SUPPORTING DATA FOR
ENVIRONMENTAL TRENDS

Compiled by Daniel B. Tunstall,
The Conservation Foundation

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SYMBOLS USED IN TABLES

Table columns may not add to totals because of rounding.

NA	not available
-	not applicable
>	greater than
<	less than

*Map or diagram. Data not included in this book. For graphic presentation, see Environmental Trends.

In July, 1981, the Council on Environmental Quality published Environmental Trends. Composed of more than 250 charts, maps, diagrams, and supportive text, Environmental Trends was conceived as a national briefing book that would provide policy makers, in and out of government, with readily accessible information to understand better how natural and man-made environments were changing. Approximately 15,000 copies were distributed throughout the United States and abroad and sold through the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

The project that culminated in the publication of Environmental Trends was begun in 1975 by the Council on Environmental Quality. The project was sponsored by the U.S. Geological Survey and the U.S. Fish and Wildlife Service, both of the Department of the Interior, the U.S. Environmental Protection Agency, and the Man and the Biosphere Program of the U.S. Department of State.

Supporting Data for Environmental Trends is a companion document to Environmental Trends. It has been compiled to provide analysts and researchers with the statistical data that were used to prepare the graphics in Environmental Trends. Supporting Data contains 185 tables, with sources and technical notes included at the back of the report.

The statistics in the tables were taken from various published and unpublished sources. Therefore, the number of significant figures for the same information may differ.

The statistical tables were compiled by Daniel B. Tunstall, The Conservation Foundation. David W. Moody, U.S. Geological Survey, served as Contract Officer's Representative.

Chapter 1 PEOPLE AND THE LAND

1-4 Total population, 1900-1978, and projected to 2025

(in million people)

Year	U.S. resident population	Year	U.S. resident population	Year	U.S. resident population
1900	76.1	1927	119.0	1954	161.9
1901	77.6	1928	120.5	1955	165.1
1902	79.2	1929	121.8	1956	168.1
1903	80.6	1930	123.1	1957	171.2
1904	82.2	1931	124.0	1958	174.1
1905	83.8	1932	124.8	1959	177.1
1906	85.4	1933	125.6	1960	180.0
1907	87.0	1934	126.4	1961	183.0
1908	88.7	1935	127.3	1962	185.8
1909	90.5	1936	128.1	1963	188.5
1910	92.4	1937	128.8	1964	191.1
1911	93.9	1938	129.8	1965	193.5
1912	95.3	1939	130.9	1966	195.6
1913	97.2	1940	132.5	1967	197.5
1914	99.1	1941	133.7	1968	199.4
1915	100.5	1942	134.6	1969	201.4
1916	102.0	1943	135.1	1970	203.8
1917	103.3	1944	133.9	1971	206.2
1918	103.2	1945	133.4	1972	208.2
1919	104.5	1946	140.6	1973	209.9
1920	106.5	1947	144.1	1974	211.4
1921	108.5	1948	146.7	1975	213.0
1922	110.1	1949	149.3	1976	214.7
1923	112.0	1950	151.9	1977	216.3
1924	114.1	1951	154.0	1978	218.0
1925	115.8	1952	158.4		
1926	117.4	1953	159.0		

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 5.

1-4 cont. Total population, 1900-1978, and projected to 2025

(in million people)

Year	Series 1 projection	Series 2 projection	Series 3 projection
1980	224.1	222.2	220.7
1985	238.9	232.9	228.8
1990	254.7	243.5	236.3
1995	269.4	252.8	242.0
2000	282.8	260.4	245.9
2005	297.6	267.6	248.6
2010	315.2	275.3	250.9
2015	334.7	283.2	252.5
2020	354.1	290.1	253.0
2025	373.1	295.7	251.9

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 5.

1-5 Population growth rates, 1900-1978

(in percentages)

Year	Rate of growth	Year	Rate of growth	Year	Rate of growth
1900	1.7	1927	1.3	1954	1.8
1901	2.0	1928	1.1	1955	1.8
1902	2.0	1929	1.1	1956	1.8
1903	1.9	1930	0.9	1957	1.7
1904	1.9	1931	0.7	1958	1.7
1905	2.0	1932	0.6	1959	1.7
1906	1.9	1933	0.6	1960	1.6
1907	1.8	1934	0.7	1961	1.6
1908	2.0	1935	0.7	1962	1.5
1909	2.0	1936	0.6	1963	1.4
1910	1.8	1937	0.7	1964	1.3
1911	1.6	1938	0.8	1965	1.2
1912	1.8	1939	0.8	1966	1.1
1913	1.9	1940	0.9	1967	1.0
1914	1.7	1941	1.0	1968	1.0
1915	1.4	1942	1.3	1969	1.0
1916	1.4	1943	1.3	1970	1.1
1917	1.3	1944	1.1	1971	1.1
1918	0.8	1945	1.0	1972	0.8
1919	0.9	1946	1.5	1973	0.8
1920	1.6	1947	1.8	1974	0.7
1921	1.7	1948	1.7	1975	0.8
1922	1.5	1949	1.7	1976	0.7
1923	1.8	1950	1.6	1977	0.8
1924	1.7	1951	1.7	1978	0.8
1925	1.4	1952	1.7		
1926	1.4	1953	1.7		

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 5.

1-6 Population, by region, 1950-1978

(in million people)

Year	North-east	North central	South	West
1950	39.6	44.6	47.3	20.3
1951	39.6	45.1	48.3	21.0
1952	40.2	45.7	48.8	21.7
1953	41.0	46.4	48.9	22.5
1954	41.8	47.5	49.2	23.3
1955	42.3	48.5	50.2	24.1
1956	42.6	49.3	51.2	25.0
1957	43.1	49.9	52.3	25.9
1958	43.8	50.6	53.1	26.7
1959	44.4	51.1	54.1	27.6
1960	44.8	51.7	55.2	28.3
1961	45.4	52.2	56.2	29.2
1962	45.8	52.6	57.2	30.1
1963	46.4	53.1	58.0	31.0
1964	47.0	53.7	58.9	31.6
1965	47.5	54.2	59.6	32.2
1966	47.8	54.8	60.2	32.7
1967	48.1	55.3	60.8	33.2
1968	48.4	55.7	61.5	33.7
1969	48.7	56.1	62.2	34.3
1970	49.2	56.7	63.0	35.0
1971	49.7	57.0	64.0	35.6
1972	49.7	57.3	65.2	36.1
1973	49.5	57.4	66.2	36.7
1974	49.4	57.5	67.2	37.3
1975	49.4	57.6	68.1	38.0
1976	49.4	57.7	69.0	38.6
1977	49.3	58.0	69.8	39.3
1978	49.1	58.2	70.6	40.1

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 6.

1-7 Population growth rates, by region, 1950-1978

(Average annual rate of growth, in percentages*)

Years	North-east	North central	South	West
1950-1955	1.4	1.7	1.2	3.7
1955-1960	1.2	1.3	2.0	3.5
1960-1965	1.2	1.0	1.6	2.8
1965-1970	0.7	0.9	1.2	1.7
1970-1975	0.1	0.3	1.6	1.8
1975-1978	-0.2	0.4	1.2	1.9

*Growth rates are based on population estimates for July 1 of each year given.

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington. D.C.: Government Printing Office, 1981), p. 6.

1-9 Increase in population density along major coasts, 1940-1976

(in percentages)

Area	Percent increase
Total U.S. area	62
Total noncoastal areas	40
Total coastal areas	88

Region	Percent increase
Pacific	205
Gulf	163
Atlantic	67
Great Lakes	57

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 7.

1-10 Population in urban and rural areas, 1900-1950, and in metropolitan and nonmetropolitan areas, 1950-1978

(in million people)

Year	Urban	Rural	Total
1900	30.7	45.4	76.0
1910	42.6	49.3	92.0
1920	54.3	51.4	105.7
1930	68.9	53.8	122.8
1940	74.4	57.2	131.7
1950	96.5	54.2	150.7

Year	SMSA, inside central city	SMSA, outside central city	Non-metro-politan	Total
1950	53.7	40.9	56.7	151.3
1960	59.9	59.6	59.7	179.3
1970	62.9	74.2	62.8	199.8
1978	59.7	83.3	70.4	213.5

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 8.

1-13 Population growth rates in metropolitan and nonmetropolitan counties, 1950-1977

(Average annual rate of growth, in percentages)

Year	Total U.S.	Metropolitan counties	Nonmetropolitan counties
1950-1960	1.69	2.32	0.30
1960-1970	1.25	1.57	0.43
1970-1977	0.92	0.79	1.29

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 10.

Chapter 2 CRITICAL AREAS

2-2 Total wetland acreage, presettlement to 1971

(in million acres)

Year	Million acres
1700	127
1922	91
1954	82
1971	70

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 18.

2-3 Wetland acreages, selected States, 1850-1975

(in million acres)

Year	Florida	South Florida	Arkansas
1850	20.325	NA	7.687
1906	19.800	6.179	5.912
1922	16.846	NA	4.220
1940	NA	NA	NA
1954	15.266	5.709	3.749
1968	NA	NA	NA
1970	NA	NA	NA
1973	NA	4.172	NA
1975	NA	NA	NA

Year	Louisiana	Missouri	California
1850	NA	3.432	2.193
1906	NA	2.440	NA
1922	NA	1.085	1.179
1940	4.206	NA	NA
1954	NA	0.322	0.457
1968	3.911	NA	NA
1970	3.890	NA	NA
1973	NA	NA	NA
1975	NA	NA	0.400

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 19.

2-3 cont. Wetland acreages, selected States, 1850-1975

(in thousand acres)

Year	Delaware	Mississippi	Long Island, New York
1850	NA	76.10	NA
1930	NA	75.10	NA
1954	120.10	NA	34.72
1959	116.90	NA	31.12
1964	115.50	NA	26.50
1968	NA	66.90	22.39
1971	NA	NA	20.06
1974	115.00	NA	NA

Year	Suffolk County, Long Island	Nassau County, Long Island
1850	NA	NA
1930	NA	NA
1954	20.59	14.13
1959	19.21	11.91
1964	17.00	9.50
1968	12.93	9.46
1971	10.83	9.23
1974	NA	NA

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 19.

2-4 Use of filled wetlands, Maine to Delaware, 1955-1964

(in percentages)

Use	Percent
Dredged Spoil	34
Housing	27
Recreation	15
Transportation	10
Industrial	7
Dumps	6
Other	1

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 19.

2-7 Designated and proposed wilderness areas, 1964-1979

(in million acres)

Year	Designated	Proposed	Total
1964	9.244	37	46.24
1965	9.244	37	46.24
1966	9.244	37	46.24
1967	9.244	37	46.24
1968	10.032	37	47.03
1969	10.191	37	47.19
1970	10.395	37.21	47.60
1971	10.395	37.76	48.15
1972	11.026	37.96	48.99
1973	11.026	37.96	48.99
1974	11.380	38.58	49.96
1975	12.716	38.85	51.57
1976	14.454	39.50	53.95
1977	14.485	54.9	69.385
1978	19.001	57.3	76.301
1979	19.001	74.4	93.701

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 24.

2-9 The National Wild and Scenic Rivers System, 1968-1978

(in miles)

Year	Miles
1968	788.65
1969	788.65
1970	883.65
1971	883.65
1972	910.65
1973	976.65
1974	1,033.55
1975	1,157.45
1976	1,622.15
1977	1,622.15
1978	2,317.35

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 26.

2-11 National Park Service units, 1872-1978

(in number of units)

Year	Number of units
1872	1
1880	5
1890	12
1900	17
1910	45
1920	64
1930	106
1940	153
1950	172
1960	190
1970	257
1978	322

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 30.

2-12 National and State Park acreages, 1872-1978

(in million acres)

Year	National Parks
1872	2.2
1880	2.2
1890	3.8
1900	4.1
1910	7.9
1920	13.4
1930	17.9
1940	25.9
1950	26.1
1960	27.4
1970	29.7
1978	75.4

Year	State Parks
1941	4.3
1946	4.6
1950	4.7
1955	5.1
1956	5.2
1958	5.4
1959	5.7
1960	5.6
1961	5.8
1962	5.8
1967	7.4
1970	8.6
1975	9.8

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 31.

2-14 Visits to National and State Parks, 1954-1978

(in million visits)

Year	National Parks	State Parks
1954	47.83	NA
1955	50.01	NA
1956	54.92	200.71
1957	59.28	NA
1958	58.68	237.33
1959	62.81	255.31
1960	79.23	259.00
1961	86.66	273.48
1962	97.04	284.80
1963	102.71	NA
1964	111.39	NA
1965	121.31	NA
1966	133.08	NA
1967	139.68	391.06
1968	150.84	NA
1969	163.99	NA
1970	172.00	482.54
1971	200.54	NA
1972	211.62	NA
1973	215.58	NA
1974	217.44	NA
1975	238.85	565.71
1976	267.76	NA
1977	262.60	NA
1978	283.09	NA

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 33.

2-15 Overnight stays in National Park Service-operated campgrounds, 1960-1978

(in million overnight stays)

Year	Tents	Recreation vehicles	Total
1960	3.585	1.260	4.845
1961	3.586	1.473	5.059
1962	4.307	1.811	6.119
1963	4.621	2.149	6.770
1964	5.043	2.413	7.457
1965	5.104	2.980	8.084
1966	5.062	3.938	9.000
1967	4.715	4.594	9.309
1968	4.788	4.623	9.411
1969	4.390	4.659	9.049
1970	4.684	4.339	9.023
1971	3.482	4.451	7.934
1972	3.651	4.731	8.383
1973	3.801	4.883	8.685
1974	3.791	4.620	8.411
1975	3.735	5.081	8.817
1976	3.870	5.397	9.267
1977	3.973	5.345	9.318
1978	3.775	5.353	9.129

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 34.

2-16 The ten most popular National Parks, 1978

(in million visits)

Park	Million visits
Great Smoky Mountains, Tennessee and North Carolina	11.555
Hot Springs, Arkansas	5.421
Grand Teton, Wyoming	4.160
Acadia, Maine	3.130
Rocky Mountain, Colorado	3.038
Olympic, Washington	2.997
Grand Canyon, Arizona	2.986
Yosemite, California	2.669
Yellowstone, Wyoming	2.623
Mt. Rainier, Washington	2.094

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 35.

2-17 Properties on the National Register of Historic Places, 1968-1978

(in number of properties)

Year	Number of Properties
1968	6
1969	365
1970	1,200
1971	2,200
1972	3,800
1973	5,900
1974	9,200
1975	11,300
1976	13,500
1977	15,100
1978	18,300

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 36.

2-18 Properties on the National Register of Historic Places, by type, 1978

(in percentages)

Category	Percent
Buildings	80
Districts	13
Sites	4
Objects	2
Structures	1

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 37.

2-19 Properties removed from the National Register of Historic Places, 1971-1978

(in number of properties removed annually)

Year	Number of properties removed
1971	20
1972	19
1973	24
1974	32
1975	23
1976	11
1977	29
1978	23

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 37.

2-24 Loss of life from selected natural disasters, 1900-1977

(in average annual deaths per 10 million population)

Years	Total	Hurricanes	Floods
1900-1904	NA	1.2	NA
1905-1909	NA	39.1	NA
1910-1914	NA	1.5	NA
1915-1919	NA	20.1	NA
1920-1924	NA	0.5	NA
1925-1929	78.3	35.6	9.7
1930-1934	21.8	1.3	2.3
1935-1939	42.4	15.9	12.1
1940-1944	19.6	2.2	4.7
1945-1949	21.2	0.9	4.3
1950-1954	18.1	2.8	3.8
1955-1959	20.2	7.7	5.8
1960-1964	9.0	1.9	2.6
1965-1969	16.6	4.2	5.2
1970-1974	18.7	1.4	9.9
1975-1977	10.4	0.5	0.8

Years	Tornadoes	Earthquakes
1900-1904	NA	NA
1905-1909	NA	16.1
1910-1914	NA	NA
1915-1919	25.4	2.4
1920-1924	24.0	NA
1925-1929	32.7	0.2
1930-1934	16.3	1.9
1935-1939	14.3	0.1
1940-1944	12.5	0.1
1945-1949	13.4	2.5
1950-1954	11.4	0.2
1955-1959	6.1	0.4
1960-1964	2.5	2.1
1965-1969	7.2	0.1
1970-1974	6.8	0.6
1975-1977	0.2	0.5

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 42.

2-25 Property damage from selected natural disasters, 1900-1977

(in average annual property loss as a percent of GNP)

Years	Total	Hurricanes	Floods
1900-1904	NA	NA	NA
1905-1909	NA	NA	NA
1910-1914	NA	NA	NA
1915-1919	NA	0.072	NA
1920-1924	NA	0.004	NA
1925-1929	0.165	0.037	0.106
1930-1934	0.070	0.021	0.023
1935-1939	0.336	0.088	0.229
1940-1944	0.107	0.034	0.060
1945-1949	0.113	0.031	0.071
1950-1954	0.169	0.048	0.101
1955-1959	0.159	0.060	0.084
1960-1964	0.091	0.044	0.041
1965-1969	0.165	0.071	0.063
1970-1974	0.277	0.057	0.127
1975-1977	0.192	0.057	0.074

Years	Tornadoes	Earthquakes
1900-1904	NA	NA
1905-1909	NA	0.029
1910-1914	NA	NA
1915-1919	0.029	0.0001
1920-1924	0.027	NA
1925-1929	0.022	0.0001
1930-1934	0.024	0.0014
1935-1939	0.019	0.0001
1940-1944	0.013	0.0001
1945-1949	0.011	0.0004
1950-1954	0.021	0.0004
1955-1959	0.016	0.0001
1960-1964	0.005	0.002
1965-1969	0.031	0.0001
1970-1974	0.092	0.001
1975-1977	0.061	0.0001

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 43.

Chapter 3 HUMAN SETTLEMENTS

3-3 Population in suburban areas and central cities, 1940-1978

(in million people)

Year	Central cities	Suburban areas
1940	43.4	25.9
1950	49.4	35.1
1960	58.0	54.9
1970	62.9	74.2
1978	59.7	83.3

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 48.

3-4 Population density, by location, 1940-1978

(in population per square mile)

Year	U.S. average	SMSAs	Central cities	Suburban areas	Non-metro-politan
1940	44	334	6585	129	23
1950	51	407	7517	175	24
1960	51	364	5336	183	21
1970	58	354	4390	199	20
1978	61	369	4167	223	22

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 48.

3-6 Composition of housing stock, by type of unit and location, 1977

(in percentages)

Location	Single family	Mobile home	Multi-family	Total
Total U.S.	67.3	4.6	28.1	100
In SMSAs	61.5	3.0	35.5	100
Central cities in SMSAs	49.5	1.0	49.6	100
Suburban areas in SMSAs	71.6	4.6	23.8	100
Outside SMSAs (nonmetropolitan)	79.4	8.0	12.6	100

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 50.

3-7 Composition of housing stock, by type of unit, 1940-1977

(in percentages)

Year	Multi-family units	Mobile homes	Single-family units
1940	28.4	0.4	71.2
1950	29.9	0.7	69.4
1960	23.6	3.1	75.0
1970	27.8	4.6	69.1
1977	28.1	4.6	67.3

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 50.

3-8 Occupied housing units, 1900-1977

(in million units)

Year	Million units
1900	16.0
1910	20.3
1920	24.4
1930	29.9
1940	34.9
1950	42.8
1960	53.0
1970	63.4
1977	75.3

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 51.

3-9 Occupied housing units, per 100,000 population, 1900-1977

(in thousand units per 100,000 population)

Year	Thousand units per 100,000 population
1900	21.1
1910	22.0
1920	22.9
1930	24.3
1940	26.3
1950	28.2
1960	29.4
1970	31.1
1977	34.8

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 51.

3-10 Characteristics of new single-family housing units, 1966-1978

Size of house
(in median square feet)

Year	Size of house
1966	1,525
1967	1,570
1968	1,605
1969	1,585
1970	1,400
1971	1,415
1972	1,460
1973	1,540
1974	1,565
1975	1,560
1976	1,620
1977	1,630
1978	1,650

Facilities
(in percent of units)

Year	Fireplace	Central air conditioning	Electric heat
1966	NA	25	20
1967	NA	28	20
1968	NA	31	22
1969	45	36	25
1970	35	34	28
1971	36	36	31
1972	38	43	36
1973	44	49	42
1974	49	48	49
1975	53	46	49
1976	58	49	42
1977	61	54	50
1978	64	58	52

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 52.

3-10 cont. Characteristics of new single-family housing units, 1966-1978

Structure
(in percent of units)

Year	Garage	Two or more baths	Full or partial basement	Two or more levels
1966	64	50	44	28
1967	65	52	44	29
1968	66	54	43	30
1969	65	56	42	30
1970	58	48	37	27
1971	57	48	36	27
1972	61	53	37	25
1973	65	60	41	33
1974	68	61	45	35
1975	67	60	45	35
1976	72	67	45	37
1977	73	69	44	37
1978	74	73	42	39

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 52.

3-11 Characteristics of new multifamily housing units, 1971-1978

Size
(in median square feet)

Year	Size
1971	887
1972	892
1973	892
1974	922
1975	942
1976	894
1977	881
1978	863

Structure and facilities
(in percent of units)

Year	Air conditioning	Electric heat	Two or more baths	Four or more floors
1971	NA	NA	NA	16
1972	NA	NA	NA	15
1973	NA	NA	NA	16
1974	86	60	24	16
1975	85	59	24	23
1976	75	59	19	14
1977	80	66	20	8
1978	79	68	20	8

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 53.

3-12 Condition of housing, 1940-1977

(in percent of households)

Year	Lacking complete plumbing	Crowded	Delapidated
1940	44.6	20.2	18.1
1950	35.4	15.8	9.8
1960	16.8	11.5	5.0
1970	6.9	8.2	4.5
1977	3.1	4.4	NA

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 54.

3-13 Homes with selected major electric appliances, 1950-1977

(in percent of homes with appliances)

Year	Air conditioning	Dishwashers	Clothes dryers	Home freezers	Clothes washers
1950	0.8	2.0	1.4	7.2	NA
1955	5.6	4.0	9.2	16.8	NA
1960	15.1	7.1	19.6	23.4	55.4
1965	24.2	13.5	26.4	27.2	57.4
1970	40.6	26.5	44.6	31.2	62.1
1974	51.6	36.6	56.5	41.7	68.4
1975	52.8	38.3	57.7	43.5	69.9
1976	54.4	39.6	58.6	44.4	72.5
1977	55.3	40.9	59.3	44.8	73.3

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 55.

3-14 Overall opinion of living unit, by location, 1977

(in percentages)

Location	Excellent	Good	Fair	Poor
Total U.S.	34.1	47.0	15.5	2.9
In SMSAs	34.7	46.7	15.2	2.9
Central cities in SMSAs	28.4	47.4	19.5	4.1
Suburban areas in SMSAs	39.8	46.1	11.6	2.0
Outside SMSAs (nonmetropolitan)	32.8	47.6	16.2	2.8

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 56.

3-15 Overall opinion of neighborhood, by location, 1977

(in percentages)

Location	Excellent	Good	Fair	Poor
Total U.S.	34.8	46.6	15.4	2.7
In SMSAs	33.7	46.2	16.5	3.1
Central cities in SMSAs	26	47	22	5
Suburban areas in SMSAs	40	46	12	2
Outside SMSAs (nonmetropolitan)	37	48	13	2

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 56.

3-16 Inadequate neighborhood services, 1973-1977

(in percent of households)

Year	Public transportation	Shopping	Hospitals or health clinics	Police
1973	31.9	12.6	NA	NA
1974	37.8	13.4	12.0	9.0
1975	36.0	13.3	11.8	8.4
1976	34.5	13.2	12.4	9.2
1977	35.0	13.0	14.8	9.3

Year	Fire protection	Schools	Outdoor recreation facilities
1973	NA	5.4	NA
1974	4.9	4.2	NA
1975	4.3	3.6	NA
1976	4.8	3.9	NA
1977	NA	4.5	23.0

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 57.

3-17 Neighborhood deficiencies, 1973-1977

(in percent reporting undesirable conditions)

Year	Noise	Heavy traffic	Commercial/ industrial uses
1973	45.7	28.9	13.4
1974	49.2	31.4	18.6
1975	50.9	30.2	17.1
1976	52.6	30.4	20.3
1977	48.3	29.1	20.6

Year	Odors	Deteriorating housing	Abandoned houses
1973	11.6	8.6	5.8
1974	10.2	10.1	6.8
1975	8.8	9.5	6.8
1976	9.5	10.0	7.1
1977	8.6	10.2	7.0

Year	Inadequate street lights	Streets need repair	Crime
1973	19.9	14.1	13.2
1974	21.0	19.4	17.1
1975	25.0	17.1	18.4
1976	24.4	17.5	17.8
1977	24.8	18.3	16.9

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 58.

3-17 cont. Neighborhood deficiencies, 1973-1977

(in percent reporting undesirable conditions)

Year	Litter	Impassable roads	Want to move because of one or more of above conditions
1973	12.3	NA	3.4
1974	14.6	10.8	2.8
1975	14.4	10.7	11.1
1976	15.3	10.6	11.4
1977	16.0	12.2	5.4

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 58.

Chapter 4 TRANSPORTATION

4-1 Major transportation networks, 1925-1978

(in thousand miles)

Year	Total roads	Rural roads	Municipal roads	Pipelines	Airways
1925	3,246	3,006	240	NA	NA
1929	NA	NA	NA	NA	NA
1930	3,259	3,009	250	NA	NA
1935	3,310	3,032	278	NA	NA
1939	NA	NA	NA	NA	31
1940	3,287	2,920	367	NA	37
1944	NA	NA	NA	NA	NA
1945	3,319	2,939	380	NA	50
1950	3,313	2,922	391	NA	81
1951	NA	NA	NA	NA	NA
1955	3,418	2,954	464	NA	171
1956	NA	NA	NA	NA	NA
1960	3,546	2,989	557	287	293
1962	NA	NA	NA	NA	NA
1965	3,690	3,009	681	326	268
1970	3,730	3,169	561	381	291
1975	3,838	3,199	640	393	313
1976	NA	NA	NA	393	333
1977	3,867	3,180	687	NA	NA
1978	NA	NA	NA	NA	NA

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 62.

4-1 cont. Major transportation networks, 1925-1978

(in thousand miles)

Year	Rail-roads	Inter-state highway systems	Inland water-ways	Heavy rail transit (subways)
1925	NA	NA	NA	NA
1929	249.4	NA	NA	NA
1930	NA	NA	NA	NA
1935	NA	NA	NA	NA
1939	235.1	NA	24.6	NA
1940	NA	NA	24.7	NA
1944	227.3	NA	NA	NA
1945	NA	NA	24.8	0.38
1950	NA	NA	25.0	NA
1951	223.4	NA	NA	NA
1955	220.7	NA	25.1	0.38
1956	NA	2.7	NA	NA
1960	NA	10.4	25.3	NA
1962	215.1	NA	NA	NA
1965	211.9	21.2	25.4	0.39
1970	206.3	31.5	25.5	NA
1975	199.1	37.4	25.5	0.50
1976	192.4	28.2	25.5	NA
1977	191.2	38.9	NA	NA
1978	NA	39.4	NA	NA

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 62.

4-2 Transportation vehicles, 1920-1978

(in vehicles per 1,000 population)

Year	Autos	Bicycles	Trucks	Recreational boats	Motorcycles
1920	76.4	NA	10.4	NA	NA
1925	150.9	NA	22.2	NA	NA
1929	NA	NA	NA	NA	NA
1930	187.2	NA	29.9	NA	NA
1935	177.4	NA	30.8	NA	NA
1940	207.4	NA	36.9	NA	1.0
1944	NA	NA	NA	NA	NA
1945	193.3	NA	38.0	NA	NA
1950	265.6	NA	56.6	NA	3.0
1951	NA	NA	NA	NA	NA
1955	315.9	NA	62.3	NA	2.5
1960	342.7	130.6	66.2	NA	3.2
1965	388.9	NA	76.4	NA	7.1
1970	437.9	245.3	92.2	NA	13.9
1973	NA	NA	NA	45.8	NA
1975	500.9	352.1	121.0	NA	25.8
1976	513.3	NA	129.4	59.4	23.2
1977	525.6	NA	136.7	NA	23.3
1978	NA	424.3	NA	NA	NA

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 62.

4-2 cont. Transportation vehicles, 1920-1978

(in vehicles per 1,000 population)

Year	Railroad cars	Buses	Aircraft	Freight vessels
1920	NA	NA	NA	NA
1925	NA	0.16	NA	NA
1929	22.4	NA	0.08	NA
1930	NA	0.33	0.08	NA
1935	NA	0.46	0.07	NA
1939	16.1	NA	NA	NA
1940	NA	0.76	0.14	NA
1944	16.1	NA	NA	NA
1945	NA	1.2	0.28	NA
1950	NA	1.5	0.61	NA
1951	13.8	NA	NA	NA
1955	12.5	1.5	0.52	NA
1960	NA	1.5	0.65	NA
1965	9.6	1.6	0.73	NA
1970	8.9	1.9	0.76	0.12
1973	NA	NA	NA	NA
1975	8.3	2.2	0.92	0.15
1976	8.1	2.2	0.96	0.16
1977	7.9	2.3	NA	NA
1978	NA	NA	NA	NA

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 62.

4-3 Sales of specialized vehicles, 1961-1978

(in thousand vehicles sold)

Year	Motor-cycles	Snow-mobiles	Recrea-tional vehicles	Mopeds
1961	NA	NA	63	NA
1962	NA	NA	80	NA
1963	NA	NA	119	NA
1964	NA	NA	151	NA
1965	NA	NA	193	NA
1966	NA	NA	220	NA
1967	NA	NA	244	NA
1968	NA	85	331	NA
1969	NA	255	401	NA
1970	NA	425	380	NA
1971	NA	495	451	NA
1972	1233	460	583	NA
1973	1429	450	529	NA
1974	1109	435	296	NA
1975	831	316	340	25
1976	986	243	541	75
1977	1035	195	534	150
1978	NA	226	526	250

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 63.

4-4 Local passenger travel, 1950-1975

(in passenger-miles per capita)

Year	Auto	School bus	Transit bus	Rail transit	Commuter rail
1950	3398	101	182	268	34
1960	4019	157	107	91	23
1970	5369	196	75	62	23
1975	5743	228	72	49	21

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 63.

4-5 Principal means of transportation to work, 1960-1977

(in percent of workers)

Year	Auto	Car-pool	Public trans.	Walk, other
1960	67*	-	13	20
1970	66	12	8	14
1974	69	14	7	10
1975	69	17	5	9
1976	71	15	6	8
1977	71	16	6	7

*Includes carpool.

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 64.

4-6 Principal means of transportation to work, by location, 1977

(in percent of workers)

Location	Auto	Car-pool	Public trans.	Walk, other
Total U.S.	71	16	6	7
In SMSAs	71	15	8	6
Central cities in SMSAs	65	14	13	7
Suburban areas in SMSAs	76	16	3	5
Outside SMSAs (nonmetropolitan)	69	19	1	11

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 64.

4-7 Intercity passenger travel, 1929-1977

(in passenger-miles per capita)

Year	Total	Auto	Private aircraft	Commercial aircraft
1929	1,799.3	1,437.1	NA	NA
1940	2,493.6	2,209.8	.8	9.1
1945	2,605.0	1,651.0	NA	32.2
1950	3,323.9	2,886.1	5.3	61.2
1955	4,316.4	3,861.4	9.1	129.0
1960	4,357.7	3,923.2	12.8	176.1
1965	4,754.9	4,224.8	22.7	277.5
1970	5,813.3	5,034.1	44.6	537.3
1975	6,151.7	5,271.5	52.1	642.6
1977	6,718.4	5,718.1	55.9	759.0

Year	Bus	Rail-road	Inland waterway
1929	50.9	279.2	27.1
1940	77.0	187.2	9.8
1945	205.3	700.7	15.7
1950	149.5	214.0	7.9
1955	132.7	173.9	10.3
1960	110.6	120.0	15.0
1965	123.0	90.9	16.0
1970	124.1	53.5	19.6
1975	119.2	47.4	18.8
1977	119.7	49.5	18.5

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 65.

4-8 Intercity freight transportation, 1929-1977

(in ton-miles per capita)

Year	Total	Truck	Petroleum pipeline
1929	4,993.0	164.2	221.7
1940	4,665.7	468.1	454.4
1945	7,704.2	502.1	951.8
1950	6,999.5	1,139.1	849.4
1955	7,718.0	1,350.9	1,229.8
1960	7,300.9	1,583.5	1,272.4
1965	8,464.0	1,855.0	1,531.2
1970	9,499.0	2,021.5	2,114.7
1975	9,698.1	2,131.1	2,379.9
1977	10,775.1	2,583.2	2,588.6

Year	Air	Railroad	Inland waterway
1929	0.03	3,737.0	870.5
1940	0.15	2,861.3	870.9
1945	0.67	5,178.6	1,071.7
1950	2.0	3,931.0	1,079.9
1955	3.0	3,822.6	1,314.6
1960	4.9	3,217.1	1,222.4
1965	9.9	3,663.6	1,353.8
1970	16.2	3,782.9	1,565.2
1975	17.5	3,562.8	1,605.4
1977	19.3	3,841.3	1,733.4

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 65.

4-10 Energy consumption, by mode of transportation, 1965-1977

(in quads*)

Year	Total, all modes	Total highway	Auto
1965	11,863.9	8,942.0	6,273.4
1970	15,797.4	11,629.4	8,203.0
1975	17,731.0	13,750.0	9,497.6
1977	19,251.0	15,122.9	10,028.2

Year	Bus	Truck	Rail
1965	120.0	2,540.0	575.3
1970	126.6	3,282.9	543.6
1975	119.2	4,077.3	576.6
1977	132.3	4,906.0	609.8

Year	Air	Water	Pipeline
1965	740.0	565.5	517.0
1970	1,652.1	753.3	744.6
1975	1,529.8	851.3	595.2
1977	1,616.9	1,102.8	561.6

*One quad is the equivalent of 15.8 billion barrels of oil.

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 67.

4-11 Energy intensity for freight transportation, 1976

(in BTUs per ton-mile)

Mode	BTUs per ton-mile
Air	12,030
Truck	2,500
Rail	676
Marine	467

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 68.

4-12 Energy intensity for local and intercity passenger travel, 1976

(in BTUs per passenger-mile)

Local passenger travel

Mode	BTUs per passenger-mile
Auto	4,310
Transit rail	3,030
Bus	2,960

Intercity passenger travel

Mode	BTUs per passenger-mile
Air	6,760
Auto	4,310
Rail	3,230
Bus	1,010

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 68.

4-13 Automobile fuel economy and standards, 1940-1985

(in miles per gallon)

Year	All cars	New cars	Fuel economy standards
1940	15.29	NA	NA
1945	15.03	NA	NA
1950	14.95	NA	NA
1951	14.99	NA	NA
1952	14.67	NA	NA
1953	14.70	NA	NA
1954	14.58	NA	NA
1955	14.53	NA	NA
1956	14.36	NA	NA
1957	14.40	NA	NA
1958	14.30	NA	NA
1959	14.30	NA	NA
1960	14.28	NA	NA
1961	14.38	NA	NA
1962	14.37	NA	NA
1963	14.26	NA	NA
1964	14.25	NA	NA
1965	14.07	NA	NA
1966	14.00	NA	NA
1967	13.93	15.8	NA
1968	13.79	15.4	NA
1969	13.63	15.4	NA
1970	13.57	15.5	NA
1971	13.57	15.1	NA
1972	13.49	15.0	NA
1973	13.10	14.5	NA
1974	13.43	14.4	NA
1975	13.53	15.6	NA
1976	13.72	17.7	NA
1977	13.94	18.6	NA
1978	-	19.6	18.0
1979	-	-	19.0
1980	-	-	20.0
1981	-	-	22.0
1982	-	-	24.0
1983	-	-	26.0
1984	-	-	27.0
1985	-	-	27.5

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 69.

4-14 Automobile emissions and standards, 1957-1985

(in grams per mile)

All autos

Years	Hydro-carbons	Carbon monoxide	Nitrogen oxides
1957-1967	8.7	87	NA
1970	10.6	74.4	3.9
1971	9.9	71.7	4.0
1972	9.4	69.7	4.1
1973	8.9	68.3	4.0
1974	8.5	67.5	3.9
1975	8.0	65.4	3.7
1976	7.5	62.4	3.5
1977	7.0	59.2	3.2
1978	6.4	55.6	3.0

Standards for new autos

Years	Hydro-carbons	Carbon monoxide	Nitrogen oxides
1957-1967	8.7	87	4.0
1970	4.1	34	NA
1971	4.1	34	NA
1972	3.0	28	NA
1973	3.0	28	3.1
1974	3.0	28	3.1
1975	1.5	15	3.1
1976	1.5	15	3.1
1977	1.5	15	2.0
1978	1.5	15	2.0
1979	1.5	15	2.0
1980	0.41	7	1.0
1981-1985	0.41	3.4	1.0

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 70..

4-15 Noise levels of surface transportation vehicles, 1971

(in decibels at 50 feet)

Highway

Mode	Decibels at 50 feet
Heavy trucks	84
Motorcycles	82
Garbage trucks	82
Highway buses	82
Automobiles (sport)	75
City buses	73
Light trucks	72
Automobiles (standard)	69

Rail

Mode	Decibels at 50 feet
Trains	94
Rapid transit	86

Recreational vehicles

Mode	Decibels at 50 feet
Off-road motorcycles	85
Snowmobiles	85
Motor boats	80

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 71.

4-16 Population exposed to noise at 23 major airports, 1972

(in thousand people exposed)

Airport	Noise level in excess of NEF 30*	Noise level in excess of NEF 40*
Atlanta	99.8	27.0
Boston	431.3	32
Buffalo	113.8	9.7
Chicago:		
Midway	38.5	1.8
O'Hare	771.7	66.6
Cleveland	128.7	11.2
Denver	180.3	28.3
Los Angeles	292.4	51.1
Miami	260.0	29.7
Minneapolis-St. Paul	96.7	8.8
New York:		
Kennedy	507.3	111.5
La Guardia	1057.0	17.1
New Orleans	32.5	8.9
Newark	431.9	27.5
Philadelphia	76.9	0.3
Phoenix	20.5	6.2
Portland	1.2	0.3
San Diego	77.3	24.0
San Francisco	124.1	11.4
Seattle	123.2	17.3
St. Louis	100.0	8.5
Washington, D.C.:		
Dulles	3.5	0.0
National	24.4	2.0

*NEF, noise exposure forecast, is the total aircraft-generated noise measured at locations near an airport during a typical 24 hours.

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 72.

Chapter 5 MATERIAL USE AND SOLID WASTE

5-2 U.S. material consumption, 1948-1978

(in million tons per year, except as noted)

Year	Building materials	Coal	Other non-fuel minerals
1948	580.1	531.1	31.9
1958	1,291.0	366.7	49.4
1968	1,812.8	498.8	91.0
1978	2,020.6	618.0	106.8

Year	Ferrous metals	Plastic resins	Copper, lead, zinc
1948	62.9	0.7	3.4
1958	71.5	2.5	4.0
1968	107.3	8.6	5.2
1978	115.0	18.8	5.0

Year	Aluminum	Pulp from roundwood
1948	0.8	15.0
1958	2.2	20.4
1968	4.7	28.1
1978	6.0	30.5

Year	Petroleum (billion barrels per year)	Natural gas (trillion cubic feet per year)	Lumber, plywood, and veneer (million cubic feet roundwood per year)
1948	2.1	4.9	6,000
1958	3.3	10.8	6,240
1968	4.8	19.5	7,680
1978	6.8	19.4	8,700

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 78.

5-3 U.S. material consumption in relation to gross national product, 1948-1978

(in tons consumed per million dollars GNP, except as noted)

Year	Building materials	Coal	Other non-fuel minerals
1948	1,189.4	1,089.0	65.4
1958	1,851.4	525.9	70.8
1968	1,723.5	474.2	86.5
1978	1,458.6	446.1	77.1

Year	Ferrous metals	Plastic resins	Copper, lead, zinc
1948	128.9	1.5	7.0
1958	102.5	3.6	5.7
1968	102.0	8.2	4.9
1978	83.0	13.6	3.6

Year	Aluminum	Pulp from roundwood
1948	1.6	30.8
1958	3.1	29.3
1968	4.4	26.7
1978	4.3	22.0

Year	Petroleum (barrels consumed per million $ GNP)	Natural gas (thousand cubic feet consumed per million $ GNP)	Lumber, plywood and veneer (thousand cubic feet of round-wood consumed per million $ GNP)
1948	4,335	10,140	12.3
1958	4,754	15,430	8.95
1968	4,553	18,500	7.3
1978	4,924	14,010	6.3

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 80.

5-4 U.S. material consumption per capita, 1948-1978

(in pounds per person per year, except as noted)

Year	Building materials	Coal	Other non-fuel minerals
1948	7,914.0	7,245.6	435.2
1958	14,762.7	4,193.3	564.9
1968	18,073.8	4,973.1	907.3
1978	18,503.7	5,659.3	978.0

Year	Ferrous metals	Plastic resins	Copper, lead, zinc
1948	858.1	10.1	46.4
1958	817.6	29.0	45.7
1968	1,069.8	85.9	51.8
1978	1,053.1	178.2	45.8

Year	Aluminum	Pulp from roundwood
1948	10.9	204.6
1958	25.2	233.3
1968	46.9	280.2
1978	54.9	279.3

Year	Petroleum (gallons per person per year)	Natural gas (thousand cubic feet per person per year)	Lumber, plywood, and veneer (cubic feet of roundwood per person per year)
1948	605.6	33.7	40.9
1958	796.0	61.5	35.7
1968	1,002.7	97.0	38.3
1978	1,307.7	88.9	39.8

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 82.

5-5 Solid wastes disposed of by manufacturing industries, 1974-1977

(in million short tons)

Year	Total manufacturing	Chemicals	Primary metals
1974	133.3	38.2	40.8
1975	139.1	38.7	42.7
1976	156.8	50.3	42.4
1977	160.0	55.7	41.7

Year	Food processing	Stone, clay, glass	Paper
1974	11.6	9.3	8.8
1975	12.6	11.3	9.1
1976	15.0	11.1	10.1
1977	13.1	12.6	10.6

Year	Lumber	Trans-portation	Machinery
1974	6.9	4.2	2.7
1975	8.1	3.8	2.7
1976	9.3	4.3	3.1
1977	6.3	4.7	3.6

Year	Petroleum and coal	Fabricated metal
1974	2.4	2.1
1975	2.0	1.9
1976	2.6	2.1
1977	2.9	2.0

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 84.

5-6 Hazardous waste generated by selected industries, 1975

(in million metric tons per year, wet weight)

Industry	Million metric tons per year
Primary metals, smelting, and refining	8.27
Organic chemicals, pesticides, and explosives	6.86
Electroplating	5.28
Inorganic chemicals	3.40
Textile dying and finishing	1.77
Petroleum refining	1.76
Rubber and plastics	.79

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 85.

5-8 Consumer solid wastes disposed of and recycled, 1960-1978

(in million tons)

Year	Gross disposed	Recycled	Net disposed
1960	86.9	6.1	80.8
1965	104.8	6.4	98.4
1970	131.1	7.7	123.4
1971	132.6	8.0	124.6
1972	138.5	8.3	130.2
1973	142.9	9.6	133.3
1974	143.1	10.5	132.6
1975	135.6	8.9	126.7
1976	143.2	10.7	132.5
1977	146.6	11.7	134.9
1978	150.4	12.4	138.0

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 86.

5-9 Consumer solid wastes disposed of, by materials, 1978

(in million tons)

Type of waste	Million tons
Total	150
Paper	52
Yard	27
Food	23
Glass	15
Metals	13
Miscellaneous	20

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 86.

5-10 Recycled consumer solid wastes, by material, 1960-1978

(in percent of gross discards recycled)

Year	Paper and paperboard	Aluminum	Ferrous metals
1960	18.8	NA	0.5
1965	15.8	NA	1.0
1970	16.0	1.3	1.2
1971	15.9	2.4	1.3
1972	16.0	3.2	1.4
1973	16.5	3.4	2.4
1974	16.3	5.0	3.4
1975	15.5	8.7	4.4
1976	16.1	9.2	4.5
1977	19.8	7.1	2.5
1978	20.1	13.3	2.5

Year	Glass	Rubber
1960	1.4	5.7
1965	1.2	12.5
1970	1.3	8.2
1971	1.8	8.9
1972	2.1	7.9
1973	2.3	6.8
1974	2.5	6.1
1975	2.7	6.9
1976	2.7	3.9
1977	3.4	3.4
1978	3.3	3.3

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 87.

Chapter 6 TOXIC SUBSTANCES

6-2 Synthetic organic pesticide production, by type, 1950-1978

(in million pounds)

Year	Total	Herbicides	Insecticides	Fungicides
1950	286.0	NA	NA	NA
1951	464.0	49.4	318.8	95.9
1955	506.4	NA	NA	126.6
1960	647.8	102.5	366.2	179.1
1961	699.7	121.0	411.1	167.6
1962	729.7	150.9	461.4	117.5
1963	763.5	174.5	477.9	111.1
1964	782.7	226.4	443.7	112.7
1965	877.2	262.9	490.4	123.8
1966	1,013.1	323.7	552.0	137.4
1967	1,049.7	409.4	495.8	144.4
1968	1,192.4	469.0	569.2	154.2
1969	1,104.4	393.3	570.5	140.6
1970	1,034.1	403.8	490.1	140.2
1971	1,135.7	428.5	557.7	149.5
1972	1,157.7	451.3	563.6	142.8
1973	1,289.0	495.8	639.2	154.0
1974	1,417.2	604.2	650.2	162.8
1975	1,603.0	788.0	659.6	155.4
1976	1,364.4	656.0	566.1	142.3
1977	1,387.6	674.2	570.0	143.3
1978	1,416.5	663.6	605.4	147.5

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 92.

6-3 Insecticide production, by type of chemical, 1960-1978

(in million pounds)

Year	Total insecticides	Organo-chlorine insecticides	Organo-phosphorous insecticides
1960	366	NA	NA
1961	411	NA	NA
1962	461	NA	NA
1963	478	285	74
1964	444	229	81
1965	490	260	95
1966	552	272	120
1967	496	224	NA
1968	569	255	NA
1969	571	NA	NA
1970	490	148	132
1971	558	165	138
1972	564	208	161
1973	639	220	173
1974	650	207	187
1975	660	172	213
1976	566	150	190
1977	570	NA	204
1978	605	NA	208

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 93.

6-4 Selected herbicides used by farmers on crops, 1964-1976

Herbicides used
(in million pounds)

Year	Total herbicides	Atrazine	Alachlor
1964	76.3	10.8	NA
1966	112.4	23.5	NA
1971	224.0	57.2	14.8
1976	394.0	90.3	88.5

Year	2,4-D	Trifluralin	All Others
1964	29.7	NA	35.8
1966	39.5	5.2	44.2
1971	33.3	11.4	107.3
1976	38.4	28.3	148.7

Acres treated
(in million acres)

Year	Total herbicides	Atrazine	Alachlor
1964	NA	7.9	NA
1966	98.7	15.0	NA
1971	157.8	39.8	11.6
1976	196.6	61.8	53.5

Year	2,4-D	Trifluralin
1964	56.3	NA
1966	56.9	6.9
1971	54.8	16.6
1976	58.6	33.7

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 94.

6-4 cont. Selected herbicides used by farmers on crops, 1964-1976

Pounds used per acre
(in pounds per acre)

Year	Average, all herbicides	Atrazine	Alachlor
1964	NA	1.4	NA
1966	1.1	1.6	NA
1971	1.4	1.4	1.3
1976	2.0	1.5	1.7

Year	2,4-D	Trifluralin
1964	0.5	NA
1966	0.7	0.7
1971	0.6	0.7
1976	0.7	0.8

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 94.

6-5 Selected insecticides used by farmers on crops, 1964-1976

Insecticides used
(in million pounds)

Year	Total insecticides	Toxaphene	Methyl parathion
1964	143.2	34.2	10.0
1966	137.6	30.9	8.0
1971	153.8	32.9	27.6
1976	162.1	30.7	22.8

Year	DDT	Carbofuron	Ethyl parathion
1964	35.2	NA	6.1
1966	29.2	NA	8.4
1971	14.3	2.9	9.4
1976	-	11.6	6.6

Year	Aldrin/ dieldrin	All others
1964	12.0	45.6
1966	15.5	45.6
1971	8.2	58.7
1976	0.9	89.6

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 95.

6-5 cont. Selected insecticides used by farmers on crops, 1964-1976

Acres treated
(in million acres)

Year	Total insecticides	Toxaphene	Methyl parathion
1964	NA	8.0	6.7
1966	42.6	5.4	4.5
1971	56.8	5.6	12.1
1976	74.9	4.9	12.1

Year	DDT	Carbofuron	Ethyl parathion
1964	12.2	NA	4.8
1966	8.9	NA	6.1
1971	3.2	3.8	10.0
1976	-	11.4	12.0

Year	Aldrin/ dieldrin
1964	14.4
1966	14.6
1971	8.1
1976	0.5

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 95.

6-5 cont. Selected insecticides used by farmers on crops, 1964-1976

Pounds used per acre
(in pounds per acre)

Year	Average, all insecticides	Toxaphene	Methyl parathion
1964	NA	4.3	1.5
1966	3.3	5.8	1.8
1971	2.7	5.9	2.3
1976	2.2	6.3	1.9

Year	DDT	Carbofuron	Ethyl parathion
1964	2.9	NA	1.3
1966	3.3	NA	1.4
1971	4.5	0.8	0.9
1976	-	1.0	0.5

Year	Alrin/ deildrin
1964	0.8
1966	1.1
1971	1.0
1976	1.9

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 95.

6-6 Pesticide residues in river water and sediments in Texas, Louisiana, and Oklahoma, 1968-1976

(in percent of samples with residues)

DDT

Year	Water	Sediments
1968	36	NA
1969	38	NA
1970	37	89
1971	27	100
1972	21	77
1973	17	36
1974	6	40
1975	5	33
1976	4	27

Aldrin

Year	Water	Sediments
1968	1	NA
1969	NA	NA
1970	2	81
1971	NA	100
1972	NA	66
1973	1	1
1974	3	2
1975	0	2
1976	0	2

Dieldrin

Year	Water	Sediments
1968	14	NA
1969	37	NA
1970	31	87
1971	47	100
1972	44	75
1973	28	31
1974	29	43
1975	22	49
1976	21	36

Chlordane

Year	Water	Sediments
1968	NA	NA
1969	64	NA
1970	28	100
1971	35	100
1962	29	74
1973	12	27
1974	16	36
1975	9	43
1976	15	36

Malathion

Year	Water
1968	NA
1969	NA
1970	14
1971	8
1972	4
1973	2
1974	6
1975	9
1976	14

2,4-D

Year	Water
1968	34
1969	33
1970	33
1971	18
1972	28
1973	56
1974	38
1975	36
1976	29

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 96.

6-7 Pesticide residues in fish and birds, 1966-1976

(in parts per million)

Fish

Year	DDT	Deildrin	Toxaphene
1969	1.06	0.08	NA
1970	0.87	0.08	NA
1971	0.67	0.04	0.05
1972	0.59	0.07	0.11
1973	0.40	0.04	0.11
1974	0.44	0.08	0.11
1975	NA	NA	NA
1976	0.36	0.06	0.35

Starlings

Year	DDT	Deildrin
1968	0.579	0.084
1970	0.355	0.036
1972	0.387	0.035
1974	0.229	0.019
1976	0.254	0.039

Waterfowl (by flyway): DDT

Year	Pacific	Central	Mississippi	Atlantic
1966	0.65	0.15	0.25	0.70
1969	0.71	0.30	0.40	1.03
1972	0.34	0.15	0.37	0.44
1976	0.22	0.28	0.25	0.32

Waterfowl (by flyway): Deildrin

Year	Pacific	Central	Mississippi	Atlantic
1966	0.01	0.01	0.01	0.01
1969	0.02	0.02	0.04	0.05
1972	0.01	0.02	0.02	0.02
1976	0.02	0.03	0.05	0.06

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 97.

6-8 Pesticide residues in human tissue, 1970-1976

(in parts per million)

Year	DDT	Heptachlor epoxide	Oxychlordane
1970	7.88	0.09	NA
1971	7.95	0.09	NA
1972	6.88	0.08	0.11
1973	5.88	0.09	0.12
1974	4.99	0.08	0.12
1975	5.12	0.11	0.14
1976	4.84	0.11	0.14

Year	Deildrin
1970	0.18
1971	0.22
1972	0.18
1973	0.18
1974	0.15
1975	0.17
1976	0.15

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 98.

6-9 Production of selected industrial chemicals, 1950-1978

(in million pounds)

Year	Benzene	Asbestos	Vinyl chloride
1950	1,340.0	NA	249.5
1955	2,247.7	1,564	528.6
1960	3,343.0	1,418	1,037.0
1961	3,986.7	1,332	1,044.0
1962	3,994.2	1,452	1,311.5
1963	4,732.6	1,448	1,435.2
1964	5,338.0	1,626	1,615.0
1965	6,044.7	1,590	2,000.0
1966	6,983.0	1,610	2,499.5
1967	7,085.9	1,442	2,423.6
1968	7,311.0	1,634	2,968.9
1969	8,664.9	1,568	3,735.9
1970	8,286.0	1,468	4,040.2
1971	7,864.9	1,518	4,335.8
1972	9,155.4	1,618	5,088.5
1973	10,623.3	1,752	5,351.1
1974	10,879.2	1,691	5,621.2
1975	7,484.8	1,544	4,196.3
1976	10,418.4	1,451	5,676.9
1977	10,497.2	1,345	5,985.9
1978	10,877.2	1,286	6,941.1

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 100.

6-9 cont. Production of selected industrial chemicals, 1950-1978

(in million pounds)

Year	Phthalates	Acry-lonitrile	PCBs
1950	142.6	NA	NA
1955	212.8	117.9	NA
1960	344.7	229.2	37.9
1961	376.5	249.5	36.5
1962	470.0	360.1	38.4
1963	521.9	455.3	44.7
1964	601.4	594.2	50.8
1965	678.7	771.6	60.5
1966	754.5	716.1	65.8
1967	783.9	670.8	75.3
1968	840.6	1,021.0	82.9
1969	883.8	1,156.6	76.4
1970	855.1	1,039.3	85.1
1971	978.2	978.9	40.5
1972	1,145.7	1,114.7	38.6
1973	1,203.1	1,354.2	42.2
1974	1,207.3	1,411.7	41.1
1975	903.8	1,214.6	29.7
1976	1,042.9	1,517.8	29.6
1977	1,202.4	1,646.0	13.3
1978	1,258.6	1,752.3	0.0

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 100.

6-11 PCB residues in fish and birds, 1969-1976

(in parts per million)

Fish

Year	PCB residue
1969	1.06
1970	1.07
1971	0.90
1972	1.07
1973	0.71
1974	0.96
1975	*
1976	0.87

Starlings

Year	PCB residue
1970	0.358
1972	0.215
1974	0.068
1976	0.243

Waterfowl

	PCB residue, by flyway			
Year	Pacific	Central	Missis-sippi	Atlantic
1969	0.20	0.20	0.44	1.29
1972	0.11	0.10	0.66	1.24
1976	0.16	0.15	0.23	0.52

*Not measured in 1975.

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 102.

6-12 PCB residues in human tissue, 1972-1976

(in percent of population with PCB residues detected)

Year	Percent of population with PCB residues detected
1972	74.0
1973	78.6
1974	90.7
1975	94.4
1976	98.1

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 102.

6-13 Cancer deaths associated with vinyl chloride and polyvinyl chloride, 1942-1973

(in standardized mortality ratio*)

Vinyl chloride workers

Type of cancer	Standardized mortality ratio
All cancer	149
Respiratory cancer	156
Biliary and liver cancer	1155

Polyvinyl chloride communities

Type of cancer	Standardized mortality ratio
Central nervous system	158

*The ratio of the number of observed to expected cancer deaths times 100.

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 103.

6-14 Cancer deaths associated with asbestos, 1959-1977

(in standardized mortality ratio*)

U.S. and Canadian asbestos insulation workers

Type of cancer	Standardized mortality ratio
All cancer	311
Lung cancer	458
Esophagus cancer	257

U.S. asbestos production and textile workers

Type of cancer	Standardized mortality ratio
All cancer	259
Lung cancer	417
Gastrointestinal cancer	260

*The ratio of the number of observed to expected cancer deaths times 100.

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 104.

6-15 Primary demand for selected metals, 1954-1978

(in million pounds)

Year	Lead	Chromium	Nickel
1954	1,336	530	167.8
1955	1,260	932	174.2
1956	1,268	1,098	238.6
1957	1,178	1,058	222.0
1958	1,072	732	119.8
1959	1,194	790	184.6
1960	1,078	716	247.2
1961	1,388	638	268.4
1962	1,310	566	255.8
1963	1,350	850	240.0
1964	1,302	1,096	264.2
1965	1,396	1,028	380.8
1966	1,566	1,128	457.6
1967	1,498	858	365.6
1968	1,816	916	324.4
1969	1,784	960	304.8
1970	1,658	984	349.4
1971	1,890	682	271.0
1972	1,980	1,016	335.6
1973	2,118	1,096	415.2
1974	1,862	1,120	438.2
1975	1,442	744	309.0
1976	1,860	922	333.8
1977	1,771	1,020	319.2
1978	1,707	NA	369.0

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 106.

6-15 cont. Primary demand for selected metals, 1954-1978

(in million pounds)

Year	Arsenic	Cadmium	Mercury
1954	24.8	7.4	2.8
1955	28.6	10.6	3.6
1956	38.4	12.5	3.7
1957	34.8	10.8	3.6
1958	31.0	7.9	3.6
1959	39.8	11.2	3.8
1960	37.1	9.8	3.5
1961	41.9	9.9	3.6
1962	41.2	11.9	4.5
1963	43.5	11.3	5.4
1964	49.9	8.7	5.6
1965	49.4	10.3	4.5
1966	48.6	14.4	4.8
1967	53.4	11.1	4.5
1968	47.8	13.3	4.9
1969	41.2	15.1	5.1
1970	40.6	9.1	4.1
1971	39.3	10.9	3.1
1972	37.9	12.6	3.1
1973	48.4	12.5	3.5
1974	NA	12.1	4.6
1975	NA	6.7	3.7
1976	NA	11.9	5.2
1977	NA	9.0	4.7
1978	NA	9.9	5.3

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 106.

6-17 Cancer deaths associated with metals, 1940-1973

(in standardized mortality ratio*)

Type of cancer	Standardized mortality ratio
Respiratory cancer among cadmium smelter workers	235
Digestive organ cancer among lead smelter workers	150
Respiratory cancer among lead smelter workers	148
Respiratory cancer among lead battery plant workers	132
Respiratory cancer among arsenic workers	267

*The ratio of the number of observed to expected cancer deaths times 100.

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 108.

6-18 Radiation exposure, by source, 1970

(in mrem per person per year)

Source	Mrem per person per year
Total, all sources	182
Terrestrial	58
Cosmic	44
Medical	73
Global nuclear fallout	4
Industrial/Occupational	0.8
Nuclear power	0.003
Miscellaneous	2

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 110.

6-19 Radiation levels from nuclear fallout, as measured by strontium-90 and cesium-137 in pasteurized milk, 1960-1978

(in picocuries per liter)

Year	Strontium-90	Cesium-137
1960	8.6	18.0
1961	8.0	11.0
1962	13.4	44.0
1963	23.5	108.0
1964	23.8	109.0
1965	17.6	58.0
1966	13.3	29.0
1967	10.2	16.0
1968	8.9	11.0
1969	7.5	9.0
1970	7.3	8.0
1971	6.8	9.0
1972	5.6	6.0
1973	4.4	5.0
1974	4.7	8.0
1975	3.9	9.0
1976	3.5	7.0
1977	3.6	6.0
1978	3.8	7.3

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 112.

6-20 Radiation levels from nuclear power generation, as measured by krypton-85 in air, 1962-1976

(in picocuries per cubic meter)

Year	Krypton-85
1962	7.5
1963	9.0
1964	9.5
1965	10.0
1966	11.0
1967	11.5
1968	12.5
1969	13.5
1970	15.4
1971	14.8
1972	14.9
1973	16.7
1974	17.0
1975	17.5
1976	17.3

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 112.

6-22 Relative risk of cancer from radiation, 1946-1974

(in relative risk*)

Type of cancer	Relative risk
Respiratory cancer among uranium miners	4.78
Bone cancer among radium dial painters	123.1
Thyroid cancer among patients receiving thymus x-ray	136.0
Leukemia among ankylosing spondylitis patients	12.1
Leukemia among atomic bomb survivors	3.7

*The number of observed cases divided by the number of expected cases, taking into account sex and age differences.

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 114.

Chapter 7 CROPLAND, FOREST, AND RANGELAND

7-2 Uses of cropland, 1949-1978

(in million acres)

Year	Total cropland	Harvested	Failed crops
1949	478	352	9
1954	465	339	13
1959	457	317	10
1964	444	292	6
1969	472	286	6
1974	465	322	8
1975	NA	330	6
1976	NA	331	9
1977	NA	337	10
1978	473	330	7

Year	Summer fallow	Idle	Pasture
1949	26	22	69
1954	28	19	66
1959	31	33	66
1964	37	52	57
1969	41	51	88
1974	31	21	83
1975	30	NA	NA
1976	30	NA	NA
1977	30	NA	NA
1978	31	29	76

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 119.

7-5 Agricultural production, 1960-1978

(in a production index in which 1967=100)

Year	Crops	Livestock
1960	93	88
1961	92	91
1962	92	92
1963	96	95
1964	93	97
1965	99	95
1966	95	97
1967	100	100
1968	103	100
1969	104	101
1970	100	105
1971	112	106
1972	113	107
1973	119	105
1974	110	106
1975	121	101
1976	121	105
1977	130	106
1978	131	106

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 121.

7-6 Agricultural inputs, 1950-1977

Time spent on farmwork
(in billion hours)

Year	Billion hours	Year	Billion hours
1950	15.1	1965	7.3
1951	15.2	1966	6.9
1952	14.5	1967	6.7
1953	14.0	1968	6.4
1954	13.3	1969	6.2
1955	12.8	1970	6.0
1956	12.0	1971	5.7
1957	11.1	1972	5.4
1958	10.5	1973	5.3
1959	10.3	1974	5.2
1960	9.8	1975	5.0
1961	9.4	1976	4.8
1962	9.0	1977	4.7
1963	8.7		
1964	8.2		

Horsepower of farm machines
(in million horsepower)

Year	Million horsepower	Year	Million horsepower
1950	93	1965	176
1951	101	1966	182
1952	108	1967	189
1953	115	1968	195
1954	121	1969	199
1955	126	1970	203
1956	134	1971	206
1957	139	1972	209
1958	144	1973	212
1959	150	1974	219
1960	153	1975	222
1961	158	1976	228
1962	162	1977	232
1963	167		
1964	172		

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 122.

7-6 cont. Agricultural inputs, 1950-1977

Fertilizers applied
(in million tons)

Year	Million tons	Year	Million tons
1950	4.1	1964	10.5
1951	4.7	1965	11.0
1952	5.2	1966	12.4
1953	5.6	1967	14.0
1954	5.9	1968	15.0
1955	6.1	1969	15.5
1956	6.0	1970	16.1
1957	6.4	1971	17.2
1958	6.5	1972	17.2
1959	7.4	1973	18.0
1960	7.5	1974	19.3
1961	7.8	1975	17.6
1962	8.4	1976	20.8
1963	9.5	1977	22.1

Pesticides applied
(in million pounds)

Year	Total pesticides	Herbicides	Insecticides	Fungicides	Other pesticides
1964	291.4	76.3	143.2	41.2	30.7
1966	328.2	112.4	137.6	47.7	30.5
1971	463.7	224.0	153.8	46.3	39.6
1976	649.8	394.3	162.1	50.2	43.2

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 122.

7-6 cont. Agricultural inputs, 1950-1977

Water for irrigation
(in billion gallons per day)

Year	Billion gallons per day
1960	52
1965	66
1970	73
1975	80

Energy spent on farms
(in trillion BTUs)

Year	Trillion BTUs
1950	1203
1954	1303
1956	1413
1960	1484
1964	1747
1968	1995
1970	2087

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 122.

7-11 Commercial forest land, by region and ecosystem, 1977

(in million acres)

Pacific coast

Ecosystem	Million acres
Douglas - fir	18.4
Hemlock - sitka spruce	12.0
Ponderosa pine	12.0
Fir - spruce	9.7
Lodge-pole pine	2.9
Larch	0.7
Redwood	0.7
Western white pine	0.1
Western hardwoods	10.4

Rocky Mountain

Ecosystem	Million acres
Ponderosa pine	14.7
Douglas - fir	12.2
Fir - spruce	10.1
Lodge-pole pine	9.8
Larch	1.7
Hemlock - sitka spruce	1.2
Western white pine	0.3
Other western softwoods	0.5
Western hardwoods	4.6

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 128.

7-11 cont. Commercial forest land, by region and ecosystem, 1977

(in million acres)

North

Ecosystem	Million acres
Spruce - fir	18.3
White - red - jack	11.9
Loblolly - shortleaf pine	3.4
Oak - hickory	51.8
Maple - beech - birch	32.5
Elm - ash - cottonwoods	21.9
Aspen - birch	19.6
Oak - pine	4.2
Oak - gum - cypress	0.8

South

Ecosystem	Million acres
Loblolly - shortleaf pine	46.5
Longleaf - slash pine	17.0
White - red - jack pine	0.4
Oak - hickory	59.0
Oak - pine	30.4
Oak - gum - cypress	26.1
Elm - ash - cottonwood	3.4
Maple - beech - birch	0.4

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 128.

7-12 Sawtimber growth and harvest, by type, 1952-1976

(in billion board feet per year)

Total U.S.

Year	Growth	Harvest
1952	45.0	52.2
1962	54.2	51.4
1970	65.0	62.5
1976	73.6	66.2

Softwood

Year	Growth	Harvest
1952	29.4	39.1
1962	36.0	38.7
1970	43.2	47.1
1976	49.1	51.7

Hardwood

Year	Growth	Harvest
1952	15.6	13.0
1962	18.1	12.7
1970	21.8	15.4
1976	24.3	14.5

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 130.

7-13 Sawtimber growth and harvest, by region and ownership, 1952-1976

(in billion board feet per year)

Region

	North		South	
Year	Growth	Harvest	Growth	Harvest
1952	9.2	6.4	21.4	20.2
1962	11.3	6.3	26.4	18.4
1970	12.8	8.8	31.9	23.1
1976	14.0	8.6	36.7	26.6

	Rocky Mountain		Pacific Coast	
Year	Growth	Harvest	Growth	Harvest
1952	4.3	3.2	10.2	22.4
1962	4.6	4.3	11.9	22.3
1970	5.2	5.0	15.0	25.6
1976	6.6	4.8	16.3	26.1

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 131.

7-13 cont. Sawtimber growth and harvest, by region and ownership, 1952-1976

(in billion board feet per year)

Ownership

Year	Farm and other private		Forest industry	
	Growth	Harvest	Growth	Harvest
1952	23.8	25.5	9.5	17.2
1962	28.6	22.2	11.3	14.5
1970	34.3	25.7	13.6	18.5
1976	39.6	26.5	14.5	21.3

Year	National forest		Other public	
	Growth	Harvest	Growth	Harvest
1952	7.7	6.7	4.0	2.7
1962	9.2	11.0	5.0	3.6
1970	11.3	13.4	5.8	4.9
1976	12.7	12.5	6.8	5.8

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 131.

7-14 Sawtimber growth and harvest in two regions, by ownership, 1952-1976

(in billion board feet per year)

South

	Farm and other private		Forest industry	
Year	Growth	Harvest	Growth	Harvest
1952	13.5	13.8	5.6	4.8
1962	16.5	13.2	6.7	4.0
1970	20.4	15.4	7.7	5.8
1976	24.9	16.5	7.9	7.8

	National forest		Other public	
Year	Growth	Harvest	Growth	Harvest
1952	1.6	1.0	0.6	0.6
1962	2.3	0.8	0.8	0.4
1970	2.6	1.2	1.2	0.7
1976	2.5	1.6	1.4	0.8

Pacific

	Farm and other private		Forest industry	
Year	Growth	Harvest	Growth	Harvest
1952	2.8	5.8	2.6	11.1
1962	3.3	3.3	3.0	9.1
1970	4.1	2.9	3.7	10.5
1976	4.2	3.1	4.4	11.2

	National forest		Other public	
Year	Growth	Harvest	Growth	Harvest
1952	2.9	4.1	1.9	1.4
1962	3.3	7.6	2.3	2.4
1970	4.7	8.9	2.6	3.3
1976	4.6	7.7	3.1	4.0

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 132.

7-15 Roundwood harvest, by product, 1950-1976

(in billion cubic feet)

Year	Total, all products	Lumber	Plywood and veneer	Pulp products
1950	10.8	5.9	0.3	1.5
1951	11.0	5.8	0.4	1.8
1952	10.8	5.8	0.4	1.8
1953	10.7	5.7	0.5	1.9
1954	10.6	5.6	0.5	2.0
1955	11.0	5.8	0.6	2.2
1956	11.3	5.9	0.6	2.5
1957	10.2	5.1	0.6	2.4
1958	10.0	5.1	0.6	2.2
1959	10.8	5.7	0.7	2.4
1960	10.2	5.1	0.7	2.6
1961	10.0	4.9	0.8	2.5
1962	10.2	5.1	0.8	2.6
1963	10.6	5.1	0.9	2.7
1964	11.2	5.6	1.0	2.9
1965	11.5	5.7	1.0	3.1
1966	11.5	5.6	1.0	3.2
1967	11.2	5.4	1.0	3.2
1968	11.7	5.6	1.1	3.4
1969	11.6	5.5	1.1	3.6
1970	11.7	5.4	1.1	3.8
1971	11.6	5.5	1.2	3.6
1972	11.9	5.6	1.4	3.5
1973	12.3	5.7	1.3	3.7
1974	11.8	5.1	1.1	4.1
1975	10.7	4.9	1.1	3.4
1976	12.1	5.6	1.3	3.7

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 133.

7-15 cont. Roundwood harvest, by product, 1950-1976

(in billion cubic feet)

Year	Fuel-wood	Misc.
1950	2.3	0.8
1951	2.2	0.7
1952	2.0	0.7
1953	1.9	0.7
1954	1.8	0.7
1955	1.7	0.6
1956	1.7	0.6
1957	1.6	0.6
1958	1.5	0.6
1959	1.4	0.5
1960	1.3	0.5
1961	1.2	0.5
1962	1.1	0.5
1963	1.1	0.5
1964	1.0	0.5
1965	0.9	0.6
1966	0.8	0.6
1967	0.8	0.5
1968	0.7	0.5
1969	0.6	0.5
1970	0.5	0.4
1971	0.5	0.5
1972	0.5	0.5
1973	0.5	0.5
1974	0.5	0.5
1975	0.5	0.4
1976	0.5	0.5

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 133.

7-16 Forest conditions, 1950-1978

(in million acres per year)

Area planted and direct seeded

Year	Million acres	Year	Million acres	Year	Million acres
1950	0.49	1960	2.10	1970	1.58
1951	0.45	1961	1.76	1971	1.69
1952	0.52	1962	1.37	1972	1.68
1953	0.71	1963	1.33	1973	1.75
1954	0.81	1964	1.31	1974	1.60
1955	0.78	1965	1.29	1975	1.93
1956	0.89	1966	1.28	1976	1.89
1957	1.14	1967	1.37	1977	1.98
1958	1.53	1968	1.44	1978	2.09
1959	2.12	1969	1.43		

Wildfire damage

Year	Million acres	Year	Million acres	Year	Million acres
1950	15.5	1960	4.5	1970	3.3
1951	10.8	1961	3.0	1971	4.3
1952	14.2	1962	4.1	1972	2.6
1953	10.0	1963	7.1	1973	1.9
1954	8.8	1964	4.2	1974	2.9
1955	8.1	1965	2.7	1975	1.8
1956	6.6	1966	4.6	1976	5.1
1957	3.4	1967	4.7	1977	3.2
1958	3.3	1968	4.2		
1959	4.2	1969	6.7		

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 134.

7-16 cont. Forest conditions, 1950-1978

(in million acres per year)

Spruce budworm defoliation

Year	Total	Western states	Eastern states
1968	6.6	5.3	1.3
1969	5.8	4.6	1.2
1970	6.0	4.0	2.0
1971	6.5	4.8	1.6
1972	8.3	5.5	2.8
1973	8.7	4.4	4.2
1974	16.2	5.5	10.8
1975	14.5	5.3	9.2
1976	15.0	5.8	9.1
1977	16.8	6.5	10.3

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 134.

7-17 Recreational use of the National Forests, 1965-1977

(in million recreation visitor-days)

Year	Million recreation visitor-days
1965	160.3
1966	150.7
1967	149.6
1968	156.7
1969	162.8
1970	172.6
1971	178.1
1972	184.0
1973	188.2
1974	192.9
1975	199.2
1976	199.9
1977	204.8

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 135.

7-18 Recreational use of the National Forests, by activity, 1977

(in million recreation visitor-days)

Recreation activity	Million recreation visitor-days
Camping	56.5
Mechanized recreation travel	49.3
Fishing	16.0
Hunting	14.5
Resort and residence use	11.0
Nature study	11.0
Boating and other water sports	10.4
Hiking and mountain climbing	10.3
Picnicing	8.3
Winter sports	8.1
Visitor information (exhibits, talks, etc.)	3.6
Horseback riding	2.9
Gathering forest products	2.8

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 136.

7-21 Rangeland, by ecosystem, 1976

(in million acres)

Grasslands (48 states)	Million acres
Plains grasslands	175.2
Prairie	41.2
Mountain grasslands	26.9
Desert grasslands	24.7
Annual grasslands	10.2
Alpine	6.8
Wet grasslands	4.4
Mountain meadows	3.3

Shrublands (48 states)	Million acres
Sagebrush	130.0
Desert shrub	81.2
Pinyon - juniper	47.3
Southwestern shrubsteppe	43.2
Texas savanna	28.4
Chapparal - mountain shrub	14.1
Desert	7.5
Shinnery	4.7

Alaskan tundra	Million acres
Alpine tundra	103.1
Moist tundra	66.6
Wet tundra	26.3
Shrub thickets	17.8
Muskeg bog	14.4
Aleutian alpine	2.2
Aleutian moist tundra	1.2

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 140.

7-22 Quality of rangeland, by ecosystem, 1976

(in percentages)

Grasslands (48 states)	Low	Mod. low	Mod. high	High
Plains grasslands	11.5	39.5	34	15
Prairie	14	38	34	14
Mountain grasslands	15	31	36	18
Desert grasslands	16.4	50.4	24.6	8.4
Annual grasslands	45	37	5	13
Alpine	1	29	27	43
Wet grasslands	34.7	20.6	27.6	16.9
Mountain meadows	8	21	39	32
Total grasslands	14	39	32	15

Shrublands (48 states)	Low	Mod. low	Mod. high	High
Sagebrush	17	35	36	12
Desert shrub	14.7	31.5	36.4	17.4
Pinyon - juniper	18	44	29	9
Southwestern shrubsteppe	33	41	16	10
Texas savanna	14	46	24	16
Chapparal - mountain shrub	28	38	22	12
Desert	5	6	12	77
Shinnery	15.3	40.5	27.6	16.5
Total shrublands	18	37	30	15

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 142.

7-22 cont. Quality of rangeland, by ecosystem, 1976

(in percentages)

Alaskan tundra	Low	Mod. low	Mod. high	High
Alpine tundra	0	0	18	82
Moist tundra	0	5	34	61
Wet tundra	0	0	0	100
Shrub thickets	0	5	11	84
Muskeg - bog	0	0	0	100
Aleutian alpine	0	5	25	70
Aleutian moist tundra	0	0	30	70
Total Alaskan tundra	0	2	19	79

All rangeland	Low	Mod. low	Mod. high	High
Total, 48 states	16	38	31	15
Total, 50 states	12	28	28	32

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 142.

7-23 Productivity of rangeland, by ecosystem, 1976

(in average pounds of herbage and browse produced per acre per year)

Grasslands (48 states)	Average pounds per acre per year
Plains grasslands	1,016
Prairie	3,318
Mountain grasslands	1,661
Desert grasslands	307
Annual grasslands	2,064
Alpine	564
Wet grasslands	5,139
Mountain meadows	2,824

Shrublands (48 states)	Average pounds per acre per year
Sagebrush	1,027
Desert shrub	249
Pinyon - juniper	385
Southwestern shrubsteppe	488
Texas savanna	2,142
Chapparal - mountain shrub	1,929
Desert	0
Shinnery	1,870

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 144.

Chapter 8 WILDLIFE

8-2 Selected large mammal populations on Bureau of Land Management lands, 1961-1975

(by population)

Year	Caribou	Pronghorn antelope	Moose
1961	NA	195,957	76,525
1962	NA	190,850	76,540
1963	NA	152,658	91,190
1964	NA	183,550	91,600
1965	600,000	174,800	91,450
1966	600,000	162,800	91,590
1967	600,000	169,930	101,340
1968	600,000	178,400	101,210
1969	600,000	178,400	101,210
1970	600,000	173,310	101,345
1971	500,000	179,125	NA
1972	500,000	197,125	NA
1973	442,000	172,026	101,565
1974	450,000	190,669	151,664
1975	400,000	192,248	152,130

Year	Bighorn Sheep
1961	NA
1962	NA
1963	NA
1964	NA
1965	44,880
1966	63,940
1967	43,960
1968	44,030
1969	44,030
1970	43,980
1971	35,320
1972	35,320
1973	NA
1974	40,883
1975	39,521

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 150.

8-3 Selected large mammal populations in National Forests and National Grasslands, 1960-1978

(by population)

Year	Elk	Pronghorn antelope	Moose
1960	299,000	54,000	16,000
1961	313,000	54,000	17,000
1962	334,000	49,000	20,000
1963	338,000	51,000	21,000
1964	346,000	48,000	21,000
1965	361,000	50,000	21,000
1966	357,000	46,000	21,000
1967	375,000	44,000	21,000
1968	351,000	38,000	22,000
1969	361,000	38,000	21,000
1970	362,000	37,000	24,000
1971	366,000	39,000	23,000
1972	368,000	42,000	25,000
1973	365,000	39,000	25,000
1974	387,000	42,000	25,000
1975	396,000	46,000	22,000
1976	401,000	45,000	23,000
1977	431,000	50,000	23,000
1978	414,920	59,970	23,323

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 151.

8-3 cont. Selected large mammal populations in National Forests and National Grasslands, 1960-1978

(by population)

Year	Bighorn sheep	Alaska brown bear	Wolf
1960	11,000	6,230	NA
1961	11,100	6,235	NA
1962	11,100	6,235	NA
1963	11,100	6,335	NA
1964	12,100	6,335	NA
1965	13,000	6,200	NA
1966	13,000	6,300	2,500
1967	14,000	6,330	2,800
1968	13,000	6,419	2,700
1969	12,800	6,350	2,500
1970	12,800	8,350	2,700
1971	12,850	5,960	2,600
1972	12,850	5,960	2,000
1973	13,000	5,400	1,600
1974	13,000	5,400	1,400
1975	14,000	5,300	1,300
1976	15,000	5,300	1,400
1977	16,000	5,300	1,000
1978	16,546	5,310	1,375

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 151.

8-3 cont. Selected large mammal populations in National Forests and National Grasslands, 1960-1978

(by population)

Year	Caribou	Mule deer	Whitetail deer
1960	NA	2,160,000	902,000
1961	NA	2,322,000	898,000
1962	NA	2,413,000	935,000
1963	NA	2,380,000	865,000
1964	NA	2,351,000	900,000
1965	NA	2,367,000	936,000
1966	150	2,204,000	879,000
1967	150	2,251,000	928,000
1968	175	2,144,000	930,000
1969	160	2,138,000	887,000
1970	125	2,089,000	861,000
1971	260	2,013,000	809,000
1972	280	1,852,000	810,000
1973	350	1,767,000	782,000
1974	360	1,662,000	824,000
1975	400	1,491,000	814,000
1976	400	1,396,000	783,000
1977	390	1,405,000	807,000
1978	396	1,443,761	796,864

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 151.

8-3 cont. Selected large mammal populations in National Forests and National Grasslands, 1960-1978

(by population)

Year	Blacktail deer	Black bear	Mountain goat
1960	559,000	109,000	26,000
1961	620,000	109,000	30,000
1962	670,000	109,000	29,000
1963	688,000	106,000	31,000
1964	714,000	105,000	31,000
1965	720,000	108,000	32,000
1966	720,000	110,000	31,000
1967	817,000	108,000	30,000
1968	765,000	103,000	31,000
1969	666,000	100,000	31,000
1970	659,000	98,000	31,000
1971	645,000	97,000	30,000
1972	630,000	97,000	29,000
1973	516,000	92,000	29,000
1974	506,000	93,000	27,000
1975	504,000	94,000	27,000
1976	519,000	96,000	24,000
1977	511,000	93,000	24,000
1978	537,220	92,552	24,629

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 151.

8-3 cont. Selected large mammal populations in National Forests and National Grasslands, 1960-1978

(by population)

Year	Peccary	Mountain lion	Dall sheep
1960	NA	NA	1,000
1961	NA	NA	900
1962	NA	NA	900
1963	NA	NA	900
1964	NA	NA	900
1965	NA	NA	900
1966	NA	NA	900
1967	NA	NA	900
1968	NA	NA	900
1969	NA	NA	1,210
1970	NA	NA	1,205
1971	NA	NA	1,150
1972	NA	NA	1,150
1973	20,000	7,300	1,200
1974	21,000	8,400	1,200
1975	21,000	8,300	1,200
1976	20,000	8,400	1,200
977	21,000	8,700	1,200
1978	20,183	9,349	1,200

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 151.

8-3 cont. Selected large mammal populations in National Forests and National Grasslands, 1960-1978

(by population)

Year	Grizzly bear	Bison
1960	745	NA
1961	775	NA
1962	805	NA
1963	820	NA
1964	780	NA
1965	900	NA
1966	900	NA
1967	903	NA
1968	829	NA
1969	832	NA
1970	830	NA
1971	700	NA
1972	800	NA
1973	810	350
1974	670	310
1975	620	300
1976	620	230
1977	630	150
1978	667	175

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 151.

8-4 Animals removed or killed by Federal predator control activities, 1937-1978

(in number of animals)

Year	Coyote	Bobcat	Red wolf
1937	80,299	7,472	980
1938	84,844	7,189	1,343
1939	93,039	9,033	1,188
1940	104,072	10,566	1,246
1941	110,495	10,347	1,362
1942	111,076	10,957	781
1943	103,971	9,527	1,004
1944	108,050	8,900	1,161
1945	102,979	7,325	1,354
1946	108,311	6,487	1,551
1947	103,982	6,508	1,450
1948	90,270	7,223	1,053
1949	75,448	8,231	1,032
1950	66,281	10,874	1,051
1951	60,455	13,343	1,244
1952	50,661	13,476	1,451
1953	55,000	18,905	1,797
1954	52,636	19,559	1,589
1955	55,204	19,249	2,487
1956	55,402	19,495	1,940
1957	62,585	22,198	2,681
1958	62,765	23,453	2,615
1959	78,714	25,079	3,393
1960	94,769	25,808	3,830
1961	100,363	25,177	2,532
1962	104,787	21,228	2,780
1963	89,653	20,780	2,771
1964	97,096	20,918	2,617
1965	90,236	17,294	-
1966	77,258	13,365	-
1967	75,892	11,031	-
1968	69,390	9,351	-
1969	74,070	8,443	-
1970	73,093	8,403	-
1971	75,661	6,608	-
1972	71,298	5,351	-
1973	76,490	4,526	-
1974	71,777	3,790	-
1975	81,471	2,559	-
1976	88,985	2,298	-
1977	65,649	1,018	-
1978	60,983	599	-

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 152.

8-4 cont. Animals removed or killed by Federal predator control activities, 1937-1978

(in number of animals)

Year	Bear	Mountain lion	Timber wolf
1937	299	212	27
1938	392	255	17
1939	495	241	26
1940	608	214	9
1941	528	204	5
1942	636	204	10
1943	618	147	10
1944	592	167	9
1945	619	163	11
1946	730	113	6
1947	919	127	10
1948	744	148	14
1949	652	131	4
1950	719	236	108
1951	733	229	134
1952	714	197	182
1953	729	184	65
1954	860	232	93
1955	874	195	171
1956	977	285	96
1957	1,039	267	109
1958	1,023	331	172
1959	978	292	161
1960	1,023	290	2
1961	1,039	276	1
1962	815	254	2
1963	842	294	8
1964	711	323	24
1965	605	280	15
1966	549	212	5
1967	499	143	9
1968	440	152	34
1969	399	145	14
1970	403	121	11
1971	234	80	14
1972	191	49	-
1973	196	29	-
1974	86	24	-
1975	117	39	-
1976	179	51	-
1977	92	60	-
1978	100	34	-

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 152.

8-6 Selected bird species populations, 1966-1977

(in mean annual percentage change in population)

Species	Mean annual percentage change
Cattle egret	+10
Brown-headed cowbird	+ 2
Common grackle	+ 1
House finch	0
Starling	0
Eastern kingbird	- 1
Vesper sparrow	- 1
Loggerhead shrike	- 3
Eastern bluebird	- 4
Grasshopper sparrow	- 4

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 154.

8-7 Most frequently observed breeding bird species, 1977

(in mean number observed per route)

Species	Mean number observed per route
Red-winged blackbird	85
House sparrow	69
Common grackle	62
Starling	61
Western meadowlark	58
American robin	36
Mourning dove	36
Common crow	29
Eastern meadowlark	28
Cardinal	25
Song sparrow	24
Barn swallow	22

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 155.

8-9 Duck breeding populations in North America, 1955-1979

(in million ducks)

Year	Million ducks
1955	44.7
1956	46.7
1957	39.4
1958	42.7
1959	46.0
1960	34.4
1961	36.6
1962	31.2
1963	32.3
1964	32.7
1965	30.7
1966	36.9
1967	36.3
1968	33.5
1969	37.8
1970	43.8
1971	37.8
1972	46.4
1973	38.6
1974	39.3
1975	41.4
1976	38.3
1977	36.6
1978	39.7
1979	43.0

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 157.

8-10 Duck harvest, by flyway, 1952-1978

(in million ducks)

Year	Atlantic	Missis-sippi	Central	Pacific	Total
1952	1.8	6.8	4.0	5.7	18.4
1953	1.6	5.8	3.7	5.1	16.3
1954	1.6	5.2	2.8	4.5	14.3
1955	2.2	6.8	3.7	4.7	17.5
1956	1.9	6.4	3.7	4.3	16.2
1957	1.9	7.1	4.7	5.1	18.8
1958	1.6	6.0	3.2	5.1	16.0
1959	0.9	3.4	1.6	2.5	8.3
1960	1.1	4.0	1.8	3.0	9.8
1961	0.9	2.2	1.0	2.4	6.5
1962	0.9	1.4	0.5	2.4	5.3
1963	1.1	3.2	1.3	3.4	9.0
1964	1.2	4.4	1.6	3.1	10.4
1965	1.3	4.5	1.5	3.5	10.9
1966	1.8	6.1	2.6	4.2	14.7
1967	1.7	5.9	2.7	5.2	15.6
1968	1.7	3.0	1.5	3.6	10.0
1969	2.2	5.6	3.2	4.8	15.9
1970	2.5	7.9	3.6	5.2	19.3
1971	2.1	6.7	3.4	4.7	17.0
1972	2.1	6.3	3.6	4.5	16.6
1973	1.9	5.7	3.0	3.8	14.5
1974	2.1	6.4	2.7	4.2	15.6
1975	2.3	8.0	3.5	4.7	18.6
1976	2.6	7.3	3.3	4.9	18.1
1977	2.3	7.3	2.9	3.6	16.2
1978	2.4	7.7	3.4	4.6	18.2

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 158.

8-11 Brown pelican populations and toxic residues in eggs, 1969-1975

(in parts per million of toxic residue in eggs)

Southern and Baja California

Year	DDT	PCBs	Number of young fledged
1969	1,204	200	4
1970	NA	NA	5
1971	NA	NA	42
1972	221	NA	207
1973	183	43	134
1974	97	146	1,185
1975	113	120	NA

South Carolina

Year	DDT	PCBs	Dieldrin	Number of young fledged
1969	7.81	6.11	1.16	980
1970	5.27	5.25	0.82	945
1971	3.20	6.49	0.46	1,349
1972	3.69	7.51	0.45	970
1973	2.56	4.75	0.45	2,726
1974	2.72	7.63	0.58	1,625
1975	1.80	6.45	0.40	1,800

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 159.

8-13 U.S. and foreign fish catch in U.S. waters, 1950-1979

(in billion pounds)

Year	U.S.	Foreign	Total
1950	4.9	NA	NA
1951	4.4	NA	NA
1952	4.4	NA	NA
1953	4.4	NA	NA
1954	4.8	NA	NA
1955	4.9	NA	NA
1956	5.3	NA	NA
1957	4.9	NA	NA
1958	4.9	NA	NA
1959	5.1	NA	NA
1960	4.9	NA	NA
1961	5.3	NA	NA
1962	5.3	NA	NA
1963	4.9	NA	NA
1964	4.6	NA	NA
1965	4.9	NA	NA
1966	4.2	NA	NA
1967	4.0	NA	NA
1968	4.2	NA	NA
1969	4.2	5.7	9.9
1970	4.9	6.6	11.5
1971	5.0	7.7	12.7
1972	4.8	7.3	12.1
1973	4.9	7.1	11.9
1974	5.0	6.9	11.8
1975	4.9	6.0	10.8
1976	5.4	5.1	10.5
1977	5.2	3.8	9.0
1978	6.1	3.9	9.9
1979	6.3	3.6	9.8

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 161.

8-14 U.S. and foreign catch of selected fish species in U.S. waters, 1950-1979

(in million pounds)

Alaska pollock

Year	Foreign	Year	Foreign
1953	508.7	1967	3,825.7
1954	555.7	1968	4,853.2
1955	531.2	1969	5,627.2
1956	538.0	1970	4,410.0
1957	639.9	1971	3,811.9
1958	760.7	1972	3,093.1
1959	990.0	1973	3,217.1
1960	1,115.7	1974	3,264.8
1961	1,025.3	1975	2,855.8
1962	1,274.5	1976	2,726.8
1963	1,503.8	1977	2,226.8
1964	2,024.2	1978	2,367.8
1965	2,297.6	1979	2,303.2
1966	2,692.3		

Atlantic herring

Year	U.S.	Foreign	Year	U.S.	Foreign
1950	196.6	287.7	1965	75.8	506.2
1951	67.2	267.7	1966	72.3	880.4
1952	155.2	292.8	1967	71.4	1,238.7
1953	111.3	225.1	1968	93.1	2,005.0
1954	130.2	236.8	1969	71.4	1,866.3
1955	105.7	201.1	1970	68.3	1,722.0
1956	147.9	196.0	1971	76.0	624.0
1957	161.6	222.7	1972	88.5	431.3
1958	179.0	233.1	1973	59.1	459.5
1959	121.4	238.8	1974	71.9	339.5
1960	155.2	246.1	1975	79.7	323.6
1961	58.3	342.3	1976	110.5	96.3
1962	158.6	601.5	1977	111.6	4.7
1963	154.8	473.2	1978	111.3	0.0
1964	63.7	605.9	1979	143.4	0.0

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 162.

8-14 cont. U.S. and foreign catch of selected fish species in U.S. waters, 1950-1979

(in million pounds)

Haddock

Year	U.S.	Foreign	Year	U.S.	Foreign
1950	91.0	NA	1965	116.1	215.1
1951	104.3	NA	1966	116.3	150.7
1952	95.4	NA	1967	76.5	36.9
1953	79.2	NA	1968	56.1	34.1
1954	102.3	NA	1969	36.2	12.8
1955	90.0	NA	1970	18.5	4.8
1956	107.9	NA	1971	16.1	7.8
1957	103.2	NA	1972	8.5	4.1
1958	79.4	NA	1973	6.1	5.6
1959	79.5	NA	1974	5.3	4.2
1960	91.8	0.2	1975	8.8	3.2
1961	101.4	0.6	1976	6.4	3.1
1962	108.7	10.1	1977	17.5	6.4
1963	97.4	23.6	1978	26.8	22.4
1964	102.6	38.8	1979	31.2	10.6

Clams

Year	Total, U.S.	Surf clams, U.S.	Year	Total, U.S.	Surf clams, U.S.
1950	39.6	7.7	1965	70.8	44.1
1951	41.8	10.5	1966	72.8	45.1
1952	40.0	12.6	1967	71.5	45.1
1953	36.5	12.7	1968	67.2	40.6
1954	31.5	11.8	1969	80.7	49.6
1955	33.0	12.0	1970	99.2	67.3
1956	38.1	16.0	1971	84.5	52.5
1957	39.8	18.0	1972	90.7	63.5
1958	36.4	14.5	1973	107.5	82.4
1959	44.9	23.2	1974	121.8	96.1
1960	49.5	25.1	1975	113.2	87.0
1961	50.3	27.5	1976	81.0	49.1
1962	54.2	30.9	1977	96.2	51.0
1963	63.4	38.6	1978	87.7	39.2
1964	64.5	38.1	1979	92.1	34.9

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 162.

8-14 cont. U.S. and foreign catch of selected fish species in U.S. waters, 1950-1979

(in million pounds)

Pacific halibut

Year	U.S.	Year	U.S.
1950	38.7	1965	40.5
1951	35.3	1966	40.3
1952	38.0	1967	39.8
1953	34.7	1968	25.7
1954	43.7	1969	33.2
1955	36.9	1970	34.3
1956	41.9	1971	28.2
1957	36.6	1972	25.7
1958	36.3	1973	26.3
1959	40.8	1974	17.9
1960	38.3	1975	21.2
1961	53.2	1976	20.6
1962	53.8	1977	17.7
1963	45.6	1978	17.7
1964	35.0	1979	21.4

Pacific perch

Year	U.S.	Year	U.S.
1950	1.5	1965	31.5
1951	1.8	1966	27.1
1952	6.4	1967	35.7
1953	6.2	1968	27.8
1954	10.8	1969	13.2
1955	5.3	1970	14.9
1956	8.2	1971	10.8
1957	7.9	1972	9.8
1958	5.9	1973	5.2
1959	8.8	1974	2.2
1960	9.7	1975	7.1
1961	12.8	1976	5.7
1962	18.3	1977	5.7
1963	24.7	1978	5.4
1964	22.0	1979	NA

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 162.

8-16 Fish kills caused by pollution, 1961-1976

(in million fish killed)

Year	Million fish killed
1961	14.9
1962	44.0
1963	6.9
1964	22.9
1965	12.1
1966	9.6
1967	11.3
1968	15.8
1969	41.2
1970	22.3
1971	73.7
1972	17.7
1973	37.8
1974	119.1
1975	16.1
1976	13.6

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 165.

8-17 Extinct vertebrate species and subspecies, 1760-1979

(in cumulative number of extinct species and subspecies)

Years	Total	Birds	Fish	Mammals
1760-1779	1	0	0	1
1780-1799	1	0	0	1
1800-1819	1	0	0	1
1820-1839	4	3	0	1
1840-1859	6	5	0	1
1960-1879	8	7	0	1
1980-1899	22	18	0	4
1900-1919	31	23	1	7
1920-1939	42	31	3	8
1940-1959	46	32	6	8
1960-1979	46	32	6	8

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 166.

8-18 Threatened and endangered species in the United States, December, 1979

(in number of species)

	Endangered	Threatened
Mammals	35	3
Birds	67	3
Reptiles	11	10
Amphibians	5	2
Fishes	29	12
Snails	2	5
Clams	23	0
Crustaceans	1	0
Insects	6	2
Plants	49	7

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 167.

8-19 Population of selected threatened and endangered species, 1941-1979

(in number of animals)

Year	Key deer	Whooping crane	California condor	Bald eagle
1941	NA	21	NA	NA
1945	NA	NA	60	NA
1948	NA	16	NA	NA
1949	30	NA	NA	NA
1951	NA	25	NA	NA
1962	NA	NA	40	NA
1964	300	NA	NA	NA
1968	NA	60	52	119
1969	NA	NA	NA	129
1970	NA	NA	NA	124
1971	NA	NA	NA	128
1972	600	80	NA	167
1973	NA	NA	NA	171
1974	NA	NA	NA	170
1975	NA	NA	NA	176
1976	NA	96	NA	178
1977	NA	NA	NA	197
1978	NA	NA	NA	192
1979	NA	123	28	188

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 168.

Chapter 9 ENERGY

9-1 and 9-2

Energy consumption, by fuel type, 1850-1978

(in quads)

Year	Total	Coal	Natural gas	Petro-leum	Hydro-power
1850	2.3	.2	-	-	-
1860	3.1	.5	-	-	-
1870	4.0	1.0	-	-	-
1880	5.0	2.0	-	.1	-
1890	7.1	4.1	.3	.2	-
1900	9.6	6.8	.3	.2	.3
1910	16.6	12.7	.5	1.0	.5
1920	21.3	15.5	.8	2.6	.8
1930	23.3	13.6	2.0	5.4	.8
1940	25.0	12.5	2.7	7.5	.9
1950	33.62	12.89	5.97	13.32	1.44
1951	36.11	13.20	7.05	14.43	1.46
1952	35.83	11.84	7.55	14.96	1.50
1953	36.78	11.87	7.91	15.57	1.44
1954	35.73	10.17	8.33	15.85	1.39
1955	39.18	11.52	9.00	17.26	1.41
1956	40.76	11.72	9.61	17.95	1.49
1957	40.81	11.14	10.19	17.94	1.56
1958	40.66	9.83	10.66	18.54	1.63
1959	42.36	9.79	11.72	19.27	1.59
1960	44.08	10.12	12.39	19.92	1.65
1961	44.72	9.89	12.93	20.22	1.68
1962	46.80	10.18	13.73	21.05	1.82
1963	48.60	10.69	14.40	21.70	1.77
1964	50.77	11.25	15.29	22.30	1.91
1965	52.99	11.89	15.77	23.25	2.06
1966	55.72	12.48	17.00	24.13	2.07
1967	57.88	12.24	17.94	25.28	2.35
1968	61.32	12.66	19.21	26.98	2.35
1969	64.51	12.72	20.68	28.34	2.66
1970	66.82	12.66	21.80	29.52	2.65
1971	68.30	12.01	22.47	30.56	2.86
1972	71.63	12.45	22.70	32.95	2.94
1973	74.61	13.30	22.51	34.84	3.01
1974	72.35	12.88	21.73	33.05	3.31
1975	70.71	12.82	19.95	32.73	3.22
1976	74.16	13.73	20.35	34.83	3.07
1977	76.56	14.14	19.93	37.18	2.52
1978	78.01	14.09	19.82	37.79	3.15

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 177 and p. 178.

9-1 and 9-2 cont. Energy consumption, by fuel type, 1850-1978

(in quads)

Year	Nuclear power	Fuel wood
1850	-	2.1
1860	-	2.6
1870	-	2.9
1880	-	2.9
1890	-	2.5
1900	-	2.0
1910	-	1.9
1920	-	1.6
1930	-	1.5
1940	-	1.4
1950	0	NA
1951	0	NA
1952	0	NA
1953	0	NA
1954	0	NA
1955	0	NA
1956	0	NA
1957	0	NA
1958	0	NA
1959	0	NA
1960	0.01	NA
1961	0.02	NA
1962	0.03	NA
1963	0.04	NA
1964	0.04	NA
1965	0.04	NA
1966	0.06	NA
1967	0.09	NA
1968	0.14	NA
1969	0.15	NA
1970	0.24	NA
1971	0.41	NA
1972	0.58	NA
1973	0.91	NA
1974	1.27	NA
1975	1.90	NA
1976	2.11	NA
1977	2.70	NA
1978	2.98	NA

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 177 and p. 178.

9-3 Net trade in energy resources, 1950-1978

(in quads)

Year	Total net trade	Coal	Natural gas	Oil
1950	-0.47	0.78	0.03	-1.24
1951	0.71	1.67	0.03	-0.98
1952	0.20	1.40	0.02	-1.20
1953	-0.46	0.97	0.02	-1.44
1954	-0.67	0.91	0.02	-1.58
1955	-0.54	1.46	0.02	-1.98
1956	-0.30	1.98	0.03	-2.26
1957	-0.12	2.17	0.00	-2.26
1958	-1.86	1.41	-0.10	-3.14
1959	-2.51	1.04	-0.12	-3.40
1960	-2.74	1.02	-0.15	-3.57
1961	-3.08	0.98	-0.22	-3.82
1962	-3.53	1.08	-0.40	-4.20
1963	-3.25	1.35	-0.40	-4.21
1964	-3.64	1.33	-0.44	-4.53
1965	-4.06	1.37	-0.44	-5.01
1966	-4.32	1.35	-0.47	-5.21
1967	-4.04	1.35	-0.50	-4.91
1968	-4.90	1.37	-0.58	-5.73
1969	-5.56	1.53	-0.70	-6.42
1970	-5.72	1.93	-0.77	-6.92
1971	-7.41	1.54	-0.88	-8.07
1972	-9.32	1.53	-0.97	-9.83
1973	-12.66	1.44	-0.98	-12.98
1974	-12.18	1.59	-0.91	-12.66
1975	-11.73	1.77	-0.90	-12.51
1976	-14.63	1.59	-0.92	-15.20
1977	-18.00	1.42	-0.98	-18.24
1978	-16.94	1.02	-0.92	-16.74

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 178.

9-4 and 9-5 Energy production, by fuel type, 1850-1978

(in quads)

Year	Total energy production	Wood	Coal	Oil	Natural gas
1850	2.316	2.1	.216	NA	NA
1860	3.119	2.6	.516	.003	NA
1870	3.974	2.9	1.043	.031	NA
1880	5.110	2.9	2.058	.152	NA
1890	7.119	2.5	4.096	.266	.257
1900	9.893	2.0	7.020	.369	.254
1910	17.275	1.9	13.074	1.215	.547
1920	22.965	1.6	17.175	2.569	.883
1930	23.619	1.5	14.011	5.208	2.148
1940	26.488	1.4	13.380	7.849	2.979
1950	34.53	NA	14.62	12.27	6.23
1951	37.84	NA	15.04	13.96	7.42
1952	36.94	NA	13.23	14.28	7.96
1953	37.23	NA	12.74	14.73	8.35
1954	35.56	NA	10.98	14.54	8.68
1955	39.07	NA	12.72	15.65	9.34
1956	41.61	NA	13.72	16.46	10.00
1957	42.01	NA	13.42	16.47	10.60
1958	39.20	NA	11.18	15.49	10.94
1959	40.89	NA	11.08	16.31	11.95
1960	41.78	NA	11.12	16.39	12.66
1961	42.27	NA	10.73	16.76	13.11
1962	43.88	NA	11.21	17.11	13.72
1963	46.15	NA	12.15	17.68	14.51
1964	48.02	NA	12.83	17.96	15.30
1965	49.66	NA	13.38	18.40	15.78
1966	52.51	NA	13.82	19.56	17.01
1967	55.40	NA	14.19	20.83	17.94
1968	57.12	NA	13.93	21.63	19.07
1969	59.43	NA	14.20	21.98	20.45
1970	62.52	NA	15.05	22.91	21.67
1971	61.98	NA	13.59	22.57	22.28
1972	62.82	NA	14.49	22.64	22.21
1973	62.46	NA	14.39	22.06	22.19
1974	61.22	NA	14.47	21.04	21.21
1975	60.05	NA	15.19	20.10	19.64
1976	60.09	NA	15.85	19.59	19.48
1977	60.37	NA	15.90	19.78	19.57
1978	61.01	NA	15.11	20.61	19.27

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 178.

9-4 and 9-5 cont. Energy production, by fuel type, 1850-1978

(in quads)

Year	Nuclear energy	Hydropower, geothermal, other
1850	-	NA
1860	-	NA
1870	-	NA
1880	-	NA
1890	-	NA
1900	-	.250
1910	-	.539
1920	-	.738
1930	-	.752
1940	-	.880
1950	0	1.41
1951	0	1.42
1952	0	1.47
1953	0	1.41
1954	0	1.36
1955	0	1.36
1956	0	1.43
1957	0	1.52
1958	0	1.59
1959	0	1.55
1960	0.01	1.60
1961	0.02	1.65
1962	0.03	1.81
1963	0.04	1.77
1964	0.04	1.89
1965	0.04	2.06
1966	0.06	2.06
1967	0.09	2.35
1968	0.14	2.35
1969	0.15	2.65
1970	0.24	2.65
1971	0.41	3.13
1972	0.58	2.90
1973	0.91	2.91
1974	1.27	3.23
1975	1.90	3.22
1976	2.11	3.06
1977	2.70	2.42
1978	2.98	3.04

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 178.

9-7 Energy consumption, by sector, 1950-1978

(in quads)

Year	Total	Residential and commercial	Industrial and misc.	Transportation	Electric utilities
1950	33.62	7.58	12.18	8.84	5.03
1951	36.11	7.74	13.54	9.44	5.40
1952	35.83	7.84	12.96	9.42	5.62
1953	36.78	7.62	13.66	9.49	6.00
1954	35.73	7.88	12.38	9.41	6.06
1955	39.18	8.47	13.83	10.15	6.73
1956	40.76	8.81	14.22	10.47	7.24
1957	40.81	8.55	13.98	10.78	7.49
1958	40.66	9.31	13.29	10.61	7.45
1959	42.36	9.59	14.02	10.73	8.01
1960	44.08	10.04	14.46	11.18	8.40
1961	44.72	10.26	14.43	11.36	8.68
1962	46.80	10.80	14.96	11.79	9.25
1963	48.60	10.85	15.55	12.33	9.86
1964	50.77	11.00	16.59	12.62	10.57
1965	52.99	11.57	17.02	13.10	11.29
1966	55.72	12.06	17.78	13.60	12.28
1967	57.88	12.97	17.58	14.38	12.96
1968	61.32	13.10	18.58	15.50	14.14
1969	64.51	13.70	19.23	16.12	15.46
1970	66.82	14.06	19.52	16.73	16.51
1971	68.30	14.28	19.24	17.35	17.44
1972	71.63	14.65	19.92	18.32	18.74
1973	74.61	13.97	22.02	18.88	19.74
1974	72.35	13.68	20.38	18.35	19.94
1975	70.71	13.67	18.29	18.47	20.28
1976	74.16	14.39	18.92	19.34	21.51
1977	76.56	14.86	19.05	20.02	22.64
1978	78.01	15.10	18.62	20.54	23.76

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 182.

9-8 Energy consumption, by end use, 1950-1978

(in quads)

Year	Total	Residential and commercial	Industrial and misc.	Transportation
1950	33.62	9.96	14.71	8.96
1951	36.11	10.31	16.26	9.56
1952	35.83	10.58	15.74	9.52
1953	36.78	10.52	16.67	9.59
1954	35.73	10.88	15.36	9.49
1955	39.18	11.60	17.36	10.23
1956	40.76	12.19	18.01	10.54
1957	40.81	12.15	17.81	10.84
1958	40.66	13.07	16.93	10.66
1959	42.36	13.64	17.92	10.78
1960	44.08	14.37	18.48	11.23
1961	44.72	14.89	18.44	11.40
1962	46.80	15.76	19.22	11.83
1963	48.60	16.13	20.10	12.37
1964	50.77	16.77	21.35	12.66
1965	52.99	17.76	22.09	13.13
1966	55.72	18.80	23.28	13.64
1967	57.88	20.18	23.29	14.42
1968	61.32	21.09	24.70	15.53
1969	64.51	22.54	25.82	16.15
1970	66.82	23.77	26.29	16.76
1971	68.30	24.69	26.23	17.38
1972	71.63	25.84	27.45	18.34
1973	74.61	25.75	29.92	18.93
1974	72.35	25.57	28.39	18.40
1975	70.71	25.98	26.21	18.52
1976	74.16	27.18	27.59	19.39
1977	76.56	38.39	28.11	20.07
1978	78.01	29.30	28.13	20.59

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 183.

9-9 Residential heating, by fuel type, 1940-1975

(in percent of all households)

Year	Wood	Coal	Fuel oil	Utility gas	Bottled gas
1940	22.8	54.7	10.0	11.3	-
1950	10.1	36.6	22.6	26.6	1.8
1960	4.2	12.2	32.4	43.1	5.1
1970	1.3	2.9	26.0	55.2	6.0
1975	1.2	0.8	22.5	56.4	5.7

Year	Elec-tricity	Other, none
1940	-	1.2
1950	0.7	3.7
1960	1.8	1.2
1970	7.7	.9
1975	12.6	.8

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 184.

9-11 Per capita energy consumption and gross domestic product for four nations, 1961-1977

United States

Year	Energy consumption per capita (tons of oil equivalent)	Gross domestic product (U.S. dollars)
1961	5.60	2,851
1962	5.79	3,023
1963	5.94	3,141
1964	6.10	3,309
1965	6.30	3,536
1966	6.61	3,827
1967	6.73	4,003
1968	7.04	4,321
1969	7.41	4,610
1970	7.66	4,-89
1971	7.79	5,125
1972	8.10	5,594
1973	8.29	6,189
1974	8.04	6,639
1975	7.81	7,148
1976	8.19	7,878
1977	8.30	8,666

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 186.

9-11 cont. Per capita energy consumption and gross domestic product for four nations, 1961-1977

West Germany

Year	Energy consumption per capita (tons of oil equivalent)	Gross domestic product (U.S. dollars)
1961	2.67	1,470
1962	2.85	1,588
1963	3.04	1,672
1964	3.09	1,824
1965	3.15	1,962
1966	3.16	2,065
1967	3.15	2,092
1968	3.39	2,252
1969	3.70	2,532
1970	3.89	3,069
1971	3.89	3,537
1972	4.06	4,200
1973	4.29	5,546
1974	4.19	6,137
1975	3.93	6,782
1976	4.29	7,265
1977	4.26	8,407

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 186.

9-11 cont. Per capita energy consumption and gross domestic product for four nations, 1961-1977

Netherlands

Year	Energy consumption per capita (tons of oil equivalent)	Gross domestic product (U.S. dollars)
1961	1.98	1,045
1962	2.17	1,118
1963	2.37	1,197
1964	2.44	1,388
1965	2.59	1,532
1966	2.68	1,638
1967	2.81	1,785
1968	3.10	1,950
1969	3.37	2,180
1970	3.78	2,431
1971	3.85	2,812
1972	4.40	3,430
1973	4.59	4,475
1974	4.50	5,225
1975	4.33	6,072
1976	4.72	6,537
1977	4.58	7,680

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 186.

9-11 cont. Per capita energy consumption and gross domestic product for four nations, 1961-1977

United Kingdom

Year	Energy consumption per capita (tons of oil equivalent)	Gross domestic product (U.S. dollars)
1961	3.20	1,440
1962	3.27	1,498
1963	3.39	1,580
1964	3.40	1,709
1965	3.55	1,827
1966	3.53	1,936
1967	3.52	1,997
1968	3.65	1,873
1969	3.75	1,995
1970	3.83	2,192
1971	3.78	2,497
1972	3.85	2,810
1973	4.00	3,168
1974	3.83	3,420
1975	3.63	4,056
1976	3.69	3,925
1977	3.78	4,370

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 186.

9-12 Energy consumed by sector for nine nations, 1972

(in percentage consumed by sector)

Country	Transportation	Industrial	Residential, commercial, misc.	Losses in generation and transmission of electricity
United States	22	36	25	17
Canada	17	33	27	23
France	15	39	28	18
West Germany	13	42	29	16
Italy	15	46	24	15
Netherlands	10	44	32	13
United Kingdom	13	40	24	23
Sweden	11	31	33	25
Japan	12	51	19	17

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 188.

9-15 Coal production, 1900-1978

(in million short tons)

Year	Total	Underground	Surface
1900	270	NA	NA
1901	293	NA	NA
1902	302	NA	NA
1903	357	NA	NA
1904	352	NA	NA
1905	393	NA	NA
1906	414	NA	NA
1907	480	NA	NA
1908	416	NA	NA
1909	461	NA	NA
1910	502	NA	NA
1911	496	NA	NA
1912	534	NA	NA
1913	570	NA	NA
1914	513	NA	NA
1915	531	NA	NA
1916	590	NA	NA
1917	651	NA	NA
1918	6-8	NA	NA
1919	552	NA	NA
1920	658	NA	NA
1921	505	NA	NA
1922	476	NA	NA
1923	656	NA	NA
1924	570	NA	NA
1925	581	NA	NA
1926	656	NA	NA
1927	596	NA	NA
1928	575	NA	NA
1929	608	NA	NA
1930	536	NA	NA
1931	442	NA	NA
1932	360	NA	NA
1933	383	356	27
1934	416	387	39
1935	425	393	32
1936	491	453	37
1937	499	458	41
1938	495	457	38
1939	448	402	46

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 191.

9-15 cont. Coal production, 1900-1978

(in million short tons)

Year	Total	Underground	Surface
1940	441	419	42
1941	516	460	56
1942	581	516	65
1943	652	556	96
1944	684	561	123
1945	731	502	129
1946	594	460	134
1947	685	531	154
1948	649	494	155
1949	479	358	121
1950	562	425	117
1951	574	444	130
1952	510	384	126
1953	486	367	119
1954	420	306	114
1955	491	360	131
1956	528	379	149
1957	515	371	144
1958	532	397	135
1959	431	292	139
1960	435	293	142
1961	421	280	141
1962	440	288	152
1963	479	309	170
1964	505	328	177
1965	528	338	190
1966	545	342	203
1967	561	350	210
1968	553	345	209
1969	569	348	222
1970	610	340	270
1971	563	278	285
1972	535	288	247
1973	558	286	272
1974	566	264	302
1975	611	279	332
1976	647	281	366
1977	665	257	409
1978	632	229	403

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 191.

9-16 Land disturbed and reclaimed by the coal mining industry, 1930-1978

(in million acres)

Status	Million acres
Used	2.119
Reclaimed	1.545

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 192.

9-18 Coal mine deaths from accidents, 1906-1978

(in number of deaths)

Year	Total	Underground	Surface
1906	2,138	1,960	178
1907	3,242	3,024	218
1908	2,445	2,286	159
1909	2,642	2,492	150
1910	2,821	2,637	184
1911	2,656	2,486	170
1912	2,419	2,220	199
1913	2,785	2,624	161
1914	2,454	2,288	166
1915	2,269	2,109	160
1916	2,226	2,076	150
1917	2,696	2,435	261
1918	2,580	2,333	247
1919	2,323	2,135	188
1920	2,272	2,077	195
1921	1,995	1,875	120
1922	1,984	1,846	138
1923	2,462	2,304	158
1924	2,402	2,264	138
1925	2,234	2,107	127
1926	2,518	2,400	118
1927	2,231	2,109	122
1928	2,176	2,092	84
1929	2,187	2,076	111
1930	2,063	1,950	113
1931	1,463	1,378	85
1932	1,207	1,130	77
1933	1,064	976	88
1934	1,226	1,132	94
1935	1,242	1,144	98
1936	1,342	1,256	86
1937	1,413	1,318	95
1938	1,105	1,027	78
1939	1,078	1,014	64
1940	1,388	1,308	80
1941	1,266	1,166	100
1942	1,471	1,353	118
1943	1,451	1,327	124
1944	1,298	1,166	132

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 193.

9-18 cont. Coal mine deaths from accidents, 1906-1978

(in number of deaths)

Year	Total	Under-ground	Surface
1945	1,068	960	108
1946	968	863	105
1947	1,158	1,047	111
1948	999	880	119
1949	585	508	77
1950	643	547	96
1951	785	707	78
1952	548	474	74
1953	461	409	52
1954	396	342	54
1955	420	352	68
1956	448	390	58
1957	478	424	54
1958	358	315	43
1959	293	251	42
1960	325	274	51
1961	294	256	38
1962	289	244	45
1963	284	245	39
1964	242	210	32
1965	259	223	36
1966	233	194	39
1967	222	174	48
1968	311	268	43
1969	203	149	54
1970	260	206	54
1971	181	141	40
1972	156	122	34
1973	132	99	33
1974	133	90	43
1975	155	99	56
1976	141	104	37
1977	139	91	48
1978	106	76	30

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 193.

9-20 Natural gas and oil production, 1950-1978

Natural gas

Year	Billion cubic feet per year	Year	Billion cubic feet per year
1950	6,020	1965	15,290
1951	7,170	1966	16,470
1952	7,690	1967	17,390
1953	8,060	1968	18,490
1954	8,390	1969	19,830
1955	9,030	1970	21,020
1956	9,660	1971	21,610
1957	10,250	1972	21,620
1958	10,570	1973	21,730
1959	11,550	1974	20,710
1960	12,230	1975	19,240
1961	12,660	1976	19,100
1962	13,250	1977	19,160
1963	14,080	1978	18,880
1964	14,820		

Crude Oil

Year	Million barrels per year	Year	Million barrels per year
1950	1,974	1965	2,849
1951	2,248	1966	3,028
1952	2,290	1967	3,216
1953	2,357	1968	3,329
1954	2,315	1969	3,372
1955	2,484	1970	3,517
1956	2,617	1971	3,454
1957	2,617	1972	3,455
1958	2,449	1973	3,361
1959	2,575	1974	3,203
1960	2,575	1975	3,057
1961	2,622	1976	2,976
1962	2,676	1977	3,009
1963	2,753	1978	3,164
1964	2,787		

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 195.

9-23 Nuclear reactors built, being built, or planned, September 1973 - December 1979

(in number of reactors)

Year and month	Number of reactors	Year and month	Number of reactors
1973		1976	
September	203	January	236
October	205	February	236
November	209	March	236
December	212	April	236
		May	236
1974		June	236
January	212	July	236
February	219	August	237
March	219	September	237
April	229	October	236
May	231	November	236
June	231	December	235
July	237		
August	241	1977	
September	237	January	234
October	234	February	234
November	234	March	230
December	233	April	230
		May	230
1975		June	230
January	233	July	230
February	234	August	230
March	235	September	230
April	244	October	223
May	244	November	221
June	242	December	221
July	241		
August	241	1978	
September	240	January	219
October	240	February	219
November	238	March	219
December	236	April	219
		May	213
		June	213

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 198.

9-23 cont. Nuclear reactors built, being built, or planned, September 1973 - December 1979

(in number of reactors)

Year and month	Number of reactors
July	213
August	213
September	212
October	212
November	211
December	207
1979	
January	196
February	196
March	196
April	195
May	195
June	195
July	192
August	192
September	192
October	190
November	190
December	188

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 198.

9-25 Nuclear power generation, 1957-1979

(in billion kilowatt hours)

Year	Billion kilowatt hours
1957	*
1958	0.2
1959	0.2
1960	0.5
1961	1.7
1962	2.3
1963	3.2
1964	3.3
1965	3.7
1966	5.5
1967	7.7
1968	12.5
1969	13.9
1970	21.8
1971	38.1
1972	54.1
1973	83.3
1974	114.0
1975	172.5
1976	191.1
1977	250.9
1978	276.4
1979	255.5

*less than 0.05

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 200.

9-26 Low-level radioactive wastes disposed of, 1962-1979

(cumulative volume, in million cubic meters buried)

Year	Total	Commercial	Federal
1962	1,861	1,861	NA
1963	8,101	8,101	NA
1964	21,197	21,197	NA
1965	34,321	34,321	NA
1966	50,509	50,509	NA
1967	69,878	69,878	NA
1968	89,518	89,518	NA
1969	110,877	110,877	NA
1970	135,872	135,872	NA
1971	165,174	165,174	NA
1972	202,473	202,473	NA
1973	249,514	249,514	NA
1974	303,116	303,116	NA
1975	360,745	360,745	NA
1976	1,808,528	434,966	1,373,562
1977	1,923,514	407,055	1,416,459
1978	2,060,403	584,972	1,475,431
1979	2,225,902	667,551	1,558,351

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 201.

9-28 Production of hydropower, 1950-1978

(in billion kilowatt hours)

Year	Billion kilowatt hours
1950	100.8
1951	104.4
1952	109.7
1953	109.6
1954	111.7
1955	116.3
1956	125.2
1957	133.3
1958	143.7
1959	141.2
1960	149.1
1961	155.2
1962	171.7
1963	169.0
1964	180.3
1965	197.0
1966	198.0
1967	224.9
1968	225.9
1969	253.5
1970	250.1
1971	269.3
1972	275.7
1973	275.2
1974	304.0
1975	302.9
1976	286.9
1977	224.0
1978	284.2

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 203.

9-30 Production of electricity from geothermal resources, 1970-1978

(in billion kilowatt hours)

Year	Billion kilowatt hours
1970	525
1971	528
1972	1,453
1973	1,966
1974	2,453
1975	3,246
1976	3,615
1977	3,582
1978	2,978

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 205.

9-31 Solar collectors manufactured, 1974-1979

(in million square feet manufactured)

Year	Low temperature	Medium temperature, special, other
1974	1,137	137
1975	3,026	717
1976	3,876	1,925
1977	4,743	5,569
1978	5,873	4,988
1979	8,388	5,952

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 206.

Chapter 10 WATER RESOURCES

10-10 Water use, 1900-1975

(in billion gallons per day)

Year	Withdrawal	Consumption
1900	40	NA
1910	66	NA
1920	92	NA
1930	110	NA
1940	136	NA
1950	200	NA
1955	240	NA
1960	270	61
1965	310	77
1970	370	88
1975	420	95

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 219.

10-11 Water withdrawal, by use, 1950-1975

(in billion gallons per day)

Year	Steam electric utilities	Irrigation	Industrial and misc.
1950	40	110	37
1955	72	110	39
1960	100	110	38
1965	130	120	46
1970	170	130	47
1975	190	140	44

Year	Public water supplies	Rural domestic
1950	14	3.6
1955	17	3.6
1960	21	3.6
1965	24	4.0
1970	27	4.5
1975	29	4.9

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 220.

10-12 Water consumption, by use, 1960-1975

(in billion gallons per day)

Year	Steam electric utilities	Irrigation	Industrial and misc.	Public water supplies	Rural domestic
1960	0.2	52	3.0	3.5	2.8
1965	0.4	66	3.4	5.2	3.2
1970	0.8	73	4.1	5.9	3.4
1975	1.9	80	4.2	6.7	3.4

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 221.

10-13 Water withdrawal and consumption in the Pacific Northwest and California regions, 1960-1975

(in billion gallons per day)

Pacific Northwest

Year	Withdrawal	Consumption
1960	29.0	8.3
1965	29.0	11.0
1970	30.0	11.0
1975	33.0	11.0

California

Year	Withdrawal	Consumption
1960	33.0	13.0
1965	38.0	17.0
1970	48.0	22.0
1975	51.0	23.0

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 222.

10-14 Water withdrawal and consumption in the Great Basin, Upper Colorado, and Lower Colorado regions, 1960-1975

(in billion gallons per day)

Great Basin

Year	Withdrawal	Consumption
1960	7.0	3.3
1965	6.9	3.0
1970	6.7	3.2
1975	6.9	3.6

Upper Colorado

Year	Withdrawal	Consumption
1960	NA	NA
1965	6.7	3.3
1o70	8.1	4.1
1975	4.1	1.7

Lower Colorado

Year	Withdrawal	Consumption
1960	NA	NA
1965	6.6	3.3
1970	7.2	5.0
1975	8.5	6.3

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 224.

10-15 Water withdrawal and consumption in the Missouri, Arkansas - White - Red, Rio Grande, and Texas - Gulf regions, 1960-1975

(in billion gallons per day)

Missouri

Year	Withdrawal	Consumption
1960	21.6	7.6
1965	20.8	10.2
1970	24.0	12.0
1975	35.0	15.0

Arkansas - White - Red

Year	Withdrawal	Consumption
1960	10.4	4.1
1965	10.4	5.7
1970	12.0	6.8
1975	15.0	9.0

Rio Grande

Year	Withdrawal	Consumption
1960	NA	NA
1965	7.3	4.2
1970	6.3	3.3
1975	5.4	3.5

Texas - Gulf

Year	Withdrawal	Consumption
1960	NA	NA
1965	16.0	7.3
1970	21.0	6.2
1975	22.0	8.0

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 226.

10-16 Water withdrawal and consumption in the Souris - Red - Rainy, Upper Mississippi, and Lower Mississippi regions, 1960-1975

(in billion gallons per day)

Souris - Red - Rainy

Year	Withdrawal	Consumption
1960	0.17	0.054
1965	0.30	0.070
1970	0.32	0.071
1975	0.36	0.094

Upper Mississippi

Year	Withdrawal	Consumption
1960	11.0	0.57
1965	16.0	0.73
1970	16.0	0.76
1975	19.0	0.80

Lower Mississippi

Year	Withdrawal	Consumption
1960	5.3	1.3
1965	5.2	2.0
1970	13.0	3.6
1975	16.0	5.5

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 228.

10-17 Water withdrawal and consumption in the Great Lakes, Ohio, and Tennessee regions, 1960-1975

(in billion gallons per day)

Great Lakes

Year	Withdrawal	Consumption
1960	29.0	0.93
1965	33.0	1.1
1970	39.0	1.2
1975	36.0	1.1

Ohio

Year	Withdrawal	Consumption
1960	24.0	0.80
1965	30.0	0.94
1970	36.0	0.92
1975	36.0	1.2

Tennessee

Year	Withdrawal	Consumption
1960	7.5	0.40
1965	8.2	0.40
1970	7.9	0.24
1975	11.0	0.28

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 230.

10-18 Water withdrawal and consumption in the New England, Mid-Atlantic, and South-Atlantic - Gulf regions, 1960-1975

(in billion gallons per day)

New England

Year	Withdrawal	Consumption
1960	6.4	0.29
1965	7.2	0.36
1970	9.7	0.41
1975	14.0	0.44

Mid-Atlantic

Year	Withdrawal	Consumption
1960	27.1	1.2
1965	33.6	1.5
1970	45.0	1.4
1975	52.0	1.6

South-Atlantic - Gulf

Year	Withdrawal	Consumption
1960	18.9	2.0
1965	28.4	2.7
1970	35.0	3.3
1975	43.0	3.7

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 232.

10-19 Water withdrawal and consumption in Alaska, Hawaii, and Caribbean regions, 1960-1975

(in billion gallons per day)

Alaska

Year	Withdrawal	Consumption
1960	0.20	0.0007
1965	0.10	0.01
1970	0.25	0.016
1975	0.20	0.0056

Hawaii

Year	Withdrawal	Consumption
1960	1.6	0.41
1965	2.0	0.58
1970	2.7	0.81
1975	2.5	0.56

Caribbean

Year	Withdrawal	Consumption
1960	1.2	0.28
1965	1.7	0.27
1970	3.0	0.17
1975	4.1	0.24

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 234.

Chapter 11 WATER QUALITY

11-2 Fecal coliform bacteria, average annual violation rates, 1975-1979

(in violation rate, the average annual percentage of samples in violation)

Year	Violation rate
1975	36
1976	32
1977	34
1978	35
1979	35

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 240.

11-4 Fecal coliform bacteria in major rivers, 1966-1978

(in violation rate, the average annual percentage of samples in violation)

Year	Columbia	Willamette	Rio Grande	Red	Missouri
1966	NA	NA	NA	NA	NA
1967	NA	93	NA	NA	NA
1968	NA	82	NA	NA	NA
1969	NA	85	NA	NA	40
1970	NA	59	63	NA	28
1971	NA	50	NA	87	47
1972	NA	48	81	73	48
1973	NA	69	82	82	60
1974	28	55	72	76	72
1975	11	47	61	56	46
1976	7	23	50	28	44
1977	NA	31	NA	33	85
1978	NA	17	NA	27	NA

Year	Tennessee	Susquehanna	Mississippi	Hudson	Potomac
1966	NA	NA	NA	100	NA
1967	NA	NA	NA	NA	NA
1968	26	NA	NA	NA	NA
1969	NA	NA	36	100	NA
1970	NA	NA	67	96	NA
1971	NA	32	57	NA	49
1972	28	41	59	89	19
1973	18	NA	62	93	11
1974	11	49	58	67	2
1975	11	80	58	NA	20
1976	11	81	52	NA	3
1977	22	NA	64	NA	11
1978	20	NA	NA	NA	16

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 242.

11-4 Fecal coliform bacteria in major rivers, 1966-1978

(in violation rate, the average annual percentage of samples in violation)

Year	Ohio	Delaware	Alabama
1966	NA	NA	NA
1967	NA	86	NA
1968	79	64	NA
1969	70	68	NA
1970	67	39	NA
1971	79	64	NA
1972	65	68	NA
1973	59	77	NA
1974	51	77	NA
1975	59	39	46
1976	46	37	NA
1977	NA	48	NA
1978	NA	38	NA

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 242.

11-5 Dissolved oxygen, average annual violation rates, 1975-1979

(in violation rate, the average annual percentage of samples in violation)

Year	Violation rate
1975	5
1976	6
1977	11
1978	5
1979	4

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 244.

11-7 Dissolved oxygen in major rivers, 1966-1978

(in violation rate, the average annual percentage of samples in violation)

Year	Columbia	Willamette	Rio Grande	Red	Missouri
1966	NA	11	NA	0	2
1967	NA	12	NA	0	3
1968	0	4	NA	0	0
1969	0	0	NA	0	2
1970	NA	0	0	0	1
1971	NA	0	0	2	2
1972	NA	0	3	0	2
1973	NA	0	0	1	1
1974	0	1	7	1	3
1975	0	0	1	2	1
1976	0	0	1	4	1
1977	0	0	1	4	1
1978	0	0	2	1	1

Year	Tennessee	Susquehanna	Mississippi	Hudson	Potomac
1966	12	0	1	75	18
1967	5	0	4	NA	11
1968	8	0	2	NA	14
1969	9	0	3	50	20
1970	9	0	1	41	16
1971	8	12	3	NA	9
1972	3	4	4	30	10
1973	3	2	5	0	9
1974	3	6	2	0	12
1975	7	2	2	2	4
1976	3	0	3	0	1
1977	6	0	5	0	13
1978	6	0	4	0	0

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 246.

11-7 cont. Dissolved oxygen in major rivers, 1966-1978

(in violation rate, the average annual percentage of samples in violation)

Year	Ohio	Delaware	Alabama
1966	5	65	NA
1967	8	50	NA
1968	4	51	NA
1969	11	49	NA
1970	6	46	27
1971	19	34	12
1972	2	26	6
1973	6	31	10
1974	5	30	7
1975	0	27	5
1976	NA	25	2
1977	NA	18	13
1978	NA	21	10

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 246.

11-8 Total phosphorus, average annual violation rates, 1975-1979

(in violation rate, the average annual percentage of samples in violation)

Year	Violation rate
1975	47
1976	47
1977	48
1978	48
1979	47

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 248.

11-10 Total phosphorus in major rivers, 1966-1978[1]

(in violation rate, the average annual percentage of samples in violation)

Year	Columbia	Willamette	Rio Grande	Red	Missouri
1966	NA	NA	NA	NA	48
1967	NA	NA	NA	NA	39
1968	NA	NA	NA	NA	18
1969	NA	NA	61	NA	60
1970	NA	NA	18	NA	78
1971	NA	NA	50	NA	60
1972	NA	NA	92	NA	49
1973	NA	NA	89	NA	53
1974	13	NA	74	81	50
1975	2	NA	74	59	37
1976	2	NA	60	57	33
1977	0	50	53	62	37
1978	0	25	53	53	38

Year	Tennesse	Susquehanna	Mississippi	Hudson	Potomac
1966	18	NA	70	NA	NA
1967	10	NA	57	NA	NA
1968	16	NA	58	NA	NA
1969	2	NA	54	NA	NA
1970	6	NA	65	NA	NA
1971	6	NA	69	45	NA
1972	8	NA	80	27	NA
1973	17	NA	85	21	NA
1974	12	31	79	11	NA
1975	9	15	84	4	NA
1976	4	25	81	3	NA
1977	4	24	82	11	NA
1978	6	21	75	7	NA

[1] For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 250.

11-10 cont. Total phosphorus in major rivers, 1966-1978

(in violation rate, the average annual percentage of samples in violation)

Year	Ohio	Delaware	Alabama
1966	30	NA	NA
1967	38	NA	NA
1968	55	NA	NA
1969	82	NA	NA
1970	78	NA	NA
1971	86	38	NA
1972	66	30	48
1973	74	NA	32
1974	56	15	NA
1975	52	20	8
1976	33	20	4
1977	46	16	10
1978	43	4	NA

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 250.

11-12 Phenols in the upper Ohio River basin, 1968-1976

(in violation rate, the average annual percentage of samples in violation)

Year	Exceeding 1 microgram per liter	Exceeding 5 micrograms per liter
1968	78	43
1969	72	35
1970	73	37
1971	67	38
1972	75	23
1973	82	27
1974	53	8
1975	46	14
1976	44	19

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 254.

11-13 Discharges to water, by pollutant and by point and nonpoint sources, 1977

(in percent of pollutant)

Pollutant	Point discharges	Nonpoint discharges
Total suspended solids	0.4	99.6
Total dissolved solids	10	90
Biochemical oxygen demand	27	73
Nitrogen	9	91
Phosphorus	6	94
Dissolved heavy metals	60	40

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 255.

11-15 Population served by municipal wastewater systems, by level of treatment, 1960-1978

(in million people)

	Degree of treatment	Million people
1960	Secondary or better	4
	Primary and advanced primary	36
	No treatment	70
	Not served by wastewater system	70
1970	Primary, secondary, and tertiary	86
	No treatment	59
	Not served by wastewater system	58
1978	Tertiary	18
	Advanced secondary	31
	Secondary	56
	Advanced primary	26
	Primary	21
	No treatment	2
	Not served by wastewater system	66

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 258.

11-16 Eutrophication of U.S. lakes, 1975

(in percent of U.S. lakes)

Condition	Percent of U.S. lakes
Exhibiting accelerated eutrophication	85
Not exhibiting accelerated eutrophication	15
Receiving some point source effluents	78
Not receiving point source effluents	7
Expected to improve with point source controls	37
Not expected to improve with point source controls	41

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 262.

11-18 Toxic residues in Great Lakes fish, 1969-1976

(in parts per million)

Mercury (Lake St. Clair)

Year	Walleye	Rock bass	Channel catfish	Yellow perch
1969	NA	NA	NA	NA
1970	2.83	NA	NA	NA
1971	NA	NA	NA	NA
1972	1.38	NA	NA	NA
1973	1.18	1.24	1.62	NA
1974	1.07	0.49	0.37	1.22
1975	1.03	0.37	0.35	0.31
1976	0.78	0.37	0.35	0.28

DDT (Lake Michigan)

Year	Lake trout	Coho salmon	Bloaters
1969	NA	11.82	9.940
1970	19.19	14.03	9.87
1971	13.00	9.85	6.24
1972	11.31	7.17	4.33
1973	9.96	4.48	2.09
1974	8.42	3.82	1.33
1975	7.50	3.25	1.27
1976	5.65	2.98	0.90

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 264.

11-18 cont. Toxic residues in Great Lakes fish, 1969-1976

(in parts per million)

Dieldrin (Lake Michigan)

Year	Lake trout	Coho salmon	Bloaters
1969	NA	0.210	0.270
1970	0.27	0.12	0.19
1971	0.20	0.11	0.27
1972	0.20	0.13	0.18
1973	0.27	0.09	0.28
1974	0.30	0.10	0.28
1975	0.35	0.10	0.39
1976	0.30	0.08	0.35

PCBs (Lake Michigan)

Year	Lake trout	Coho salmon	Bloaters
1969	NA	NA	NA
1970	NA	NA	NA
1971	NA	NA	NA
1972	12.86	10.93	5.66
1973	18.93	12.17	5.24
1974	22.91	10.45	5.57
1975	22.28	10.77	4.54
1976	18.68	9.21	4.11

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 264.

11-19 Ocean dumping of U.S. wastes by barge, 1951-1978

(in million tons)

Year	Total	Sewage sludge	Industrial	Construction
1951	1.7	NA	NA	NA
1956	3.4	NA	NA	NA
1961	5.8	NA	NA	NA
1966	7.4	NA	NA	NA
1968	9.8	4.5	4.7	0.6
1973	10.9	4.9	5.1	1.0
1974	10.4	5.0	4.6	0.8
1975	8.9	5.0	3.4	0.4
1976	8.3	5.3	2.7	0.3
1977	7.4	5.1	1.8	0.4
1978	8.3	5.5	2.5	0.2

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 266.

11-20 Oil spills in U.S. waters, 1971-1978

(in thousand incidents and million gallons spilled)

Year	Thousand incidents	Million gallons spilled
1971	7.5	8.6
1972	8.4	16.8
1973	11.0	15.4
1974	11.9	16.7
1975	10.9	21.7
1976	11.7	24.4
1977	12.6	10.0
1978	11.8	14.2

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 267.

Chapter 12 AIR QUALITY

12-3 Average Pollutant Standards Index (PSI) for 23 Standard Metropolitan Statistical Areas, 1974-1978

(in days per year in PSI intervals)

Year	PSI = 100-200 (unhealthful)	PSI = 200-300 (very unhealthful)	PSI > 300 (hazardous)
1974	62.5	22.3	1.4
1975	62.1	20.7	0.6
1976	63.6	18.1	0.3
1977	56.5	15.9	0.2
1978	55.6	15.0	0.5

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 275.

12-4 Pollutant Standards Index (PSI) in 24 Standard Metropolitan Statistical Areas, 1973-1978

(in days per year in PSI intervals)

Portland (Oregon)

Year	PSI = 100-200	PSI = 200-300	PSI > 300
1973	179	49	0
1974	119	12	0
1975	70	13	0
1976	67	3	0
1977	76	5	0
1978	73	2	0

Seattle - Everett

Year	PSI = 100-200	PSI = 200-300	PSI > 300
1973	170	57	0
1974	105	11	0
1975	68	5	0
1976	85	5	0
1977	91	4	0
1978	60	2	0

San Francisco

Year	PSI = 100-200	PSI = 200-300	PSI > 300
1973	26	3	0
1974	29	2	0
1975	27	2	0
1976	44	1	0
1977	24	0	0
1978	21	1	0

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 276.

12-4 cont. Pollutant Standards Index (PSI) in 24 Standard Metropolitan Statistical Areas, 1973-1978

(in days per year in PSI intervals)

Sacramento

Year	PSI = 100-200	PSI = 200-300	PSI > 300
1973	14	0	0
1974	4	0	0
1975	21	0	0
1976	35	3	0
1977	19	0	0
1978	25	2	0

Los Angeles

Year	PSI = 100-200	PSI = 200-300	PSI > 300
1973	125	147	5
1974	129	163	1
1975	134	137	1
1976	126	142	0
1977	136	117	0
1978	111	95	0

San Bernardino - Riverside - Ontario (California)

Year	PSI = 100-200	PSI = 200-300	PSI > 300
1973	117	71	4
1974	118	107	7
1975	99	112	2
1976	86	88	0
1977	74	108	0
1978	77	67	1

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 276.

12-4 cont. Pollutant Standards Index (PSI) in 24 Standard Metropolitan Statistical Areas, 1973-1978

(in days per year in PSI intervals)

San Diego

Year	PSI = 100-200	PSI = 200-300	PSI > 300
1973	31	5	0
1974	26	2	0
1975	45	3	0
1976	65	9	0
1977	41	4	0
1978	32	6	0

Salt Lake City

Year	PSI = 100-200	PSI = 200-300	PSI > 300
1973	70	11	0
1974	53	19	3
1975	54	19	1
1976	85	25	0
1977	52	9	0
1978	51	20	0

Denver

Year	PSI = 100-200	PSI = 200-300	PSI > 300
1973	115	51	4
1974	127	45	3
1975	108	35	2
1976	149	33	0
1977	122	20	1
1978	133	39	1

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 276.

12-4 cont. Pollutant Standards Index (PSI) in 24 Standard Metropolitan Statistical Areas, 1973-1978

(in days per year in PSI intervals)

Houston

Year	PSI = 100-200	PSI = 200-300	PSI > 300
1973	NA	NA	NA
1974	32	3	0
1975	44	4	0
1976	52	12	0
1977	39	11	0
1978	70	24	0

Kansas City

Year	PSI = 100-200	PSI = 200-300	PSI > 300
1973	21	4	0
1974	5	0	0
1975	4	0	0
1976	6	1	0
1977	17	8	0
1978	47	9	0

St. Louis

Year	PSI = 100-200	PSI = 200-300	PSI > 300
1973	132	41	0
1974	62	44	10
1975	113	16	1
1976	108	27	6
1977	90	13	0
1978	94	18	7

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 276.

12-4 cont. Pollutant Standards Index (PSI) in 24 Standard Metropolitan Statistical Areas, 1973-1978

(in days per year in PSI intervals)

Milwaukee

Year	PSI = 100-200	PSI = 200-300	PSI > 300
1973	NA	NA	NA
1974	25	4	0
1975	32	8	0
1976	24	8	0
1977	26	7	0
1978	31	3	0

Memphis

Year	PSI = 100-200	PSI = 200-300	PSI > 300
1973	NA	NA	NA
1974	22	4	0
1975	10	7	2
1976	24	0	0
1977	19	2	1
1978	34	3	0

Chicago

Year	PSI = 100-200	PSI = 200-300	PSI > 300
1973	189	34	1
1974	223	15	2
1975	164	28	3
1976	67	13	1
1977	123	18	1
1978	119	28	3

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 276.

12-4 cont. Pollutant Standards Index (PSI) in 24 Standard Metropolitan Statistical Areas, 1973-1978

(in days per year in PSI intervals)

Louisville

Year	PSI = 100-200	PSI = 200-300	PSI > 300
1973	71	14	0
1974	94	27	0
1975	154	31	0
1976	146	14	0
1977	90	13	1
1978	86	8	0

Buffalo

Year	PSI = 100-200	PSI = 200-300	PSI > 300
1973	NA	NA	NA
1974	47	10	0
1975	40	10	1
1976	23	8	0
1977	37	3	0
1978	20	3	0

Cincinnati

Year	PSI = 100-200	PSI = 200-300	PSI > 300
1973	30	1	0
1974	10	0	0
1975	18	2	0
1976	40	1	0
1977	59	4	0
1978	29	1	0

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 276.

12-4 cont. Pollutant Standards Index (PSI) in 24 Standard Metropolitan Statistical Areas, 1973-1978

(in days per year in PSI intervals)

Syracuse

Year	PSI = 100-200	PSI = 200-300	PSI > 300
1973	NA	NA	NA
1974	3	0	0
1975	5	0	0
1976	5	2	0
1977	5	2	0
1978	12	0	0

Rochester

Year	PSI = 100-200	PSI - 200-300	PSI > 300
1973	NA	NA	NA
1974	3	0	0
1975	2	0	0
1976	8	0	0
1977	4	0	0
1978	6	0	0

Philadelphia

Year	PSI = 100-200	PSI = 200-300	PSI > 300
1973	NA	NA	NA
1974	132	23	3
1975	124	18	1
1976	80	7	0
1977	69	10	0
1978	71	10	0

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 276.

12-4 cont. Pollutant Standards Index (PSI) in 24 Standard Metropolitan Statistical Areas, 1973-1978

(in days per year in PSI intervals)

Washington, D.C.

Year	PSI = 100-200	PSI = 200-300	PSI > 300
1973	112	14	3
1974	52	22	3
1975	84	26	0
1976	132	15	0
1977	67	7	0
1978	67	3	0

New York

Year	PSI = 100-200	PSI = 200-300	PSI > 300
1973	NA	NA	NA
1974	NA	NA	NA
1975	33	226	11
1976	38	225	4
1977	186	86	1
1978	160	14	0

Tampa - St. Petersburg

Year	PSI = 100-200	PSI = 200-300	PSI > 300
1973	NA	NA	NA
1974	8	1	1
1975	9	1	0
1976	5	0	0
1977	19	0	0
1978	10	2	0

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 276.

12-5 National ambient carbon monoxide concentrations, 1972-1978

(in milligrams per cubic meter)

Year	Milligrams per cubic meter
1972	3.60
1973	3.49
1974	3.16
1975	3.03
1976	2.79
1977	2.50
1978	2.35

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 280.

12-6 National ambient zone concentrations, 1972-1977

(in micrograms per cubic meter)

Year	Total U.S.	California	Non-California
1972	115.8	146.9	104.8
1973	119.1	149.8	108.2
1974	120.9	151.6	110.0
1975	119.6	150.2	108.8
1976	121.8	137.6	116.2
1977	121.9	137.4	116.4

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 280.

12-7 National ambient sulfur dioxide concentrations, 1972-1977

(in micrograms per cubic meter)

Year	Micrograms per cubic meter
1972	23.0
1973	21.4
1974	20.7
1975	20.4
1976	19.7
1977	19.4

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 281.

12-8 National ambient total suspended particulate concentrations, 1972-1977

(in micrograms per cubic meter)

Year	Micrograms per cubic meter
1972	66.1
1973	65.0
1974	62.4
1975	60.1
1976	61.2
1977	61.0

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 281.

12-9 Ambient nitrogen dioxide concentrations, selected areas, 1972-1977

(in micrograms per cubic meter)

Year	Los Angeles County	Orange County	Riverside and San Bernardino Counties	San Francisco Bay Area
1972	134	93	65	49
1973	130	103	65	58
1974	123	106	63	55
1975	124	111	56	55
1976	129	97	50	54
1977	131	105	56	54

Year	Cleveland	Louisville	Atlanta
1972	NA	NA	NA
1973	NA	NA	NA
1974	65	56	59
1975	69	53	48
1976	71	56	50
1977	65	55	49

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 282.

12-10 Ambient trace metal concentrations in 92 urban areas, 1965-1974

(in micrograms per cubic meter)

Year	Lead	Nickel	Chromium
1965	0.82	0.020	0.006
1966	0.85	0.015	0.006
1967	0.95	0.015	0.006
1968	0.93	0.020	0.009
1969	1.10	0.020	0.007
1969	1.07	0.015	0.005
1971	1.11	0.010	0.006
1972	1.04	0.006	0.004
1973	0.85	0.007	0.005
1974	0.84	0.005	0.005

Year	Vanadium	Cadmium
1965	0.010	0.0025
1966	0.007	0.0020
1967	0.007	0.0020
1968	0.007	0.0015
1969	0.015	0.0050
1970	0.008	0.0004
1971	0.003	0.0004
1972	0.003	0.0004
1973	0.003	0.0004
1974	0.003	0.0004

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 283.

12-12 Carbon monoxide emissions, 1970-1977

(in million metric tons per year)

Year	Total	Trans-portation	Indus-trial	Other
1970	102.2	80.5	8.0	13.7
1971	102.5	81.1	7.9	13.5
1972	103.8	85.4	7.9	10.5
1973	103.5	85.9	8.2	9.4
1974	99.7	81.7	8.2	9.8
1975	96.9	82.0	7.3	7.6
1976	102.9	85.1	7.8	10.0
1977	102.7	85.7	8.3	8.7

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 285.

12-13 Hydrocarbon emissions, 1970-1977

(in million metric tons per year)

Year	Total	Trans-portation	Indus-trial	Other
1970	29.5	12.2	8.6	8.7
1971	29.1	12.2	8.8	8.1
1972	29.6	12.5	9.3	7.8
1973	29.7	12.3	9.7	7.7
1974	28.6	11.5	9.6	7.5
1975	26.9	11.3	9.2	6.4
1976	28.7	11.6	10.1	7.0
1977	28.3	11.5	10.1	6.7

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 286.

12-14 Nitrogen oxide emissions, 1970-1977

(in million metric tons per year)

Year	Total	Stationary fuel combustion	Transportation	Other
1970	19.6	11.1	7.4	1.1
1971	20.2	11.3	7.9	1.0
1972	21.6	11.9	8.7	1.0
1973	22.3	12.3	9.0	1.0
1974	21.7	12.1	8.6	1.0
1975	21.0	11.5	8.6	0.9
1976	22.8	12.4	9.4	1.0
1977	23.1	13.0	9.2	0.9

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 287.

12-15 Nitrogen oxide emissions from stationary fuel combustion sources, by fuel type, 1970-1977

(in million metric tons per year)

Year	Coal	Natural gas	Oil
1970	4.4	5.0	1.4
1971	4.3	5.1	1.5
1972	4.6	5.2	1.7
1973	4.9	5.2	1.9
1974	4.9	5.0	1.8
1975	4.8	4.6	1.7
1976	5.4	4.8	1.8
1977	5.7	4.8	2.0

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 287.

12-16 Sulfur oxide emissions, 1970-1977

(in million metric tons per year)

Year	Total	Stationary fuel combustion	Industrial	Other
1970	29.8	22.6	6.3	0.9
1971	28.3	21.6	5.8	0.9
1972	29.6	22.0	6.7	0.9
1973	30.2	23.1	6.3	0.8
1974	28.4	22.1	5.6	0.7
1975	26.1	20.8	4.6	0.7
1976	27.2	21.9	4.5	0.8
1977	27.4	22.4	4.2	0.8

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 288.

12-17 Sulfur oxide emissions from stationary fuel combustion sources, by fuel type, 1970-1977

(in million metric tons per year)

Year	Coal	Oil
1970	18.6	3.9
1971	17.6	3.8
1972	18.0	3.9
1973	18.9	4.1
1974	18.1	3.8
1975	17.3	3.4
1976	18.0	3.8
1977	17.8	4.1

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 288.

12-18 Total suspended particulate emissions, 1970-1977

(in million metric tons per year)

Year	Total	Industrial	Stationary fuel combustion	Other
1970	22.2	11.9	7.1	3.2
1971	20.9	11.3	6.6	3.0
1972	19.6	10.6	6.4	2.6
1973	19.2	10.3	6.5	2.4
1974	17.0	8.9	5.6	2.5
1975	13.7	6.5	5.0	2.2
1976	13.2	6.2	4.6	2.4
1977	12.4	5.4	4.8	2.2

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 289.

12-19 Total suspended particulate emissions from industrial sources, 1970-1977

(in million metric tons per year)

Year	Industries, total	Mineral products	Metals
1970	11.9	7.8	2.1
1971	11.3	7.4	1.9
1972	10.6	6.9	1.9
1973	10.3	6.4	2.1
1974	8.9	5.5	1.9
1975	6.5	3.7	1.4
1976	6.2	3.2	1.5
1977	5.4	2.7	1.3

Year	Chemicals	Petroleum	Other industrial products
1970	0.3	0.1	1.6
1971	0.2	0.1	1.7
1972	0.2	0.1	1.5
1973	0.2	0.1	1.5
1974	0.2	0.1	1.2
1975	0.2	0.1	1.1
1976	0.2	0.1	1.2
1977	0.2	0.1	1.1

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 289.

12-20 Compliance status of major stationary air pollution sources, 1975-1979

(in percent of all plants)

Year	In compliance	In violation	Unknown
1975	55	27	18
1976	77	21	2
1977	83	16	1
1978	87	11	2
1979	88	9	3

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 290.

12-21 Compliance status of major stationary air pollution sources, by industry, 1979

(in percentages)

Source	In compliance	In violation
Total, major stationary sources	88	12
Iron and steel mills	23	77
Primary smelters	48	52
Coal- and oil-fired power plants	62	38
Municipal incinerators	69	31
Pulp and paper mills	79	21
Petroleum refineries	79	21
Aluminum reduction plants	80	20
Portland cement plants	86	14
Gray iron foundries	88	12
Sulfuric acid plants	91	9
Phosphate fertilizer plants	92	8
Coal cleaning facilities	94	6
Asphalt concrete plants	96	4

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 291.

Chapter 13 BIOSPHERE

13-1 World population, by region, 1800-1979

(in billion people)

Year	World total	Asia total	South Asia	East Asia
1800	.98	.63	NA	NA
1850	1.3	.80	NA	NA
1900	1.7	.93	NA	NA
1950	2.5	1.4	.72	.67
1960	3.1	1.7	.89	.83
1970	3.7	2.1	1.1	1.0
1979	4.4	2.6	1.4	1.2

Year	Europe	Africa	Latin America	USSR
1800	.15	.11	.02	.06
1850	.21	.11	.04	.08
1900	.30	.13	.07	.13
1950	.39	.22	.16	.18
1960	.43	.28	.22	.21
1970	.46	.36	.28	.24
1979	.48	.46	.35	.26

Year	North America	Oceania
1800	.007	.002
1850	.03	.002
1900	.08	.006
1950	.17	.013
1960	.20	.016
1970	.23	.019
1979	.24	.022

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 296.

13-2 World population growth rates, by region, 1950-1979

(average annual rate of growth in percent)

Year	World	Africa	Latin America	North America
1950-1955	1.9	2.2	2.6	1.8
1955-1960	2.0	2.3	2.8	1.8
1960-1965	1.9	2.5	2.8	1.5
1965-1970	2.1	2.6	2.7	1.1
1970-1975	1.9	2.7	2.5	0.9
1975-1979	1.7	2.9	2.4	0.8

Year	Asia	Europe & USSR	Oceania
1950-1955	2.0	1.1	2.3
1955-1960	2.1	1.1	2.3
1960-1965	2.0	1.1	2.1
1965-1970	2.5	0.8	2.0
1970-1975	2.2	0.7	1.9
1975-1979	1.9	0.6	1.3

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 298.

13-4 Population in urban and rural areas, by size, 1920-1975

(in billion people)

Year	World total	Urban	Size of city: More than million people	Size of city: 500,000-1 million people
1920	1.810	.216	NA	NA
1930	2.013	.283	NA	NA
1940	2.246	.382	NA	NA
1950	2.502	.706	.181	.072
1960	3.013	.994	.280	.097
1970	3.605	1.371	.442	.124
1975	4.028	1.596	.506	.154

Year	Rural and small towns	Size of city: 100,000-500,000 people	Size of city: Less than 100,000 people
1920	1.594	NA	NA
1930	1.730	NA	NA
1940	1.796	NA	NA
1950	1.864	.151	.302
1960	2.019	.212	.405
1970	2.233	.268	.537
1975	2.432	.324	.612

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 300.

13-5 Ten largest cities in the world, 1975

(in million people)

City	Million people
Tokyo - Yokohama	17.3
New York - Northeast New Jersey	17.0
Mexico City	10.9
Shanghai	10.9
London	10.7
Sao Paulo	10.0
Rhein - Ruhr	9.7
Los Angeles - Long Beach	9.5
Buenos Aires	9.3
Paris	9.2

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 301.

13-6 Population by region, 1950-1979, with projections to 2000

(in billion people)

Year	World			Asia	Africa
1950	2.5			1.381	.22
1960	3.1			1.660	.28
1970	3.7			2.046	.36
1979	4.4			2.583	.46
	High	Med.	Low		
1980	4.548	4.470	4.384	2.643	.459
1985	5.012	4.884	4.753	2.895	.531
1990	5.544	5.340	5.140	3.171	.614
1995	6.142	5.833	5.533	3.470	.709
2000	6.797	6.350	5.921	3.785	.814

Year	Latin America	Europe	USSR	North America
1950	.16	.39	.18	.17
1960	.22	.43	.21	.20
1970	.28	.46	.24	.23
1979	.35	.48	.26	.24
1980	.347	.483	.266	.244
1985	.432	.494	.279	.254
1990	.496	.506	.290	.263
1995	.565	.518	.300	.271
2000	.636	.530	.309	.276

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 302.

13-8 Area and productivity of ecosystems, 1970s

Ecosystem type	Area of ecosystem (in million square kilometers)	Mean net primary productivity (in grams of carbon per square meter per year)
Continental (total)	149	324
Tropical rain forest	17.0	900
Tropical seasonal forest	7.5	675
Temperate evergreen forest	5.0	585
Temperate deciduous forest	7.0	540
Boreal forest	12.0	360
Woodland and shrubland	8.0	270
Savanna	15.0	315
Temperate grassland	9.0	225
Tundra and alpine meadow	8.0	65
Desert scrub	18.0	32
Rock, ice, and sand	24.0	1.5
Cultivated land	14.0	290
Swamp and marsh	2.0	1,125
Lake and stream	2.5	225
Marine (total)	361	69
Open ocean	332.0	57
Upwelling zones	0.4	225
Continental shelf	26.6	162
Algal bed and reef	0.6	900
Estuaries	1.4	810
World total	510	144

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 306.

13-10 Tropical moist forests, by region and country, 1945-1978

(in thousand square kilometers)

Year	Nicaragua	Costa Rica	Brazil	Columbia	Ivory Coast
1945	NA	NA	NA	NA	NA
1954	NA	NA	NA	NA	NA
1957	NA	NA	3,120	NA	NA
1961	NA	NA	NA	NA	NA
1965	NA	NA	NA	NA	NA
1966	NA	NA	2,975	646	90
1967	NA	22	NA	NA	NA
1970	50	NA	NA	NA	NA
1971	NA	NA	NA	NA	NA
1972	NA	17	NA	512	NA
1974	NA	NA	NA	NA	54
1975	NA	NA	2,860	468	NA
1976	NA	NA	NA	463	NA
1977	35	16	NA	394	30
1978	NA	NA	NA	NA	NA

Year	Ghana	Thailand	Philippines	Malaysia
1945	NA	NA	225	NA
1954	35	NA	NA	NA
1957	NA	NA	NA	100
1961	NA	274	NA	NA
1965	NA	249	170	NA
1966	NA	NA	NA	NA
1967	NA	NA	NA	NA
1970	NA	NA	NA	NA
1971	NA	NA	133	NA
1972	23	201	NA	83
1974	NA	NA	NA	NA
1975	NA	NA	NA	NA
1976	NA	NA	115	NA
1977	NA	NA	NA	72
1978	20	132	NA	NA

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 308.

13-12 World arable land, 1951-1975

Year	Arable area (in billion hectares)	Arable area per capita (in hectares)
1951-1955	1.2	.48
1961-1965	1.4	.44
1971-1975	1.5	.39

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 312.

13-13 Arable and potentially arable land, by region, 1970s

(in million hectares)

Countries	Arable	Potentially arable
United States	200.5	340.0
Other major exporters*	104.0	140.0
Western Europe	90.1	135.0
Japan	5.7	8.0
Eastern Europe	54.4	60.0
USSR	232.5	320.0
People's Republic of China	127.5	190.0
Latin America	136.5	475.0
North Africa/Middle East	91.5	130.0
Other African LDCs	160.5	600.0
South Asia	207.5	230.0
Southeast Asia	34.9	65.0
East Asia	31.1	70.0

* Canada, Republic of South Africa, Australia, Argentina

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 313.

13-14 World agricultural production, 1954-1978

(in an index in which 1961-1965 = 100)

World

Year	Production	Production per capita
1954	77	91
1955	80	93
1956	84	96
1957	85	96
1958	90	99
1959	91	98
1960	94	100
1961	95	99
1962	98	100
1963	100	100
1964	103	101
1965	104	100
1966	109	103
1967	114	106
1968	118	107
1969	118	105
1970	121	106
1971	126	108
1972	124	104
1973	133	110
1974	131	111
1975	132	111
1976	138	114
1977	141	115
1978	147	118

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 314.

13-14 cont. World agricultural production, 1954-1978

(in an index in which 1961-1965 = 100)

Developed countries

Year	Production	Production per capita
1954	77	86
1955	81	90
1956	85	93
1957	86	93
1958	91	97
1959	92	97
1960	96	100
1961	95	97
1962	98	99
1963	99	99
1964	103	102
1965	104	102
1966	111	107
1967	115	110
1968	119	113
1969	117	110
1970	119	111
1971	125	115
1972	124	113
1973	133	121
1974	129	116
1975	128	114
1976	134	119
1977	137	120
1978	143	124

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 314.

13-14 cont. World agricultural production, 1954-1978

(in an index in which 1961-1965 = 100)

Developing countries

Year	Production	Production per capita
1954	77	96
1955	78	95
1956	82	97
1957	83	96
1958	87	98
1959	89	98
1960	92	99
1961	94	99
1962	97	100
1963	100	100
1964	104	102
1965	104	99
1966	106	98
1967	111	101
1968	115	102
1969	121	104
1970	126	106
1971	128	105
1972	125	100
1973	132	103
1974	134	102
1975	141	105
1976	144	105
1977	150	106
1978	155	107

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 314.

13-15 World agricultural inputs, 1950-1978

Fertilizer use
(in thousand metric tons)

Year	Thousand metric tons	Year	Thousand metric tons
1950	8,978	1965	39,710
1951	13,778	1966	43,910
1952	14,558	1967	50,784
1953	15,735	1968	54,975
1954	17,500	1969	59,509
1955	20,260	1970	62,978
1956	21,290	1971	68,280
1957	22,650	1972	72,072
1958	23,810	1973	76,911
1959	25,710	1974	83,587
1960	26,970	1975	82,374
1961	28,680	1976	89,990
1962	30,100	1977	95,577
1963	32,730	1978	99,361
1964	36,260		

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 315.

13-15 cont. World agricultural inputs, 1950-1978

Irrigated cropland
(in million hectares)

Year	World	Asia	North and Latin America
1961	188.764	140.248	24.093
1970	216.732	158.446	27.798

Year	Europe	Africa	Oceania
1961	17.666	5.679	1.078
1970	21.900	7.001	1.587

Agricultural labor force
(in million people)

Year	Million people
1950	707
1955	727
1960	749
1965	756
1970	769
1975	769

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 315 .

13-16 Extinct species and subspecies of vertebrate animals worldwide, 1600s - 1900s

(in number of species and subspecies*)

Century	Known to be extinct	Probably extinct by the year 2000
1600s	21	-
1700s	36	-
1800s	84	-
1900s	85	185

*Numbers are not cumulative.

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 318.

13-17 Extinction of species, by region, 1980-2000

(in number of species)

Region	Range of possible extinctions by 2000
World	437,000 - 1,453,000
Tropical forests	249,000 - 828,000
Latin America	100,000 - 333,000
Africa	20,000 - 65,000
South and Southeast Asia	129,000 - 430,000
All other habitats	188,000 - 625,000

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 319.

13-18 Whale exploitation, by species, pre-hunting through the 1970s

Whale abundance, pre-hunting and 1970s

Species	Virgin stock (in thousands)	1970s stock (in thousands)	Percent of virgin stock remaining
Blue	215	13	6
Humpback	50	7	14
Fin	448	101	22
Sei	200	76	38
Sperm	922	641	69
Gray	11	11	100
Minke	361	325	90

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 320.

13-18 cont. Whale exploitation, by species, pre-hunting through the 1970s

Whale catch, 1920-1978

Year	Total	Blue	Hump-back	Fin
1920	9,634	2,274	545	4,946
1921	11,932	2,987	603	6,904
1922	12,532	5,275	1,162	4,494
1923	17,068	6,869	1,979	6,723
1924	15,614	4,845	1,206	6,894
1925	22,543	7,548	3,342	9,121
1926	27,605	7,227	3,038	14,264
1927	23,182	8,715	2,548	8,608
1928	22,131	9,627	1,481	7,053
1929	26,521	13,763	315	9,133
1930	37,246	19,079	1,919	14,281
1931	41,323	29,649	782	10,588
1932	10,698	6,705	236	3,550
1933	25,940	19,062	224	6,083
1934	30,826	17,486	2,289	8,668
1935	38,200	16,834	4,088	14,078
1936	40,509	18,108	4,691	12,148
1937	47,222	14,636	6,612	17,686
1938	54,532	15,035	5,125	29,680
1939	44,493	14,152	1,393	22,622
1940	36,643	11,559	528	19,924
1941	23,508	5,029	2,933	9,150
1942	7,707	80	335	2,144
1943	8,102	151	277	1,794
1944	6,400	353	265	2,242
1945	5,946	1,111	303	2,653
1946	19,391	3,675	493	11,022
1947	34,664	9,302	290	16,495
1948	43,123	7,157	515	24,028
1949	43,810	7,781	3,395	21,763
1950	44,932	6,313	5,063	22,902
1951	55,746	7,278	4,352	22,819
1952	49,744	5,436	4,023	25,605

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 320.

13-18 cont. Whale exploitation, by species, pre-hunting through the 1970s

Whale catch, 1920-1978 (cont.)

Year	Total	Blue	Hump-back	Fin
1953	44,912	4,218	3,328	25,581
1954	53,533	3,009	3,155	31,335
1955	54,927	2,495	2,713	32,185
1956	58,029	1,987	3,880	31,496
1957	58,922	1,775	3,196	31,657
1958	64,114	1,995	2,923	31,680
1959	64,286	1,442	5,055	30,952
1960	63,484	1,465	3,576	31,064
1961	65,658	1,987	2,840	31,916
1962	65,966	1,255	2,436	30,155
1963	63,510	1,429	2,758	21,916
1964	62,788	372	318	19,153
1965	64,418	613	452	12,351
1966	57,439	243	59	6,692
1967	51,914	70	4	6,400
1968	46,266	0	2	5,085
1969	45,548	0	0	5,320
1970	46,633	0	0	5,057
1971	42,469	9	24	4,547
1972	39,634	0	6	4,191
1973	41,772	7	18	2,616
1974	41,192	0	15	2,077
1975	38,892	0	17	1,634
1976	29,972	0	11	785
1977	27,025	0	14	155
1978	20,608	0	32	650

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 320.

13-18 cont. Whale exploitation, by species, pre-hunting through the 1970s

Whale catch, 1920-1978 (cont.)

Year	Sei	Sperm	Minke
1920	1,120	749	NA
1921	687	751	NA
1922	781	820	NA
1923	898	599	NA
1924	1,719	950	NA
1925	1,093	1,439	NA
1926	1,494	1,582	NA
1927	1,997	1,314	NA
1928	2,290	1,680	NA
1929	1,549	1,761	NA
1930	841	1,126	NA
1931	205	99	NA
1932	99	108	NA
1933	31	540	NA
1934	541	1,842	NA
1935	962	2,238	NA
1936	723	4,839	NA
1937	1,236	7,052	NA
1938	929	3,763	NA
1939	815	5,511	NA
1940	541	4,091	NA
1941	814	5,582	NA
1942	373	4,775	NA
1943	506	5,374	NA
1944	989	2,551	NA
1945	218	1,661	NA
1946	747	3,454	NA
1947	1,131	7,446	NA

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 320.

13-18 cont. Whale exploitation, by species, pre-hunting through the 1970s

Whale catch, 1920-1978 (cont.)

Year	Sei	Sperm	Minke
1948	1,573	9,850	NA
1949	1,855	9,016	NA
1950	2,471	8,183	NA
1951	3,033	18,264	NA
1952	3,123	11,557	NA
1953	2,208	9,577	NA
1954	2,491	13,543	NA
1955	6,940	15,594	NA
1956	2,076	18,590	NA
1957	3,138	19,156	NA
1958	5,670	21,846	NA
1959	5,539	21,298	NA
1960	7,035	20,344	NA
1961	7,785	21,130	NA
1962	8,804	23,316	NA
1963	9,549	27,858	NA
1964	13,690	29,255	NA
1965	25,454	25,548	NA
1966	23,067	27,378	NA
1967	19,016	26,424	NA
1968	17,099	24,080	NA
1969	11,980	24,137	4,111
1970	11,195	25,842	4,539
1971	10,460	22,642	4,787
1972	8,615	18,895	7,927
1973	6,388	22,305	10,438
1974	6,234	21,217	11,649
1975	4,975	21,045	11,221
1976	1,866	17,134	10,176
1977	2,179	12,279	12,398
1978	634	10,274	9,018

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 320.

13-19 Population of selected endangered and threatened species, 1947-1979

(in numbers of animals)

Year	African elephants	Black rhinos	Kemp's (Atlantic) ridley turtles
1947	NA	NA	40,000
1960	NA	NA	NA
1968	NA	NA	NA
1969	NA	90,000	NA
1970	5,000,000	NA	NA
1971	NA	NA	NA
1972	NA	NA	NA
1973	NA	NA	NA
1974	NA	NA	NA
1975	NA	NA	NA
1976	NA	NA	NA
1977	NA	NA	NA
1978	NA	NA	NA
1979	1,300,000	15,000	750

Year	Golden lion marmosets	Mountain gorillas	Mauritius kestrels
1947	NA	NA	NA
1960	NA	450	NA
1968	600	NA	NA
1969	NA	NA	NA
1970	400	NA	NA
1971	NA	NA	NA
1972	NA	NA	NA
1973	NA	NA	6
1974	NA	NA	NA
1975	250	NA	NA
1976	NA	NA	NA
1977	NA	NA	13
1978	NA	200	19
1979	NA	NA	NA

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 322.

13-19 cont. Population of selected endangered and threatened species, 1947-1979

(in number of animals)

Year	Bengal tigers
1947	NA
1960	NA
1968	NA
1969	NA
1970	NA
1971	NA
1972	1,827
1973	NA
1974	NA
1975	NA
1976	NA
1977	2,484
1978	NA
1979	NA

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 322.

13-20 World commercial fish catch, 1950-1978

(in million metric tons)

Year	Total	Peruvian anchovies	All other species
1950	21.1	-	21.1
1951	23.5	-	23.5
1952	25.1	-	25.1
1953	25.9	-	25.9
1954	27.6	-	27.6
1955	28.9	-	28.9
1956	30.8	0.1	30.7
1957	31.7	.3	31.4
1958	33.3	.8	32.5
1959	36.9	2.0	34.9
1960	40.2	3.5	36.7
1961	43.6	5.3	38.3
1962	44.8	7.1	37.7
1963	46.6	7.2	39.4
1964	51.9	9.8	42.1
1965	53.2	7.7	45.5
1966	57.3	9.6	47.7
1967	60.4	10.5	49.9
1968	63.9	11.3	52.6
1969	62.7	9.7	53.0
1970	68.1	13.1	55.0
1971	68.5	11.2	57.3
1972	64.2	4.8	59.4
1973	65.1	1.7	63.4
1974	68.9	4.0	64.9
1975	68.6	3.3	65.3
1976	72.1	4.3	67.8
1977	71.2	.8	70.4
1978	72.4	1.2	71.2

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 325.

13-22 World oil spills from tankers, 1973-1979

Year	Number of incidents	Thousand long tons spilled
1973	36	84.500
1974	48	67.115
1975	45	188.042
1976	29	204.235
1977	49	213.080
1978	35	260.488
1979	65	723.533

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 328.

13-23 Chlorofluoromethane production, 1967-1977

(in thousand metric tons)

Year	World total
1967	440
1968	510
1969	587
1970	637
1971	692
1972	783
1973	879
1974	939
1975	817
1976	893
1977	852

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 331.

13-24 Carbon dioxide concentrations in air, 1958-1979

(in parts per million)

Year	Mauna Loa, Hawaii	South Pole
1957	315.82	314.41
1958	316.71	315.83
1959	317.32	316.09
1960	318.23	316.63
1961	318.87	317.54
1962	319.34	318.02
1963	319.92	318.93
1964	320.67	319.15
1965	321.31	320.20
1966	322.13	321.10
1967	323.59	321.63
1968	325.17	322.11
1969	326.36	323.57
1970	327.40	325.01
1971	329.22	325.67
1972	330.57	326.77
1973	330.91	328.20
1974	331.83	328.77
1975	333.60	329.84
1976	334.66	331.07
1977		332.77
1978		333.08
1979		335.00

For the graphic presentation of data in this table, see Environmental Trends, Council on Environmental Quality (Washington, D.C.: Government Printing Office, 1981), p. 332.

1-1
Physical characteristics of the United States

The national atlas of the United States of America, U.S. Geological Survey (Washington, D.C., 1970), p. 61.

1-2
Climatic zones of the United States

Climatic chart of the world, U.S. Air Force, Aeronautic Chart and Information Center (St. Louis, Mo., 1965), reprinted from *World atlas: Physical, political, and economic*, Edward B. Espenshade, Jr., ed. (Chicago: Rand McNally and Co., 1957). Copyright by Rand McNally and Co., R.L. 81-Y-31.

Köeppen's classification of climates is based on monthly and annual averages of temperature and precipitation. Each climatic division is designated by a series of letters. The first letter corresponds to one of five major divisions: A, rainy climates with no winters; B, dry climates; C, rainy climates with mild winters; D, rainy climates with severe winters; and E, polar climates with no warm season.

A second capital letter subdivides two of the five divisions: BS, dry grassland or steppes; BW, desert; ET, tundra; and EF, continuous frost.

Small letters are used to indicate seasonal variation in temperature and precipitation: f, moist; w, winter dry; s, summer dry; a, hot summers, temperature of warmest month is greater than 71.6°F (22°C); b, cool summers, temperature of the warmest month under 71.6°F (22°C), but with at least four months above 50°F (10°C); c, cool short summers, only one to three months above 50°F (10°C); and so forth. For further details, see *An outline of geography*, Preston E. James (Boston: Ginn and Company, 1943), pp. 370–379.

1-3
Population distribution, 1970

Graphic summary of the 1970 population census, U.S. Bureau of the Census (Washington: USGPO, 1973), suppl. rep. PC(SI)-55, p. 15.

The 1970 census definition of urban population includes places with 2,500 or more residents.

1-4
Total population, 1900-1978, and projected to 2025

1900–1977: *Statistical abstract of the United States: 1978*, U.S. Bureau of the Census (Washington: USGPO, 1978), table 2, p. 6.

1978: *Current population reports*, U.S. Bureau of the Census (Washington: USGPO, 1978), series P-25, n. 729.

1980–2025: *Current population reports* (Washington: USGPO, 1977), series P-25, n. 704, table D, p. 6.

Data are as of July 1 of the year noted.

Data for 1900–1978 exclude Armed Forces overseas.

Projections to 2025 include Armed Forces overseas.

1-5
Population growth rates, 1900-1978

1900–1909: *Statistical abstract of the United States: 1976*, U.S. Bureau of the Census (Washington: USGPO, 1976), table 2, p. 5.

1910–1969: *Current population reports*, U.S. Bureau of the Census (Washington: USGPO, 1973), series P-25, n. 499, tables A, 4, pp. 1, 11, in *Social indicators, 1973*, U.S. Office of Management and Budget (Washington: USGPO, 1973), pp. 246, 249.

1970–1977: *Statistical abstract of the United States: 1978* (Washington: USGPO, 1978), table 2, p. 6.

1978: *Current population reports* (Washington: USGPO, 1978), series P-25, n. 729.

Rates are based on the population change during the calendar year as a percentage of the midyear population.

Prior to 1940, data exclude Alaska, Hawaii, and Armed Forces overseas, except for 1917–1919, when Armed Forces overseas were included.

Beginning in 1940, data for total U.S. population include Armed Forces overseas.

1-6
Population, by region, 1950-1978

1950–1959: *Current population reports*, U.S. Bureau of the Census (Washington: USGPO, 1965), series P-25, n. 304, table 2, p. 10.

1960–1969: *Current population reports* (Washington: USGPO, 1971), series P-25, n. 460, table 1, p. 8.

1970–1976: *Current population reports* (Washington: USGPO, 1978), series P-25, n. 727, table 3, p. 7.

1977–1978: *Current population reports* (Washington: USGPO, 1978), series P-25, n. 790, table 1, p. 2.

1-7
Population growth rates, by region, 1950-1978

See 1-6.

1-8
Population density along major coasts, 1976

Statistical abstract of the United States: 1978, U.S. Bureau of the Census (Washington: USGPO, 1978), table 7, p. 10.

1-9
Increase in population density along major coasts, 1940-1976

See 1-8.

1-10
Population in urban and rural areas, 1900-1950, and in metropolitan and nonmetropolitan areas, 1950-1978

Urban and rural: *Historical statistics of the United States, colonial times to 1970*, U.S. Bureau of the Census (Washington: USGPO, 1975), p. 12.

Metropolitan and nonmetropolitan, 1950 and 1960: *Statistical abstract of the United States: 1976*, U.S. Bureau of the Census (Washington: USGPO, 1976), table 15, p. 16. 1970 and 1978: *Current population reports*, U.S. Bureau of the Census (Washington: USGPO, 1979), series P-20, n. 336, table 19, p. 34.

Each Standard Metropolitan Statistical Area (SMSA) is divided into two areas: "central city" and "outside the central city." The largest city within each SMSA is usually designated the "central city." The remainder of the SMSA is "outside the central city." This remaining area may include cities of 50,000 or more and may be located in more than one State. Areas of the country that do not meet the SMSA criteria are designated nonmetropolitan.

In addition to the county or counties containing such a city or cities, contiguous counties are included in an SMSA if, according to certain criteria, they are socially and economically integrated with the central county. In New England, SMSAs consist of towns and cities rather than counties.

The 1950–1978 data include residents of the 243 SMSAs as defined in the 1970 Census of Population. The 1970 and 1978 data include civilian noninstitutional residents only.

1-11
Metropolitan areas with population increases of 20% or more, 1970-1977

Current population reports, U.S. Bureau of the Census (Washington: USGPO, 1979), series P-25, n. 810, table 1, pp. 4–24.

1-12
Population migration, 1970-1978

Current population reports, U.S. Bureau of the Census (Washington: USGPO, 1975), series P-20, n. 285, p. 2.

Current population reports (Washington: USGPO, 1978), series P-20, n. 331, table 1, p. 5.

Details may not add to total because of rounding.

1-13
Population growth rates in metropolitan and nonmetropolitan counties, 1950-1977

1950–1970: "The new pattern of nonmetropolitan population change," Calvin L. Beale and Glenn V. Fuguitt, University of Wisconsin, Center for Demography and Ecology, 1975.

1970–1977: "Trends in metropolitan and nonmetropolitan population growth since 1970," Richard L. Forstall, U.S. Bureau of the Census, 1975. *Current population reports*, U.S. Bureau of the Census (Washington: USGPO, 1979), series P-25, n. 810, tables 6, 7, pp. 30, 31.

1-14
Population change in nonmetropolitan counties, 1970-1977

Social and economic trends in rural America, USDA Economics, Statistics, and Cooperatives Service (Washington, D.C., 1979), p. 13.

1-15
Urban regions, 2000

Jerome P. Pickard, Appalachian Regional Commission, Washington, D.C.

Two urban regions, the Lower Rio Grande Valley and El Paso–Ciudad Juarez, are international and include area and population in Mexico.

2-1
Natural wetlands, 1954

Water atlas of the United States, Water Information Center, Inc. (Port Washington, N.Y., 1973), plate 74.

Wetlands of the United States, Samuel P. Shaw and C. Gordon Fredine, U.S. Fish and Wildlife Service (Washington, D.C., 1956), circ. 39, plate 21.

The map does not show approximately 11 million acres of wetlands not specifically delineated.

Data not available for Alaska and Hawaii.

The Fish and Wildlife Service, Office of Biological Services, is conducting the National Wetlands Inventory. National summary data are expected to be available in 1982.

2-2
Total wetland acreage, presettlement to 1971

Wetlands of the United States, Samuel P. Shaw and C. Gordon Fredine, U.S. Fish and Wildlife Service (Washington, D.C., 1956), circ. 39, pp. 6–7.

"Inland wetlands: Their ecological role and environmental status," William Niering and Richard Goodwin, *Bull. Ecol. Soc. Amer.* 55(2):4 (June 1974).

Data include 48 States only.

2-3
Wetland acreages, selected States, 1850–1975

Wetlands of the United States, Samuel P. Shaw and C. Gordon Fredine, U.S. Fish and Wildlife Service (Washington, D.C., 1956), circ. 39, p. 7.

Florida State Planning Office, Tallahassee, unpublished data.

Cooperative Gulf of Mexico estuarine inventory and study, Louisiana, National Oceanic and Atmospheric Administration and Louisiana Department of Wildlife and Fisheries (New Orleans, 1971), phase I, area description, and phase IV, biology, p. 10.

"Deterioration and restoration of coastal wetlands," S. M. Gagliano et al., reprinted from *Proceedings of 12th International Conference of Coastal Engineering*, Washington, D.C. (Jackson, Miss.: The Gulf Coast Association of Geological Societies, 1970), p. 7.

"Versatile wetlands—an endangered species," Peter Sullivan, *Conservation News* 41(5):20 (1976), p. 5.

Supplementary report on the coastal wetlands inventory of Delaware, U.S. Fish and Wildlife Service (Washington: USGPO, 1965).

"Search for wetlands," Kathi Jensen, *Delaware Conservationist* 19(16):2 (1965).

Cooperative Gulf of Mexico estuarine inventory and study, Mississippi, National Oceanic and Atmospheric Administration and Mississippi Marine Conservation Commission (Ocean Springs, Miss.: Gulf Coast Research Laboratory, 1973), pp. 16, 179, 180.

Long Island marine wetlands: Status, value, and preservation potentials, New York State Department of Environmental Conservation (Albany: Office of Planning Services, 1972), pp. 9–10.

2-4
Use of filled wetlands, Maine to Delaware, 1955–1964

Fish and man: Conflict in the Atlantic estuary, John Clark (Highlands, N.J.: American Littoral Society, 1967), spec. pub. 5, reprinted in *The economic and social importance of estuaries*, EPA (Washington: USGPO, 1971), p. E-7.

2-5
State programs protecting wetlands and coastal areas, 1978

National Wetlands Newsletter, Environmental Law Institute, v. 1, n. 3 (February 1979).

Strengthening State wetlands regulations, U.S. Fish and Wildlife Service (Washington: USGPO, 1979).

"Computer-aided environmental legislative data system," U.S. Army Corps of Engineers, Construction Engineering Research Laboratory (accessed April–May 1979).

Floodplain management (Executive Order 11988) and *Protection of wetlands* (Executive Order 11990), both issued in May 1977, directly affect coastal and riverine wetlands by prohibiting Federal agencies from needlessly damaging or destroying floodplains and wetlands.

2-6
National Wilderness Preservation System, 1978

USDA Forest Service.

BLM lands were first admitted to the system in 1979 and are not shown on the map.

2-7
Designated and proposed Wilderness Areas, 1964-1979

1964–1976: USDA Forest Service, National Wilderness Monitoring System, computer printout, August 1, 1977.
1977–1979: "Wilderness fact sheet," USDA Forest Service, Recreation Management Staff, February 15, 1979. Unpublished data from USDA Forest Service; National Park Service; U.S. Fish and Wildlife Service; Bureau of Land Management.

In addition to the acreage shown, the 1976 BLM Organic Act includes approximately 120 million acres which are under consideration for wilderness designation.

2-8
National Wild and Scenic Rivers, 1978

U.S. Department of the Interior, Heritage Conservation and Recreation Service.

2-9
The National Wild and Scenic Rivers System, 1968-1978

Environmental quality—1976, Council on Environmental Quality (Washington: USGPO, 1976), p. 96.
U.S. Department of the Interior, Heritage Conservation and Recreation Service, unpublished data.

2-10
The National Park System, 1979

National Park Service.

2-11
National Park Service units, 1872-1978

1872–1976: *Index of the National Park System and affiliated areas as of January 1, 1975*, National Park Service (Washington: USGPO, 1975); photocopy of updated addenda to the index, October 22, 1976.
1977: *National Park statistical abstract 1977*, National Park Service (Washington: USGPO, 1978), table 1, p. 1.
1978: Photocopy of updated addenda to the 1977 index, February 1979.

2-12
National and State Park acreages, 1872-1978

National: See 2-11.
State, 1941–1975: *State park statistics—1970*, National Recreation and Park Association (Arlington, Va., 1971), p. 9; *Statistical abstract of the United States: 1976* (Washington: USGPO, 1976), table 355, p. 216; *State park statistics—1975* (Arlington, Va., 1977), p. 28.

2-13
Representation of natural regions in the National Park System, 1970

Part two of the National Park System plan, natural history, National Park Service (Washington: USGPO, 1972), figs. 1a, 3, pp. 6–7, 12–13, based on "Physiographic divisions of the United States," N. M. Fenneman, *Annals of the Association of American Geographers*, v. 18 (3rd ed., 1928).

2-14
Visits to National and State parks, 1954-1978

National Parks, 1945–1975: *Public use of the National Parks: A statistical report, 1954–1964*, National Park Service (Washington: USGPO, 1966), p. 4; *Public use of the National Parks: A statistical report, 1960–1970* (USGPO, 1971), p. 5; *Public use of the National Parks, December 1972* (USGPO, 1972), p. 9; *Public use of the National Park System, calendar year report 1973* (USGPO,

1974), p. 6; *Public use of the National Park System, calendar year report 1975* (USGPO, 1976), p. 23. 1976: *National Park statistical abstract, 1977* (USGPO, 1978), table 2, p. 2. 1977–1978: *National Park statistical abstract, 1978* (USGPO, 1979), table 2, p. 2.

State Parks, 1956–1975: *State park statistics, 1970*, National Park and Recreation Association (Arlington, Va., 1971), p. 9; *State park statistics, 1975* (Arlington, Va., 1977), p. 27.

2-15
Overnight stays in National Park Service-operated campgrounds, 1960–1978

National Park statistical abstracts, 1978, National Park Service (Washington: USGPO, 1979), table 3, p. 2.

2-16
The 10 most popular National Parks, 1978

National Park statistical abstract, 1978, National Park Service (Washington: USGPO, 1979), table 4, pp. 7–17.

2-17
Properties on the National Register of Historic Places, 1968–1978

U.S. Department of the Interior, Heritage Conservation and Recreation Service, National Register of Historic Places, unpublished data.

Includes National Historic Landmarks.

2-18
Properties on the National Register of Historic Places, by type, 1978

See 2-17.

A district may include up to 10,000 individual buildings or properties.

2-19
Properties removed from the National Register of Historic Places, 1971–1978

See 2-17.

Excludes 22 properties removed from the register prior to 1971 and 9 properties removed with no date indicating time of removal.

2-20
Urban population and lands affected by stream flooding, by Water Resources Region, 1967

Flood hazard in the United States: A research assessment, Gilbert F. White (Boulder: University of Colorado, 1975), monograph NSF-RA-E-75-006, p. 2, based on *List of urban places with information about flood problems*, U.S. Army Corps of Engineers (Washington, D.C., 1967) and *Statistical bulletin 317*, U.S. Department of Agriculture (Washington: USGPO, 1962).

Includes approximately 4,000 large urban areas with flood problems and refers to both direct and indirect effects.

The flash flood data were developed in 1976 by the American Red Cross for the National Weather Service, U.S. Department of Commerce.

2-21
Hurricane risk along the Gulf and Atlantic coasts

Hurricane hazard in the United States: A research assessment, Waltraud A. R. Brinkman (Boulder: University of Colorado, 1975), monograph NSF-RA-75-007, p. 6., based on *Atlantic hurricane frequencies along the U.S. coastline*, Simpson and Lawrence (Washington: U.S. Department of Commerce, 1971), NOAA tech. memo. NWS SR-58.

2-22
Frequency of tornadoes, 1953–1962

The national atlas of the United States of America, U.S. Geological Survey (Washington, D.C., 1975), p. 116.

Mobile home residents are particularly at risk from tornadoes. Their number increased dramatically during the 1960s, and for years the homes were not well anchored. An unanchored mobile home can be overturned by winds of 54 miles per hour; anchored mobile homes withstand winds of over 100 miles per hour. Improved construction and the use of tiedown equipment are providing more protection.

Data not available for Alaska and Hawaii.

2-23
Earthquake risk zones

Earthquake and tsunami hazards in the United States: A research assessment, Robert S. Ayre (Boulder: University of Colorado, 1975), monograph NSF-RA-E-75-005, p. 7, based on *Disaster preparedness; Report to the Congress*, Executive Office of the President, Office of Emergency Preparedness (Washington: USGPO, 1972), v. 1, 2, 3.

The map is based on the known distribution of damaging earthquakes and the modified Mercali intensities associated with these earthquakes; evidence of strain release; and consideration of major geologic structures and provinces believed to be associated with earthquake activity. The probable frequency of occurrence of damaging earthquakes in each zone was not considered in assigning ratings to the various zones.

Map revised 1969.

2-24
Loss of life from selected natural disasters, 1900–1977

Floods, 1925–1975: *Climatological data, annual summary 1977*, National Oceanic and Atmospheric Administration (Asheville, N.C., 1978), 28(13):117. 1976–1977: National Oceanic and Atmospheric Administration, National Weather Service, unpublished data.

Hurricanes, 1900–1934: *Historical statistics of the United States, colonial times to 1970*, U.S. Bureau of the Census (Washington: USGPO, 1975), p. 448. 1935–1977: *Climatological data, annual summary 1977*, National Oceanic and Atmospheric Administration (Asheville, N.C., 1978) 28(13):77.

Tornadoes, 1916–1977: *Climatological data, annual summary 1977*, National Oceanic and Atmospheric Administration (Asheville, N.C., 1978), 28(13):64.

Earthquakes, 1906–1971: *Earthquake and tsunami hazards in the United States: A research assessment*, Robert S. Ayre (Boulder: University of Colorado, 1975), monograph NSF-RA-E-005, table I-2, p. 27. 1972–1977: National Oceanic and Atmospheric Administration, unpublished data.

Population, 1900–1977: *Statistical abstract of the United States: 1978*, U.S. Bureau of the Census (Washington: USGPO, 1979), table 2, p. 6.

Average annual deaths per 10 million were calculated by dividing the average number of deaths for a given 5 years by the average annual resident population for the same period.

Lives lost, 1900–1924, are for selected years. Years reported for hurricanes are 1901, 1903, 1906, 1909, 1912, and 1915–1924. For tornadoes, the years are 1916–1924; for earthquakes, 1906, 1915, and 1918.

Hurricane data include North Atlantic tropical cyclones, storms that form in the tropics and that have winds of 39–73 miles per hour; hurricanes have winds of 74 miles per hour or higher accompanied by heavy rains, high waves, and tides.

Tornadoes are local storms of short duration formed of winds rotating at very high speeds, usually counterclockwise. These storms are visible as a vortex, a whirlpool of wind rotating about a hollow cavity in which centrifugal forces produce a partial vacuum. The fall in barometric pressure is so rapid that wooden structures are often lifted and burst open by the air confined within them.

Earthquake data include tsunamis. Earthquakes are a shaking or trembling of the earth that accompanies movement of its crust. Their magnitude is measured on a Richter scale, with the measurements increasing geometrically.

2-25
Property damage from selected natural disasters, 1900–1977

Hurricanes, 1915–1969; *Hurricane hazard in the United States: A research assessment*, Waltraud A. R. Brinkman (Boulder: University of Colorado, 1975), monograph NSF-RA-E-75-007, fig. III-1, p. 23. 1970–1977: *Climatological data, annual summary 1977*, National Oceanic and Atmospheric Administration (Asheville, N.C., 1978), 28(13):77.

Tornadoes, 1916–1977: *Climatological data, annual summary 1977*, 28(13):64.

Earthquakes, 1905–1969: *Earthquake and tsunami hazards in the United States: A research assessment*, Robert S. Ayre (Boulder: University of Colorado, 1975), monograph NSF-RA-E-75-005, table I-2, p. 27. 1970–1977: National Oceanic and Atmospheric Administration, unpublished data.

Gross National Product, 1905–1909: *Long-term economic growth, 1860–1970*, U.S. Department of Commerce (Washington: USGPO, 1973), data series A1, p. 182. 1910–1939: *Long-term economic growth, 1860–1970* (USGPO, 1973), data series A2, p. 183. 1940–1972: *Economic report of the President: Transmitted to the Congress, February 1974*, Council of Economic Advisers (Washington: USGPO, 1974), p. 250. 1973–1977: *Statistical abstract of the United States: 1978*, U.S. Bureau of the Census (Washington: USGPO, 1979), table 710, p. 441.

Implicit price deflator: *Long-term economic growth, 1860–1970* (USGPO, 1973), data series B61 and B62, pp. 222–223. *Economic report of the President: Transmitted to the Congress, February 1974* (USGPO, 1974), p. 252.

Population: *Statistical abstract of the United States: 1978* (USGPO, 1979), table 710, p. 441.

Average annual property loss as a percentage of gross national product was calculated by dividing the average annual loss from the four natural hazards by the average annual gross national product for each 5 years.

For hurricanes, 1970–1977, and tornadoes, 1916–1977, property damages are reported in ranges. The midpoint of the range was used for these years.

3-1
Standard Metropolitan Statistical Areas, 1950

U.S. census of population: 1950, U.S. Bureau of the Census (Washington: USGPO, 1952), v. 1, fig. 13, p. xxxiv.

3-2
Standard Metropolitan Statistical Areas, 1978

State and metropolitan area data book, 1979, U.S. Bureau of the Census (Washington: USGPO, 1980), pp. xii–xiii.

3-3
Population in suburban areas and central cities, 1940–1978

1940–1960: *1960 census of population*, U.S. Bureau of the Census (Washington: USGPO, 1964), v. 1, U.S. summary, and previous decennial issues; U.S. Bureau of the Census, Population Division, unpublished data.

1970–1978: *Current population reports*, U.S. Bureau of the Census (Washington: USGPO, 1979), series P-20, n. 336, table 19, p. 34.

Each SMSA is divided into two areas: "central city" and "outside central city." Suburban areas here refer to outside central cities.

Population data are not strictly comparable.

1940 and 1950: Resident population in 168 SMSAs as defined by the 1950 census. Excludes Alaska and Hawaii, which were admitted to the Union in 1959.

1960: Resident population in 209 SMSAs as defined by the 1960 census.

1970 and 1978: Civilian noninstitutional population in 243 SMSAs as defined by the 1970 census.

3-4
Population density, by location, 1940–1978

See 3-3.

Density data are not strictly comparable. See note in 3-3 for population differences.

1940 and 1950: Area as defined by the 1950 census.

1960 and 1970: Area as defined by the 1960 and 1970 censuses, respectively.

1978: Area as defined by the 1970 census.

3-5
Land use in Standard Metropolitan Statistical Areas, by region, 1970

Farming in the city's shadow, USDA Economic Research Service (Washington: USGPO, 1974), agr. econ. rep. 250, fig. 3, pp. 6–7.

Data refer to the average size of SMSAs in each region. Regions are USDA farm production regions.

3-6
Composition of housing stock, by type of unit and location, 1977

Annual housing survey: 1977, U.S. Bureau of the Census (Washington: USGPO, 1979), part A, p. 1.

Data include 80.7 million year-round housing units and exclude 1.7 million vacant (seasonal and migratory) units. The annual housing survey includes the 50 States and the District of Columbia.

Single-family units are primarily detached houses. This category also includes two or more attached townhouses which are separated by an unbroken ground-to-roof wall (no common basement or attic) and which have their own separate utilities.

Multifamily units consist of two or more attached units which share utilities (such as plumbing) and have no ground-to-roof wall separating them.

Mobile homes include mobile homes and trailers.

3-7
Composition of housing stock, by type of unit, 1940-1977

1940: *16th census of the United States: 1940, housing*, U.S. Bureau of the Census (Washington: USGPO, 1943), v. II, part 1, table 4, p. 10.

1950: *Census of housing: 1950 (taken as part of the 17th decennial census of the United States)* (USGPO, 1953), v. I, part 1, table 5, p. 1-3.

1960: *1960 census of housing (taken as part of the 18th decennial census of the United States* (USGPO, 1963), v. I, part 1, table 5, pp. 1-16 to 1-21.

1970 and 1977: See 3-6.

3-8
Occupied housing units, 1900-1977

1900–1910: *Historical statistics of the United States, colonial times to 1970*, U.S. Bureau of the Census (Washington: USGPO, 1975), p. 646.

1920–1970: *Statistical abstract of the United States: 1978*, U.S. Bureau of the Census (Washington: USGPO, 1978), table 1377, p. 792.

1977: See 3-6.

3-9
Occupied housing units, per 100,000 population, 1900-1977

See 3-8.

Statistical abstract of the United States: 1978, U.S. Bureau of the Census (Washington: USGPO, 1978), table 2, p. 6.

3-10
Characteristics of new single-family housing units, 1966-1978

Size of house, 1966–1970: *Characteristics of new one-family homes: 1974*, U.S. Bureau of the Census (Washington: USGPO, 1975), constr. rep. series C25-74-13, p. 103. 1971–1975: *Characteristics of new housing: 1975* (USGPO, 1976), constr. rep. series C25-75-13, p. 54. 1976–1978: *Characteristics of new housing: 1978* (USGPO, 1979), constr. rep. series C25-78-13, p. 53.

Structure and facilities, 1966–1971: *Characteristics of new one-family homes: 1974*, pp. 33, 39, 45, 51, 57, 75, 81. 1972–1977: *Characteristics of new housing: 1977* (USGPO, 1978), constr. rep. series C25-77-13, pp. 34, 42, 43. 1978: *Characteristics of new housing: 1978*, pp. 32, 38, 39.

Data on size of house include new single-family houses sold, including townhouses.

Data on structure and facilities include homes sold and contractor-built, owner-built, and rental home started in 1966–1970. For 1971–1978, they include privately owned single-family houses completed.

Percentages exclude houses for which questions were not answered.

Two or more stories include split-level homes.

3-11
Characteristics of new multifamily housing units, 1971-1978

1971–1973: *Characteristics of new housing: 1975*, U.S. Bureau of the Census (Washington: USGPO, 1976), constr. rep. series C25-75-13, table 17, pp. 42–44. 1974–1978: *Characteristics of new housing: 1978* (USGPO, 1979), constr. rep. series C-25-78-13, pp. 44–46.

Data refer to privately owned multifamily units completed. Air conditioning refers to both central air conditioning and individual room units.

3-12
Condition of housing, 1940-1977

1940: *Social indicators, 1973*, U.S. Office of Management and Budget (Washington: USGPO, 1973), pp. 206, 209, from *16th census of the United States: 1940, housing*, U.S. Bureau of the Census (Washington: USGPO, 1943), v. II, part 1, pp. 16, 38.
1950–1970: *Housing in the seventies*, U.S. Department of Housing and Urban Development (Washington: USGPO, 1973), p. 6–4, from *1970 census of housing*, U.S. Bureau of the Census (Washington: USGPO, 1972), and previous decennial issues.
1977: See 3-6, pp. 2, 4.

Lacking complete plumbing, 1940: Lacking some or all basic plumbing facilities—private bath, private flush toilet, running water. 1950–1970: Lacking one or more plumbing facilities or sharing a facility. 1977: Lacking some or all plumbing facilities.
Crowded: More than one person per room.
Dilapidated, 1940: Needing major repair—a unit with serious defects which require repair or replacement or a unit continued neglect of which would jeopardize soundness of the structure or safety of the occupants. 1950–1970: A unit which does not provide safe and adequate shelter and endangers health, safety, or well-being of the occupants. Defects are so critical or widespread that the structure should be extensively repaired, rebuilt, or torn down.

3-13
Homes with selected major electric appliances, 1950-1977

Merchandising (New York: Billboard Publications, 1978) and previous annual issues.

Estimates are based on appliances shipped by manufacturers, appliances, purchased from retailers (initial purchases and replacements), and lifetime expectancies of appliances.
Percentages refer to the number of homes wired for electricity (75.8 million in 1977).
Clothes washers, 1950 and 1955: Available data are not comparable and are therefore excluded.

3-14
Overall opinion of living unit, by location, 1977

See 3-6, part B, p. 8.

3-15
Overall opinion of neighborhood, by location, 1977

See 3-6, part B, pp. 17–18.

3-16
Inadequate neighborhood services, 1973-1977

See 3-6, part B, pp. 16–17, and previous annual issues.

3-17
Neighborhood deficiencies, 1973-1977

See 3-6, part B, pp. 13–15, and previous annual issues.

4-1
Major transportation networks, 1925-1978

Roads, 1925–1970: *Historical statistics of the United States, colonial times to 1970*, U.S. Bureau of the Census (Washington: USGPO, 1975), p. 710. *Highway statistics, summary to 1975*, Federal Highway Administration (Washington: USGPO, 1977), p. 211. 1977: *Highway statistics 1977*, Federal Highway Administration (Washington: USGPO, 1979), p. 229.

National Interstate Highway System, 1956–1978: "Quarterly report on the Federal-aid highway program, December 31, 1978," U.S. Department of Transportation, Office of Assistant Secretary for Governmental and Public Affairs (news release, April 24, 1979, and previous issues).

Natural gas pipelines, 1960–1976: "Brief excerpts from *Gas Facts,*" American Gas Association (Arlington, Va., 1978), p. 7.

Petroleum pipelines, 1960–1976: *Statistical abstract of the United States: 1978,* U.S. Bureau of the Census (Washington: USGPO, 1978), table 1128, p. 665.

Railways, 1929–1977: *Yearbook of railroad facts,* Association of American Railroads (Washington, D.C., 1979), p. 46.

Airways and inland waterways, 1939–1976: *Transportation facts and trends* (14th ed.), Transportation Association of America (Washington, D.C., 1978), p. 31.

Heavy rail transit (subway), 1945–1975: "United States rapid transit systems," Bob Abrams, National Capital Transportation Agency (Washington, D.C., 1965). U.S. Department of Transportation, Urban Mass Transit Administration, unpublished data.

All data are in statute miles.

National Interstate Highway System data are miles open at end of year.

Pipeline data include natural gas transmission lines and petroleum trunk lines.

Railways include all line-haul railroads and exclude yard tracks and sidings; one mile of railroad may include two or more parallel tracks.

Airways, 1960–1976, includes jet routes.

Heavy rail transit data are route-miles, not miles of track, for Atlanta, Baltimore, Boston, Chicago, Cleveland, the District of Columbia, New York City, the Trans-Hudson Port Authority and the New Jersey-Pennsylvania Port Authority, Philadelphia, and San Francisco.

Inland waterways are commercially navigable.

4-2
Transportation vehicles, 1920–1978

Autos, trucks, and buses, 1920–1975: *Highway statistics, summary to 1975,* Federal Highway Administration (Washington: USGPO, 1977), table MV-200, p. 45. 1976–1977: *Highway statistics 1977,* Federal Highway Administration (Washington: USGPO, 1979), p. 62.

Bicycles, 1960–1970: *Bicycle transportation,* U.S. Environmental Protection Agency (Washington: USGPO, 1974), p. 49. 1975–1978: Bicycle Manufacturers Association, unpublished data.

Motorcycles, 1940: *Statistical abstract of the United States: 1976,* U.S. Bureau of the Census (Washington: USGPO, 1976), table 988, p. 593. 1950–1977: *Statistical abstract of the United States: 1978* (Washington: USGPO, 1978), table 1090, p. 649.

Railroad cars, 1929–1977: *Yearbook of railroad facts,* Association of American Railroads (Washington, D.C., 1979), pp. 48, 49, 52.

Civil aircraft, 1929–1955: *Historical statistics of the United States, colonial times to 1970,* U.S. Bureau of the Census (Washington: USGPO, 1975), p. 772. 1960–1976: *Statistical abstract of the United States: 1978,* U.S. Bureau of the Census (Washington: USGPO, 1978), table 1131, p. 669.

Recreational boats, 1973–1976: *Recreational boating in the continental United States in 1973 and 1976: The Nationwide Boating Survey,* U.S. Coast Guard (Washington: USGPO, 1978), pp. 21, 22.

Freight vessels, 1970–1976: *Transportation energy conservation data book* (3rd ed.), Oak Ridge National Laboratory (Oak Ridge, Tenn., 1979), p. 1-154.

Population: *Statistical abstract of the United States: 1978,* U.S. Bureau of the Census (Washington: USGPO, 1978), table 2, p. 6.

Autos, trucks, and buses include registered vehicles.

Motorcycles, 1940–1977, include registrations of publicly owned motorcycles and excludes military vehicles. The 1977 data are estimated.

Railroad cars include locomotives, freight cars, and passenger cars in service.

Civil aircraft, 1950–1976, includes active and inactive aircraft, gliders, dirigibles, balloons, and blimps.

Recreational boats, 1973–1976, include runabouts, rowboats, johnboats, sailboats, canoes, cabin cruisers, skiffs, dinghies, kayaks, rafts, houseboats, and other boats.

Freight vessels, 1970–1976, include towboats, tugs, and barges operated for freight transportation on U.S. waterways.

Population is the resident population.

4-3
Sales of specialized vehicles, 1961-1978

Motorcycles, 1972–1977: *1978 motorcycle statistical annual,* Motorcycle Industry Council (Washington, D.C., 1978), p. 12, and previous annual issues.

Snowmobiles: *An assessment of the snowmobile manufacturing industry and sport, 1978,* International Snowmobile Industry Association (Washington, D.C., 1978), appendix A, p. 47.

Recreational vehicles, 1961–1966: *Motor vehicle facts and figures 1976,* Motor Vehicle Manufacturers Association (Detroit, 1977), p. 27. 1967–1977: *Facts and trends 1977,* Recreational Vehicle Industry Association (Chantilly, Va., 1978), p. 4. 1978: *Marketing report,* Recreational Vehicle Industry Association (Chantilly, Va., 1979), p. 6.

Mopeds, 1975–1977: Moped Association of America, unpublished data. 1978: News release.

Motorcycles include wholesale shipments to dealers by Harley Davidson, Honda, Kawasaki, Suzuki, and Yamaha for on-highway, off-highway, and dual-purpose bikes.

Recreational vehicles include total shipments of travel trailers, truck campers, camping trailers, and motor homes, except for 1961–1964, when motor homes are excluded.

Snowmobiles include all North American retail sales. Year refers to model year; for example, 1978 data are for April 1977 through March 1978.

4-4
Local passenger travel, 1950-1975

U.S. Department of Transportation, Office of the Secretary, unpublished data, in *Environmental Quality—1977,* Council on Environmental Quality (Washington: USGPO, 1977), p. 321.

Autos include taxis and personal trucks.

4-5
Principal means of transportation to work, 1960-1977

1960–1970: *Residential energy uses,* U.S. Bureau of the Census (Washington: USGPO, 1977) current housing reports, series H-123, special reports, chart 6.

1974–1977: *Annual housing survey: 1977,* U.S. Bureau of the Census (Washington: USGPO, 1979), part A, p. 6, and previous annual issues.

Data are not strictly comparable. Data for 1960–1970 include all workers 14 years old and older; 1974–1977 data include heads of households only.

4-6
Principal means of transportation to work, by location, 1977

See 4-5.

4-7
Intercity passenger travel, 1929-1977

All modes, 1929: *National transportation trends and choices,* U.S. Department of Transportation (Washington: USGPO, 1977), p. 114. 1939–1959: *Transportation facts and trends* (13th ed.), Transportation Association of America (Washington, D.C., 1977), p. 18. All modes except air, 1960–1977: *Motor vehicle facts and figures 1978,* Motor Vehicle Manufacturers Association (Washington, D.C., 1978), p. 54.

Air, 1960–1977: *Transportation facts and trends* (14th ed.), Transportation Association of America (Washington, D.C., 1978), p. 18.

Population: *Statistical abstract of the United States: 1978,* U.S. Bureau of the Census (Washington: USGPO, 1978), table 2, p. 6.

All 1977 data are preliminary.

Autos and buses data include intracity portions of intercity trips and excludes rural-to-rural trips, strictly intracity trips with both origin and destination in the same city, local bus or transit movement, and nonrevenue school and government bus operation.

Railroad data include commuter travel.

Commercial aircraft, 1970–1977, includes Alaska and Hawaii.

Population is the resident population.

4-8
Intercity freight transportation, 1929-1977

1929: *National transportation trends and choices,* U.S. Department of Transportation (Washington: USGPO, 1977), p. 114.
1939-1977: *Transportation facts and trends* (14th ed.), Transportation Association of America (Washington, D.C., 1978), p. 8.

Data include both for-hire and private carriers and mail and express transportation as appropriate, except for railroads, 1969-1977.

4-9
Major pipelines, 1975

National transportation trends and choices, appendix—U.S. transportation atlas, U.S. Department of Transportation (Washington: USGPO, 1976).

4-10
Energy consumption, by mode of transportation, 1965-1977

Transportation energy conservation data book (3rd ed.), Oak Ridge National Laboratory (Oak Ridge, Tenn., 1979), ORNL-5493, p. 2-13.

Energy use for recreational boats, included in the total, is not disaggregated separately. One estimate for 1976 puts this figure at 0.38 quads per year.
Highway total includes civilian autos (passenger cars and taxis), motorcycles, buses (intercity, school, and local), and trucks.
Air includes general aviation and certified air carriers.
Water transport is estimated from fuel purchased domestically.
Rail includes local rail (heavy and light) and operating Class 1 railroads (passenger and freight).
Total for all modes includes gasoline used for other purposes than highway, water, and air transportation, such as for cleaning fluid, fire starters, lawn mowers, etc.

4-11
Energy intensity for freight transportation, 1976

See 4-10, p. 2-28.

The unit of measure is the number of Btu consumed per route-ton-mile. A route-ton-mile represents one ton of goods transported one route-mile. A route-mile is the distance traveled between two selected points, a distance that differs for transportation modes. For example, the distance traveled by air is shorter than that traveled by auto or rail, so that data are not strictly comparable among modes.
Data for pipelines are not available in a comparable form.

4-12
Energy intensity for local and intercity passenger travel, 1976

See 4-10, p. 2-28.

The unit of measure is the number of Btu consumed per route-passenger-mile traveled. A route-passenger-mile represents one passenger traveling one route-mile. (See 4-11.)
Data do not include energy used in construction and maintenance.
Disaggregated local and intercity auto passenger travel data are not available.

4-13
Automobile fuel economy and standards, 1940-1985

All cars: *Highway statistics 1977,* Federal Highway Administration (Washington: USGPO, 1979), table VM-1, p. 100, and previous annual issues. *Highway statistics, summary to 1965,* Federal Highway Administration (Washington: USGPO, 1967), table VM-201A, p. 42.
New cars: *Transportation energy conservation data book* (3rd ed.), Oak Ridge National Laboratory (Oak Ridge, Tenn., 1979), ORNL-5493, p. 2-29.

Data are not strictly comparable.
Data for all cars are based on the average number of miles traveled per gallon of fuel consumed.
Data for new cars are based on the 1975 Federal Test Procedure, which is weighted to take into account both city and highway driving.

New cars, 1967–1974 model years, production data were used; 1975–1978 model years, manufacturers' sales forecast data were used.

4-14
Automobile emissions and standards, 1957-1985

All autos, 1957–1967: *Statistical abstract of the United States: 1978,* U.S. Bureau of the Census (Washington: USGPO, 1978), table 360, p. 216. 1970–1978: U.S. Environmental Protection Agency, unpublished data.

New autos: *The costs of clean air, 1974,* U.S. Environmental Protection Agency (Washington, D.C., 1974), table 3-1, p. 111-4. *Automobile exhaust emission surveillance analysis of the fiscal year 1974 program,* U.S. Environmental Protection Agency (Ann Arbor, Mich., 1976), p. 12. *Environmental quality—1977.* Council on Environmental Quality (Washington: USGPO, 1977), p. 22. U.S. Department of Commerce, Bureau of Economic Analysis, unpublished data.

Emissions from all light-duty autos, 1970–1978, and from all new autos are measured by the 1975 Federal Test Procedure, which assumes an average speed of 19.6 miles per hour at 75° F.

1957–1974: Passenger cars and light-duty trucks with a gross vehicle weight of 6,000 pounds or less.

1975–1985: Passenger cars only.

Nitrogen oxides, 1957–1967: No estimates available.

4-15
Noise levels of surface transportation vehicles, 1971

Report to the President and Congress on noise, U.S. Environmental Protection Agency (Washington: USGPO, 1972), Sen. doc. 92-63, p. 2-77.

4-16
Population exposed to noise at 23 major airports, 1972

Aviation noise abatement policy, U.S. Department of Transportation, Office of the Secretary, and Federal Aviation Administration (Washington, D.C., 1976), p. 20.

5-1
Flow of materials, products, and solid wastes, 1977

Adapted from *Choices for conservation,* Resource Conservation Committee (Washington: USGPO, 1980), fig. 1, p. 7.

Resource recovery refers to a productive use of material that would otherwise be disposed of as waste. It encompasses recycling, material conversion, and energy recovery. The most common process is recycling, the reprocessing of wastes to recover the original raw material. For example, steel is recovered from tin cans and fiber is recovered from wastepaper. Reuse differs in that a product is reused in the same form; for example, glass bottles. In material conversion, the waste is used in a different form, such as in road-paving material from auto tires. Energy recovery refers to obtaining heat from organic wastes, as in refuse-derived fuel incinerators.

5-2
U.S. material consumption, 1948-1978

See 5-1, table 3, p. 28.

Estimates for the raw materials consumed account for more than 95% of all material use by weight. Only large volume materials have been included. Synthetic organics other than plastics and many metals were omitted.

5-3
U.S. material consumption in relation to gross national product, 1948-1978

See 5-1, table 4, p. 29.

5-4
U.S. material consumption per capita, 1948-1978

See 5-1, table 4, p. 29.

5-5
Solid wastes disposed of by manufacturing industries, 1974–1977

Pollution abatement costs and expenditures, 1977, U.S. Bureau of the Census (Washington: USGPO, 1979), current industrial reports MA-200(77)-2, table 4a, and previous annual issues.

Data include solid wastes properly disposed of by means acceptable to local, State, and Federal authorities. Recovered materials are excluded. The aggregated data are composed partly of wet weight and partly of dry weight figures. Wet weight, which includes the water content, is the tonnage actually handled and charged for by the waste treatment industry.

The apparent decline in lumber wastes between 1976 and 1977 may reflect a change in survey samples rather than a change in the amount of solid wastes disposed of.

Sludge is the residue from scrubbers or after wastewater has been treated.

Dumps, landfills, sanitary landfills, and secured landfills are the four major types of solid waste land disposal sites that receive both municipal and industrial (including commercial) solid waste. In its *Report to Congress: Waste disposal practices and their effects on ground water* (Washington: USGPO, 1977), p. 145, EPA has defined the four major types of sites as follows:

"A dump is an uncovered land disposal site where solid and/or liquid wastes are deposited with little or no regard for pollution control or aesthetics. Dumps are susceptible to open burning and are exposed to the elements, vectors, and scavengers.

"A landfill is a land disposal site located without regard to possible effects on water resources, but which employs intermittent or daily cover to minimize scavenger, aesthetic, vector, and air pollution problems.

"A sanitary landfill is a land disposal site that employs an engineered method of disposing of solid wastes on land in a manner that minimizes environmental hazards by spreading the solid wastes in thin layers, compacting the solid wastes to the smallest practical volume, and applying and compacting cover material at the end of each operating day.

"A secured landfill is a land disposal site that allows no hydraulic connection with natural waters, segregates the waste, has restricted access, and is continually monitored."

Leachate is formed from water percolating through solid wastes. Leachate from post-consumer solid wastes is a highly mineralized fluid containing chloride, iron, lead, copper, sodium, nitrate, and a variety of organic chemicals. Municipal sites generate about 90 billion gallons of leachate per year, most of it filtering into ground water. If manufacturing wastes are included, hazardous substances such as cyanide, cadmium, chromium, chlorinated hydrocarbons, and PCBs may be present in leachate.

5-6
Hazardous wastes generated, by selected industries, 1975

"USEPA's industry studies on hazardous waste management," presented at the National Conference on Hazardous Waste Management, San Francisco, February 1, 1977, table 3, p. 9.

Data on hazardous wastes by the manufacturing sector are not strictly comparable to the data on total manufacturing solid waste shown in 5-5.

EPA studied seven other industries: Special machinery, which generates 0.16 million metric tons per year; leather tanning, 0.15; paint and allied products, 0.10; pharmaceuticals, 0.07; waste oil re-refining, 0.06; electronic components, 0.04; batteries, 0.01.

Hazardous wastes can damage human health or living organisms because these wastes are lethal, nondegradable, or persistent. They can be biologically magnified. They can cause or tend to cause detrimental, cumulative effects.

EPA has defined potentially hazardous waste in terms of potential damage from improper land disposal. These damages include "ground water contamination via leachate; surface water contamination via runoff; air pollution via open burning, evaporation, sublimation, and wind erosion; poisoning via direct contact; poisoning via the food chain; and fire and explosion." ("The potential for national health and environmental damages from industrial residue disposal," E. C. Lazar, et al., in Proceedings of the National Conference on Disposal of Residues on Land, September 13–15, 1976, sponsored by the EPA Office of Solid Waste, p. 196.)

5-7
Industrial hazardous wastes generated, by EPA region, 1975

See 5-6, table 5, p. 13.

5-8
Consumer solid wastes disposed of and recycled, 1960-1978

1960–1970: "Post-consumer solid waste and resource recovery baseline," Franklin Associates, Ltd., prepared for the Resource Conservation Committee (Washington: EPA, 1979), table 1, p. 9.

1971–1976: Environmental Protection Agency, Office of Solid Waste, unpublished data.

1977–1978: Franklin Associates, Ltd., unpublished data prepared for the Committee.

Consumer solid wastes exclude wastewater treatment sludge (about 5 million tons, dry weight, per year), discarded autos and building demolition materials (30–40 million tons per year), street sweepings, and litter.

If food and yard wastes are excluded, the net waste disposed of by consumer residential and commercial sources in 1978 becomes 100 million tons.

5-9
Consumer solid wastes disposed of, by material, 1978

See 5-8.

5-10
Recycled consumer solid wastes, by material, 1960-1978

1960–1970: See 5-8, pp. 11, 21.

1971–1975: *Resource recovery and waste reduction: Fourth report to Congress*, EPA (Washington: USGPO, 1977), SW-600, table 6, p. 19.

1976: Environmental Protection Agency, unpublished data.

1977–1978: See 5-8.

Data for ferrous metals are highly inferential and preliminary.

6-2
Synthetic organic pesticide production, by type, 1950-1978

Synthetic organic chemicals 1978, International Trade Commission (Washington: USGPO, 1979), and previous annual issues.

The International Trade Commission publishes production and sales data for a synthetic organic chemical only if three or more companies produce it. Because most pesticides are patented and are produced by fewer than three companies, production data do not become public knowledge. Production data include the quantity made available by the original manufacturers only; they exclude intermediate products. About a fourth of the amount produced is exported.

National pesticide use is currently monitored for agriculture only; missing from the totals is the approximately 40% used in or around the home, in government, and in the commercial sector.

Data from quinquennial USDA farm surveys (see sources in 6-4) are made public approximately 2 years after the data are collected.

Insecticides include fumigants, rodenticides, and a small quantity of synthetic soil conditioners.

6-3
Insecticide production, by type of chemical, 1960-1978

Synthetic organic chemicals 1978, International Trade Commission (Washington: USGPO, 1979), and previous annual issues; organochlorine data for 1970–1976 were estimated from a graph in the 1976 issue (USGPO, 1977), p. 268.

Insecticides include rodenticides, soil conditioners, and fumigants. Organophosphorous data are not available for 1967–1969. Because of confidentiality rules, carbamate data are not available.

6-4
Selected herbicides used by farmers on crops, 1964-1976

1964: *Quantities of pesticides used by farmers in 1964*, USDA Economic Research Service (Washington: USGPO, 1968), agr. econ. rep. 131, pp. 19, 20.

1966: *Quantities of pesticides used by farmers in 1966*, USDA Economic Research Service (Washington: USGPO, 1970), agr. econ. rep. 179, tables 23, 25, pp. 37, 38, 44.

1971: *Farmers' use of pesticides in 1971—Quantities*, USDA Economic Research Service (Washington: USGPO, 1974), agr. econ. rep. 252, pp. 9, 40, 41.

1976: *Farmers' use of pesticides in 1976*, USDA Economics, Statistics, and Cooperatives Service (Washington: USGPO, 1978), agr. econ. rep. 418, pp. 9, 36, 38.

6-5
Selected insecticides used by farmers on crops, 1964-1976

1964: *Quantities of pesticides used by farmers in 1964*, USDA Economic Research Service (Washington: USGPO, 1968), agr. econ. rep. 131, pp. 26, 27.

1966: *Quantities of pesticides used by farmers in 1966*, USDA Economic Research Service (Washington: USGPO, 1970), agr. econ. rep. 179, tables 28, 30, pp. 50–55. *Extent of farm pesticide use on crops in 1966*, USDA Economic Research Service (Washington: USGPO, 1968), agr. econ. rep. 147, p. 9.

1971: *Farmers' use of pesticides in 1971—Quantities*, USDA Economic Research Service (Washington: USGPO, 1974), agr. econ. rep. 252, pp. 13, 50.

1976: *Farmers' use of pesticides in 1976*, USDA Economics, Statistics, and Cooperatives Service (Washington: USGPO, 1979), agr. econ. rep. 418, pp. 15, 48, 52.

DDT includes its related compound TDE.

Aldrin/dieldrin data for 1976 include aldrin only. Because aldrin rapidly breaks down into its metabolite, dieldrin, most residues are dieldrin.

6-6
Pesticide residues in river water and sediments in Texas, Louisiana, and Oklahoma, 1968-1976

Environmental quality—1977, Council on Environmental Quality (Washington: USGPO, 1977), p. 242, UPGRADE analysis of U.S. Geological Survey data collected at 60 stream monitoring sites.

Data are annual composite detection rates. Other agricultural regions may have concentrations as high as or higher than these. These levels are functions of monitoring and do not reflect the extent of the problem elsewhere.

6-7
Pesticide residues in fish and birds, 1966-1976

Fish: U.S. Fish and Wildlife Service, Columbia National Fisheries Research Laboratory, Columbia, Mo., unpublished data.

Starlings, 1968: "Nationwide residues of organochlorines in starlings, 1974," Donald H. White, *Pesticides Monitoring J.* 10:15 (1976). 1970–1976: "Nationwide residues of organochlorines in starlings, 1976," Donald H. White, *Pesticides Monitoring J.* 12:197 (1979).

Waterfowl, 1966: Based on "Occurrences of PCB in National Fish and Wildlife Monitoring Program," Charles R. Walker, U.S. Fish and Wildlife Service. 1969: "Nationwide residues of organochlorines in wings of adult mallards and black ducks, 1972–1973," Donald H. White and Robert G. Heath, *Pesticides Monitoring J.* 9:184 (1976). 1972–1976: "Nationwide residues of organochlorines in wings of adult mallards and black ducks, 1976," Donald H. White, *Pesticides Monitoring J.* 13:16 (1979).

Freshwater fish were sampled in 50 States as part of the National Pesticide Monitoring Program. Two-thirds of the fish were carp, suckers, catfish, and other bottom-dwelling species. The remaining were predacious species: trout, walleye, bass, and bluegill. The whole fish was analyzed. Data are in terms of geometric mean. DDT includes its derivatives. Dieldrin includes aldrin.

Starlings were sampled in the coterminous 48 States as part of the National Pesticide Monitoring Program. Feet, beaks, wingtips ,

and skins were removed and the remainder analyzed. Approximately 1,400 starlings were analyzed each year. Data are in terms of geometric mean, wet weight. DDT refers to its derivative, DDE.

Waterfowl residues were sampled in the 48 States as part of the National Pesticide Monitoring Program. Each year more than 5,000 samples were drawn from adult mallard wings sent to the U.S. Fish and Wildlife Service by sportsmen. Data are in terms of mean wet weight. DDT data for 1966 refer only to its derivative, DDE; for 1969–1976, data include its metabolites.

6-8
Pesticide residues in human tissue, 1970–1976

1970–1974: "Survey of pesticide residues and their metabolites in humans," R. W. Kutz, S. C. Strassman, and A. R. Yobs, *Pesticide management and insecticide resistance* (New York: Academic Press, Inc., 1977), tables 4–7, pp. 530–534.

1975–1976: Environmental Protection Agency, Office of Toxic Substances, unpublished data.

Data are for fiscal years.

Pesticide residues and associated chemicals were measured in the 48 coterminous States as part of the National Human Monitoring Program for Pesticides.

Approximately 2,000 samples were collected each year by medical pathologists from selected cities. Individuals with known or suspected pesticide poisoning were excluded.

Data are in terms of geometric mean, lipid basis. DDT includes its metabolites.

6-9
Production of selected industrial chemicals, 1950–1978

Benzene, vinyl chloride, acrylonitrile, phthalates: *Synthetic organic chemicals 1978,* International Trade Commission (Washington: USGPO, 1979), and previous annual issues.

Asbestos, 1955: *Mineral facts and problems,* U.S. Bureau of Mines (Washington: USGPO, 1976), p. 120. 1960–1978: *Asbestos,* U.S. Bureau of Mines (Washington: USGPO, 1979), mineral commodity profiles, p. 17.

PCBs, 1960–1971: *Polychlorinated biphenyls and the environment,* Interdepartmental Task Force on PCBs (Washington: USGPO, 1972), pp. 6, 7. 1972–1978: Monsanto Industrial Chemicals Company, unpublished data.

One gallon of benzene equals 7.31 pounds.

Data for asbestos are for primary demand; 1978 asbestos data are estimated.

PCB data include only that produced for domestic sale.

Data for benzene, phthalates, acrylonitrile, and vinyl chloride include only that produced by the original manufacturers; they exclude intermediate products.

6-10
Flow of asbestos in the environment

Based on *Asbestos: An information resource,* U.S. Department of Health, Education, and Welfare, National Institutes of Health (Washington, D.C., 1978), p. 53.

6-11
PCB residues in fish and birds, 1969–1976

See 6-7.

Data are for fiscal years.

6-12
PCB residues in human tissue, 1972-1976

1972: "Organochlorine pesticide residues in human adipose tissue," F. W. Kutz, A. R. Yobs, and S. C. Strassman, *Bull. Soc. Pharmacol. Environ. Pathol.* 4:19 (1976).

1973–1976: Environmental Protection Agency, Office of Toxic Substances, National Human Monitoring Program, unpublished data.

Data are for fiscal years.

See 6-8 for information on the National Human Monitoring Program.

6-13
Cancer deaths associated with vinyl chloride and polyvinyl chloride, 1942-1973

"Neoplastic risk among workers exposed to vinyl chloride," Richard J. Waxweiler, et al. "Oncogenic and mutagenic risks in communities with polyvinyl chloride production facilities," Peter R. Infante. *Annals of the New York Academy of Sciences: Occupational carcinogenesis* 271: 41, 43, 49, 52, 55 (1976).

Data are for 1,294 workers with at least 5 years' experience in a vinyl chloride or polyvinyl chloride plant and for whom at least 10 years had elapsed since their initial employment. The study was conducted in 1972. Of 136 deaths, 35 were attributed to cancers.

The polyvinyl chloride communities studied were Ashtabula, Painesville, Avon Lake, and North Ridgeville, all northern Ohio communities with a total of more than 66,000 residents in 1972. Observed and expected cancer deaths and standardized mortality ratios were developed for residents 45 years and older for the years 1958–1973, a period when 38 people died from a cancer of the central nervous system.

6-14
Cancer deaths associated with asbestos, 1959-1977

Insulation workers: "Asbestos-associated disease in U.S. shipyards," Irving J. Selikoff, Environmental Science Laboratory, Mt. Sinai School of Medicine, memorandum to the National Institute of Environmental Health Sciences, November 27, 1977, table 1.

Production and textile workers: "Case study 1: Asbestos—The TLV approach," William J. Nicholson, *Annals of the New York Academy of Sciences: Occupational carcinogenesis* 271:156 (1976).

From 1967 to 1977, 17,800 asbestos insulation workers were studied. Of 2,270 deaths, 994 were attributed to cancers.

From 1959 to 1977, 689 asbestos production and textile workers were studied. Of 199 deaths, 72 were attributed to cancers.

Gastrointestinal cancers include cancer of the stomach, colon, rectum, and esophagus.

Lung cancers include cancer of the pleura, trachea, and bronchus.

6-15
Primary demand for selected metals, 1954-1978

Lead, 1954–1976: *Lead,* U.S. Bureau of Mines (Washington, D.C., 1977), mineral commodity profiles, p. 21. 1977–1978: U.S. Bureau of Mines, unpublished data.

Chromium, 1954–1976: *Chromium,* U.S. Bureau of Mines (Washington, D.C., 1977), mineral commodity profiles, p. 14. 1977: U.S. Bureau of Mines, unpublished data.

Nickel, 1954–1978: *Nickel,* U.S. Bureau of Mines (Washington, D.C., 1979), mineral commodity profiles, p. 18.

Arsenic, 1954–1973: *Mineral facts and problems, 1975,* U.S. Bureau of Mines (Washington: USGPO, 1976), p. 105.

Cadmium, 1954–1957: *Mineral facts and problems, 1975,* U.S. Bureau of Mines (Washington, USGPO, 1976), p. 203. 1958–1978: *Cadmium,* U.S. Bureau of Mines (Washington, D.C., 1979), mineral commodity profiles, pp. 11, 203.

Mercury, 1954–1973: *Mineral facts and problems, 1975,* U.S. Bureau of Mines (Washington: USGPO, 1976), p. 681. 1974–1978: *Mineral commodity summaries 1979,* U.S. Bureau of Mines (Washington: USGPO, 1979), p. 96.

Chromium, nickel, and mercury data for the last year are estimates.

6-16
Flow of mercury in the environment

Based on *Materials balance and technology assessment of mercury and its compounds on national and regional bases,* EPA (Springfield, Va.: National Technical Information Service, 1975), EPA 560/3-75-007, pp. c, f, g.

Data do not include accidental releases or such unmeasured quantities as are released from coal-fired plants.

6-17
Cancer deaths associated with metals, 1940–1973

"Cancer mortality among cadmium production workers," Richard A. Lemen, et al. "Cancer mortality patterns in the lead industry," W. Clark Cooper. "Case study 4: Inorganic arsenic—Ambient level approach to the control of occupational carcinogenic exposures," Hector P. Blejer and William Wagner. *Annals of the New York Academy of Sciences: Occupational carcinogenesis* 271: 276, 254, 182 (1976).

Between 1940 and 1974, 292 white males with 2 or more years' employment in cadmium smelting were studied. Of 92 deaths, 27 were attributed to cancers.

Between 1947 and 1971, 2,352 lead smelter workers were studied. Of 342 deaths, 69 were attributed to cancers.

At the same time, 4,680 lead battery plant workers were studied. Of 1,014 deaths, 186 were attributed to cancers.

Arsenic workers involved in pesticide production between 1940 and 1972 were sampled. Of 173 deaths, 28 were attributed to cancers, 16 of them among workers whose exposure was less than 1 year.

6-18
Radiation exposure, by source, 1970

Effects on populations of exposure to low levels of ionizing radiation, National Academy of Sciences, Advisory Committee on the Biological Effects of Ionizing Radiation (Washington: USGPO, 1972), pp. 12, 19.

Exposure refers to the average annual whole-body dose rate expressed in rems or millirems. The rem is a unit of radiation dose equivalent. Individual doses are given in rems or millirems; population doses are in rems (i.e., person-rems).

Two recent studies raise problems with the 1972 estimate. See: *Report of the work group on radiation exposure reduction,* U.S. Department of Health, Education, and Welfare, Interagency Task Force on Ionizing Radiation (Washington, D.C., 1979). "The effects on populations of exposure to low levels of ionizing radiation," National Academy of Sciences, Committee on the Biological Effects of Ionizing Radiation, draft, June 1979.

The 1972 figure of 73 mrems per person per year for medical exposure is based in part on the 55 mrems per person per year received by the general population in 1964 from diagnostic X-rays. Using a different method of computation, the 1979 Committee reported 17 mrems per person per year for 1964 and 20 mrems for 1970.

The 1979 interagency report estimates the general population exposure from nuclear power in 1978 at 56,000 person-rems per year, approximately 0.26 mrem per person, which is far larger than the 0.003 mrem per person per year reported for 1972. The increase is a function of a change in measurement techniques rather than of a real change in radiation exposure.

6-19
Radiation levels from nuclear fallout as measured by strontium-90 and cesium-137 in pasteurized milk, 1960–1978

Environmental Protection Agency, Eastern Environmental Radiation Facility, Montgomery, Ala., unpublished data.

6-20
Radiation levels from nuclear power generation, as measured by krypton-85 in air, 1962-1976

1962-1969: Based on *Radiological quality of the environment in the United States, 1977,* EPA (Washington: USGPO, 1977), fig. 2-9, p. 44.

1970-1976: See 6-19.

6-21
Radiation exposure of special population groups, 1970s

Ore miners, coal-fired electric generating station personnel, nuclear reprocessing and spent-fuel storage personnel, residents adjacent to boiling water reactors, residents adjacent to pressurized water reactors, residents near piles of old uranium mill tailings, X-ray recipients, and individuals with pacemakers: *Radiological quality of the environment in the United States, 1977,* EPA (Washington: USGPO, 1977), pp. 5, 6, 7.

Civilian nuclear power reactor personnel, jet plane crews, naval nuclear propulsion workers, DOE research and development laboratory personnel, medical X-ray technicians, dental X-ray technicians, and other medical personnel handling radionuclides: "The effects on populations of exposure to low levels of ionizing radiation," National Academy of Sciences, Committee on the Biological Effects of Ionizing Radiation, draft, June 1979.

Residents within 50 miles of Three Mile Island during 1979 accident: *Population dose and health impact of the accident at Three Mile Island Nuclear Power Station,* U.S. Department of Health, Education, and Welfare, Ad Hoc Population Dose Assessment Group (Washington: USGPO, 1979), pp. 1, 2.

All exposures are expressed in mrem per person per year average whole-body dose unless otherwise specified. The doses for ore miners, coal-fired electric generating station personnel, nuclear reprocessing and spent-fuel storage personnel, and individuals with cardiac pacemakers are internal doses. The doses for residents adjacent to boiling and pressurized water reactors are external doses. The dose for residents near piles of old uranium mill tailings is a trachea-bronchial internal dose. The dose for X-ray recipients is the estimated mean active external bone marrow dose to adults in mrads per year.

Occupational exposure of special groups is estimated as follows: Civilian nuclear power industry, 30,000 persons; operation and maintenance of naval nuclear propulsion plants, 35,000; DOE research and development, 100,000; residents within 50 miles of Three Mile Island exposed between March 28 and April 7, 1979, 2 million; medical personnel handling radionuclides, 100,000; operators of medical X-ray equipment, 200,000; operators of dental X-ray equipment, 200,000.

6-22
Relative risk of cancer from radiation, 1946-1974

Uranium miners: "Respiratory disease mortality among uranium miners," Victor E. Archer, et al., *Annals of the New York Academy of Sciences: Occupational carcinogenesis* 271: 282, 284 (1976).

Radium dial painters, patients receiving thymus X-rays, ankylosing spondylitis patients, and atomic bomb survivors: *Effects on populations of exposure to low levels of ionizing radiation,* National Academy of Sciences, Advisory Committee on the Biological Effects of Ionizing Radiation (Washington: USGPO, 1972), pp. 129, 124, 117.

Data for uranium miners use a standardized mortality ratio divided by 100.

Between 1960 and 1974, 780 American Indian underground uranium miners were studied. Of 107 deaths, 17 were attributed to malignant neoplasms, of which 11 were from respiratory cancers. Between 1950 and 1974, 3,366 white male underground uranium miners were studied. Of 745 deaths, 206 were attributed to cancers, 144 of which were from respiratory cancers. Expected death rates for Indians were calculated from the male nonwhite population of Arizona and New Mexico; expected death rates for white miners were calculated from the male white population of the United States.

Between 1946 and 1971, 775 dial painters who had been exposed to doses of between 1 and 50,000 rads of radium-226 between 1915 and 1935 were studied; 48 developed a bone cancer.

In 1963, 2,878 patients who had been exposed in childhood to thymus X-rays between 1926 and 1957 were studied; thyroid cancers were surgically removed from 19

In 1955, 11,287 ankylosing spondylitis patients exposed to radiation treatment between 1935 and 1954 at the age of 10 or older were studied in England and Wales; 32 developed a leukemia.

Of the survivors of the atomic bombs detonated at Hiroshima and Nagasaki in 1945, 19,472 were studied between 1951 and 1970; 62 who had been exposed at the age of 10 or older developed leukemia.

7-1
Cropland

The national atlas of the United States of America, U.S. Geological Survey (Washington, D.C., 1970), p. 160.

Map shows cropland area for 1964.

Several Federal agencies estimate cropland acreages for the mid-1970s.

The *1974 census of agriculture* estimates cropland at 440 million acres in 1974.

The Crop Reporting Board, USDA Economics, Statistics, and Cooperatives Service, estimates cropland including pasture at 465 million acres in 1974.

The Inventory and Monitoring Division, USDA Soil Conservation Service, estimates non-Federal cropland at 400 million acres, excluding Alaska and Hawaii, in 1975.

7-2
Uses of cropland, 1949-1978

Our land and water resources, USDA Economic Research Service (Washington: USGPO, 1974), misc. pub. 1290, p. 4.

Major uses of land in the United States: 1974, USDA Economics, Statistics, and Cooperatives Service (Washington: USGPO, 1979), agr. econ. rep. 440, p. 9.

USDA Economics, Statistics, and Cooperatives Service, unpublished data.

1978 data for idle cropland and pasture are preliminary.

7-3
Prime farmland, 1975

"A perspective on prime farmland," Keith O. Schmude, *J. Soil & Water Conserv.* 32:241 (1977).

7-4
Prime farmland lost to urbanization and water projects, by farm production region, 1967-1975

See 7-3, pp. 241, 242.

Estimates for USDA Soil Conservation Service regions of prime farmland include non-Federal land only and exclude Alaska and Hawaii.

7-5
Agricultural production, 1960-1978

1960–1963: *Agricultural statistics 1975*, U.S. Department of Agriculture (Washington: USGPO, 1975), table 618, p. 440.

1964–1978: *Agricultural statistics 1979*, U.S. Department of Agriculture (Washington: USGPO, 1979), table 633, p. 440.

Data for 1978 are preliminary.

7-6
Agricultural inputs, 1950-1978

Time spent on farmwork: *Changes in farm production and efficiency, 1977*, USDA Economics, Statistics, and Cooperatives Service (Washington: USGPO, 1978), statistical bulletin 612, p. 32.

Horsepower of farm machines: *Changes in farm production and efficiency, 1977*, p. 31.

Fertilizers applied: *Changes in farm production and efficiency, 1977*, p. 27.

Pesticides applied, 1964: *Quantities of pesticides used by farmers in 1964*, USDA Economics, Statistics, and Cooperatives Service (Washington: USGPO, 1968), agr. econ. rep. 131, pp. 9, 13, 19, 26. 1966: *Farmers' use of pesticides in 1971—Quantities*, USDA Economics, Statistics, and Cooperatives Service (Washington: USGPO, 1974), agr. econ. rep. 252, pp. 8, 11, 15, 18. 1971 and 1976: *Farmers' use of pesticides in 1976*, USDA Economics, Statistics, and Cooperatives Service (Washington: USGPO, 1978), agr. econ. rep. 418, pp. 6, 9, 15, 20.

Water for irrigation: *Estimated use of water in the United States in 1975*, U.S. Geological Survey (Washington: USGPO, 1977), circ. 765, p. 38, and previous quinquennial surveys.

Energy spent on farms: *The U.S. food and fiber sector: Energy use and outlook*, USDA Economic Research Service (Washington: USGPO, 1974), p. 2.

Btus converted from kilocalories (kcal), as published in "Energy use in the food system," J.S. and C.E. Steinhart, *Science* 184:309 (1974). (1 kcal = 3.968 Btus; 1 Btu = 0.252 kcal.)

Time spent on farmwork includes crops, livestock, and overhead. After 1964, time used for horses, mules, and farm gardens was excluded.

Horsepower includes tractors only (exclusive of steam and garden).

Fertilizers include nitrogen, phosphate, and potash nutrients used.

Pesticides include amounts used on crops only; excludes pesticide use for livestock and other purposes.

Water used for irrigation refers to water consumed, not water withdrawn.

Energy spent on farms includes fuel, electricity, fertilizer, agricultural steel, farm machinery, tractors, and irrigation.

7-7
Sheet and rill erosion from water on cropland, by State, 1977

USDA Soil Conservation Service, 1977 National Erosion Inventory Estimates, unpublished computer printout, December 1978, table J1.

Estimates include non-Federal cropland only and exclude Alaska and Hawaii.

7-8
Wind erosion on cropland in the Great Plains States, 1977

See 7-7, table K1.

Estimates include non-Federal cropland only.

7-9
Forests

The national atlas of the United States of America, U.S. Geological Survey (Washington, D.C., 1970), p. 160.

Map shows forest area for 1959.

7-10
Ownership of forest land, 1977

Forest statistics of the United States, 1977, USDA Forest Service (Washington: USGPO, 1978), tables 1, 2, pp. 2, 8.

All data are preliminary.

7-11
Commercial forest land, by region and ecosystem, 1977

See 7-10, tables 4, 5, pp. 12, 17.

All data are preliminary. They exclude 18 million acres of nonstocked forest areas.

Forest types describe associations of tree species, which in turn reflect factors of site, climate, and stand history.

The forest ecosystems presented are combinations of more than 80 local forest types traditionally used for forest management purposes.

Commercial forest land is land which produces or is capable of producing commercial timber and has not been withdrawn from timber use. Areas must be able to produce more than 20 cubic feet of timber per acre per year.

7-12
Sawtimber growth and harvest, by type, 1952-1976

See 7-10, tables 34, 35, pp. 84, 86.

All data are preliminary.

Sawtimber refers to live trees of commercial species containing at least one 12-foot saw log or two noncontiguous 8-foot logs.

The minimum diameter for softwood is 9 inches, except in the West where it is 11 inches. For hardwood it is 11 inches.

Board feet is a standard measure of 12″ × 12″ × 1″ or its equivalent for sawtimber and lumber.

Growth is the annual change in volume of sound wood in live sawtimber trees resulting from natural causes.

Harvest is the net volume of growing stock trees removed from the inventory by harvesting, cultural practices, land clearing, and change in land use.

7-13
Sawtimber growth and harvest, by region and ownership, 1952-1976

See 7-10, pp. 83–86.

A farm is a place of 10 or more acres from which the annual sale of agricultural products totaled $50 or more or a place of less than 10 acres from which the sale of agricultural products totaled $250 or more during the previous year.

Other private lands are privately owned lands other than forest industry, farmer-owned, or corporate lands.

Forest industry lands are owned by companies or individuals operating wood-using plants.

National Forests have been so designated by Executive Order or statute and are under the administration of the USDA Forest Service.

Other public lands include all publicly owned lands other than National Forests.

7-14
Sawtimber growth and harvest in two regions, by ownership, 1952-1976

See 7-10, pp. 83–86.

7-15
Roundwood harvest, by product, 1950-1976

The demand and price situation for forest products, 1976–1977, USDA Forest Service (Washington: USGPO, 1977), table 2, p. 39.

Data for 1973–1976 are preliminary.

Roundwood products are logs, bolts, and other round sections cut for industrial and consumer use.

Miscellaneous products include cooperage logs, poles and piling, fenceposts, hewn ties, round mine timbers, box bolts, excelsior bolts, chemical wood, shingle bolts, and miscellaneous items.

7-16
Forest conditions, 1950-1978

Area planted and direct seeded, 1950–1970: *The outlook for timber in the United States*, USDA Forest Service (Washington: USGPO, 1974), forest res. rep. 20, p. 40. 1971–1978: *1978 report, forest planting, seeding, and silvical treatments in the United States*, USDA Forest Service (Washington: USGPO, 1979).

Area burned by wildfire: *Historical statistics of the United States, colonial times to 1970*, U.S. Bureau of the Census (Washington: USGPO, 1975), p. 537. *1977 wildfire statistics*, USDA Forest Service (Washington: USGPO, 1979), table 2, p. 14, and previous annual issues.

Spruce budworm defoliation: *Forest insect and disease conditions in the United States, 1977*, USDA Forest Service (Washington: USGPO, 1978), figs. 1, a, pp. 39, 57.

Data on seeding include forest plantings, windbarrier plantings, and direct seedings in fiscal years.

7-17
Recreational use of the National Forests, 1965-1977

USDA Forest Service, Recreation Information Management System, unpublished data.

Mechanized recreation travel includes: automobiles, scooters and motorcycles, ice and snowcraft (primarily snowmobiles), specialized land craft (primarily all-terrain vehicles), train and bus touring, aircraft use, aerial trams and lifts, non-motorized aircraft, and bicycles.

7-18
Recreational use of the National Forests, by activity, 1977

Statistical abstract of the United States: 1978, U.S. Bureau of the Census (Washington: USGPO, 1978), table 396, p. 243.

Resort and residence use includes day and overnight visits.

Nature study includes viewing scenery, sports, and entertainment.

Picnicking includes games and team sports.

7-19
Rangeland

The national atlas of the United States of America, U.S. Geological Survey (Washington, D.C., 1970), p. 160.

Map shows rangeland area for 1959 and includes cropland used only for pasture, pastured woodland, other pasture land in farms, and grazing land not in farms.

Excluded are two ecosystems which can be considered either forest land or rangeland: pinyon-juniper (47 million acres) and chapparal-mountain shrub (14 million acres). With these two ecosystems, total rangeland is 881 million acres in 1976.

7-20
Ownership of rangeland, 1977

Review draft of "An assessment of the forest and rangeland situation in the United States," USDA Forest Service (Washington, D.C., 1979), p. 242.

All data are preliminary.

Excluded are the pinyon-juniper and chapparal-mountain shrub ecosystems.

7-21
Rangeland, by ecosystem, 1976

See 7-20, p. 29.

All data are preliminary.

7-22
Quality of rangeland, by ecosystem, 1976

See 7-20, p. 242.

All data are preliminary.

Excluded are 1 million acres in Hawaii which are of varying quality.

High indicates that vegetation and soils deviate from site potential by less than 40%. Moderately high, by 40 to 59%. Moderately low, by 60 to 79%. Low, by 80% or more from potential.

7-23
Productivity of rangeland, by ecosystem, 1976

See 7-20, p. 35.

All data are preliminary.

Excludes Alaska and Hawaii.

8-1
Distribution of vertebrate species and major subspecies, by region, 1970s

An assessment of the forest and rangeland situation in the United States, USDA Forest Service (Washington: USGPO, 1979), fig. 4.1, p. 166.

Includes resident and common migrant vertebrate species and selected subspecies which are listed by the Federal or a State government as endangered or threatened, are judged sensitive to land or water management practices, and are of commercial or recreational importance.

Regions are those of the USDA Forest Service.

Regional details do not add to U.S. totals because double counting of species and major subspecies has been eliminated.

8-2
Selected large mammal populations on Bureau of Land Management lands, 1961-1975

Public land statistics 1976, U.S. Department of the Interior (Washington: USGPO, 1977), p. 84, and previous annual issues.

The Bureau of Land Management manages 450 million acres.

Data for pronghorn antelope do not include Alaska.

8-3
Selected large mammal populations in National Forests and National Grasslands, 1960-1978

Annual wildlife and fisheries report 1978, USDA Forest Service (Washington: USGPO, 1979), and previous annual issues.

Data are limited to National Forests and Grasslands and may therefore exclude significant populations of these species, for example, the caribou found in the Arctic Wildlife Refuge.

The National Forests and Grasslands total 187 million acres.

8-4
Animals removed or killed by Federal predator control activities, 1937-1978

1937-1970: *Predator control 1971,* Advisory Committee on Predator Control (Washington: USGPO, 1972), p. 22.

1971-1977: U.S. Fish and Wildlife Service, Animal Damage Control Division, unpublished data.

Years are fiscal years.

Some hybrid animals, for example, red wolf/coyote and red wolf/dog, are included.

Federal funding for taking red wolves ended in 1964; it ended for the timber wolf in 1971. Both are now endangered, although for the timber wolf, endangerment does not include those in Alaska.

8-5
Bird species observed, 1968-1977

U.S. Fish and Wildlife Service, Migratory Bird and Habitat Research Laboratory, Breeding Bird Survey, unpublished data.

The Fish and Wildlife Service's annual Breeding Bird Survey measures the number and abundance of bird species. North America is divided into 62 ecological regions. All birds seen or heard within a quarter-mile radius during fifty 3-minute stops spaced at half-mile intervals along randomly selected 24.5-mile routes, of which there are 2,300, are counted. One-degree blocks of latitude and longitude are used as a basis for route selection to ensure good geographic distribution of the routes. Both starting point and direction of travel for 1 to 16 routes within each block are determined from a table of random numbers. The survey is described in "Ecological distribution of breeding birds," Steven R. Peterson, *Proceedings of the symposium on management of forest and range habitats for nongame birds, May 6-9, 1975, Tucson, Ariz.,* USDA Forest Service (Washington, D.C., 1975), gen. tech. rep. WO-1, pp. 22-38.

8-6
Selected bird species populations, 1966-1977

See 8-5.

8-7
Most frequently observed breeding bird species, 1977

See 8-5.

The house sparrow and starling were introduced to North America.

8-8
Distribution of North American breeding and wintering ducks, 1970s

Waterfowl habitat trends in the Aspen Parkland of Manitoba, William H. Kiel, Jr., Arthur S. Hawkins, Noland G. Perret, Canadian Wildlife Service (Ottawa: Information Canada, 1972), rep. series 18, fig. 7, p. 54.

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8-9
Duck breeding populations in North America, 1955-1979

The status of waterfowl and fall flight forecasts 1979, U.S. Fish and Wildlife Service and Canadian Wildlife Service (Laurel, Md., 1979), fig. 3.

Duck breeding populations are counted from late April until early June.

Population includes mallards *(Anas platyrhynchos),* gadwalls *(Anas strepera),* pintails *(Anas actua),* green-winged teals *(Anas crecca),* blue-winged teals *(Anas discors),* American wigeons *(Anas americana),* northern shovelers *(Anas clypeata),* redheads *(Aythya americana),* canvasbacks *(Aythya valisineria),* scaups *(Aythya affinis, Aythya marila),* and others; it excludes eiders, oldsquaws, scoters, and mergansers.

8-10
Duck harvest, by flyway, 1952-1978

1952–1977: U.S. Fish and Wildlife Service, Office of Migratory Bird Management, memorandum from Biologist, Waterfowl Harvest Survey Section to Chief, June 6, 1979.

1978: "Waterfowl harvest and hunter activity in the United States during the 1978 hunting season," Samuel M. Carney et al., U.S. Fish and Wildlife Service, Office of Migratory Bird Management, administrative report, June 21, 1979, table 1.

The harvest year extends from the fall of one year through the following winter; for example, 1952 begins in autumn 1952 and ends in winter 1953.

Data for 1978 are estimated.

Data include ducks bagged and unretrieved kill.

Harvest data include mallards *(Anas platyrhynchos),* black ducks *(Anas rubripes),* gadwalls *(Anas strepera),* pintails *(Anas acuta),* green-winged teals *(Anas crecca),* blue-winged teals *(Anas discors),* wood ducks *(Aix sponsa),* American wigeons *(Anas americana),* northern shovelers *(Anas clypeata),* redheads *(Aythya americana),* canvasbacks *(Aythya valisineria),* ring-necked ducks *(Aythya collaris),* scaups *(Aythya affinis, Aythya marila),* goldeneyes *(Bucephala clangula, Bucephala islandica),* buffleheads *(Bucephala albeola),* eiders *(Somateria mollissima, Somateria spectabilis, Polysticta stelleri),* oldsquaws *(Clangula hyemalis),* scoters *(Melanitta nigra, Melanitta deglandi, Melanitta perspicillata),* ruddy ducks *(Oxyura jamaicensis),* mergansers *(Mergus merganser, Mergus serrator, Lophodytes cucullatus),* and other ducks.

The total includes 0.05 to 0.14 million ducks harvested annually in the Alaska flyway.

8-11
Brown pelican populations and toxic residues in eggs, 1969-1976

Southern and Baja California, 1969–1974, fledglings and DDT residues: "Brown pelicans: Improved reproduction off the southern California coast," Daniel W. Anderson et al., *Science* 190:807 (1975). 1975 data and PCB residues: "The status of brown pelicans at Anacapa Island in 1975," Daniel W. Anderson et al., *California Fish and Game* 63:6 (1977).

South Carolina: "Effects of organochlorine residues on eggshell thickness, reproduction, and population status of brown pelicans in South Carolina and Florida, 1969–1976," Lawrence J. Blus, Thair B. Lamont, and Burkett S. Neely, Jr., *Pesticides Monitoring J.* 12(4): 173, 182 (1979), tables 1, 9.

Residues are the geometric mean concentration in eggs, parts per million lipid weight.

Areas in southern California and northwestern Baja California include Anacapa and Santa Cruz islands and Isla Coronado Norte.

Areas in South Carolina were Marsh Island in the Cape Romain National Wildlife Refuge and Deveaux Bank.

8-12
Distribution of fish species and major subspecies, by type of environment and region, 1970s

See 8-1, p. 186.

Regions are those of the USDA Forest Service.

A given species may be found in several environments, which are classified as suggested in *Classification of wetlands and deep water habitats of the United States*, L. M. Cowardin, F. C. Golet, and E. T. LaRoe, U.S. Fish and Wildlife Service (Washington, D.C., 1977), p. 100.

Regional details do not add to U.S. totals because double counting of species and major subspecies has been eliminated.

8-13
U.S. and foreign fish catch in U.S. waters, 1950-1979

U.S. catch: *Fisheries of the United States, 1979,* National Oceanic and Atmospheric Administration, National Marine Fisheries Service (Washington: USGPO, 1980), pp. 6, 24.

Foreign catch, 1969–1976: National Marine Fisheries Service, unpublished data. 1977: *Fisheries of the United States, 1978* (Washington: USGPO, 1979), p. 12. 1978–1979: *Fisheries of the United States, 1979* (Washington: USGPO, 1979), pp. 12, 13.

U.S. waters extend out 200 miles from the coast.

U.S. catch excludes weight of mollusk shells; 1970–1979 data are fish landings, not catch.

8-14
U.S. and foreign catch of selected fish species in U.S. waters, 1950-1979

Pacific halibut, 1950–1979: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, unpublished data.

Haddock, 1950–1955: *The United States marine fishery resource*, John P. Wise, ed. (Washington: USGPO, 1976), MARMAP contrib. 1, p. 98. 1956–1976: "Review and assessment of the Georges Bank and Gulf of Maine haddock fishery," Stephen H. Clark and William J. Overholtz (Woods Hole, Mass.: National Marine Fisheries Service, 1980), lab. ref. 79-05, table 1. 1977–1979: "Georges Bank and Gulf of Maine haddock assessment update," Stephen H. Clark and Ronald J. Essig (Woods Hole, Mass.: National Marine Fisheries Service, 1980), lab. ref. 80-06, table 1. Foreign, 1960–1976: Clark and Overholtz, table 1; 1977–1979: Clark and Essig, table 1.

Clams, total, 1950–1965, and surf, 1950–1965: National Marine Fisheries Service, unpublished data. 1966–1975: *A comprehensive review of the commercial clam industries in the United States*, National Marine Fisheries Service (Washington: USGPO, 1977), p. 47. 1976–1978: *Fisheries of the United States, 1978,* National Marine Fisheries Service (Washington: USGPO, 1979), p. 2, and previous annual issues.

1979: National Marine Fisheries Service, unpublished data.

Alaska pollock, 1953–1970: Wise, p. 194. 1971–1979: National Marine Fisheries Service, unpublished data.

Atlantic herring, 1950–1970: Wise, p. 129. 1971–1972, domestic: Wise, p. 352. 1973–1978, domestic: *Fisheries of the United States, 1978* (Washington: USGPO, 1979), p. 1, and previous annual issues. 1971–1976, foreign: National Marine Fisheries Service, unpublished data. 1977–1978, foreign: *Fisheries of the United States, 1978* (Washington: USGPO, 1979), pp. viii, 14. 1979, domestic and foreign: *Fisheries of the United States, 1979* (Washington: USGPO, 1980) p. 8.

Pacific perch, 1950–1972: Wise, pp. 183, 352. 1973–1978: *Fisheries of the United States, 1978* (Washington: USGPO, 1979), p. 1, and previous annual issues.

Management data by species are available as follows: Pacific halibut—42 Fed. Reg. 8782, 9298 (1977), 43 Fed. Reg. 17242 (1978). Haddock—42 Fed. Reg. 13998 (1977). Clams—42 Fed. Reg. 60438 (1977). Alaska pollock—43 Fed. Reg. 17242 (1978). Atlantic herring—43 Fed. Reg. 60474 (1978). Pacific perch—42 Fed. Reg. 8578, 8782, 9298 (1977), 43 Fed. Reg. 17242 (1978), 44 Fed. Reg. 66356 (1979).

8-15
Estuarine habitat lost to dredging and filling, 1950-1969

National estuary study, U.S. Fish and Wildlife Service (Washington: USGPO, 1970), v. 2, appendix A, staff report.

Data include all water depths, except in the Great Lakes, where the water included was 6 feet or less.

8-16
Fish kills caused by pollution, 1961-1976

Fish kills caused by pollution in 1976, EPA Office of Water Planning and Standards (Washington: USGPO, 1979), pp. 4, 5.

8-17
Extinct vertebrate species and subspecies, 1760-1979

Threatened wildlife of the United States, U.S. Fish and Wildlife Service (Washington: USGPO, 1973), pp. 1–4.

The Tecopa pupfish *(Cyprinodon nevadensis calidae)* and the Santa Barbara song sparrow *(Melospiza melodia graminer)* are believed to be extinct and will be removed from the list of endangered and threatened species. As of December 1979, neither had been declared extinct and removed officially.

The passenger pigeon was extirpated from the wild in the 1890s, and the last known specimen died in the Cincinnati Zoo in 1914.

Dates refer to the last sighting, not to an official announcement of extinction. A species is often believed extinct several decades before official declaration by the U.S. Fish and Wildlife Service.

8-18
Threatened and endangered animal species in the United States, December 1979

U.S. Fish and Wildlife Service, Office of Endangered Species, *Endangered Species Tech. Bull.* 5(1):12 (1980).

For a species to be designated endangered or threatened, a qualified individual or group first brings the species to the attention of the U.S. Fish and Wildlife Service, which determines whether it is in fact threatened with extinction.

If extinction is possible because of habitat destruction or modification, overexploitation, disease, or predation and if its survival requires human assistance, it will be designated endangered or threatened. Then a plan to restore the population to sustainable levels is prepared and the remaining animals or plants are protected and managed.

The official Federal list of endangered and threatened species is periodically revised and published in the *Federal Register*.

Through cooperative agreements, States are provided matching funds for conservation of listed species. In addition, the U.S. Fish and Wildlife Service has established recovery teams which prepare recovery plans.

8-19
Population of selected threatened and endangered species, 1941-1979

Key deer, 1949–1972, and whooping crane, 1972: *Threatened wildlife of the United States,* U.S. Fish and Wildlife Service (Washington: USGPO, 1973), p. 265.

Whooping crane, 1941–late 1960s and 1976–1979, and California condor, 1979: U.S. Fish and Wildlife Service, Office of Endangered Species, unpublished data.

California condor, 1940s–late 1960s: *Predator control—1971,* Advisory Committee on Predator Control (Washington: USGPO, 1972), p. 86.

Bald eagle, 1969–1979: "Bald eagle-osprey survey report 1979," USDA Forest Service, prepared 1979, unpublished.

Data for the bald eagle include nesting pairs in the National Forests of Michigan, Wisconsin, and Minnesota.

8-20
Condition of selected threatened and endangered species

Threatened wildlife of the United States, U.S. Fish and Wildlife Service (Washington: USGPO, 1973), pp. 7, 88, 102, 104, 124, 127, 129, 133, 138, 141, 162, 217, 220, 237, 241, 242, 243, 245, 247, 265.

U.S. Fish and Wildlife Service, Office of Endangered Species, *Endangered Species Tech. Bull.,* Jan., Feb., March, April, May, Oct., Nov. 1979; Feb. 1980.

Predator control—1971, Advisory Committee on Predator Control (Washington: USGPO, 1972), pp. 86, 149, 154, 156.

U.S. Fish and Wildlife Service, Office of Endangered Species, unpublished data.

9-1
Energy consumption, by fuel type, 1850-1978

1850–1940, all fuel types, and 1950 fuelwood only: *Energy perspectives,* U.S. Department of the Interior (Washington: USGPO, 1975), p. 34.

1950–1978, except wood data: *Annual report to Congress,* 1978, U.S. Department of Energy, Energy Information Administration (Washington: USGPO, 1979), v. Two: Data, DOE/EIA-017312, p. 7.

These figures are estimates of the amount of energy used in homes, commercial establishments, transportation systems, and industry.

Forms of energy not marketed directly are not included (for example, energy derived from draft animals and water wheels in the 19th century).

The energy derived by the pulp and paper industry from its own waste products is not included.

Energy derived from all forms of biomass and not includes in the 1978 total ranges from 1.3 to 1.8 quads.

In addition, many other forms of energy make up a very small portion of the total: Direct solar, currently estimated at 1/200 of 1% of all energy consumed, windmills, and photovoltaic cells.

For 1950–1978, coal includes bituminous, lignite, and anthracite. Natural gas excludes natural gas plant liquids. Oil includes natural gas liquids and crude oil burned as fuel. Hydropower includes electric utility and industrial generation of hydropower and net electricity imports. Geothermal and other include wood, refuse, and other biomass fuels used to generate electricity.

Data for 1978 are preliminary.

9-2
Energy consumption, by fuel type, 1950-1978

Annual report to Congress, 1978, U.S. Department of Energy, Energy Information Administration (Washington: USGPO, 1979), v. Two: Data, DOE/EIA-017312, p. 7.

Data for 1978 are preliminary.

9-3
Net trade in energy resources, 1950-1978

See 9-2, p. 11.

Total includes coke and electricity generated from coal, for which net trade was −0.31 quads in 1978.

Oil includes crude oil and refined petroleum products including unfinished oils and natural gas plant liquids.

Data for 1978 are preliminary.

9-4
Energy production, by fuel type, 1850-1978

1850–1940: *Historical statistics of the United States, colonial times to 1970,* U.S. Bureau of the Census (Washington: USGPO, 1975), pp. 587–588.

1950–1978: See 9-2, p. 5.

Coal, 1850–1940, includes bituminous and Pennsylvania anthracite; 1950–1978, include bituminous, lignite, and anthracite.

Wood data are for consumption, not production.

Natural gas, 1950–1978, excludes natural gas plant liquids.

Oil, 1950–1978, includes crude oil, lease condensate, and natural gas liquids.

Geothermal includes wood, refuse, and other biomass fuels used to generate electricity.

Data for 1978 are preliminary.

9-5
Energy production, by fuel type, 1950-1978

See 9-2, p. 5.

Other includes wood, refuse, and other biomass fuels used to generate electricity.

9-6
Energy flow in the U.S. economy, 1975

"Annual U.S. energy use drops again," U.S. Bureau of Mines, news release, April 5, 1976, adapted from *Man, energy, society,* Earl Cook (San Francisco: W. H. Freeman & Company, 1976), p. 313.

Food energy is excluded.

Hydropower is computed as 100% efficient.

Changes in inventories, invariably relatively small, are included in net imports or exports.

Industrial consumption includes nonfuel uses of energy resources (asphalt, petrochemicals).

Efficiency figures used to disaggregate useful heat and work from waste are very rough estimates of first-law efficiency: Household/commercial, 72%; transportation, 15%; industrial, 40%. Electric generation efficiency averages about 38% when hydropower is included.

9-7
Energy consumption, by sector, 1950-1978

See 9-2, p. 9.

Data for 1978 are preliminary.

9-8
Energy consumption, by end use, 1950-1978

See 9-2, p. 9.

Energy consumption is allocated in proportion to sales by privately owned Class A and B electric utilities, which accounted for 78% of the market in 1977.

Miscellaneous includes coal used to run mine machinery, coal sales to mine employees, and changes in mine inventories of coal.

Data for 1978 are preliminary.

9-9
Residential heating, by fuel type, 1940-1975

Residential energy uses, U.S. Bureau of the Census (Washington: USGPO, 1978), current housing reports, series H-123-77.

9-10
Residential heating, by fuel type and county, 1970

See 9-9.

9-11
Per capita energy consumption and gross domestic product for four nations, 1961-1977

Energy consumption, 1961: *Energy balances of OECD countries, 1974/1976,* Organization for Economic Cooperation and Development, International Energy Agency (Paris, 1978), p. 26.

1962-1977: *Energy balances of OECD countries, 1975/77* (Paris, 1979), p. 88.

Gross domestic product and population, 1961: *National accounts of OECD countries, 1976* (Paris, 1978), v. 1. 1962-1977: *National accounts of OECD countries, 1952-1977* (Paris, 1979), v. 1, pp. 133, 146.

One metric ton of crude oil equals 43 million Btu.

Gross domestic product excludes income originating overseas.

GDP is computed here using market exchange rates.

9-12
Energy consumed by sector for nine nations, 1972

How industrial societies use energy—a comparative analysis, Joel Darmstadter, Joy Dunkerley and Jack Alterman (Baltimore: The Johns Hopkins University Press, 1977), p. 187. Published for Resources for the Future.

9-13
Energy supply systems for fossil fuels

MERES and the evaluation of energy alternatives, Council on Environmental Quality (Washington: USGPO, 1975), p. 6, adapted from *The reference energy system and associated data base,* Murray D. Goldberg (Upton, N.Y.: Brookhaven National Laboratory, 1974), BNL 19263.

9-14
Coal fields, 1970s

Coal resources of the United States, January 1, 1974, Paul Averitt, U.S. Geological Survey (Washington: USGPO, 1975), bulletin 1412, p. 5.

9-15
Coal production, 1900-1978

1900-1913: *Coal mining fatalities in the United States, 1870-1914, with statistics of coal production, labor and mining methods by States and calendar years,* U.S. Bureau of Mines (Washington, D.C., 1916), p. 10.

1914-1966: Bituminous Coal Operators, unpublished data. Pennsylvania Department of the Environment, unpublished data.

1967-1978: *Injury experience in coal mining, 1978,* U.S. Department of Labor, Mine Safety and Health Administration (Washington: USGPO, 1980), informational rep. 1112, table 2, p. 13, and previous annual issues.

Surface, 1967-1978, includes strip mining, augering, culm banks, and dredging.

9-16
Land disturbed and reclaimed by the coal mining industry, 1930-1978

1930-1978: U.S. Bureau of Mines, unpublished data.

Data are for bituminous, subbituminous, and lignite coal only.

Land disturbed includes that used in surface and underground mining and for coal-cleaning plant wastes.

Reclamation data include land reclaimed by the industry, not through State and private efforts.

Although State requirements differ, mine operators are generally required to revegetate disturbed land.

Acreage includes only initial reclamation.

Data for 1978 are preliminary.

9-17
Streams affected by acid mine drainage, 1970s

Water atlas of the United States, Water Information Center, Inc. (Port Washington, N.Y., 1973), plate 57.

9-18
Coal mine deaths from accidents, 1906-1978

Injury experience in coal mining, 1978, U.S. Department of Labor, Mine Safety and Health Administration (Washington: USGPO, 1980), informational rep. 1112, table 2, p. 13, and previous annual issues.

From 1901 to 1978, 110,939 deaths resulted from mining accidents.

Data for 1906–1909 include only States with complete records of fatal injuries. They represent 98%–99% of the total coal production; 1910–1978 data include the entire coal industry.

Underground includes fatalities from roof and face falls, haulage equipment, gas and dust explosions, explosives, electricity, machinery, pressure bumps and bursts, and inrushes of water or material.

Surface includes fatalities at all other work locations, including underground mines' surface works, strip mines, culm banks, dredges, and mechanical-cleaning plants. Beginning in 1955, includes fatalities in auger mines.

9-19
Natural gas and oil fields, 1970s

Energy perspectives 2, U.S. Department of the Interior (Washington: USGPO, 1976), p. 91.

Final environmental statement, proposed five-year OCS oil and gas lease sale schedule March 1980–February 1985, U.S. Department of the Interior, Bureau of Land Management (Washington: USGPO, 1980), pp. 40–41.

9-20
Natural gas and oil production, 1950-1978

See 9-2, p. 5.

Data exclude natural gas liquids.

Crude oil data include lease condensate.

9-21
Liquified natural gas facilities, 1980

"LNG facilities located in the United States," U.S. Department of Transportation, Office of Operations and Enforcement (February 1980).

9-22
The nuclear fuel cycle

Based on *Annual report to Congress, 1977,* U.S. Department of Energy, Energy Information Administration (Washington: USGPO, 1978), v. Two, Executive summary, projections of energy supply and demand and their impacts, DOE/EIA-0036/2, p. 192.

9-23
Nuclear reactors built, being built, or planned, September 1973-December 1979

Program summary report, U.S. Nuclear Regulatory Commission (Springfield, Va.: National Technical Information Service, 1980), v. 4, n. 1, p. 1–4, and previous monthly issues.

9-24
Nuclear reactors, December 1979

Program summary report, U.S. Nuclear Regulatory Commission (Springfield, Va.: National Technical Information Service, 1980), v. 4, n. 1, p. 1–4.

9-25
Nuclear power generation, 1957-1979

1957–1978: See 9-2, p. 135.

1979: *Monthly Energy Review,* February 1980, p. 72.

Data include electric utility plants only. They cover all plants, including those in operation and those that have been shut down. Most of the latter were test or prototype units.

9-26
Low-level radioactive wastes disposed of, 1962-1979

Commercial, 1962-1978: "Inventory (1962-1978) and projections (to 2000) of shallow land burial of radioactive wastes at commercial sites: An update," W. F. Holcomb, *Nuclear Safety* 21:380 (May-June 1980). 1979: "Inventory of shallow land disposal of radioactive wastes at commercial sites (1962-1979): An update," W. F. Holcomb, U.S. Environmental Protection Agency (Draft, 1980), technical note EPA-ORP/TAD-80-6, table 2, p. 5.

Federal, 1976-1979: U.S. Department of Energy, unpublished data.

It is estimated that by 1985 there will have been 1.5-2.7 million cubic meters of low-level wastes generated in the United States.

9-27
Radioactive waste disposal sites, 1979

Report to the President by the Interagency Review Group on Nuclear Waste Management, U.S. Department of Energy (Springfield, Va.: National Technical Information Service, 1979), tables 9, 10, 15, pp. D-12, D-14, D-19.

High-level wastes include spent fuel (an estimated 2,300 metric tons of heavy metal) stored temporarily at nuclear power plants.

It is estimated that by 1985 there will be 258,000 cubic meters of high-level wastes in the United States, a decrease of 11,000 cubic meters since 1977 as a result of the processing of the wastes to reduce their liquid content.

As of December 31, 1979, closed sites included: National Lead Co. of Ohio, Niagara Falls, N.Y.; Nuclear Engineering Co., Maxey Flats, Ky. and Sheffield, Ill.; Nuclear Fuel Services, Inc., West Valley, N.Y.; and Weldon Springs, St. Charles County, Mo.

There are two disposal sites in Hanford, Wash., one for Department of Energy high-level and low-level wastes, the other for commercial low-level wastes.

9-28
Production of hydropower, 1950-1978

See 9-2, p. 5.

9-29
Geothermal resources, 1970s

"Geothermal energy and our environment," U.S. Department of Energy (Washington, D.C., 1980), DOE/EV-0088.

9-30
Production of electricity from geothermal resources, 1970-1978

See 9-2, p. 149.

9-31
Solar collectors manufactured, 1974-1979

Solar collector manufacturing activity, July 1978 through December 1979, U.S. Department of Energy (Washington: USGPO, 1980), table 1, p. 2.

U.S. Water Resources Council data for 1975 refers to a mid-1970s period rather than to the specific year. It is the base period for 1985 and 2000 projections for the Second National Water Assessment by the Water Resources Council.

10-1
The hydrologic cycle

Adapted from "Where we get our water: From ocean to sky to land to ocean," W. C. Ackerman, E. A. Coleman, and H. O. Ogrosky, in "Water," *The yearbook of agriculture 1955,* U.S. Department of Agriculture (Washington: USGPO, 1955), p. 42.

10-2
Water resource regions, 1975

The nation's water resources, 1975–2000, U.S. Water Resources Council (Washington: USGPO, 1978), v. 1, summary, p. 5.

The United States is divided into 21 hydrologic regions, each with a major river basin or a series of smaller river basins. These regions are divided into 106 assessment subregions and 222 planning subregions. For each region, approximate county areas are designated for comparison of demand and use data with supply data.

Inland water surfaces include lakes, reservoirs, and ponds having 40 acres or more area; streams, sloughs, estuaries, and canals one-eighth of a statute mile or more in width; and deeply indented embayments and sounds and other coastal waters behind or sheltered by headlands or islands separated by less than 40 acres of area.

10-3
Average annual precipitation, 1931-1960

See 10-2, p. 16.

The world average includes 26 inches of rain and 9 inches of snow, sleet, or hail.

10-4
Available ground water, 1975

The nation's water resources, 1975–2000, U.S. Water Resources Council, (Washington: USGPO, 1978), v. 3 (analytic data), appendix II (annual water supply and use analysis), table II-1, pp. 23–26.

10-5
Ground water withdrawal, 1975

"Annual water adequacy analysis," U.S. Water Resources Council, unpublished computer printout, August 1979, prepared for the Water Resources Council Second National Water Assessment, table ZI-5.

10-6
Ground water overdraft, 1975

See 10-4.

10-7
Average streamflow of large rivers, 1941-1970

Large rivers of the United States, K. T. Iseri and W. B. Langbein, U.S. Geological Survey (Washington: USGPO, 1975), circ. 686, p. 4.

10-8
Inadequate surface water supply for instream use, 1975

The nation's water resources, 1975–2000, U.S. Water Resources Council (Washington: USGPO, 1978), v. 2 (water quantity, quality, and related land considerations), part II (water-management problem profiles), table II-7, pp. 138–147.

10-9
Flooding problems, 1975

Estimated flood damages, U.S. Water Resources Council (Washington: USGPO, 1977), appendix B, nationwide analysis report, p. 13.

Degree of severity is based on dollar losses and damages—current, projected, percent increase projected between 1975 and 2000, per person, per earnings, per unit area, and cropland losses—and on the number of places in a subregion with flooding problems.

10-10
Water use, 1900-1975

Withdrawals, 1900–1970, and consumption, 1960–1970: *Water policies for the future*, National Water Commission (Port Washington, N.Y.: Water Information Center, Inc., 1973), p. 7.

Withdrawals and consumption, 1975: *Estimated use of water in the United States in 1975*, U.S. Geological Survey (Washington: USGPO, 1977), circ. 765, p. 10.

If water is returned to a surface water source and is again withdrawn, it is again counted in total withdrawals.

10-11
Water withdrawal, by use, 1950-1975

1950–1970: *Estimated use of water in the United States in 1970*, U.S. Geological Survey (Washington: USGPO, 1972), circ. 676, p. 10.

1975: *Estimated use of water in the United States in 1975*, U.S. Geological Survey (Washington: USGPO, 1977), circ. 765, p. 10.

10-12
Water consumption, by use, 1960-1975

1960: *Estimated use of water in the United States, 1960*, U.S. Geological Survey (Washington: USGPO, 1961), circ. 456, tables 1, 3, 5, 7, 9, 15, pp. 13, 15, 17, 19, 21, 24.

1965: *Estimated use of water in the United States, 1965* (Washington: USGPO, 1968), circ. 556, tables 5, 8, 11, 14, 17, 26, pp. 17, 22, 26, 33, 39, 47.

1970: *Estimated use of water in the United States in 1970* (Washington: USGPO, 1972), circ. 676, tables 5, 6, 7, 8, 9, 10, pp. 19, 21, 23, 25, 27, 29.

1975: *Estimated use of water in the United States in 1975* (Washington: USGPO, 1977), circ. 765, tables 5, 6, 7, 8, 9, 10, pp. 21, 23, 25, 27, 29, 31.

10-13 through 10-19
Water withdrawal and consumption, by region, 1960-1975

1960: *Estimated use of water in the United States, 1960*, U.S. Geological Survey (Washington: USGPO, 1961), circ. 456, p. 25.

1965: *Estimated use of water in the United States, 1965* (Washington: USGPO, 1968), circ. 556, pp. 48, 49.

1970: *Estimated use of water in the United States in 1970* (Washington: USGPO, 1972), circ. 676, pp. 28, 36.

1975: *Estimated use of water in the United States in 1975* (Washington: USGPO, 1977), circ. 765, p. 38.

For additional discussion of water resources see the 21 regional reports in *The nation's water resources, 1975-2000*, U.S. Water Resources Council (Washington: USGPO, 1978), v. 4.

11-2
Fecal coliform bacteria, average annual violation rates, 1975-1979

Council on Environmental Quality, Washington, D.C. UPGRADE analysis of the U.S. Geological Survey National Stream Quality Accounting Network (NASQAN) data. NASQAN data are published for each State by the U.S. Geological Survey in *Water resources data for [State], 197[ ] water year.*

The 1975 data for all States and all NASQAN stations are printed in *Quality of rivers in the United States, 1975 water year—based on the National Stream Quality Accounting Network (NASQAN)*, U.S. Geological Survey (Reston, Va., 1977), open file rep. 78-200. The 1976 data are expected to be published in 1981.

Fecal coliform (FC), dissolved oxygen (DO), phosphorus, and metals data are from approximately 470 NASQAN stations in 350 hydrologically based accounting units. NASQAN is considered uniform because the same pollutants are measured at all stations under standardized conditions of collection, frequency, and analytical methods. FC, DO, and phosphorus are measured monthly and metals are measured quarterly, weather and other conditions permitting.

Years refer to water years. A water year begins in October and ends in September; for example, 1975–1979, begins in October 1974 and ends in September 1979.

Although there are no Federal standards for water quality, Federal agencies have recommended acceptable levels for a number of pollutants—criteria which regional, State, and local governments are encouraged to adopt.

The composite violation rate represents the proportion of all measurements of a specific water quality variable which exceeds the violation level for that variable. Although violation levels are based on published water quality criteria, the word "violation" is used for simplicity and does not necessarily imply a legal violation.

The pollutants, criteria (violation levels), and water use relative to the criteria are: *Fecal coliform*, above 200 cells/100 ml, swimming; *dissolved oxygen*, below 5.0 mg/l, desirable fish populations; *total phosphorus*, below

0.1 mg/l, prevention of plant nuisances in streams or other flowing waters not discharging directly to lakes or impoundments; *total mercury*, above 2.0 μg/l for domestic water supply, above 0.05 μg/l for fresh water fish and wildlife; *total arsenic*, above 100 μg/l for crop irrigation, above 50 μg/l for domestic water; *total cadmium*, above 10 μg/l for domestic water; *total lead*, above 50.0 μg/l for domestic water. (These levels are listed in *Quality criteria for water*, U.S. Environmental Protection Agency (Washington: USGPO, 1976).)

"The composite violation rate has several important advantages as an indicator. First, it relates the water quality data to known reference levels, many of which are associated with potential impacts such as beach closings or harm to aquatic life. Second, the composite indicator statistically reduces the bias caused by any high values erroneously recorded, a problem with most large data bases, in contrast to certain other measures such as mean values. Third, the composite violation rate can be applied flexibly. It can be used for a single monitoring station, all the stations on a river or river reach, or even the entire nation.

"As with most other indicators and statistical measures, some of the year-to-year variation in composite violation rates may not represent significant changes in water quality. Instead, the variation may be due to changes in streamflow, temperature, measurement schedules, and other factors. A genuinely significant improvement or worsening in a particular water quality variable usually becomes apparent only after several years of consistently different values have been measured in a river." (*Environmental quality—1976*, Council on Environmental Quality (Washington: USGPO, 1976), p. 271.)

11-3
Fecal coliform bacteria in U.S. waters, 1978

See 11-2.

Years refer to water years. See 11-2.

11-4
Fecal coliform bacteria in major rivers, 1966-1978

Council on Environmental Quality, UPGRADE analysis of the U.S. Environmental Protection Agency's Storage and Retrieval (STORET) data.

These 13 rivers were selected from 22 waterways analyzed by the U.S. Environmental Protection Agency. The 22 rivers and bays were the 10 longest rivers, the 10 with the highest flow (cubic feet per second), and were in or near the 10 largest urban areas.

The 13 rivers were those with the most complete data available. (Other major rivers, such as the Colorado, were excluded because of data limitations.) Most of the stations on the 13 are operated by the U.S. Geological Survey, but data were also included from several State and other Federal agencies.

Because all stations did not operate continuously and some took more measurements than others, the data may be biased toward conditions where FC, DO, or phosphorus were measured more frequently.

Data shown here have at least 20 observations per river per year from all stations combined. For any year shown with no data, either that parameter was not measured, was measured but not reported to STORET, or was measured infrequently (less than 20 observations per year).

Data for 1978 are preliminary.

11-5
Dissolved oxygen, average annual violation rates, 1975-1979

See 11-2.

Years refer to water years. See 11-2.

11-6
Dissolved oxygen in U.S. waters, 1978

See 11-2.

11-7
Dissolved oxygen in major rivers, 1966-1978

See 11-4.

Values higher than 20 milligrams per liter were excluded because of possible errors or poor samples.

Data for 1978 are preliminary.

11-8
Total phosphorus, average annual violation rates, 1975-1979

See 11-2.

Measurements of total phosphorus include dissolved phosphorus and phosphorus associated with suspended solids.

Years refer to water years.

11-9
Total phosphorus in U.S. waters, 1978

See 11-2.

11-10
Total phosphorus in major rivers, 1966-1978

See 11-4.

Values higher than 2.5 micrograms per liter were excluded because of possible errors or poor samples.

Data for 1978 are preliminary.

11-11
Heavy metals, 1975-1978

See 11-2.

Violations of mercury, cadmium, and lead levels are based on criteria for domestic water supply. Violations of arsenic levels are based on criteria for crop irrigation. See 11-2 for criteria levels.

Data are based on measurements of total heavy metals, which include dissolved metals and metals associated with suspended solids.

The 1975–1978 data for mercury, arsenic, and cadmium refer to the percentage of all observations in 1975–1978 which were in violation of the criteria. In other words, the statistic mapped for each accounting unit is the ratio of all observations in violation divided by the total number of observations from all stations in that accounting unit for the 4-year period.

Data for lead are for 1978 only. Lead data for 1975–1977 are not comparable to 1978 data because of changes in measurement techniques.

Years refer to water years.

11-12
Phenols in the upper Ohio River basin 1968-1976

Environmental quality—1977, Council on Environmental Quality (Washington: USGPO, 1977), UPGRADE analysis of the U.S. Environmental Protection Agency's STORET data, pp. 246, 248.

The upper Ohio River is the 300 miles between Pittsburgh and approximately Huntington, W. Va.

For 1968–1975, the composite violation rate was calculated from measurements at 14 State, local, and Federal sites. For 1976, 10 Ohio River Sanitation Commission stations were studied.

The phenol criterion is 1 microgram per liter in Ohio and 5 micrograms per liter in Pennsylvania and West Virginia.

11-13
Discharges to water, by pollutant and by point and nonpoint source, 1977

"Estimates of national water pollutant discharges by polluting sector: 1977," L. P. Gianessi and H. M. Peskin, unpublished tables assembled under National Science Foundation grant SOC 77 15045, as part of the Environmental Policy Evaluation Program of Resources for the Future.

Estimates made in April 1980.

11-14
Point source discharges to water, by sector, 1977

See 11-13.

11-15
Population served by municipal wastewater systems, by level of treatment, 1960-1978

1960 and 1970: "Market for water and wastewater treatment equipment," K. L. Kollar, *J. Water Pollution Control Fed.* 51:682 (1979).

1978: *1978 needs survey, conveyance and treatment of municipal wastewater, summaries of technical data*, U.S. Environmental Protection Agency (Washington: USGPO, 1979), FRD-2, tables 7, 8, 16, 26, 30, 44, pp. 19, 21, 37, 57, 65, 125.

Data for 1960 and 1970 are not strictly comparable to 1978 data because of different methods of data collection.

In 1978, there were more than 20,000 wastewater facilities in operation throughout the country removing some 75% (11 million pounds/day) of BOD_5 and 78% (also 11 million pounds/day) of suspended solids. BOD_5 is the amount of oxygen consumed metabolically by test microorganisms in a sample in 5 days.

1978 primary treatment also includes 2 million people who are served by wastewater treatment systems that have no discharges to surface waters.

1960–1970: Data aggregated by State from the 1960 and 1970 censuses of population.

An alternative to conventional wastewater treatment is land treatment, wherein wastewater is sprayed onto field crops. The water percolates through the soil to surface and ground waters. Land treatment produces effluent similar to or better than that of advanced secondary treatment systems and usually costs less. In addition, two nutrients in wastewater, nitrogen and phosphorus, promote agricultural growth.

11-16
Eutrophication of U.S. lakes, 1975

U.S. Environmental Protection Agency, National Eutrophication Survey, unpublished data.

Data include 175 of the 775 lakes studied. The 775 lakes represent 6% of the 13,600 inland lakes and reservoirs which qualify as large water bodies.

The survey may be biased toward large water bodies (more than 100 acres) impacted by municipal wastewater discharges. In the East, selected lakes were impacted by one or more municipal sewage treatment plants.

11-17
Water quality problem areas of the Great Lakes, 1978

Great Lakes water quality: Seventh annual report to the International Joint Commission, Great Lakes Water Quality Board (Windsor, Ontario: International Joint Commission, 1979), fig. 2.6, p. 20.

11-18
Toxic residues in Great Lakes fish, 1969-1976

U.S. Fish and Wildlife Service, Great Lakes Fish Laboratory, Ann Arbor, Mich., unpublished data.

The Food and Drug Administration's levels are not strictly applicable to these data because the guidelines pertain only to edible portions of the fish and Fish and Wildlife Service analyzes the whole fish. Concentrations in edible portions are slightly lower than in whole fish.

The PCB level is under review and may be changed from 5 parts per million to 2.

11-19
Ocean dumping of U.S. wastes by barge, 1951-1978

1951–1968: *Ocean dumping, a national policy*, Council on Environmental Quality (Washington: USGPO, 1970), pp. 3, 8.

1973–1978: *Annual report to Congress, Jan.–Dec. 1978, on administration of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended (P.L. 92-532) and implementing the International Ocean Dumping Convention*, U.S. Environmental Protection Agency (Washington: USGPO, 1979), pp. 16, 16A.

Data for 1951–1968 may not be strictly comparable to data for 1973–1978. Specific permits were not required for ocean dumping before 1973. Data for 1951–1968 may underestimate the amounts dumped. Totals for 1951–1968 include radioactive wastes and explosives. Totals for 1973–1978 include incinerated wood (18,000 tons in 1978).

Construction debris includes masonry, tile, stone, plastic, wiring, piping, shingles, glass, cinderblock, tar, tarpaper, plaster, vegetation, and excavation dirt.

Outfall pipes carrying wastes to sea through pipes often as long as 7 miles are located primarily near urban areas on the Pacific coast.

11-20
Oil spills in U.S. waters, 1971-1978

1971–1972: *Polluting incidents in and around U.S. waters, calendar year 1977,* U.S. Coast Guard (Washington, D.C., 1978), p. 23.

1973–1978: *Polluting incidents in and around U.S. waters, calendar year 1977 and 1978,* U.S. Coast Guard (Washington, D.C., 1980), p. 16.

Data are compiled from the U.S. Coast Guard's Pollution Incident Reporting System (PIRS).

Areas include the Great Lakes, ocean waters within 200 miles of the coast, and inland waters (river channels, harbors, etc.).

All major sources include vessels, land vehicles, nontransportation-related facilities, pipelines, marine facilities, and land facilities.

11-21
Toxic residues in coastal mussels and oysters, 1976

U.S. Environmental Protection Agency, Environmental Research Laboratory, Mussel Watch Program, Narragansett, R.I., unpublished data.

The EPA Mussel Watch Program measures toxic substances in bivalve molluscs. Four species are used: mussels are *Mytilus edulis* (west and east coasts) and *Mytilus californianus* (west coast); oysters are *Crassostrea virginica* (east and Gulf coasts) and *Ostrea equestris* (Gulf coast).

On the maps each circle represents the concentration in one sample at one station. A sample consists of about 25 mussels or oysters of the same species.

For 1976–1978, more than 100 samples have been analyzed each year.

Preliminary data for 1977 and 1978 show no marked changes of the substances reported.

The program will make a complete collection of samples again in 1981.

DDT refers to its derivatives DDD and DDE only.

All concentrations are measured in dry weight.

12-1
Criteria and noncriteria air pollutants

Environmental quality—1975, Council on Environmental Quality (Washington: USGPO, 1975), pp. 300–303, 328–331.

Air quality criteria for ozone and other photochemical oxidants, U.S. Environmental Protection Agency (Washington: USGPO, 1979).

Air quality criteria for lead, U.S. Environmental Protection Agency (Washington: USGPO, 1978).

Air quality criteria for carbon monoxide, U.S. Environmental Protection Agency (Washington: USGPO, 1980).

"Air quality criteria for oxides of nitrogen," U.S. Environmental Protection Agency, draft, June 1979.

U.S. Environmental Protection Agency, unpublished data.

12-2
Pollutant Standards Index values, pollutant levels, and health effects

Guidelines for public reporting of daily air quality—Pollutant Standards Index (PSI), U.S. Environmental Protection Agency (Research Triangle Park, N.C., 1976), EPA-450/2-76-013, OAQPS 1.2-044, table 3, p. 10.

12-3
Average Pollutant Standards Index in 23 Standard Metropolitan Statistical Areas, 1974-1978

1974–1978: *Environmental quality—1980,* Council on Environmental Quality (Washington: USGPO, 1981), pp. 148–152, based on the U.S. Environmental Protection Agency's air quality data bank, SAROAD (Storage and Retrieval of Aerometric Data).

A Standard Metropolitan Statistical Area (SMSA) is an area with an urban center of 50,000 persons or more, including the county containing that center and any neighboring counties that are closely associated with the central area by daily commuting ties. SMSAs contain not only urbanized areas, which occupy only 10% of the land, but also open space, forests, recreation areas, parks, and cropland.

The PSI values are an average of 23 SMSAs which were included because data were available. New York was excluded because comparable data for 1974 are not available in SAROAD. Other major SMSAs may have many days of unhealthful air, but comparable data for 1974–1978 are not available in SAROAD.

The PSI analysis for 1973–1978 is based on standards applicable during 1979, not on standards applicable at the time of monitoring. The primary standard for ozone was relaxed in 1979 from 160 to 240 micrograms per cubic meter per hour.

In addition to the five criteria pollutants, the product of total suspended particulates and sulfur dioxide is included. Other pollutants for which standards have been set can be readily added. Although lead is now a criteria pollutant, it has not yet been incorporated in the PSI.

12-4
Pollutant Standards Index in 24 Standard Metropolitan Statistical Areas, 1973-1978

1973: *Environmental quality—1978*, Council on Environmental Quality (Washington: USGPO, 1979), pp. 15–17, based on the U.S. Environmental Protection Agency's air quality data bank, SAROAD (Storage and Retrieval of Aerometric Data).

1974–1978: See 12-3.

In 1978 in these 24 SMSAs, photochemical oxidants were the primary pollutant in 15 SMSAs; carbon monoxide was the predominant pollutant in 6 SMSAs.

Total suspended particulates and sulfur dioxide caused high PSI readings in Chicago, Cincinnati, Salt Lake City, and other major industrial centers, but rarely do these readings exceed more than a few days per year.

12-5
National ambient carbon monoxide concentrations, 1972-1978

U.S. Environmental Protection Agency, Office of Air Quality and Standards, unpublished data.

CO, oxidants, SO_2, TSP, and NO_2 data are from the National Aerometric Data Bank (NADB).

Data collected at fixed monitoring sites are reported quarterly by local and State governments.

Annual composite averages of CO are based on daily 8-hour measurements taken at 183 urban monitoring sites. Sites selected are those with at least 5 years' data.

12-6
National ambient ozone concentrations, 1972-1977

National air quality, monitoring, and emissions trends report, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards (Washington: USGPO, 1978), EPA-450/2-78-052, fig. 3-6, p. 3-12.

Trends are based on the average of the 90th percentile of the hourly measurements taken from April through September.

Many sites are monitored only during this peak pollutant season when ozone values are highest. Of the 226 sites, 59 were in California.

12-7
National ambient sulfur dioxide concentrations, 1972-1977

See 12-6, fig. 3-5, p. 3-8.

Trends are based on the annual composite average of daily 24-hour averages. Data were collected at 1,233 monitoring sites.

12-8
National ambient total suspended particulate concentrations, 1972-1977

See 12-6, fig. 3-2, p. 3-2.

Trends are based on the annual composite average (geometric mean) of daily 24-hour averages.

Data were collected at 2,707 monitoring sites.

12-9
Ambient nitrogen dioxide concentrations, selected areas, 1972-1977

See 12-6, fig. 3-11, p. 3-18.

Sites were included if they had at least 3 years' data with at least 4,000 hourly observations per year.

Trends are based on annual composite averages of hourly measurements taken at 56 urban sites: *23 in California* (Los Angeles County, 9; Orange County, 2; Riverside, San Bernardino Counties, 6; San Francisco Bay area, 6) and *33 outside California* (Cleveland, 18; Louisville, 9; Atlanta, 6).

12-10
Ambient trace metal concentrations in 92 urban areas, 1965-1974

National trends in trace metals in ambient air, 1965-1974, U.S. Environmental Protection Agency (Washington: USGPO, 1977), pp. 8, 9.

Data were taken from the National Air Surveillance Network (NASN).

Trends are based on the annual average of the 50th percentile median from 92 urban high-volume stations in 92 center-city and suburban business areas.

Except for lead, there are no ambient standards proposed nor is there consensus as to what concentrations may be harmful to human health.

Recent data for vanadium and cadmium cannot be detected in smaller concentrations.

12-11
Acid precipitation in the eastern United States, 1955-1976

Based on "Acid rain," Gene E. Likens, Richard R. Wright, James N. Galloway, and Thomas J. Butler, *Scientific American* 241(4): 43-51 (1979), copyright 1979 by Scientific American, Inc., all rights reserved.

12-12 to 12-19
General note on emissions

Data are compiled from the U.S. Environmental Protection Agency's National Emissions Data Bank (NEDB), other EPA data sources, and other published sources.

States are required to report semi-annually.

Data are not limited to major metropolitan areas but include point and areal sources.

Transportation includes highway vehicles, aircraft, railroads, vessels, and miscellaneous mobile engines such as farm equipment, industrial and construction machinery, lawnmowers, and snowmobiles.

Stationary includes all fuel combustion in boilers, stationary internal combustion engines, and other stationary combustion equipment. Emissions are from electric power plants, industry, and residential, commercial, government, and educational fuel consumers.

Industrial includes manufacturing equipment.

12-12
Carbon monoxide emissions, 1970-1977

See 12-6, pp. 5-5 to 5-12.

Other includes emissions from stationary fuel combustion, solid wastes, forest fires, and managed burnings.

12-13
Hydrocarbon emissions, 1970-1977

See 12-6, pp. 5-5 to 5-12.

Other includes emissions from stationary fuel combustion, solid waste, and use of organic solvents.

Hydrocarbons may be referred to as volatile organic compounds although they are not strictly comparable. Hydrocarbons include photochemically nonreactive compounds (for example, methane); volatile organic compounds do not.

12-14
Nitrogen oxide emissions, 1970-1977

See 12-6, pp. 5-5 to 5-12.

Stationary fuel combustion includes emissions from electric utilities, industrial establishments, and residential, commercial, and institutional sources.

Other includes emissions from industrial processes and solid wastes.

Due to methodology, emission estimates include all nitrogen oxides. Ambient measurements include only nitrogen dioxide.

12-15
Nitrogen oxide emissions from stationary fuel combustion sources, by fuel type, 1970-1977

U.S. Environmental Protection Agency, Office of Air and Waste Management, unpublished data.

Data exclude a small amount (about 0.4 million metric tons per year) of nitrogen oxide emitted by stationary fuel combustion sources that use kerosene, liquified petroleum gas, and other fuels.

12-16
Sulfur oxide emissions, 1970-1977

See 12-6, pp. 5-5 to 5-12.

Stationary fuel combustion includes emissions from electric utilities and industrial, residential, commercial and institutional sources.

Other includes emissions from solid wastes and transportation.

Due to methodology, emission estimates include all sulfur oxides. Ambient measurements include only sulfur dioxides.

12-17
Sulfur oxide emissions from stationary fuel combustion sources, by fuel type, 1970-1977

See 12-6, pp. 5-5 to 5-12.

Data exclude a small amount (0.15 million metric tons per year) of sulfur oxide produced by industrial stationary fuel combustion sources that use other fuels.

Natural gas does not produce sulfur oxide when burned.

12-18
Total suspended particulate emissions, 1970-1977

See 12-6, pp. 5-5 to 5-12.

Other includes emissions from solid wastes and transportation.

Data include both suspended and settled particulates, in contrast to ambient TSP measurements, which include only suspended particulates.

12-19
Total suspended particulate emissions from industrial sources, 1970-1977

See 12-6, pp. 5-5 to 5-12.

12-20
Compliance status of major stationary air pollution sources, 1975-1979

U.S. Environmental Protection Agency, Office of Enforcement, unpublished data for the Compliance Data System, which includes probable compliance data collected on a quarterly basis from State and local air pollution control agencies.

Approximately 200,000 stationary sources are subject to State Implementation Plans, which set limits on emissions as part of a statewide plan to reduce ambient concentrations of criteria pollutants. Of these sources, 23,760 are classified as major (or Class A) sources because each of them is capable of emitting more tnan 100 tons of pollutant each year.

Minor (or Class B) sources are all other facilities (approximately 176,000).

12-21
Compliance status of major stationary air pollution sources, by industry, 1979

The 13 major categories shown here include 5,412 sources—about a fifth of all major stationary sources.

13-1
World population, by region, 1800-1979

1800–1900: *The determinants and consequences of population trends,* United Nations (New York, 1973), v. 1, p. 21.

1950–1979: *World population 1979: Recent demographic estimates for the countries and regions of the world,* U.S. Bureau of the Census (Washington: USGPO, 1980), tables 2, B-2, D-1, pp. 24, 168, 376.

U.S. Bureau of the Census, unpublished data.

13-2
World population growth rates, by region, 1950-1979

World population 1979: Recent demographic estimates for the countries and regions of the world, U.S. Bureau of the Census (Washington: USGPO, 1980), table 2, p. 24.

13-3
Population density, 1975

The global 2000 report to the President, Council on Environmental Quality and U.S. Department of State (Washington: USGPO, 1980), v. 2, the technical report.

13-4
Population in urban and rural areas, by size of area, 1920-1975

Demographic yearbook 1960, United Nations (New York, 1960), table 2, p. 116.

The determinants and consequences of population trends, United Nations (New York, 1973), v. 1, pp. 190, 578.

Trends and prospects in the population of urban agglomerations, 1950–2000, as assessed in 1973–1975, United Nations (New York, 1975), pp. 13, 21.

World urbanization 1950–1970, Kingsley Davis (Berkeley: University of Calif., 1969), v. 1, tables A, B, pp. 57–111.

Rural data for 1920–1940 are not strictly comparable to that for 1950–1975.

13-5
Ten largest cities in the world, 1975

Trends and prospects in the population of urban agglomerations, 1950–2000, as assessed in 1973–1975, United Nations (New York, 1975), p. 61.

13-6
Population by region, 1950-1979, with projections to 2000

1950–1979, except Asia: See 13-1.

1980–2000, and Asia, 1950–1979: *Illustrative projections of world populations to the 21st century,* U.S. Bureau of the Census (Washington: USGPO, 1979), current population reports, special studies series P-23, n. 79, pp. 17–18.

U.S. Bureau of the Census, unpublished data.

Asia includes Oceania.

13-7
Major ecosystems of the world, 1970s

Ecoscience: Population, Resources, Environment, Paul R. Ehrlich, Anne H. Ehrlich and John P. Holdren (San Francisco: W.H. Freeman and Company, 1977), fig. 4-26, pp.144–145. Adapted from *Fundamentals of ecology* (3rd ed.), E.P. Odum (Philadelphia: W.B. Saunders, 1971), and *Communities and ecosystems,* R.H. Whittaker (New York: Macmillan, 1970). Reprinted with permission.

13-8
Area and productivity of ecosystems, 1970s

See 13-7, table 4-6, p. 132, from "Carbon in the biota," R.H. Whittaker and G.E. Likens, in *Carbon and the biosphere,* G.M. Woodwell and E.V. Pecan, eds. (Washington: U.S. Atomic Energy Commission Technical Information Center, 1973), pp. 281–300.

13-9
Tropical moist forests, 1970s

"Crossroads for tropical biology," William J. Cromie, *Mosaic,* National Science Foundation, v. 10, n. 3, May/June 1979, pp. 10–11. Reprinted with permission.

13-10
Tropical moist forests, by region and country, 1945-1978

Conversion of tropical moist forests, Norman Myers, National Academy of Sciences (Washington, D.C., 1980), pp. 80, 81, 95, 97, 98, 108, 128, 132, 133, 134, 135, 156, 158.

Trends in individual countries may not be representative of an entire region.

13-11
Lands vulnerable to desertification, 1970s

World conservation strategy, International Union for the Conservation of Nature and Natural Resources with United Nations Environment Programme and World Wildlife Fund (Gland, Switzerland, 1980).

Arid and semiarid lands occupy roughly one-third of the earth's land surface. Although they vary in land forms and types of vegetation, they have low levels of precipitation (less than 20 inches of rainfall per year), with great seasonal and year-to-year variation, and relatively sparse vegetation.

Cultivation in marginal areas during periods of higher than normal rainfall is especially dangerous and may be a main cause of desertification. When dry years follow a year of plenty, ploughed soil or soil from which the sparse cover of natural plants has been eliminated is at the mercy of wind and water. The fine clays and silts are carried away and the remaining sand drifts. The social and environmental impacts are serious: Arable land is lost; wildlife is dispersed and depleted; the risk of starvation increases; and greater pressure is put on remaining lands.

13-12
World arable land, 1951-1975

The global 2000 report to the President, Council on Environmental Quality and U.S. Department of State (Washington: USGPO, 1980), v. 2, the technical report, tables 6-12, 6-13, pp. 97, 99.

13-13
Arable and potentially arable land, by region, 1970s

U.S. Department of Agriculture, Economics, Statistics, and Cooperatives Service, unpublished data.

LDCs are less developed countries.

13-14
World agricultural production, 1954-1978

1954–1969: *The world food situation and prospects to 1985,* U.S. Department of Agriculture (Washington: USGPO, 1974), for. agr. econ. rep. 98, p. 2.

1970–1978: *1979 Handbook of agricultural charts,* U.S. Department of Agriculture (Washington: USGPO, 1979), agr. handbook n. 561, p. 84.

Developed countries include: United States, Canada, Europe, USSR, Japan, Republic of South Africa, Australia, and New Zealand.

Developing countries include: South and Central America, Africa (except Republic of South Africa), and Asia (except Japan and communist Asia).

13-15
World agricultural inputs, 1950-1978

World fertilizer use: *1978 fertilizer yearbook,* United Nations Food and Agriculture Organization (Rome, 1979), and previous annual issues.

Irrigated cropland and world labor force: *World population trends and policies, 1977 monitoring report,* United Nations (New York, 1979), v. 1, tables 65, 69, pp. 165, 167.

13-16
Extinct species and subspecies of vertebrate animals worldwide, 1600s-1900s

"Breaking the web," George Uetz and Donald L. Johnson, *Environment*, v. 16, n. 10, December 1974, p. 33, from J.A. Davis, New York Zoological Society, the Zoological Park, Bronx Park, New York, January 1972; and from *Red data books*, International Union for the Conservation of Nature and Natural Resources (Lausanne, Switzerland), various issues.

13-17
Extinction of species, by region, 1980-2000

The global 2000 report to the President, Council on Environmental Quality and U.S. Department of State (Washington: USGPO, 1980), v. 2, the technical report, table 13-30, p. 331.

Projections assume a low deforestation case from 1975 to the year 2000. Of the total of 3 to 10 million species, 10% are in the virgin forests of the Amazon, 5% in African tropical forests, 10% in South and Southeast Asian tropical forests, and 75% in oceans, fresh water, nontropical forests, islands, etc.

13-18
Whale exploitation, by species, pre-hunting through the 1970s

Whale abundance: "The status of whales," Victor B. Scheffer, *Pacific discovery*, v. 29, n. 1, 1976, p. 3.

Whale catch, 1920–1970, except minke: *The whale problem: A status report*, William E. Schevill, ed. (Cambridge, Mass.: Harvard University Press, 1974), table 13-1, pp. 306–307. 1971–1978, except minke: *International whaling statistics*, Committee for Whaling Statistics (Sandefjord, Norway, 1979), LXXXIII, table b, p. 12. 1969–1978, minke: *International whaling statistics*, Committee for Whaling Statistics (Sandefjord, Norway, 1979), LXXXIII, table Z^2, p. 27.

Catch data for minke are not available for years prior to 1968.

13-19
Population of selected endangered and threatened species, 1947-1979

African elephant: "African elephants slaughtered," Baynard Webster, *New York Times*, June 10, 1980, pp. C1–C2.

Black rhinoceros: "Rhinoceros background sheet," World Wildlife Fund (Washington, D.C., September 1979), p. 4, from International Union for the Conservation of Nature and Natural Resources.

Bengal tiger: *Red data book*, International Union for the Conservation of Nature and Natural Resources (Gland, Switzerland, 1972), v. 1. *World wildlife yearbook 1978–1979*, World Wildlife Fund (Morges, Switzerland, 1979), p. 59.

Kemp's (Atlantic) ridley sea turtle: "Experts gather to talk turtle," Constance Holden, *Science* 206:1383–1384 (December 21, 1979).

Mountain gorilla: "Mountain gorilla *(Gorilla gorilla beringei)* status (1980) with some reference to other gorilla species," Diane Fossey, June 1980, p. 2. "Endangered mountain gorillas killed, raising the possibility of poachers," Thomas O'Toole, *Washington Post*, July 30, 1978.

Golden lion marmoset: *Red data book*, International Union for the Conservation of Nature and Natural Resources (Gland, Switzerland, 1974), v. 1. "Will the pot of gold have a rainbow?," Devra G. Kleinman, *Animal Kingdom*, New York Zoological Society, February/March 1976, p. 4.

Mauritius kestrel: *World wildlife yearbook 1978–1979*, World Wildlife Fund (Morges, Switzerland, 1979), p. 137.

The International Union for the Conservation of Nature and Natural Resources (IUCN) defines endangered species as those "in danger of extinction and whose survival is unlikely if the causal factors continue operating." Vulnerable species are "likely to move into the endangered category in the near future if the causal factors continue operating." Rare species have "small world populations that are not at present endangered or vulnerable but are at risk." (*Red data book*, International Union for the Conservation of Nature and Natural Resources (Gland, Switzerland, 1977), v. 2, preamble 3.)

All 7 species shown here, except the African elephant, are listed as endangered by the IUCN. The African elephant is listed as threatened (comparable to IUCN's category of vulnerable) by the U.S. Fish and Wildlife Service.

Black rhinoceros data are for those in Kenya and Tanzania only, but similar declines are occurring throughout the rhinoceros's range.

Bengal tiger data are for those in India only.

Kemp's (Atlantic) ridley sea turtle data are for nesting females.

Marmosets are also called tamarins.

13-20
World commercial fish catch, 1950-1978

Fisheries of the United States, 1979, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (Washington: USGPO, 1980), p. 24.

Total includes marine and fresh water fish.

13-21
Areas of marine pollution, 1970s

Continuing, intermittent, and potential pollution: *Pollution and international problems for fisheries*, United Nations Food and Agriculture Organization (Rome, 1971), world food problems, n. 14, fig. 1.

Ten largest oil spills: News release, U.S. Coast Guard, September 1979, *Oil spill intelligence report*, Center for Short-Lived Phenomena, Cambridge, Mass. (August 10, 1979), v. 2, n. 32, p. 2.

Sites of major spills shown on the map refer to the 10 largest tanker accidents and oil well blowouts between 1967 and 1979. At least 60,000 tons of oil were lost in each spill.

13-22
World oil spills from tankers, 1973-1979

"Newsletter—worldwide tanker losses and oil spills—full years," Tanker Advisory Center, Inc., New York (April, 1980).

Data are based on reports by agents of Lloyd's of London. These include accidents resulting in insurance claims and other known accidents in oceans, estuaries, and fresh water. Accidents were caused by weather damage, strandings, collisions, other contact (rammed dock or moored vessel), fires and explosions, machinery damage, and other mishaps (lost anchor, crew negligence, steering trouble, breakdown at sea, etc.).

Data are for accidental spills from tankers, ore/oil carriers, and bulk/oil carriers capable of carrying at least 6,000 tons of cargo and fuel oil. Operational discharges (for example, those occurring when tanks are cleaned) and spills from liquid gas carriers are excluded.

13-23
Chlorofluoromethane production, 1967-1977

Stratospheric ozone depletion by halocarbons: Chemistry and transport, National Academy of Sciences (Washington, D.C., 1979), p. 21.

Chlorofluoromethane production shown includes the total of the compounds F-11, F-12, and F-22, which are about 95 percent of the chlorofluoromethanes produced.

13-24
Carbon dioxide concentrations in air, 1958-1979

"Atmospheric carbon dioxide concentration, the observed airborne fraction, the fossil fuel airborne fraction, and the difference in hemispheric airborne fractions," R. B. Bacastow and C. D. Keeling, in *Scope 16: Global carbon modelling*, B. Bolen, ed. (London: John Wiley and Sons, 1981).