

Chronology

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c. 15,000–10,000 BCE *Homo sapiens* arrives in North America, having crossed a land bridge between Siberia and Alaska. (In the absence of definitive archaeological, genetic, or other evidence, theories about the early history of human settlement in the Western Hemisphere continue to be revised; alternate models have proposed ocean voyages by Pacific or Atlantic routes, much earlier dates of initial settlement, and multiple waves of migration.)

c. 10,000 BCE The woolly mammoth (*Mammuthus primigenius*) becomes extinct over most of its range, which includes parts of the present United States. Climate change, human hunting, disease, or a combination of factors have been blamed for the species' demise. Most of North America's endemic Pleistocene megafauna—including horses, llamas, sloths, the mastodon, and big cats—disappear around the same time.

c. 2830 BCE A Great Basin bristlecone pine (*Pinus longaeva*) germinates in the White Mountains of California. Now named “Methuselah,” it is the world's oldest known surviving non-clonal organism.

c. 850–1150 CE The Anasazi, or ancient Puebloans, build the irrigation systems, multistory “great houses,” and astronomical sites of Chaco Canyon in present-day New Mexico. Around 1300 the canyon is abandoned, possibly as the result of climate change.

c. 1050–c. 1400 A Mississippian Indian city now known as Cahokia, near present-day St. Louis, Missouri, attains a population estimated at between 8,000 and 40,000, making it the largest settlement in pre-Columbian North America. The city is abandoned before 1400; disease, political disorder, and local environmental collapse caused by deforestation and over-hunting are among several hypotheses proposed to account for its demise.

1492 In October, an expedition led by Christopher Columbus arrives in the Bahamas, beginning a new phase in European exploration and inaugurating a major ecological event, the “Columbian Exchange” of species between the Old World and the New. The Native American population in the Western Hemisphere at the time of Columbus's voyages has been estimated at anywhere from about 8 million to over 100 million.

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Native Americans significantly modify the lands they inhabit, clearing and burning forests for agriculture, cultivating fields, and hunting. In subsequent years, millions of Native Americans die from diseases introduced by Europeans or are killed.

1620 William Bradford, arriving at Cape Cod in the *Mayflower*, sees what he later describes as “a hideous and desolate wilderness, full of wild beasts and wild men.”

1670 The Hudson’s Bay Company is established by royal charter from Charles II and joins an already flourishing trade in furs between North America and Europe.

1681 In his “Concessions to the Province of Pennsylvania,” William Penn stipulates that “in clearing the ground, care be taken to leave one acre of trees for every five acres cleared, especially to preserve oak and mulberries, for silk and shipping.”

1739 Benjamin Franklin’s *Pennsylvania Gazette* reports on a dispute over Philadelphia’s tanneries, from which “many offensive and unwholesome Smells do arise . . . to the great Annoyance of the Neighbourhood.” The Assembly accepts a proposal from the tanners to regulate their own trade; the *Gazette* argues that public rights ought to take precedence, and that tan-yards ought to be prohibited, as they are in other “well-regulated Towns and Cities.”

1781 Thomas Jefferson compiles his *Notes on the State of Virginia*, detailing the natural and demographic features of the state for a French correspondent.

1785 Congress passes an ordinance for the disposal of western lands that authorizes the survey of newly acquired lands and their division into regular townships and sections. Sections of each township are set aside “for the maintenance of public schools” and for veterans’ benefits. Boundaries established by the ordinance are often still visible and in use today.

1790 The first U.S. census reports a population of almost 4 million.

1800 U.S. population exceeds 5 million.

1802 Congress authorizes the creation of an Army Corps of Engineers.

1803 The United States buys the Louisiana Territory from France, doubling the nation’s size; at a total price of just over \$23 million, the final cost is about 4 cents an acre.

1804 On May 14 Meriwether Lewis and William Clark depart St. Louis with 30 soldiers, Lewis's slave York, and a Newfoundland dog. Their task is to explore the Louisiana Purchase and the territory between it and the Pacific at the behest of President Jefferson, who hopes they will find a way to reach the Pacific Ocean by boat. On the upper Missouri, they are joined by a Shoshone woman, Sacagawea. The Corps of Discovery arrives at the Pacific Ocean at the mouth of the Columbia River in 1805 and returns to St. Louis in 1806, producing extensive records and journals of the land and life encountered.

1808 John Jacob Astor founds the American Fur Company, which comes to dominate the U.S. fur trade.

1810 U.S. population grows to over 7 million.

1820 U.S. population grows to more than 9 million.

1824 With the passage of the General Survey Act and other legislation, the Army Corps of Engineers takes on increasing responsibility for public works, including road and canal surveys and river improvements.

1825 The Erie Canal, begun in 1798, is completed in October, linking the Hudson River with Lake Erie over a course of more than 350 miles; it enables transportation of immigrants, goods, and grain.

1827 John James Audubon begins publication of his *Birds of America*, completing the first edition in 1838.

1830 U.S. population reaches almost 13 million.

1834 Cyrus McCormick of Virginia patents a grain reaper that cuts and holds stalks for binding, significantly increasing farm productivity; along with his brothers, he later founds McCormick Harvesting Machine Company, one of the nation's largest manufacturers of agricultural equipment.

1840 U.S. population exceeds 17 million. In Paris, Alexis de Tocqueville publishes the second volume of his *Democracy in America*. "Europe is much concerned with the American wilderness," he writes, "but Americans themselves hardly give it a thought. The wonders of inanimate nature leave them cold, and it is hardly an exaggeration to say that they do not see the admirable forests that surround them until the trees fall to their axes. Another spectacle fills their eyes. The American people see themselves tramping through wilds, draining swamps, diverting rivers, populating solitudes, and taming nature."

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1845 On July 4, Henry David Thoreau moves into a small house he had built for himself on the shore of Walden Pond in Concord, Massachusetts, on land owned by Ralph Waldo Emerson. He will spend two years, two months, and two days there, keeping careful notes of all his observations, and publish *Walden, or Life in the Woods* in 1854. Also in July, journalist John L. O'Sullivan coins the phrase "manifest destiny," and urges U.S. annexation of new territories "for the free development of our yearly multiplying millions."

1846 Anglo-American periodicals use the phrase "acid rain" to translate a report from Nismes, Belgium, describing the phenomenon for the first time. The U.S. whaling fleet reaches its peak size of more than 700 vessels.

1849 The U.S. Department of the Interior is established alongside the existing executive departments of State, Treasury, and War. The Swamp Land Act is passed, giving Louisiana authority to build levees and drains for flood and mosquito control; it is soon extended to a dozen other states.

1850 U.S. population exceeds 23 million. The town of Lowell, Massachusetts, about 25 miles from Walden Pond, is home to ten large spinning mill complexes, employing more than 10,000 workers. With a population of 33,000, Lowell is the leading factory town in the United States.

1857 In October, New York City's Board of Commissioners of the Central Park announces a design competition for a great park. They select the naturalistic "Greensward" plan, by Frederick Law Olmsted and Calvert Vaux.

1859 On August 30, the first oil is pumped from a well in Titusville, Pennsylvania. Titusville is later hailed as "the birthplace of the petroleum industry"; refined as kerosene, its products begin to replace whale oil as a preferred fuel for lighting and are adopted for many other purposes.

1860 U.S. population exceeds 31 million.

1861 Carleton E. Watkins takes the first of his widely reproduced photographs of Yosemite.

1862 In May, President Lincoln signs the Homestead Act, which grants 160 acres of undeveloped western land to citizens who build a small

house on their quarter-section and farm it for at least five years. Subsequent amendments offer 640 acres in areas where the original allotment will not sustain a homestead; by 1900, settlers file claims for more than 80 million acres.

1864 *Man and Nature*, by George Perkins Marsh, is published. Marsh, a lawyer and former member of Congress, had been sent on diplomatic assignments to Greece and Italy, where he observed the arid land that had resulted from the heedless logging of forests. In June, President Lincoln signs a bill protecting Yosemite Valley and the nearby Mariposa Grove of giant sequoias as a public reserve, the Yosemite Grant, to remain inviolate forever; it is the first federal withdrawal of public lands for conservation purposes and effectively the first national park, though responsibility for the reserve is yielded to the state of California.

1866 Ernst Haeckel, a German biologist inspired by Charles Darwin's *Origin of Species* (1859), coins the term "oecologie."

1867 The United States buys Alaska from Russia—about 600,000 square miles for \$7.2 million, or about 2 cents an acre.

1869 On May 10, the completion of the first transcontinental railroad is celebrated with the driving of a golden spike at Promontory Summit, Utah. On May 24, Major John Wesley Powell begins the first of two descents of the Green and Colorado rivers, leading a party of nine from what is now Green River, Wyoming, to Grand Wash Cliffs at the terminus of the Grand Canyon, where he arrives in late August.

1870 U.S. population approaches 39 million. In Cleveland, John D. Rockefeller incorporates Standard Oil, which soon dominates the fledgling oil industry. Congress passes "An Act to prevent the Extermination of Fur-bearing Animals in Alaska," regulating the seal hunt and leasing hunting rights.

1871 John Burroughs publishes *Wake-Robin*, his first collection of nature essays. Congress, noting that "the most valuable food fishes of the coast and the lakes of the United States are rapidly diminishing in number, to public injury," authorizes the President to appoint a Commissioner of Fish and Fisheries. Ferdinand Hayden of the U.S. Geological Survey of the Territories travels with photographer William Henry Jackson and artist Thomas Moran through Yellowstone.

1872 In March, Congress authorizes the creation of Yellowstone National Park in the Wyoming and Montana territories; in the absence of state governments it remains under federal management. The Union Pacific Railroad, envisioning a tourist attraction, had lobbied strenuously for the new park, which includes geysers and mud pots, elk and bison, Yellowstone Lake, and a magnificent waterfall. The state of Nebraska deems April 10 a "Tree-Planting Day"; it is the prototype of subsequent Arbor Day celebrations. In May, Congress passes the General Mining Act. It allows the staking of claims on federal land and, if the claim proves out, the patenting of land for \$2.50 or \$5 an acre, depending on whether the ore is in a seam or a placer deposit in a stream. The law prompts a land rush that will result in hundreds of thousands of acres passing from public to private ownership.

1876 John Ericsson, designer of the Civil War ironclad *Monitor*, publishes *Solar Investigations*, detailing his development of a solar-powered engine, the "sun-motor." "I had to abandon my various schemes," he later writes, "not being able to compete with the vast energy stored up in lumps of coal. But the time will come when such lumps will be scarce as diamonds."

1877 In June, *Forest and Stream* notes: "The City of New York is greatly indebted to the American Acclimatization Society for the setting at liberty [of] a large number of common starlings (*Sturnus vulgaris*) in the Central Park." In the wake of this and subsequent introductions, the European starling becomes an abundant and widespread invasive species, with a detrimental effect on native bird populations.

1878 In April, John Wesley Powell submits his *Report on the Lands of the Arid Region of the United States* to Secretary of the Interior Carl Schurz in which he predicts that "all the waters of all the arid lands will eventually be taken from their natural channels" for irrigation. He proposes a system of water law that would favor small landholders and prevent domination of the region by absentee corporate interests, but his vision for the West will largely be ignored. In October, Thomas Edison files the first of several patent applications leading to the development of practical electric lighting. Alexander Starbuck, in his *History of the American Whale Fishery*, writes: "Whaling as a business has declined; 1st, from the scarcity and shyness of the whales, requiring longer and more expensive voyages; 2d, extravagance in fitting out and refitting; 3d, the character of the men engaged; 4th, the introduction of coal-oils."

1879 The California Electric Light Company in San Francisco sets up the nation's first central electric utility station. Congress passes the Timber and Stone Act, offering federal land considered "unfit for farming" to small holders at \$2.50 an acre; fraud enables large companies to buy much of the more valuable land.

1880 U.S. population exceeds 49 million.

1881 Chicago and Cincinnati pass the country's first air pollution ordinances.

1884 In January, the U.S. Circuit Court in San Francisco rules that hydraulic gold mining, which fills riverbeds with immense volumes of silt and gravel, flooding out farmers in California's Central Valley, is "a public and private nuisance," and issues an injunction against the practice.

1885 Coal becomes the principal source of energy in the U.S., surpassing wood, as demand from railroads and the steel industry increases. The Adirondack Forest Preserve, including some 6 million acres of public and private land, is created by act of the New York State Legislature; in 1894, the state's constitution decrees that these lands, now known as the Adirondack Park, "shall be forever kept as wild."

1886 The National Audubon Society is founded by naturalist and writer George Bird Grinnell. Its mission is to bring public attention to the killing of birds for their meat, eggs, and feathers; the fledgling organization collapses after 39,000 people join in its first year. (In 1896 Harriet Hemenway of Boston founds the Massachusetts Audubon Society, and in 1902, several state Audubon societies affiliate to become the new National Audubon Society.)

1887 The Boone and Crockett Club is formed by Theodore Roosevelt and George Bird Grinnell. Its purpose is to promote "manly sport with the rifle" and to defend the integrity of Yellowstone Park.

1889 In *The Extermination of the American Bison*, William T. Hornaday reports that only 1,091 bison (*Bison bison*) remain alive in North America—635 of them in the wild—out of an 1870 population estimated at over 5 million and pre-18th century numbers of at least 25 million. Albert Pope introduces the "safety" bicycle featuring same-size wheels, ball-bearings, and pneumatic tires; by 1896 four million Americans own "safeties."

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1890 U.S. population approaches 63 million. In September, Congress authorizes the creation of Sequoia National Park, south of Yosemite. In October, after intense lobbying by John Muir and others, the Yosemite Reserve of 1864 is expanded and made into Yosemite National Park. The new park records 4,500 visitors in its first year (over 3.2 million will come in 2006); the state of California retains management authority over Yosemite Valley and the Mariposa Grove until 1906, when it cedes them back to the federal government after an intense legislative struggle.

1891 Congress passes the General Land Revision Act in March. (President Benjamin Harrison sets aside 13 million acres in the public domain as forest reserves by 1893; in 2007 there are approximately 190 million acres of national forests.)

1892 In February, in the wake of escalating tensions between Great Britain and the U.S. over pelagic seal hunting in the Bering Sea and dramatic declines in seal populations, a treaty is signed agreeing to resolve the dispute by arbitration. Great Britain argues that its ships have the right “to come and go upon the high sea without let or hindrance, and to take therefrom at will,” while the U.S. claims the right to preserve its seal populations—“half human in their intelligence, valuable to mankind, almost the last of their species”—from unsustainable pelagic hunting. The arbitrators rule in Britain’s favor, ordering large damages be paid for three vessels seized in 1886–87, while also ordering a one-year moratorium on pelagic hunting, imposing seasonal limits, and prohibiting the use of explosives, firearms, and nets. These measures fail to stem the seals’ ongoing decline. Scottish-born naturalist and writer John Muir, the painter William Keith, several businessmen, bankers, and lawyers from San Francisco, and professors from Stanford and the University of California at Berkeley form the Sierra Club in May to defend Yosemite National Park against efforts to shrink its boundaries and to “explore, enjoy, and render accessible the mountain regions of the Pacific Coast.”

1893 Historian Frederick Jackson Turner publishes “The Significance of the Frontier in American History,” an essay arguing that “the forces dominating American character” had been shaped by the “return to primitive conditions” experienced during the westward expansion of European settlement in the U.S. According to Turner, the 1890 census announced the effective end of the frontier.

1899 Congress enacts the Rivers and Harbors Act, often referred to as the first federal environmental law. It bans the construction of bridges, dams, dikes, and other structures in or over navigable waters without congressional approval and forbids the unauthorized disposal of dredged or fill material in such waters as well. Gifford Pinchot, the first American to be formally trained in the new European science of forestry, is named head of the Division of Forestry with the responsibility to oversee the forest reserves. Pinchot and John Muir espouse opposing philosophies of natural-resource management; Muir campaigns for the preservation of large tracts of wilderness while Pinchot promotes the sustainable “wise use” of resources for the long-term public benefit of people (“each year cut no more than is grown”).

1900 U.S. population exceeds 76 million. The Lacey Act becomes the first federal law protecting game, prohibiting the interstate shipment of illegally taken wildlife and importation of invasive non-native species. Enforcement of the act becomes the responsibility of the Biological Survey within the Department of Agriculture.

1902 Congress establishes the United States Reclamation Service (later renamed the Bureau of Reclamation) in July; the agency will eventually complete over 600 dams and reservoirs in western states, becoming the largest U.S. water wholesaler and the second-largest hydroelectric provider. The bison population of Yellowstone National Park—the last remaining wild herd in the U.S.—is counted at 23.

1903 The first Federal Bird Reservation is established by President Theodore Roosevelt on Pelican Island, Florida, and placed under the jurisdiction of the Biological Survey. (Pelican Island and other early federal wildlife reservations are re-designated as national wildlife refuges in 1942. Though the primary purpose of the refuges is to provide protected habitat for many species of wildlife, the managers of some of the refuges allow hunting, oil and gas drilling, logging, and practice bombing by the military.)

1904 An Asian bark fungus (*Cryphonectria parasitica*) is reported in American chestnut trees (*Castanea dentata*) in the Bronx Zoo; by 1950, the chestnut—an important part of Appalachian forest ecosystems from Maine to Florida—is largely wiped out.

1905 The Forest Service is established within the Department of

Agriculture to manage U.S. forest reserves (referred to as “National Forests” beginning in 1907), with Gifford Pinchot as its first chief. The agency manages federal forests and grasslands in the interests of wild-life habitat, watershed protection, recreation, and timber production.

1906 The Antiquities Act, which authorizes the President to set aside federal lands as national monuments or historic sites without congressional action, becomes law in June. Many areas, including the Grand Canyon, Grand Teton, Bryce Canyon, and Death Valley, are first protected under the Antiquities Act and later are made national parks by acts of Congress. (The act is challenged repeatedly in court as an unconstitutional infringement on congressional power, but the Supreme Court will uphold the law. Congress amends the act in 1950 to restrict its use in Wyoming, and in 1980 to limit it in Alaska.) The Department of Agriculture conducts its first inventory of “swamp and overflowed lands” in the U.S. to identify areas that can be reclaimed for farming and other uses.

1908 Grand Canyon National Monument is created by President Theodore Roosevelt, who says from the canyon’s south rim: “Leave it as it is. The ages have been at work on it and man can only mar it.” Roosevelt convenes the first Governors’ Conference on Conservation, inspiring many state-level conservation measures, and creates a National Conservation Commission, chaired by Gifford Pinchot, to conduct an inventory of America’s natural resources, which they present to Congress in 1909. The National Bison Range is established in Montana.

1910 U.S. population exceeds 92 million. Gifford Pinchot, dismissed from his government post by President Taft, serves as president of the recently founded National Conservation Association and publishes *The Fight for Conservation*.

1911 The output of the “modern” whaling industry—dominated by Norwegian factory vessels hunting in Antarctic waters—surpasses the peak levels attained by the American whaling fleet in the 1840s and 1850s. In July, the North Pacific Fur Seal Treaty joins Great Britain, Japan, Russia, and the U.S. in an agreement to ban pelagic sealing for 15 years and land sealing for five years. Russia and the U.S., together home to the principal seal rookeries, agree to share hunting revenues with the pelagic sealing nations. Seal populations—having fallen to around 300,000 from an estimated 3–4 million before commercial hunting—begin a dramatic recovery.

1913 After a decade-long dispute, Congress and President Wilson authorize the building of the O'Shaughnessy Dam at Hetch Hetchy Valley in Yosemite National Park despite vigorous opposition by John Muir and the Sierra Club

1914 Assembly-line production of the Ford Model-T automobile increases dramatically and Ford becomes the world's largest industrial enterprise. On September 1, the last surviving passenger pigeon (*Ectopistes migratorius*), named Martha, dies in the Cincinnati Zoo. Until the 19th century, passenger pigeons were among the most numerous birds in North America; they became extinct because of widespread hunting for food and the destruction of their forest habitat.

1916 The National Park Service is created to manage the growing number of federal parks. Housed in the Department of the Interior, its first director is Stephen Mather, a member of the Sierra Club who had favored the construction of the dam in Hetch Hetchy and feuded with John Muir.

1917 Mount McKinley National Park is established in the Alaska Territory.

1918 Save-the-Redwoods League is founded in California and raises money to buy surviving stands of old-growth *Sequoia sempervirens*, eventually deeding most of them to the state of California to become state parks. Congress passes the Migratory Bird Treaty Act, ratifying an earlier treaty protecting birds that migrate between the U.S. and Canada; subsequent agreements with Mexico (1936), Japan (1972), and the Soviet Union (1976) expand the list of protected bird species, now numbering over 800.

1919 Grand Canyon National Park is created, incorporating much of the national monument designated in 1908.

1920 U.S. population exceeds 106 million. The Mineral Leasing Act becomes law; it regulates the extraction of coal, oil, and natural gas on federal lands not covered by the General Mining Act of 1872.

1922 California's last known surviving grizzly bear (*Ursus arctos horribilis*) is shot and killed. The grizzly is the state's official mammal and appears on the state flag.

1924 In June, at the urging of Aldo Leopold, the Forest Service protects a section of the Gila National Forest as the Gila Wilderness; it is the first officially designated "wilderness" area in the U.S.

1930 U.S. population exceeds 123 million.

1931 In April, construction begins on the massive Boulder Canyon Project (later known as Hoover Dam) on the Colorado River. In the wake of a widening drought, the plains of the Midwest and the South experience several “black blizzards,” harbingers of what will become known as the Dust Bowl. Dutch elm disease, already responsible for widespread “elm death” in northern Europe, is reported in trees in Cleveland and Cincinnati. Though attempts are made at containment, the disease begins to spread throughout North America, devastating both forest and urban plantings.

1933 In March, the administration of Franklin D. Roosevelt creates the Civilian Conservation Corps as part of its New Deal program. By 1942, when the Corps is disbanded, over 3 million people have been employed in a variety of projects: building park trails and logging roads, planting trees, and working to prevent soil erosion and forest fires. In May, President Roosevelt signs a bill establishing the Tennessee Valley Authority. The Soil Erosion Service is established in September. In December, the Supreme Court rules in favor of New Jersey in an ocean dumping case against New York City, preventing the city from disposing of “offensive or injurious matter” off the New Jersey coast. Construction begins on the Grand Coulee Dam on the Columbia River.

1934 In March, Congress passes the Migratory Bird Hunting Stamp Act, which requires bird hunters to buy a license stamp. Revenues from the program—over \$670 million cumulatively by 2003—are used to preserve wetlands, and cartoonist J. N. “Ding” Darling, who conceived it, designs the first stamp. Beginning in the spring, vast dust storms bury the high plains of Oklahoma, Texas, New Mexico, Colorado, and Kansas under millions of tons of wind-blown soil and darken skies in Chicago and New York City. Severe wind erosion caused by drought and over-farming continues for years. An estimated 2.5 million people emigrate from the affected areas over the next half-decade.

1935 On April 14—“Black Sunday”—another massive dust storm rises from the plains; an Associated Press reporter traveling through Oklahoma coins the phrase “Dust Bowl.” Within two weeks, Congress establishes the Soil Conservation Service (moving the Soil Erosion Service into the Department of Agriculture), and by December over 30,000 workers are assigned to erosion control projects. Ornithologists from Cornell Univer-

sity make film and sound recordings of the endangered ivory-billed woodpecker (*Campephilus principalis*) in the Singer Tract, a remnant of old-growth forest in Louisiana; by 1944, after extensive logging in the Tract, only one bird is known to survive in the U.S. In May, President Roosevelt establishes the Rural Electrification Administration to bring electric power to rural communities (almost 90 percent of which are not connected to utilities). In June, Congress passes the Taylor Grazing Act, which regulates grazing on federal lands in an attempt to prevent their deterioration. The General Wildlife Federation is created to protect habitat for birds and other species (in 1936 its name is changed to the National Wildlife Federation). The Wilderness Society is created by Robert Marshall, Benton MacKaye, Aldo Leopold, Bernard Frank, and Harvey Broome, with Robert Sterling Yard as its first president; its goal is to give permanent protection to wilderness throughout the country.

1936 Hoover Dam is completed in March. Lake Mead, behind the dam, is the largest man-made lake in the U.S.

1939 The Bureau of Fisheries and the Biological Survey are combined to become the Fish and Wildlife Service, under the jurisdiction of the Department of the Interior. The agency administers the national wildlife refuges and eventually the 1973 Endangered Species Act.

1940 U.S. population exceeds 132 million.

1942 In December, a group led by Nobel laureate Enrico Fermi achieves the first self-sustaining nuclear chain reaction in a laboratory under the University of Chicago football stadium.

1945 In July, the U.S. conducts a nuclear weapons test—the first of more than 1,000—near Alamogordo, New Mexico. In August, the U.S. drops atomic bombs on Hiroshima and Nagasaki, killing at least 115,000 people and prompting Japanese surrender in World War II. American farmers begin widespread use of the pesticide DDT.

1946 The Bureau of Land Management is created within the Interior Department by merging the Grazing Service and the General Land Office. The BLM oversees federal land not under the jurisdiction of the National Park Service, the Forest Service, the Fish and Wildlife Service, or the military. Much of it is rangeland, and the agency, which tends to favor resource extraction, is called “the Bureau of Livestock and Mining” by its critics. The Ecologists Union is founded, determined to take “direct action” to save

threatened areas; it is later renamed The Nature Conservancy and in 1955 begins acquiring land for conservation. In August, President Truman signs the Atomic Energy Act, establishing the Atomic Energy Commission under civilian control and regulating the dissemination of information about nuclear power and nuclear weapons. The International Convention for the Regulation of Whaling, signed in Washington, D.C., in December, establishes the International Whaling Commission to oversee the conservation of declining whale fisheries.

1947 The Los Angeles Air Pollution Control District—the nation's first such agency—is established in October to confront the city's increasing smog problems. It regulates industrial air pollution and later bans residential incinerators. In December, President Truman dedicates the Everglades National Park, preserving what remains—about one-quarter—of the vast wetland that once covered the lower third of the Florida peninsula, much of the rest having been drained for agriculture and later housing development by the U.S. Army Corps of Engineers. Water diversion, polluted runoff from sugar-cane fields and cattle ranches, and ongoing development continue to damage the park's ecosystems.

1948 A weather inversion traps gases emitted by smelters operated by U.S. Steel at Donora, Pennsylvania, killing 21 people and sickening 6,000, one-third of the town's population. The National Park Service reports over a million visitors to Yellowstone National Park.

1949 Aldo Leopold's *A Sand County Almanac* is published.

1950 U.S. population approaches 152 million.

1951 Oil passes coal as the principal energy source in the U.S.

1952 David Brower is hired as the first executive director of the Sierra Club. Brower has been active in club affairs as editor of the *Sierra Club Bulletin* and a leader of hiking and climbing expeditions. He leads a campaign to block a plan to build two hydroelectric dams inside Dinosaur National Monument in northeast Utah. The campaign, which involves publication of a campaign book and newspaper advertising, succeeds when plans for the dams are dropped in 1955 as part of a deal in which the Sierra Club agrees not to oppose a dam at Glen Canyon. (Brower will later bitterly regret the compromise.)

1953 In December, President Dwight Eisenhower delivers his “Atoms for Peace” speech at the United Nations General Assembly, proposing international nuclear cooperation.

1954 In April, researchers at Bell Laboratories announce development of a silicon-based solar battery. *The New York Times* argues that the invention “may mark the beginning of a new era, leading eventually to the realization of one of mankind’s most cherished dreams—the harnessing of the almost limitless energy of the sun.” In August, President Eisenhower signs the Atomic Energy Act of 1954, easing restrictions on the international exchange of nuclear technology and enabling the commercial development of nuclear power.

1955 Under pressure from the timber industry, the Forest Service increases the “allowable cut” in federal forests to 8.6 billion board feet, up from 5.6 billion in 1949. The first commercial whale-watching cruises are offered from a San Diego municipal pier; thousands gather on the California coast to watch migrating gray whales (*Eschrichtius robustus*).

1957 In July, the Sodium Reactor Experiment, a nuclear facility at the Santa Susana Field Laboratory, near Los Angeles, begins supplying power to the local grid. In December, the Shippingport Reactor in Pennsylvania comes on line; it is the first large-scale commercial reactor in the U.S.

1960 U.S. population exceeds 179 million. *This Is the American Earth*—the first in the Sierra Club’s “Exhibit Format” series of large, illustrated conservation books—is published in May. Based on an exhibit put together by Ansel Adams and Nancy Newhall for the Smithsonian Institution, with photographs by Adams and others and a text by Newhall, it is the subject of enthusiastic reviews and editorials across the country; Supreme Court Justice William O. Douglas calls it “one of the great statements in the history of conservation.”

1962 *Silent Spring* is published. The author is Rachel Carson, a zoologist and marine biologist previously known for her best-selling books on marine and coastal wildlife. First published in *The New Yorker*, the book warns of the devastation that pesticides, particularly DDT, and other chemicals are wreaking on birds and other creatures. Carson is criticized by the chemical industry, parts of the food industry, and some academic scientists, but the book is a best seller and has an immense impact worldwide.

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1963 Congress passes the Clean Air Act in July (significantly expanding it in 1970, 1977, and 1990), and ratifies the Limited Nuclear Test Ban Treaty in September, ending American, British, and Soviet testing of nuclear weapons in the atmosphere, underwater, and in space. (Although this treaty has only limited impact on the nuclear arms race, and other nations continue atmospheric tests for some years, it ends atmospheric testing of nuclear weapons by the U.S.)

1964 The Wilderness Act is passed and signed by President Lyndon Johnson eight years after it was first introduced. The law sets aside 9.1 million acres of national forest land to be preserved in perpetuity from any and all development, “where man is a visitor but does not remain.” Congress will add national forest lands and lands managed by the National Park Service and the Bureau of Land Management to the system, which will grow to 100 million acres.

1965 The Department of the Interior announces in February that traces of DDT have been found in the tissue of Antarctic seals and penguins. In July, the Scenic Hudson Preservation Conference—an alliance of local residents and national environmental groups—files a lawsuit before the Federal Power Commission seeking to challenge permits sought by Consolidated Edison for a hydroelectric plant at Storm King Mountain on the Hudson River in New York. The commission argues that the organizations have no material interest in the matter and therefore lack legal standing to bring the case, but the U.S. Court of Appeals for the Second Circuit rules in December that “aesthetic, conservational, or recreational” interests can suffice to establish standing, a precedent that permits increased environmental litigation.

1966 In June, the Sierra Club publishes ads in several newspapers opposing Bureau of Reclamation efforts to build two hydroelectric dams inside the Grand Canyon. One ad is headlined “Should We Also Flood the Sistine Chapel So Tourists Can Get Closer to the Ceiling?” Immediately following publication, the IRS announces that it is reviewing the tax deductible status of contributions to the club. The club challenges the agency in court and loses, suffering a drop in major contributions but a large increase in membership. David Brower observes that “people may not know whether or not they like the Sierra Club, but they know what they think about the IRS.” In October, the Enrico Fermi Nuclear Reactor near Detroit, Michigan, suffers a partial core meltdown. Though no radiation escapes, officials are forced to consider a large-scale evacuation.

1967 The Environmental Defense Fund is founded by attorneys and scientists in New York who begin litigation to ban the pesticide DDT. The U.S. Fish and Wildlife Service publishes its first list of endangered species.

1968 The discovery of an oil field beneath the North Slope of Alaska and the Beaufort Sea, larger than any previously known in the U.S., is announced in March, and within the year plans begin for the construction of a Trans-Alaska pipeline. *The Population Bomb*, by Stanford biologist Paul R. Ehrlich, becomes a best seller following its publication in May; it predicts widespread famine in the wake of global overpopulation. In September, Congress declines to fund the proposed construction of two dams inside the Grand Canyon. In October, President Johnson signs legislation creating the North Cascades National Park, Redwood National Park, and the Wild and Scenic Rivers System, protecting waterways with “outstandingly remarkable” features.

1969 An oil rig in the Santa Barbara Channel operated by Union Oil Company blows out, spilling 3 million gallons of crude oil into the ocean and creating a slick that eventually covers 800 square miles, fouling beaches and killing an estimated 10,000 birds. David Brower is forced to resign as executive director of the Sierra Club after an internal power struggle; he founds Friends of the Earth in the United States. (A year later, Les Amis de la Terre is founded in France. Friends of the Earth International eventually includes groups in about 70 nations.)

1970 U.S. population exceeds 203 million. U.S. domestic oil production, having risen sharply and consistently for many decades, peaks at about 9.5 million barrels per day. The National Environmental Policy Act (NEPA), introduced by Washington senator Henry “Scoop” Jackson, becomes law on January 1. It requires federal agencies to analyze the environmental impact of major federal projects, inform the public of pending projects and allow comments to be registered, and establishes the Council on Environmental Quality, a White House agency charged with coordinating environmental policy. In March, Alaska Native and environmental groups including the Environmental Defense Fund, Friends of the Earth, and The Wilderness Society file lawsuits to block construction of the Trans-Alaska pipeline, alleging failure to hire Native contractors and failure to study environmental impacts. The first Earth Day is celebrated on April 22. Conceived by Wisconsin senator Gaylord Nelson,

it attracts an estimated 20 million participants nationwide. In June, the Ford Foundation awards \$100,000 in seed money to the Natural Resources Defense Council, founded by a group of young lawyers. A major extension of the 1963 Clean Air Act becomes law, despite opposition from the automobile industry, establishing national ambient air quality standards and regulating tailpipe emissions and hazardous pollutants. In December, President Nixon establishes the Environmental Protection Agency by executive order.

1971 In January, two tankers operated by Standard Oil of California collide in dense fog under the Golden Gate Bridge, spilling 800,000 gallons of oil into San Francisco Bay and causing widespread damage and public outrage. In March, faced with citizen protests over exhaust and noise pollution, Congress votes to end funding for a supersonic passenger plane. In July, Oregon enacts the nation's first statewide container deposit law, the Oregon Bottle Bill. Similar laws are eventually passed in ten other states. In September, the *Phyllis Cormack*, rechristened *Greenpeace*, sails from Vancouver with a crew of U.S. and Canadian activists to protest an underground nuclear test in the Aleutian Islands; the group later attempts to disrupt French nuclear testing and Soviet whaling in the Pacific. (In 1979, Greenpeace International unites loosely affiliated Greenpeace groups that have been started throughout the world.) The Alaska Native Land Claim Settlement Act becomes law in December, transferring 44 million acres and nearly a billion dollars, half of which is to come from new oil revenues, to Native Alaskans. The law extinguishes Native claims for most of the state, sets up regional Native corporations to administer land grants, and removes a political obstacle impeding construction of the Trans-Alaska pipeline. Sierra Club Legal Defense Fund (later renamed Earthjustice) is created to provide legal services to the Sierra Club and other environmental organizations.

1972 In April, the Supreme Court issues its decision in *Sierra Club v. Morton* in a dispute over a large ski resort the Walt Disney Corporation plans to build in Mineral King valley in the Sierra Nevada. Though the Sierra Club loses its case, the litigation affirms the principle that conservation groups can take their grievances to the federal courts. (The ski resort is never built.) In June, Stockholm hosts the United Nations Conference on the Human Environment. More than a thousand journalists from across the world attend the gathering, along with thousands of activists. Whaling by Japan and other nations and the use of the toxic

defoliant Agent Orange by the U.S. military are among the most hotly debated issues. During the last days of the conference, the EPA bans the use of DDT in the U.S. In September, at a conference in Bucharest, Norwegian philosopher Arne Naess presents the concept of “deep ecology” and calls for a holistic, egalitarian, and global approach to environmental problems. In October, Congress passes new environmental laws: the Marine Protection, Research and Sanctuaries Act (also known as the Ocean Dumping Act), which gives the EPA regulatory power over waste disposal in U.S. territorial waters; the Marine Mammal Protection Act; and the Federal Water Pollution Control Act (also known as the Clean Water Act).

1973 CITES, the Convention on International Trade in Endangered Species of Wild Fauna and Flora, is finalized in March. In May, the Izaak Walton League sues the Forest Service, claiming the agency’s preferred logging method—clear cutting, which strips large expanses of forest bare of all trees—is illegal. A federal judge agrees and halts the practice nationwide, prompting legislative efforts to permit its return. In July, Vice President Spiro Agnew breaks a tie in the Senate, enabling passage of an amendment that declares the Trans-Alaska pipeline in compliance with the National Environmental Policy Act. In October, the Organization of Petroleum Exporting Countries suspends shipments of crude oil to nations that supported Israel during the Yom Kippur War, triggering long lines at filling stations, rationing, and a sharp spike in gasoline prices. In the wake of the embargo, the U.S. introduces the 55-mph national speed limit (in effect until 1995), an extended daylight saving time (until 1976), a Strategic Petroleum Reserve, Corporate Average Fuel Economy standards, and a cabinet-level Department of Energy. In November, President Nixon signs the Trans-Alaska Pipeline Authorization Act. The EPA announces regulations requiring a gradual phase-out of leaded gasoline. The Endangered Species Act becomes law in December. It sets up a system for listing rare species as “threatened” or “endangered,” for designating “critical habitat,” and for ensuring that actions undertaken or permitted by the federal government not “jeopardize” the species or hinder its chances of recovering. Construction begins on the Watts Bar Nuclear Generating Station near Spring City, Tennessee, the last commercial nuclear power plant in the U.S. to come on line (as of 2007). A group of 54 produce growers forms California Certified Organic Farmers, which promotes and sets standards for organic agriculture.

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1974 President Gerald Ford signs the Safe Drinking Water Act in December.

1975 The Eastern Wilderness Act is signed into law in January after a campaign lasting several years. It protects 207,000 acres of wilderness in 13 states, mostly recovering forests that have been acquired by the federal government after extensive logging. Construction of the Trans-Alaska pipeline resumes in March.

1976 The National Forest Management Act becomes law, superseding the Organic Act of 1897 and allowing clear cutting to resume. The Federal Land Policy and Management Act is passed. It guides management of lands controlled by the Bureau of Land Management and allows Congress to consider creating wilderness areas on BLM lands; it also ends land claims under the 1862 Homestead Act, except in Alaska where the last Homestead Act claimant receives land in 1988. *Foreign Affairs* publishes an essay by Amory Lovins entitled "Energy Strategy, The Road Not Taken?" It describes a "hard path" relying on fossil fuels and nuclear fission, and a "soft path" that depends on conservation and renewable energy sources such as wind and solar power.

1977 In April, over 2,000 Clamshell Alliance protestors occupy the construction site of a nuclear reactor at Seabrook, New Hampshire; 1,414 are arrested and detained. (Only one of the two reactors planned for the site ultimately comes on line, and the owner of the Seabrook Station is bankrupted by the project.) In July, the Trans-Alaska pipeline delivers its first oil to the Valdez terminal on Prince William Sound.

1978 The Smithsonian Institution lists close to 10 percent of 22,000 plant species native to the continental U.S. as threatened or endangered, largely because of habitat loss. President Jimmy Carter declares an emergency at Love Canal, a neighborhood in Niagara Falls, New York, contaminated for years by toxic waste by Hooker Chemical Company. All residents are evacuated, and the federal government buys their abandoned property; a leader of the local protest group, Lois Gibbs, later moves to Washington, D.C., and starts the Citizens Clearinghouse for Hazardous Waste. The EPA bans the use of chlorofluorocarbon propellants in aerosol cans. In June, the Supreme Court upholds the Endangered Species Act in a case involving the snail darter (*Percina tanasi*), a tiny fish threatened by the Tellico Dam on the Little Tennessee River in eastern Tennessee. (Congress later exempts "economically important" federal projects from

the provision of the ESA; a federal court finds the Tellico Dam not economically important; Congress votes to exempt the Tellico Dam from the ESA and the dam is built. Remnant populations of the snail darter are discovered elsewhere, and its status is lowered from “endangered” to “threatened.”)

1979 In March, the Three Mile Island nuclear power plant near Harrisburg, Pennsylvania, suffers a partial meltdown, prompting evacuation of the surrounding area. The accident delivers a major setback to the American nuclear industry. In April, the EPA bans production of polychlorinated biphenyls, a notably toxic class of persistent organic pollutants. Facing a sharp spike in oil prices precipitated by the Iranian Revolution and a broader “crisis of confidence,” President Carter addresses the nation in July, urging conservation. He lowers federal thermostats and installs solar panels on the White House roof. (President Reagan later has the panels removed.) Inspired by Edward Abbey’s novel *The Monkey Wrench Gang* (1975), Earth First! is founded by four young men who feel that the mainstream environmental movement has become too willing to compromise. Its motto: “No Compromise in Defense of Mother Earth.”

1980 U.S. population approaches 227 million. In June, the Supreme Court decides *Diamond v. Chakrabarty*, ruling that a genetically modified organism may be patented; Anand Chakrabarty, a General Electric engineer, had developed a transgenic bacterium to help clean up oil spills. In December, President Carter signs the Alaska National Interest Lands Conservation Act, protecting 104 million acres in parks, refuges, and wilderness areas; it expands Mount McKinley National Park, renamed Denali National Park, and the Arctic National Wildlife Refuge. Also in December, Congress passes the Comprehensive Environmental Response, Compensation and Liability Act, commonly known as the Superfund Act, in the wake of the Love Canal disaster; it identifies hazardous waste sites, determines parties responsible for cleanup, and provides funds for federal remediation where the original polluters are bankrupt or unidentifiable.

1981 James G. Watt becomes Secretary of the Interior after leading the Mountain States Legal Foundation, which represents the interests of miners, ranchers, timber companies, and other extractive industries. His nomination is opposed by a majority of environmental organizations; a petition calling for his ouster is signed by more than a million people. He resigns in 1983.

1982 The International Whaling Commission, meeting in Brighton, England, approves a moratorium on commercial whaling to take effect in 1985, the result of an intense campaign carried out by activists throughout the world. Japan and Norway defy the ban and continue whaling. Dr. Benjamin Chavis of the NAACP coins the term “environmental racism” in discussing the proposed placement of a PCB landfill in Warren County, North Carolina. Congress passes the Nuclear Waste Policy Act, seeking a 10,000-year disposal site for radioactive materials stored at a host of temporary locations. Under the Act, Nevada’s Yucca Mountain is selected for development as a nuclear waste repository in 1987; the Department of Energy currently projects an opening date of 2017.

1983 In February, the EPA agrees to buy out and evacuate the residents of Times Beach, Missouri, following the revelation late in 1982 that dioxin contamination in the soil dramatically exceeded safe levels. (A contractor hired to spray oil on the town’s roads, to suppress dust, had used toxic industrial waste.) Times Beach becomes a Superfund site, and is soon disincorporated and demolished. Plans to log a stand of old-growth trees in the Siskiyou National Forest in Oregon spark a protest, in April, by members of Earth First!, who block timber company bulldozers for months. The Forest Service later cancels the timber sale, and the area is incorporated into the South Kalmiopsis Roadless Area.

1984 In June, César Chávez of the United Farm Workers calls for a renewed boycott against the California table-grape industry to protest worker exposure to pesticides; he later goes on a 36-day hunger strike to draw attention to the issue. In December, an accident at a Union Carbide pesticide factory in Bhopal, India, releases methyl isocyanate and other toxic gases into the city, killing an estimated 7,000 people within a few days and ultimately causing an estimated 15,000 more deaths. Union Carbide, a U.S.-based multinational, denies responsibility; its CEO, later arrested on manslaughter charges, leaves India on bail and is not extradited.

1985 In the May issue of *Nature*, British scientists report a hole in the ozone layer over Antarctica; their finding suggests ozone depletion is occurring more rapidly than previously expected. The Department of Agriculture begins its “Swampbuster” program, denying federal subsidies to farmers who drain wetlands; the program is later expanded to offer incentives for wetlands restoration.

1986 Harvesting of trees from the national forests reaches 5 billion board feet, up from 900 million in 1946. (Only 10 percent of America's old-growth forests remain.) The USDA, the EPA, and the FDA establish the Coordinated Framework for Regulation of Biotechnology to regulate newly developed transgenic organisms.

1987 The Montreal Protocol on Substances that Deplete the Ozone Layer is adopted by more than 100 countries. It calls for a reduction in the emission of ozone-depleting chemicals by 2000, but is amended in 1990 and 1992 to call for a complete phase-out of the use of chlorofluorocarbons, halons, and carbon tetrachloride by 2000 and methyl chloroform by 2005.

1988 The Intergovernmental Panel on Climate Change is established to investigate whether carbon dioxide and other gases are causing a warming of the global atmosphere and, if so, whether human activity is a major contributor. After many years of warnings from the scientific community, NASA climatologist James Hansen declares that "global warming is here." The federal government, asserting damage to the Everglades National Park and the Loxahatchee National Wildlife Refuge, sues the state of Florida for failing to enforce environmental laws.

1989 In March, the oil tanker *Exxon Valdez* runs aground in Alaska's Prince William Sound, spilling an estimated 11 million gallons of North Slope crude. The spill covers over 6,000 square miles of ocean and over 800 miles of shoreline, killing hundreds of thousands of marine animals and causing long-term environmental degradation. Alar, a controversial agricultural chemical used mainly on apples, is withdrawn by its manufacturer in June following a *60 Minutes* report based on a study by the Natural Resources Defense Council; the EPA later bans the product. In October, international trade in elephant ivory is banned.

1990 U.S. population approaches 249 million. The northern spotted owl (*Strix occidentalis caurina*), dependent on the old-growth forests of Washington, Oregon, and California for its habitat, is listed as a threatened subspecies under the Endangered Species Act in June, following litigation brought by environmental groups. (The listing provokes considerable controversy, and becomes an issue in the 1992 presidential campaign.) Sulfur dioxide emissions from U.S. coal plants reach 28 million tons, almost double the emissions before World War II. In August, in the wake of the *Exxon Valdez* disaster, Congress passes the Oil Pollution Act.

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The National Wetlands Inventory reports that, since the 1780s, the U.S. has lost over half of its wetlands.

1991 The first National People of Color Environmental Leadership Summit is held in Washington, D.C., attracting more than a thousand participants. In a negotiated settlement following a 1988 federal lawsuit, plans begin for restoring water flows in the Florida Everglades and regulating the use of agricultural chemicals in the surrounding region.

1992 Canada, Mexico, and the U.S. sign the North America Free Trade Agreement, easing trade restrictions among the three countries. The proposed treaty causes a rift within the environmental movement, with some organizations in support and others claiming that it could undermine environmental laws and labor protections in the U.S. The United Nations holds an Earth Summit in Rio de Janeiro on the 20th anniversary of the 1972 Stockholm conference; major treaties concerning climate and biodiversity are adopted.

1993 Water contaminated with cryptosporidium, a protozoan parasite, sickens more than 400,000 and kills more than 100 people in the Milwaukee area beginning in March. Blame is leveled at one of the city's water-treatment facilities, leading the EPA to tighten water-quality regulations. In April, President Bill Clinton hosts a "Forest Summit" in Portland, Oregon, to try to solve the timber conflict in the Northwest. Several Cabinet members attend, along with loggers, environmentalists, scientists, and others. As a result of the summit, a new Northwest Forest Plan aims to balance preservation with production of a sustainable supply of wood and pulp. The EPA establishes a 25-member National Environmental Justice Advisory Council in late September, bringing representatives of community, industry, governmental, tribal, activist, and academic groups together to discuss issues of environmental justice.

1994 President Clinton issues an executive order in February directing all federal agencies to conduct their activities in a way that will promote environmental justice. In May, the FDA allows the sale of the rot-resistant Flav'r Savr™ tomato, the first genetically modified whole food intended for public consumption; after a variety of production problems, it is withdrawn from the market within a few years. Genetically modified canola, corn, and soybeans are subsequently approved by the FDA and begin to be widely adopted by U.S. farmers. In June, Exxon Mobil is ordered to pay \$5 billion in damages in the wake of the *Exxon*

Valdez disaster; the company immediately appeals. (In 2007, the Supreme Court agrees to review the case.)

1995 In January, the National Park Service begins a controversial plan to reintroduce the gray wolf (*Canis lupus*) into Yellowstone National Park and central Idaho, which were part of its natural range until the 1920s. Fourteen wild gray wolves from Canada are released in the park. (In 2007, approximately 370 wolves live in Yellowstone, although both gray and red wolves remain endangered in most states.) The EPA identifies 126 types of ecosystems that are threatened or critically endangered. Approximately 5 million people live on farms in the U.S., down from over 31 million in 1920.

1997 In May, prompted in part by concerns over environmental justice, the Nuclear Regulatory Commission seeks “further study” before it will license a planned uranium-enrichment facility at Homer, Louisiana; the request effectively blocks the facility. In August, the National Cancer Institute reports on radiation exposures from Cold War atmospheric nuclear testing in Nevada; an estimated 120,000 excess thyroid cancers (above the statistical norm) and 6,000 deaths may have been caused by these tests. The Kyoto Protocol on greenhouse gases is agreed to in December and signed by the U.S., though President Clinton declines to submit it to the Senate in the wake of the Byrd-Hagel resolution, passed by a vote of 95–0, which opposes key provisions of the agreement. (President George W. Bush later withdraws the U.S. from the protocol.) Also in December, Julia Butterfly Hill takes up residence in an ancient redwood in the Headwaters forest in northern California. She names the tree Luna and pledges to save it from being logged. It will be two years before her feet touch the ground. She spends her days giving interviews to journalists from all over the world. Luna is spared, though vandalized after Hill leaves.

1999 In November, tens of thousands of loosely affiliated anti-globalization protestors—including a variety of environmental, labor, religious, student, and anarchist groups—stage demonstrations in Seattle and disrupt the third ministerial meeting of the World Trade Organization.

2000 The population of the U.S. exceeds 281 million. Three-fourths of Americans now live in and around cities, up from 20 percent at the time of the Civil War and 5 percent in 1790. (Between 1820 and 2000, the per capita income in the U.S. has doubled every 42 years, and since 1880 U.S.

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industrial production has exceeded that of any other nation.) In August, Toyota introduces a hybrid gasoline-electric model, the Prius, which becomes a best seller among hybrid vehicles. The Census Bureau reports on the commutes of U.S. workers: 76 percent drive to work alone, 12 percent carpool, 4.7 percent use public transportation, 3.3 percent work at home, 2.9 percent walk, and 1.2 percent ride a bicycle or motorcycle.

2001 In a controversial November *Nature* article, University of California–Berkeley ecologist Ignacio Chapela presents evidence that genetically modified corn has contaminated wild varieties in the Mexican state of Oaxaca. The average fuel efficiency of U.S. cars and light trucks falls to 23.9 mpg, from a 1987–88 high of 25.9 mpg; over 3.5 million sport-utility vehicles are sold, up from just over 700,000 in 1990.

2002 The USDA creates the National Organic Program, regulating organic food production.

2003 The GloFish®, a genetically modified zebra fish (*Zebra danio*), is made available for sale in pet stores after the Food and Drug Administration offers no objection; it is the first transgenic organism sold as a pet.

2004 The National Wetlands Inventory reports that, since 1998, the U.S. has seen a small net gain in wetlands acreage: restoration programs and land set-asides have balanced ongoing losses from development.

2005 Hurricane Katrina, which devastates New Orleans and the Gulf Coast in August, heightens anxieties about global warming, a possible intensifier of the region's weather patterns. In December, on the initiative of New York governor George Pataki, the governors of seven northeastern states sign a memorandum agreeing to a mandatory cap-and-trade program to limit carbon dioxide emissions, the Regional Greenhouse Gas Initiative.

2006 *An Inconvenient Truth*, a documentary about global warming featuring former Vice President Al Gore, heightens concern over greenhouse gas emissions; it later wins an Academy Award for best documentary feature. In June, President George W. Bush protects the Northwestern Hawaiian Islands Marine National Monument (also known as the Papahānaumokuākea Marine National Monument) under the Antiquities Act, creating an ocean reserve of approximately 140,000 square miles. The state of California passes the Global Warming Solutions Act,

mandating a reduction in greenhouse gases to 1990 levels by the year 2020. The estimated population of the U.S. passes 300 million in mid-October. In December, scientists describe widespread losses to commercial honey-bee colonies in the eastern U.S.; later named "Colony Collapse Disorder," the phenomenon is reported elsewhere and becomes a subject of ongoing research and concern.

2007 In January, the federal Fish and Wildlife Service proposes the addition of the polar bear (*Ursus maritimus*) to its list of threatened and endangered species as Arctic warming reduces the bear's summer habitat. After years of protection and recovery, the bald eagle (*Haliaeetus leucocephalus*) is removed from the list later in the year. In March, the Organization of American States receives a delegation of Inuit people from Alaska, Canada, and Russia who argue that the United States' failure to limit greenhouse gas emissions is destroying their way of life. In April, in a 5-4 decision in *Massachusetts v. Environmental Protection Agency*, the Supreme Court rules that the 1990 Clean Air Act gives the EPA regulatory authority over automobile greenhouse gas emissions, an authority the EPA had avoided claiming. In June, General Electric and Hitachi announce plans to build two new nuclear power plants in Matagorda County, Texas, scheduled to open in 2014; in August, the board of the Tennessee Valley Authority decides to complete Watts Bar 2, a nuclear reactor mothballed in 1988 and now expected to begin commercial generation in 2013. (Just over 100 commercial nuclear reactors are in operation in the U.S., providing around 20 percent of the nation's electricity, but no new plants have been ordered since 1978, and several have been decommissioned early.) In September, satellite imagery reveals that the Northwest Passage between the Atlantic and Pacific is free of ice and fully navigable. In October, Al Gore and the United Nations Intergovernmental Panel on Climate Change are named as winners of the Nobel Peace Prize. China is reported to have overtaken the U.S. as the world's leading emitter of greenhouse gases from fossil fuel consumption, though Americans are responsible for over six times as much greenhouse gas per capita.