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AFTER EARTH DAY

A few miles north from Denver, along Colorado's Front Range, the busy urban corridor straddling Interstate 25 along the eastern range of the Rocky Mountains, lies the small, picturesque town of Erie. In 2005, Erie was little more than an historic, old coal town consisting of two paved roads, a miniature urban center with a few restaurants, a handful of retail stores, a post office, and a bar boasting continuous service since 1926. Then along came fracking, and everything changed.

Within a few years, Erie and surrounding Weld County were suddenly, uneasily, riding the crest of an economic boom. Since 2005, more than 23,000 active oil and gas production wells, mostly fracking sites, have appeared in Weld County, so numerous they seemed to one journalist "more common than trees."¹ In Erie, the population tripled from 6,291 to 19,723 in little more than a decade. The explosive growth of oil and gas production rapidly transformed the town's retail economy, workforce, and households. By 2015, the median family income was \$103,796, almost double the national average. The surge of new residents produced a thriving and expensive market for housing construction—many homes costing in excess of \$300,000. New homes? "They'll sell in a night," one local businesswoman told a reporter. "I'll have people come in here and say, 'Yup, it was up there for two hours and it sold.'"² Rising tax revenues, retail sales, and many other economic windfalls from robust oil and gas production have brought new wealth and a multitude of desirable community amenities to Erie and Weld County. But less than a decade after fracking arrived, middle school children and their parents were parading through a drilling site chanting "Hey, hey! Ho, Ho! These fracking wells have got to go."³

By 2015, the *Washington Examiner* reported that controversy over Erie's fracking sites "has grown so bitter that Erie residents don't tell neighbors if their spouse works for the oil industry. Many won't discuss the issue with reporters . . ." Remarked one woman to a reporter: "You don't tell them your husband works for an oil company. When they say, 'Hey, what does your husband do?' you just smile and change the subject." Fracking technology has brought Erie, like numerous other communities across the United States, not only prosperity

but divisive controversy, environmental disruption, and a problematic future. In 2014, Erie was selected among “The Best Places to Live” in America.⁴ The same year, the fracking battle catapulted Erie into national attention and earned it the unwelcome distinction as “ground zero for the disputes over property rights and environmental protection that fracking has unleashed.”⁵ Most important, the fracking conflict is U.S. environmental politics in the present tense. The rapidly enlarging contention is a showcase for many issues inseparable from environmental policymaking and certain to appear in variation throughout later chapters.

“FRACK, BABY, FRACK”

By 2009, when the drilling sites first appeared in Erie, fracking technology had already spread rapidly across the United States. More than thirty-five major oil shale formations exist beneath the United States and the Gulf of Mexico. Virtually every U.S. state is or could become a fracking site for natural gas and petroleum. The fracking rigs arriving in Erie were the leading edge of the fracking boom rapidly expanding to exploit Colorado’s Niobrara shale deposit, the fourth largest oil and gas shale formation in the United States.

A Spreading Technology

A relatively recent innovation called high-volume hydraulic fracturing and horizontal drilling has greatly increased fracking’s efficiency and economic profitability, thus dramatically accelerating its growth across the natural gas industry into what many industry experts now call a revolution in oil and natural gas production. Like almost all environmental issues, fracking is a complex mix of politics, economics, technology, science, and health risks—in Erie’s case, with a generous seasoning of neighborhood conflict and intergovernmental dissention.

Oil shale is a densely packed sedimentary material formed millions of years ago containing oil and natural gas combined like an egg in cake batter within the densely packed rock. Fracking technology is designed especially to reach and capture these petroleum resources locked in deep sedimentary layers.

Fracking involves igniting underground explosives to fracture oil shale. Engineers then combine a vertical pipe, often miles deep, with a horizontally drilled pipe to pump into the shale millions of gallons of heated, salty water mixed with numerous chemicals to produce a brine, under pressure high enough to penetrate the fractures. The heated brine releases petroleum and natural gas embedded in the shale. The whole mix is captured, pumped to the surface, and separated into petroleum materials and wastewater.⁶ Fracking involves massive water consumption, the potential contamination of surface and subsurface water resources by the drilling brine, and disposal of the millions of gallons of wastewater. Most drilling companies assert that the drilling brine is environmentally safe and that the brine’s diffusion through the oil shale and its eventual disposal

above ground pose few ecological hazards. (One mining company executive even publicly—and harmlessly—drank a small glass of the drilling brine to demonstrate its safety.)⁷ Most drillers believe that any additional environmental regulation, when needed, can be provided by the relevant state or local governments.

Contested Environmental Impacts

There is little doubt, however, that the newest fracking technology can pose significant health risks and create potentially severe ecological damage, unless properly managed by mining companies and carefully regulated by government. An extensive review of the available research, reported by the highly respected National Academies of Science, concluded that oil shale mining “is much more costly, energy intensive, and environmentally damaging than drilling for conventional oil. The processes . . . involve significant disturbance of the land, extensive use of water (a particular concern in dry regions where oil shale is often found), and potential emissions of pollutants to the air and groundwater. . . .”⁸

Fracking’s potential impact upon the nation’s rivers, lakes, streams, and underground water has become especially contentious. Even a relatively small drilling site pours millions of gallons of chemically treated water into a fracking well. Fracking sites currently operating or planned near large urban drinking water sources or infrastructure, for instance, might create significant contamination and extremely costly remediation. Small, repeated earthquakes have occasionally been linked to fracking operations. Farmers near fracking operations have complained about methane-contaminated wells, poisoned cattle, and drilling access roads destroying timber and isolating croplands. Clear and convincing evidence of these and other environmental impacts attributed to fracking technology, however, is fragmentary and controversial. A 2015 EPA investigation of fracking’s geologic impact found no evidence that fracking had created “widespread, systemic impacts on drinking water resources in the United States” but admitted the conclusion was very tentative.⁹ Some limited university studies have found no evidence of groundwater contamination at a few southwestern fracking sites; other research reveals no earthquakes associated in other regions. Illness directly linked to fracking-contaminated soil and water among farmers and ranchers remains unproven. Thus, the fracking boom advances, even as government regulators, property owners, the drilling companies, health scientists, and environmentalists debate when, where, and how to regulate it.

Neighbor Against Neighbor

Whatever else fracking’s impacted, it has divided communities and governments while setting neighbors against each other. It also has produced substantial income for property owners living atop a shale formation and for local governments. In Erie, for example, property owners with mineral rights received an average of \$25,000 to lease their land for drilling. Local retail sales and new store

openings rapidly increased. Controversy began, however, with construction of the earliest among more than 200 drilling sites erected within the city by 2016 and has continued unabated.

The Erie controversy was incited by many events. In 2012, an early drilling site near Red Hawk Elementary School, within the range permitted by state law, soon provoked teachers, parents, and neighbors to complain that the noise disrupted school work and the sleep of nearby residents. Truck traffic crowded local roadways. Concern about possibly hazardous emissions from drilling sites and geologic disturbances, based upon news from other communities, circulated among residents. In 2014, the National Oceanic and Atmospheric Administration released a study revealing that propane levels in Erie were ten times higher than the recommended limits for high-extraction communities.¹⁰ That same year, a new drilling site produced noise twenty-four hours daily, violating state regulations and forcing some residents to cover their bedroom windows with four-inch upholstery foam to smother the noise.¹¹

Governments in Conflict

Erie's government, the fracking corporations, local residents, community business, and state regulators have struggled to find a satisfactory political strategy to reconcile their often dissonant interests. The controversy is intensified by federalism. Environmental regulation involves federalism, which usually proceeds with considerable cooperation among federal, state, and local governments. But federalism has raw edges, exposed when federal and state governments disagree about regulation. In Erie, local, state, and federal governments all have asserted competing claims to regulatory authority over fracking. The state, not Erie's city government, regulates all oil and gas drilling sites and resists regulation by local authorities; state officials, in turn, resist Washington preempting state regulation. Colorado's property law separates property rights above ground from mineral rights below. Thus, a landowner with property overlying shale deposits may refuse to allow fracking at the surface, but it can—and does—happen that “a person or company who wants to develop the minerals can go to a more willing neighbor and bore laterally underneath the property of the recalcitrant anti-fracker.”¹² Some residents want fracking entirely prohibited; some just want the drilling off their property, and others, citing Erie's sudden prosperity, oppose any prohibition of local drilling.

Local community activists, a coalition of longtime residents and new middle-class arrivals, organized public forums and informal gatherings and hosted wine-and-cheese house parties where strategies were developed to pressure local and state governments to resolve the fracking issues. Since then, local efforts have failed to persuade Erie's state and congressional representatives to invest Erie and Weld County with authority to regulate local drilling. Both a local and a state referendum to freeze further drilling have failed. The drillers have worked diligently to earn Erie's acceptance and to mitigate, if not eliminate, many of the problems

arousing community criticism. One drilling corporation, for example, has spent about \$3.3 million in Weld County since 2007 on philanthropic endeavors, such as buying solar panels to power the Erie Community Center.¹³ At some drilling pads, the company has voluntarily moved beyond required boundaries, and others removed or rescheduled drilling hours to diminish the neighborhood noise.

A Continuing Controversy

The collision of community and corporate interests remains, and some conflicts defy compromise. By early 2018, Colorado's energy regulators had received more than 900 complaints about fracking from Weld County, and Erie's local government had passed an ordinance—which drillers claim is illegal—intended to control objectionable odors originating at drilling sites.¹⁴

The issue has outgrown Erie. The simmering political conflict has provoked attention and engagement from national advocacy groups representing a multitude of environmental, petroleum industry, and state and local government interests that regard Erie and Colorado as a showcase for the larger national debate over which governments should regulate fracking and how it should be done. As the Colorado fracking conflict evolves, however, it could be overtaken by the sudden, rapid decline in global petroleum prices starting in 2014—an economic shock already driving many small fracking operations out of production. In Colorado, as elsewhere in the United States, communities like Erie seem perched precariously between an economic boom and a potential bust.

Whatever the outcome, the fracking battles, wherever fought across the United States, have become environmental politics in the present tense, testimony that environmental issues are bundled inextricably in economic, political, scientific, and social issues certain to appear in variation throughout later chapters. These are a permanent legacy of an American Environmental Era hardly a generation old.

AMERICA'S ENVIRONMENTAL LEGACY

By the time Donald Trump entered the White House, America's environmental movement had transformed the nation's environment and its politics in many enduring ways. Perhaps most impressive has been the improvement of the nation's air quality. Ambient concentrations of sulfur oxides, carbon monoxide, nitrogen oxides, particulates, and ozone—all associated with serious human health disorders—had decreased by 73 percent between 1970 and 2016, and many more acutely dangerous ambient air toxics, especially formaldehyde and lead, have been reduced or virtually eliminated.¹⁵ Dangerous chemical and biological pollutants of major U.S. waterways, such as the Mississippi, Potomac, and Ohio rivers, have been reduced sharply.

Aggressive regulatory programs have reduced significantly the number of abandoned hazardous waste sites across the United States and, for the first time, compelled the manufacturers and distributors of hazardous or toxic chemicals to

comply with national standards for their transport and disposal. National testing programs now require more rigorous screening and testing of newly manufactured chemicals to protect human health and the environment. Numerous plant and animal species that were threatened with extinction, including the American bald eagle and the American panther, have been protected and, in a few instances, restored to vitality. Equally important, the United States was committed to numerous regional and international treaties, such as the Montreal Protocol, to reduce the global ozone hole, testifying to a growing recognition that the quality of the nation's domestic environment and global environmental quality have become interdependent. Most important politically, these transformations seemed securely grounded in a durable national consensus that environmental protection must now be a first-order public concern—a remarkable emergence of a national ecological consciousness that was nonexistent a few decades ago.

Despite these transformations, the U.S. environment remains significantly degraded in critical respects. In 2017, more than 123 million Americans lived in a county where one or more of eight regulated air pollutants exceed National Air Quality Standards.¹⁶ More than half the total area of the nation's biologically essential estuaries and almost half the nation's river miles are considered unacceptably polluted. The primary cause of this water degradation is still largely unregulated. Surprisingly little information is available about the extent to which Americans are exposed to thousands of existing chemicals or about the possible health risks involved. Federal government estimates suggest that information on public exposure is available for less than 6 percent of more than 1,400 naturally occurring and manufactured chemicals considered to pose a human health threat.¹⁷ The EPA has been able to assess the public health risks for an even smaller proportion of the about 1,500 new chemicals introduced annually into commerce and industry. "EPA's review of new chemicals provides only limited assurance that health and environmental risks are identified," according to a report by the U.S. Government Accountability Office (GAO; formerly the Government Accounting Office), "because the agency has limited information with which to review them."¹⁸ In fact, one of the most compelling national environmental problems is the pervasive lack of reliable scientific information about current environmental quality and human exposure to environmental contaminants—data that are absolutely essential for sound environmental policymaking.¹⁹

It is increasingly apparent that the scope and scale of this ecological degradation were often gravely underestimated and that the social and economic costs of pollution regulation were frequently miscalculated badly when the nation's major environmental policies were enacted. For instance, when Congress wrote legislation in 1976 requiring the EPA to ban or regulate any chemicals posing an unreasonable risk to human health, it did not anticipate that more than 62,000 chemical substances might have to be evaluated to determine their toxicity. Nor did Congress predict when it wrote the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, popularly known as Superfund) to clean up the nation's worst abandoned chemical waste sites that more than 40,000 sites

would be discovered, that 500 new sites would be identified annually, and that the initial funding would be virtually exhausted by the mid-1990s, thus requiring annual additional appropriations of \$1.2 billion through at least 2015.²⁰ We know now that the seemingly inexorable expansion in the scale and costs of environmental restoration is often the consequence of better environmental monitoring and research revealing, often to considerable surprise, the true reach and complexity of environmental problems. Thus, environmental protection is a work in progress.

THE EVOLUTION OF U.S. ENVIRONMENTALISM

The first Earth Day in April 1970 was the big bang of U.S. environmental politics, launching the country on a sweeping social learning curve about ecological management never before experienced or attempted in any other nation. No challenge has been more fundamental to U.S. environmentalism since Earth Day 1970 than the constructive adaptation of the original vision of environmental conservation and a renewal, once written into law and embedded into the political and economic structure of U.S. life, to domestic and global changes.

The Environmental Decade: From Richard Nixon to Ronald Reagan

The 1970s, the decade spanning the presidencies of Richard Nixon, Gerald Ford, and Jimmy Carter, remain the most remarkably creative legislative period in the history of U.S. environmentalism.²¹ During this decade, almost all of the major environmental laws, federal environmental regulatory institutions, and environmental interest groups that now define the contours of the nation's environmental politics and policy appeared.

A Republican, Richard Nixon himself was no environmentalist, nor were most congressional Republicans. But both congressional parties recognized the enormous political capital to be gained by riding the crest of the upwelling public concern for environmental protection. In Congress, a vigorous, broad coalition of Democrats and Republicans in both chambers collaborated in creating the legislative majorities essential to firmly establish the legal and political foundations of the U.S. environmental era.²²

By the time Richard Nixon's presidency abruptly ended in 1974, Congress had written the National Environmental Policy Act of 1969, which required all federal agencies to prepare environmental impact statements for any significant actions affecting the environment, declared a national policy "to encourage productive and enjoyable harmony between man and his environment," and created the Council on Environmental Quality within the White House to advise the president on environmental matters. During this period, the Clean Air

Amendments of 1970 for the first time mandated national air pollution standards and regulatory laws to enforce them. Two years later, the Federal Water Pollution Control Act Amendments of 1972 (Clean Water Act) set national water quality goals, established a national pollution discharge permit system, and created federal grants to the states to improve municipal waste treatment plants. To administer these new laws, Nixon created by executive order the EPA, the largest federal regulatory agency and the first of its kind in any national government.

A cascade of environmental legislation continued throughout the 1970s. The Endangered Species Act (1973) broadened federal authority to protect all endangered and threatened species, and the Safe Drinking Water Act (SDWA, 1974) authorized the federal government for the first time to set standards protecting the quality of the nation's drinking water. The Toxic Substances Control Act of 1976 (TSCA) required premarket testing of chemical substances and authorized the EPA to regulate or ban the manufacture, sale, and use of chemicals posing "an unreasonable risk of injury to health or to the environment," and the Resource Conservation and Recovery Act of 1976 (RCRA), requiring the EPA to set national standards for hazardous waste treatment, storage, and disposal.

By the time Jimmy Carter entered the White House in 1977, public support for environmental protection had become so broadly and deeply founded that it was, in effect, a part of the national consensus—that array of issues publicly accepted as an essential and priority concern of government. Carter's term began with his successful promotion of the Surface Mining Control and Reclamation Act (1977), establishing for the first time federal standards for strip mining and requiring mine operators to environmentally restore mined lands. Carter was also instrumental in the congressional passage of amendments to the Clean Air Act (CAA) and Clean Water Act in 1977. Powerfully aided by national revelation of the extensive, buried toxic waste dump discovered under the suburban settlement at New York's Love Canal, Carter was able to collaborate with Congress in the creation of CERCLA.

But Carter's administration was also beset from the outset by an energy crisis, created when the Organization of Petroleum Exporting Countries (OPEC) in 1973 imposed an embargo on U.S. imports of Middle Eastern petroleum.²³ The economic shock of the embargo and the political turbulence in its aftermath compelled the federal government for the first time since World War II to regulate domestic petroleum prices and supply, to set energy-efficiency standards for transportation and consumer products, and to create a national energy plan. Carter proposed and Congress enacted legislation establishing the new Department of Energy (DOE).

Policy Deadlock: From Ronald Reagan to George W. Bush

The environmental movement had prospered through the 1970s. That changed with the advent of the Reagan administration (1981–1989). Reagan and

his advisers, abetted by a new cadre of sympathetic congressional Republicans and the collapse of bipartisan congressional environmentalism, believed they had been elected to bring regulatory relief to the U.S. economy, and environmental regulations were an early priority on their hit list of laws needing regulatory reform. The environmental movement regarded the Reagan administration as the most environmentally hostile in a half century and Reagan's regulatory reform as the cutting edge of an implacable assault on the institutional foundations of federal environmental laws enacted during the 1970s.²⁴

The Reagan years severely tested the foundations of the environmental movement. Although the foundations held, little was done to advance the implementation of existing policies or to address new and urgent environmental issues. Accompanied by polarizing partisan infighting and protracted legislative delays, Congress was able to pass important amendments to the Clean Water Act, the SDWA, CERCLA, and the RCRA. The future of commercial nuclear power seemed to plunge from bleak to barren when the deadly 1984 reactor meltdowns at the Soviet Union's Chernobyl nuclear power facility released a catastrophic cloud of high levels of atmospheric radioactivity over the Soviet Union and its adjacent European neighbors.

President George Bush (1989–1993) ended the pernicious policy impasse of the Reagan years. The EPA's morale and resources, severely depleted during the Reagan years, improved. The Bush administration sponsored and adeptly promoted the CAA Amendments of 1990, a long-overdue reform of the CAA of 1970. The Energy Policy Act of 1992 for the first time created a comprehensive federal energy plan to reduce U.S. dependence on imported oil, encouraged energy efficiency and conservation, and promoted renewable energy.

The environmental movement expected much of Bill Clinton, especially because Vice President Al Gore was an outspoken environmentalist and Clinton had cultivated the environmentalist vote. In the end, the Clinton administration was distinguished more by its ambitions than by its accomplishments.²⁵ Clinton generally reinvigorated environmental regulation and installed aggressive environmentalist administrators in strategic executive agencies such as the Department of the Interior and the EPA. He revived U.S. engagement in international environmental policymaking, eventually committing the United States to the Kyoto Protocol to control global climate change (which the U.S. Senate, for its part, refused to ratify).

But Clinton confronted throughout most of his administration a hostile Republican congressional majority that thwarted most of his legislative initiatives.²⁶

Environmental Leadership Revived: From George W. Bush to Barack Obama

Then came Republican George W. Bush (2001–2009). To the wary environmental movement, Bush's succession to the White House seemed to announce

a profoundly unsettling new regime emerging from the shadows of the bitterly remembered Reagan administration, and it enthusiastically embraced its environmental attitudes. The environmental movement and most passionate environmentalists vigorously opposed Bush's election, even though Bush strongly represented himself as a moderate environmentalist, a prudent reformer rather than an anti-environmental zealot.

Bush's relationship with the environmental movement was confrontational from the outset. His appointment of individuals closely associated with energy production and natural resource consumption to strategic leadership positions in the executive branch, especially in the Department of the Interior and the DOE, and the close association of Vice President Dick Cheney with the oil and gas industry provoked deep misgivings among environmentalists.²⁷ The Energy Policy Act of 2005 and the subsequent Energy Independence and Security Act of 2009 exemplified the Bush administration's ambitious effort to create a long-term energy strategy for the United States. Although the environmental community generally welcomed these initiatives aimed at increasing energy efficiency and developing renewable energy resources, environmentalists continued to criticize the heavy emphasis on accelerated fossil fuel exploration, new commercial nuclear power, and coal-fired utilities in the Energy Independence and Security Act.

During the Bush administration, the EPA did strengthen national air pollution controls on particulates and mercury emissions, but to environmentalists, these and other administration initiatives were too laggard and limited. Christie Todd Whitman, Bush's first EPA administrator, had complained at the end of her term that the Bush administration seemed condemned to "an eternal fistfight" with environmental groups.²⁸ Her remark became prophetic.

A Collision of Expectations: The Obama Presidency

The election of Barack Obama and the return of Democratic majorities to both congressional chambers in 2009 seemed to signify a renewed White House commitment to innovative and new environmental initiatives and a relief from the adversarial, polarizing environmental legislative politics of the Bush administration. Obama's first term began with a bold program of ambitious environmental legislation, regulations, and other initiatives that never quite materialized. The White House environmental agenda was soon depleted by a severe economic recession and embattled by a tenacious partisan deadlock afflicting Congress for the duration of his presidency.

During its first term, the Obama administration created a significant record of environmental achievements. Among the most important legislation was the administration's American Recovery and Reinvestment Act of 2009, the massive economic recovery program that included more than \$100 billion in spending, tax incentives, and loan guarantees to promote energy efficiency, renewable energy development, fuel-efficient cars, and control of climate-warming

emissions, among other programs appealing to environmentalists. The administration promoted new congressional initiatives to create a regulatory program to control domestic climate-warming emissions. The EPA enacted numerous new and revised environmental regulatory programs, including revised regulations to limit mercury emissions from industrial fossil fuel combustion, further regulations to improve control of other toxic air pollutants, and new, stricter mileage standards for automobiles and light trucks. White House guidelines were written to strengthen protection of federal scientific research and regulation from White House political interference.

The president, however, inherited the most severe economic recession since the Great Depression and was compelled to weaken or eliminate many regulatory and legislative environmental initiatives in order to reduce federal expenditures and regulatory costs. Moreover, the 2010 congressional elections returned to the House of Representatives a Republican majority hostile to most White House environmental initiatives and preoccupied with reducing federal spending and regulation. A divided congress virtually assured legislative deadlock and the failure of almost all Obama's environmental legislative proposals.

The White House effort to enact new legislation to control climate-warming emissions failed despite an enormous investment of time and political resources. The EPA postponed its widely anticipated reform of regulations controlling atmospheric ozone and weakened its initial plan to strengthen regulation of atmospheric soot (particulates). Facing continuing budget deficits, the administration reduced the EPA's budget for three successive years.²⁹ Thus, the Obama administration, caught between conflicting demands to revive a severely weakened economy, to achieve legislative leadership in a bitterly divided Congress, and to satisfy the environmentalist expectations, was almost predestined to create disappointment and division within the environmentalist community. The second term, however, was a very different matter.

By the end of his second term, Obama had created an unprecedented environmental presidency he expected would endure. This legacy was crafted almost entirely through the exercise of the president's inherent executive powers, which did not require congressional collaboration to implement—a strategy that increased Republican determination to revoke most of Obama's regulatory enactments if they won the White House in 2016. Obama became the first president to actively and consistently promote climate change as a major priority in his regulatory agenda, legislative initiatives, and public speeches.

The foundation of Obama's second-term climate agenda was the president's regulatory power created by the Clean Air Act and exercised through the EPA. Using this authority, in 2015 the EPA drafted the Clean Power Plan, a rule establishing state-by-state goals for carbon emission reductions from electric utilities—a major source of climate-warming gases—and permitting states great discretion in determining how to meet goals. The EPA estimated that the rule would reduce these national emissions by an estimated 32 percent below 2005 levels by 2030.³⁰ This rule, coupled with a 2015 EPA rule mandating tougher emission rules for

trucks and heavy-duty vehicles and an agreement with China to jointly reduce national carbon emissions significantly, constituted the fundamentals of the climate agenda. Late in his second term, to the satisfaction of environmentalists, the president rejected the Keystone XL pipeline proposal, the long-disputed plan to build a 1,179-mile pipeline to transport 800,000 barrels a day of carbon-heavy petroleum from the Canadian oil sands to the Gulf Coast.

Virtually all these and other environmental regulations enacted during Obama's second term, however, have been challenged by a great diversity of opponents in most of the federal court venues, a strategy that seemed certain to delay their implementation and mire them in prolonged legal wrangling. Whether all or part of the Obama administration's environmental legacy would endure under this siege of litigation remained an open question when Obama exited the White House.

A Radical Redirection: The Trump Environmental Agenda

A year after his startling election, Donald Trump appeared in the White House before the national media and beside six piles of office paper six-feet tall to dramatize his "war on Washington's regulatory industry."³¹ One relentless target of the Republican presidential campaign had been federal environmental regulations that, Trump asserted, created unemployment, inhibited economic growth, and inflicted excessive, unnecessary costs upon American industry. And no federal agency epitomized all that Trump and congressional Republicans considered wrong with environmental management more than the EPA. Trump promised a sweeping "regulatory rollback" at the EPA and across a vast expanse of other environmental agencies and laws, creating what Republicans believed was a long overdue, radical retrenchment of excessive federal authority.

The Trump initiatives struck especially hard at the Obama administration's major environmental enactments to control domestic climate-warming emissions, to accelerate renewable power development, and to enlarge the scope of national air and water pollution standards. Trump also promised to liberate domestic fossil fuel industries from production restrictions, to open previously restricted public lands for energy exploration, and to revoke the Obama administration's Clean Power Plan and the Paris Climate Agreement, the foundations of the federal government's program to reduce domestic climate-warming emissions. And the president promised concurrently to reduce drastically the personnel and regulatory power of the EPA.³² Trump's agenda seemed blessed by political circumstances. Republican majorities, enlarged by the 2016 presidential elections, controlled both congressional chambers and responded enthusiastically to Trump's attacks on environmental regulation. Powerful business and industrial interests vigorously supported the Trump deregulation agenda. Additionally, voters showed scant interest or concern about environmental issues, thus apparently giving Republicans considerable latitude to propose comprehensive policy reforms.³³

The White House environmental agenda also created the most politically toxic relationship between environmentalists and the White House since the first Earth Day. The scope and vehemence of Trump's assault on environmental regulation alarmed and deeply angered environmentalists who overwhelmingly opposed Trump's election, which they considered the prelude to a massive subversion of the nation's environmental quality. The Trump agenda "takes a wrecking ball to agencies that protect our health, safety and environment," asserted the president of the Union of Concerned Scientists.³⁴ The Sierra Club's executive director, Michael Brune, exemplified the mood of most national environmental organizations. "Trump can't reverse our clean energy and climate progress with the stroke of a pen," he warned, "and we'll fight Trump in the courts, in the streets, and at the state and local level across America to protect the health of every community."³⁵

By the end of the administration's second year, practically every federal environmental agency's staff and authority, especially the EPA's regulatory programs, had been critically altered by the Trump administration's regulatory rollback. The first year box score: twenty-nine regulatory rules cancelled, twenty-four additional rollbacks underway, and seven more regulations rewritten.³⁶ Among Trump's most important executive orders were a cancellation of the EPA's Clean Power Plan restricting national climate-warming emissions, an end to the moratorium on federal coal leases on public land, and a cancellation of the mandate that federal officials consider climate-change impacts during decision making. The president had also ordered a severe reduction of references to climate change, renewable energy, and related issues across federal agency websites, and the virtual elimination of the EPA's climate-warming website with climate data links. The president also repeated his promise to withdraw the U.S. commitment to the Paris Climate Agreement limiting international climate-warming emissions.

The Trump administration, however, faced a long, contentious political struggle with environmentalists and their allies if the promised regulatory rollbacks were to succeed. Revising existing EPA regulations, for example, involves extensive procedural requirements sure to mobilize strong opposition. Opponents of major regulatory revisions have also turned to the courts, launching a flood tide of litigation that may delay, and perhaps defeat, many proposed regulatory reforms. Many important White House legislative initiatives will require uncertain congressional collaboration to succeed.

ONGOING CHALLENGES: PRESENT AND FUTURE

On that first Earth Day in 1970, more than half the Americans living today had not been born. A whole new generation has matured. Americans now have more than fifty years of collective experience with unprecedented experimentation in environmental management. The ultimate test of the ambitious U.S. regime of

environmental regulation will be not how well it was conceived but how well it endures. That endurance depends largely on how well U.S. science, political culture, and environmental leadership can learn from past experience and creatively apply the lessons learned to several profound problems now recognized as inherent in all environmental policymaking.

Keeping Environmentalism Contemporary

The environmental movement is now almost a half century old. Environmentalism is no longer the fresh, growing, politically ascending force that propelled environmental issues to unprecedented importance in national politics and policy. The Trump environmental program is the latest among many challenges environmental organizations face that have come with a now-familiar presence of environmentalists among the nation's major advocacy groups. Environmental organizations continually struggle to keep environmental issues a priority on the national policy agenda, to sustain a large, politically robust membership base, and to keep their messages politically relevant to a new generation of Americans. These challenges are especially significant because the membership of many major environmental organizations has been aging. (One of the largest and most influential conservation organizations, for example, reported that the average age of their membership is sixty-five, and only 5 percent of its million members are younger than fifty.)³⁷ In politics, moreover, public perceptions can become more important than environmental realities in creating priority for environmentalism on the national policy agenda. Many environmental problems, such as visibly polluted air and water, public pesticide exposures, and threatening toxic waste sites, that effectively dramatized the immediate need for environmental regulation now may seem—whatever the reality—less publicly important. Many newer, profoundly important environmental issues, such as global climate change or the relentless decline in the quality and quantity of fresh water, are difficult to characterize with a powerful, persuasive imagery that makes them immediately important and relevant to the public.

Thus, among the nation's environmental leadership, a growing, often heated discussion has evolved concerning whether environmentalist language is stale, the issues no longer compelling, and the major advocacy groups too unimaginative and complacent about delivering their political messages. A vigorous constituency within the environmental community is advocating new strategies and a fresh language to inspire a more contemporary image and wider public appeal for environmentalism, especially among the young, ethnic minorities, the economically underprivileged, and middle-income Americans recovering from a severe economic recession.

Modernizing Environmental Laws

The nation's environmental management is grounded on an essential but aging legal foundation of federal legislation and regulations. Many of these laws

need updating and adaptation to remain relevant to contemporary environmental conditions and responsive to a rapidly enlarging and diversifying body of new knowledge created by environmental science. “Our environmental laws,” environmental journalist and advocate Greg Esterbrook has noted, “are a generation or more out of date,” and he cites what he believes are compelling examples: “The Clean Air Act, signed by President Richard M. Nixon in 1970, has not been amended since 1990, a quarter-century ago. The Clean Water Act, passed in 1972, has not been updated since 1987. The Endangered Species Act, passed in 1973, was last amended in 1982. The National Environmental Policy Act, the law that mandates environmental impact statements, was passed in 1970 and last amended in 1982.”³⁸

When the Toxic Substances Control Act was written in 1972, for example, it was unrecognized that more than 50,000 chemicals would be subject to its review and possible regulation, and consequently, complete and faithful implementation of the legislation has been impossible—an impasse long recognized and requiring a revised, updated regulatory strategy to relieve.³⁹

Modernizing these laws has been difficult for several reasons. Party polarization over environmental regulation has become deeply entrenched within Congress and between Republican and Democratic presidents since 2000, imposing a policy deadlock that forestalls any sustained and comprehensive partisan collaboration to revise comprehensively existing environmental laws. Additionally, the nation’s slow recovery from the severe 2008 economic recession, health care issues, and a growing national preoccupation with terrorism and national security have driven environmental issues down the list of governmental and public priorities. Without a compelling national emergency or a timely emergence of party collaboration on national environmental issues, modernizing the nation’s environmental governance will continue to be slow and extremely incremental.

Implementing Policy

The character and pace of policy implementation changes continually in response to shifting public moods; to ebbs and flows in crucial resources, such as money and personnel invested in carrying out environmental policies; to changes in political party control of Congress, the White House, and state governments; and to other changes discussed in later chapters. In short, policy implementation is unfolding and variable, powerfully driven by economic, political, and cultural forces. Practically every important environmental ill has been targeted by a major federal law, but the majority of important environmental laws have been implemented at a plodding pace, and portions of all the laws exhibit regulatory rigor mortis.

One reason for this plodding pace is the growing complexity of the regulatory process. The average size of major environmental statutes has inflated from about fifty pages in the 1970s to more than 500 pages currently. The original CAA (1970) was sixty-eight pages, the CAA Amendments of 1990 weighed in at 788 pages, and the regulations required for their implementation will exceed 10,000

pages. Like an augury of the future, the American Clean Energy and Security Act (2009), the first climate change regulatory legislation to be proposed by the House of Representatives, bloated to more than 1,400 pages. To create the elephantine regulations necessary to implement these complex laws and to apply the procedures in the appropriate instances can consume an enormous amount of time.⁴⁰

Another important source of regulatory delay is the increasing mismatch between the responsibilities assigned to environmental agencies and the budgetary resources required to accomplish them. Although the EPA's workload has increased enormously since its creation in 1970, its budget has failed to keep pace.⁴¹ Decades of underfunding has left the EPA overwhelmed by the scientific and administrative complexity of its regulatory tasks. For example, by 2018 the EPA was decades behind in the required risk assessment—each of which might require eight years—for hundreds of chemicals on a growing list for which it was responsible.⁴²

Enforcement of most environmental legislation also depends on voluntary compliance by regulated interests, public and private, but the responsible federal and state agencies often lack the resources to monitor compliance with the law. Few states, for example, routinely inspect public and private drinking water systems, even though such inspections are required by the SDWA (1974).⁴³ Many states lack the technical resources to develop numerical standards for many groundwater contaminants and, instead, depend on evidence of environmental damage or public health risks before acting to control these substances.

Controlling Costs

By most estimates, the national cost of environmental regulation does not seem excessive, particularly when compared with estimated economic benefits, nor likely to inhibit healthy economic growth.⁴⁴ Currently, the United States spends about \$120 billion annually for environmental control or about 2 percent of the gross national product.⁴⁵ Overall, the annual proportion of national expenditures invested in pollution control appears to have decreased since 1990.⁴⁶ But these expenditures sometimes conceal troublesome details. The cost of individual regulatory programs is soaring, often inflicting heavy, unanticipated costs on specific economic sectors, depleting regulatory resources, and compelling a search for scarce, new funding sources, as the following examples illustrates:

- *Superfund* was created to clean up the nation's numerous abandoned hazardous waste sites. After originally authorizing \$1.6 billion for the project, Congress was compelled in the mid-1980s to increase spending to \$15.2 billion, and estimates suggest the program will require annual congressional supplements of at least \$1.5 billion after 2010.⁴⁷
- *Federal storm water runoff regulations* will require the District of Columbia to spend \$1.9 billion to completely renovate its antiquated sewer system.⁴⁸

The roster of inflationary programs has become a virtual catalog of the nation's major environmental laws. Unanticipated environmental problems, unexpected scientific complexities, and inexperience with new regulations are the common causes of cost overruns. The litany of other inflationary provocations includes administrative delay, litigation, bureaucratic bungling, waste, missing information, and political obstruction. Whatever the reasons, excessive costs divert public and private capital from more productive investment, promote economic inefficiency, impair competitiveness in some industries, and increase consumer costs. Bloated budgets become a cudgel in the hands of opponents eager to beat back demands for essential improvements in environmental management.

Environmentalists traditionally suspect, often correctly, that the estimates of regulatory costs produced by businesses or other regulated interests are inflated deliberately. (However, they are seldom dubious about the considerably lower estimates they usually produce.) They also believe that benefit–cost comparisons applied to environmental policies are usually biased, because it is much easier to monetize the costs of regulation than the benefits. Leaving aside predictable and usually unresolvable arguments over the “real” costs of environmental regulations, the fact of sharply rising costs has compelled many major environmental leaders to seek creative strategies for reducing the expense and to collaborate in this effort with the businesses and industries being regulated.

Responding to Evolving Science

When the political leadership of U.S. environmentalism set out its initial policy agenda following Earth Day 1970, the ozone hole, global climate change, genetically altered foods, endocrine disrupters, leaking underground toxic storage tanks, ionizing radiation, indoor air pollution, and a multitude of other environmental issues—as well as many thousands of chemicals now common in U.S. commerce and industry—were unknown. All these matters and many more currently on the environmental movement's priority list are largely the product of scientific research in the past several decades. In later chapters, we observe how science contributes constructively to environmental management through, for example, the discovery of environmentally benign substitutes for more harmful chemicals such as chlorofluorocarbons. But the relentless evolution of scientific research can also frustrate, confuse, and discredit existing environmental policy by producing all sorts of new and unexpected discoveries. For example, to meet the public health standards of the CAA, the EPA in 2006 slightly lowered the short-term threshold for public exposure to particulates (soot) as a result of scientific research conducted since the original standard had been set several decades previously. Although the new standard, described by the EPA as “the most health-protective in U.S. history,” is assumed to create from \$9 billion to \$70 billion in long-term health and visibility benefits, it is also estimated to cost electric utilities alone about \$400 million yearly to implement.⁴⁹

A rising tide of ecological science poses several continuing challenges to environmental scientists and policymakers. First, it can produce new data indicating

that prior policy decisions may have been based on inadequate information and must be revised—perhaps with great political or legal difficulty and at considerable expense.⁵⁰

Scientific research can also produce ambiguous, fragmentary, or contradictory data concerning the existence or extent of an environmental problem—especially at an early stage in the research—at a time when policymakers feel compelled to do something about the issue. Sometimes a solution—or the appearance of one—seems so urgent that policymakers believe that they cannot wait for additional research or perhaps that additional research may never satisfactorily resolve the issue, because the impact of an environmental regulation will remain inconclusive. The continuing scientific ambiguity about the ecological impact of human-made chemicals mimicking human hormones (often called endocrine disrupters) and the persisting controversy about the ecological impact of species loss illustrate this sort of science problem.

Finally, scientific research can complicate environmental policymaking and, in the process, drive up the cost and time involved in remedying environmental ills by disclosing, instead of timely or quick answers to an ecological problem, the unanticipated need for new information. Pentagon planners call these discoveries the *unk-unks*—the unknown unknowns, the kinds of information they don't know are needed until a problem is investigated. Consider, for instance, the experience of scientists trying to explain the sudden dramatic increase in fish kills between 1991 and 1993 in North Carolina's vast estuaries. Unprecedented millions of fish were floating to the water surface with large, bleeding sores, often accompanied by a strange smell that burned the eyes and throat—not the smell of decaying fish. At first, investigators assumed the familiar explanation—lack of dissolved oxygen in the water, a seasonal deficiency in the estuarine environment that is sometimes fatal to fish. Instead, extensive fish biopsies gradually revealed something wholly unexpected—the presence of enormous quantities of a tiny, one-celled creature, a dinoflagellate of the species *Pfiesteria piscicida*, an apparently harmless organism seldom studied and never associated with extensive fish kills. So biologists began to observe *Pfiesteria* habits intensively. They discovered that, when estuarine nutrient levels of nitrogen and phosphorous increased significantly, *Pfiesteria* can transform into a murderous organism with a personality akin to the star of the science fiction movie *Alien*, multiplying in staggering numbers and aggressively attacking and consuming huge fish populations. Thus, an unk-unk—in this case, the complete life cycle of *Pfiesteria*—was unexpectedly uncovered in the course of investigating a fish kill and became a critical component in understanding and eliminating the problem itself.⁵¹

The Challenge of Sustainability

In September 2018, the Swedish manufacturer of Legos, the tough, brightly colored little plastic blocks found worldwide, announced it would soon create its toys “sustainably” by replacing with less polluting materials the plastic in the

100 million bricks it produced daily. Across the Atlantic, that same month, the Mayor's Office of Sustainability in New York announced that it was giving to 320,000 students in public and charter high schools a reusable, stainless-steel water bottle to replace single-use plastic bottles in an effort to reduce landfill waste.^{52,53} By the time New York's students received their new water bottles, more than 400 American colleges were offering sustainability-related bachelor's degrees and the United Nations had declared Seventeen Sustainable Development Goals as an essential metric to measure national progress globally. Sustainability planning, in one form or another, has become a global enterprise.

The concept of "sustainability" or "sustainable development," as a transcendent vision for public policymaking, has permeated deeply into the philosophy of American environmentalism and its image of a sound civic culture. Yet sustainability is often an imprecise and contested vision, at once compelling and formidable to translate into viable public policy. And Washington's once enlarging commitment to promoting sustainable national development through public policy, culminating with the Obama administration's ambitious national plans, has rapidly receded as the Trump environmental agenda gives priority to other matters.

Sustainability and Federal Policy

In 1987, sustainable development crossed the threshold from an emerging concern to a transcendent goal for many within the national environmental movement. In that year, *Our Common Future* (often called the Brundtland Report) was published by the World Commission on Environment and Development. This report responded to increasing worldwide apprehension about the long-term environmental impact of national growth by concisely proposing that nations balance present and future development by "meeting the needs of the present without compromising the ability of future generations to meet their own needs." While the report's definition has become virtually synonymous with the concept itself, sustainable development in the United States has been translated nationally into a multitude of variations. The EPA, for example, defines sustainability to mean "to create and maintain the conditions under which humans and nature can exist in productive harmony to support present and future generations."⁵⁴ Different definitions often imply different policy agendas focused on different resources and development metrics.

Beginning with the Clinton administration (1992–2000), the federal government became increasingly active in promoting national sustainability planning and research. Clinton attained national visibility to sustainability issues by creating the President's Council on Sustainable Development, headed by Vice President Al Gore, to advise the White House on sustainability matters. While sustainability never assumed White House importance during George W. Bush's administration (2000–2008), state and local governments began increasingly to introduce sustainability as an operational concept in land and resource planning. By 2010, a U.S. national directory cited more than 2,700 private or public entities involved with environmental sustainability.⁵⁵

The Obama administration promoted sustainability as a major environmental priority, investing considerable political capital and federal resources in advancing sustainability planning in both the public and private sectors. Among Obama's five executive orders promoting sustainability, the last and most comprehensive, EO 13514, required all federal agencies to publish an annual Strategic Sustainability Plan, mandated that all federal buildings progressively achieve standards for federal sustainable buildings, ordered the federal government to achieve greater energy efficiency and reliance on renewable energy, and committed the federal government to reduce climate-warming emissions.

The election of Donald Trump brought an end to the Obama sustainability initiatives. While Obama's executive orders were not revoked—with the exception of the mandate for federal reduction of climate-warming emissions—sustainability planning appeared to be a White House cast off, unattended, underfunded, and largely unmentioned.

State and Local Government Initiatives

Local governments, and to a lesser extent the states, are gradually introducing sustainability into their planning procedures. A third of American cities have adopted sustainability plans within the last decade, almost a fifth of local governments have specific budget allocations for sustainability-related activities, and about a fifth have dedicated staff for sustainability planning.⁵⁶ Efforts continue in numerous state legislatures to create legal mandates requiring some form of state-wide sustainability planning or state sustainability staff position. Nonetheless, the states have been slower than local governments to introduce sustainability planning into their governing process.

Sustainability's Many Meanings

Over time, as Jonathan M. Harris, an international environmental scholar, has observed, the definition of a sustainable society has been interpreted to include at least three qualities:

- *Economic*: “An economically sustainable system must be able to produce goods and services on a continuing basis, to maintain manageable levels of government and external debt, and to avoid extreme sectoral imbalances which damage agricultural and industrial production.”
- *Social*: “A socially sustainable system must achieve distributional equity, adequate provision for social services including health and education, gender equality, and political accountability and participation.”
- *Environmental*: “An environmentally sustainable system must maintain a stable resource base, avoiding over-exploitation of renewable resource systems . . . and depleting non-renewable resources. . . . This includes maintenance of biodiversity, atmospheric stability, and other ecosystem functions.”⁵⁷

Sustainability, however, is still loaded with ambiguities that can reduce it to a cliché weighted with goals that can seem competitive, even contradictory. This ambiguity easily leads to dissimilar, sometimes conflicting or contested definitions that become apparent especially when translating sustainability into specific public policy goals or creating a metric to measure progress toward sustainable development.

Protection of nonrenewable resources, for instance, may appear inconsistent with sustained economic production. Adequate provision of health and education services may appear to require reduction of public spending to protect biodiversity. Should sustainable energy consumption be measured by growth of renewable energy production or by reduction in per capita energy consumption? Decisions inevitably involve political, economic, and social trade-offs between competing policy goals and competing stakeholders. Some of the most divisive political controversies within the environmental movement arise from these decisions. Nonetheless, decisions, inspired by some vision of sustainability, are continually being made by American governments, corporations, and educational institutions that do translate sustainability into public policies, corporate growth strategies, and educational curricula.

PLAN FOR THE BOOK

This chapter has introduced, broadly and briefly, the major themes that later chapters explore in more depth and detail. It has also provided a review of many significant events since Earth Day 1970 that define the political setting for environmental policymaking today, thus creating a present sense of place in the rapidly evolving politics of U.S. environmentalism. The chapters that follow progress from a broad overview of the major governmental institutions, private interests, and political forces shaping all environmental policy today to an increasingly sharp focus on the distinctive issues, actors, and interests involved with specific environmental problems.

Chapter 2 (Making Policy: The Process) describes the phases of the policy cycle that shape all major environmental policies. Included is an exploration of the influence of the U.S. Constitution and U.S. political culture on this process. Also discussed is the nature of environmental pressure groups and other stakeholders in the policy process and the important role of public opinion and the scientific community in policymaking.

Chapter 3 (Making Policy: Governmental Institutions and Politics) describes the specific U.S. governmental institutions, private interests, and political forces engaged in environmental policymaking. The narrative includes a discussion of the presidency, the important bureaucracies, Congress, and the courts. Also discussed is the importance of political events such as changing congressional majorities, economic growth or recession, and shifting public moods.

Almost all environmental policymaking entails some common issues. Chapter 4 (Common Policy Challenges: Risk Assessment and Environmental Justice)

explores two of the most scientifically contentious and politically controversial of these issues: risk analysis and environmental justice. Risk analysis is concerned with determining whether specific chemicals, industrial processes, consumer products, and environmental contaminants, among many other things, pose a significant threat to public health or the environment and, if they do, how they should be regulated. Environmental justice investigates whether various social groups, particularly minorities of color and economically disadvantaged individuals, are disproportionately exposed to environmental risks or denied reasonable opportunity to protect themselves from such risks.

Among the longest-running and least-resolvable conflicts in environmental policymaking is over the economic cost and fairness of environmental regulations. Chapter 5 (*More Choice: The Battle Over Regulatory Economics*) looks at two major aspects of this issue: the use of benefit–cost analysis to evaluate environmental regulations and proposals to replace current methods of environmental regulation with policies that rely on market forces to achieve results. Discussed are the major arguments and interests aligned on different sides of these issues together with evidence about the impact of proposed economic reforms when they have been instituted.

Chapter 6 (*Command and Control in Action: Air and Water Pollution Regulation*) describes the nation's major air and water pollution control laws, evaluates their impacts, and discusses the impact of new Trump administration regulatory reforms. The chapter explains how these laws illustrate the command-and-control style of regulation now common in the United States. Also described are the substantive elements of the CAA (1970) and the Federal Water Pollution Control Act Amendments (1972). The accomplishments and deficiencies resulting from these major air and water pollution laws are reviewed together with characteristic policymaking challenges created by the scientific and economic requirements of air and water pollution control.

Chapter 7 (*A Regulatory Thicket: Toxic and Hazardous Substances*) focuses on the major regulatory legislation to control environmental dangers posed by chemical, biological, and radioactive agents. The major laws examined include the TSCA (1976), the RCRA (1974), and Superfund legislation. The chapter briefly describes the major elements of these important laws and examines their impacts in the context of determining whether they have accomplished their purpose to control the manufacture and distribution of ecologically harmful chemicals and to safely regulate toxic waste from the cradle to the grave.

Chapter 8 (*Energy: America's Energy Politics in Transformation*) describes the nation's primary energy resources and increasing reliance on fossil fuels together with the ecological, economic, and political risks entailed. The Trump administration's new fossil fuel regulatory changes and promotion of coal production are explained and evaluated. The chapter focuses special attention on increasing petroleum supplies, the attractions and environmental dangers associated with increased coal production, and the environmental problems linked to nuclear power. Also explored are future energy policy options and the ecological

implications, especially in the contentious trade-off between coal and nuclear power as future energy sources and the challenges created by greater reliance on energy conservation and energy efficiency as alternatives to major reliance on traditional energy sources.

Chapter 9 (635 Million Acres of Politics: The Contested Resources of Public Lands) focuses on the historic political battle over the use of more than 600 million acres of public land, mostly controlled by the federal government. The narrative examines the major economic and environmental interests engaged in a century-long battle over access to timber, natural gas, petroleum, grazing land, hydroelectric power, and other important resources on federal land. Described are the major federal agencies caught in the middle of these conflicts, such as the Department of the Interior and the U.S. Forest Service. The chapter also discusses new Trump administration federal land use policies, the major legislation land use agencies are expected to implement in managing these resources, and the resulting problems, including the obstacles to achieving ecosystem management on federal lands.

Chapter 10 (The Politics and Policy of Global Climate Change) focuses on the scientific and political status of domestic climate policy and the Trump administration's impact on national climate regulations. The scientific evidence of global climate change, the political and scientific conflict associated with control of climate-warming emissions, and the impact of climate issues on public opinion and voting is examined. The Trump administration's major revisions of national climate emissions regulations are described and evaluated. The growing importance of states in national climate policy is discussed. The Trump administration's withdrawal from the Paris Accord to control global climate-warming emissions is explained and evaluated.

CONCLUSION

In calendar time, the presidential election of Donald Trump preceded the fifth decade of the U.S. Environmental Era proclaimed in the 1970s. In political time, it commenced an uncertain season for environmentalists now deep into that era, a season of conflicting implications and richly contradictory experiences. From the perspective of policymaking, a sense of frustration and impasse nurtured by often bitterly divisive conflict between organized environmentalism and the White House has permeated the era. Yet evidence is abundant that environmental leaders have enormously enlarged the temporal and geographical scope of their policy vision to embrace sustainable development, ecosystem management, and global ecological restoration. Improvements in environmental quality have become increasingly apparent and sometimes impressive, yet regulatory achievements fall gravely below expectations. Environmentalism has matured to the point where its organizational advocates can reflect critically on past experience and accept the need for rethinking and reforming their policy agendas, especially

the need to moderate the escalating cost of environmental protection and to find more effective ways to implement pollution regulation. At the same time, the rapid progress of environmental science reveals with increasing acuteness the need to improve significantly the quality of the science base on which environmental policy is grounded. Environmentalism is now firmly rooted in U.S. political culture, yet its electoral force often seems surprisingly feeble.

The election of Donald Trump, however, has abruptly and radically altered the political trajectory of American environmental policymaking. The Trump administration's ambitious agenda of environmental deregulation, accelerated fossil fuel energy development, and federal divestment of protected public lands constitutes the most pervasive constriction of national environmental governance since Earth Day 1970. While the ultimate impact of these unprecedented White House initiatives may be determined by the federal courts, Congressional elections, and public opinion, the short-term impact has been uncertainty, diminished capacity, and a retreat of federal authority in environmental governance.

Suggested Readings

Andrews, Richard N. L. *Managing the Environment, Managing Ourselves: A History of American Environmental Policy*. 2nd ed. New Haven, CT: Yale University Press, 2006.

Daynes, Byron W., and Holly O. Hughes. *White House Politics and the Environment: Franklin D. Roosevelt to George W. Bush*. College Station: Texas A&M University, 2010.

Gardner, Gary. *Creating a Sustainable Future: The Need for Innovation and Leadership*. Washington, DC: Worldwatch Institute, 2011.

Lomborg, Bjorn. *The Skeptical Environmentalist: Measuring the Real State of the World*. New York: Cambridge University Press, 2001.

Mazmanian, Daniel A., and Michael E. Kraft. *Toward Sustainable Communities: Transition and Transformations in Environmental Policy*. 2nd ed. Cambridge, MA: MIT Press, 2009.

Meadowcroft, James, and Daniel J. Fiorino. *Conceptual Innovation in Environmental Policy*. Cambridge, MA: MIT Press, 2017.

Merchant, Carolyn. *American Environmental History: An Introduction*. New York: Columbia University Press, 2007.

Sachs, Jeffrey D. *The Age of Sustainable Development*. New York: Columbia University Press, 2015.

Shabecoff, Philip. *A Fierce Green Fire: The American Environmental Movement*. Washington, DC: Island Press, 2003.

Notes

1. Zack Coleman, "Freaking Out Over Fracking," *Washington Examiner*, April 27, 2015, available at <http://www.washingtonexaminer.com/freaking-out-over-fracking/article/2563518>.
2. Ibid.
3. Troy Hooper, "Colorado Fracking Protests Target Drilling Near School," *The Colorado Independent*, June 6, 2012, available at http://www.huffingtonpost.com/2012/06/06/colorado-fracking-protest-school_n_1575816.html [accessed March 13, 2015].
4. "Best Places to Live 2015, Erie Colo.," *Money*, available at <http://time.com/money/3984422/erie-colorado-best-places-to-live-2015/>.
5. Mark Jaffe, "Drilling Rigs and Housing Development Face Off in Colorado Suburbs," *Denver Post*, February 13, 2015, available at http://www.denverpost.com/managingtheboom/ci_27522307/drilling-rigs-and-housing-development-face-off-colorado.
6. U.S. Department of the Interior, 2012 Oil Shale and Tar Sands Programmatic EIS Information Center, "About Oil Shale," available at <http://ostseis.anl.gov/guide/oilshale/>.
7. Catherine Tsai, "Halliburton Executive Drinks Fracking Fluid," *Huff Post Green*, August 22, 2011, available at www.huffingtonpost.com/2011/08/22/halliburton-executive-drinks-fracking-fluid_n_933621.html.
8. Curt Suplee, *What You Need to Know About Energy* (Washington, DC: The National Academies, 2008), 29.
9. U.S. Environmental Protection Agency, Office of Research and Development, *Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources: Executive Summary* (Washington, DC: U.S. Environmental Protection Agency, 2015), E-6.
10. Troy Hooper, "Colorado Fracking Protests."
11. Mark Jaffe, "Drilling Rigs and Housing Development Face Off in Colorado Suburbs," *Denver Post*, February 16, 2015, available at <https://getpocket.com/a/read/845837745>; see also Alex Burness, "Erie Neighbors Say They've Been Kept in Dark About 13 Planning Sites," *Daily Camera*, available at http://www.dailycamera.com/erie-news/ci_25968637/erie-neighbors-say-theyve-been-kept-dark-about.
12. Mark Jaffe, "Drilling Rigs and Housing Development Face Off in Colorado Suburbs."
13. Zack Coleman, "Freaking Out Over Fracking."
14. Anthony Hahn, "Vista Ridge Residents, Erie Officials Wary of Fracking Sites, Push Back on Health Reports," *Daily Camera*, May 31, 2017, available at http://www.dailycamera.com/erie-news/ci_31028251/vista-ridge-resident.
15. U.S. EPA, "Air Quality Trends," available at https://gispub.epa.gov/air/trendsreport/2017/#growth_w_cleaner_air.
16. U.S. EPA, "National Air Quality: Status and Trends of Key Pollutants: Status and Trends Through 2016," <https://www.epa.gov/air-trends>.

17. U.S. General Accounting Office (GAO), *Chemical Risk Assessment: Selected Federal Agencies, Procedures, Assumptions and Policies*, Document no. GAO 01-810 (Washington, DC, August 2001), 16.
18. GAO, *Chemical Regulation: Options Exist to Improve EPA's Ability to Assess Health Risks and Manage Its Chemical Review Program*, Report no. GAO-05-2005 (Washington, DC, June 13, 2005), 1; see also, GAO, *Chemical Regulation: Observations on the Toxic Substances Control Act and EPA Implementation*, Report no. GAO-13-696T (Washington, DC, February, 2012).
19. Robert O'Malley, Kent Davender-Bares, and William C. Clark, "'Better' Data: Not as Simple as It Might Seem," *Environment Magazine*, March 2003, 9-18.
20. Katherine Probst and David Konisky, *Superfund's Future: What Will It Cost? Executive Summary* (Washington, DC: Resources for the Future, 2001).
21. A comprehensive summary of federal environmental legislation since 1970 is found in Norman J. Vig and Michael E. Kraft, "Major Federal Laws on the Environment, 1969-2008," in *Environmental Policy: New Directions for the Twenty-First Century*, ed. Norman J. Vig and Michael E. Kraft (Washington, DC: CQ Press, 2010), App. 1.
22. Useful analyses of the presidency's role in environmental policymaking can be found in Dennis L. Soden, ed., *The Environmental Presidency* (Albany, NY: SUNY Press, 1999); Norman J. Vig, "Presidential Powers and Environmental Policy," in *Environmental Policy: New Directions for the Twenty-First Century*, ed. Norman J. Vig and Michael E. Kraft (Washington, DC: CQ Press, 2010), 75-98.
23. The Carter administration's difficulties with energy policy are examined from different perspectives in Richard H. K. Vietor, *Energy Policy in America since 1945* (Cambridge: Cambridge University Press, 1984); Pietro S. Nivola, *The Politics of Energy Conservation* (Washington, DC: Brookings Institution, 1986).
24. More detailed analyses of Reagan's environmental policies are found in Michael E. Kraft and Norman J. Vig, "Environmental Policy in the Reagan Presidency," *Political Science Quarterly* 99 (Fall 1984): 414-439; Barry D. Freedman, *Regulation in the Reagan-Bush Era: The Eruption of Presidential Influence* (Pittsburgh, PA: University of Pittsburgh Press, 1995); V. Kerry Smith, *Environmental Policy Under Reagan's Executive Order: The Role of Cost-Benefit Analysis* (Chapel Hill: University of North Carolina Press, 1984); Robert V. Bartlett, "The Budgetary Process and Environmental Policy," in *Environmental Policies in the 1980s*, ed. Norman J. Vig and Michael E. Kraft (Washington, DC: CQ Press, 1984); J. Clarence Davies, "Environmental Institutions and the Reagan Administration," in *Environmental Policies in the 1980s*, ed. Norman J. Vig and Michael E. Kraft (Washington, DC: CQ Press, 1984).
25. On the Clinton presidency, see Campbell Colin and Bert A. Rockman, eds., *The Clinton Presidency: First Impressions* (Chatham, NJ: Chatham House, 1995); "GOP Sets 104th Congress on New Regulatory Course," *Congressional Quarterly Weekly Report*, December 10, 1994, 1693-1719.

26. During Clinton's first term, however, Congress passed the important Food Quality Protection Act of 1996. The act created a new approach to regulating pesticides used in food, fiber, and other crops by requiring the EPA to determine the health risk in foods by considering all the ways in which people were exposed to harmful chemicals and created a reasonable risk health standard for raw and processed food that replaced the earlier standard barring processed food containing even a trace of chemicals thought to cause cancer.
27. The environmentalist indictment of George W. Bush's administration is summarized in Natural Resources Defense Council, *Rewriting the Rules, Year-End Report 2002: The Bush Administration's Assault on the Environment* (Washington, DC: Natural Resources Defense Council, January 2003); U.S. Congress, House of Representatives, Committee on Government Reform—Minority Staff, Special Investigations Division, *Politics and Science in the Bush Administration: Prepared for Rep. Henry W. Waxman* (Washington, DC, August 2003).
28. Quoted in Katherine Q. Seelye, "Whitman Quits as E.P.A. Chief," *New York Times*, May 22, 2003, 1A.
29. Jeremy P. Jacobs and Jean Chemnick, "Obama Proposes Agency's 3rd Consecutive Budget Cut," *E&E Reporter*, February 13, 2012, available at <http://www.eenews.net/Greenwire/rss/2012/02/13/2> (accessed May 20, 2012).
30. On details of the Plan, see U.S. EPA, *Clean Power Plan for Existing Power Plants*, available at <http://www.epa.gov/cleanpowerplan/clean-power-plan-existing-power-plants>; and Union of Concerned Scientists, *The Clean Power Plan: A Climate Changer* (Cambridge, MA: Union of Concerned Scientists, 2015), available at http://www.ucsusa.org/our-work/global-warming/reduce-emissions/what-is-the-clean-power-plan#.VmOm-r_i4oE.
31. Juliet Eilperin, "Trump Pledges To Cut Regulations Down To 1960 Levels—But That May Be Impossible," *Washington Post*, December 14, 2017, available at https://www.washingtonpost.com/politics/trump-pledges-to-whittle-federal-regulations-down-to-1960-levels/2017/12/14/17de13a4-e119-11e7-bbd0-9dfb2e37492a_story.html?utm_term=.005ee64db371.
32. Mark Hand, "Repeal of Obama-Era Environmental Rules Dominates Trump's Regulatory Agenda," *Think Progress*, July 29, 2017, available at <https://thinkprogress.org/trump-releases-deregulatory-agenda-6ad07b7dd28a>.
33. Andrew Follett, "Poll: Environment Is Least Important Issue to Americans," *The Daily Caller News Foundation*, December 21, 2016, available at <http://dailycallernewsfoundation.org>; Pew Research Center, *People and the Press: "Presidential Election Reactions and Expectations,"* November 21, 2016, available at <http://www.people-press.org/2016/11/21/presidential-election-reactions-and-expectations/>.
34. Kate Sheppard and Alexander C. Kaufman, "Donald Trump's Latest Budget Still Takes an Ax to Environmental Protection Agency," May 23, 2017, available at https://www.huffingtonpost.com/entry/trump-budget-environmental-protection-agency_us_592449d8e4b034684b100247.

35. Adam Beitman, "Trump's Attack on Clean Air and Climate Action Targets Policy That Saves Thousands of Lives and Billions of Dollars," Sierra Club, March 27, 2017, available at <https://content.sierraclub.org/press-releases/2017/03/trump-s-attack-clean-air-and-climate-action-targets-policy-saves-thousands>.
36. Nadja Popovich and Livia Albeck-Ripka, "Environmental Rules on the Way Out Under Trump," *New York Times*, October 6, 2017, available at www.nytimes.com/interactive/2017/10/05/climate/trump-environment-rules-reversed.html?_r=0.
37. Paul Voosen, "Myth-Busting Scientist Pushes Greens Past Reliance on 'Horror Stories,'" *E&E Reporter*, April 23, 2012, available at www.eenews.net/public/Greenwire/2012/04/03/1.
38. Greg Esterbrook, "Let's Modernize Our Environmental Laws," *New York Times*, October 8, 2015, A31.
39. U.S. Governmental Accountability Office (GAO), *Toxic Substances EPA Has Increased Efforts to Assess and Control Chemicals But Could Strengthen Its Approach*, "Report in Brief," Report no. GAO-13-249 (Washington DC: GAO, 2013).
40. GAO, *Status of EPA's Reviews of Chemicals Under the Chemical Testing Program*, Report no. GAO/RCED 92-31FS (Washington, DC, October 1991), 27.
41. J. Clarence Davies, *Nanotechnology Oversight: An Agenda for the New Administration* (Washington, DC: Woodrow Wilson Center, 2008), 10.
42. Sheldon Krinsky, "The Unsteady State and Inertia of Chemical Regulation Under the US Toxic Substances Control Act," *PLoS*, December 18, 2017, available at <http://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.2002404>.
43. Michael Decourcy Hines, "Survey Finds Flaws in States' Water Inspections," *New York Times*, April 15, 1993, A14; GAO, *Widening Gap Between Needs and Available Resources Threatens Vital EPA Program*, Report no. GAO/RCED 92-184, Washington, DC, July 1992.
44. See, for example, The White House, Office of Management and Budget, *Draft 2012 Report to Congress on the Benefits and Costs of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities*, available at http://www.whitehouse.gov/omb/inforeg_regpol_reports_congress, for estimated costs and benefit of EPA regulations between 2002 and 2012.
45. U.S. Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States, 1996* (Washington, DC: Government Printing Office, 1997).
46. For estimates on national pollution expenditures and their impact, see William A. Pizer and Raymond Kopp, "Calculating the Costs of Environmental Regulation," Discussion Paper 03-06, Resources for the Future, Washington, DC, March 2003; U.S. Environmental Protection Agency, Office of Policy Planning and Evaluation, *The Costs of a Clean Environment* (Washington, DC: EPA, 1990), v-viii.

47. Jonathan L. Ramseur, Mark Reisch, and James E. McCarthy, "Superfund Taxes or General Revenues: Funding Policy Issues for the Superfund Program I," Document RL 31410, Congressional Research Service, Washington, DC, February 4, 2008, 9.
48. Lisa Rein, "As Pressure Increases, So Do Ways to Control Pollution," *Washington Post*, May 23, 2006, A01.
49. Andrea Fischer, "EPA Tightens Particulate Matter Rule; Manufacturers Concerned With Costs," *Transport Topics*, October 2, 2006, 4, 35.
50. Ibid.
51. Chris Reuther, "Microscopic Murderer: Pollution May Be Motivating *Pfiesteria* to Kill Fish by the Thousands," Academy of Natural Sciences, Philadelphia, May–June 1999, available at www.acnatsci.org/research/kye/pfiester.html.
52. Stanley Reed, "Lego Wants to Completely Remake Its Toy Bricks (Without Anyone Noticing)," *New York Times*, September 1, 2018, B1.
53. James Barron, "320,000 High Schoolers to Get Free Water Bottles. The Goal? 54 Million Fewer Single-Use Containers," *New York Times*, September 24, 2018, A23.
54. EPA, "What is Sustainability?" available at <https://www.epa.gov/sustainability/learn-about-sustainability#what>.
55. Thaddeus C. Trzyna, Elizabeth Margold, and Julia K. Osborn, *World Directory of Environmental Groups*, 7th ed. (Sacramento, CA: International Center for the Environment and Public Policy, 2005); Harbinger Communications, *National Environmental Directory* (Santa Cruz, CA: Harbinger Communications, 2005), available at www.environmentaldirectory.net/search.htm.
56. International City Managers Association, "Nearly a Third of Local Governments Have Adopted Sustainability Plans," available at <https://icma.org/articles/article/nearly-third-local-governments-have-adopted-sustainability-plans>.
57. Jonathan M. Harris, "Basic Principles of Sustainable Development," Working Paper 00–04, Global Development and Environment Institute, Medford, MA, 2000, 5–6.