

2

Environmental History: Learning from the Past

Biodiversity

CASE STUDY

Near Extinction of the American Bison

In 1500, before Europeans settled North America, 30–60 million North American bison—commonly known as the buffalo—grazed the plains, prairies, and woodlands over much of the continent.

These animals were once so numerous that in 1832 a traveler wrote, “As far as my eye could reach the country seemed absolutely blackened by innumerable herds.” A single herd on the move might thunder past for hours.

For centuries, several Native American tribes depended heavily on bison. Typically they killed only enough animals to meet their needs for food, clothing, and shelter. They also burned dried feces of these animals, known as “buffalo chips,” to cook food and provide heat.

By 1906, the once vast range of the bison had shrunk to a tiny area, and the species had been driven nearly to extinction (Figure 2-1). How did this happen? It began when settlers moving west after the Civil War upset the sustainable balance between Native Americans and bison. Several Plains tribes traded bison skins to settlers for steel knives and firearms, which allowed them to kill more bison.

But it was the new settlers who caused the most relentless slaughter. As railroads spread westward in the late 1860s, railroad companies hired professional bison hunters—including Buffalo Bill Cody—to supply construction crews with meat. Passengers also gunned down bison from train windows for sport, leaving the carcasses to rot.

Commercial hunters shot millions of bison for their hides and tongues (considered a delicacy), leaving most of the meat to rot. “Bone pickers” collected the bleached bones that whitened the prairies and shipped them east to be ground up as fertilizer.

Farmers shot bison because they damaged crops, fences, telegraph poles, and sod houses. Ranchers killed them because they competed with cattle and sheep for pasture. The U.S. Army killed at least 12 million bison as part of its campaign to subdue

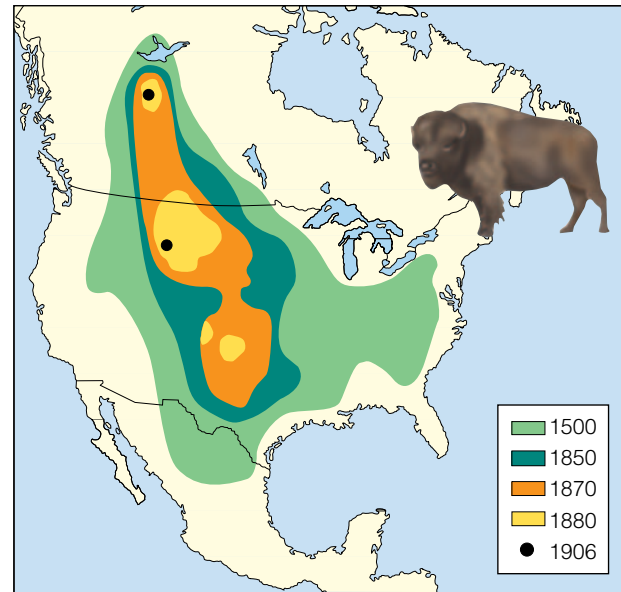


Figure 2-1 The historical range of the bison shrank severely between 1500 and 1906, mostly because of unregulated and deliberate overhunting.

the Plains tribes by killing off their primary source of food.

Between 1870 and 1875, at least 2.5 million bison were slaughtered each year. Only 85 bison were left by 1892. They were given refuge in Yellowstone National Park and protected by an 1893 law that forbids the killing of wild animals in national parks.

In 1905, 16 people formed the American Bison Society to protect and rebuild the captive population. Soon thereafter, the federal government established the National Bison Range near Missoula, Montana. Today an estimated 350,000 bison are alive, about 97% of them on privately owned ranches.

Some wildlife conservationists have suggested restoring large herds of bison on public lands in the North American plains. This idea has been strongly opposed by ranchers with permits to graze cattle and sheep on federally managed lands.

The history of humanity's relationships to the environment provides many important lessons that can help us deal with today's environmental problems and avoid repeating past mistakes.

A continent ages quickly once we come.

ERNEST HEMINGWAY

This chapter addresses the following questions:

- What major beneficial and harmful effects have hunter-gatherer societies, agricultural societies, and industrialized societies had on the environment? What might be the environmental impact of the current information and globalization revolution?
- What are the major phases in the history of land and wildlife conservation, public health, and environmental protection in the United States?
- What is Aldo Leopold's land ethic?

2-1 CULTURAL CHANGES AND THE ENVIRONMENT

What Major Human Cultural Changes Have Taken Place? Agriculture, Industrialization, and Globalization

Since our hunter-gatherer days we have undergone three major cultural changes that have increased our impact on the environment.

Evidence from fossils, DNA analysis, and studies of ancient cultures suggests that the earliest form of the human (*Homo sapiens*) species was *Homo sapiens idaltu*, which existed about 160,000 years ago. The latest version of our species, *Homo sapiens sapiens*, has been around for only about 60,000 years. Thus the various versions of *Homo sapiens* have walked the earth for less than an eye blink of the estimated 3.7-billion-year existence of life on this marvelous planet. We are the planet's new infants.

Until about 12,000 years ago, we were mostly hunter-gatherers who typically moved as needed to find enough food for survival. Since then, three major cultural changes have occurred: the *agricultural revolution* (which began 10,000–12,000 years ago), the *industrial-medical revolution* (which began about 275 years ago), and the *information and globalization revolution* (which began about 50 years ago).

These changes have greatly increased our impact on the environment in three ways. They have given us much more energy and new technologies with which to alter and control more of the planet to meet our basic needs and increasing wants. They have also allowed expansion of the human population, mostly because of increased food supplies and longer life spans. In addition, they have greatly increased our resource use, pollution, and environmental degradation.

How Did Ancient Hunting-and-Gathering Societies Affect the Environment? Living Lightly on the Earth

Hunter-gatherers had a fairly small impact on their environment.

During most of their 60,000-year existence, *Homo sapiens sapiens* have been **hunter-gatherers**. They survived by collecting edible wild plant parts, hunting, fishing, and scavenging meat from animals killed by other predators. Our hunter-gatherer ancestors typically lived in small bands of fewer than 50 people who worked together to get enough food to survive. Many groups were nomadic, picking up their few possessions and moving seasonally from place to place to find enough food.

The earliest hunter-gatherers (and those still living this way today) survived through expert knowledge and understanding of their natural surroundings. Because of high infant mortality and an estimated average life span of 30–40 years, hunter-gatherer populations grew very slowly.

Advanced hunter-gatherers had greater environmental impacts than those of early hunter-gatherers. They used more advanced tools and fire to convert forests into grasslands. There is also some evidence that they probably contributed to the extinction of some large animals. They also altered the distribution of plants (and animals feeding on such plants) as they carried seeds and plants to new areas.

Early and advanced hunter-gatherers exploited their environment to survive. But their environmental impact usually was limited and local because of their small population, low resource use per person, migration that allowed natural processes to repair most of the damage they caused, and lack of technology that could have expanded their impact.

What Was the Agricultural Revolution? More Food, More People, Longer Lives, and an Increasing Ecological Footprint

Agriculture provided more food for more people who lived longer and in better health but also greatly increased environmental degradation.

Some 10,000–12,000 years ago, a cultural shift known as the **agricultural revolution** began in several regions of the world. It involved a gradual move from usually nomadic hunting-and-gathering groups to settled agricultural communities in which people domesticated wild animals and cultivated wild plants.

Plant cultivation probably developed in many areas, some including tropical forests of Southeast Asia, northeast Africa, and Mexico. People discovered how to grow various wild food plants from roots or tubers (fleshy underground stems). To prepare the land



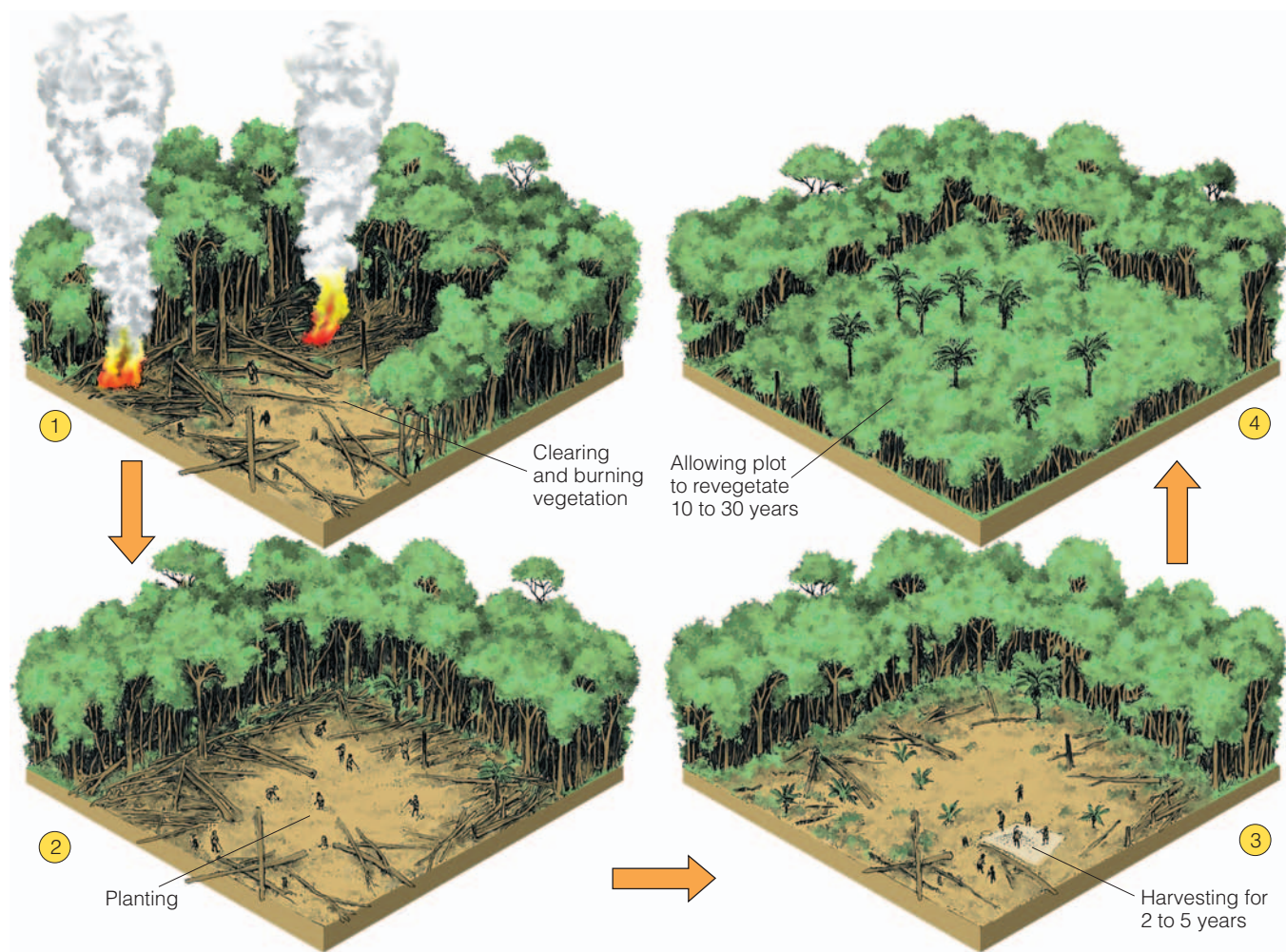


Figure 2-2 The first crop-growing technique may have been a combination of slash-and-burn and shifting cultivation in tropical forests. This method is sustainable only if small plots of the forest are cleared, cultivated for no more than 5 years, and then allowed to regenerate for 10–30 years to renew soil fertility. Indigenous cultures have developed many variations of this technique and have found ways to use some former plots nondestructively while they are being regenerated.

for planting, they cleared small patches of tropical forests by cutting down trees and other vegetation and then burning the underbrush (Figure 2-2). The ashes fertilized the often nutrient-poor tropical forest soils in this **slash-and-burn cultivation**.

Early growers also used various forms of **shifting cultivation** (Figure 2-2), primarily in tropical regions. After a plot had been used for several years, the soil became depleted of nutrients or reinvaded by the forest. Then the growers cleared a new plot. They learned that each abandoned patch normally had to be left fallow (unplanted) for 10–30 years before the soil became fertile enough to grow crops again. While patches were regenerating, growers used them for tree crops, medicines, fuelwood, and other purposes. In this manner, most early growers practiced *sustainable cultivation*.

These early farmers had fairly little impact on the environment. Their dependence mostly on human muscle power and crude stone or stick tools meant they could cultivate only small plots and their population size and density were low. In addition, normally

enough land was available so they could move to other areas and leave abandoned plots unplanted for the several decades needed to restore soil fertility.

As more advanced forms of agriculture grew and spread they led to various beneficial and harmful effects (Figure 2-3).

What Is the Industrial–Medical Revolution? More People, Longer Lives, More Production, and an Even Larger Ecological Footprint

Because of the industrial–medical revolution more people live longer and healthier lives at a higher standard of living, but pollution, resource waste, and environmental degradation have increased.

The next cultural shift, the **industrial–medical revolution**, began in England in the mid-1700s and spread to the United States in the 1800s. It involved a shift from dependence on *renewable* wood (with supplies

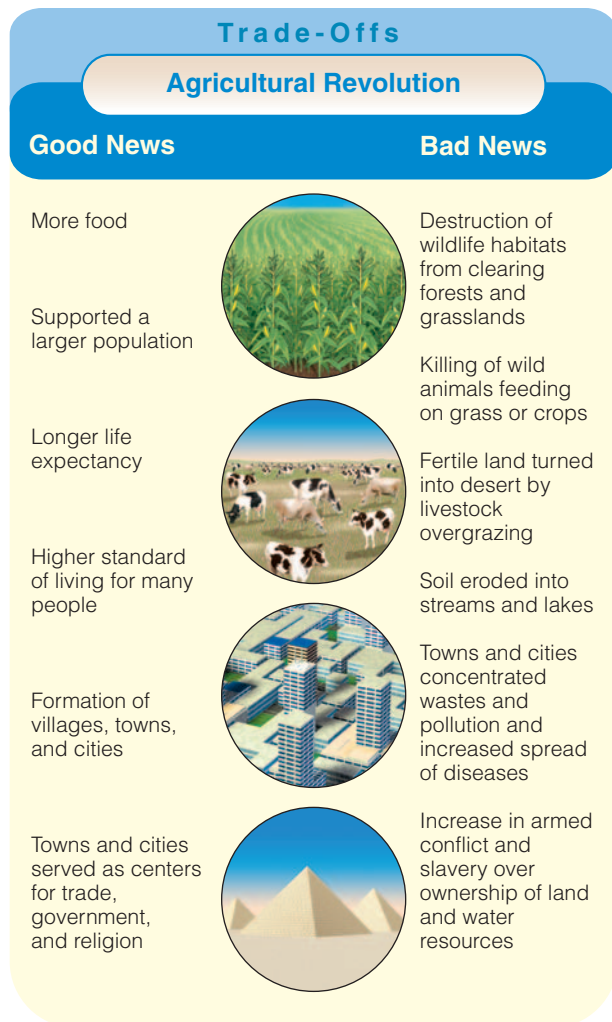


Figure 2-3 Trade-offs: good and bad news about the shift from hunting and gathering to agriculture. Pick the single pieces of good news and bad news that you think are the most important.

dwindling in some areas because of unsustainable cutting) and flowing water to dependence on machines running on *nonrenewable* fossil fuels (first coal and later oil and natural gas). This led to a switch from small-scale, localized production of handmade goods to large-scale production of machine-made goods in centralized factories in rapidly growing industrial cities.

Factory towns grew into cities as rural people came to the factories for work. There they worked long hours under noisy, dirty, and hazardous conditions. Other workers toiled in dangerous coal mines.

In early industrial cities, coal smoke belching from chimneys was so heavy that many people died of lung ailments. Ash and soot covered everything, and some days the smoke was thick enough to blot out the sun.

Fossil fuel-powered farm machinery, commercial fertilizers, and new plant-breeding techniques in-

creased crop yields per acre. This helped protect biodiversity by reducing the need to expand the area of cropland. Because fewer farmers were needed, more people migrated to cities. With a larger and more reliable food supply and longer life spans, the human population began the sharp increase that continues today.

Figure 2-4 lists some of the beneficial (*good news*) and harmful (*bad news*) effects of the advanced industrial-medical revolution.

How Might the Information and Globalization Revolution Affect the Environment? Information Blessing or Information Overload?

Global access to information can help us understand and respond to environmental problems but can lead to confusion from information overload.

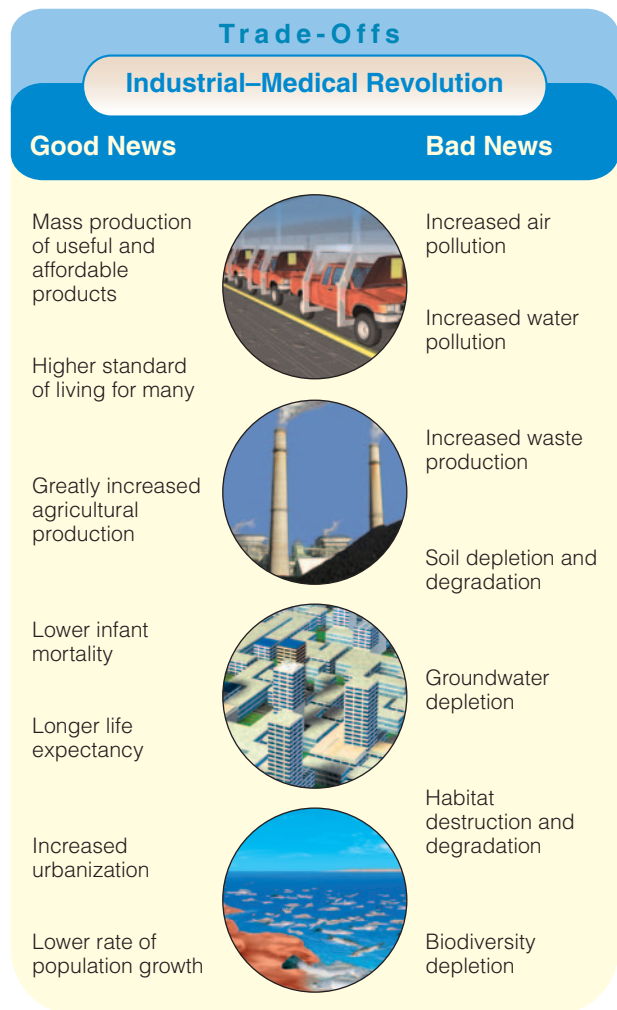


Figure 2-4 Trade-offs: good and bad news about the effects of the advanced industrial revolution. Pick the single pieces of good news and bad news that you think are the most important.





Figure 2-5 Trade-offs: good and bad news about the effects of this latest cultural revolution. Pick the single pieces of good news and bad news that you think are the most important.

Since 1950, and especially since 1970, we have begun making a new cultural shift called the **information and globalization revolution**. It is based on using new technologies for gaining rapid access to much more information on a global scale. These technologies include the telephone, radio, television, computers, the Internet, automated databases, and remote-sensing satellites. Figure 2-5 lists some of the possible beneficial and harmful effects of the information and globalization revolution.

2-2 ENVIRONMENTAL HISTORY OF THE UNITED STATES: THE TRIBAL AND FRONTIER ERAS

What Happened during the Tribal Era? Sustainable Living

Native Americans living in North America for at least 10,000 years had a fairly low environmental impact.

The environmental history of the United States can be divided into four eras: *tribal*, *frontier*, *conservation*, and *environmental*.

During the *tribal era*, North America was occupied by 5–10 million tribal people for at least 10,000 years be-

fore European settlers began arriving in the early 1600s. These indigenous people were called Indians by the Europeans and now are often called Native Americans. They practiced hunting and gathering, burned and cleared fields, and planted crops. Because of their small populations and simple technology, they had a fairly low environmental impact.

With some exceptions, most Native American cultures had a deep respect for the land and its animals and did not believe in land ownership, as indicated by the following quotation:

My people, the Blackfeet Indians, have always had a sense of reverence for nature that made us want to move through the world carefully, leaving as little mark behind as possible. (Jamake Highwater, Blackfoot)

What Happened During the Frontier Era (1607–1890)? Taking Over a Continent

European settlers saw the continent as a vast frontier to conquer and settle.

The *frontier era* began in the early 1600s when European colonists began settling North America. The early colonists developed a **frontier environmental worldview**. They viewed most of the continent as having vast and seemingly inexhaustible resources and as a hostile and dangerous wilderness to be conquered and managed for human use.

The government set up by European settlers conquered Native American tribes, took over the land, and urged people to spread across the continent. The transfer of vast areas of public land to private interests accelerated the settling of the continent.

This frontier environmental view prevailed for more than 280 years, until the government declared the frontier officially closed in 1890. However, this worldview that there is always another frontier to conquer remains as an important part of American culture today.

2-3 ENVIRONMENTAL HISTORY OF THE UNITED STATES: THE EARLY CONSERVATION ERA (1832–1960)

What Happened between (1832–70)? Ignored Warnings

A few people warned Americans that they were degrading their resource base, but few listened.

Between 1832 and 1870, some people became alarmed at the scope of resource depletion and degradation in the United States. They urged that part of the unspoiled wilderness on public lands—owned jointly by



Figure 2-6 *Henry David Thoreau* (1817–62) was an American writer and naturalist who kept journals about his excursions into wild nature throughout parts of the northeastern United States and Canada and at Walden Pond in Massachusetts. He sought self-sufficiency, a simple lifestyle, and a harmonious coexistence with nature.

all people but managed by the government—be protected as a legacy to future generations.

Two early conservationists were *Henry David Thoreau* (Figure 2-6) and *George Perkins Marsh* (1801–1882). Thoreau was alarmed at the loss of numerous wild species from his native eastern Massachusetts. To gain a better understanding of nature, he built a cabin in the woods on Walden Pond near Concord, Massachusetts, lived there alone for 2 years, and wrote *Life in the Woods*, an environmental classic.*

In 1864, *George Perkins Marsh*, a scientist and member of Congress from Vermont, published *Man and Nature*, which helped legislators and citizens see the need for resource conservation. Marsh questioned the idea that the country's resources were inexhaustible. He also used scientific studies and case studies to show how the rise and fall of past civilizations were linked to the use and misuse of their resource base. Some of his resource conservation principles are still used today. Most of these warnings were not taken seriously.

What Happened Between 1870 and 1930? Government and Citizen Involvement

The government and newly formed private groups tried to protect more of the nation's natural resources and improve public health.

*I can identify with Thoreau. I spent 15 years living in the deep woods studying and thinking about how nature works and writing books such as the one you are reading. I lived in a school bus with an attached greenhouse. I used it as a scientific laboratory for evaluating things such as passive and active solar energy technologies, waste disposal (composting toilets), natural cooling (earth tubes), ways to save energy and water, and biological control of pests. It was great fun and I learned a lot. Since most of the world is urban I came out of the woods to find out more about this way of living.

Between 1870 and 1930, a number of actions increased the role of the federal government and private citizens in resource conservation and public health, as summarized in Figure 1 on p. A3 of Appendix 2. The *Forest Reserve Act of 1891* was a turning point in establishing the responsibility of the federal government for protecting public lands from resource exploitation.

In 1892, nature preservationist and activist *John Muir* (Figure 2-7) founded the Sierra Club. He became the leader of the *preservationist movement* that called for protecting large areas of wilderness on public lands from human exploitation, except for low-impact recreational activities such as hiking and camping. This idea was not enacted into law until 1964. Muir also proposed and lobbied for creation of a national park system on public lands.

Mostly because of political opposition, effective protection of forests and wildlife did not begin until *Theodore Roosevelt* (Figure 2-8, p. 26), an ardent conservationist, became president. His term of office, 1901–9, has been called the country's *Golden Age of Conservation*.

While in office he persuaded Congress to give the president power to designate public land as federal wildlife refuges. During his presidency he established wildlife reserves and more than tripled the size of the national forest reserves.

In 1905, Congress created the U.S. Forest Service to manage and protect the forest reserves. Roosevelt appointed *Gifford Pinchot* (1865–1946) as its first chief. Pinchot pioneered scientific management of forest resources on public lands. In 1906, Congress passed the *Antiquities Act*, which allows the president to protect areas of scientific or historical interest on federal lands as national monuments. Roosevelt used this act to protect the Grand Canyon and other areas that would later become national parks.

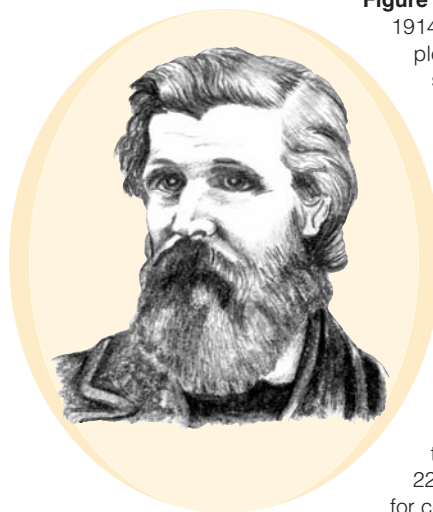


Figure 2-7 *John Muir* (1838–1914) was a geologist, explorer, and naturalist. He spent 6 years studying, writing journals, and making sketches in the wilderness of California's Yosemite Valley and then went on to explore wilderness areas in Utah, Nevada, the Northwest, and Alaska. He was largely responsible for establishing Yosemite National Park in 1890. He also founded the Sierra Club and spent 22 years lobbying actively for conservation laws.



Figure 2-8 *Theodore ("Teddy") Roosevelt* (1858–1919) was a writer, explorer, naturalist, avid birdwatcher, and 26th president of the United States. He was the first national political figure to bring the issues of conservation to the attention of the American public. According to many historians, he has contributed more than any other president to natural resource conservation in the United States.



In 1907, Congress became upset because Roosevelt had added vast tracts to the forest reserves and banned further executive withdrawals of public forests. On the day before the bill became law, Roosevelt defiantly reserved another 6.5 million hectares (16 million acres). Most environmental historians view Roosevelt (a Republican) as the country's best environmental president.

In 1916, Congress passed the *National Park Service Act*. It declared that parks are to be maintained in a manner that leaves them unimpaired for future generations. The Act also established the National Park Service (within the Department of the Interior) to manage the system.

After World War I, the country entered a new era of economic growth and expansion. During the Harding, Coolidge, and Hoover administrations, the federal government promoted increased resource removal from public lands at low prices to stimulate economic growth.

President Hoover (a Republican) went even further and proposed that the federal government return all remaining federal lands to the states or sell them to private interests for economic development. But the Great Depression (1929–41) made owning such lands unattractive to state governments and private investors. The depression was bad news for the country. But some say that without it we might have little if any public lands left today.

What Happened between 1930 and 1960? Depression and War

During the economic depression of the 1930s the government bought land and hired many workers to

restore the country's degraded environment and build dams to supply electricity and water.

A second wave of national resource conservation and improvements in public health began in the early 1930s as President *Franklin D. Roosevelt* (1882–1945) strove to bring the country out of the Great Depression. Figure 2 on p. A4 in Appendix 2 summarizes major events during this period. Roosevelt persuaded Congress to enact federal government programs to provide jobs and restore the country's degraded environment. The following are examples of these programs.

The government purchased large tracts of land from cash-poor landowners, and the *Civilian Conservation Corps* (CCC) was established in 1933. It put 2 million unemployed people to work planting trees and developing and maintaining parks and recreation areas. The CCC also restored silted waterways and built levees and dams for flood control.

The government built and operated many large dams in the Tennessee Valley and in the arid western states, including Hoover Dam on the Colorado River. The goals were to provide jobs, flood control, cheap irrigation water, and cheap electricity for industry.

Many environmental historians praise Roosevelt (a Democrat) for his efforts to get the country out of a major economic depression and restore past environmental degradation.

Federal resource conservation and public health policy during the 1940s and 1950s changed little, mostly because of preoccupation with World War II (1941–45) and economic recovery after the war.

2-4 ENVIRONMENTAL HISTORY OF THE UNITED STATES: THE ENVIRONMENTAL ERA (1960–2004)

What Happened during the 1960s? An Environmental Awakening

The modern environmental movement began and more citizens urged government to improve environmental quality.

A number of milestones in American environmental history occurred during the 1960s, as summarized in Figure 3 on p. A5 in Appendix 2. In 1962, biologist *Rachel Carson* (1907–64) published *Silent Spring*, which documented the pollution of air, water, and wildlife from pesticides such as DDT (Individuals Matter, right). This influential book helped broaden the concept of resource conservation to include preservation of wildlife and the *quality* of the air, water, and soil.

Many historians mark Carson's wake-up call as the beginning of the modern **environmental move-**


**INDIVIDUALS
MATTER**

Rachel Carson

Rachel Carson (Figure 2-A) began her professional career as a biologist for the Bureau of U.S. Fisheries

(later the U.S. Fish and Wildlife Service). In that capacity, she carried out research on oceanography and marine biology and wrote articles about the oceans and topics related to the environment.

In 1951, she wrote *The Sea Around Us*, which described in easily understandable terms the natural history of oceans and how humans were harming them. This book sold more than 2 million copies, was translated into 32 languages, and won a National Book Award.

During the late 1940s and throughout the 1950s, DDT and related compounds were increasingly used to kill insects that ate food crops, attacked trees, bothered people, and transmitted diseases such as malaria.

In 1958, DDT was sprayed to control mosquitoes near the home and private bird sanctuary of one of Rachel Carson's friends. After the spraying, her friend witnessed the agonizing deaths of several birds. She begged Carson to find someone

to investigate the effects of pesticides on birds and other wildlife.

Carson decided to look into the issue herself and found that independent research on the environmental effects of pesticides was almost nonexistent. As a well-trained scientist, she surveyed the scientific literature, became convinced that pesticides could harm wildlife and humans, and methodically developed information about the harmful effects of widespread use of pesticides.

In 1962, she published her findings in *Silent Spring*, an allusion to the silencing of "robins, catbirds, doves, jays, wrens, and scores of other bird voices" because of their exposure to pesticides.

Many scientists, politicians, and policy makers read *Silent Spring*, and the public embraced it. But manufacturers of chemicals viewed the book as a serious threat to their booming pesticide sales and mounted a campaign to discredit her. A parade of critical reviewers and

industry scientists claimed her book was full of inaccuracies, made selective and biased use of research findings, and failed to give a balanced account of the benefits of pesticides.

Some critics even claimed that, as a woman, she was incapable of understanding such a highly scientific and technical subject. Others charged that she was a hysterical woman and a radical nature lover trying to scare the public in order to sell books.

During these intense attacks, Carson was suffering from terminal cancer. Yet she strongly defended her research and countered her critics. She died in 1964—18 months after the publication of *Silent*

Spring—without knowing that many historians consider her work an important contribution to the modern environmental movement then emerging in the United States.



Figure 2-A Rachel Carson (1907–1964)

ment in the United States. It flourished when a growing number of citizens organized to demand that political leaders enact laws and develop policies to curtail pollution, clean up polluted environments, and protect unspoiled areas from environmental degradation.

In 1964 Congress passed the *Wilderness Act*, inspired by the vision of John Muir more than 80 years earlier. It authorized the government to protect undeveloped tracts of public land as part of the National Wilderness System, unless Congress later decides they are needed for the national good. Land in this system is to be used only for nondestructive forms of recreation such as hiking and camping.

Between 1965 and 1970, the emerging science of *ecology* received widespread media attention. At the same time, the popular writings of biologists such as

Paul Ehrlich, Barry Commoner, and Garrett Hardin awakened people to the interlocking relationships among population growth, resource use, and pollution.

During that period, a number of events increased public awareness of pollution. The public also became aware that pollution and loss of habitat were endangering well-known wildlife species such as the North American bald eagle, grizzly bear, whooping crane, and peregrine falcon.

During the 1969 U.S. *Apollo* mission to the moon, astronauts photographed the earth from space. This allowed people to see the earth as a tiny blue and white planet in the black void of space and led to the development of the *spaceship-earth environmental worldview*. It reminded us that we live on a marvelous planetary spaceship (*Terra I*) that we should not harm because it is the only home we have.



What Happened during the 1970s? The Environmental Decade

Increased awareness and public concern led Congress to pass a number of laws to improve environmental quality and conserve more of the nation's natural resources.

During the 1970s, media attention, public concern about environmental problems, scientific research, and action to address these concerns grew rapidly. Figure 4 on p. A6 of Appendix 2 summarizes major environmental events during this period, which is sometimes called the *first decade of the environment*.

The first annual *Earth Day* was held on April 20, 1970. During this event, proposed by Senator *Gaylord Nelson* (born 1916), some 20 million people in more than 2,000 communities took to the streets to heighten awareness and to demand improvements in environmental quality.

Republican President *Richard Nixon* (1913–94) responded to the rapidly growing environmental movement. He established the *Environmental Protection Agency* (EPA) in 1970 and supported passage of the *Endangered Species Act of 1973*. This greatly strengthened the role of the federal government in protecting endangered species and their habitats.

In 1978, the *Federal Land Policy and Management Act* gave the *Bureau of Land Management* (BLM) its first real authority to manage the public land under its control, 85% of which is in 12 western states. This law angered a number of western interests whose use of these public lands was restricted for the first time.

In response, a coalition of ranchers, miners, loggers, developers, farmers, some elected officials, and others launched a political campaign known as the *sagebrush rebellion*. It had two major goals. One was to sharply reduce government regulation of the use of public lands. The other was to remove most public lands in the western United States from federal ownership and management and turn them over to the states. Then the plan was to persuade state legislatures to sell or lease the resource-rich lands at low prices to ranching, mining, timber, land development, and other private interests. This represented a return to President Hoover's plan to turn all public land over to private ownership that was thwarted by the Great Depression.

Jimmy Carter (a Democrat, born 1924), president between 1977 and 1981, was very responsive to environmental concerns. He persuaded Congress to create the *Department of Energy* to develop a long-range energy strategy to reduce the country's heavy dependence on imported oil. He appointed respected environmentalists to key positions in environmental and resource agencies and consulted with environmental leaders on environmental and resource policy matters.

In 1980, Carter helped create a *Superfund* as part of the *Comprehensive Environment Response, Compensation, and Liability Act* to clean up abandoned hazardous waste sites, including the Love Canal near Niagara Falls, New York. Carter also used the Antiquities Act of 1906 to triple the amount of land in the National Wilderness System and double the area in the National Park System (primarily by adding vast tracts in Alaska).

What Happened during the 1980s? Environmental Backlash

An anti-environmental movement formed to weaken or do away with many of the environmental laws passed in the 1960s and 1970s and to destroy the political effectiveness of the environmental movement.

Figure 5 on p. A6 in Appendix 2 summarizes some key environmental events during the 1980s that shaped U.S. environmental policy. During this decade, farmers and ranchers and leaders of the oil, automobile, mining, and timber industries strongly opposed many of the environmental laws and regulations developed in the 1960s and 1970s. They organized and funded a strong *anti-environmental movement* that persists today.

In 1981, *Ronald Reagan* (a Republican, born 1911), a self-declared *sagebrush rebel* and advocate of less federal control, became president. During his 8 years in office he angered environmentalists by appointing to key federal positions people who opposed most existing environmental and public land use laws and policies.

Reagan greatly increased private energy and mineral development and timber cutting on public lands. He also drastically cut federal funding for research on energy conservation and renewable energy resources and eliminated tax incentives for residential solar energy and energy conservation enacted during the Carter administration. In addition, he lowered automobile gas mileage standards and relaxed federal air and water quality pollution standards.

Although Reagan was immensely popular, many people strongly opposed his environmental and resource policies. This resulted in strong opposition in Congress, public outrage, and legal challenges by environmental and conservation organizations, whose memberships soared during this period.

In 1988, an industry-backed anti-environmental coalition called the *wise-use movement* was formed. Its major goals were to weaken or repeal most of the country's environmental laws and regulations and destroy the effectiveness of the environmental movement in the United States. Politically powerful coal,

oil, mining, automobile, timber, and ranching interests helped back this movement.

Upon his election in 1989, *George H. W. Bush* (a Republican, born 1924) promised to be “the environmental president.” But he received criticism from environmentalists for not providing leadership on such key environmental issues as population growth, global warming, and loss of biodiversity. He also continued support of exploitation of valuable resources on public lands at giveaway prices. In addition, he allowed some environmental laws to be undercut by the powerful influence of industry, mining, ranching, and real estate development industries.

What Happened from 1990 to 2004? Trying to Hold the Line

Since 1990 American environmentalists have spent most of their time and money trying to keep anti-environmentalists from weakening or eliminating most environmental laws passed in the 1960s and 1970s.

Figure 6 on p. A8 of Appendix 2 summarizes some key environmental events that took place between 1990 and 2004. In 1993, *Bill Clinton* (a Democrat, born 1946) became president and promised to provide national and global environmental leadership. During his 8 years in office he appointed respected environmentalists to key positions in environmental and resource agencies and consulted with environmentalists about environmental policy, as Carter did.

He also vetoed most of the anti-environmental bills (or other bills passed with anti-environmental riders attached) passed by a Republican-dominated Congress between 1995 and 2000. He announced regulations requiring sport utility vehicles (SUVs) to meet the same air pollution emission standards as cars. Clinton also used executive orders to make forest health the primary priority in managing national forests and to declare many roadless areas in national forests off limits to roads and logging. In addition, he used the Antiquities Act of 1906 to protect various parcels of public land in the West from development and resource exploitation by declaring them national monuments. He protected more public land as national monuments in the lower 48 states than any other president, including Teddy Roosevelt and Jimmy Carter.

Environmentalists criticized Clinton, however, for failing to push hard enough on key environmental issues such as global warming and global and national biodiversity protection.

Since 1990 environmentalists have had to spend much of their time and funds fighting efforts by the anti-environmental movement to discredit the environmental movement and weaken or eliminate

most environmental laws passed during the 1960s and 1970s. They also had to counter claims by anti-environmental groups that problems such as global warming and ozone depletion are hoaxes or not very serious.

During the 1990s many small and mostly local grassroots environmental organizations sprang up to deal with environmental threats in their local communities. Interest in environmental issues increased on many college campuses and environmental studies programs at colleges and universities expanded. In addition, awareness of important but complex environmental issues such as sustainability, population growth, biodiversity protection, and threats from global warming increased.

In 2001, *George W. Bush* (a Republican, born 1946) became president. Like Reagan in the 1980s, he appointed to key federal positions people who opposed or wanted to weaken many existing environmental and public land use laws and policies. Also like Reagan, he did not consult with environmental groups and leaders in developing environmental policies, and he greatly increased private energy and mineral development and timber cutting on public lands. Bush weakened protections on almost as much public lands as Teddy Roosevelt protected.

Bush also opposed increasing automobile gas mileage standards as a way to save energy and reduce dependence on oil imports, and he supported relaxation of various federal air and water quality pollution standards. Like Reagan, he developed an energy policy that placed much greater emphasis on use of fossil fuels and nuclear power than on reducing energy waste and relying more on renewable energy resources.

In addition, he withdrew the U.S. from participation in the international Kyoto treaty designed to help reduce carbon dioxide emissions that can promote global warming. He also repealed or tried to weaken most of the pro-environmental measures established by Clinton.

In 2003, leaders of a dozen major environmental organizations charged that Bush, backed by a Republican-dominated Congress, was well on the way to compiling the worst environmental record of any president in the history of the country.

A few moderate Republican members of Congress have urged their party to return to its environmental roots, put down during Teddy Roosevelt’s presidency, and shed its anti-environmental approach to legislation. Most Democrats agree and believe that the environmental problems we face are much too serious to be held hostage by political squabbling. They call for cooperation, not confrontation. They urge elected officials, regardless of party, to enter into a new pact to



have the United States become the world leader in making this the *environmental century*.

2-5 CASE STUDY: ALDO LEOPOLD AND HIS LAND ETHIC

Who Was Aldo Leopold? Teacher, Conservationist, and Proponent of Land Ethics

Aldo Leopold played a major role in educating us about the need for conservation and providing ethical guidelines for our actions in nature.

Aldo Leopold (Figure 2-9) is best known as a strong proponent of *land ethics*, a philosophy in which humans as part of nature have an ethical responsibility to preserve wild nature.

After earning a master's degree in forestry from Yale University, he joined the U.S. Forest Service. He became alarmed by overgrazing and land deterioration on public lands where he worked, and was convinced the United States was losing too much of its mostly untouched wilderness.

In 1933, Leopold became a professor at the University of Wisconsin and founded the profession of game management. In 1935, he was one of the founders of the Wilderness Society.

He was a keen student of nature as he took long walks in the countryside. As years passed, he developed a deep understanding and appreciation for wildlife and urged us to include nature in our ethical concerns. Through his writings and teachings he became one of the founders of the *conservation* and *environmental movements* of the 20th century. In doing this, he laid important groundwork for the field of environmental ethics.

Leopold died in 1948 while fighting a brush fire at a neighbor's farm in central Wisconsin. His weekends of planting, hiking, and observing nature at his farm in

Figure 2-9 *Aldo Leopold* (1887–1948) was a forester, writer, and conservationist. His book *A Sand County Almanac* (published after his death) is considered an environmental classic that inspired the modern environmental movement. His *land ethic* expanded the role of humans as protectors of nature.



Wisconsin provided material for his most famous book, *A Sand County Almanac*, published after his death in 1949. Since then more than 2 million copies of this important book have been sold.

What Is Leopold's Concept of Land Ethics? Work with Nature

We need to become plain citizens of the earth instead of its conquerors.

The following quotations from his writings reflect Leopold's land ethic, and they form the basis for many of the beliefs of the modern *environmental wisdom worldview* (p. 17).

All ethics so far evolved rest upon a single premise: that the individual is a member of a community of interdependent parts.

That land is a community is the basic concept of ecology, but that land is to be loved and respected is an extension of ethics.

The land ethic changes the role of Homo sapiens from conqueror of the land-community to plain member and citizen of it.

We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect.

Anything is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.

Thank God, they cannot cut down the clouds!

HENRY DAVID THOREAU

CRITICAL THINKING

1. What three major things would you do to reduce the harmful environmental impacts of advanced industrial societies?
2. What one person do you believe has made the greatest and longest lasting contribution to the conservation and environmental movements in the United States (or in the country where you live)? Explain.
3. Public forests, grasslands, wildlife reserves, parks, and wilderness areas are owned by all citizens and managed for them by federal and state governments in the United States. In terms of the management policies for most of these lands, would you classify yourself as (a) a preservationist, (b) a conservationist, or (c) an advocate of transferring most public lands to private enterprise? Explain.
4. Do you favor or oppose efforts to greatly weaken or repeal most environmental laws in the United States (or in the country where you live)? Explain.
5. Some analysts believe the world's remaining hunter-gatherer societies should be given title to the land

on which they and their ancestors have lived for centuries and should be left alone by modern civilization. They contend that we have created protected reserves for endangered wild species, so why not create reserves for these endangered human cultures? What do you think? Explain.

PROJECTS

1. What major changes (such as a change from agricultural to industrial, from rural to urban, or changes in population size, pollution, and environmental degradation) have taken place in your locale during the past 50 years? On balance, have these changes improved or decreased **(a)** the quality of your life and **(b)** the quality of life for members of your community as a whole?
2. Use the library or Internet to summarize the major accomplishments of the anti-environmental movement in the United States between 1980 and 2005.
3. Use the library or Internet to find bibliographic information about *Ernest Hemingway* and *Henry David Thoreau*, whose quotes appear at the beginning and end of this chapter.

4. Make a concept map of this chapter's major ideas using the section heads, subheads, and key terms (in boldface type). Look on the website for this book for information about making concept maps.

LEARNING ONLINE

The website for this book contains study aids and many ideas for further reading and research. They include a chapter summary, review questions for the entire chapter, flash cards for key terms and concepts, a multiple-choice practice quiz, interesting Internet sites, references, and a guide for accessing thousands of InfoTrac® College Edition articles. Log on to

<http://biology.brookscole.com/miller14>

Then click on the Chapter-by-Chapter area, choose Chapter 2, and select a learning resource.

