thus the data do not reflect specialty bike makers or other manufacturers. The Bike Council estimated 1997 through 2001 figures in the table. According to a Bicycle Council representative, the estimates are a combination of domestic forecasts produced by a panel of industry experts and import data from monthly U.S. census databases.

Transit

The American Public Transit Association provided these figures, which are based on information in the U.S. Department of Transportation, Federal Transit Administration (FTA), National Transit Database. These data are generally considered accurate because the FTA reviews and validates information submitted by individual transit agencies. Reliability may vary because some transit agencies

cannot obtain accurate information or misinterpret data. APTA conservatively adjusts FTA data to include transit operators that do not report to the database (private, very small, and rural operators).

Class I Rail

The data are from Railroad Facts, published annually by the Association of American Railroads (AAR). AAR data are based on 100-percent reporting by Class I railroads to the Surface Transportation Board (STB) via Schedule 700 of the *R1 Annual Report*. STB defines Class I railroads as having operating revenues at or above a threshold indexed to a base of $250 million (1991) and adjusted annually in concert with changes in the Railroad Freight Rate Index published by the Bureau of Labor Statistics. In 2000, the threshold for Class I railroads was $261.9 million. Although Class I railroads encompasses only 2 percent of the number of railroads in the country, they account for over 71 percent of the industry's mileage operated. Historical reliability may vary due to changes in the railroad industry, including bankruptcies, mergers, and declassification by the STB. Small data errors may also have occurred because of independent rounding in this series by the AAR.

Amtrak

Amtrak maintains a computer database with a record of every locomotive and car it operates. For each vehicle, those records include the year built, its service status (operating or not on a daily basis), and location. These data should be considered very reliable.

Water Transportation

U.S. Department of Transportation, Maritime Administration (MARAD), which classifies vessels as merchant based on size and type, reports these data in annual issues of its *Merchant Fleets of the World*. MARAD compiles these figures from a data service provided by Lloyd's Maritime Information Service. The parent company, Lloyd's Register (LR), collects data from several sources: its 200 offices worldwide, data transfers and agreements with other classification societies, questionnaires to ship owners and shipbuilders, feedback from government agencies, and input from port agents. According to an LR official, consistent data gathering methods have been maintained for more than 30 years but cautioned that inconsistencies may occur in groupings of ship types over time. For example, tank barges are now included in the tanker ship-type grouping rather than the barge grouping.

TABLE 1-13. Active Air Carrier and General Aviation Fleet by Type of Aircraft

Air Carrier, Certificated, All Services

Prior to 1995, data originated from the U.S. Department of Transportation, Federal Aviation Administration (FAA), FAA *Statistical Handbook of Aviation*. Later data are from the Aerospace Industries Association (AIA), *Aerospace Facts and Figures*. However, Aerospace Facts and Figures is compiled from the FAA *Statistical Handbook of Aviation*. U.S. air carrier fleet data are based on reports collected by FAA field offices from carriers. The reports include information on the number of aircraft by type used in air carrier service. The FAA points out that this information is not an inventory of the aircraft owned by air carriers, but represents the aircraft reported to the FAA as being used in air carrier fleet service. The reported aircraft are all aircraft carrying passengers or cargo for compensation or hire under 14 CFR 121 and 14 CFR 135.

General Aviation

The 1960-1980 figures originated from the FAA *Statistical Handbook of Aviation*. Later data are from FAA annual issues of the *General Aviation* and *Air Taxi Activity* (GAATA) Survey report, table 3.1. The FAA collects both aircraft registration data and voluntary information about aircraft operation, equipment, and location. Before 1978, the FAA mandated owners to annually register their aircraft for the Aircraft Registration Master File. This was a complete enumeration of operating aircraft. Registrants were also asked to voluntarily report information on hours flow, avionics equipment, base location, and use. The FAA changed their data collection methodology in 1978. The annual registration requirement became triennial and the General Aviation Activity and Avionics Survey was initiated to sample aircraft operation and equipment data.

The General Aviation Activity and Avionics Survey was renamed the General Aviation and Air

Taxi Activity Survey in 1993 to reflect the fact that the survey includes air taxi aircraft. This survey is conducted annually and encompasses a stratified, systematic design from a random start to generate a sample of all general aviation aircraft in the United States. It is based on the FAA registry as the sampling frame. FAA established three stratification design variables in the survey: 1) the average annual hours flown per aircraft by aircraft type, 2) the aircraft manufacturer/model characteristics, and 3) the state of aircraft registration.

Data Reliability

Because of the change in 1978, the reliability of comparisons over time will be affected. The FAA asserted that the change to a triennial registration deteriorated the Aircraft Registration Master File in two ways. First, the resulting lag in registration updates caused the number of undeliverable questionnaires to steadily increase over the three-year period. Second, inactive aircraft would remain in the registry, inflating the general aviation fleet count. In addition, a new regulation added two categories of aircraft to the general aviation fleet. However, FAA concluded that these changes resulted in no more than a five-percent error in the fleet population estimate.

The reliability of the GAATA survey can be impacted by two factors: sampling and nonsampling error. A measure, called the standard error, is used to indicate the magnitude of sampling error. Standard errors can be converted for comparability by dividing the standard error value by the estimate (derived from sample survey results) and multiplying it by 100. This quantity, referred to as the percent standard error, totaled seven-tenths of a percent in 1997 for the general aviation fleet. A large standard error relative to an estimate indicates lack of precision and, inversely, a small standard error indicates precision.

Nonsampling errors could include problems such as nonresponse, respondent's inability or unwillingness to provide correct information, differences in interpretation of questions, and data-entry mistakes. Readers should note that nonresponse bias might be a component of reliability errors in the data from 1980 to 1990. The FAA conducted telephone surveys of nonrespondents in 1977, 1978, and 1979 and found no significant differences or inconsistencies in respondents' and nonrespondents' replies. The FAA discontinued the telephone survey of nonrespondents in 1980 to save costs. Nonresponse surveys were resumed in 1990, and the FAA found notable differences and thus adjusted its fleet estimates. The 1991 through 1996 data have been revised to reflect nonresponse bias. In 1997, a sample of 29,954 aircraft was identified and surveyed from an approximate population of 251,571 registered general aviation aircraft. Just over 65 percent of the sample responded to the survey.

Highway, Total (registered vehicles)

The 1960 to 1980 figures are from the U.S. Department of Transportation, Federal Highway Administration (FHWA) document, *Highway Statistics, Summary to 1985*, table MV-201 and related tables. Data quality and consistency will be less reliable for these years because of a diversity of registration practices from state to state. Users should recognize that motor vehicle statistical information is not necessarily comparable across all states or within a state from year to year. For instance, the FHWA reported that separate data on single-unit trucks and combinations was unobtainable from all states in 1990.

After 1980, the FHWA began to use the Highway Performance Monitoring System (HPMS) database, which improved data reliability. FHWA reviews state-reported HPMS data for completeness, consistency, and adherence to these specifications. Some inaccuracy may arise from variations across states in their adherence to federal guidelines in the *Highway Performance Monitoring System Field Manual for the Continuing Analytical and Statistical Database*.

If choosing to compare state data, the FHWA recommends that users carefully select a set of peer states that have characteristics similar to the specific comparison. Improperly selected peer states are likely to yield invalid data comparisons. Characteristics that a user needs to consider in determining compatibility of a peer state include similarities and differences in urban/rural areas, population densities, degrees of urbanization, climate, geography, state laws and practices that influence data definitions, administrative controls of public road systems, state economies, traffic volumes, and degrees of centralization of state functions. The FHWA has

developed a set of variables that users may use to determine appropriate peer states.

Other 2-Axle 4-Tire Vehicle (truck)

Sources for these figures included FHWA's *Highway Statistics, Summary to 1995* (table VM-201A) and annual issues of *Highway Statistics* (table VM-1). FHWA compiles these figures from the U.S. Bureau of the Census' Truck Inventory and Use Survey (TIUS). Since 1963, Census has conducted the TIUS every five years with the last survey completed in 1997. The Census Bureau changed the name of the survey to the Vehicle Inventory and Use Survey (VIUS) in 1997. The VIUS collects data and the physical and operational characteristics of the nation's truck population. In 1997, 131,000 trucks were surveyed from an estimated universe of over 75 million trucks. Chronological reliability may be diminished due to sampling design changes in 1977, 1982, and 1992. In 1977, the sampling universe was first stratified by the number of trucks in a state: large (> 1.5 million trucks), medium (700,000 to 1.5 million), and small (< 700,000); and then by two truck sizes.

Stratification in 1982 was then based on body type rather than vehicle weight. In 1992 and 1997, the sampling universe was first subdivided geographically and then into five strata: 1) pickups, 2) vans, 3) single-unit light, 4) single-unit heavy, and 5) truck tractor. Cases were then selected randomly within each stratum.

Census delivered a mail-out/mail-back survey to the owner identified in the vehicle registration records. Data collection is staggered as state records become available. Owners report data only for the vehicles selected. In the 1992 survey, a method was employed to also collect data on new truck purchases in the latter half of the year to estimate the fleet for the calendar year. This adjustment in the sampling frame had not been done in previous surveys and may diminish chronological reliability. The sample for 1997 was some 22,500 vehicles smaller than for 1992. The 1997 VIUS had two sampling stages. For the first stage, the Census Bureau surveyed about 131,000 trucks registered as of July 1, 1997. The second stage sampled a total of 3,000 truck owners with state mailing addresses different from the state of truck registration.

The accuracy and reliability of the VIUS survey depends jointly on sampling variability and nonsampling errors. Standard errors arising from sampling variability can be converted for comparability by dividing the standard error value by the estimate and multiplying it by 100. This quantity, referred to as the percent standard error, totaled two-tenths of a percent in 1992 and 1997 for the VIUS sample. A large standard error relative to an estimate indicates lack of precision and, inversely, a small standard error indicates precision. The 1992 TIUS achieved over 90.2 percent reporting and the 1997 response rate equaled 84.5 percent, thus reliability may have decreased in the most recent survey.

Transit

The American Public Transit Association (APTA) provided these data, which are based on the Federal Transit Administration (FTA), National Transit Database. These data are generally accurate because the FTA reviews and validates information submitted by individual transit agencies. Reliability may vary because some transit agencies cannot obtain accurate information or may misinterpret data. APTA conservatively adjusts FTA data to include transit operators that do not report to the database (private, very small, and rural operators).

Railroad (all categories)

The data are from *Railroad Facts*, published annually by the Association of American Railroads (AAR). AAR data are based on 100-percent reporting by Class I railroads to the Surface Transportation Board (STB) via Schedule 700 of the *R1 Annual Report*. Thus, data estimates are considered very reliable. The STB defines Class I railroads as having operating revenues at or above a threshold indexed to a base of $250 million (1991) and adjusted annually in concert with changes in the Railroad Freight Rate Index published by the Bureau of Labor Statistics. In 2000, the adjusted threshold for Class I railroads was $ 261.9 million. Declassification from Class I status occurs when a railroad falls below the applicable threshold for three consecutive years. Although Class I railroads encompasses only 2 percent of the number of railroads in the country, they account for over 71 percent of the industry's mileage operated.

AAR determines the number of non-Class I railroads through an annual, comprehensive survey sent to every U.S. freight railroad. By following up with nonrespondents, the AAR obtains essentially

a 100 percent census of all railroads. Use of the current survey instrument began in 1986.

Amtrak

Amtrak maintains a computer database with a record of every locomotive and car it operates. For each vehicle, those records include the year built, service status (operating or not operating on a daily basis), and location. This data should be considered very reliable.

Water Transportation

The source for Inland Nonself-Propelled Vessels, Self-Propelled Vessels, and flag passenger and cargo vessels is the U.S. Army Corps of Engineers (USACE), *Waterborne Transportation Lines of the United States*, annual issues. Data are collected by the USACE's Navigation Data Center (NDC) by various means, including the U.S. Coast Guard's registry, maritime service directories, and waterway sector publications. However, an annual survey of companies that operate inland waterway vessels is the principle source of data. More than 3,000 surveys are sent to these companies, and response rates are typically above 90 percent. However, a USACE official did report that less than 10 percent of the total number of companies operating inland vessels either did not receive or respond to the annual survey.

Oceangoing Steam Motor Ships

Merchant Fleets of the World, published annually by the U.S. Department of Transportation, Maritime Administration (MARAD), is the source of these data. MARAD, which classifies vessels as merchant based on size and type, compiles these figures from a data service provided by Lloyd's Maritime Information Service (LMIS). The parent company, Lloyd's Register (LR), collects data from 200 offices worldwide, from data transfers and agreements with other classification societies, from questionnaires to ship owners and ship builders, from feedback from government agencies, and from input from port agents. According to an LR official, consistent data-gathering methods have been maintained for more than 30 years. The same official did caution that there are sometimes inconsistencies in groupings of ship types over time. For example, propelled tank barges are now included in the tanker ship-type grouping.

Recreational Boats

Boating Statistics, published annually by the U.S. Coast Guard (USCG), is the source. The USCG derives these figures from state and other jurisdictional reporting of the actual count of valid boat numbers issued. In accordance with federal requirements, all 55 U.S. states and territories require motor-powered vessels to be numbered. However, over half the states do not require non-powered vessels to be numbered. Accuracy can also be diminished by noncompliance of boat owners with numbering and registration laws. In 1996, the USCG estimated that approximately eight million recreational boats are not numbered and, thus, are excluded from the reported number of recreational vessels. The USCG did not provide estimates for the number of boats without numbering in their reports after 1996. Some jurisdictions fail to report by publication deadlines, and the USCG provided estimates based on the previous year's estimate.

TABLE 1-14. U.S. Automobile and Truck Fleets by Use

These statistics originate from two sources. The R.L. Polk Co. provides numbers for commercial fleet vehicles from state registrations. Bobit Publishing Co. also obtains fleet vehicle sales data from automobile manufacturers. These two sources cover nearly 100 percent of fleet vehicles in the United States. Thus, the data should be very accurate.

TABLE 1-15. Annual U.S. Motor Vehicle Production and Factory (Wholesale) Sales

TABLE 1-16. Retail New Passenger Car Sales

TABLE 1-17. New and Used Passenger Car Sales and Leases

TABLE 1-18. Retail Sales of New Cars by Sector

The U.S. Department of Commerce, Bureau of Economic Analysis, uses data from Ward's Automotive Reports. The sectoral break down is derived from registration data obtained from R.L. Polk. Ward's obtains sales data directly from manufacturers. Readers should note that automobile manufacturers have inflated sales figures in the past, but Ward's does contact companies to verify numbers that appear too high or low.

TABLES 1-19 and 1-20. Period Sales, Market Shares, and Sales-Weighted Fuel Economies of New Domestic and Imported Automobiles and Light Trucks, Selected Sales Periods

These data originate from Oak Ridge National Laboratory's (ORNL) Light-Duty MPG and Market Shares System database, which relies on information from monthly Ward's Automotive Reports. Comparisons and observations are made on sales and fuel economy trends from one model year to the next. ORNL has adopted several conventions to facilitate these comparisons, such as the use of sales-weighted average to estimate fuel economy and vehicle characteristics. For example, "sales-weighted" miles per gallon refers to a composite or average fuel economy based on the distribution of vehicle sales. ORNL's methodology for sales-weighting can be found in the Appendix of the *Highway Vehicle MPG and Market Shares Report: Model Year 1990* (the latest published report). The method was changed dramatically in 1983, and data reliability prior to that year is questionable. This information is now published annually in ORNL's *Transportation Energy Data Book*.

TABLE 1-21. Number of Trucks by Weight

These data are derived from the Vehicle Inventory and Use Survey (VIUS) conducted in 1997 by the U.S. Bureau of the Census. This survey, formerly known as the Truck Inventory and Use Survey (TIUS), has been conducted every 5 years since 1963. The VIUS collects data and the physical and operational characteristics of the nation's truck population. In 1997, 131,000 trucks were surveyed from an estimated universe of over 75 million trucks. Chronological reliability may be diminished due to sampling design changes in 1977, 1982, and 1992. In 1977, the sampling universe was first stratified by the number of trucks in a state: large (> 1.5 million trucks), medium (700,000 to 1.5 million), and small (< 700,000); and then by two truck sizes.

Stratification in 1982 was then based on body type rather than vehicle weight. In 1992 and 1997, the sampling universe was first subdivided geographically and then into five strata: 1) pickups, 2) vans, 3) single-unit light, 4) single-unit heavy, and 5) truck tractor. Cases were then selected randomly within each stratum.

Census delivered a mail-out/mail-back survey to the owner identified in the vehicle registration records. Data collection is staggered as state records become available. Owners report data only for the vehicles selected. In the 1992 survey, a method was employed to also collect data on new truck purchases in the latter half of the year to estimate the fleet for the calendar year. This adjustment in the sampling frame had not been done in previous surveys and may diminish chronological reliability. The sample for 1997 was some 22,500 vehicles smaller than for 1992. The 1997 VIUS had two sampling stages. For the first stage, the Census Bureau surveyed about 131,000 trucks registered as of July 1, 1997. The second stage sampled a total of 3,000 truck owners with state mailing addresses different from the state of truck registration.

The accuracy and reliability of the VIUS survey depends jointly on sampling variability and non-sampling errors. Standard errors arising from sampling variability can be converted for comparability by dividing the standard error value by the estimate and multiplying it by 100. This quantity, referred to as the percent standard error, totaled two-tenths of a percent in 1992 and 1997 for the VIUS sample. A large standard error relative to an estimate indicates lack of precision and, inversely, a small standard error indicates precision. The 1992 TIUS achieved over 90.2 percent reporting and the 1997 response rate equaled 84.5 percent, thus reliability may have decreased in the most recent survey.

TABLE 1-22. World Motor Vehicle Production, Selected Countries

Motor Vehicle Production, Factory Sales, and New Passenger Car Retail Sales

Ward's Motor Vehicle Facts & Figures is the source of these data. Ward's obtains sales data directly from manufacturers. Readers should note that automobile manufacturers have inflated sales figures in the past, but Ward's does contact companies to verify numbers that appear too high or low.

Used Passenger Car Sales and Leased Passenger Cars

ADT Automotive Used Car Market Report is the source of these data. The *Wall Street Journal* (WSJ) is the original source of 1999 data. According to

an ADT representative, publishing deadlines require ADT to use WSJ numbers until they can be replaced with National Automotive Dealers Association data. ADT Automotive's Market Analysis Department also gathers figures from CNW Marketing/Research and the R.L. Polk Co. CNW estimates used car sales volumes by collecting state title transfer data and determining if a transaction was made between private individuals or between a consumer and a franchised or independent dealer. This estimate is evaluated by comparing total transactions with state automobile sales revenues. Polk, an additional source of data, maintains a state vehicle registration database. For 1998, the ADT representative stated that Polk's data were within 5 percentage points of CNW estimates.

TABLE 1-23. Number and Size of the U.S. Flag Merchant Fleet and Its Share of the World Fleet

The U.S. Department of Transportation, Maritime Administration, which classifies vessels as merchant based on size and type, compiles these figures from a data service provided by Lloyd's Maritime Information Service. The parent company, Lloyd's Register (LR), collects data from several sources: its 200 offices worldwide, data transfers and agreements with other classification societies, questionnaires to ship owners and shipbuilders, feedback from government agencies, and input from port agents. According to an LR official, consistent data gathering methods have been maintained for more than 30 years, but cautioned that inconsistencies may occur in groupings of ship types over time. For example, tank barges are now included in the tanker ship-type grouping rather than the barge grouping.

TABLE 1-24. U.S. Airport Runway Pavement Conditions

These data originate from the U.S. Department of Transportation, Federal Aviation Administration (FAA), National Plan of Integrated Airport Systems (NPIAS). The NPIAS includes all commercial service airports, all reliever airports, and selected general aviation airports. It does not include more than 1,000 publicly owned public use landing areas, privately owned public use airports, and other civil landing areas not open to the general public. NPIAS airports serve 92 percent of general aviation aircraft (based on an estimated fleet of 200,000 aircraft). In 1998, the NPIAS encompassed 3,344 of the 5,357 airports with public access. Runway pavement condition is classified as follows:

Good: All cracks and joints are sealed.

Fair: Mild surface cracking, unsealed joints, and slab edge spalling.

Poor: Large open cracks, surface and edge spalling, vegetation growing through cracks and joints.

On a rotating basis, the FAA arranges annual inspections for about 2,000 of the approximately 4,700 public-use airports. The inspections are based on funding availability and not on statistical criteria, and nearly all runways are inspected every two years. Inspections are primarily made to collect information for pilots on airport conditions. The FAA relies on state and local agencies to perform inspections, so some inaccuracy may arise from variation in their adherence to federal guidelines regarding pavement condition reporting. In 1998, the U.S. General Accounting Office found that Pavement Condition Index information was available for about 35 percent of NPIAS airports (GAO/RCED-98-226).

TABLE 1-25. Median Age of Automobiles and Trucks in Operation in the United States

The R.L. Polk Co. is a private enterprise that purchases state registration data to maintain a database of operational vehicles. Its data represent a near census of registered vehicles in the United States, and the age estimate should be considered very reliable.

TABLE 1-26. Condition of U.S. Roadways by Functional System

U.S. Department of Transportation, Federal Highway Administration (FHWA) collects pavement condition data from each state through the Highway Performance Monitoring System. The FHWA uses two rating schemes—the Present Serviceability Rating (PSR) and the International Roughness Indicator (IRI). IRI is used to measure the condition of Interstates, other principal arterials, rural minor arterials, and other National Highway System roadways. PSR is used to measure the condition of rural major collectors and urban minor arterials and collectors. Rural minor collectors are not measured. Where IRI data are not reported for sampled sections, the PSR data are

collected. Using the PSR, values range from 0.1 to 5.0, where 5.0 denotes new pavement in excellent condition and 0.1 denotes pavement in extremely poor condition. On the IRI scale however, lower values indicate smoother roads (e.g., <60 for interstate pavement in very good condition to >170 for interstate pavement in poor condition).

The IRI is an objective measure of pavement roughness developed by the World Bank. The PSR is a more subjective measure of a broader range of pavement characteristics and therefore less comparable. Prior to 1993, all pavement conditions were evaluated using PSR values. Beginning with data published in *Highway Statistics 1993*, the FHWA began a transition to the IRI, which should eventually replace the PSR. The change from PSR to IRI makes comparisons between pre-1993 pavement condition data and 1993 and later pavement condition data difficult. Thus, trend comparisons should be made with care.

FHWA indicates that the protocol of measuring pavement roughness is not followed by all states, and some did not report for all required mileage. Totals only reflect those states reporting usable or partially usable data. Column percentages may not sum to 100 and may differ slightly from percentages in source tables, which were adjusted so that they would add to 100. FHWA believes that the IRI data are of "reasonably good quality."

TABLE 1-27. Condition of U.S. Bridges

These figures are from the U. S. Department of Transportation, Federal Highway Administration (FHWA), National Bridge Inventory Database. State highway agencies are required to maintain a bridge inspection program and inspect most bridges on public roadways at a minimum of every two years. With FHWA approval, certain bridges may be inspected less frequently. A complete file of all bridges is collected and maintained, representing a very reliable assessment of bridge conditions. However, some inaccuracy may be attributable to variations in state inspector's adherence to the National Bridge Inspection Standards.

TABLE 1-28. Average Age of Urban Transit Vehicles

These figures are based on information in the U.S. Department of Transportation, Federal Transit Administration (FTA), National Transit Database. The legislative requirement for the NTD is found in Title 49 U.S.C. 5335(a). Transit agencies receiving funds through the Urbanized Area Formula Program are generally required to report financial and operating data, including vehicle inventories. Transit operators that do not report to FTA are those that do not receive Urbanized Area Formula Funding, typically private, small, and rural operators. The data are generally considered accurate because FTA reviews and validates information submitted by individual transit agencies. Reliability may vary because some transit agencies cannot obtain accurate information or may misinterpret certain data definitions.

TABLE 1-29. Class I Railroad Locomotive Fleet by Year Built

The data are from *Railroad Facts*, published annually by the Association of American Railroads (AAR). Figures reported by AAR are based on 100-percent reporting by Class I railroads to the Surface Transportation Board (STB) via Schedule 700 of the *R1 Annual Report*. STB defines Class I railroads as having operating revenues at or above a threshold indexed to a base of $250 million (1991) and adjusted annually in concert with changes in the Railroad Freight Rate Index published by the Bureau of Labor Statistics. In 2000, the threshold for Class I railroads was $261.9 million. Declassification from Class I status occurs when a railroad falls below the applicable threshold for three consecutive years. Although Class I railroads encompasses only 2 percent of the number of railroads in the country, they account for over 71 percent of the industry's mileage operated.

TABLE 1-30. Age and Availability of Amtrak Locomotive and Car Fleets

Amtrak maintains a computer database with a record of every locomotive and car it operates. For each vehicle those records include the year built, its service status (operating or not on a daily basis), and location. These data should be considered very reliable.

TABLE 1-31. U.S. Flag Vessels by Type and Age

The data are from the U.S. Army Corps of Engineers (USACE), *Waterborne Transportation Lines of the United States* (WTLUS), annual issues. The

WTLUS database contains information on vessel operators and characteristics and descriptions for all domestic vessel operations. Data are collected by the USACE's Navigation Data Center, primarily through a survey of vessel operating companies. More than 3,000 surveys are sent to these companies and response rates are typically above 90 percent. However, a USACE official did report that less than 10 percent of the total number of companies operating inland vessel fleets either did not receive and/or did not respond to the annual survey.

TABLE 1-32. U.S. Vehicle-Miles

TABLE 1-33. Roadway Vehicle-Miles Traveled (VMT) and VMT per Lane-Mile by Functional Class

TABLE 1-34. U.S. Passenger-Miles

Air Carrier, Certificated, Domestic, All Services

The U.S. Department of Transportation (USDOT), the Bureau of Transportation Statistics, Office of Airline Information, reports aircraft revenue-miles and passenger-miles in its publication *Air Traffic Statistics*. These numbers are based on 100-percent reporting of passengers and trip length by large certificated air carriers. Minor errors arise from nonreporting but amount to less than 1 percent of all air carrier passenger-miles. The figures do not include data for all airlines, such as most scheduled commuter airlines and all nonscheduled commuter airlines. These, if added, may raise total air passenger-miles by about 5 percent.

General Aviation

Passenger-mile numbers for 1975 to present are calculated by adjusting the Interstate Commerce Commission's 1974 figure for air passenger-miles by the percentage change in annual hours flown by general aviation aircraft as published in the USDOT, Federal Aviation Administration (FAA), *FAA Statistical Handbook of Aviation*. Numbers in the handbook are based on the General Aviation and Air Taxi Survey (GAATA). In 1993, the GAATA stopped including commuter aircraft. Commuter-miles collected before 1993 by the GAATA were, according to one FAA official, woefully underreported. Therefore, problems with the estimate of general aviation aircraft include: a break in the series between 1992 and 1993, a possible outdated factor used to calculate passenger-miles, and the classification of commuter operations.

Highway

Highway vehicle-miles of travel (vmt) are estimated using data from the Highway Performance Monitoring System (HPMS), a database maintained by FHWA that contains information on highway characteristics supplied by individual states. Annual vmt by highway functional system is calculated as the product of the annual average daily traffic (AADT) along each highway section, the centerline length of each highway section, and the number of days in the year. Also, expansion factors are used for roadways that are sampled rather than continuously monitored. Vmt by vehicle type is estimated using vehicle share estimates supplied by states.

FHWA has established methods for collecting, coding, and reporting HPMS data in two manuals: *Traffic Monitoring Guide* (TMG) and *Highway Performance Monitoring System Field Manual*. The prescribed sampling process for collecting highway volume data, which is used to estimate AADT, is based on statistical methods. However, in practice, several factors affect the ultimate quality of the data. FHWA discusses many of these issues in their annual *Highway Statistics* report and other publications. However, BTS is not aware of any study or report that has statistically quantified the accuracy of vmt estimates. Some of the primary issues related to data quality are noted here.

1. The sampling procedures suggested in the TMG and HPMS *Field Manual* are designed to produce traffic volume estimates with an average precision level of 80-percent confidence with a 10-percent allowable error at the state level. FHWA provides additional guidance to states through annual workshops and other avenues to help them follow these procedures as closely as possible. However, the actual data quality and consistency of HPMS information are dependent on the programs, actions, and maintenance of sound databases by numerous data collectors, suppliers, and analysts at the state, metropolitan, and other local area levels. Not all states follow the recommended sampling, counting, and estimating procedures contained in the *Traffic Monitoring Guide*, and the exact degree to which the states follow these guidelines overall is

unknown. However, FHWA believes that most states generally follow the guidelines.

2. Estimates for higher level roadway systems are more accurate than those for lower level ones, since traffic volumes on higher level roadways are sampled at a higher rate. The TMG recommends that traffic counts be collected for all Interstate and principal arterial sections on a three-year cycle. Under this scheme, about one-third of the traffic counts for these roadway sections in a given year are actually measured, while volumes on the remainder are factored to represent present growth. Although some States collect data at all traffic count locations every year, most use some variation of the TMG data collection guidelines. Volumes on urban and rural minor arterials, rural major collectors, and urban collectors are collected using a sampling procedure. States are not required to report volumes for rural/urban local systems and rural minor collectors, though most do so. However, the methods used to estimate travel on these roadways vary from state to state since there are no standard guidelines for calculating travel on these roadways.

3. Vmt estimates by vehicle type are less accurate than are estimates for total motor vehicle vmt for several reasons: 1) vehicle classification equipment can frequently misclassify vehicles (see B.A. Harvey et al, *Accuracy of Traffic Monitoring Equipment*, GDOT 9210, (Georgia Tech Research Institute:1995)); 2) vehicle shares are often determined by methods or by special studies that are not directly compatible with HPMS data definitions and/or purposes, and observed local-level vehicle classification counts are difficult to apply on a statewide basis; and 3) vehicle type definitions can vary among states.

4. Vmt estimates for combination trucks in HPMS differ from survey-based estimates from the Truck Inventory and Use Survey (TIUS), as much as 50 percent for some categories of combination trucks. Much of this discrepancy appears to be due to differences in truck classification definitions and biases introduced by data collection practices. See R.D. Mingo et al.1995. *Transportation Research Record*, No. 1511 (Washington, DC: National Academy Press), pp. 42-46.

5. FHWA adjusts questionable data using a variety of standard techniques and professional judgement. For example, national average temporal adjustment factors developed from HPMS and other national highway monitoring programs are applied to state data, when necessary, to compensate for temporal deficiencies in sampling practices. Also, in estimating vmt by vehicle type, FHWA employs an iterative process to reconcile vmt, fuel economy (miles per gallon), fuel consumption, and vehicle registration estimates. Fuel consumption, total vmt by highway functional class, and registrations by vehicle group are used as control totals. This process limits the size of errors and ensures data consistency.

6. Passenger-miles of travel (pmt) are calculated by multiplying vmt estimates by vehicle loading (or occupancy) factors from various sources, such as the Nationwide Personal Transportation Survey conducted by FHWA and TIUS. Thus, pmt data are subject to the same accuracy issues as vmt, along with uncertainties associated with estimating vehicle-loading factors.

Transit

The American Public Transit Association (APTA) figures are based on information in USDOT, Federal Transit Administration (FTA), National Transit Database. Transit data are generally considered accurate because FTA reviews and validates information submitted by individual transit agencies. However, reliability may vary because some transit agencies cannot obtain accurate information or may misinterpret data. APTA adjusts the FTA data to include transit operators that do not report to the FTA database (private, very small, and rural operators).

Class I Rail (vehicle-miles)

Data are from *Railroad Facts*, published annually by the Association of American Railroads (AAR). AAR data are based on 100-percent reporting by Class I railroads to the Surface Transportation Board (STB) via Schedule 700 of the *R1 Annual Report* required of Class I railroads. STB defines Class I railroads as having operating revenues at or above a threshold indexed to a base of $250 million (1991) and adjusted annually in concert with changes in the Railroad Freight Rate Index published by the Bureau of Labor Statistics. In 1999, the adjusted threshold for Class I railroads was $258.5 million. Declassification from Class I status occurs when a railroad falls below the applicable threshold for three consecutive

years. Although Class I railroads encompasses only 2 percent of the number of railroads in the country, they account for over 71 percent of the industry's mileage operated.

Intercity Train

The AAR passenger-miles number is based on an almost 100-percent count of tickets and, therefore, is considered accurate.

TABLE 1-36. Long-Distance Travel in the United States by Selected Trip Characteristics: 1995

TABLE 1-37. Long-Distance Travel in the United States by Selected Traveler Characteristics: 1995

The data presented in these tables are estimates derived from the 1995 American Travel Survey (ATS) conducted for the U.S. Department of Transportation, Bureau of Transportation Statistics. The survey's estimation procedure inflates unweighted sample results to independent estimates of the total population of the United States. Values for missing data are estimated through imputation procedures.

Since ATS estimates come from a sample, they are subject to two possible types of error: nonsampling and sampling. Sources of nonsampling errors include inability to obtain information about all sample cases, errors made in data collection and processing, errors made in estimating values for missing data, and undercoverage.

The accuracy of an estimate depends on both types of error, but the full extent of the nonsampling error is unknown. Consequently, the user should be particularly careful when interpreting results based on a relatively small number of cases or on small differences between estimates.

Standard errors for ATS estimates that indicate the magnitude of sampling error as well as complete documentation of the source and reliability of the data may be obtained from detailed ATS reports. Because of methodological differences, users should use caution when comparing these data with data from other sources.

TABLE 1-38. U.S. Air Carrier Departures, Enplaned Revenue Passengers, and Enplaned Revenue Tons

The *Airport Activity Statistics of Certificated Air Carriers* (AAS) is the source of these data. Published annually by the U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information (OAI), the AAS presents traffic statistics for all scheduled and nonscheduled service by large certificated U.S. air carriers for each airport served within the 50 states, the District of Columbia, and other U.S. areas designated by the Federal Aviation Administration. The publication draws its data from the T-100 and T-3 databases maintained by OAI. These data are based on a 100-percent reporting of enplanements, departures, and tonnage information by large certificated U.S. air carriers via BTS Form 41.

Prior to 1993, the AAS included all scheduled and some nonscheduled enplanements for certificated air carriers but did not include enplanements for air carriers offering charter service only. Prior to 1990, the freight category was divided into both freight and express shipments and the mail category was divided into U.S. mail (priority and nonpriority) and foreign mail. Beginning in 1990, only aggregate numbers were reported for freight and mail.

Air traffic hubs are designated as geographical areas based on the percentage of total passengers enplaned in the area. A hub may have more than one airport. This definition of hub should not be confused with the definition used by airlines in describing their "hub-and-spoke" route structures.

TABLE 1-39. Passengers Boarded at the Top 50 U.S. Airports

The *Airport Activity Statistics of Certificated Air Carriers* (AAS) is the source of these data. Published by USDOT, Bureau of Transportation Statistics, Office of Airline Information (OAI), the AAS presents traffic statistics for all scheduled and nonscheduled service by large certificated U.S. air carriers for each airport served within the 50 states, the District of Columbia, and other U.S. areas designated by the Federal Aviation Administration. The publication draws its data from the T-100 and T-3 databases maintained by OAI. These data are based on a 100-percent reporting of enplanements, departures, and tonnage information by large certificated U.S. air carriers via BTS Form 41.

Prior to 1993, the AAS included all scheduled and some nonscheduled enplanements for certificated air carriers but did not include enplanements for air carriers offering charter service only. Prior

to 1990, the freight category was divided into both freight and express shipments and the mail category was divided into U.S. mail (priority and nonpriority) and foreign mail. Beginning in 1990, only aggregate numbers were reported for freight and mail.

TABLE 1-40. Air Passenger Travel Arrivals in the United States from Selected Foreign Countries

TABLE 1-41. Air Passenger Travel Departures from the United States to Selected Foreign Countries

The International Trade Administration in the U.S. Department of Commerce publishes the *U.S. International Air Travel Statistics Report* annually. The passenger data is based on information collected by the U.S. Immigration and Naturalization Service using the INS Form I-92. All passengers on international flights must complete the I-92 form with the exception of those passengers on flights arriving or departing from Canada.

The international passenger arrivals and departures data for Canada is obtained from *Air Carrier Traffic at Canadian Airports*, which is published by Statistics Canada. Three surveys are conducted by Statistics Canada in order to collect the necessary passenger data. Since all data is not received by the time of publication and data is occasionally updated or resubmitted by the participating carriers, data should be considered preliminary for the years referenced in the source publication.

TABLE 1-44. U.S. Ton-Miles of Freight

Air Carrier

Air Carrier Traffic Statistics, published by the U.S. Department of Transportation, Bureau of Transportation Statistics (BTS), Office of Airline Information (OAI), is the source of these data. Large certificated U.S. air carriers report domestic freight activities to OAI via BTS Form 41. The information reported in the table represents transportation of freight (excluding passenger baggage), U.S. and foreign mail, and express mail within the 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands. It also covers transborder traffic to Canada and Mexico by U.S. carriers. The data does not include information on small certificated air carriers, which represent less than 5 percent of freight ton-miles.

Intercity Truck

The data are estimates from *Transportation in America*, published by the Eno Transportation Foundation, Inc. (Eno). Eno's estimates of intercity truck ton-miles are based on historic data from the former Interstate Commerce Commission (ICC), estimates from the American Trucking Association, and other sources. Eno supplements its estimates by using additional information on vehicle-miles of truck travel published in Highway Statistics by the Federal Highway Administration. Users should note that truck estimates in the tables do not include local truck movements.

Class I Rail

The data are from *Railroad Facts*, published annually by the Association of American Railroads (AAR). AAR data are based on 100-percent reporting by Class I railroads to the Surface Transportation Board (STB). The data represent all revenue freight activities of the Class I railroads and are not based on information from the Rail Waybill Sample. The STB defines Class I railroads as having operating revenues at or above a threshold indexed to a base of $250 million (1991) and adjusted annually in concert with changes in the Railroad Freight Rate Index published by the Bureau of Labor Statistics. In 2000, the adjusted threshold for Class I railroads was $ 261.9 million. Declassification from Class I status occurs when a railroad falls below the applicable threshold for three consecutive years. Although Class I railroads encompasses only 1 percent of the number of railroads in the country, they account for over 71 percent of the industry's mileage operated.

Domestic Water Transport

The data are from *Waterborne Commerce of the United States*, published by the U.S. Army Corps of Engineers (USACE). All vessel operators of record report their domestic waterborne traffic movements to USACE via ENG Forms 3925 and 3925b. Cargo movements are reported according to points of loading and unloading. Certain cargo movements are excluded: 1) cargo carried on general ferries, 2) coal and petroleum products loaded from shore facilities directly into vessels for fuel use, 3)

military cargo moved in U.S. Department of Defense vessels, and 4) cargo weighing less than 100 tons moved on government equipment. USACE calculates ton-miles by multiplying the cargo's tonnage by the distance between the points of loading and unloading.

Oil Pipeline

The data for 1960, 1965, and 1970 are from *Transportation in America*, published by the Eno Transportation Foundation, Inc., and the data for 1975 to 1998 are from *Shifts in Petroleum Transportation*, by the Association of Oil Pipe Lines (AOPL). Eno's data are based on information from the former Interstate Commerce Commission's *Transport Economics*. Common carrier oil pipelines reported all freight activities to the ICC.

AOPL obtains barrel-miles from the Federal Energy Regulatory Commission (FERC), which requires petroleum shippers to report annual shipments. AOPL then coverts barrel-miles to ton-miles using conversion figures in the American Petroleum Institute's (API's) *Basic Petroleum Data Book*. Since 16 percent of pipeline shipments are intrastate and not subject to FERC reporting requirements, AOPL makes adjustments to FERC data.

TABLE 1-45. Average Length of Haul: Domestic Freight and Passenger Modes

Freight

Air Carrier and Truck

The Eno Transportation Foundation, Inc. estimated these figures.

Class I Rail

The data are from *Railroad Facts*, published annually by the Association of American Railroads (AAR). AAR data are based on 100-percent reporting by Class I railroads to the Surface Transportation Board (STB) via Schedule 700 of the *R1 Annual Report* required of Class I railroads. The STB defined Class I railroads as having operating revenues at or above a threshold indexed to a base of $250 million (1991) and adjusted annually in concert with changes in the Railroad Freight Rate Index published by the Bureau of Labor Statistics. In 2000, the adjusted threshold for Class I railroads was $ 261.9 million. Declassification from Class I status occurs when a railroad falls below the applicable threshold for three consecutive years. Although Class I railroads encompasses only 1 percent of the number of railroads in the country, they account for over 71 percent of the industry's mileage operated.

Water

The data are from *Waterborne Commerce of the United States*, published by the U.S. Army Corps of Engineers (USACE). All vessel operators of record report their domestic waterborne traffic movements to USACE via ENG Forms 3925 and 3925b. Cargo movements are reported according to points of loading and unloading. Certain cargo movements are excluded: 1) cargo carried on general ferries, 2) coal and petroleum products loaded from shore facilities directly into vessels for fuel use, 3) military cargo moved in U.S. Department of Defense vessels, and 4) cargo weighing less than 100 tons moved on government equipment. USACE calculates ton-miles by multiplying the cargo's tonnage by the distance between points of loading and unloading.

Oil Pipeline

The Eno Transportation Foundation, Inc., provided these figures, which are estimates based on U.S. Department of Energy and Association of Oil Pipe Lines reports. Figures are derived by dividing estimated pipeline ton-miles by estimated crude and petroleum products tonnage.

Passenger

Air Carrier

The U.S. Department of Transportation (USDOT), the Bureau of Transportation Statistics, Office of Airline Information, reports average trip length in its publication *Air Traffic Statistics*. These numbers are based on 100-percent reporting of passengers and trip length by large certificated air carriers via BTS Form 41. The figures do not include data for all airlines, such as most scheduled commuter airlines and all nonscheduled commuter airlines.

Bus

The Eno Transportation Foundation, Inc. estimated these figures based on Class I carrier passen-

ger data and vehicle-miles data from *Highway Statistics*, an annually published report of the USDOT, Federal Highway Administration.

Commuter Rail

The American Public Transit Association (APTA) provided these data, which are based on the USDOT, Federal Transit Administration's (FTA's), National Transit Database. Transit data are generally accurate because the FTA reviews and validates information submitted by individual transit agencies. Reliability may vary because some transit agencies cannot obtain accurate information or may misinterpret data. APTA conservatively adjusts FTA data to include transit operators that do not report to the database (private, very small, and rural operators).

Intercity/Amtrak

The Statistical Appendix to the *Amtrak Annual Report* is the source of these data. Amtrak data are based on 100 percent of issued tickets, and thus should be accurate.

TABLE 1-46. Top U.S. Foreign Trade Freight Gateways by Value of Shipments: 2001

The value of U.S. air, maritime, and land imports and exports are captured from administrative documents required by the U.S. Departments of Commerce and Treasury. In 1990, the United States entered into a Memorandum of Understanding with Canada concerning the exchange of import data. As a consequence, each country is using the other's import data to replace its own export data. U.S. international merchandise trade statistics, therefore, are no longer derived exclusively from the administrative records of the Departments of Commerce and Treasury, but from Revenue Canada. Import value is for U.S. general imports, customs value basis. Export value is FAS (free along ship) and represents the value of exports at the U.S. port of export, including the transaction price and inland freight, insurance, and other charges. Trade levels reflect the mode of transportation as a shipment entered or exited a U.S. Customs port.

Truck, rail pipeline, mail, and miscellaneous modes are included in the total for land modes. Data present trade activity between the United States, Puerto Rico, and the U.S. Virgin Islands and Canada and Mexico. These statistics do not include traffic between Guam, Wake Island, and America Samoa and Canada and Mexico. These statistics also exclude imports that are valued at less than $1,250 and for exports that are valued at less than $2,500.

TABLE 1-49. U.S. Waterborne Freight

The data are from *Waterborne Commerce of the United States*, published by the U.S. Army Corps of Engineers (USACE). All vessel operators of record report their domestic waterborne traffic movements to USACE via ENG Forms 3925 and 3925b. Cargo movements are reported according to points of loading and unloading. Certain cargo movements are excluded: 1) cargo carried on general ferries, 2) coal and petroleum products loaded from shore facilities directly into vessels for fuel use, 3) military cargo moved in U.S. Department of Defense vessels, and 4) cargo weighing less than 100 tons moved on government equipment. USACE calculates ton-miles by multiplying the cargo's tonnage by the distance between points of loading and unloading.

Foreign waterborne statistics are derived from Census Bureau and U.S. Customs data, which excludes traffic between Guam, Wake Island, and American Samoa and any other foreign country, and imports and exports used by U.S. Armed Forces abroad. Individual vessel movements with origins and destinations at U.S. ports, traveling via the Panama Canal are considered domestic traffic.

TABLE 1-50. Tonnage of Top 50 U.S. Water Ports, Ranked by Total Tons

Data on the weight of U.S. maritime imports and exports are captured from administrative documents required by the U.S. Departments of Commerce and Treasury. In 1990, the United States entered into a Memorandum of Understanding with Canada concerning the exchange of import data. As a consequence, each country is using the other's import data to replace its own export data. The United States' merchandise trade statistics, therefore, are no longer derived exclusively from U.S. government administrative records, but from Revenue Canada. Maritime weight data are initially processed and edited by the Foreign Trade Division, U.S. Census Bureau (Census) as part of the overall edits and quality checks performed on all U.S. international merchandise trade data.

After Census processing, the U.S. Army Corps of Engineers (USACE) and the Maritime Administration (MARAD) perform additional maritime-specific processing and quality edits on maritime-related data elements, including the weight of maritime imports and exports. The USACE and MARAD began performing this function in October 1998 after the Foreign Waterborne Trade data program was transferred from the Census Bureau. Prior to October 1998, the USACE historically performed additional specialized edits at the port level, including reassignment of some tonnage data to the actual waterborne port rather than the reported U.S. Customs port.

TABLE 1-46. Modal Shares of Freight Shipments within the United States by Domestic Establishments: 1993 and 1997

TABLE 1-52. Value, Tons, and Ton-Miles of Freight Shipments within the United States by Domestic Establishment, 1997

TABLE 1-55. U.S. Hazardous Materials Shipments by Mode of Transportation, 1997

TABLE 1-56. U.S. Hazardous Materials Shipments by Hazard Class, 1997

These data are collected via the 1997 Commodity Flow Survey (CFS) undertaken through a partnership between the U.S. Department of Commerce, Census Bureau (Census), and the U.S. Department of Transportation, Bureau of Transportation Statistics. For the 1997 CFS, Census conducted a sample of 100,000 domestic establishments randomly selected from a universe of about 800,000 multiestablishment companies in the mining, manufacturing, wholesale trade, and selected retail industries. It excluded establishments classified as farms, forestry, fisheries, governments, construction, transportation, foreign, services, and most retail.

Reliability of the Estimates

An estimate based on a sample survey potentially contains two types of errors—sampling and nonsampling. Sampling errors occur because the estimate is based on a sample, not on the entire universe. Nonsampling errors can be attributed to many sources in the collection and processing of the data and occur in all data, not just those from a sample survey. The accuracy of a survey result is affected jointly by sampling and nonsampling errors.

Sampling Variability

Because the estimates are derived from a sample of the survey population, results are not expected to agree with those that might be obtained from a 100-percent census using the same enumeration procedure. However, because each establishment in the Standard Statistical Establishment List had a known probability of being selected for sampling, estimating the sampling variability of the estimates is possible. The standard error of the estimate is a measure of the variability among the values of the estimate computed from all possible samples of the same size and design. Thus, it is a measure of the precision with which an estimate from a particular sample approximates the results of a complete enumeration. The coefficient of variation is the standard error of the estimate divided by the value being estimated. It is expressed as a percent. Note that measures of sampling variability, such as the standard error or coefficient of variation, are estimated from the sample and are also subject to sampling variability. Standard errors and coefficients of variation for CFS data presented in this report are given in Appendix B of the 1997 Economic Census report, and are available online www.census.gov/econ/wwwse0700.html.

Nonsampling Errors

In the CFS, as in other surveys, nonsampling errors can be attributed to many sources, including 1) nonresponse; 2) response errors; 3) differences in the interpretation of questions; 4) mistakes in coding or recoding the data; and 5) other errors of collection, response, coverage, and estimation.

A potentially large source of nonsampling error is due to nonresponse, which is defined as the inability to obtain all intended measurements or responses from selected establishments. Nonresponse is corrected by imputation.

TABLE 1-53. Value of U.S. Land Exports to and Imports from Canada and Mexico by Mode

The Transborder Surface Freight Data (TSFD) is derived from official U.S. international merchan-

dise import and export data. (For a description of U.S. merchandise trade statistics, see www.census.gov/foreign-trade/www/index.html). As of December 1995, about 96 percent of the value of all U.S. imports has been collected electronically by the Automated Broker Interface System. About 55 percent of the value of all U.S. exports is collected electronically through the U.S./Canada Data Exchange and the Automated Export Reporting Program. The balance is collected from administrative records required by the U.S. Departments of Commerce and Treasury.

The TSFD incorporates all data, by surface mode, on shipments entering or exiting the United States from or to Canada or Mexico. Prior to January 1997, this dataset also included transshipments—shipments entering or exiting the United States by way of U.S. Customs ports on the northern or southern borders even when the actual origin or final destination of the goods was other than Canada or Mexico. (In other U.S. Bureau of the Census trade statistics, transshipments through Canada and Mexico are credited to the true country of origin or final destination.) To make this dataset more comparable to other U.S. Census Bureau trade statistics, detailed information on transshipments has been removed. The TSFD presents a summary of transshipments by country, direction of trade, and mode of transportation. Shipments that neither originate nor terminate in the United States (i.e., intransits) are beyond the scope of this dataset because they are not considered U.S. international trade shipments.

In general, the reliability of U.S. foreign trade statistics is very good. Users should be aware that trade data fields (e.g., value and commodity classification) are typically more rigorously reviewed than transportation data fields (e.g., the mode of transportation and port of entry/exit). Users should also be aware that the use of foreign trade data to describe physical transportation flows may not be accurate. For example, this dataset provides surface transportation information for individual U.S. Customs districts and ports on the northern and southern borders. However, because of filing procedures for trade documents, these ports may or may not record where goods physically cross the border. This is because the information filer may choose to file trade documents at one port while shipments actually enter or exit at another port. The TSFD, however, is the best publicly available approximation for analyzing transborder transportation flows. Since the dataset was introduced in April 1993, it has gone through several refinements and improvements. When improbabilities and inconsistencies were found in the dataset, extensive analytical reviews were conducted and improvements made. However, accuracy varies by direction of trade and individual field. For example, import data are generally more accurate than export data. This is primarily because the U.S. Customs Bureau uses import documents for enforcement purposes while it performs no similar function for exports. For additional information on TSFD, the reader is referred to the U.S. Department of Transportation, Bureau of Transportation Statistics Internet site at www.bts.gov/transborder.

TABLE 1-54. Crude Oil and Petroleum Products Transported in the United States by Mode

Pipelines

The Association of Oil Pipelines (AOPL) obtains barrel-miles from the Federal Energy Regulatory Commission (FERC), which requires petroleum shippers to report annual shipments. AOPL then converts barrel-miles to ton-miles using conversion figures in the American Petroleum Institute's (API's) *Basic Petroleum Data Book*. Since 16 percent of pipeline shipments are intrastate and not subject to FERC reporting requirements, AOPL makes adjustments to FERC data to include intrastate shipments. AOPL also conducts periodic studies to estimate intrastate shipments.

Water Carriers

Data are from *Waterborne Commerce of the United States*, published by the U.S. Army Corps of Engineers (USACE). All vessel operators of record report domestic freight and tonnage information to USACE via ENG Forms 3925 and 3925b. Cargo movements are reported according to points of loading and unloading. Certain cargo movements are excluded: 1) cargo carried on general ferries, 2) coal and petroleum products loaded from shore facilities directly into vessels for fuel use, 3) military cargo moved in U.S. Department of Defense vessels, and 4) cargo weighing less than 100 tons moved on government equipment. USACE calculates ton-miles by

multiplying the cargo's tonnage by the distance between the points of loading and unloading.

Motor Carriers

AOPL estimates ton-miles by multiplying tons by the average length of haul. For crude, the tonnage of the prior year is projected by using a growth rate established by data from the U.S. Department of Energy, Energy Information Administration's *Petroleum Supply Annual*, vol. 1, table 37. For products, the same calculation is made but with a growth rate estimated by the American Trucking Association in *Financial and Operating Statistics, Class I and II, Motor Carriers*, Summary table VI-B. Average length of haul is determined from the prior six years of data for ton-miles and tonnage of crude and petroleum products moved by motor carriers.

Railroad

AOPL calculates ton-miles by multiplying tonnage by average length of haul. Tonnage data for crude and products comes from the Association of American Railroad's *Freight Commodity Statistics*, U.S. Class I Railroads. The U.S. Department of Transportation, Federal Railroad Commission provides the average length of haul for crude and products in its Carload Way Bill Statistics.

TABLE 1-57. Worldwide Commercial Space Launches

The U.S. Department of Transportation, Federal Aviation Administration, Associate Administrator for Commercial Space Transportation (AST) licenses and regulates U.S. commercial space launches as authorized by the Commercial Space Launch Act of 1984 and Executive Order 12465. Every commercial space launch must be approved and monitored by AST. Thus, data reliability is high.

TABLE 1-58. Passengers Denied Boarding by the Largest U.S. Air Carriers

TABLE 1-59. Mishandled-Baggage Reports Filed by Passengers with the Largest U.S. Air Carriers

TABLE 1-60. Flight Operations Arriving On Time for the Largest U.S. Air Carriers

These numbers are based on data filed with the U.S. Department of Transportation on a monthly basis by the largest U.S. air carriers – those that have at least one percent of total domestic scheduled-service passenger revenues. Data cover nonstop scheduled service flights between points within the United States (including territories). The largest U.S. carriers account for more than 90 percent of domestic operating revenues. They include Alaska Airlines, America West Airlines, American Airlines, Continental Airlines, Delta Air Lines, Northwest Airlines, Trans World Airlines, Southwest Airlines, United Airlines, and US Airways. However, there are other carriers offering domestic scheduled passenger service that are not required to report. In some cases, major airlines sell tickets for flights that are actually operated by a smaller airline that is not subject to the reporting requirement.

TABLE 1-61. U.S. Air Carrier Delays Greater than 15 Minutes by Cause

The source of these data, the U.S. Department of Transportation (USDOT), Federal Aviation Administration (FAA), counts a flight as delayed if it departed or arrived more than 15 minutes after its scheduled gate departure and arrival times. FAA calculates delayed departures based on the difference between the time a pilot requests FAA clearance to taxi and the time an aircraft's wheels lift off the runway, minus the airport's standard unimpeded taxi-out time. Users should note that taxi-out time varies by airport due to differences in configurations. The cause of delay is also recorded, e.g., weather, terminal volume, closed runways, etc.

USDOT guidance defines departure as the time the aircraft parking brake is released and gate arrival as the time the brake is set. According to the USDOT's Office of the Inspector General (OIG), FAA's omission of part of a plane's ground movement compromises the data's validity. A recent OIG report noted that the FAA tracks ground time only after a pilot requests clearance and fails to track a plane's time in the ramp area. OIG found that ramp time comprised 28.7 percent to 40.5 percent of the average taxi-out time at the three major New York area airports (OIG Audit Report CR-2000-112), and would not be counted as an FAA delay.

Reliability

Several data collection changes complicate comparisons over time. For example, FAA modified its

method for calculating volume-related delays that resulted in a 17 percent drop in such delays. Decreases in volume-related delays from 1998 to 1999 totaled less than one percent. Moreover, prior to 1999, USDOT did not provide a clear definition of what a departure was. An OIG Audit (CE-1999-054) report noted that air carriers used four different departure events: 1) rolling of aircraft wheels; 2) release of parking brake; 3) closure of passenger and/or cargo doors; and 4) a combination of door closures and release of the parking break. The same report also noted errors in the reporting of departure times by the air carriers.

Data are now manually entered in FAA's Operations Network (OSPNET) database, and reporting errors may arise and decrease reliability. The FAA monitors data quality assurance by spot checking the reported delay data and requesting that discrepancies be reviewed by the responsible facility. According to an OIG Audit (CR-2000-112), however, mistakes are not reliably corrected and many air traffic controllers suggested that delays are underreported sometimes by as much as 30 percent.

TABLE 1-62. Major U.S. Air Carrier Delays, Cancellations, and Diversions

A second data source for air-carrier delay is the USDOT, Bureau of Transportation Statistics, Office of Airline Information (OAI). This information originates from the Airline Service Quality Performance data. These figures are collected from the largest airlines—those that have at least one percent or more of total domestic scheduled service passenger revenues. Delays are categorized by phase of flight (i.e., gate-hold, taxi-out, airborne, or taxi-in delays). These data differ from FAA's OSPNET information due to differences in definition of delay.

While the FAA tracks delays on the taxiway, runway, and in the air, BTS tracks delays at the departure and arrival gates. OAI calculates delays as the difference between scheduled and actual gate departure. If a flight leaves the gate within 15 minutes of its scheduled time, then OAI would record it as departed on-time even if it sat for several hours on the ramp or runway, in which case the delay would be accounted for as a late arrival.

TABLE 1-63. Annual Person-Hours of Delay Per Person

TABLE 1-64. Roadway Congestion Index

TABLE 1-65. Congestion Index and Cost Values

The Texas Transportation Institute's (TTI) *Urban Roadway Congestion Annual Report* provided figures for tables 1-60 through 62. TTI relies on data from the U.S. Department of Transportation, Federal Highway Administration, Highway Performance Monitoring System database (HPMS). TTI utilizes these data as inputs to its congestion estimation model. Detailed documentation for the TTI model and estimations can be found at this website http://mobility.tamu.edu.

Structure, Assumptions, and Parameters

Urban roadway congestion levels are estimated using a formula measuring traffic density. Average travel volume per lane on freeways and principal arterial streets are estimated using area wide estimates of vehicle-miles of travel (vmt) and lane miles of roadway. The resulting ratios are combined using the amount of travel on each portion of the system so that the combined index measures conditions on the freeway and principal arterial street systems. Values greater than one are indicative of undesirable congestion levels. Readers seeking the algorithm for the congestion index should examine this websitehttp://mobility.tamu.edu.

Annual person-hours of delay results from the multiplication of daily vehicle-hours of incident and recurring delay times 250 working days per year times 1.25 persons per vehicle. Two types of costs are incurred due to congestion: time delay and fuel consumption. Delay costs are the product of passenger vehicle hours of delay times $12.85 per hour person time value times 1.25 occupants per vehicle. Fuel costs are calculated for passenger and commercial vehicles from the multiplication of peak period congestion speeds, the average fuel economy, fuel costs, and vehicle-hours of delay.

In previous reports, the TTI methodology assumed that 45 percent of all traffic, regardless of the urban location, occurred in congested conditions. TTI indicated that this assumption overestimated travel in congested periods. Thus, their 2002 estimates now vary by urban area anywhere from 18 percent to 50 percent of travel that occurs

in congestion. TTI's model structure applies to two types of roads: freeways and principal arterial streets. The model derives estimates of vehicle traffic per lane and traffic speed for an entire urban area. Based on variation in these amounts, travel is then classified under 5 categories: uncongested, moderately congested, heavily congested, severely congested, and extremely congested (a new category in 1999). The threshold between uncongested and congested was changed in 2002. Previous editions classified congested travel when areawide traffic levels reached 14,000 vehicles per lane per day on highways and 5,500 vehicles per lane per day on principal arterial streets. For the current edition, these values are 15,500 and 5,500 vehicles per lane per day, respectively. Previous years values have been re-estimated based on these new assumptions. Readers should refer to the TTI Internet site for more detailed algorithms and estimation procedures at http://mobility.tamu.edu.

TTI reviews and adjusts the data used in their models. State and local officials also review the TTI data and estimations. Some of the limitations acknowledged in the TTI report include the macroscopic character of the index. Thus, it does not account for local variations in travel patterns that may affect travel times. The index also does not account for local improvements, such as ramp metering or travel speed advantages obtained with transit or carpool lanes.

TABLE 1-66. Amtrak On-Time Performance Trends and Hours of Delay by Cause

Amtrak determines on-time performance through its computer system maintained at the National Operations Center (NOPS) in Wilmington, Delaware. If a train is delayed, a call is made to the NOPS for recordkeeping. These data can be supplemented with computer entries made for locomotive or car malfunctions that cause delays. These data should be considered reliable.

Chapter 2 Safety

AIR DATA

TABLE 2-1. Transportation Fatalities by Mode

TABLE 2-2. Injured Persons by Transportation Mode

TABLE 2-3. Transportation Accidents by Mode

TABLE 2-4. Distribution of Transportation Fatalities by Mode

TABLE 2-7. Transportation-Related Occupational Fatalities

TABLE 2-9. U.S. Air Carrier Safety Data

TABLE 2-10. U.S. Commuter Air Carrier Safety Data

TABLE 2-11. U.S. Air Carrier Fatal Accidents by First Phase of Operation

TABLE 2-12. U.S. Commuter Air Carrier Fatal Accidents by First Phase of Operation

TABLE 2-13. U.S. On-Demand Air Taxi Safety Data

TABLE 2-14. U.S. General Aviation Safety Data

National Transportation Safety Board investigators perform onsite and offsite investigations of all accidents involving U.S. registered air carriers operating under 14 CFR 121, 14 CFR 135, and general aviation U.S. Department of Transportation (USDOT), Federal Aviation Administration (FAA) regulations. The investigators compile information on fatalities and injuries for all accidents. The counts for fatalities and serious injuries are expected to be extremely accurate. (See glossary for serious injury definition.)

Exposure data (aircraft-miles, aircraft-hours, and aircraft-departures) are obtained from the FAA, which in turn gets some of its exposure data from the USDOT, Bureau of Transportation Statistics, Office of Airline Information (OAI) and other exposure data from its own General Aviation and Air Taxi Activity and Avionics (GAATAA) Survey. The OAI data represent 100 percent reporting by airlines. Tables that include air carriers (14 CFR 121, scheduled and nonscheduled service) and commuter air carriers (14 CFR 135, scheduled service only) use OAI exposure data. Tables that include on-demand air taxi (14 CFR 135, nonscheduled service) and general aviation use GAATAA Survey results. For information about the GAATA Survey, please refer to the chapter 1 data accuracy statement for table 1-9.

The coefficients of variation for aircraft-hours vary by year, but are usually in the 9 to 10 percent range for on-demand air taxi and are approximately 2 percent for general aviation.

TABLE 2-15. Number of Pilot-Reported Near Midair Collisions by Degree of Hazard

Near Midair Collision reports are provided voluntarily by air carriers, general aviation companies, and the military, and this information is added to the Near Midair Collisions System database. Factors that may influence whether or not a near midair collision is reported include the pilot's or other crew member's perception of whether a reportable near midair collision occurred, which in turn can depend on factors such as visibility conditions; the reporter's flying experience; or the size of the aircraft involved. A reportable incident is one in which an aircraft is within 500 feet of another aircraft and a possibility of collision existed.

TABLE 2-16. Airline Passenger Screening Results by Type of Weapons Detected, Persons Arrested, and Bomb Threats Received

Federal Aviation Regulations (FARs) mandate that passenger screening be performed by each air carrier required to implement an approved security program. The USDOT, Federal Aviation Administration, monitors the records of passenger screening in accordance with FAR, and oversees compliance with the carriers' security programs through, for example, scheduled and unscheduled inspections. FAR requires the reporting of information on bomb threats.

HIGHWAY DATA

TABLE 2-1. Transportation Fatalities by Mode

TABLE 2-2. Transportation Injuries by Mode

TABLE 2-3. Transportation Accidents by Mode

TABLE 2-4. Distribution of Transportation Fatalities by Mode

TABLE 2-5. Highway-Rail Grade-Crossing Safety Data and Property Damage

TABLE 2-7. Transportation-Related Occupational Fatalities

TABLE 2-17. Motor Vehicle Safety Data

TABLE 2-18. Motor Vehicle Fatalities, Vehicle-Miles, and Associated Rates by Highway Functional System

TABLE 2-19. Occupant Fatalities by Vehicle Type and Nonoccupant Fatalities

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TABLE 2-22. Motorcycle Ride Safety Data

TABLE 2-23. Truck Occupant Safety Data

TABLE 2-24. Bus Occupant Safety Data

TABLE 2-25. Fatalities by Highest Blood Alcohol Concentration in Highway Crashes

TABLE 2-27. Motor Vehicle Fatal Crashes by Day of Week, Time of Day, and Weather and Light Conditions

TABLE 2-28. Motor Vehicle Fatal Crashes by Posted Speed Limit

TABLE 2-20. Occupant and Nonmotorist Fatalities in Crashes by Number of Vehicles and Alcohol Involvement

Fatalities

Highway fatality data come from the Fatality Analysis Reporting System (FARS), which is compiled by trained FARS analysts at USDOT, National Highway Traffic Safety Administration (NHTSA) regional offices. Data are gathered from a census of police accident reports (PARs), state vehicle registration files, state drivers licensing files, state highway department data, vital statistics, death certificates, coroner/medical examiner reports, hospital medical reports, and emergency medical service reports. A separate form is completed for each fatal crash. Blood alcohol concentration (BAC) is estimated when not known. Statistical procedures used for unknown data in FARS can be found in the NHTSA report: *Transitioning to Multiple Imputation - A New Method to Impute Missing Blood Alcohol Concentration (BAC) Values in FARS*, DOT HS 809 403 (Washington, DC: January 2002).

Data are collected from relevant state agencies and electronically submitted for inclusion in the FARs database on a continuous basis. Cross-verification of PARs with death certificates ensures that undercounting is rare. Moreover, when data are entered, they are checked automatically for acceptable range values and consistency, enabling quick corrections when necessary. Several programs continually monitor the data for completeness and accuracy. Periodically, sample cases are analyzed for accuracy and consistency.

Note that the FARS data do not include motor vehicle fatalities on nonpublic roads. However, previous NHTSA analysis found that these fatalities account for 2 percent or fewer of the total motor vehicle fatalities per year. (See glossary for highway fatality definition.)

Injuries and Crashes

NHTSA's General Estimates System (GES) data are a nationally representative sample of police-reported crashes that contributed to an injury or fatality or resulted in property damage, and involved at least one motor vehicle traveling on a trafficway. Trained GES data collectors randomly sample PARs and forward copies to a central contractor for coding into a standard GES system format. Documents such as police diagrams or supporting text provided by the officers may be further reviewed to complete a data entry.

NHTSA suggests that about half of motor vehicle crashes in the United States are not reported to police and that the majority of these unreported crashes involve minor property damage and no significant personal injury. A NHTSA study of injuries from motor vehicle crashes estimated the total count of nonfatal injuries at over 5 million compared with the GES's estimate of 3.2 million in 1998. (See glossary for highway crash and injury definitions.)

(See U.S. Department of Transportation, National Highway Traffic Safety Administration, *Traffic Safety Facts*, 2000, DOT HS 809 337 (Washington, DC: December 2001), appendices B

and C for further information on GES, including a table of standard errors applicable to GES data.)

TABLE 2-29. Safety Belt and Motorcycle Helmet Use

The National Occupant Protection Use Survey (NOPUS), conducted biennially between 1994 and 2000 by the U.S. Department of Transportation, National Highway Traffic Safety Administration is the source for these data.

In 1994 and 1996, NOPUS consisted of three separate studies: 1) the Moving Traffic Study, which provides information on overall shoulder belt use, 2) the Controlled Intersection Study, which provides more detailed information about shoulder belt use by type of vehicle, characteristics of the belt users, and child restraint use, and 3) the Shopping Center Study, which provides information on rear-seat belt use and shoulder belt misuse. In 1998, the Shopping Center Study was dropped from the survey. The Controlled Intersection Study includes the collection of license plate information to link seat belt use to vehicle type. As the results of the Controlled Intersection Study for 2000 were not available prior to publication, only the Moving Traffic Study data were used in this table.

In 1998, NOPUS separated pickups from the light truck category, thereby creating three categories of passenger vehicles: passenger cars, pickup trucks, and other passenger vehicles. Other passenger vehicles include vans, minivans, and sport utility vehicles. In this table, 1998 and 2000 data for pickup trucks and other passenger vehicles are combined into the light truck category to allow comparison to data from the earlier surveys.

In 1994, operators and riders wearing any type of helmet were counted as helmeted. In 1996, 1998, and 2000, motorcycle helmets that meet USDOT standards are counted as valid protection, whereas those that do not meet USDOT standards were treated as if the operator/rider were not wearing a helmet.

Data collection from the Moving Traffic Study was conducted at 2,063 sites across the country. Shoulder belt use was obtained for drivers and right-front passengers only. Three observers (two observers in 1994 and 1996) were stationed for 30 minutes at interstate/highway exit ramps, controlled (intersections with stop signs or traffic signals), and uncontrolled intersections. Every day of the week and all daylight hours (8 a.m. to 6 p.m.) were covered in each survey. Commercial and emergency vehicles were excluded.

NOPUS was designed as a multistage probability sample to ensure that the results would represent occupant protection use in the country. In the first stage, counties were grouped by regions (northeast, midwest, south, west), level of urbanization (metropolitan or not), and level of belt use (high, medium, or low). Fifty counties or groups of counties were selected based on vehicle miles of travel in those locations. In the next stage, roadways were selected from two categories: major roads and local roads. Of the originally selected sites, some were found to be ineligible during mapping and data collection, and at some sites no vehicles were observed. In 2000, a total of 157,694 passenger vehicles were observed: 93,916 passenger cars and 63,778 light trucks (of which 24,747 were pickup trucks and 39,031 were other passenger vehicles). 645 motorcycles were also observed during the 2000 NOPUS.

Each reported estimate has been statistically weighted according to the sample design. Two kinds of error can be attributed to all survey research: sampling and nonsampling. A measure, called the standard error, is used to indicate the magnitude of sampling error. The source information provides two standard errors along with each estimate. Nonsampling errors could include problems such as vehicles not counted, incorrect determination of restraint use, and data entry mistakes, among others.

TABLE 2-30. Estimated Number of Lives Saved by Use of Restraints

The U.S. Department of Transportation, National Highway Traffic Safety Administration (NHTSA) uses data obtained from the Fatality Analysis Reporting System to calculate the number of lives saved by the use of restraints. The methodology used is outlined in a NHTSA report, *Research Note, Estimating Lives Saved by Restraint Use in Potentially Fatal Crashes* (Washington, DC: June 1995). The general approach is to adjust the observed number of fatalities by a determined effectiveness rate for each type of restraint. This equates to subtracting the actual fatalities from the potential fatalities to determine the number of lives saved. This method is more

accurate than earlier estimation methods since all calculations are derived from NHTSA's count of fatalities in which restraints were used. Reported restraint use is believed to be accurate for fatalities.

The key to NHTSA's calculations is the effectiveness estimate for preventing fatalities for each type of restraint. With the exception of an adjustment in the effectiveness estimate for front outboard air bag-only restraint use in passenger cars (NHTSA, *Fourth Report to Congress, Effectiveness of Occupant Protection Systems and Their Use*, Washington, DC, May 1999), a list of effectiveness estimates can be found in a NHTSA report, *Estimating Alcohol Involvement in Fatal Crashes in Light of Increases in Restraint Use*, published in March 1998.This report also includes additional references describing the determination of these effectiveness estimates.

TRANSIT DATA

TABLE 2-1. Transportation Fatalities by Mode

TABLE 2-2. Transportation Injuries by Mode

TABLE 2-3. Transportation Accidents by Mode

TABLE 2-4. Distribution of Transportation Fatalities by Mode

TABLE 2-31. Transit Safety and Property Damage Data

TABLE 2-32. Transit Safety Data by Mode for All Reported Accidents

TABLE 2-33. Transit Safety Data by Mode for All Reported Incidents

TABLE 2-34. Reports of Violent Crime, Property Crime, and Arrests by Transit Mode

The data for this report are obtained from the U.S. Department of Transportation, Federal Transit Administration's (FTA's) National Transit Database (NTD) Reporting System. Transit agencies are required to file an NTD report at regular intervals if they are recipients of Urbanized Area Formula Funds. In 2000, 592 agencies reported to the NTD. Of that total, 67 transit agencies received exemptions from detailed reporting because they operated 9 or fewer vehicles, and 7 were deleted because their data were incomplete. Thus, 518 individual reporters were included in the NTD, accounting for 90 to 95 percent of passenger-miles traveled on transit. Of the transit agencies reporting, 23.7 percent contract for some or all of their transportation from private or public companies or organizations.

Transit operators report fatalities, injuries, accidents, incidents, and property damage in excess of $1,000. Electronic reporting has recently been implemented for the NTD. Certification from a company's Chief Executive Officer must accompany all NTD reports along with an independent auditor's statement. Upon receipt, an NTD report is reviewed and outstanding items noted in writing to the agency that submitted the form. (See glossary for transit fatality, injury, and accident definitions.)

Four major categories of transit safety are collected: 1) collisions, 2) derailments/buses going off the road, 3) personal casualties, and 4) fires. These major categories are divided into subcategories. The collisions category comprises collisions with vehicles, objects, and people (except suicides). Of the four major categories, only the first two are included in the definition of transit accidents adopted in this report (see glossary). Understanding this definition of accident is relevant to understanding how double counting is removed in the grand total of U.S. transportation fatalities and injuries. (See cross modal comments in box 2-1.)

Transit data submitted to the NTD are generally considered accurate because the FTA reviews and validates information submitted by individual transit agencies. However, reliability may vary because some transit agencies cannot obtain accurate information or misinterpret data.

Security

FTA collects security data from transit agencies serving urbanized areas of over 200,000 in population, using Form 405, and manages it in the National Transit Database (NTD). The reporting of security data follows the FBI *Uniform Crime Reporting Handbook* (Washington, DC: 1984) and is divided into two categories: 1) Reported Offenses, including violent and property crime, and 2) Arrests, consisting of less serious crimes. The figures for violent and property crime are based on records of calls for service, complaints, and/or investigations. They do not reflect the findings of a

court, coroner, jury, or decision of a prosecutor. Security data were first reported in 1995 and were not compiled for earlier years.

In 2000, the number of agencies reporting to this database was 592. Of that, 67 transit agencies received exemptions from detailed reporting because they operated nine or fewer vehicles, and seven were deleted because their data were incomplete. Thus, 518 individual reporters are included in the full database in 2000. Of the transit agencies reporting, 23.7 percent contract for some or all of their transportation from private or public companies or organizations.

RAILROAD DATA

TABLE 2-1. Transportation Fatalities by Mode

TABLE 2-2. Transportation Injuries by Mode

TABLE 2-3. Transportation Accidents by Mode

TABLE 2-4. Distribution of Transportation Fatalities by Mode

TABLE 2-5. Highway-Rail Grade-Crossing Safety Data and Property Damage

TABLE 2-7. Transportation-Related Occupational Fatalities

TABLE 2-35. Railroad and Grade-Crossing Fatalities by Victim Class

TABLE 2-36. Railroad and Grade-Crossing Injured Persons by Victim Class

TABLE 2-37. Train Fatalities, Injuries, and Accidents by Type of Accident

TABLE 2-38. Railroad Passenger Safety Data

TABLE 2-39. Railroad System Safety and Property Damage Data

TABLE 2-40. Fatalities and Injuries of On-Duty Railroad Employees

Railroads are required to file a report for each train accident resulting in property damage in excess of $6,600, each highway-rail accident, and each incident involving the operation of a railroad resulting in a fatality or a reportable injury. (See glossary for reportable injury, train accident and incident, and nontrain incident definitions.)

Reporting requirements, which are fixed in law, are very broad and encompass events not strictly related to transportation. For example, if a passenger falls on a staircase and breaks a leg in the station while going to a train, the injury would be reported and appear in the data as a rail injury.

Box 2-1.
Cross-Modal Comparisons

Caution must be exercised in comparing fatalities (and injuries) across modes because different definitions for reportable events are used among the modes. In particular, rail and transit facilities and injuries include deaths and injuries that are not, strictly speaking, caused by transportation accidents, but are caused by such events as a fall on a transit station escalator; or for railroad employees, a fire in a workshed. Similar fatalities for the air and highway modes (death at airports not caused by moving aircraft, or fatalities from accidents in automobile repair shops) are not counted towards the totals for these modes.

Total fatalities (injuries) in the tables are less than the sum of the modal totals because some deaths (injuries) are reported and counted in more than one mode. To avoid double counting, adjustments have been made to fatality totals (see table 2-4).

WATERBORNE TRANSPORTATION DATA

TABLE 2-1. Transportation Fatalities by Mode

TABLE 2-2. Transportation Injuries by Mode

TABLE 2-3. Transportation Accidents by Mode

TABLE 2-4. Distribution of Transportation Fatalities by Mode

TABLE 2-7. Transportation-Related Occupational Fatalities

TABLE 2-41. Waterborne Transportation Safety Data and Property Damage Related to Vessel Casualties

TABLE 2-42. Waterborne Transportation Safety Data Not Related to Vessel Casualties

U.S. waterborne fatality and injury data are based on reports required by CFR Part 4.05-10. This code requires that the owner, agent, master,

operator, or person in charge file a written report of any marine casualty or accident within five days of the accident. Reports must be delivered to Investigative Officers (IOs) at a U.S. Coast Guard Marine Safety Office or Marine Inspection Office at the U.S. Department of Transportation, who use these reports as guides to investigate the marine casualty or accident. The IO ensures that all the entries on the forms are filled out and errors are corrected. Regulations require IO notification of marine casualties for certain circumstances, including loss of life; injuries that require medical treatment beyond first aid; and, for individuals engaged or employed onboard a vessel in commercial service, injuries that render a person unfit to perform routine duties.

Incidents requiring an investigation include death, injury resulting in substantial impairment, and other incidents determined important to promoting the safety of life or property or to protect the marine environment. These incidents are investigated in accordance with procedures set forth in the regulations. Furthermore, the Federal Water Pollution Control Act mandates that certain incidents be reported to the U.S. Coast Guard. The reports are entered into the Marine Safety Information System, which is later analyzed and transferred to the Marine Safety Management System maintained in Washington, DC.

RECREATIONAL BOATING DATA

TABLE 2-1. Transportation Fatalities by Mode

TABLE 2-2. Transportation Injuries by Mode

TABLE 2-3. Transportation Accidents by Mode

TABLE 2-4. Distribution of Transportation Fatalities by Mode

TABLE 2-43. Recreational Boating Safety, Alcohol Involvement, and Property Damage Data

TABLE 2-44. Personal Watercraft Safety Data

TABLE 2-45. U.S. Coast Guard Search and Rescue Statistics, Fiscal Years

Operators of boats involved in an accident resulting in 1) a fatality, 2) an injury requiring medical treatment beyond first aid, 3) damage to the vessel or other property greater than $500 or complete loss of vessel, or 4) the disappearance of a person from the vessel under circumstances indicating death or injury are required to file a report with the U.S. Coast Guard. If a person dies within 24 hours of the occurrence, requires medical treatment beyond first aid, or disappears from the vessel, reports must be made within 48 hours of the occurrence. In cases involving only damage to the vessel and/or property, reports are to be submitted within 10 days of the occurrence. Although there is no quantitative estimate of the response rate, there may be considerable underreporting, especially of nonfatal accidents, because of the difficulty of enforcing the requirement and because boat operators may not always be aware of the law.

NATURAL GAS AND LIQUID PIPELINE DATA

TABLE 2-1. Transportation Fatalities by Mode

TABLE 2-2. Transportation Injuries by Mode

TABLE 2-3. Transportation Accidents by Mode

TABLE 2-4. Distribution of Transportation Fatalities by Mode

TABLE 2-46. Hazardous Liquid and Natural Gas Pipeline Safety and Property Damage Data

U.S. fatality and injury data for natural gas pipelines are based on reports filed with the U.S. Department of Transportation (USDOT), Office of Pipeline Safety (OPS). Accidents must be reported as soon as possible, but no later than 30 days after discovery. Reports are sent to the Information Systems Manager at the OPS. Possible sources of error include a release going undetected; even if subsequently detected and reported, it may not be possible to accurately reconstruct the accident. Property damage figures are estimates. (See glossary for gas and liquid pipeline fatality data and injury definitions.)

TABLE 2-6. Hazardous Materials Safety Data and Property Damage Data

Incidents resulting in certain unintentional releases of hazardous materials must be reported under 49 CFR 171.16. Each carrier must submit a

report to the U.S. Department of Transportation, Research and Special Programs Administration (RSPA) within 30 days of the incident, including information on the mode of transportation involved, results of the incident, and a narrative description of the accident. These reports are made available on the incident database within 60 days of receipt.

Fatalities and injuries are counted only if they are directly due to a hazardous material. For example, a truck operator killed by impact forces during a motor vehicle crash would not be counted as a hazardous-material fatality. RSPA verifies all reported fatalities and injuries by telephone with the carrier submitting the report.

Possible sources of error include a release going undetected; even if subsequently detected and reported, it may not be possible to accurately reconstruct the accident. Although RSPA acknowledges that there is some level of underreporting, it believes that the underreporting is limited to small, nonserious incidents. As incident severity increases, it is more likely that the incident will come to RSPA's attention and will ultimately be reported. Additionally, the reporting requirements were extended to intrastate highway carriers on October 1, 1998, and the response rate from this new group is expected to increase over time. Property damage figures are estimates determined by the carrier prior to the 30-day reporting deadline and are generally not subsequently updated. Property damage figures, therefore, may underestimate actual damages.

Chapter 3 Transportation and the Economy

TABLE 3-1a & 3-1b. U.S. Gross Domestic Product Attributed to For-Hire Transportation Services (Current and chained 1996 dollars)

TABLE 3-2a & 3-2b. U.S. Gross Domestic Product Attributed to Transportation-Related Final Demand (Current and chained 1996 dollars)

TABLE 3-3a & 3.3b. U.S. Gross Domestic Demand Attributed to Transportation-Related Final Demand (Current and chained 1996 dollars)

TABLE 3-4a & 3-4b. Contributions to Gross Domestic Product: Selected Industries (Current and chained 1996 dollars)

TABLE 3-5. Gross Domestic Product by Major Social Function

Tables 3-1 through 3-5 present data on transportation's contributions to the economy through consumption (or the money spent on transportation activity). The *Survey of Current Business* (SCB) published by the U.S. Department of Commerce, Bureau of Economic Analysis (BEA). The SCB is a monthly journal that contains estimates of U.S. economic activity, including industry contributions to the Gross Domestic Product (GDP). GDP is defined as the net value of the output of goods and services produced by labor and property located in the United States. BEA constructs two complementary measures of GDP-one based on income and the other on expenditures (product). Together, they represent the National Income and Product Accounts (NIPA), our nation's principle framework for macroeconomic estimates. The product side results from the addition of labor, capital, and taxes for producing output. Consumption derives from household, business, and government expenditures and net foreign purchases.

Table 3-3 presents transportation's economic impact in a different form, Gross Domestic Demand (GDD). Also derived from the national accounts, GDD is the sum of personal consumption, gross private domestic investment, and government purchases. GDD includes imports, but excludes exports, thus counting only what is consumed, purchased, or invested in the United States.

GDP Methodology

The 1960 through 1985 data in table 3-1 are from the November 1993 issue of the SCB. The 1990 through 1991 data and 1992 through 1996 data are from an August 1996 and November 1997 SCB issue respectively. The October 1999 issue introduced a revised methodology for GDP estimates (Yuskavage 1996). This section describes BEA's methodology for estimating transportation's share of GDP.

BEA's current-dollar estimates of GDP by industry rely on several sources, including the Bureau of Labor Statistics (BLS), the Health Care Financing Administration, and the Internal Revenue Service (IRS). Some of the tables in this chapter report chained-dollar figures. BEA derived chained dollars by using the Fisher Ideal Quantity Index to calculate changes between adjacent years (Parker and Triplett 1996; Landerfeld and Parker 1997). Annual changes are then chained to form a time series that incorporates the effects of relative price and output composition changes. Please refer to page 142 of the August 1996 issue of the S*urvey of Current Business* for the mathematical formulas (Yuskavage 1996). This method produced separate estimates of gross output and intermediate inputs for a sector's GDP calculation. BEA updated the reference year for the chained-dollar estimates from 1992 to 1996.

Transportation GDP in chained dollars was estimated using the double-deflation method, which relies on a chain-type quantity index formula, and requires gross output and intermediate input information. Principal source data for the transportation categories include: 1) operating revenues of air carriers and Federal Express from the U.S. Department of Transportation and public sources (air); 2) operating revenues for Class I motor carriers from historical records of the Interstate Commerce Commission and Census Bureau annual surveys (trucking and warehousing); 3) BEA personal consumption expenditures (PCE), BLS, and trade sources (local and interurban passenger transit); 4) operating revenues for Class I railroads and Amtrak (rail); and 5) other trade sources (pipelines). Data sources for water were not provided (Yuskavage, 1996).

Table 3-1 reported current dollar estimates from various SCB issues. BEA derived the 1991 data and subsequent years in four steps:

1. BEA's benchmark input-output (I-O) tables produced input compositions for 1977, 1982, and 1987.

2. BEA estimated 1978 through 1981 and 1983 through 1986 input compositions by interpolating the 1977, 1982, and 1987 figures.

3. BEA estimates the 1977 through 1987 imported and domestically imported shares of each detailed input.

4. BEA estimates the 1988 through 1994 input compositions based on the 1987 figures and the Economic Censuses of 1992.

For intermediate input estimations, BEA deflates each of the current-dollar inputs. (BEA deflates import and domestic production separately.) For deflation, quantities are approximated by real values (expressed at present with 1996 as the base period) that are calculated by dividing the current-dollar value of the component by its price index. BEA develops estimates for import prices with data from a variety of sources, but primarily from the BLS import price series.

Reliability and Accuracy

BEA views GDP as a reliable measure of output because of the source data underlying the estimates. The following reliability comments are based on the Valliant (1993) SCB article and Ritter (2000). GDP data originate from three types of sources. The foundational data come first from the economic censuses conducted every five years. These approach complete enumerations of sectoral activity in state and local governments, manufacturing, services, retail trade, wholesale trade, construction, transportation, communications and utilities, mining, finance, insurance, and real estate. Annual estimates from the second tier of GDP data and emanate from sources such as IRS tax returns and smaller surveys of establishments. The Annual Retail Trade Survey, for instance, forms one of the major components of the annual estimates. The U.S. Census Bureau collects sales and end-of-year inventory data from about 22,000 retail firms totaling $2 trillion of the $8.8 trillion GDP amount. While considered reliable by many economists, sampling variability may introduce errors into these annual estimates. Moreover, the Census Bureau imputes (substitutes estimates for missing or clearly incorrect data) about 11 percent of reported national annual retail sales because of accounting inconsistencies or raw survey data errors. The third component of the GDP flows from quarterly estimates.

In the October 1993 SCB, Valliant described the reliability and accuracy of the quarterly estimates of GDP, providing insights into the pre-1985 data in terms of dispersion and bias. BEA followed a schedule that produced three successive "current" estimates; advanced, preliminary, and final. BEA analysts developed a dispersion and bias measure based on the difference between these three estimates.

Dispersion is the average of the absolute values of the revisions, or, the difference between P, representing the percentage change in the current estimates, and L representing the percentage change in the latest available estimates, divided by n, representing the number of quarterly changes. Bias is the average of the revisions. According to the October 1993 SCB, dispersion averaged 1.6 percent from 1958 to 63 and dropped to 1.1 percent for 1968 to 1972. BEA stated that these declines in dispersion correspond with more accurate initial and final estimates subsequent to the late 1950s. For years after 1973 until 1991, the BEA concluded that more accurate source data for preliminary and final estimates did not improve reliability by much. BEA also determined that bias was not large enough from 1978 to 1991 to be significant under normality assumptions at the five-percent confidence level. Overall, for the period beginning in 1978 and covering the 1985 data from table 3-1, the BEA concluded there was no evidence of reliability increases. BEA also questioned its own estimating procedures and, in particular, the use of disparate sources of data, which may explain why reliability levels have not increased.

The NIPA framework also undergoes major updates referred to as comprehensive, or benchmark revisions. Eleven of these have been completed including one in 1996 and most recently on October 28, 1999 that provided the data for tables 3-1 through 3-5. The major change encompassed a definitional change reflecting our evolving economic system. Software became a business investment rather than just a "purchased input," or the equivalent of raw material. Unless the company increased the price of its product to cover software

purchases, no impact registered in the GDP. With this benchmark revision, the Census Bureau increased the 1996 estimate by $115 billion, or 1.5 percent—the amount of software investments made in that year. Another change involved the Census Bureau's interpretation of the value of "unpriced" banking services such as ATM (automatic teller machine) contributions to an establishment's productivity. Previously, banking service productivity relied only on an index constructed from labor input. Economists argued that this ignored productivity gains from technological improvements such as ATMs and electronic banking. The BLS developed a productivity based instead of bank transactions, and this was used in the 1999 revision. For more detail, readers should refer to Moulton and Seskin (1999).

Sources of Error for GDP Estimates

The GDP estimates can contain several kinds of error. One source of error arises from estimates based on preliminary or incomplete tabulations of source data or BEA judgment in the absence of data. Errors may also arise because of sampling errors and biases in monthly, quarterly, annual, or periodic tabulations. Another source of potential error may arise when data are seasonally adjusted. Readers should refer to the October 1993 SCB issue for more detail (Young 1993).

NIPA and Transportation-Related Final Demand

For table 3-2, transportation-related final demand (TRFD) is from NIPA reported in the SCB. It represents the sum of all consumer and government expenditures for transportation purposes, plus the value of goods and services purchased by business as investment for transportation purposes. Since TRFD includes only expenditures on the final products of the economy, it is comparable to GDP and provides a measure of transportation's importance from a consumption perspective.

NIPA tables report the composition of production and the distribution of incomes earned in production. The totals of these produce a GDP estimate that should theoretically be equal, but there is always a difference referred to as the "statistical discrepancy." NIPA is based on four subaccounts of national economic activity. These include 1) the personal income and outlay account, 2) the gross savings and investment account, 3) the government receipts and expenditures account, and 4) the foreign transactions account.

Personal Consumption Expenditures (PCE) for transportation include 1) road motor vehicles, such as new and used automobiles, and motorcycles; 2) motor vehicle parts, such as tires, tubes, accessories; 3) motor fuels and lubricants; and 4) transportation services, such as repair, greasing, washing, parking, storage, rental, leasing, tolls, insurance, and purchased local and intercity transportation services. Motor vehicles used primarily for recreation, boats, noncommercial trailers, and aircraft are excluded.

Gross private domestic fixed investment in transportation includes private purchases of transportation structures and equipment. Transportation structures include railroads and petroleum pipelines. Transportation equipment consists of automobiles, trucks, buses, truck trailers, aircraft, ships and boats, and railroad equipment.

Goods and services that are counted as part of transportation-related exports include 1) civilian aircraft, engines, and parts; 2) road motor vehicles, engines, and parts; 3) passenger fares, including receipts of U.S. air and ocean/cruise carriers for transporting non-U.S. residents between the United States and foreign countries or between two foreign points; and 4) other transportation. The total for road motor vehicles, engines and parts excludes boats, aircraft, and noncommercial trailers. Other transportation includes 1) the freight revenues of U.S.-operated ocean, air, and other carriers (e.g., rail, pipeline, and Great Lakes shipping) for international transport of U.S. exports and for transporting foreign freight between foreign points; 2) port expenditure receipts (representing payments for goods and services purchased in the United States by foreign-operated carriers); and 3) receipts of U.S. owners from foreign operators for the charter of vessels and rental of freight cars and containers.

Goods and services that are counted as part of transportation-related imports include 1) civilian aircraft, engines, and parts; 2) road motor vehicles, engines, and parts; 3) passenger fares, including payments to foreign air and ocean/cruise carriers for the transportation of U.S. residents between the United States and foreign countries or between two foreign points; and 4) other transportation. The total for road motor vehicle, engines and parts excludes boats, aircraft, and noncommercial trail-

ers. Other transportation includes 1) freight revenues of foreign-operated ocean, air, and other carriers (e.g., rail, pipeline, and Great Lakes shipping) for international transport of U.S. imports and for the transportation of foreign freight between foreign points; 2) port expenditure receipts (representing payments for goods and services purchased in foreign countries by U.S.-operated carriers); and 3) payments to foreign owners from U.S. operators for the charter of vessels and rental of freight cars and containers.

Transportation-related government purchases include federal, state, and local purchases of transportation services, and government expenditures on transportation-related structures and equipment. Federal, state, and local purchases represent the sum of consumption expenditures and gross inventory. Defense-related purchases include expenditures on the transportation of materials (care and movement of goods by water, rail, truck, and air); the rental of trucks and other transportation equipment and warehousing fees; and travel of persons (care and movement of Department of Defense military civilian employees), including tickets for all modes of travel, per diem, taxi fares, automobile rental, and mileage allowances for privately owned vehicles.

Further References

This data source and accuracy statement is based on several papers that have appeared in the SCB. Data users who desire more methodological detail can refer to the list of references at the end of this chapter.

TABLE 3-6. National Transportation and Economic Trends

The *Statistical Abstract of the United States* published by the U.S. Department of Commerce, Census Bureau, is the source of the population data. The *Current Population Reports* are the source of the *Abstract's* data that are collected through the *Current Population Survey* (CPS). This is a monthly survey administered by the Census Bureau of a scientifically selected sample representative of the noninstitutional civilian population in 754 areas covering every state and the District of Columbia. Like other surveys, the CPS is subject to sampling error. Readers should note that estimates based on the CPS may not agree with census counts because different procedures are used. Changes in the CPS also mean that annual comparisons must be made with caution. For instance, in 1994, the CPS methodology was dramatically changed, and the estimates began to incorporate 1990 census population controls, adjusted for the estimated undercount.

Industrial production data come from the Industrial Production Index, produced by the Board of Governors of the Federal Reserve System and published in the *Economic Report of the President*. For annual figures, individual industrial production (IP) indexes are constructed from a variety of sources, including the quinquennial Censuses of Manufactures and Mineral Industries; the Annual Survey of Manufactures, prepared by the Census Bureau; the Minerals Yearbook, prepared by the U.S. Department of the Interior; and publications of the U.S. Department of Energy. The Federal Reserve Board (FRB) uses these data in a modeling framework to produce estimates of industrial production. Below are brief discussions on three major sources for the IP indexes; the survey of manufactures, the census of manufactures, and the electric utility survey.

Annual Survey of Manufacturers

The Census Bureau conducts a mail survey of approximately 55,000 manufactures with three different sample strata. The sampling frame is based on previously surveyed firms and is updated annually based partially on IRS administrative records and other sources. Large manufactures (shipments > $500 million, and > 250 employees), some computer manufacturing firms, and all remaining firms with at least 250 employees are selected. Establishments with employment generally ranging from 20 to 250 employees are sampled with a probability proportional to a composite measure of establishment size. Approximately 5,000 of the smallest firms (5 to 20 employees) are also sampled and receive a shorter survey instrument. Additional information on the survey, readers should refer to www.census.gov/econ/www/ma0300.html.

Census of Manufacturers

The Census of Manufactures collects data through mail surveys from approximately 237,000 multiunit and single-unit firms with a minimum payroll figure. This census is supplemented by IRS

administrative data from over 142,000 firms not contacted by mail. For additional information on the census, readers should refer to www.census.gov/econ/www/ma0100.html.

Electric Utility Survey

Since 1971, the FRB has conducted the *Monthly Survey of Industrial Electricity Use* based on responses from utilities and manufacturing and mining firms that are cogenerators. This survey is the basis for estimates of the amount of electricity power used by 120 industrial sectors. More than 40 industrial production series estimates are based on data from this survey and compose 28 percent of the Industrial Production Index in 1994 value-added proportions.

Survey responses are voluntary and are gathered from a panel of 175 utilities and 186 cogenerating companies with a monthly response rate near 95 percent. In 1992, an additional 71 new cogenerators joined the panel. This resulted, according to an FRB statistical analysis, in a decrease of the standard deviation of errors for electricity growth rates from 3.0 to 1.9 percentage points. Overall, the estimates for total power use produce a standard error of about 0.5 percentage points. The panel accounts for approximately 73 percent of industrial electric power use in the United States.

The *Survey of Current Business*, published by the U.S. Department of Commerce, Bureau of Economic Analysis, is the source of GDP estimates. Readers should refer to the source and accuracy statement for tables 3-1 through 3-5 for information on GDP estimates.

TABLE 3-7. Passenger and Freight Transportation Expenditures

Detailed information from the source was not available at the time of publication. Readers should contact the Eno Transportation Foundation, Inc. directly for information about methodologies and reliability.

TABLE 3-8. Sales Price of Transportation Fuel to End-Users

The U.S. Department of Energy, Energy Information Administration's (EIA's) *Monthly Energy Review*, tables 9.4 and 9.7, provided price data, except for railroad fuel. Pre-1981 data were reported by the EIA from Bureau of Labor Statistics reports. Beginning in 1983, the EIA administered a series of surveys to collect data on petroleum prices, market distribution, supply, and demand. The EIA-782 series encompasses three surveys: 1) Form EIA-782A, Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report; 2) Form EIA-782B, Resellers'/Retailers' Monthly Petroleum Product Sales Report; and 3) Form EIA-782C, Monthly Report of Prime Supplier Sales of Petroleum Products Sold for Local Consumption.

EIA developed a method for comparing data from the new surveys with older information gathered by various methods. As a result, a number of adjustment factors were developed and used to "backcast" price estimates. Readers who require a more detailed description of this methodology should refer to EIA's petroleum data publications web page (www.eia.doe.gov/oil_gas/petroleum/pet_frame.html) and the explanatory notes section.

Changes in sample elements or collection methods may affect data continuity. Two regulatory changes affected data collection in October 1993. The Clean Air Act Amendments of 1990 required that oxygenated gasoline be sold in the winter months in ozone nonattainment areas. Thus, the EIA-782 forms were modified to collect information on fuels divided among conventional, oxygenated, and reformulated categories. Second, requirements for the production and selling of low-sulfur diesel were required and necessitated the separation of diesel fuel into high- and low-sulfur categories. Moreover, surveys prior to October 1993 did not include propane. The EIA followed several different sampling designs during two periods in the 1980s and thus, there may be some price estimate discontinuity for periods between December 1983 and January 1984 as well as between August and September of 1988.

Data Collection

The 782 series occurs on a monthly schedule via mail. The 782A and 782C surveys reflect a census of about 115 and 190 firms, respectively. The 782B samples about 2,000 firms. The EIA first stratifies by sales volume for the form 782B survey to ensure that dealers with 5 percent or more of the market are captured with certainty. The remaining elements of the frame were assigned a probability of selection to form a 2,200 firm survey. These

"noncertainty" companies were poststratified by geographic area and type of sales category.

Data Reliability

EIA has studied its sampling effects on reliability and determined that the sample size of 2,000 should yield a less than 1-percent price coefficient of variation in its estimates. Errors can arise because of nonresponse, but an EIA official indicated that the response rates for the 1997-1999 782A, B, and C surveys averaged 95 percent, 86 percent, and 96 percent, respectively. Because survey data invariably contain incomplete data (because of reporting errors or nonresponse), EIA estimates or "imputes" missing data. Readers requiring imputation algorithms should refer to the 782 series explanatory notes referred to above.

TABLE 3-9. Price Trend of Gasoline v. Other Consumer Goods and Services

Data in this table were reproduced from the American Petroleum Institute's (API) *Basic Petroleum Data Book*. API noted that data reported prior to 1981 was obtained from Platt's *Oil Price Handbook and Oilmanac*. Platt's is part of Standard and Poor's, and an independent third party organization that tracks the petroleum industry. Platt's reported the retail price of gasoline based on telephone interviews with gas stations in 55 cities. More detailed historical information on their data collection methods could not be ascertained and the data's reliability is uncertain. API reported the Bureau of Labor Statistics (BLS) as its data source for 1981 to 2001 retail gasoline prices. The remainder of this section discusses the BLS Consumer Price Index (CPI) data collection and estimation methods used to derive the average retail price of gasoline.

BLS uses the CPI as a measure of average price changes paid by urban consumers for a fixed basket of goods and services. BLS estimates the CPI with a survey-based approach. Survey results define a categorization of goods and services, a representative sample of items to track, and weights according to the consumption of an average consumer during a base period.

Sample Design

BLS relies on two sampling frames for their CPI estimates. One represents the universe of retail outlets from which households may purchase defined groups of commodities and services including gasoline. A second represents households across urban areas. Moreover, the household frame is based on an "urban-consumer" population and consists of households in Metropolitan Statistical Areas (MSA's) and in urban places with more than 2,500 inhabitants. This "all urban" CPI (CPI-U) provides the estimates for retail gasoline prices shown in table 3-9. Thus, this frame does not represent non-urban consumers.

For the retail outlet sampling frame, BLS relies on the Point-of-Purchase Survey (CPOPS) conducted by the Census Bureau in 94 Primary Sampling Units (PSUs) identified by BLS. PSUs are based on urban counties, groups of contiguous urban counties, or MSAs. For the household sample, a noncompact clustering procedure was employed which dispersed households evenly within a Census enumeration district (ED). More detailed sampling design information can be found in BLS's *Handbook of Methods* at http://stats.bls.gov/opub/hom/homhome.htm.

Prices for the goods and services used to calculate the CPI are collected in 91 PSUs located in 85 urban areas throughout the country. The sample size for the CPOPS totals about 21,000 retail and service establishments-supermarkets, department stores, gasoline stations, hospitals, etc. Food, fuels, and a few other items are priced monthly in all 85 locations. BLS field representatives collect all price information through visits or telephone calls in the household surveys. Price changes are computed based on a sample of outlets selected from locations identified by consumers. Specific sample items are then selected from each sample outlet to ensure that the market basket is representative of where households shop.

Estimation

BLS routinely updates its price estimates for specific items among the collection of goods and services, for example, a new car model year. BLS employs three techniques to produce new price estimates. First, an item that is directly comparable to the previous discontinued good will be used to provide a price estimate. However, a substitute item may be inappropriate when goods change slightly in their characteristics. BLS relies on Hedonic regression modeling as a second "quality adjustment" for price estimates. This statistical technique can model

the importance of various quality characteristics that add value to a particular good (the fiber content and construction of apparel products for instance). A researcher can estimate a Hedonic regression model that identifies the factors most important is determining the price of a good, and BLS field representatives will note these in their data collection. Imputation is a third quality adjustment used for "noncomparable" substitutions where BLS estimates the price change from previous averages. Detailed algorithms can be found in chapter 17 of the BLS *Handbook of Methods* at http://stats.bls.gov/opub/hom/homhome.htm.

Effective January 1999, BLS began using a new formula for calculating the basic components of the Consumer Price Index for all Urban Consumers (CPI-U) and the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W). The new formula, the geometric mean estimator, is used in index categories that comprise approximately 61 percent of total consumer spending represented by the CPI-U. Based on BLS research, it is expected that use of the new formula will reduce the annual rate of increase in the CPI by approximately 0.2 percentage points per year. Additional information on this change was published in the April 1998 CPI Detailed Report and is available on the Internet at http://stats.bls.gov/cpihome.htm.

Accuracy

One of the CPI's limitations is that it represents price movements for urban residents and may not correctly represent nonurban consumption patterns. The CPI may also contain sampling error because it is estimated from a sample of consumer purchases. Nonsampling error may occur if respondents provide BLS field representatives with inaccurate or incomplete information. Another potential source of error identified by BLS may occur because of a time lag between the Point-of-Purchase Survey and the initiation of price collection for commodities and services at resampled outlets. Because of the time lag, the products offered by the outlet at the time pricing is initiated may not coincide with the set from which the CPOPS respondents were purchasing.

The CPI is also subject to response error when data are not collected because of nonresponse. BLS established a nonresponse auditing program in 1986. It reported that response rates in 1990 for transportation commodities and services were above 90 percent.

Bias

Four categories of bias were identified in the BLS report, *Measurement Issues in the Consumer Price Index*, published in 1997. First, because of the fixed-weight nature of the index, the CPI creates substitution bias by placing too much weight on items measured in previous surveys from which consumers may have shifted away. Second, the study found that the index did not account for consumers switching to discount stores. Third, a quality change bias was also identified when the differences between goods priced in two different periods cannot be accurately measured nor deduced from the accompanying price difference between the goods. Finally, the report noted that the CPI also had a new product bias because the index inadequately reflected consumer value of products introduced into the market. The commission concluded that the CPI overstated the true cost-of-living change by 1.1 percentage points per year.

TABLE 3-10. Producer Price Indices for Transportation Services

TABLE 3-11. Producer Price Indices for Transportation Equipment

Data shown in these tables are drawn from annual issues of *The Supplement to Producer Price Indexes* published by the Bureau of Labor Statistics (BLS) in the U.S. Department of Labor. These indexes represent a measure of outputs in all goods-producing American industries as well as partial coverage of service industries including transportation. BLS defines a price as the net revenue accrued to a specified production establishment from a specified kind of buyer for a specific product shipped under specific transaction terms on a specified day of the month. BLS collects this data series through surveys of a sample of establishments that report their prices from economic transactions.

Data Collection

A BLS field economist visits an establishment or cluster of establishments selected for price sampling. The economist uses a disaggregation proce-

dure to select a sample of transactions from all the establishment's revenue-producing activities. This disaggregation procedure assigns a probability of selection to each shipping or receipt category proportionate to its value within a reporting unit. In most cases, the final price index produced by the BLS requires that 1) there are at least three different respondents to a survey, 2) at least two reporting units provide price information in a given month, and 3) no single respondent accounts for 50 percent or more of the weight for a given item.

BLS regional offices review field data for consistency and completeness. The national office then conducts a final review and a survey is then tailored specifically to establishments or clusters of establishments. BLS refers to these as repricing schedules and sends them to reporting establishments on a regular basis. Most prices refer to a reporting schedule on a particular day of the month, usually, the first Tuesday or the 13th of a month.

Estimation

BLS collects prices for over 100,000 items. It utilizes several different weighting schemes for the numerous indexes produced because some products will have a greater effect on the movement of groupings of individual products. BLS utilizes the net output of shipment values as weights for the 4-digit SIC industries. Net output values include only shipments from establishments in one industry to other industry establishments and, thus, differ from gross shipment values. The latter would include shipments among establishments in the same industry, even if those establishments are separate firms. BLS also makes seasonal adjustments if statistical tests and economic rationale justify them, and computes data when a participating company does not deliver a price report. BLS bases the missing price estimation on the average of price changes for similar products reported by other establishments.

Accuracy

As in all surveys, the accuracy of producer price indexes depends on the quality of information voluntarily provided by participating establishments. One of the accuracy concerns of BLS revolves around the preferred use of realistic transaction prices (including discounts, premiums, rebates, allowances, etc.) rather than list or book prices. Before BLS fully changed its data collection method in 1986, a survey indicated that about 20 percent of traditional commodity indexes were based on list prices. The newer and more systematic methodology decreased the use of list prices. BLS documentation (available at http://stats.bls.gov/opub/hom) provided no more details on sampling error, response rates, or the availability of generalized variance parameters or techniques for estimating them.

TABLE 3-12. Personal Expenditures by Category

TABLE 3-13. Personal Consumption Expenditures on Transportation by Subcategory

Data used in these tables are from the Bureau of Labor Statistics, *Annual Report of Consumer Expenditure Survey.* The Consumer Expenditure Survey (CEX) collects information from U.S. households and families on their buying habits (expenditures), income, and consumer characteristics. The strength of the survey is that it allows data users to relate the expenditures and income of consumers to the characteristics of those consumers. BLS uses 11 standard characteristics to classify consumers, including income, before-tax income class, age, size of the consumer unit, composition of the consumer unit, number of earners, housing tenure, race, type of area (urban or rural), region, and occupation.

The CEX is a national probability sample of households. The sampling frame (i.e., the list from which housing units are chosen) for this survey is generated from the 1990 census 100-percent detail file, which is augmented by a sample drawn from new construction permits. Coverage improvement techniques are also utilized to eliminate recognized deficiencies in the census.

Data Collection

The current survey consists of two separate surveys (Interview and Diary), each utilizing a different data collection technique and sample. Data is collected for each survey from approximately 5,000 households. In the Interview survey, each consumer unit (CU) in the sample is interviewed every three months over five calendar quarters. The interviewer uses a structured questionnaire to

collect both the demographic and expenditure data in the Interview survey. The interviewer collects the demographic data in the Diary survey whereas the respondent enters the expenditure data on the diary form. Both surveys accept proxy responses from any eligible household member who is at least 16 years old if an adult is not available after a few attempts to contact that person. The respondent family completes the Diary (or recordkeeping) survey at home for two consecutive one-week periods.

A reinterview program for the CEX provides quality control. The program provides a means of evaluating individual interviewer performance to determine how well the procedures are being carried out in the field. A member of the supervisory staff conducts the reinterview. Subsamples of approximately 6 percent of households in the Interview survey and 17 percent in the Diary survey are reinterviewed on an ongoing basis. A new diary form with more categories and expanded use of cues for respondents was introduced in 1991, based on results from earlier field and laboratory studies.

Estimation

Missing or invalid data on demographic or work experience are imputed. No imputation is done for missing data on expenditures or income. Selected portions of the Diary data are also adjusted by automated imputation and allocation routines when respondents report insufficient detail to meet publication requirements. These procedures are performed annually on the data. The imputation routines assign qualifying information to data items when there is clear evidence of invalid nonresponse.

The statistical estimation of the population quantities of interest, such as the average expenditure on a particular item by a CU or the total number of CUs in a particular demographic group, is conducted via a weighting scheme. Each CU included in the survey is assigned a weight that is interpreted as representing the number of similar families in the universe of interest, the U.S. civilian noninstitutional population. Readers should refer to http://stats.bls.gov/opub/hom/homch16_c.htm for the detailed weighting method.

Beginning with 1997 data, BLS introduced a new calibration method to compute weights in the Consumer Expenditure Survey. The weights are calculated using a model-assisted, design-based regression estimator.

Accuracy

The Consumer Expenditures Survey is a sample survey and hence is subject to two types of errors, nonsampling and sampling. Nonsampling errors can be attributed to many sources, such as differences in the interpretation of questions, inability or unwillingness of the respondent to provide correct information, mistakes in recording or coding the data obtained, and other errors of collection, response, processing, coverage, and estimation for missing data. The full extent of nonsampling error is unknown. Sampling errors occur because the survey data are collected from a sample and not from the entire population. Tables with coefficients of variation and other reliability statistics are available on request from the national office. However, because the statistics are shown at the detailed item level, the tables are extensive.

TABLE 3-14. Cost of Owning and Operating an Automobile

Your Driving Costs produced by the American Automobile Association (AAA) provided the data for this table. Prior to 1985, the cost figures are for a mid-sized, current model, American car equipped with a variety of standard and optional accessories. After 1985, the cost figures are for a composite of three current model American cars:

1. A 1999 Chevrolet Cavalier LS,
2. A 1999 Ford Taurus SEL Deluxe, and
3. A 1999 Mercury Grand Marquis LS.

Thus, the estimates are not reliable estimates for all cars.

Fuel costs were based on an average price of $1.195 per gallon of regular unleaded gasoline, weighted 20 percent full-serve and 80 percent self-serve. Insurance figures were based on personal use of vehicles driven less than 10 miles to or from work, with no young drivers. Normal depreciation costs were based on the vehicle's trade-in value at the end of four years or at 60,000 miles. American Automobile Association (AAA) analysis covers vehicles equipped with standard and optional accessories, including automatic transmission, air conditioning, power steering, power disc brakes, AM/FM stereo, driver-and passenger side air bag, anti-lock brakes, cruise control, tilt steering wheel, tinted glass, emission equipment, and rear window defogger.

TABLE 3-15a & 3-15b. Average Passenger Fare (Current and chained 1996 dollars)

TABLE 3-18. Total Operating Revenues

Air

The U.S. Department of Transportation, Bureau of Transportation Statistics (BTS), Office of Airline Information, reports passenger fares and operating revenues in its publication *Air Carrier Financial Statistics*. These numbers are based on 100 percent reporting by large certificated air carriers. Minor errors from nonreporting may occur but amount to less than one percent of all passenger or freight activity. The figures do not include data for all airlines; such as most scheduled commuter airlines and all nonscheduled commuter airlines.

Class I Bus

Class I passenger motor carriers are required to report financial and operating information to BTS using form MP-1. (Prior to 1996, Class I carriers were required to report to the Interstate Commerce Commission.) Class I passenger motor carriers are defined as those having annual gross operating revenues, as adjusted for inflation, of $5,000,000 or more. This table does not include Class I carriers whose data had not been received at the time of publication. Thus, these data do not represent total Class I passenger motor carrier activity.

Transit

The American Public Transit Association (APTA) reports these figures, which are based on the annual National Transit Database (NTD) report published by the USDOT, Federal Transit Administration (FTA). The legislative requirement for the NTD is found in Title 49 U.S.C. 5335(a). Transit agencies receiving funds through the Urbanized Area Formula Program are generally required to report financial and operating data, including capital expenditures, revenues and expenses. These data are generally considered accurate because the FTA reviews and validates information submitted by individual transit agencies. Reliability may vary because some transit agencies cannot obtain accurate information or misinterpret certain data definitions. APTA conservatively adjusts FTA data to include transit operators that do not report to the database (private and very small operators and rural operators).

Rail

Data are from *Railroad Facts* published annually by the Association of American Railroads (AAR). AAR figures are based on 100-percent reporting by all nine Class I railroads to the Surface Transportation Board (STB) via Schedule 700 of the *R1 Annual Report*. STB defines Class I railroads as having operating revenues at or above a threshold indexed to a base of $250 million in 1991 and adjusted annually in concert with changes in the "Railroad Freight Rate Index" published by the Bureau of Labor Statistics. In 2000, the adjusted threshold for Class I railroads was $ 261.9 million. Declassification from Class I status occurs when a railroad falls below the applicable threshold for three consecutive years. Although Class I railroads comprise only 1 percent of the number of railroads in the country, they account for over 71 percent of the industry's mileage operated, 91 percent of total freight rail revenue, and 88 percent of railroad employment.

Intercity/Amtrak

Average passenger fare data are based on 100 percent of issued tickets, and thus should be accurate. Created as a publicly-owned for-profit corporation, Amtrak collects its own financial data and reports this information in its annual report. Auditing should ensure the accuracy of the operating revenue figures.

Trucking and Courier Services (except air)

The Census Bureau's Transportation Annual Survey (formerly known as the Motor Freight Transportation and Warehousing Survey) is the source of this information. The sample survey represents all employer firms with one or more establishments engaged primarily in providing commercial motor freight transportation or public warehousing services. It excludes motor carriers that operate as auxiliary establishments to nontransportation companies, as well as independent owner-operators with no paid employees. Thus, the data do not represent the total trucking industry.

In 1999, Transportation Annual Survey was merged with the Census Bureau's Service Annual Survey (SAS) and is the source of data for years 1998 and later. SAS provides estimates of operating

revenue of taxable firms and revenue and expenses of firms exempt from federal income taxes for selected service industries. Unlike the Transportation Annual Survey, the SAS is based on the North American Industry Classification System (NAICS).

As with all sample surveys, two types of errors are possible: sampling and nonsampling. Nonsampling errors may include response errors and mistakes in coding or keying data. For additional information about the survey and data reliability, the reader is referred to the Census Bureau website at www.census.gov.

Water (Domestic)

Eno Transportation Foundation, Inc. is the source of these data. Eno estimates these figures by multiplying ton-mile figures by estimated revenue per ton-mile. The U.S. Army Corps of Engineers reports the ton-mile figures in its publication *Waterborne Commerce of the United States*, and the revenue per ton-miles figures are estimated by Eno.

Oil Pipeline

Eno Transportation Foundation, Inc., publishes these data, which are based on Federal Energy Regulatory Commission (FERC) data and reported by the Oil Pipeline Research Institute for years 1977 to the present. FERC data originates from required quarterly reports filed by pipeline companies. Prior to 1977, the data are based on the former Interstate Commerce Commission data for regulated pipelines, and estimated to be 16 percent of the total of nonregulated pipelines.

Gas Pipeline

These statistics originate from *Gas Facts*, published annually by the American Gas Association (AGA).AGA data are based on gas utilities participation and reporting to the Uniform Statistical Report and estimates for those companies not reporting based on recent historical experience. Varying percentages of nonreporters from year to year introduce minor reliability problems for time-series comparisons.

TABLE 3-19. Employment in For-Hire Transportation and Selected Transportation-Related Industries

Employment data by industry are from the National Employment, Hours, and Earnings estimates published by the Bureau of Labor Statistics (BLS), U.S. Department of Labor. These estimates originate from the Current Employment Statistics (CES) survey program. The CES is a monthly survey conducted by state employment security agencies in cooperation with the BLS. The survey provides employment, hours, and earnings estimates based on payroll records of nonfarm business establishments, including government.

BLS uses a stratified sample based on a sector's employment size, or the degree of variability among its establishments, or both. This ensures that BLS captures a more representative survey from employers with large payrolls. Thus, large establishments are certain of selection while smaller ones have less of chance.

Data Collection

Data are collected electronically from about two-thirds of the respondents and by mail or fax from the remainder. The primary type of electronic reporting is touch-tone phone self-response; others are computer-assisted phone interviews and phone voice recognition technology. Increasingly, data are collected through electronic data interchange from a small but growing number of companies that have a large number of establishments across the country. Mail respondents submit Form 790 to the BLS each month. It is then edited and returned to the respondent for use again the following month. All firms with 250 employees or more are asked to participate in the survey, as well as a sample of smaller firms.

Estimation

Employment estimates are made at what is termed the basic estimating cell level and aggregated upward to broader levels of industry detail by simple addition. Basic cells are defined by industry (usually at the 3- or 4-digit SIC level) and are stratified within industry by geographic region and/or size class in the majority of cases. Within the wholesale trade, retail trade, and services divisions, most industries are stratified into three to five size classes (beginning in 1984).

Most national employment estimates are multiplied by bias adjustment factors to produce the monthly published estimates. Bias adjustment factors are used primarily to compensate for the inability to capture the entry of new firms on a

timely basis. New firms contribute a substantial amount to employment growth each year, but there is a lag between the creation of a firm and its inclusion on the sample frame (i.e., the Unemployment Insurance universe file). It is, therefore, necessary to use modeling techniques to capture this segment of the population. BLS also performs seasonal adjustments for certain SIC industries.

Accuracy

BLS does not publish data reliability information along with estimates. Instead, it provides estimation formula and the necessary parameters so that users can estimate standard errors. For additional information, see the "Explanatory Notes and Estimates of Error" in the BLS monthly publication *Employment and Earnings*.

The CES survey, which began over 50 years ago, predates the introduction of probability sampling as the internationally recognized standard for sample surveys. Instead, a quota sample has been used since its inception. Quota samples are at risk for potentially significant biases, and recently completed BLS research suggests that, despite the large CES sample size, employment estimates based on that sample at times diverge substantially from those that a more representative sample would have been expected to produce. This leads to an over-reliance on bias adjustment in the estimation procedure. Because bias adjustment is primarily based on past experience, it is limited in its ability to accurately reflect changing economic conditions on a timely basis.

Government Employment

The Office of the Secretary provides employment figures for the U.S. Department of Transportation. State and local highway department employment figures are from the *State and Local Government Employment and Payroll Estimates*, published by the U.S. Department of Commerce, Bureau of the Census. The data are for the 50 states and the District of Columbia. Employment and payroll data pertain to the month of October. At present, data are collected for one pay period that includes October 12 (regardless of the period's length) through the Public Employment Survey (PES).

Employment refers to all persons gainfully employed by and performing services for a government. Employees include all persons paid for personal services performed from all sources of funds, including persons paid from federally funded programs, paid elected officials, persons in a paid leave status, and persons paid on a per meeting, annual, semiannual, or quarterly basis. Excluded from employment statistics are unpaid officials, pensioners, persons whose work is performed on a fee basis, and contractors and their employees.

The Census Bureau derives full-time equivalent (FTE) employment by summing the number of full-time employees reported and converting the number of hours worked by part-time employees to a full-time equivalent amount. Up until 1985 data, the method used to calculate FTEs was based solely on payroll data. Effective with 1986 data, the annual employment survey started collecting data on the number of hours worked by part-time employees in order to provide a more accurate representation of full-time equivalent employment. No October 1985 FTE employment data are available.

Beginning in 1999, the Public Employment Survey (PES) was conducted using a separate sample of approximately 11,000 government units to improve data accuracy and survey efficiency. Government units meeting any of the following criteria are included in the survey: 1) counties with populations greater than 100,000; 2) cities with populations greater than 75,000; 3) townships in New England and Mid-Atlantic with populations greater than 50,000; 4) special districts with FTEs greater than 1000; 5) independent school districts with enrollment greater than 10,000; and 6) all dependent and independent schools providing college level education. In 1999, government units were sampled to obtain a relative standard error of 3 percent or less for FTE and total payroll for each of the states by type of government groups.

Prior to 1993, the PES used a joint sample of approximately 24,000 units for both employment and finance. From 1993 to 1998, the sample size was reduced to around 14,000 units. The standard error for the PES prior to 1999 was designed to be around 3 percent for major state- or county-level estimates of finance variables (state-level for 1993-1998 and county-level prior to 1993). Employment estimates are made using regression, except when the number of noncertainty cases contributing to the estimate is less than 20, where a simple unbiased estimate is used.

TABLE 3-20. Employment in Transportation Occupations

TABLE 3-22. Median Weekly Earnings of Full-Time Wage and Salary Workers in Transportation by Detailed Occupation

Employment by detailed transportation occupation data are from the Occupational Employment Statistics (OES) survey, collected by the Bureau of Labor Statistics (BLS). The OES is a periodic mail survey of nonfarm establishments that collects occupational employment data on workers by industry. The OES program surveys approximately 725,000 establishments in 400 detailed industries. The average response rate for the last three years, according to a BLS official, averaged about 70 percent.

The sample is selected primarily from the list of business establishments reporting to the state unemployment insurance program. The OES sample initially stratifies the universe of establishments by three-digit industry code and size- class code. Establishments employing 250 employees or more are sampled with certainty. Establishments employing fewer than 250 employees but more than 4 employees are sampled with probability proportional to the size class employment within each three-digit industry. Establishments employing four or fewer employees (i.e., size class 1 establishments) are not sampled. Instead, the employment for these establishments are accounted for by assigning a larger sampling weight to establishments employing five to nine employees (i.e., size-class 2 establishments). Within each three-digit industry/size- class cell, establishments are systematically selected into the sample through a single random start.

Data Collection

Employers are the source of occupational data. Within establishments, the main source of occupational data reported by respondents is personnel records. Data are collected from respondents primarily by mail. Occasionally, visits are made to large employers and to other respondents who indicate particular difficulty in completing the questionnaires. Ordinarily, two mailings follow the initial mailing. After the third mailing, a subsample of the remaining nonrespondents is drawn and contacted by telephone. The OES survey follows a 3-year cycle. Three surveys are conducted alternately for manufacturing, nonmanufacturing, and the balance of nonmanufacturing industries.

Estimation

During the sample selection process, each sampled establishment is assigned a sampling weight that is equal to the reciprocal of its probability of selection. For example, if an establishment on the sampling frame had a 1 in 10 chance of being selected into the sample, then its sampling weight is 10. For establishments that did not respond to the survey, a nonresponse adjustment factor is calculated and applied against the sampling weights of the responding establishments within each state/3-digit industry/size-class cell. Multiplying these adjustment factors by sampling weights increases the weight of the responding establishments so they can account for the missing employment data of the nonresponding establishments.

Accuracy

The OES survey uses a subsample replication technique to estimate variances in occupational employment at the 3-digit industry/size-class level. For additional information on occupational employment estimates and measurements of sampling error associated with the estimates, the reader is referred to http://stats.bls.gov/oes/home.htm.

TABLE 3-21. Average Wage and Salary Accruals per Full-Time Equivalent Employee by Transportation Industry

TABLE 3-23. Total Wage and Salary Accruals by Transportation Industry

The *Survey of Current Business* (tables 6.3c and 6.6c) published by the U.S. Department of Commerce, Bureau of Economic Analysis, is the source of transportation wage and salary data. These estimates are based on BLS tabulations of employee wages that are covered by State unemployment insurance. As a component of the income side of National Income and Product Account, wages and salaries comprise part of the GDP calculation. These data reflect the monetary remuneration of employees in terms of wage accruals less disbursements. It is defined as the difference between wages and salaries on a "when-earned" basis, or accrued, and wages and salaries on a "when-paid," or dis-

bursed basis. This computation was instituted in 1992 because a significant portion of bonus payments were missed in previous calculations. Readers should also refer to the earlier discussion of GDP methods and reliability for more detail.

TABLE 3-24. Labor Productivity Indices for Selected Transportation Industries

The Bureau of Labor Statistic's (BLS) *Industry Productivity Measures* is the source of transportation labor productivity data. BLS develops industry productivity measures based on various data sources.

For rail, BLS uses freight ton-mile and passenger miles that are collected by the Surface Transportation Board (STB), the Association of American Railroads (AAR), and Amtrak. BLS also aggregates four different air transportation outputs to form a single productivity index: domestic passenger-miles, domestic freight ton-miles, international passenger-miles, and international freight ton-miles. Air transportation data come from *Air Carrier Traffic Statistics and Air Carrier Financial Statistics*, published by the U.S. Department of Transportation, Bureau of Transportation Statistics. For petroleum pipeline, BLS relies on data from the Association of Oil Pipelines and derived an output index based on trunkline barrel-miles. A barrel-mile is one barrel of petroleum moved through one mile of pipeline.

Estimation

BLS generally calculates labor productivity by dividing an index of output (in this case, ton-miles) by an index of hours. Output is derived with a weight adjusted Tornqvist formula that produces an output ratio for one year. BLS then combines these in a series that produces a chained output index. The hour indexes are developed from data in BLS's Current Employment Statistics (CES; see discussion above for table 3-12) and are the results of dividing the annual aggregate hours for each year by a base-period figure. Readers who need more detail, such as mathematical specifications or equations, should refer to Kunze and Jablonski (Kunze and Jablonski 1998) or call the Office of Productivity and Technology at BLS.

Accuracy

BLS provides no measures of reliability. However, BLS makes an assumption that transportation outputs should be measured using the production of passenger-miles or freight-miles. Another school of thought might assume that many transportation firms or facilities are actually providing capacity rather than actual use. Thus, an argument can be made that productivity should be based on capacity rather than use. In fact, this is how BEA measures transportation output. To evaluate the BLS assumption, one study compared the two approaches by examining the different growth rates produced by BLS and BEA and found that in 25 of 35 service industries, the differences are within one percentage point. For transportation, differences in growth rates across BLS and BEA estimates were two percentage points or less (Kunze and Jablonski 1998).

Beginning with 1997 data, the indices for bus and petroleum pipelines did not meet BLS publication standards and are considered less reliable than those for other modes. These industries had between 14,000 and 15,000 employees, far below the 50,000-employee threshold established for transportation industries by BLS. However, they both met a basic test of variability of the annual percent changes in the output per hour measure.

GOVERNMENT REVENUES AND EXPENDITURES

TABLE 3-25a &3-25b. Federal, State, and Local Government Transportation-Related Revenues and Expenditures, Fiscal Year (Current and constant 1996 dollars)

TABLE 3-26a & 3-26b. Federal Transportation-Related Revenues, Fiscal Years (Current dollars and constant 1996 dollars)

TABLE 3-27a & 3-27b. Federal Transportation-Related Expenditures by Mode, Fiscal Year (Current and constant 1996 dollars)

TABLE 3-28. Cash Balances of the Transportation-Related Federal Trust Funds, Fiscal Year

The main sources for federal-level data are the *Budget of the United States Government* and the *Appendix to the Budget*. These data are the actual figures as reported for the various transportation-related programs in the appendices of each year's

budget document.[1] The figures are consistent from year to year and follow the definitional structure required by the Office of Management and Budget (OMB).

Primary sources for state and local transportation-related revenues and expenditures data are censuses and surveys collected by the U.S. Census Bureau. All units of government are included in the Census of Governments, which is taken at five-year intervals for years ending in 2 or 7, and these data are full counts, which are not subject to sampling error.

State and local government data for noncensus years are obtained by annual surveys, which are subject to sampling error. For U.S. totals of local government revenues and expenditures in this report, sampling variability is less than 3 percent.

Federal figures in this report correspond to the federal fiscal year, which begins on October 1, while state and local data are for fiscal years that generally start in July. While this may create a small error in totals for any given year, the data are suitable for illustrating trends in public transportation finance. Programs terminated before 1985 are excluded from the tables. The totals for transportation revenues and expenditures in this report are the sum of the Census Bureau's state and local numbers plus the total of the federal numbers.

The source of the chained dollar deflators is *The National Income and Product Account Tables*, Bureau of Economic Analysis, table 7.1, "Quantity and Price Indexes for Gross Domestic Product." All inflation-adjusted data are for the base year 1996, instead of 1992 as in previous editions of *National Transportation Statistics*. Note that deflators used for the federal data differ from those used for state and local data. Thus, if expenditures are totaled across different levels of government in chained dollars before and after federal grant transfers, the totals will not match.

[1] The federal budget is broken down into 20 functional categories, of which one is transportation (function 400). Function 400 is not tied to any one department or agency, but instead aggregates transportation functions wherever in the federal government they occur. Thus, the transportation function may include many activities, such as highway construction and safety, airways and airports, maritime subsidies, U.S. Coast Guard operations, railroads, and mass transit. It also covers grants-in-aid programs to support state and local activities. A good summary of the federal budget process can be found in Stanley E. Collender, *The Guide to the Federal Budget, Fiscal Year 1996* (Washington, DC: Urban Institute Press. 1995).

Transportation Revenues

Transportation revenue estimates include transportation-related user charges, taxes, or fees earmarked for transportation-related expenditures. Estimates include transit fares from systems owned and operated by state and local governments, including those systems operated under contract by a private firm under day-to-day financial oversight by government.

Federal transportation revenues generally consist of trust-fund collections from user charges, such as fuel taxes, vehicle taxes, registration and licensing fees, and air passenger ticket taxes. Damage payments made by private parties are deposited in the funds to reimburse the government for related fund expenditures.

The five transportation-related Federal trust funds are established by law:

1. Highway Trust Fund (HTF), which includes both highway and transit accounts;
2. Airport and Airway Trust Fund (AATF);
3. Harbor Maintenance Trust Fund (HMTF);
4. Inland Waterways Trust Fund (IWATF); and
5. Oil Spill Liability Trust Fund (OSLTF).

Highway Revenues

The Highway Trust Fund (HTF) was established by the Highway Revenue Act of 1956. Highway Trust Fund revenues are derived from various excise taxes on highways users (e.g., motor fuel, motor vehicles, tires, and parts and accessories for trucks and buses) and interest earned on balances. The Transportation Equity Act for the 21st Century (TEA-21), which was enacted in June 1998, made important changes to the Federal Highway Trust Fund legislations (FHWA, 1999):

- extension of deposit provisions of almost all highway user taxes through September 30, 2005;
- after September 30, 1998, the HTF can no longer earn interest on balances, and the balance in the highway account would be transferred to the general fund;
- TEA-21 keys Federal-aid highway funds to receipts of the Highway Account of the HTF; and

- the Transit Account share of fuel tax rose from 2 cents per gallon to 2.86 cents per gallon.

The Excise tax on gasoline is the most important source of the HTF revenues and has changed five times since 1985. It increased from 9 cents per gallon in 1985 to 9.1 cents per gallon on January 1, 1987; to 14.1 cents per gallon on December 1, 1990; to 18.4 cents per gallon on October 1, 1993; to 18.3 cents per gallon on January 1, 1996; and to 18.4 cents per gallon on October 1, 1997 (FHWA, 1999).

Money paid into the fund is earmarked primarily for the Federal-aid Highway program, which is apportioned to states for planning, constructing, and improving the nation's highway system, roads, and bridges. Effective April 1983, the Highway Revenue Act of 1982 created the Mass Transit Account within the HTF.

Some portion of the HTF is dedicated to budget deficit reduction and the Leaking Underground Storage Tank Trust Fund (LUSTTF). For example, 4.3 cents per gallon of the federal excise tax on gasoline has been assigned to the general fund since January 1, 1996, and 0.1 cents per gallon was apportioned to the LUSTTF since October 1, 1997 (FHWA, 1999). These funds are not considered as transportation-related in this report.

State and local highway revenues include state and local taxes on motor fuels, motor vehicle licenses, and motor vehicle operator licenses, along with state and local charges for regular toll highways and local parking charges. Regular highway charges (revenues) include reimbursements for street construction and repairs, fees for curb cuts and special traffic signs, and maintenance assessments for street lighting, snow removal, and other highway or street services unrelated to toll facilities. Local governments use special assessments and property taxes that may be commingled with other local revenue in a general fund to finance local road and street programs. Consistent with federal revenues, state and local transportation revenues in this report do not include general funds that may be allocated to transportation.

Transit Revenues

As mentioned above, the Highway Revenue Act of 1982 created the Mass Transit Account within the HTF. Effective April 1983, the act provided one cent per gallon of the federal excise tax on gasoline sales to be set-aside for the Mass Transit Account to help finance transit capital projects. The rate was increased to 1.5 cents per gallon on December 1, 1990; to 2 cents per gallon on January 1, 1996; and to 2.86 cents per gallon on October 1, 1997 (FHWA, 1999). Although highway users pay these taxes, the funds are treated as federal transit revenues.

State and local transit revenues include revenues from operations of public mass transportation systems (rapid transit, subway, bus, railway, and commuter rail services), such as fares, charter fees, advertising income, and other operations revenues. They exclude subsidies from other governments to support either operations or capital projects.

Air Revenues

The Tax Equity and Fiscal Responsibility Act of 1982, as amended by Omnibus Budget Reconciliation Acts of 1990 and 1993, the Small Business Job Protection Act of 1996, and the Taxpayers Relief Act of 1997, provides for the transfer of receipts received in the U.S. Treasury from the passenger ticket tax and certain other taxes paid by airport and airway users to the Airport and Airways Trust Fund (AATF). Effective October 1, 1997, the Taxpayers Relief Act of 1997 extends aviation excise taxes for 10 years and includes the following major provisions (FAA, 1999):

1. retains existing freight way bill, general aviation fuel and gas taxes, and a 6-dollar departure tax on domestic flights to and from Alaska and Hawaii;

2. converts the 10 percent ad valorem tax on domestic passenger tickets to a combination of ad valorem and flight segment tax over three years beginning October 1, 1997;

3. imposes a new 7.5 percent tax on payments to airlines for frequent flyer and similar awards by banks and credit card companies, merchants, frequent flyer program partners—other airlines, hotels, or rental car companies and other businesses;

4. increases the current 6-dollar international departure tax to 12 dollars per passenger and adds a 12-dollar international arrival tax;

5. lowers tax rates on flights to certain rural airports to 7.5 percent without a flight segment component; and

6. transfers revenues from the 4.3 cents-per-gallon aviation fuel taxes currently dedicated to

reduce the national U.S. deficit from the general fund to the AATF.

Most of this trust fund is used to finance the Federal Aviation Administration's (FAA's) capital programs, namely, Facilities and Equipment; Research, Engineering, and Development; and Airport Improvement Program. Within certain limits set by Congress, some of the remaining money is used to cover FAA operation and maintenance expenses. The portion of the FAA's operation and Maintenance expenses not paid from the trust fund revenues are financed by U.S. Treasury general funds.

State and local revenues from air transportation are derived from airport charges. Beginning in 1992, local governments began collecting passenger facility charges and spending these revenues (both subject to FAA approval) to finance capital programs.

The collection of passenger facility charges was authorized by the Aviation Safety and Capacity Expansion Act of 1990.[1]

Waterway and Marine Revenues

Federal water revenues come from four primary sources: the Harbor Maintenance Trust Fund (HMTF), the Inland Waterways Trust Fund (IWATF), the Oil Spill Liability Trust Fund (OSLTF), and tolls and other charges collected by the Panama Canal Commission.

The Harbor Maintenance Trust Fund was established in accordance with the Harbor Maintenance Revenue Act of 1986. Revenues for this fund are derived from receipts of a 0.125 percent ad valorem user fee imposed on commercial users of specified U.S. ports, Saint Lawrence Seaway tolls. On March 31, 1998, per a U.S. Supreme Court ruling, the tax on exports was terminated (OMB, 2000). This fund is used to finance up to 100 percent of the U.S. Army Corps of Engineers' harbor operation and maintenance (O&M) costs, including O&M costs associated with Great Lakes navigational projects, and the fund fully finances the operation and maintenance of the Saint Lawrence Seaway Development Corp.

The Inland Waterways Trust Fund was established by the Inland Waterways Revenue Act of 1978 and amended by the Water Resources Development Act of 1986. The trust fund has been in effect since fiscal year 1981. The sources for the fund are taxes imposed on fuel for vessels engaged in commercial waterway transportation and investment interest. From this tax of 24.3 cents per gallon, 4.3 cents goes for deficit reduction, and a statutory maximum of 20 cents (raised to that level from the previous maximum of 19 cents at the beginning of 1995) goes to the Trust Fund. The funds are earmarked for financing one-half of the construction and rehabilitation costs of specified inland waterway projects.

The Oil Spill Liability Trust Fund was established by the Omnibus Budget Reconciliation Act of 1989. Revenues for this fund are raised through tax collection of 5 cents on each barrel of oil produced domestically or imported (OMB, 1999). The resources from this fund are used to finance oil pollution prevention and cleanup activities by various federal agencies. For the U.S. Coast Guard, the fund finances oil spill recovery and payment of claims. Beginning in 1997, the fund also finances the annual disbursement to the Prince William Sound Oil Spill Recovery Institute.

The Panama Canal Commission was established by the Panama Canal Act of 1979 to manage, operate, and maintain the Panama Canal under the Panama Canal Treaty of 1977. The treaty period ended on December 31, 1999, when the Republic of Panama assumed full responsibility for the canal. During the treaty period, the commission collected tolls and other revenues, which were deposited in the U.S. Treasury in an account known as the Panama Canal Revolving Fund. Money from this fund was used to finance canal operations and capital programs, which were reviewed annually by Congress. The revenues reported under this category for FY 2000 are for the first quarter (October 1999 – December 1999) of Panama Canal operations.

State and local water revenues are derived from canal tolls, rents from leases, concession rents, and other charges for use of commercial or industrial water transport and port terminal facilities and related services. Fees and rents related to water facilities provided for recreational purposes, such as marina and public docks, and toll ferries are not included.

[1] Public Law 101-508, 104 Stat. 1388 (Nov. 5, 1990).

Rail Revenues

There are no governmental transportation revenues for rail (Rail generates fuel taxes that are designated for deficit reduction and, thus, are not considered transportation revenues in these tables).

Pipeline Revenues

The Pipeline Safety Program is funded by user fees assessed on a per-mile basis. The assessments are made on each pipeline operator regulated by the Office of Pipeline Safety (OPS) of the Research and Special Programs Administration (RSPA) in the U.S. Department of Transportation. There are no state and local revenues for pipeline.

General Support Revenues

General support revenues come from the Emergency Preparedness Fund, which is generated from fees paid by registered shippers of hazardous materials. RSPA administers and distributes the revenues to states, territories, and tribes through the Hazardous Materials Emergency Preparedness (HMEP) grant program, which is authorized by Federal Hazardous Materials Transportation Law.

Transportation Expenditures

Expenditures, rather than obligations, are used in these tables because they represent the final, actual costs to the government, by year, for capital goods and operating services required by transportation programs. Obligations suggest government commitment to future transportation expenditures, but do not indicate when the funds will actually be disbursed or even if the amounts obligated will be spent.

It is important to recognize that in some accounts in the *Budget of the United States Government*, expenditures for a particular year understate total government disbursements. This is because certain offsetting collections of fees and assessments from the public are not treated as government revenues, but deducted from disbursements to determine expenditures. These collections are those mandated, by statute, to directly fund agency expenditures rather than be transferred to the U.S. Treasury. For this reason, expenditures do not necessarily indicate how much the federal government actually spends on transportation each year.

Highway Expenditures

Federal Highway Administration (FHWA) expenditures include funds for Federal Aid Highways (financed from the HTF) and the Interstate Substitution and Railroad Crossing Demonstration (financed from the general fund). The National Highway Traffic Safety Administration (NHTSA) expenditures include: operations, research, and highway traffic safety grants. Federal highway expenditures also include road construction activities managed by the Department of the Interior's National Park Service, Bureau of Indian Affairs, Bureau of Reclamation, and Bureau of Land Management; the Department of Agriculture's Forest Service; the Department of Housing and Urban Development; and other federal agencies.

State and local governments' highway expenditures reported by the Census Bureau are generally slightly lower than those reported in FHWA's *Highway Statistics* because the FHWA includes some highway expenditure data, such as law enforcement activities and patrols, and policing of streets and highways not included in the Census data. Box 3-1 outlines the major differences in Census Bureau and FHWA calculation of state and local highway transportation financial statistics.

Transit Expenditures

Federal expenditures include grants to states and local agencies for the construction, acquisition, and improvement of mass transportation facilities and equipment and for the payment of operating expenses. Several other items are also included: Federal Railroad Administration (FRA) commuter rail subsidies related to the transition of Conrail to the private sector; research and administrative expenses of the Federal Transit Administration (FTA); and Federal interest payment contribution to the Washington Metropolitan Area Transportation Authority (WMATA).

Air Expenditures

Federal expenditures reported here consist of all FAA expenditures, such as those associated with constructing, operating, and maintaining the national air traffic system; administration of the airport grant program; safety regulation; and research and development. NASA expenses related to air transportation are also included.

State and local expenditures for air include the operation and maintenance of airport facilities, as administered by local airport and port authorities quasigovernment agencies with responsibilities for promoting safe navigation and operations for air modes.

Waterway and Marine Expenditures

Federal expenditures comprise those parts of the U.S. Coast Guard's expenses that are transportation-related, such as aids to navigation, marine safety, and marine environmental protection. All expenses of the U.S. Maritime Administration are included, such as subsidies for construction and operation of vessels by U.S.-flag operators, research and development, and training of ship officers. Also included are those expenses of the U.S. Army Corps of Engineers for construction and operations and maintenance of channels, harbors, locks and dams; protection of navigation; the salaries and expenses of the Federal Maritime Commission; and the expenses of the Panama Canal Commission. Expenditures of the Panama Canal Commission for FY 2000 include outlays for the first quarter of operations, including severance pay and accumulated leave. FY 2001 expenses are for the settlement of remaining accident and contract claims against the Commission.

State and local governments incur water transportation expenditures by operating and maintaining water terminal facilities within ports and harbors.

Rail Expenditures

Federal rail transportation expenditures include:

1. expenses for rail safety enforcement;
2. inspection and program administration;
3. railroad research and development;
4. financial assistance to states for planning, acquisition, rail facility construction, and track rehabilitation with respect to low volume freight lines;
5. grants to Amtrak, including funds to upgrade the high-speed line between Boston, Massachusetts, and Washington, DC, owned by Amtrak (the Northeast Corridor Improvement Program); annual appropriations to cover operating losses; and funds to invest in new equipment and facilities;
6. the purchase of redeemable preference shares for track rehabilitation and line acquisition; and
7. loan guarantee defaults for railroad rehabilitation and improvement and Conrail labor protection.[1]

The local rail freight assistance program, a program of FRA grants to state governments, has had a 70:30 percent federal-state funding share since 1982.

Pipeline Expenditures

The Office of Pipeline Safety (OPS) reimburses state agencies up to 50 percent of their costs to carry out state pipeline safety programs. Federal expenditures are for the enforcement programs, research and development, and grants for state pipeline safety programs.

General Support Expenditures

General fund expenditures include all of the expenses of the following agencies: Office of Inspector General, National Transportation Safety Board, all expenses of the Research and Special Programs Administration, (except pipeline expenditures) and the Office of the Secretary of Transportation (except for payments to Air Carriers and the Commission on Aircraft Safety).

Limitations of the Source Data Sets

The database covers civilian transportation-related activities of government agencies including those of the U.S. Army Corps of Engineers and U.S. Coast Guard.

As mention earlier, federal government data are compiled for the federal fiscal year, which begins on October 1, while state and local data are for fiscal years that generally start in July except for four states with other starting dates (Alabama and Michigan in October, New York in April, and Texas in September). While this may create a small error in totals for any given year, the data are suitable for illustrating trends in public transportation finance.

Readers should note that state and local governments data for census years are full counts and not subject to sampling errors, whereas the data for

[1] Funds in the Conrail Labor Protection Program were provided for benefits to Conrail employees deprived of employment because of work force reductions and other actions. This program no longer exists since Conrail has been returned to the private sector. In 1988, the unobligated balances available from this program were transferred to the USCG, and in 1990 they were returned to the U.S. Treasury.

Box 3-1.
U.S. Census Bureau and Federal Highway Administration Calculations of State and Local Transportation Financial Statistics Differ in the Following Ways:

Item	Census	FHWA
Motor fuel tax revenues	Includes state and local tax revenues on any fuel used in motor vehicles and on gasoline used by aircraft.	Includes state and local fuel tax revenues attributed to highway use of fuels, including diesel fuel, gasohol, and liquefied petroleum gas used by private and commercial highway use motor vehicles and transit. Does not include revenues on gasoline used by aircraft.
Motor vehicle license tax revenues	Includes vehicle mileage and weight taxes on motor carriers; highway use taxes; or off-highway fees.	Does not include vehicle mileage and weight taxes on motor carriers; highway use taxes or off-highway fees.
Local parking charges revenues	Includes local parking revenues.	Not explicitly collected.
Highway expenditures	Excludes patrols or policing of streets and highways; traffic control activities of police or public safety agencies; law enforcement and safety activities of vehicle inspection enforcement, and vehicle size and weight enforcement; street cleaning activities; and roads within parks maintained by a park agency.	Includes patrols or policing of streets and highways; traffic control activities of police or public safety agencies; law enforcement and safety activities of vehicle inspection enforcement, and vehicle size and weight enforcement; street cleaning activities; and roads within parks maintained by a park agency.

noncensus years are estimated from annual surveys of the Bureau of the Census, which are subject to sampling variability of less than three percent. The Census Bureau's database also does not include detailed modal information on interest earnings and bond issue proceeds on the revenue side nor bond retirement and interest payments on the expenditure side

Revenues

Transportation-related revenues like local government property taxes on vehicles, equipment, and streets, and state income taxes to support rail and intercity bus services are not covered because they are not shown in the source materials used to compile the database. In addition, taxes collected from users of the transportation system that go into the general fund are not included. For example, rail generates fuel taxes that are designated for deficit reduction and hence are not considered as transportation revenues. The portion of the Highway Trust Fund (HTF) that goes to the general fund is not considered as transportation revenues.

Expenditures

It is important to recognize that in some accounts in the *Budget of the United States Government*, expenditures for a particular year understate total government disbursements. This is because certain offsetting collections of fees and assessments from the public are not treated as government revenues, but deducted from disbursements to determine expenditures. These collections are those mandated, by statute, to be applied directly to finance agency expenditures rather than being transferred to the Treasury.

In addition, the Census Bureau's highway expenditures data do not include highway law enforcement expenditures, which form a part of the state and local highway expenditures published in the

Highway Statistics. To maintain consistency between the different modes regarding the types of expenditures included, these additional data from the *Highway Statistics* report have not been used.

Data Adjustments

Revisions and corrections to previously published data have been made in most cases. The base year for chained dollar estimates for current data sets is 1996, while the earlier version was presented in chained 1992 dollars. Moreover, the following adjustments have been incorporated.

Revenues

Transportation-related revenues of the Aquatic Resources Fund have been added to water transportation revenues. In this case, only the excise tax charged on motor boat fuels for the Boat Safety Program is assumed to be transportation-related.

The preceding data series did not account for revenues of Pollution Fund, Off-Shore Oil Pollution Fund, and Deep Water Port Liability Fund prior to FY 1990. The current data sets includes revenues for these funds prior to FY 1990.

Expenditures

Not all expenditures for the U.S. Coast Guard (USCG), as reported by the Office of Management and Budget, are considered transportation-related. A new approach has been used to arrive at more accurate USCG transportation-related expenditures. Similar to the previous approach, the current approach includes all expenditures for Environmental Compliance and Restoration, Alteration of Bridges, and Oil Spill Recovery. Part of the expenditures for Operations, Acquisition, Construction and Improvement, Research & Development, and Test and Evaluation are considered as transportation. Within these program areas, only Aids to Navigation, Marine Safety, and Marine Environmental Protection activities are included in the earlier data sets. In the current version, more activities like Search and Rescue and Ice Operations have been included. In addition, Boat Safety Program expenditures have also been included.

Trust fund share of pipeline safety was added to the Research and Special Programs Administration expenditures since FY 1994. This item was not covered in the previously published data.

Federal Grants

Federal grants to state and local governments for the Boat Safety Program have been included. These were not included in the previously reported data.

Data for federal transit grants are obtained from the Office of Management and Budget public budget database. In the previous data series, they were estimated by deducting direct federal transit expenditures grants from the total federal transit expenditures.

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Chapter 4 Energy and the Environment

PETROLEUM SUPPLY

TABLE 4-1. Overview of U.S. Petroleum Production, Imports, Exports, and Consumption

The petroleum supply system is extremely complicated, with many different processes, products, and entities involved. Briefly, crude oil is produced or imported, transported to refineries where it is refined into various products, and then transported to markets. Imports and exports of crude oil and products must be accounted for, as must be nonpetroleum components of final products, such as natural gas plant liquids and ethanol for gasoline blending.

The U.S. Department of Energy, Energy Information Administration (EIA) collects extensive data at select points in the petroleum supply system. Sixteen surveys are conducted by EIA's Petroleum Supply Reporting System to track the supply and disposition of crude oil, petroleum products, and natural gas plant liquids:

- five weekly surveys cover refineries (form EIA-800), bulk terminal stocks (form EIA-801), product pipelines (form EIA-802), crude stocks (form EIA-803), and imports (form EIA-804).
- eight monthly surveys cover the same five points plus tanker and barge movement (form EIA-817), gas processing facilities (form EIA-816), and oxygenates (form EIA-819M).
- one survey (form EIA-807) collects propane data on a monthly basis in the warmer months (April-September) and on a weekly basis in the colder months.
- one annual survey determines production capacity of oxygenates and fuel ethanol (form EIA-819A), and
- one annual survey determines refinery fuel use, capacity, and crude oil receipts by transportation mode (form EIA-820).

The five weekly surveys target key points in the petroleum supply system. They do not include all companies, but sample 90 percent of volume at each selected point in the supply system. EIA rank-orders the companies involved in the survey and sends surveys as it scrolls down the list, stopping when it reaches the 90 percent level. Although 100 percent coverage is sacrificed, this method keeps the level of incoming data manageable and avoids burdening the smallest companies. All data are reviewed and anomalies checked.

Monthly surveys provide data that are used in the monthly and annual reports. They are similar to the weekly surveys, but are more exhaustive in both the range of data collected and the depth of the collection. Sample sizes and response rates for several of the key points in the supply system are shown in table A. The eight monthly surveys cover the industry more accurately than the weekly surveys and provide some double-check points that the other surveys do not. EIA expends considerable effort to ensure that its data are as accurate as possible. Revisions are made throughout the year. For example, EIA's *Annual Energy Review 1996*, released in July 1997, provided a preliminary 1996 number for total petroleum production of 8.30 million barrels per day (mmbd). The *Annual Energy Review 1997*, released a year later, revised that to 8.25 mmbd, and the 1999 Review reported 8.29 mmbd.

TABLE A.
Average Response Rates for Monthly Surveys, 1998

Survey Site	Average universe site	Average number of respondents	Percent
Refinery	252	243	96.3
Bulk terminal	300	287	95.6
Pipeline	81	80	99.3
Crude oil stocks	174	169	99.1
Refinery	252	243	96.3
Bulk terminal	300	287	95.6

NOTE: The average response rate is calculated by summing individual monthly response rates and dividing by 12.

SOURCE: Tammy G. Heppner and Carol L. French, Energy Information Administration, U.S. Department of Energy, Accuracy of Petroleum Supply Data (Washington, DC: 1998)

No complicated survey is likely to be 100 percent accurate. EIA lists four sources of potential systematic errors:

1. Some members of the target population are missed. EIA reports that it continually reviews the lists and searches industry periodicals and newspapers to identify new actors. Considering the nature

of the petroleum industry, it is very unlikely that companies with significant production are not surveyed.

2. Some members of the target population do not respond. EIA reports a 97 percent response rate for monthly surveys. For some points in the supply system, the average response is over 99 percent. Survey respondents are required by law to respond, but some nonresponse is inevitable, especially among small companies. EIA assumes that the nonrespondent's value for that month is the same as for the previous month except for imports. Since imports vary widely, with respondents frequently having no imports, EIA assumes a nonresponse means zero imports. It can be assumed that EIA is good at "filling in the blanks." Assuming for illustration purposes that 0.5 percent of production does not respond, and that EIA is 90 percent accurate in covering the gap, then there is a possibility of a 0.05 percent error. Applying that to total production of 8.29 mmbd in 1999 suggests that there could be an error of 0.0041 mmbd (4,100 barrels per day), which would not affect the published number.

3. The most serious problem may be response error. A company may have poor data, perhaps as a result of imperfect measurements, or it may transmit the wrong number. EIA has no control over a company's data quality. Companies have incentive to measure their inputs and products accurately. Otherwise, they may be cheating themselves or risking ill will with their customers or suppliers. However, no instrumentation is perfectly accurate. The high throughput of, say, a refinery with capacity of several hundred thousand barrels per day, with a variety of products changing density and some lost or used on site, is very complicated to measure. Instrumentation errors are likely to be systematic at any one site, although they will be more nearly random in the aggregate for all facilities. There is potential for small but significant overall errors.

Mistakes may be made in recording and transferring the data. EIA reviews the data and flags gross errors or missing data for review by the respondent. However, not all errors will be picked up by EIA and/or the respondent. Overall, response errors probably are several times as large as nonresponse errors, but it is beyond the scope of this profile to estimate them.

4. The final potential source of systematic error is in the clarity of the survey form, i.e., whether all respondents interpret it correctly. No doubt errors and ambiguities can creep into a form, but at least for petroleum supply, that does not appear to be a major risk. The supply system is not changing rapidly, and EIA should be able to keep with it and the terminology. However the final digit of EIA's published supply data is questionable.

For additional information on survey methodology and statistical reliability, the reader is referred to the EIA reference cited in the tables or the EIA Internet site at www.eia.doe.gov.

FUEL AND ENERGY CONSUMPTION

TABLE 4-1. Overview of U.S. Petroleum Production, Imports, Exports, and Consumption

TABLE 4-2. U.S. Consumption of Energy from Primary Sources by Sector

TABLE 4-3. Domestic Demand for Refined Petroleum Products by Sector

TABLE 4-4. U.S. Energy Consumption by the Transportation Sector

TABLE 4-7. Domestic Demand for Gasoline

Petroleum consumption is far more complex to measure than supply. Instead of a few hundred companies at most measuring points in the supply system, there are tens of millions of consumers. It would be impossible for any survey of individual consumers to produce the high rate of return of U.S. Department of Energy (DOE), Energy Information Administration's (EIA's) supply surveys. EIA's transportation data collection is further limited by the termination of the Residential Transportation Energy Consumption Survey (RTECS). Therefore, EIA uses surveys of sales of products (e.g., Form EIA-821: Annual Fuel Oil and Kerosene Sales Report) or tax collection data from the U.S. Department of Transportation, Federal Highway Administration (FHWA).

EIA reviewed the accuracy of its energy consumption data in a 1990 monograph *Energy Consumption by End-Use Sector, a Comparison of Measures by Consumption and Supply Surveys*. Unfortunately, this monograph does not discuss the

transportation sector because the consumption and supply surveys were not comparable. However, some of the results from other sectors indicate the discrepancies between supply and consumption surveys. Table B shows the ratio of fuel supplied to the sector to consumption reported by the sector in consumption surveys.

In most cases, supply is reported as substantially larger than consumption. Supplies of fuel oil to the commercial sector are reported at almost twice the level of consumption reported by that sector. Some of the discrepancies may be due to definition differences (e.g., fuel oil for apartment buildings is included in commercial supply surveys but not in consumption surveys). Overall, however, the differences are too large for great confidence in the accuracy of the data.

If transportation had been reviewed in the same format, it is likely that the discrepancies would have been larger. Most transportation fuel (gasoline for automobiles) is purchased in small quantities at irregular intervals and cannot be checked simply by looking at a utility bill. Hence, highway transportation energy consumption surveys must be extensive to avoid the risk of large uncertainties in the data. But, with the termination of the RTECS, EIA ceased conducting such surveys. Consumption data must be derived indirectly from sales of petroleum products and tax collection data. While petroleum supply may be accurate to one decimal place, it is likely that disaggregating by sector use may be within plus or minus several percentage points, or perhaps about half a quadrillion British thermal unit (Btu) in table 4-1.

TABLE B.
Reported Ratio of Fuel Supply to Reported Consumption

Sector	Electricity	Gas	Oil
Residential	1.05	0.92	0.92
Commercial	0.91	1.38	1.96
Industrial	1.18	1.28	1.34

SOURCE: U.S. Department of Energy, Energy Information Administration, Energy Consumption by End-Use Sector, A Comparison of Measures by Consumption and Supply Surveys, DOE/EIA-0533 (Washington, DC: 1990).

Motor Gasoline

Almost all gasoline is consumed in the transportation sector. Small amounts are used in the commercial sector for nonhighway use and the industrial sector, which includes agriculture, construction, and other uses. Subtracting estimates of those uses from the known total sales yields the transportation sector's total, which is further subdivided into highway and marine use. Aviation gasoline is, of course, used entirely in the transportation sector (for a very few high-performance automobiles as well as small aircraft).

Data on actual sales is collected by the states for revenue purposes. These data are forwarded to FHWA. EIA uses the data from FHWA to allocate highway consumption of motor gasoline among the states. For 1999, FHWA reported 124.7 billion gallons of gasoline sold nationally for highway use. EIA's table 5.12c of the *Annual Energy Review 2000* lists 8.33 mmbd of gasoline supplied for the transportation sector, the same as 127.7 billion gallons.

Such close agreement between supply and demand is not totally convincing. Definitions are unique to each state (e.g., whether gasohol is counted as pure gasoline or part gasoline and part renewables), measurement points vary from state to state, and each state handles losses differently. Hence, the total of all states' sales of gasoline is not entirely consistent.

Separation of highway from nonhighway uses of gasoline is, by necessity, based in part on careful estimates. Nevertheless, overall gasoline sales are well documented, and the separation is probably fairly accurate. Refinery output of motor gasoline was 7.93 mmbd in 1999, which is probably accurate to the first decimal place and maybe a little better. The transportation sector's 8.33 mmbd would have about the same accuracy.

Diesel Fuel

Diesel fuel is used in highway vehicles, railroads, boats, and military vehicles. Sales are only about 30 percent of gasoline in the transportation sector, but uncertainties are greater. More diesel than gasoline is used for nonhighway purposes, especially agriculture and construction. In addition, there has been more potential for cheating to avoid the tax; heating oil is virtually the same as diesel fuel and can easily be transferred to a vehicle. However, this is less significant now that tracers have been added to fuel oil. After the addition of tracers, the amount of transportation diesel fuel use jumped.

To estimate diesel fuel sales by mode, EIA starts with the total supply of distillate fuel and subtracts

the small amount sold to electric utilities (the most accurately known sector, as measured by EIA Form EIA-759). The remainder is divided among the other end-use sectors according to EIA's sales surveys (Form EIA-821: Annual Fuel Oil and Kerosene Sales Report, and Form EIA-863: Petroleum Product Sales Identification Survey).

This method introduces several potential elements of inaccuracy. First, the surveys of each sector are probably less accurate than the supply surveys noted earlier. Companies and individuals may inadvertently send incorrect data, or not respond at all. Then EIA has to determine what adjustment factor to use for each end-use sector. Since each sector will have a different response rate to the surveys, the adjustments will be different. Large adjustments can introduce large errors. EIA has not published its adjustments for the transportation sector. As shown in table 2, the adjustments in other sectors range from 5 to 96 percent of reported consumption. Even a 20 percent adjustment could introduce an error of one or two percentage points (plus or minus) for any one sector.

Overall, the accuracy of diesel fuel use in the transportation sector should be viewed with some skepticism.

Jet Fuel

Jet fuel is the only other petroleum-based fuel that is used in large quantities (over 1 million barrels/day) in the transportation sector. Virtually all of it is used by airlines. These data are accurate because airlines are required to report usage, and because there are relatively few certificated air carriers, data collection should be manageable.

NONPETROLEUM FUELS CONSUMPTION

TABLE 4-10. Estimated Consumption of Alternative and Replacement Fuels for Highway Vehicles

Collectively, oxygenates, natural gas, electricity, and various alternative fuels amount to only about 3 percent of all energy used in the transportation sector. While this may not be much greater than the error bars associated with petroleum use, it is important to track changes in these fuels accurately.

Oxygenates

Oxygenates, mostly methyl tributyl ether (MTBE), which is derived from natural gas and ethanol, are part of mainstream gasoline supply. They are measured routinely with petroleum supply (forms EIA-819A and 819M). Consumption is estimated from production, net imports, and stock changes. Refineries and other entities are required to report data on oxygenates, and EIA also monitors production capability to provide a crosscheck. Thus, oxygenates data are likely to be reasonably accurate.

Natural Gas

Natural gas is used in the transportation sector mainly as the fuel for compressor stations on natural gas transmission lines. A small but growing amount is used in compressed or liquefied form in vehicles. EIA collects data on natural gas much as it does for petroleum, but the system is much simpler. Natural gas transmission companies may not know exactly how much gas is used in compressor stations, but they have a good idea based on the size of the equipment and the load on the line. The reported numbers probably are reasonably accurate. Data on natural gas-fueled vehicles are collected by DOE via Form-886, which is sent to fuel suppliers, vehicle manufacturers, and consumers. In addition, private associations and newsletters are important sources of information on alternative vehicles and alternative fuels use. Since most groups work cooperatively with DOE, it is likely that the data reported are accurate. EIA tracks the number of natural gas vehicles and the number of refueling stations to provide a cross check on estimates of natural gas consumption.

Electricity

Electricity powers intercity trains (Amtrak) and intracity rail systems. In addition, the number of electric vehicles is growing. There is considerable uncertainty over the energy consumed by these modes. Amtrak no longer provides national totals of its electricity consumption. Data on intracity transit is based on U.S. Department of Transportation, Federal Transit Administration's (FTA's) National Transit Database (NTD). The legislative requirement for the NTD is found in Title 49 U.S.C. 5335(a). Transit agencies receiving funds through the Urbanized Area Formula Program are

generally required to report financial and operating data, including energy use. Although the data is generally considered accurate because FTA reviews and validates information submitted, reliability may vary because some transit agencies cannot obtain accurate information or may misinterpret certain data.

If electric vehicles become important over the next decade or two, dedicated charging stations may become commonplace, which could provide accurate data. Fleet owners (e.g., electric utilities) can keep accurate records, but individuals who plug their vehicles in at home may not. Electricity use must be estimated from the number of such vehicles and the expected driving cycles. Hence, data on electric power for transportation must be viewed as an estimate.

It should also be noted that electricity is a form of work that usually is generated from heat with the loss of about two-thirds of the energy. Automobile engines are equivalent to electric generators in that they convert chemical energy to heat and then to work, losing most of the energy as waste heat. When electrical energy is compared to petroleum in transportation, the waste heat must be included for consistency. A kilowatt-hour of electricity is equivalent to 3,413 British thermal units (Btu), but about 10,000 Btu of heat are required to produce it. This factor is dropping as generators become more efficient. High efficiency gas turbines may require 8,000 Btu or less, but the average is much higher. It is usually impossible to tell where the power for a specific use is generated, so average figures for a region are used to estimate the waste energy, a factor that further reduces the accuracy of the data.

Alternative Fuels

In addition to oxygenates, natural gas, and electricity, alternative fuels include ethanol and methanol. EIA tracks the numbers of such vehicles through Form-886, state energy offices, federal demonstration programs, manufacturers, and private associations. These numbers probably are fairly accurate although it is difficult to monitor retirements. Fuel consumption is estimated from the types of vehicles in operation, vehicle miles traveled, and expected fuel efficiency. Adjustments are necessary for the relatively few flexible-fuel vehicles. Obviously, the reported data are estimates only.

FUEL AND ENERGY CONSUMPTION BY MODE

TABLE 4-5. Fuel Consumption by Mode of Transportation

TABLE 4-6. Energy Consumption by Mode of Transportation

TABLE 4-8. Certificated Air Carrier Fuel Consumption and Travel

TABLE 4-9. Motor Vehicle Fuel Consumption and Travel

TABLE 4-11. Passenger Car and Motorcycle Fuel Consumption and Travel

TABLE 4-12. Other 2-Axle 4-Tire Vehicle Fuel Consumption and Travel

TABLE 4-13. Single-Unit 2-Axle 6-Tire or More Truck Fuel Consumption and Travel

TABLE 4-14. Combination Truck Fuel Consumption and Travel

TABLE 4-15. Bus Fuel Consumption and Travel

Fuel consumption data are collected quite differently than supply data collected by the U.S. Department of Energy, Energy Information Administration (EIA). Highway fuel consumption, for example, is based on U.S. Department of Transportation, Federal Highway Administration (FHWA) data collected from states in the course of revenue collection. EIA starts from the fuel delivered to transportation entities.

Highway

Highway fuel data (tables 4-5, 4-9, and 4-11 through 4-15) are collected mainly by FHWA. All states plus the District of Columbia report total fuel sold along with travel by highway category and vehicle registration. Data typically flows from state revenue offices to the state departments of transportation to FHWA. Even if reporting is reasonably accurate, some data are always anomalous or missing and must be modified to fit expected

patterns. In addition, as discussed earlier, there are some significant differences in methodology and definitions among the states. In particular, states differ in where the tax is applied in the fuel supply system, how gasohol is counted, how nonhighway use is treated, and how losses are handled.

Nonhighway use of gasoline and diesel fuel is a particularly large source of potential error. Some states designate nonhighway users as tax-exempt, others make the tax refundable. In either case, many people won't bother to apply if the amount of money is small. Nonhighway use of diesel fuel is especially large because many construction and agricultural vehicles are diesel powered. Thus, the fraction of petroleum attributed to transportation could be overestimated. On the other hand, some nonhighway fuel finds its way into the transportation system because heating oil can be used as diesel fuel, evading the tax. Tracers are now added to heating oil, which appears to have reduced the level of such tax evasion—if found in a truck's fuel tank, the tracer indicates diversion from a nontaxed source.

Breaking fuel use down by class of motor vehicle introduces the potential for error. FHWA must estimate the miles each class is driven and the fuel economy. Estimation of miles is based on the 1995 Nationwide Personal Transportation Survey (NPTS), administered by FHWA, and the Vehicle Inventory and Use Survey (formerly known as the Truck Inventory and Use Survey) conducted by the U.S. Census Bureau. For information about these two surveys, the reader is referred to the technical appendix of *Our Nation's Travel*, available from the FHWA, Office of Highway Information Management; and the 1997 Census of Transportation, available from the Economics and Statistics Administration within the Census Bureau. Fuel economy is based on state-supplied data, TIUS, and the National Highway Traffic Safety Administration data on new car fuel economy, which must be reduced by about 15 percent to reflect actual experience on the road. Overall, both vehicle-miles of travel and fuel economy are estimates.

Fuel consumption by buses is particularly uncertain. FHWA collects data on intercity buses, and the American Public Transit Association (APTA) covers local travel. Very little data are collected on school buses. APTA figures are based on data from the USDOT, Federal Transit Administration's (FTA's) National Transit Database, which covers about 90 to 95 percent of total passenger-miles. These data are generally accurate because FTA reviews and validates information submitted by individual transit agencies. Reliability may vary because some transit agencies cannot obtain accurate information or may misinterpret data. APTA conservatively adjusts the FTA data to include transit operators that do not report to FTA, such as private and very small operators and rural operators. Prior to 1984, APTA did not include most rural and demand responsive systems.

Air

The U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information (OAI) is the source of these data. The numbers are based on 100-percent reporting of fuel use by large certificated air carriers (those with revenues of more than $100 million annually) via Form 41. The data are probably reasonably accurate because the airlines report fuel use regularly, and the limited number of airlines aids data management.

Smaller airlines, such as medium size regional and commuter air carriers, are not required to report energy data. OAI estimates that about 8 percent would have to be added to the total of the larger airlines to account for this use, but that has not been done in table 4-5 or 4-8.

General aviation aircraft and air taxis are covered in the General Aviation and Air Taxi and Avionics Survey, conducted by the Federal Aviation Administration (FAA). The survey is conducted annually and encompasses a stratified, systematic design from a random start to generate a sample of all general aviation aircraft in the United States. It is based on the FAA registry as the sampling frame. For instance, in 2000, a sample of 31,039 aircraft was identified and surveyed from an approximate population of 256,927 registered general aviation aircraft.

The reliability of the GAATA survey can be impacted by two factors: sampling and nonsampling error. A measure, called the standard error, is used to indicate the magnitude of sampling error. Standard errors can be converted for comparability by dividing the standard error by the estimate (derived from the sample survey results) and multiplying it by 100. This quantity, referred to as the percent standard error, totaled two and four-tenths

of a percent in 2000 for the general aviation fleet. A large standard error relative to an estimate indicates lack of precision, and inversely, a small standard error indicates precision.

Nonsampling errors could include nonresponse, a respondent's inability or unwillingness to provide correct information, differences in interpretation of questions, and data entry mistakes. The reliability of general aviation fleet data comparisons over time would decrease because of changes implemented in 1978 and sampling errors discussed above. Readers should note that nonresponse bias may be a component of reliability errors in the data from 1980 to 1990. The FAA conducted telephone surveys of nonrespondents in 1977, 1978, and 1979 and found no significant differences or inconsistencies between respondent and nonrespondent replies. The FAA discontinued the telephone survey of nonrespondents in 1980 to save costs. Nonresponse surveys were resumed in 1990; and the FAA found notable differences and make adjustments to its data to reflect nonresponse bias.

The U.S. Government, in particular the Department of Defense (DOD), uses a large amount of jet fuel as shown in table 4-19 (see discussion on government consumption below). However, DOD reports all fuel purchased, including from foreign sources for operations abroad. While the data may be accurate, it is not comparable to EIA's overall U.S. supply and consumption figures on jet fuel.

International operations are included in table 4-8 but not table 4-5. The fuel use for international operations includes that purchased by U.S. airlines for return trips. OAI does not collect data on foreign airline purchases of fuel in the United States. Thus, a significant use of U.S. jet fuel is missed. However, these two factors approximately balance each other out. As shown in table 1-34, foreign carrier traffic is just slightly less than U.S. carrier international traffic, so presumably the fuel purchased here by foreign carriers is very close to the fuel purchased abroad by U.S. carriers.

Rail

The data are from *Railroad Facts*, published annually by the Association of American Railroads (AAR). AAR figures are based on 100 percent reporting by Class I railroads to the Surface Transportation Board (STB) via Schedule 700 of the *R1 Annual Report*. Thus, the data are considered accurate. STB defines Class I railroads as having operating revenues at or above a threshold indexed to a base of $250 million (1991) and adjusted annually in concert with changes in the Railroad Freight Rate Index published by the Bureau of Labor Statistics. In 2001, the adjusted threshold for Class I railroads was $266.7 million. Although Class I railroads represent only 1 percent of the number of railroads in the country, they account for over 70 percent of the industry's mileage operated and more than 90 percent of all freight revenue; energy consumption should be of the same order. For passenger travel, information is unavailable. Amtrak no longer provides data on a national basis, and the regional data appears to be inconsistent.

Transit

The APTA figures are based on information in FTA's National Transit Database. APTA conservatively adjusts FTA data to include transit operators that do not report to the FTA Database (private and very small operators and rural operators), which accounts for about 90 to 95 percent of the total passenger-miles. The data are generally accurate because the FTA reviews and validates information submitted by individual transit agencies. Reliability may vary because some transit agencies cannot obtain accurate information or misinterpret certain data definitions in federal guidelines.

Water

The EIA collects data on residual and distillate fuel oils and diesel through its *Annual Fuel Oil and Kerosene Sales Report* survey, form EIA-821. The survey targets companies that sell fuel oil and kerosene to end users. This survey commenced in 1984 and data from previous years should be used with caution.

Sampling Frame and Design

The sample's target universe includes all companies that sell fuel oil and kerosene to end users. EIA derives the sampling frame from the EIA-863 database containing identity information for approximately 22,300 fuel oil and kerosene sellers. EIA stratifies the sampling frame into two categories: companies selected with certainty and uncertainty. Those in the certainty category varied but included the end use "vessel bunkering," or sales for the fueling of commercial and private watercraft.

Sampling Error, Imputation, and Estimates

EIA reported a 92.5 percent response rate for the 2000 survey. The EIA also provides estimates of the sampling error for geographic areas and U.S. averages are 1.8 for residential distillate fuel oil, 0.8 for nonresidential retail distillate fuel oil, and 0.1 for retail residual fuel oil. Some firms inevitably ignore survey requests, causing data gaps. EIA estimates the volumes of these firm's sales by imputation; more detailed information and the algorithm can be obtained at EIA's web site in the technical notes for the Annual Fuel Oil and Kerosene Sales Report. See http://www.eia.doe.gov/oil_gas/petroleum/data_publications/fuel_oil_and_kerosene_sales/foks.html.

TABLE 4-19. U.S. Government Energy Consumption by Agency and Source

Energy consumption data are collected by DOE's Office of Federal Energy Management Programs in cooperation with most departments and agencies. DOD is by far the largest consumer, accounting for about 80 percent of the total. As discussed above, the data includes fuel purchased abroad for military bases. Since government agencies are required to report these data, they are probably accurate. However, it is possible that some consumption is missed. For example, some agencies may report only fuel supplied directly, missing consumption such as gasoline purchased by employees while on government business for which they are then reimbursed. In addition, smaller agencies were neglected. Overall, however, the data should provide a fairly good approximation of government energy consumption.

ENERGY EFFICIENCY

TABLE 4-20. Energy Intensity of Passenger Modes

TABLE 4-21. Energy Intensity of Certificated Air Carriers, All Services

TABLE 4-22. Energy Intensity of Passenger Cars, Other 2-Axle 4-Tire Vehicles, and Motorcycles

TABLE 4-24. Energy Intensity of Transit Motor Buses

TABLE 4-25. Energy Intensity of Class I Railroad Freight Service

TABLE 4-26. Energy Intensity of Amtrak Service

Total energy consumed for each mode can be estimated with reasonable accuracy. Miles traveled are known for some modes, such as air carriers, but less accurately for others, most notably automobiles. When the numbers of passengers or tons are required to calculate energy efficiency, another uncertainty is introduced. Again, air carriers and intercity buses know how many passengers are on board and how far they travel, but only estimates are available for automobiles and intracity buses.

Thus, table 4-21 should be quite accurate for certificated air carriers, though it is missing small airlines and private aircraft. Table 4-22 is based on FHWA fuel tax data, derived from state fuel tax revenues. VMT is as discussed for tables 1-9 and 1-10. Data for motorcycles must be adjusted significantly more than for automobiles because less information is collected from the states or from surveys. Transit bus data (table 4-24) are very uncertain because, unlike intercity buses, the distance each passenger travels is not measured by ticket sales.

The intermodal comparison of passenger travel in table 4-20 must be viewed with considerable caution. Data for the different modes are collected in different ways, and the preparation of the final results is based on different assumptions. As noted above, airlines accurately record passenger miles, but the data on occupancy of private automobiles must be estimated from surveys. Even relatively certain data, such as state sales of gasoline, must be modified to resolve anomalies, and transit data are even harder to make consistent. Furthermore, different groups collect the data for the various modes, and they have different needs, assumptions, and methodologies. Thus, the comparisons are only approximate.

Freight service data (table 4-25) are from *Railroad Facts*, published annually by the Association of American Railroads (AAR). AAR figures are based on 100 percent reporting by Class I railroads to the Surface Transportation Board (STB) via Schedule 700 of the *R1 Annual Report*. STB defines Class I railroads as having operating revenues at or above a threshold indexed to a base of

$250 million (1991) and adjusted annually in concert with changes in the Railroad Freight Rate Index published by the Bureau of Labor Statistics. In 2000, the adjusted threshold for Class I railroads was $ 261.9 million. Although Class I railroads comprise only 1 percent of the number of railroads in the country, they account for over 71 percent of the industry's mileage and 91 percent of all freight revenue; energy data should be of the same order.

TABLE 4-27. Annual Wasted Fuel Due to Congestion

TABLE 4-28. Wasted Fuel per Eligible Driver

The Texas Transportation Institute's (TTI) *Urban Roadway Congestion Annual Report* provided figures for tables 4-27 and 4-28. TTI relies on data from the U.S. Department of Transportation, Federal Highway Administration, Highway Performance Monitoring System database (HPMS). (See box 1-1 for detailed information about the HPMS.) TTI utilizes these data as inputs for its congestion estimation model. Detailed documentation for the TTI model and estimations can be found at http://mobility.tamu.edu/.

The sum of fuel wasted in typical congestion (recurring delay) and incident related delays equal the annual wasted fuel for an urban area. Recurring delay is the product of recurring delay (annual hours in moderate, heavy, and severe delays) and average peak period system speed divided by average fuel economy. Incident delay hours are multiplied by the average peak period system speed and divided by the average fuel economy to produce the amount of incident fuel wasted.

Structure, Assumptions, and Parameters

Urban roadway congestion levels are estimated using a formula measuring traffic density. Average daily travel volume per lane on freeways and principal arterial streets are estimated using area wide estimates of vehicle-miles of travel and lane miles of roadway. The resulting ratios are combined using the amount of travel on each portion of the system (freeway and principal arterials) so that the combined index measures conditions overall. This variable weighting factor allows comparisons between areas such as Phoenix-where principal arterial streets carry 50 percent of the amount of travel of freeways-and cities such as Phoenix where the ratio is reversed. Values greater than one are indicative of undesirable congestion levels. Readers seeking the algorithm for the congestion index should examine http://mobility.tamu.edu/.

In previous reports, TTI assumed that 45 percent of all traffic, regardless of the urban location, occurred in congested conditions. TTI indicated that this presumption overestimated travel in congested periods. Its 2002 estimates now vary by urban area anywhere from 18 to 50 percent of travel that occurs in congestion. TTI's model structure applies to two types of roads: freeways and principal arterial streets. The model derives estimates of vehicle traffic per lane and traffic speed for an entire urban area. Based on variation in these amounts, travel is then classified under 5 categories: uncongested, moderately congested, heavily congested, severely congested, and extremely congested (a new category in 1999). The threshold between uncongested and congested was changed in 1999. Previous editions classified congested travel when area wide traffic levels reached 14,000 vehicles per lane per day on highways and 5,500 vehicles per lane per day on principal arterial streets. For the current edition these values are 15,500 and 5,500 vehicles per lane per day respectively. Previous years values have been re-estimated based on these new assumptions. Readers should refer to the TTI website for more detailed information on its estimation procedures http://mobility.tamu.edu/.

TTI reviews and adjusts the data used in its model, including statewide average fuel cost estimates (published by the American Automobile Association) and the number of eligible drivers for each urban area (taken from the Statistical Abstract of the United States, published by the U.S. Department of Commerce, Bureau of the Census). The model has some limitations because it does not include local variations (such as bottlenecks, local travel patterns, or transportation improvements) that affect travel times. TTI documentation does not provide information on peer-review, sensitivity analysis, or estimation errors for their model. Information about sensitivity analysis or external reviews of the model could not be obtained and users should interpret the data cautiously.

ENVIRONMENT

TABLE 4-38. Estimated National Average Vehicle Emissions Rates by Vehicle Type and Fuel

TABLE 4-39. National Average Vehicle Emissions Rates by Vehicle Type Using Reformulated Gasoline

The U.S. Environmental Protection Agency uses its Mobile Source Emissions Factor Model (MOBILE) to generate average emissions factors for each vehicle and fuel type. The methods used in the model are theoretically sound, the assumptions are reasonable, but the data vary in quality, and no formal analysis of the accuracy of these estimates has been performed. Emissions rate estimates for light-duty vehicles are considered more reliable than those for heavy-duty vehicles because in-use emissions tests are performed on a sample of vehicles each year. Deterioration for heavy-duty vehicles in the national fleet are based only on manufacturer's engine deterioration tests. In addition, because reformulated fuels (table 4-39) are newer than other gasoline fuels (table 4-38), in use emissions test data for reformulated fuels are not as extensive.

The estimates in the tables represent average emissions rates taking into account the characteristics of the nation's fleet, including vehicle type and age, and fuel used. The model also assumes Federal Test Procedure conditions. The model does not take into account actual travel distributions across different highway types with their associated average speeds and operating mode fractions, nor do they consider ambient local temperatures. However, fleet composition and deterioration because of age are considered. Thus, these rates illustrate only trends due to vehicle emissions control improvements and their increasing use in the national fleet and should not be used for other purposes.

TABLES 4-40, 4-41, 4-42, 4-43, 4-44, 4-45 and 4-46. Estimates of National Emissions of Carbon Monoxide, Nitrogen Oxides, Volatile Organic Compounds, Particular Matter, Sulfur Dioxide, and Lead

Emissions by sector and source are estimated using various models and calculation techniques and are based on a number of assumptions and on data that vary in precision and reliability. The methods used are theoretically sound, the assumptions are reasonable, but the data vary in quality, and no formal analysis of the accuracy of these estimates has been performed.

Carbon Monoxide (CO), Nitrogen Oxides (NOx), and Volatile Organic Compounds (VOCs)

Highway vehicle emissions of CO, NOx, and VOC are generated by the U.S. Environmental Protection Agency's (EPA's) Mobile Source Emissions Factor Model (MOBILE), which uses per-mile vehicle emissions factors and vehicle travel (vehicle-miles) to calculate county-level emissions. Emissions rates are then adjusted based on fuel characteristics, vehicle fleet composition, emissions control measures, average vehicle speed, and other factors that can affect emissions. (Emissions rates used in MOBILE are based on vehicle certification tests, emissions standards, and in-use vehicle tests and are updated approximately every three years.) The U.S. Department of Transportation, Federal Highway Administration's Highway Performance Monitoring System is the source of vehicle travel estimates used in the model. Although the methodology for this survey data is sound and well documented, analyses have shown that individual states vary in how rigorously they follow the established sampling guidelines.

The nonhighway vehicle emissions are calculated annually by running EPA's NONROAD model for all categories except aircraft, commercial marine vessels, and railroads, which are calculated via emission factors and relevant activity data. Inputs to the NONROAD model include average temperatures, Reid vapor pressure, fuel usage programs and controls.

Particulate Matter Under 10 Microns (PM-10) and 2.5 Microns (PM-2.5) in Size

Highway vehicle emissions are estimated using the U.S. Environmental Protection Agency's PART model, which estimates emissions factors for exhaust emissions and brake and tire wear by vehicle type. Exhaust emissions factors are based on certification tests, while brake wear (per vehicle) and tire wear (per tire) are assumed values, which are constant over all years. Per-mile emissions factors are multiplied by vehicle travel (vehicle-miles)

and adjusted to account for other factors that effect exhaust emissions (e.g., fuel composition, weather, etc.). The U.S. Department of Transportation, Federal Highway Administration's Highway Performance Monitoring System is the source of vehicle-miles of travel (VMT) estimates used in the model. While the methodology for this survey data is sound and well documented, analyses have shown that individual states vary in how rigorously they follow the established sampling guidelines.

Fugitive dust estimates for paved and unpaved roads are calculated by multiplying VMT on each type of road by emissions factors for each vehicle type and road type.

The non-highway vehicle emissions are calculated annually by running EPA's NONROAD model for all categories except aircraft, commercial marine vessels, and railroads, which are calculated via emission factors and relevant activity data. Inputs to the NONROAD model include average temperatures, Reid vapor pressure, fuel usage programs and controls.

Sulfur Dioxide (SO_2)

Highway vehicle SO_2 emissions are estimated by multiplying vehicle travel (for each vehicle type and highway type) by an emissions factor reflecting each vehicle type and highway type. Highway SO2 emissions factors are based on vehicle type and model year, sulfur content of fuel by type and year, fuel density by fuel type, and vehicle fuel efficiency by type and model year.

In general, estimates for nonhighway vehicles are calculated based on fuel consumption and sulfur content of fuel, though other factors may be considered.

Lead

In general, lead emissions are estimated by multiplying an activity level by an emissions factor that represents the rate at which lead is emitted for the given source category. This estimate is then adjusted by a factor that represents the assumed effectiveness of control technologies. For lead released during combustion, a top-down approach is used to share national estimates of fuel consumption by fuel type to each consumption category (e.g., motor fuel, electric utility, etc.) and, subsequently, each source (e.g., passenger cars, light-duty trucks, etc.).

TABLE 4-47. Air Pollution Trends in Selected Metropolitan Statistical Areas (MSAs)

TABLE 4-48. Areas in Nonattainment of National Ambient Air Quality Standards for Criteria Pollutants

The U.S. Environmental Protection Agency measures concentrations of pollutants in the ambient air at its air quality monitoring sites, which are operated by state and local agencies. These sites conform to uniform criteria for monitor siting, instrumentation, and quality assurance, and each site is weighted equally in calculating the composite average trend statistics. Furthermore, trend sites must have complete data for 8 of the 10 years in the trend time period to be included. However, monitoring devices are placed in areas most likely to observe significant concentrations of air pollutants rather than a random sampling of sites throughout the nation.

TABLE 4-49. U.S. Carbon Dioxide Emissions from Energy Use by Sector

The combustion of fossil fuels, such as coal, petroleum, and natural gas, is the principal anthropogenic (human caused) source of carbon dioxide (CO_2) emissions. Since fossil fuels are typically 75 percent to 90 percent carbon by weight, emissions from the combustion of these fuels can be easily measured in carbon units, as is shown in the table.

CO_2 emissions data are derived from estimates. The U.S. Department of Energy, Energy Information Administration (EIA), estimates CO_2 emissions by multiplying energy consumption for each fuel type by its carbon emissions coefficient, then subtracting carbon that is sequestered by nonfuel use of fossil fuels. Carbon emissions coefficients are values used for scaling emissions to specific activities (e.g., pounds of CO_2 emitted per barrel of oil consumed).

Emissions estimates are based on energy consumption data collected and published by EIA Several small adjustments are made to its energy consumption data to eliminate double counting or miscounting of emissions. For example, EIA subtracts the carbon in ethanol from transportation gasoline consumption because of its biological origin.

Emissions coefficients are based on the density, carbon content, and heat content of petroleum

products. For many fuels, except liquefied petroleum gas (LPG), jet fuel, and crude oil, EIA assumed coefficients to be constant over time. For LPG, jet fuel, and crude oil, EIA annualized carbon emissions coefficients to reflect changes in chemical composition or product mix.

Since the combustion of fossil fuels is a major producer of CO_2 emissions, sources of uncertainty are related to: 1) volumes of fuel consumed; 2) characteristics of fuel consumed; 3) emissions coefficients; and 4) coverage. EIA notes that volumetric fuel data are fairly reliable in the 3 percent to 5 percent range of uncertainty. The density and energy content of fuels are usually estimated. According to EIA, the reliability of these estimates vary. For example, estimates of the energy content of natural gas are reliable to 0.5 percent, while estimates for coal and petroleum products are lower because they are more heterogeneous fuels. The reliability of emissions coefficients depends on whether the characteristics of a fuel are difficult to measure accurately. Finally, uncertainties may result because data may be excluded or unknown sources of emissions not included.

EIA's estimation methods, emissions coefficients, and the reliability of emissions estimates are discussed in detail in U.S. Department of Energy, Energy Information Administration, *Emissions of Greenhouse Gases in the United States*, 1998 available on: www.eia.doe.gov/oiaf/1605/ggrpt/index.html.

TABLE 4-50. Petroleum Oil Spills Impacting U.S. Waterways

The U. S. Coast Guard's (USCG) Marine Safety Information System (MSIS) is the source of these data. It includes data on all oil spills impacting U.S. navigable waters and the Coastal Zone. The USCG learns of spills through direct observation, reports from responsible parties and third parties. Responsible parties are required by law to report spills to the National Response Center (NRC). Reports may be made to the USCG or Environmental Protection Agency predesignated On Scene Coordinator for the geographic area where the discharge occurs if direct reporting to the NRC is not practicable. There is no standard format for these reports, but responsible personnel face significant penalties for failing to do so. Most reports are made by telephone, and USCG personnel complete investigations based on the information provided. The type and extent of an investigation conducted varies depending on the type and quantity of the material spilled. Each investigation will determine as closely as possible source of the pollutant, the quantity of the material spilled, the cause of the accident, as well as whether there is evidence that any failure of material (either physical or design) was involved or contributed to the incident. These are so financial responsibility may be properly assigned for the incidents, as well as proper recommendations for the prevention of the recurrence of similar incidents may be made.

Some spills may not be entered into MSIS because they are either not reported to or discovered by the USCG. The probability of a spill not being reported is inversely proportional to its size. Large spills impact a large area and a large number of people, resulting in numerous reports of such spills. Small spills are less likely to be reported, particularly if they occur at night or in remote areas where persons other than the responsible party are unlikely to detect them. Responsible parties are required by law to report spills and face penalties for failing to do so, providing a strong incentive to report spills that might be detected by others. Experience with harbor patrols shows that the number of spills increases as the frequency of patrols increases. However, the volume of material spilled does not increase significantly, indicating that the spills discovered through increased harbor patrols generally involved very small quantities.

Data Collection

From 1973 to 1985, data were collected on forms completed by the investigator and later entered into the Pollution Incident Reporting System (PIRS) by data entry clerks at USCG headquarters. Since 1985, data have been entered directly into MSIS by the investigator. From 1985 to 1991, data were entered into a specific electronic form that captured information on the spilled substance and pollution response actions. Since 1995, a growing number of reports of pollution incidents of 100 gallons or less of oil have been captured on a Notice of Violation ticket form, which are then entered into MSIS.

The information shown in this table comes from the USCG Spill Compendium, which contains spill data from the applications described above. The Compendium contains summary data from 1969

through 2000 and is intended to provide general information to the public, the maritime industry and other interested persons about spills in and around U.S. waterways. For more information about spill data, please refer to the USCG Internet site at http://www.uscg.mil/hq/g-m/nmc/response/stats/aa.htm

Nonsampling Errors

According to the USCG, nonsampling errors, such as nonreporting and mistakes made in data collection and entry, should not have a major impact on most interpretations of the data, but the impact will vary depending on the data used. The error rate for volume spilled is estimated to be less than 5 percent because larger spills, which account for most of the volume of oil spilled, are thoroughly reviewed at several levels. The error rate for the number of spills is difficult to estimate primarily due to low reporting rates for small spills. Most of the error in spill counts involves spills of less than 100 gallons.

TABLE 4-51. Leaking Underground Storage Tank Releases and Cleanups

A national inventory of reported spills and corrective actions taken for leaking underground storage tanks is compiled biannually based on state counts of leaking tanks reported by owners as required by the Resource Conservation and Recovery Act of 1976.[1] These data may be affected by general accounting errors, some of which have changed semiannual counts by as many as 2,000 actions.

TABLE 4-52. Highway Noise Barrier Construction

State highway agencies (SHAs) provide data on highway noise barrier construction, extent, and costs to the U.S. Department of Transportation, Federal Highway Administration. Individual SHA definitions of barriers and costs may differ. This could lead to nonuniformity and/or anomalies among state data, which will in turn affect national totals.

[1] Public Law 94-580, 90 Stat. 2795 (Oct. 21, 1976).

TABLE 4-53. Number of People Residing in High-Noise Areas Around U.S. Airports

The number of the people exposed to aircraft noise around airports is estimated by computer modeling rather than by actual measurements. The U.S. Department of Transportation (USDOT), Federal Aviation Administration's (FAA's) Integrated Noise Model (INM) has been the primary tool for assessing aircraft noise around airports for nearly 30 years. This model uses information on aircraft mix, average daily operations, flight tracks, and runway distribution to generate and plot contours of Day Night Sound Level (DNL). With the addition of a digitized population census database, the model can estimate the number of residents exposed to noise levels of 65 decibels (db) DNL.

The U.S. Environmental Protection Agency (EPA) produced the first estimate of airport noise exposure in 1975. It reported that 7 million residents were exposed to significant levels of aircraft noise in 1978. This number became the "anchor point" for all future estimates of the nationwide noise impacts. In 1980, FAA developed another methodology for estimating the change in the number of people impacted by noise (from the 1975 anchor value) as a function of changes in both the national fleet and in the FAA's Terminal Area Forecast (TAF). In 1990, the FAA created an improved method of estimating the change in number of people impacted (relative to the 1980 estimates).

In 1993, the FAA began using its newly developed Nationwide Airport Noise Impact Model (NANIM) to estimate the impact of airplane noise on residential communities surrounding U.S. airports that support jet operations. FAA uses this model to determine the relative changes in number of people and land area exposed to 65 db DNL as a result of changes in nationwide aircraft fleet mix and operations. NANIM uses data on air traffic patterns found in the Official Airline Guide (OAG), air traffic growth projections found in FAA's TAF, population figures from the U.S. Census Bureau, and information on noise contour areas for the top 250 U.S. civil airports with jet operations.

The methodology used in NANIM has been peer reviewed and approved. However, a formal evaluation of the model's accuracy has not been conducted. Some data used in NANIM are updated manually, thus the possibility of data entry errors

does exist. Entries are reviewed and then corrected as appropriate. The aircraft mix and operations files from FAA's TAF and OAG are updated automatically. Changes to either of the sources could introduce errors. For example, it was recently discovered that OAG redefined some aircraft codes and altered some data fields in its database. These changes make it impossible for the NANIM utility program to accurately read the current OAG database. A rewrite of the source code is necessary to eliminate this error. Also, since airport authorities are not required to produce noise exposure maps and reports unless they intend to apply for Federal grants, 14 of the 50 busiest commercial airports, including JFK and LaGuardia, have not produced (for public consumption) noise exposure maps in several years. In the absence of actual data, the NANIM database contains approximations of the noise contours areas based on airports of similar size and similar operation. Without actual airport data, it is impossible to quantify the error introduced by the approximation.

The number of people exposed to aircraft noise for 1998 through 2001 was estimated by the FAA's latest version of its MAGENTA model. This new, more accurate model is based on 2000 census data and uses input data on aircraft and operations specific to U.S. airports. This revised model also uses the FAA Terminal Forecast (TAF), which provides information on how operations will increase on an airport specific basis. Updated monthly, the TAF allows a more accurate forecast of U.S. operations.

TABLE 4-54. Motor Vehicles Scrapped

The Polk Company's Vehicles in Operation database is the source of these data. This database is a census of vehicles that are currently registered in all states within the United States. It is based on information from state department of motor vehicles. Polk updates the database quarterly (March, June, September, and December).

Scrapped vehicles are those that Polk removes from its database when: 1) States indicate registered vehicles have suffered major damage (such as a flood or accident), or 2) No renewal (reregistration) notice is received by Polk within a state's allotted time (normally one year). In the latter case, if a vehicle is subsequently reregistered, it is returned to the database. The Polk data on motor vehicles is broken down into passenger cars and trucks, and this identification comes with the registration data from the DMV.

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Glossary

14 CFR 121 (Air): Code of Federal Regulations, Title 14, part 121. Prescribes rules governing the operation of domestic, flag, and supplemental air carriers and commercial operators of large aircraft.

14 CFR 135 (Air): Code of Federal Regulations, Title 14, part 135. Prescribes rules governing the operations of commuter air carriers (scheduled) and on-demand air taxi (unscheduled).

ACCIDENT (Aircraft): As defined by the National Transportation Safety Board, an occurrence incidental to flight in which, as a result of the operation of an aircraft, any person (occupant or nonoccupant) receives fatal or serious injury or any aircraft receives substantial damage.

ACCIDENT (Automobile): See Crash (Highway)

ACCIDENT (Gas): 1) An event that involves the release of gas from a pipeline or of liquefied natural gas (LNG) or other gas from an LNG facility resulting in personal injury necessitating inpatient hospitalization or a death; or estimated property damage of $50,000 or more to the operator or others, or both, including the value of the gas that escaped during the accident; 2) An event that results in an emergency shutdown of an LNG facility; or 3) An event that is significant in the judgment of the operator even though it did not meet the criteria of 1) or 2).

ACCIDENT (Hazardous liquid or gas): Release of hazardous liquid or carbon dioxide while being transported, resulting in any of the following: 1) An explosion or fire not intentionally set by the operator; 2) Loss of 50 or more barrels of hazardous liquid or carbon dioxide; 3) Release to the atmosphere of more than 5 barrels a day of highly volatile liquids; 4) Death of any person; 5) Bodily harm resulting in one or more of the following: a) The loss of consciousness, b) The necessity of carrying person from the scene, c) The necessity for medical treatment, d) Disability that prevents the discharge of normal duties; and 6) Estimated damage to the property of the operators and/or others, exceeding $50,000.

ACCIDENT (Highway-Rail Grade-Crossing): An impact between on-track railroad equipment and an automobile, bus, truck, motorcycle, bicycle, farm vehicle, or pedestrian or other highway user at a designated crossing site. Sidewalks, pathways, shoulders, and ditches associated with the crossing are considered to be part of the crossing site.

ACCIDENT (Rail): A collision, derailment, fire, explosion, act of God, or other event involving operation of railroad on-track equipment (standing or moving) that results in railroad damage exceeding an established dollar threshold.

ACCIDENT (Recreational Boating): An occurrence involving a vessel or its equipment that results in 1) A death; 2) An injury that requires medical treatment beyond first aid; 3) Damage to a vessel and other property, totaling to more than $500 or complete loss of a vessel; or 4) The disappearance of the vessel under circumstances that indicate death or injury. Federal regulations (33 CFR 173-4) require the operator of any vessel that is numbered or used for recreational purposes to submit an accident report.

ACCIDENT (Transit): An incident involving a moving vehicle. Includes a vehicle, object, or person (except suicides) or a derailment/left roadway.

ACTIVE AIRCRAFT (General Aviation): All legally registered civil aircraft that flew one or more hours.

AERIAL APPLICATION FLYING (General Aviation): The operation of aircraft for the purposes of dispensing any substances required for agriculture, health, forestry, seeding, firefighting, and insect control purposes.

AERIAL OBSERVATION FLYING (General Aviation): Any use of an aircraft for aerial mapping and photography, surveying, patrolling, fish spotting, search and rescue, hunting, sightseeing, or highway traffic advisory not included under Federal Aviation Regulations (FAR) Part 135.

AIR CARRIER: A person who undertakes directly, by lease, or other arrangement to engage in air transportation. More specifically, the commercial system of air transportation comprising large certificated air carriers, small certificated air carriers, commuter air carriers, on-demand air taxis, supplemental air carriers, and air travel clubs.

AIR ROUTE TRAFFIC CONTROL CENTER: A facility established to provide air traffic control service to aircraft operating on an IFR (instrument flight rule) flight plan within controlled airspace and principally during the en route phase of flight.

AIR TAXI: An aircraft operator who conducts operations for hire or compensation in accordance with 14 CFR 135 (for safety purposes) or FAR Part 135 (for economic regulations/reporting purposes) in an aircraft with 30 or fewer passenger seats and a payload capacity of 7,500 pounds or less. An air taxi operates on an on-demand basis and does not meet the flight scheduled qualifications of a commuter air carrier (see below).

AIRCRAFT REVENUE HOURS: The airborne hours in revenue service, computed from the moment an aircraft leaves the ground until it lands.

AIRCRAFT REVENUE MILES: The miles (computed in airport-to-airport distances) for each interairport hop actually completed in revenue service, whether or not performed in accordance with the scheduled pattern. For this purpose, operation to a flag stop is a hop completed even if a landing is not actually made. In cases where the interairport distances are inapplicable, aircraft-miles flown are determined by multiplying the normal cruising speed for the aircraft type by the airborne hours.

AIRPORT: A landing area regularly used by aircraft for receiving or discharging passengers or cargo.

AIRPORT/AIRWAY TRUST FUND: See Trust Funds.

ALTERNATIVE FUELS: The Energy Policy Act of 1992 defines alternative fuels as methanol, denatured ethanol, and other alcohol; mixtures containing 85 percent or more (but not less than 70 percent as determined by the Secretary of Energy by rule to provide for requirements relating to cold start, safety, or vehicle functions) by volume of methanol, denatured ethanol, and other alcohols with gasoline or other fuels. Includes compressed natural gas, liquid petroleum gas, hydrogen, coal-derived liquid fuels, fuels other than alcohols derived from biological materials, electricity, or any other fuel the Secretary of Energy determines by rule is substantially not petroleum and would yield substantial energy security and environmental benefits.

AMTRAK: Operated by the National Railroad Passenger Corporation of Washington, D.C., this rail system was created by the Rail Passenger Service Act of 1970 (P.L. 91-518, 84 Stat. 1327) and given the responsibility for the operation of intercity, as distinct from suburban, passenger trains between points designated by the Secretary of Transportation.

ARTERIAL HIGHWAY: A major highway used primarily for through traffic.

ASPHALT: A dark brown to black cement-like material containing bitumens as the predominant constituent. The definition includes crude asphalt and finished products such as cements, fluxes, the asphalt content of emulsions, and petroleum distillates blended with asphalt to make cutback asphalt. Asphalt is obtained by petroleum processing.

AVAILABLE SEAT-MILES (Air Carrier): The aircraft miles flown in each interairport hop multiplied by the number of seats available on that hop for revenue passenger service.

AVERAGE HAUL: The average distance, in miles, one ton is carried. It is computed by dividing ton-miles by tons of freight originated.

AVERAGE PASSENGER TRIP LENGTH (Bus/Rail): Calculated by dividing revenue passenger-miles by the number of revenue passengers.

AVIATION GASOLINE (General Aviation): All special grades of gasoline used in aviation reciprocating engines, as specified by American Society of Testing Materials (ASTM) Specification D910 and Military Specification MIL-G5572.

Includes refinery products within the gasoline range marketed as or blended to constitute aviation gasoline.

BARREL (oil): A unit of volume equal to 42 U.S. gallons.

BLOOD ALCOHOL CONCENTRATION (Highway): A measurement of the percentage of alcohol in the blood by grams per deciliter.

BRITISH THERMAL UNIT: The quantity of heat needed to raise the temperature of 1 pound of water by 1 °F at or near 39.2 °F.

BULK CARRIER (Water): A ship with specialized holds for carrying dry or liquid commodities, such as oil, grain, ore, and coal, in unpackaged bulk form. Bulk carriers may be designed to carry a single bulk product (crude oil tanker), or accommodate several bulk product types (ore/bulk/oil carrier) on the same voyage or on a subsequent voyage after holds are cleaned.

BUS: Large motor vehicle used to carry more than 10 passengers, includes school buses, intercity buses, and transit buses.

BUSINESS TRIP (American Travel Survey): A trip taken for business or business combined with pleasure, or for attending a convention, conference, or seminar.

CAFE STANDARDS: See Corporate Average Fuel Economy Standards.

CAR-MILE (Rail): The movement of a railroad car a distance of 1 mile. An empty or loaded car-mile refers to a mile run by a freight car with or without a load. In the case of intermodal movements, the designation of empty or loaded refers to whether the trailers/containers are moved with or without a waybill.

CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY (Air Carrier): A certificate issued by the Department of Transportation to an air carrier under Section 401 of the Federal Aviation Act authorizing the carrier to engage in air transportation.

CERTIFICATED AIR CARRIER: An air carrier holding a Certificate of Public Convenience and Necessity issued by the U.S. Department of Transportation (DOT) to conduct scheduled services interstate. These carriers may also conduct nonscheduled or charter operations. Certificated air carriers operate large aircraft (30 seats or more or a maximum load of 7,500 pounds or more) in accordance with FAR Part 121. See also Large Certificated Air Carrier.

CERTIFICATED AIRPORTS: Airports that service air carrier operations with aircraft seating more than 30 passengers.

CHAINED DOLLARS: A measure used to express real prices, defined as prices that are adjusted to remove the effect of changes in the purchasing power of the dollar. Real prices usually reflect buying power relative to a reference year. The "chained-dollar" measure is based on the average weights of goods and services in successive pairs of years. It is "chained" because the second year in each pair, with its weights, becomes the first year of the next pair. Prior to 1996, real prices were expressed in constant dollars, a weighted measure of goods and services in a single year. See also Constant Dollars and Current Dollars.

CLASS I RAILROAD: A carrier that has an annual operating revenue of $250 million or more after applying the railroad revenue deflator formula, which is based on the Railroad Freight Price Index developed by the U.S. Department of Labor, Bureau of Labor Statistics. The formula is the current year's revenues x 1991 average index/current year's average index.

COASTWISE TRAFFIC (Water): Domestic traffic receiving a carriage over the ocean, or the Gulf of Mexico (e.g., between New Orleans and Baltimore, New York and Puerto Rico, San Francisco and Hawaii, Alaska and Hawaii). Traffic between Great Lakes ports and seacoast ports, when having a carriage over the ocean, is also considered coastwise.

COEFFICIENT OF VARIATION: Ratio of the sampling error (or standard error) of a statistic to the value of that statistic. Also referred to as relative standard error.

COLLECTOR (Highway): In rural areas, routes that serve intracounty rather than statewide travel. In urban areas, streets that provide direct access to neighborhoods and arterials.

COLLISION WITH OBJECT (Transit): An incident in which a transit vehicle strikes an obstacle other than a vehicle or person (e.g., building, utility pole). Reports are made if the accident results in a death, injury, or property damage over $1,000.

COLLISION WITH PEOPLE (Transit): An incident in which a transit vehicle strikes a person. Excludes suicides and suicide attempts. Reports are made if the incident results in death, injury, or property damage over $1,000.

COLLISION WITH VEHICLE (Transit): An incident in which a transit vehicle strikes or is struck by another vehicle. Reports are made if the incident results in a death, injury, or property damage over $1,000.

COMBINATION TRUCK: A power unit (truck tractor) and one or more trailing units (a semitrailer or trailer).

COMMERCIAL BUS: Any bus used to carry passengers at rates specified in tariffs; charges may be computed per passenger (as in regular route service) or per vehicle (as in charter service).

COMMERCIAL SERVICE AIRPORT: Airport receiving scheduled passenger service and having 2,500 or more enplaned passengers per year.

COMMUTER AIR CARRIER: Different definitions are used for safety purposes and for economic regulations and reporting. For safety analysis, commuter carriers are defined as air carriers operating under 14 CFR 135 that carry passengers for hire or compensation on at least five round trips per week on at least one route between two or more points according to published flight schedules, which specify the times, days of the week, and points of service. On March 20, 1997, the size of the aircraft subject to 14 CFR 135 was reduced from 30 to fewer than 10 passenger seats. (Larger aircraft are subject to the more stringent regulations of 14 CFR 121.) Helicopters carrying passengers or cargo for hire, however, are regulated under CFR 135 whatever their size. Although, in practice, most commuter air carriers operate aircraft that are regulated for *safety purposes* under 14 CFR 135 and most aircraft that are regulated under 14 CFR 135 are operated by commuter air carriers, this is not necessarily the case.

For economic regulations and reporting requirements, commuter air carriers are those carriers that operate aircraft of 60 or fewer seats or a maximum payload capacity of 18,000 pounds or less. These carriers hold a certificate issued under section 298C of the Federal Aviation Act of 1958, as amended.

COMMUTER RAIL (Transit): Urban passenger train service for short-distance travel between a central city and adjacent suburb. Does not include rapid rail transit or light rail service.

COMPACT CAR: An automobile industry designation usually consisting of cars with a wheelbase between 100 and 104 inches.

COMPRESSED NATURAL GAS: Natural gas compressed to a volume and density that is practical as a portable fuel supply. It is used as a fuel for natural gas-powered vehicles.

CONSTANT DOLLAR: Dollar value adjusted for changes in the average price level by dividing a current dollar amount by a price index. See also Chained Dollar and Current Dollar.

CORPORATE AVERAGE FUEL ECONOMY STANDARDS (CAFÉ): Originally established by Congress for new automobiles and later for light trucks. Under CAFE, automobile manufacturers are required by law to produce vehicle fleets with a composite sales-weighted fuel economy not lower than the CAFE standards in a given year. For every vehicle that does not meet the standard, a fine is paid for every one-tenth of a mile per gallon that vehicle falls below the standard.

CORPORATE FLYING (General Aviation): Corporate aircraft piloted by a professional crew.

CRASH (Highway): An event that produces injury and/or property damage, involves a motor vehicle in transport, and occurs on a trafficway or while the vehicle is still in motion after running off the trafficway.

CRUDE OIL: A mixture of hydrocarbons that exists in the liquid phase in natural underground reservoirs and remains liquid at atmospheric pressure after passing through surface-separating facilities.

CURRENT DOLLAR: Dollar value of a good or service in terms of prices current at the time the good or service is sold. See also Chained Dollar and Current Dollar.

DEADWEIGHT TONNAGE (Water): The carrying capacity of a vessel in long tons (2,240 pounds). It is the difference between the number of tons of water a vessel displaces "light" and the number of tons it displaces when submerged to the "load line."

DEMAND-RESPONSIVE VEHICLE (Transit): A nonfixed-route, a nonfixed-schedule vehicle that operates in response to calls from passengers or their agents to the transit operator or dispatcher.

DERAILMENT/LEFT ROADWAY (Transit): A noncollision incident in which a transit vehicle leaves the rails or road on which it travels. This also includes rollovers. Reports are made for all occurrences.

DESTINATION OF TRIP (American Travel Survey): The place the survey respondent names as the destination of the trip. If more than one location is visited on the same trip, the farthest point from the origin is considered the destination.

DIESEL FUEL: A complex mixture of hydrocarbons with a boiling range between approximately 350 and 650 °F. Diesel fuel is composed primarily of paraffins and naphthenic compounds that auto-ignite from the heat of compression in a diesel engine. Diesel is used primarily by heavy-duty road vehicles, construction equipment, locomotives, and by marine and stationary engines.

DISTILLATE FUEL OIL: A general classification for one of the petroleum fractions produced in conventional distillation operations. Included are No. 1, No. 2 and No. 4 fuel oils and No. 1, No. 2, and No. 4 diesel fuels. Distillate fuel oil is used primarily for space heating, on- and off-highway diesel engine fuel (including railroad engine fuel and fuel for agricultural machinery), and electric power generation.

DISTRIBUTION MAINS (Gas): A network of pipelines, services, and equipment that carry or control the supply of gas from the point of local supply to, and including, the sales meters.

DOMESTIC FREIGHT (Water): All waterborne commercial movements between points in the United States, Puerto Rico, and the Virgin Islands, excluding traffic with the Panama Canal Zone. Cargo moved for the military in commercial vessels is reported as ordinary commercial cargo; military cargo moved in military vessels is omitted.

DOMESTIC OPERATIONS (Air Carrier): All air carrier operations having destinations within the 50 United States, the District of Columbia, the Commonwealth of Puerto Rico, and the U.S. Virgin Islands.

DOMESTIC PASSENGER (Water): Any person traveling on a public conveyance by water between points in the United States, Puerto Rico, and the Virgin Islands.

DRY CARGO BARGES (Water): Large flat-bottomed, nonself-propelled vessels used to transport dry-bulk materials such as coal and ore.

EMERGENCY PREPAREDNESS TRUST FUND: See Trust Funds.

ENERGY EFFICIENCY: The ratio of energy inputs to the outputs from a process; for example, miles traveled per gallon of fuel (mpg).

ENPLANED PASSENGERS (Air Carrier): See Revenue Passenger Enplanements.

ETHANOL: A clear, colorless, flammable oxygenated hydrocarbon with a boiling point of 78.5 °C. in the anhydrous state. It is used in the United States as a gasoline octane enhancer and oxygenate (10-percent concentration). Ethanol can be used in high concentrations in vehicles optimized for its use. Otherwise known as ethyl alcohol, alcohol, or grain-spirit.

FATAL CRASH (Highway): A police-reported crash involving a motor vehicle in transport on a trafficway in which at least one person dies within 30 days of the crash as a result of that crash.

FATAL INJURY (Air): Any injury that results in death within thirty days of the accident.

FATALITY: For purposes of statistical reporting on transportation safety, a fatality shall be considered a death due to injuries in a transportation crash, accident, or incident that occurs within 30 days of that occurrence.

FATALITY (Rail): 1) Death of any person from an injury within 30 days of the accident/incident (may include nontrain accidents/incidents); or 2) Death of a railroad employee from an occupational illness within 365 days after the occupational illness was diagnosed by a physician.

FATALITY (Recreational Boating): All deaths (other than deaths by natural causes) and missing persons resulting from an occurrence that involves a vessel or its equipment.

FATALITY (Transit): A transit-caused death confirmed within 30 days of a transit incident. Incidents include collisions, derailments, personal casualties, and fires associated with transit agency revenue vehicles, transit facilities on transit property, service vehicles, maintenance areas, and rights of way.

FATALITY (Water): All deaths and missing persons resulting from a vessel casualty.

FEDERAL ENERGY REGULATORY COMMISSION (FERC): The Federal agency with jurisdiction over, among other things, gas pricing, oil pipeline rates, and gas pipeline certification.

FERRY BOAT (Transit): Vessels that carry passengers and/or vehicles over a body of water. Generally steam or diesel-powered, ferry boats may also be hovercraft, hydrofoil, and other high-speed vessels. The vessel is limited in its use to the carriage of deck passengers or vehicles or both, operates on a short run on a frequent schedule between two points over the most direct water routes other than in ocean or coastwise service, and is offered as a public service of a type normally attributed to a bridge or tunnel.

FIELD AND GATHERING GAS PIPELINES: A network of pipelines (mains) transporting natural gas from individual wells to a compressor station, processing point, or main trunk pipeline.

FLAG STOP (Air): A drop-off or pick-up point along a predetermined route that is visited only by request or if a signal to stop is given.

FOSSIL FUELS: Any naturally occurring organic fuel formed in the Earth's crust, such as petroleum, coal, and natural gas.

FREIGHT REVENUE (Rail): Revenue from the transportation of freight and from the exercise of transit, stopoff, diversion, and reconsignment privileges as provided for in tariffs.

FREIGHTERS (Water): General cargo carriers, full containerships, partial containerships, roll-on/rolloff ships, and barge carriers.

FULL-SIZE CAR: As designated by the automobile industry, cars with a wheelbase between 110 and 114 inches.

GAS TRANSMISSION PIPELINES: Pipelines installed for the purpose of transmitting gas from a source or sources of supply to one or more distribution centers, or to one or more large volume customers; or a pipeline installed to interconnect sources of supply. Typically, transmission lines differ from gas mains in that they operate at higher pressures and the distance between connections is greater.

GASOHOL: A blend of finished motor gasoline (leaded or unleaded) and alcohol (generally ethanol but sometimes methanol) limited to 10 percent by volume of alcohol.

GASOLINE: A complex mixture of relatively volatile hydrocarbons, with or without small quantities of additives that have been blended to produce a fuel suitable for use in spark ignition engines. Motor gasoline includes both leaded or unleaded grades of finished motor gasoline, blending components, and gasohol. Leaded gasoline is no longer used in highway motor vehicles in the United States.

GENERAL AVIATION: 1) All facets of civil aviation, except facets of those air carriers holding a Certificate of Public Convenience and Necessity. 2) All civil aviation activity except that of air carriers certificated in accordance with Federal Aviation Regulations (FAR) Parts 121, 123, 127, and 135. The types of aircraft used in general aviation range from corporate multiengine jet aircraft piloted by professional crews to amateur-built single-engine piston-driven acrobatic planes to balloons and dirigibles. 3) All civil aviation operations other than scheduled air services and nonscheduled air transport operations for taxis, commuter air carriers, and air travel clubs that do not hold Certificates of Public Convenience and Necessity.

GENERAL ESTIMATES SYSTEM: A data collection system that uses a nationally representative probability sample selected from all police-reported highway crashes. It began operation in 1988.

GROSS DOMESTIC PRODUCT: The total output of goods and services produced by labor and property located in the United States, valued at market prices. As long as the labor and property are located in the United States, the suppliers (workers and owners) may be either U.S. residents or residents of foreign countries.

GROSS VEHICLE WEIGHT RATING (gvwr) (Truck): The maximum rated capacity of a vehicle, including the weight of the base vehicle, all added equipment, driver and passengers, and all cargo.

HARBOR MAINTENANCE TRUST FUND: See Trust Funds.

HAZARDOUS MATERIAL: Any toxic substance or explosive, corrosive, combustible, poisonous, or radioactive material that poses a risk to the public's health, safety, or property-particularly when transported in commerce.

HEAVY RAIL (Transit): An electric railway with the capacity to transport a heavy volume of passenger traffic and characterized by exclusive rights-of-way, multicar trains, high speed, rapid acceleration, sophisticated signaling, and high-platform loading. Also known as "subway," "elevated (railway)," or "metropolitan railway (metro)."

HIGHWAY-RAIL GRADE CROSSING (Rail): A location where one or more railroad tracks are crossed by a public highway, road, or street or a private roadway at grade, including sidewalks and pathways at or associated with the crossing.

HIGHWAY TRUST FUND: A grant-in-aid type fund administered by the U.S. Department of Transportation, Federal Highway Administration. Most funds for highway improvements are apportioned to States according to formulas that give weight to population, area, and mileage.

HOUSEHOLD TRIP (American Travel Survey): A trip in which one or more members of a household travel together.

HIGHWAY-USER TAX: A charge levied on persons or organizations based on their use of public roads. Funds collected are usually applied toward highway construction, reconstruction, and maintenance.

INCIDENT (Hazmat): Any unintentional release of hazardous material while in transit or storage.

INCIDENT (Train): Any event involving the movement of a train or railcars on track equipment that results in a death, a reportable injury, or illness, but in which railroad property damage does not exceed the reporting threshold.

INCIDENT (Transit): Collisions, derailments, personal casualties, fires, and property damage in excess of $1,000 associated with transit agency revenue vehicles; all other facilities on the transit property; and service vehicles, maintenance areas, and rights-of-way.

INJURY (Air): See SERIOUS INJURY (air and general aviation).

INJURY (Gas): Described in DOT Forms 7100.1 or 7100.2 as an injury requiring "in-patient hospitalization" (admission and confinement in a hospital beyond treatment administered in an emergency room or out-patient clinic in which confinement does not occur).

INJURY (Hazardous Liquid Pipeline): An injury resulting from a hazardous liquid pipeline accident that results in one or more of the following: 1) Loss of consciousness, 2) A need to be carried from the scene, 3) A need for medical treatment, and/or 4) A disability that prevents the discharge of normal duties or the pursuit of normal duties beyond the day of the accident.

INJURY (Highway): Police-reported highway injuries are classified as follows:

Incapacitating Injury: Any injury, other than a fatal injury, that prevents the injured person from walking, driving, or normally continuing the activities the person was capable of performing before the injury occurred. Includes severe lacerations, broken or distorted limbs, skull or chest injuries, abdominal injuries, unconsciousness at or when taken from the accident scene, and inability to leave the accident scene without assistance. Exclusions include momentary unconsciousness.

Nonincapacitating Evident Injury: Any injury, other than a fatal injury or an incapacitating injury, evident to observers at the scene of the accident. Includes lumps on head, abrasions, bruises, minor lacerations, and others. Excludes limping.

Possible Injury: Any injury reported or claimed that is not evident. Includes momentary unconsciousness, claim of injuries not obvious, limping, complaint of pain, nausea, hysteria, and others.

INJURY (Highway-Rail Grade Crossing): 1) An injury to one or more persons other than railroad employees that requires medical treatment; 2) An injury to one or more employees that requires medical treatment or that results in restriction of work or motion for one or more days, or one or more lost work days, transfer to another job, termination of employment, or loss of consciousness; 3) Any occupational illness affecting one or more railroad employees that is diagnosed by a physician.

INJURY (Rail): 1) Injury to any person other than a railroad employee that requires medical treatment, or 2) Injury to a railroad employee that requires medical treatment or results in restriction of work or motion for one or more workdays, one or more lost workdays, termination of employment, transfer to another job, loss of consciousness, or any occupational illness of a railroad employee diagnosed by a physician.

INJURY (Recreational Boating): Injury requiring medical treatment beyond first aid as a result of an occurrence that involves a vessel or its equipment.

INJURY (Transit): Any physical damage or harm to a person requiring medical treatment or any physical damage or harm to a person reported at the time and place of occurrence. For employees, an injury includes incidents resulting in time lost from duty or any definition consistent with a transit agency's current employee injury reporting practice.

INJURY (Water): All personal injuries resulting from a vessel casualty that require medical treatment beyond first aid.

INLAND AND COASTAL CHANNELS: Includes the Atlantic Coast Waterways, the Atlantic Intracoastal Waterway, the New York State Barge Canal System, the Gulf Coast Waterways, the Gulf Intracoastal Waterway, the Mississippi River System (including the Illinois Waterway), Pacific Coast Waterways, the Great Lakes, and all other channels (waterways) of the United States, exclusive of Alaska, that are usable for commercial navigation.

INSTRUCTIONAL FLYING: Flying under the supervision of a flight instructor (excludes proficiency flying).

INTERCITY CLASS BUS I: As defined by the Bureau of Transportation Statistics, an interstate motor carrier of passengers with an average annual gross revenue of at least $1 million.

INTERCITY TRUCK: Truck that carries freight beyond local areas and commercial zones.

INTERMEDIATE -SIZE CAR: As designated by the automobile industry, a car with a wheelbase between 105 and 109 inches.

INTERNAL TRAFFIC (Water): Vessel movements (origin and destination) that take place solely on inland waterways located within the boundaries of the contiguous 48 states or within the state of Alaska. The term "internal traffic" also applies to carriage on both inland waterways and the water of the Great Lakes; carriage between offshore areas and inland waterways; and carriage occurring within the Delaware Bay, Chesapeake Bay, Puget Sound, and the San Francisco Bay, which are considered internal bodies of water rather than arms of the ocean.

INTERSTATE HIGHWAY: Limited access, divided highway of at least four lanes designated by the Federal Highway Administration as part of the Interstate System.

INTRAPORT (Water): Movement of freight within the confines of a port whether the port has one or several channels included in the port definition. Does not include car-ferries and general ferries moving within a port.

INTRATERRITORY TRAFFIC (Water): Traffic between ports in Puerto Rico and the U.S. Virgin Islands, which are considered a single unit.

JET FUEL: The term includes kerosene-type jet fuel and naphtha-type jet fuel. Kerosene-type jet fuel is used primarily for commercial turbojet and turboprop aircraft engines. Naphtha-type jet fuel is used primarily for military turbojet and turboprop aircraft engines.

LAKEWISE OR GREAT LAKES TRAFFIC: Waterborne traffic between U.S. ports on the Great Lakes system. The Great Lakes system is treated as a separate waterways system rather than as a part of the inland system.

LARGE CERTIFICATED AIR CARRIERS: An air carrier holding a certificate issued under section 401 of the Federal Aviation Act of 1958, as amended, that: 1) Operates aircraft designed to have a maximum passenger capacity of more than 60 seats or a maximum payload capacity of more than 18,000 pounds, or 2) Conducts operations where one or both terminals of a flight stage are outside the 50 states of the United States, the District of Columbia, the Commonwealth of Puerto Rico, and the U.S. Virgin Islands. Large certificated air carriers are grouped by annual operating revenues: 1) Majors (more than $1 billion in annual operating revenues), 2) Nationals (between $100 million and $1 billion in annual

operating revenues), Large regionals ($20 million and $99,999,999 in annual operating revenues), and 4) Medium regionals (less than $20 million in annual operating revenues).

LARGE REGIONALS (Air): Air carrier groups with annual operating revenues between $20 million and $99,999,999.

LARGE CAR: As designated by the automobile industry, a car with a wheelbase greater than 114 inches.

LARGE TRUCK: Trucks over 10,000 pounds gross vehicle weight rating, including single-unit trucks and truck tractors.

LEASE CONDENSATE: A mixture consisting primarily of pentanes and heavier hydrocarbons, which are recovered as a liquid from natural gas in lease or field separation facilities. This category excludes natural gas liquids, such as butane and propane, which are recovered at natural gas processing plants or facilities.

LIGHT-DUTY VEHICLE: A vehicle category that combines light automobiles and trucks.

LIGHT RAIL: A streetcar-type vehicle operated on city streets, semiexclusive rights-of-way, or exclusive rights-of-way. Service may be provided by step-entry vehicles or by level boarding.

LIGHT TRUCK: Trucks of 10,000 pounds gross vehicle weight rating or less, including pickups, vans, truck-based station wagons, and sport utility vehicles.

LIQUEFIED NATURAL GAS (LNG): Natural gas, primarily methane, that has been liquefied by reducing its temperature to -260 °F. at atmospheric pressure.

LIQUEFIED PETROLEUM GAS (LPG): Propane, propylene, normal butane, butylene, isobutane, and isobutylene produced at refineries or natural gas processing plants, including plants that fractionate new natural gas plant liquids.

LOCOMOTIVE: Railroad vehicle equipped with flanged wheels for use on railroad tracks, powered directly by electricity, steam, or fossil fuel, and used to move other railroad rolling equipment.

LOCOMOTIVE-MILE: The movement of a locomotive unit, under its own power, the distance of 1 mile.

MAINS (Gas): A network of pipelines that serves as a common source of supply for more than one gas service line.

MAJORS (Air): Air carrier groups with annual operating revenues exceeding $1 billion.

MEDIUM REGIONALS (Air): Air carrier groups with annual operating revenues less than $20 million.

MERCHANDISE TRADE EXPORTS: Merchandise transported out of the United States to foreign countries whether such merchandise is exported from within the U.S. Customs territory, from a U.S. Customs bonded warehouse, or from a U.S. Foreign Trade Zone. (Foreign Trade Zones are areas, operated as public utilities, under the control of U.S. Customs with facilities for handling, storing, manipulating, manufacturing, and exhibiting goods.)

MERCHANDISE TRADE IMPORTS: Commodities of foreign origin as well as goods of domestic origin returned to the United States with no change in condition or after having been processed and/or assembled in other countries. Puerto Rico is a Customs district within the U.S. Customs territory, and its trade with foreign countries is included in U.S. import statistics. U.S. import statistics also include merchandise trade between the U. S. Virgin Islands and foreign countries even though the Islands are not officially a part of the U.S. Customs territory.

METHANOL: A light, volatile alcohol produced commercially by the catalyzed reaction of hydrogen and carbon monoxide. Methanol is blended with gasoline to improve its operational efficiency.

METHYL TERTIARY BUTYL ETHER (MTBE): A colorless, flammable, liquid oxygenated hydrocarbon that contains 18.15 percent oxygen. It is a fuel oxygenate produced by reacting methanol with isobutylene.

MID-SIZE CAR: See Intermediate-Size Car.

MINI-COMPACT CAR: An automobile industry designation usually consisting of cars with a wheelbase of less than 95 inches.

MINOR ARTERIALS (Highway): Streets and highways linking cities and larger towns in rural areas, in distributing trips to small geographic areas in urban areas (not penetrating identifiable neighborhoods).

MOTOR BUS (Transit): A rubber-tired, self-propelled, manually steered bus with fuel supply onboard the vehicle. Motor bus types include: intercity, school, and transit.

MOTORCYCLE: A two- or three-wheeled motor vehicle designed to transport one or two people, including motor scooters, minibikes, and mopeds.

NATIONALS (Air): Air carrier groups with annual operating revenues between $100 million and $1 billion.

NATURAL GAS: A naturally occurring mixture of hydrocarbon and nonhydrocarbon gases found in porous geologic formations beneath the Earth's surface, often in association with petroleum. The principal constituent is methane.

NATURAL GAS PLANT LIQUIDS: Liquids recovered from natural gas in processing plants or field facilities, or extracted by fractionators. They include ethane, propane, normal butane, isobutane, pentanes plus, and other products, such as finished motor gasoline, finished aviation gasoline, special naphthas, kerosene, and distillate fuel oil produced at natural gas processing plants.

NEAR MIDAIR COLLISION (Air): An incident in which the possibility of a collision occurred as a result of aircraft flying with less than 500 feet of separation, or a report received from a pilot or flight crew member stating that a collision hazard existed between two or more aircraft.

NONOCCUPANT (Automobile): Any person who is not an occupant of a motor vehicle in transport (e.g., bystanders, pedestrians, pedalcyclists, or an occupant of a parked motor vehicle).

NONRESPONSE ERROR: Error that results from some members of the sample or census not providing information. Nonresponse bias results from a systematic difference between those who do and those who do not respond to the measurement instrument.

NONSAMPLING ERROR: All sources of bias or inaccuracy in a study other than sampling error. Examples of nonsampling errors include processing, recording, or dataentry errors; nonresponse error; and response error.

NONSCHEDULED SERVICE (Air): Revenue flights not operated as regular scheduled service, such as charter flights, and all nonrevenue flights incident to such flight.

NONSELF-PROPELLED VESSEL (Water): A vessel without the means for self- propulsion. Includes dry cargo and tanker barges.

NONTRAIN INCIDENT: An event that results in a reportable casualty, but does not involve the movement of ontrack equipment, and does not cause reportable damage above the threshold established for train accidents.

NONTRESPASSERS (Rail): A person lawfully on any part of railroad property used in railroad operations, or a person adjacent to railroad premises when injured as the result of railroad operations.

NONVESSEL-CASUALTY-RELATED DEATH: A death that occurs onboard a commercial vessel but not as a result of a vessel casualty, such as a collision, fire, or explosion.

OCCUPANT: Any person in or on a motor vehicle in transport. Includes the driver, passengers, and persons riding on the exterior of a motor vehicle (e.g., a skateboard rider holding onto a moving vehicle). Excludes occupants of parked cars unless they are double parked or motionless on the roadway.

OCCUPATIONAL FATALITY: Death resulting from a job-related injury.

OPERATING EXPENSES (Air): Expenses incurred in the performance of air transportation, based on overall operating revenues and expenses. Does not include nonoperating income and expenses, nonrecurring items, or income taxes.

OPERATING EXPENSES (Rail): Expenses of furnishing transportation services, including maintenance and depreciation of the plant used in the service.

OPERATING EXPENSES (Transit): The total of all expenses associated with operation of an individual mode by a given operator. Includes distributions of "joint expenses" to individual modes and excludes "reconciling items," such as interest expenses and depreciation. Should not be confused with "vehicle operating expenses."

OPERATING EXPENSES (Truck): Includes expenditures for equipment maintenance, supervision, wages, fuel, equipment rental, terminal operations, insurance, safety, and administrative and general functions.

OPERATING REVENUES (Air): Revenues from the performance of air transportation and related incidental services. Includes l) Transportation revenues from the carriage of all classes of traffic in scheduled and nonscheduled services, and 2) Nontransportation revenues consisting of federal subsidies (where applicable) and services related to air transportation.

OTHER FREEWAYS AND EXPRESSWAYS (Highway): All urban principal arterials with limited access but not part of the Interstate system.

OTHER PRINCIPAL ARTERIAL (Highway): Major streets or highways, many of multilane or freeway design, serving high-volume traffic corridor movements that connect major generators of travel.

OTHER RAIL REVENUE: This includes revenues from miscellaneous operations (i.e., dining- and bar-car services), income from lease of road and equipment, miscellaneous rental income, income from nonoperating property, profit from separately operated properties, dividend income, interest income, income from sinking and other reserve funds, release or premium on funded debt, contributions from other companies, and other miscellaneous income.

OTHER REVENUE VEHICLES (Transit): Other revenue-generating modes of transit service, such as cable cars, personal rapid transit systems, monorail vehicles, inclined railway cars, etc., not covered otherwise.

OTHER 2-AXLE 4-TIRE VEHICLES (Truck): Includes vans, pickup trucks, and sport utility vehicles.

OTHER WORK (General Aviation): Con-struction work (not Federal Aviation Regulations, Part 135), helicopter hoist, parachuting, aerial advertising, and towing gliders.

OXYGENATES: Any substance that when added to motor gasoline increases the amount of oxygen in that gasoline blend. Includes oxygen-bearing compounds such as ethanol, methanol, and methyl tertiary butyl ether. Oxygenated fuel tends to give a more complete combustion of carbon into carbon dioxide (rather than monoxide), thereby reducing air pollution from exhaust emissions.

PASSENGER CAR: A motor vehicle designed primarily for carrying passengers on ordinary roads, includes convertibles, sedans, and stations wagons.

PASSENGER-MILE: 1) Air: One passenger transported 1 mile; passenger-miles for one interairport flight are calculated by multiplying aircraft miles flow by the number of passengers carried on the flight. The total passenger-miles for all flights is the sum of passenger-miles for all interairport flights. 2) Auto: One passenger traveling 1 mile; e.g., one car transporting two passengers 4 miles results in eight passenger-miles. 3) Transit: The total number of miles traveled by transit passengers; e.g., one bus transporting five passengers 3 miles results in 15 passenger-miles.

PASSENGER REVENUE: 1) Rail: Revenue from the sale of tickets. 2) Air: Revenues from the transport of passengers by air. 3) Transit: Fares, transfer, zone, and park-and-ride parking charges paid by transit passengers. Prior to 1984, fare revenues collected by contractors operating transit services are not included.

PASSENGER VESSELS: A vessel designed for the commercial transport of passengers.

PEDALCYCLIST: A person on a vehicle that is powered solely by pedals.

PEDESTRIAN: Any person not in or on a motor vehicle or other vehicle. Excludes people in buildings or sitting at a sidewalk cafe. The National Highway Traffic Safety Administration also uses an "other pedestrian" category to refer to pedestrians using conveyances and people in buildings. Examples of pedestrian conveyances include skateboards, nonmotorized wheelchairs, roller-skates, sleds, and transport devices used as equipment.

PERSON-MILES (American Travel Survey): An estimate of the aggregate distances traveled by all persons on a given trip based on the estimated transportation-network-miles traveled on that trip.

PERSON TRIP (American Travel Survey): A trip taken by an individual. For example, if three persons from the same household travel together, the trip is counted as one household trip and three person trips.

PERSONAL BUSINESS TRIP (American Travel Survey): A trip taken for a school-related activity or for personal or family business, including weddings and funerals.

PERSONAL-USE VEHICLE TRIP (American Travel Survey): A trip in which the principle means of transportation is a car, pickup truck, or van; other truck; rental car, truck, or van; recreational vehicle or motor home; or motorcycle or moped.

PLEASURE TRIP (American Travel Survey): A trip taken to visit friends or relatives or for leisure.

PERSONAL CASUALTY (Transit): 1) An incident in which a person is hurt while getting on or off a transit vehicle (e.g., falls or door incidents), but not as a result of a collision, derailment/left roadway, or fire. 2) An incident in which a person is hurt while using a lift to get on or off a transit vehicle, but not as a result of a collision, derailment/left roadway, or fire. 3) An incident in which a person is injured on a transit vehicle, but not as a result of a collision, derailment/left roadway, or fire. 4) An incident in which a person is hurt while using a transit facility. This includes anyone on transit property (e.g., patrons, transit employees, trespassers), but does not include incidents resulting from illness or criminal activity.

PERSONAL WATERCRAFT: Craft less than 13 feet in length designed to be operated by a person or persons sitting, standing, or kneeling on the craft rather than within the confines of a hull.

PETROLEUM (Oil): A generic term applied to oil and oil products in all forms, such as crude oil, lease condensate, unfinished oils, petroleum products, natural gas plant liquids, and nonhydrocarbon compounds blended into finished petroleum products.

PROPERTY DAMAGE (Transit): The dollar amount required to repair or replace transit property (including stations, right of way, bus stops, and maintenance facilities) damaged during an incident.

PUBLIC ROAD: Any road under the jurisdiction of and maintained by a public authority (federal, state, county, town, or township, local government, or instrumentality thereof) and open to public travel.

RAIL MOTOR CARS: Self-propelled passenger rail cars that are driven by electric motors energized from an electrified roadway or by a generator driven by a diesel or gas turbine engine.

RAPID RAIL TRANSIT: Transit service using rail cars driven by electricity usually drawn from a third rail, configured for passenger traffic, and usually operated on exclusive rights-of-way. It generally uses longer trains and has longer station spacing than light rail.

REFORMULATED GASOLINE: Gasoline whose composition has been changed to meet performance specifications regarding ozone-forming tendencies and release of toxic substances into the air from both evaporation and tailpipe emissions. Reformulated gasoline includes oxygenates and, compared with gasoline sold in 1990, has a lower content of olefins, aromatics, volatile components, and heavy hydrocarbons.

RESIDUAL FUEL OIL: The heavier oils that remain after the distillate fuel oils and lighter hydrocarbons are distilled away in refinery operations and that conform to American Society for Testing and Materials (ASTM) Specifications D396 and 976. Includes, among others, Navy Special oil used in steam-powered vessels in government service and No. 6 oil used to power ships. Imports of residual fuel oil include imported crude oil burned as fuel.

RESPONSE ERROR: Error that results from the tendency of people to answer a question falsely, deliberate misrepresentation, unconscious falsification, or misunderstanding of what is required.

REVENUE: Remuneration received by carriers for transportation activities.

REVENUE PASSENGER: 1) Air: Person receiving air transportation from an air carrier for which remuneration is received by the carrier. Air carrier employees or others, except ministers of religion, elderly individuals, and handicapped individuals, receiving reduced rate charges (less than the applicable tariff) are considered nonrevenue passengers. Infants, for whom a token fare is charged, are not counted as passengers. 2) Transit: Single-vehicle transit rides by initial-board (first-ride) transit passengers only. Excludes all transfer rides and all nonrevenue rides. 3) Rail: Number of one-way trips made by persons holding tickets.

REVENUE PASSENGER ENPLANEMENTS (Air): The total number of passengers boarding aircraft. Includes both originating and connecting passengers.

REVENUE PASSENGER LOAD FACTOR (Air): Revenue passenger-miles as a percent of available seat-miles in revenue passenger services. The term is used to represent the proportion of aircraft seating capacity that is actually sold and utilized.

REVENUE PASSENGER-MILE: One revenue passenger transported 1 mile.

REVENUE PASSENGER TON-MILE (Air): One ton of revenue passenger weight (including all baggage) transported 1 mile. The passenger weight standard for both domestic and international operations is 200 pounds.

REVENUE TON-MILE: One short ton of freight transported 1 mile.

REVENUE VEHICLE-MILES (Transit): One vehicle (bus, trolley bus, streetcar) traveling 1 mile while revenue passengers are on board generates one revenue vehicle-mile. Revenue vehicle-miles reported represent the total mileage traveled by vehicles in scheduled or unscheduled revenue-producing services.

ROAD OIL: Any heavy petroleum oil, including residual asphaltic oil, that is used as a dust palliative and surface treatment on roads and highways. It is generally produced in 6 grades from 0, the most liquid, to 5, the most viscous.

ROLL ON/ROLL OFF VESSEL: Ships that are designed to carry wheeled containers or other wheeled cargo and use the roll on/roll off method for loading and unloading.

ROUND-TRIP DISTANCE (American Travel Survey): The estimated transportation network-miles traveled at the time of the trip from the household residence to the destination and back.

RURAL HIGHWAY: Any highway, road, or street that is not an urban highway.

RURAL MILEAGE (Highway): Roads outside city, municipal district, or urban boundaries.

SAMPLING ERROR: The estimated inaccuracy of the results of a study when a population sample, rather than a census, is used to explain the behavior of the total population. (Also referred to as margin of error and standard error.)

SCHEDULED SERVICE (Air): Transport service operated pursuant to published flight schedules.

SCHOOL BUS: A passenger motor vehicle that is designed or used to carry more than 10 passengers, in addition to the driver, and, as determined by the Secretary of Transportation, is likely to be significantly used for the purpose of transporting pre-primary, primary, or secondary school students between home and school.

SCHOOL-BUS-RELATED CRASH: Any crash in which a vehicle, regardless of body design, used as a school bus is directly or indirectly involved, such as a crash involving school children alighting from a vehicle.

SCOW (Water): Any flat-bottomed, nonself-propelled, rectangular vessel with sloping ends. Large scows are used to transport sand, gravel, or refuse.

SELF-PROPELLED VESSEL: A vessel that has its own means of propulsion. Includes tankers, containerships, dry bulk cargo ships, and general cargo vessels.

SERIOUS INJURY (Air Carrier/General Aviation): An injury that requires hospitalization for more than 48 hours, commencing within 7 days from the date when the injury was received; results in a bone fracture (except simple fractures of fingers, toes, or nose); involves lacerations that cause severe hemorrhages, nerve, muscle, or tendon damage; involves injury to any internal organ; or involves second- or third-degree burns or any burns affecting more than 5 percent of the body surface.

SMALL CERTIFICATED AIR CARRIER: An air carrier holding a certificate issued under section 401 of the Federal Aviation Act of 1958, as amended, that operates aircraft designed to have a maximum seating capacity of 60 seats or fewer or a maximum payload of 18,000 pounds or less.

STATE AND LOCAL HIGHWAY EXPENDITURES: Disbursements for capital outlay, maintenance and traffic surfaces, administration and research, highway law enforcement and safety, and interest on debt.

STREETCARS: Relatively lightweight passenger rail cars operating singly or in short trains, or fixed rails in right-of-way that are not always separated from other traffic for much of the way. Streetcars do not necessarily have the right-of-way at grade crossings with other traffic.

SUBCOMPACT CAR: As designated by the automobile industry, a car with a wheelbase between 95 and 99 inches.

SUPPLEMENTAL AIR CARRIER: An air carrier authorized to perform passenger and cargo charter services.

TANKER: An oceangoing ship designed to haul liquid bulk cargo in world trade.

TON-MILE (Truck): The movement of 1 ton of cargo the distance of 1 mile. Ton-miles are calculated by multiplying the weight in tons of each shipment transported by the miles hauled.

TON-MILE (Water): The movement of 1 ton of cargo the distance of 1 statute mile. Domestic ton-miles are calculated by multiplying tons moved by the number of statute miles moved on the water (e.g., 50 short tons moving 200 miles on a waterway would yield 10,000 ton-miles for that waterway). Ton-miles are not computed for ports. For coastwise traffic, the shortest route that safe navigation permits between the port of origin and destination is used to calculate ton-miles.

TRAFFICWAY (Highway): Any right-of-way open to the public as a matter of right or custom for moving persons or property from one place to another, including the entire width between property lines or other boundaries.

TRAIN LINE MILEAGE: The aggregate length of all line-haul railroads. It does not include the mileage of yard tracks or sidings, nor does it reflect the fact that a mile of railroad may include two or more parallel tracks. Jointly-used track is counted only once.

TRAIN-MILE: A train-mile is the movement of a train, which can consist of many cars, the distance of 1 mile. A train-mile differs from a vehicle-mile, which is the movement of one car (vehicle) the distance of 1 mile. A 10-car (vehicle) train traveling 1 mile is measured as 1 train-mile and 10 vehicle-miles. Caution should be used when comparing train-miles to vehicle-miles.

TRANSIT VEHICLE: Includes light, heavy, and commuter rail; motor bus; trolley bus; van pools; automated guideway; and demand-responsive vehicles.

TRANSSHIPMENTS: Shipments that enter or exit the United States by way of a U.S. Customs port on the northern or southern border, but whose origin or destination was a country other than Canada or Mexico.

TRAVEL PARTY (American Travel Survey): Household and nonhousehold members traveling together on a trip.

TRESPASSER (Rail): Any person whose presence on railroad property used in railroad operations is prohibited, forbidden, or unlawful.

TRIP (American Travel Survey): Roundtrip travel to a destination at least 100 miles from home. The following types of trips are excluded: 1) travel as part of an operating crew on a train, airplane, truck, bus, or ship; 2) regular commuting to work or school; 3) one-way trips to move to a new destination; and 4) trips by members of the Armed Forces while on active duty.

TROLLEY BUS: Rubber-tired electric transit vehicle, manually steered and propelled by a motor drawing current, normally through overhead wires, from a central power source.

TRUST FUNDS: Accounts that are specifically designated by law to carry out specific purposes and programs. Trust Funds are usually financed with earmarked tax collections.

TUG BOAT: A powered vessel designed for the towing or pushing of ships, dumb barges, pushed-towed barges, and rafts, but not for the carriage of goods.

U.S. FLAG CARRIER OR AMERICAN FLAG CARRIER (Air): One of a class of air carriers holding a Certificate of Public Convenience and Necessity issued by the U.S. Department of Transportation and approved by the President, authorizing scheduled operations over specified routes between the United States (and/or its territories) and one or more foreign countries.

UNLEADED GASOLINE: See Gasoline.

UNLINKED PASSENGER TRIPS (Transit): The number of passengers who board public transportation vehicles. A passenger is counted each time he/she boards a vehicle even if on the same journey from origin to destination.

URBAN HIGHWAY: Any road or street within the boundaries of an urban area. An urban area is an area including and adjacent to a municipality or urban place with a population of 5,000 or

more. The boundaries of urban areas are fixed by state highway departments, subject to the approval of the Federal Highway Administration, for purposes of the Federal-Aid highway program.

VANPOOL (Transit): Public-sponsored commuter service operating under prearranged schedules for previously formed groups of riders in 8- to 18-seat vehicles. Drivers are also commuters who receive little or no compensation besides the free ride.

VEHICLE MAINTENANCE (Transit): All activities associated with revenue and nonrevenue (service) vehicle maintenance, including administration, inspection and maintenance, and servicing (cleaning, fueling, etc.) vehicles. In addition, it includes repairs due to vandalism or to revenue vehicle accidents.

VEHICLE-MILES (Highway): Miles of travel by all types of motor vehicles as determined by the states on the basis of actual traffic counts and established estimating procedures.

VEHICLE-MILES (Transit): The total number of miles traveled by transit vehicles. Commuter rail, heavy rail, and light rail report individual car-miles, rather than train-miles for vehicle-miles.

VEHICLE OPERATIONS (Transit): All activities associated with transportation administration, including the control of revenue vehicle movements, scheduling, ticketing and fare collection, system security, and revenue vehicle operation.

VESSEL CASUALTY (Water): An occurrence involving commercial vessels that results in 1) Actual physical damage to property in excess of $25,000; 2) Material damage affecting the seaworthiness or efficiency of a vessel; 3) Stranding or grounding; 4) Loss of life; or 5) Injury causing any person to remain incapacitated for a period in excess of 72 hours, except injury to harbor workers not resulting in death and not resulting from vessel casualty or vessel equipment casualty.

VESSEL-CASUALTY-RELATED DEATH: Fatality that occurs as a result of an incident that involves a vessel or its equipment, such as a collision, fire, or explosion. Includes drowning deaths.

WATERBORNE TRANSPORTATION: Transport of freight and/or people by commercial vessels under U.S. Coast Guard jurisdiction.

WAYBILL: A document that lists goods and shipping instructions relative to a shipment.

WEEKEND TRIP (American Travel Survey): Travel by persons who stay one or two nights away, including a Friday and/or Saturday night. Travel over three to five nights including a Friday and/or Saturday night stay is defined as a long-weekend trip.

Acronyms and Initialisms

AAA	American Automobile Association
AADT	Annual Average Daily Traffic
AAMA	American Automobile Manufacturers Association
AAR	Association of American Railroads
AAS	Air Activity Statistics of Certificated Air Carriers
AGA	American Gas Association
AI	Alcohol Involvement
AIA	Aerospace Industries Association
ALVW	Adjusted Loaded Vehicle Weight
AMIO	Alien Migrant InterdictionOperations
AOPL	Association of Oil Pipelines
APTA	American Public Transit Association
ATS	American Travel Survey
ATV	All-Terrain Vehicle
BAC	Blood Alcohol Concentration
BEA	Bureau of Economic Analysis
BMA	Bicycle Manufacturer's Association
BTS	Bureau of Transportation Statistics
Btu	British Thermal Unit
CFR	U.S. Code of Federal Regulation
CFS	Commodity Flow Survey
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CVS	Certification Vehicle Standard
dB	Decibels
DNL	Day Night Sound Level
dwt	Deadweight Tons
EPA	U.S. Environmental Protection Agency
EIA	Energy Information Administration
FAA	Federal Aviation Administration
FARS	Fatality Analysis Reporting System Database
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FRA	Federal Railway Administration
FTA	Federal Transit Administration
FTP	Federal Test Procedure
FTZ	Foreign Trade Zone
GAATA	General Aviation and Air Taxi Activity
GAMA	General Aviation Manufacturers Association
GES	General Estimates System
GIS	Geographic Information System
g/mi	Grams Per Mile
GVWR	Gross Vehicle Weight Rating
HC	Hydrocarbon
HPMS	Highway Performance Monitoring System
ICC	Interstate Commerce Commission
INM	Integrated Noise Model
IO	Investigative Officer
IRI	International Roughness Index
LDT	Light-Duty Truck
LMIS	Lloyd's Maritime Information System
LPG	Liquefied Petroleum Gas
LR	Lloyd's Register
LVW	Loaded Vehicle Weight
MARAD	Maritime Administration
MCMIS	Motor Carrier Management Information System
MIC	Motorcycle Industry Council, Inc.
mmbd	Million Barrels Per Day
MOBILE	Mobile Source Emissions Factor Model

MDPV Medium-Duty Passenger Vehicles
mpg Miles Per Gallon
MSIS Marine Safety Information System
MTBE Methyl Tributyl Ether
MVMA Motor Vehicle Manufacturers Association

NANIM Nationwide Airport Noise Impact Model
NBDA National Bicycle Dealers Association
NDC Navigation Data Center
NHS National Highway System
NHTSA National Highway Traffic Safety Administration
NMAC Near Mid-Air Collision
NO_x Nitrogen Oxides
NOPS National Operations Center
NOPUS National Occupant Protection Use Survey
NPIAS National Plan of Integrated Airport Systems
NPTS Nationwide Personal Transportation Survey
NTD National Transit Database
NTS National Transportation Statistics
NTSB National Transportation Safety Board

OAI Office of Airline Information
OAG Official Airline Guide
OIG Office of the Inspector General
OPS Office of Pipeline Safety
ORNL Oak Ridge National Laboratory
OST Office of the Secretary of Transportation

PAR Police Accident Report
PIRS Pollution Incident Reporting System
PMT Passenger Miles of Travel
PSI Pollutant Standard Index
PSR Present Serviceability Rating
RFG Reformulated Gasoline
RO/RO Roll-On/Roll-Off
RSPA Research and Special Programs Administration
RTECS Residential Transportation Energy Consumption Survey
RVP Reid Vapor Pressure

SAMIS Safety Management Information Statistics
SEC Securities and Exchange Commission
SHA State Highway Agencies
SO_2 Sodium Dioxide
STB Surface Transportation Board

TMG Traffic Monitoring Guide
TIUS Truck Inventory and Use Survey
TSFD Transborder Surface Freight Data

USACE U.S. Army Corps of Engineers
USCG U.S. Coast Guard
USDOC U.S. Department of Commerce
USDOD U.S. Department of Defense
USDOT U.S. Department of Transportation
USSR Union of Soviet Social Republic

TAF Terminal Area Forecast
TIUS Truck Inventory and Use Survey
TMG Traffic Monitoring Guide
TRFD Transportation-Related Final Demand
TTI Texas Transportation Institute

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Italic page numbers refer to metric conversions.

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National Transportation Statistics 2002 presents statistics on the U.S. transportation system, including its physical components, safety record, economic performance, the human and natural environment, and national security.