
INTRODUCTION TO ENVIRONMENTAL PRACTICE AND POLICY

CHAPTER 1

AN INTRODUCTION TO ENVIRONMENTAL LAW IN PRACTICE

CHAPTER OUTLINE

- I. Environmental Protection in Context—The View from the Trenches
- II. The Drivers of Environmental Conflicts
 - A. Scientific Uncertainty
 - B. Market Failures
 - 1. Public Goods
 - 2. The Tragedy of the Commons
 - 3. Collective Action and Free Riders
 - 4. Externalities
 - C. Mismatched Scales
 - D. Conflicting Values
 - E. Environmental Justice
- III. Tools for Environmental Protection—“The Five P’s”
 - A. Prescriptive Regulation
 - B. Property Rights
 - C. Penalties
 - D. Payments
 - E. Persuasion
- IV. What Do Environmental Lawyers Do?
 - A. An Evolving Field of Law
 - B. An Evolving Practice of Law

I. ENVIRONMENTAL PROTECTION IN CONTEXT—THE VIEW FROM THE TRENCHES

The leading compilations of federal environmental statutes contain nearly 2,000 pages of law. Within those pages one encounters the Clean Air Act, the Clean Water Act, the Endangered Species Act, the National Environmental Policy Act, the Noise Control Act, and the Pollution Prevention Act, to name just a few. The enforcement of these statutes, in turn, is variously assigned to the Environmental Protection Agency, the Fish and Wildlife Service, the Forest Service, the Bureau of Land Management, and the Army Corps of Engineers, with other agencies playing important roles as well. And those are just the federal laws and federal agencies. In most instances states have a parallel statute administered by one or more state agencies. Dozens of states also expressly incorporate environmental protection into their constitutions. For example, the “right to a clean and healthful environment” is the first of the “inalienable rights” that Montana itemizes in its constitution. [MONT. CONST. Art. II, § 3](#). Moreover, there are many instances in which the law beyond “environmental law” addresses environmental concerns. Local zoning ordinances account for environmental concerns when deciding whether to permit a proposed use of the land. State and federal tax laws can reward or punish designated activities depending upon how they affect the environment.

These environmental laws affect lots of people. A list of just a few of the parties involved in recent environmental litigation includes the AFL-CIO, City of Albuquerque, American Society for the Prevention of Cruelty to Animals, Association of Irrigated Residents (AIR), Biodiversity Legal Foundation, Black Hills Regional Rail Shippers Association, California Air Resources Board, Chesapeake Bay Foundation, Desert Fishes Council, E.I. Dupont De Nemours & Co., Federal Aviation Administration, Fruit of the Loom Inc., Montana Farm Bureau, National Association of Home Builders, New Mexico Council of Churches, New Jersey Institute of Technology, State of New York, Pierre Chamber of Commerce, Rio Grande silvery minnow, Shell Oil Company, South Dakota Wheat Growers Association, Tennessee Valley Authority, Zoological Society of San Diego, and innumerable government officials and private individuals. Of course, the reported cases represent just a tiny fraction of the instances in which industry, developers, individuals, environmental groups, and others were affected by the provisions of environmental law.

Then there are the lawyers. More than 10,000 attorneys are members of the ABA’s Section on Environment, Energy, and Resources. Again, that figure neglects the many attorneys who occasionally encounter an environmental issue in the course of corporate transactions, litigation, land development, and many more unexpected contexts.

This collection of laws, affected parties, and lawyers can produce a nearly infinite combination of legal questions involving the protection of the natural environment. We will encounter many, though assuredly not all, of the most interesting and important laws and legal issues in the course of this book. Before we begin that survey, though, we will begin with two case studies that illustrate the tasks confronting environmental law, and how that affects the institutions, regulated parties, and lawyers that make environmental law work. Environmental law is often described as covering two broad areas—pollution and natural resources. The first case is short and focuses on pollution, setting out the challenges of pollution associated with energy development in the Susquehanna River watershed in Maryland, Pennsylvania, and New York. The second case addresses natural resources through a conflict on the other side of the country, exploring the difficult balance between urban development and conservation of the endangered Delhi Sands Flower-Loving Fly.

Fracking Along the Susquehanna River

Hydraulic fracturing—or “fracking”—is a process for collecting oil and natural gas that cannot be obtained through traditional drilling technologies. Fracking involves drilling deep into the earth to a strata of shale rock, then drilling horizontally from that point into the shale. The fracturing occurs when explosive charges are dropped down the bore hole and into the horizontal opening, where their explosion causes fissures in the rock. Next, millions of gallons of highly pressurized water, sand, and chemicals are pumped into the hole to expand the fissures and hold them open. Natural gas or oil flows upward to the surface, along with the wastewater.

Fracking has been around since 1947, but it became common only during the past decade. The portion of U.S. natural gas production that came from shale jumped from 1.6% in 2000 to 23.1% in 2010. *See* NATHAN RICHARDSON ET AL., *THE STATE OF STATE SHALE GAS REGULATION* (June 2013), available at http://www.rff.org/RFF/Documents/RFF-Rpt-StateofStateRegs_Report.pdf. The increase in fracking has resulted in a significant decline in U.S. oil imports that is expected to continue for decades, along with the United States transitioning from a net importer of natural gas as recently 2013, to a net exporter of natural gas by 2017. *See* U.S. Energy Info. Admin., Executive Summary, Annual Energy Outlook 2015, Apr. 14, 2015. But all of that fracking has produced as much concern as it has applause. Fracking has been associated with water pollution, dwindling water supplies, interference with wildlife habitat, and even earthquakes. Many of these effects are contested as scientific studies seek to ascertain the true consequences of fracking, for good or ill. Fracking also promises the continued use of oil and natural gas at a time when climate change activists are striving to discontinue the use of fossil fuels.

Fracking prompted American Rivers to list the Susquehanna River as the nation's most endangered river in 2011. American Rivers is a non-profit organization—founded in 1973 and boasting 65,000 members—that is dedicated to “standing up for healthy rivers so our communities can thrive.” Each year, American Rivers announces its list of the most endangered rivers in the United States. Those rivers are threatened by a variety of events, such as industrial pollution, the unintentional runoff of toxic chemicals, the construction or operation of dams, and excessive withdrawals for irrigation. The Susquehanna River, which topped the list in 2011, flows 444 miles from New York to Pennsylvania to Maryland into the Chesapeake Bay. American Rivers explained its selection in the following document.

#1 SUSQUEHANNA RIVER

NEW YORK, PENNSYLVANIA, MARYLAND

THREAT: NATURAL GAS EXTRACTION

AT RISK: CLEAN DRINKING WATER

SUMMARY

One of the longest rivers in America, the Susquehanna River provides over half of the freshwater to the Chesapeake Bay and drinking water to six million people. Unfortunately, the river is threatened by natural gas development, which requires millions of gallons of water per well, produces dangerous toxic waste, and threatens clean water and the river's health. Unless Pennsylvania, New York, and the Susquehanna River Basin Commission announce a complete moratorium on water withdrawals and hydraulic fracturing until the issuance and enforcement of comprehensive, highly protective regulations for natural gas development, public health and drinking water will be at risk.

THE RIVER

The Susquehanna River drains 27,500 square miles, and provides drinking water to six million people. Long regarded as one of the best smallmouth bass fisheries in the country, the Susquehanna is believed to be one of the most ancient rivers on earth. The Susquehanna's many tributaries have been home to native brook trout populations since the last Ice Age, and scores of communities and businesses depend on the river for drinking water, commerce, hydropower generation, and recreational boating.

THE THREAT

The Susquehanna River and its tributaries flow over the Marcellus Shale region, a rock formation underlying much of New York and Pennsylvania, containing vast reserves of natural gas. The rush to develop this abundant resource has come fast and furious, without consideration of the potential cumulative impacts to clean water, rivers, and human health.

The seriousness of the threat to the entire Susquehanna watershed cannot be overstated. Industry estimates indicate the potential for 400,000 wells across the Marcellus Shale—a number that would require, conservatively, 1.5 times the annual flow of the Susquehanna River to sustain. As part of the hydraulic fracturing (or “fracking”) process to extract natural gas, massive amounts of water are withdrawn from rivers and streams. Many of the streams being used for Marcellus Shale water withdrawals provide critical habitat for trout—a concern, especially during summer months when stream flows are already low. The water is then mixed with sand and toxic chemicals and pumped underground to fracture the shale under extreme pressure. A portion of that highly toxic, highly saline, and potentially radioactive wastewater will return to the surface, and requires specialized treatment, but at this time, only a limited number of wastewater treatment facilities have the capacity to handle it. Already, spills from trucks hauling wastewater, leaks from lined fluid holding pits, and cracked well casings have contaminated private water wells. The potential for future environmental and public health catastrophes along the Susquehanna will only increase when considering the number of new wells projected, and the amount of toxic wastewater produced.

WHAT MUST BE DONE

While Pennsylvania and New York have been working to improve clean water safeguards for natural gas development, they fall short of adequately protecting the water supply for millions of Americans. It is the responsibility of these states, along with the Susquehanna River Basin Commission (SRBC), to analyze all of the potential cumulative impacts that could result from natural gas extraction, and ensure proper regulations are in place and capable of being enforced before development is allowed to continue.

Pennsylvania, New York, and the SRBC must issue a complete moratorium on all water withdrawals for natural gas extraction and the use of hydraulic fracturing until regulations are implemented and enforced that will protect the health of the river and the people who use it.

Likewise, the U.S. Congress must take responsibility for the health of citizens across the nation and remove all exemptions from federal environmental legislation for oil and gas development. This industry must be subject to the same safeguards and oversight as other industries. Removing these exemptions and requiring full disclosure of the chemicals used in hydraulic fracturing would be a major step towards protecting the health of Americans across the country for generations to come.

Development and the Delhi Sands Flower-Loving Fly

Our second problem takes us across the country to the Delhi sand dunes (also known as the Colton Dunes), the only inland sand dune system in the Los Angeles basin. The Delhi sand dunes were created long ago when the Santa Ana winds picked up sand from several creeks and deposited it over about 35,000 acres of land located about sixty miles east of the Pacific Ocean in southern California. At first glance, the dunes are inhabited only by blowing sand and scattered shrubs. But contrary to the popular image of deserts as barren of wildlife, desert ecosystems are in fact teeming with birds, insects, reptiles, mammals and plants. The Delhi Sands are a good example of what one finds in a coastal sage scrub ecosystem. Birds such as Western meadowlarks and burrowing owls frequent the area. The San Diego horned lizard and the legless lizard live in the dunes, as do insects such as the Delhi sands metalmark butterfly and the Delhi sands Jerusalem cricket. The onset of night entices the Los Angeles pocket mouse, the San Bernardino kangaroo rat and other small mammals to survey the land. Primrose, goldfields and other wildflowers flourish after the winter rains, replaced later in the year by the wild buckwheat and the colorful butterflies that the plant attracts. The yellow flowers of telegraph weeds appear in the summer.

Increasingly, though, the Delhi Sands are home to many people, too. The area had long been inhabited by many different Native American peoples, including the Serrano, the Cahuilla, the Chemehuevi and the Mojave. Spanish and Mormon missionaries traveled across the land during the eighteenth and early nineteenth centuries, and the first European settlements in what is now western San Bernardino and Riverside Counties began after California became a state in 1850 and after the railroad reached the area in the early 1870s. The city of Colton, for example, was first settled in 1874 and named after a Civil War general who also served as the vice president of the Southern Pacific Railroad. The settlers immediately began planting citrus orchards despite concerns that the land was inadequate for farming. The citrus thrived in the warm climate once irrigated water was delivered from the nearby Santa Ana River, and much of the land was cultivated for grapes, oranges and other fruits by the late 1800s. Dairies, residential homes, and commercial and industrial development were the next to appear on the scene.

The results of the human settlements have not been especially attractive. The California Portland Cement Company mined Slover Mountain for over 100 years, leaving a pile of granite and no dunes in its wake. Similar enterprises have taken the sand for road fill and other purposes. Junk yards and petroleum tank farms abound. The Southern Pacific Railroad and Interstate 10 bisect the area. A landfill, a sewage treatment facility and many illegally dumped cars are also nearby. Off-

road vehicle enthusiasts alter the terrain of the little bit of the dunes that remains.

The human population of the dunes is as diverse as the wildlife population. Nearly sixty percent of the residents of Colton, for example, are of Hispanic origin. Another fifteen percent of Colton's residents are African-Americans, Asians, or Native Americans. The city's median family income is only slightly above \$30,000, making it one of the poorest cities in California. The closure of many military bases and the loss of defense jobs in San Bernardino County caused the region to suffer a significant economic recession beginning in the 1980s. The economic plight of the area was illustrated by the creation of the Agua Mansa Enterprise Zone, which was established by San Bernardino and Riverside Counties and the cities of Colton, Rialto, and Riverside in an effort to lure economic development to a 10,000 acre site in the region. The 1986 environmental study preceding the creation of the enterprise zone assured that there were no rare or endangered species living on the affected land.

The growth in the human population has produced a corresponding shrinkage of the original Delhi sands. Most of the original dunes were destroyed by the onset of agricultural uses at the end of the nineteenth century. Over the next one hundred years, commercial, industrial, and residential development eliminated much of the remaining dunes. A shopping center replaced seventy acres of dunes in the early 1990s, and a county park split another segment of the dunes in 1998. Only about forty square miles of dunes—or about two percent of the original sands—exist in several patches stretching between the cities of Colton and Mira Loma.

As the Delhi sands have disappeared, so has the native wildlife. Pringle's monardella, a wildflower that once grew only in the Delhi sands, has already gone extinct. The number of meadowlarks and burrowing owls has diminished as their habitats have been converted into human uses, though both birds have displayed a surprising resiliency in the presence of bulldozers and landfills and the like. And the area is still the only place on earth where the Delhi Sands Flower-Loving Fly clings to life.

The Fly—known to entomologists as *Rhaphiomidas terminatus abdominalis*—is colored orangish and brown, with dark brown oval spots on its abdomen and emerald green eyes. It is one inch long, much larger than a common house fly. Beyond that, entomologists do not know a whole lot about the Fly. They think that the Fly undergoes a metamorphosis from egg to larva to pupa to adult fly over a three-year period. Once it emerges from the sand at the end of the three years, an individual Fly lives for about a week in August and September. As its name suggests, the Fly loves flowers. It hovers like a hummingbird as it removes nectar from the native buckwheat flowers with its long tubular proboscis, thus serving as an essential pollinator. There is no indication,

though, that the Fly provides any nutritional, medicinal or other tangible benefit to people. The first Fly was collected in 1888, but it was not until a century later that the Fly was identified as a separate subspecies. The Fly probably lived throughout the full historic extent of the Delhi Sands, but today it survives in just five locations within an eight mile radius along the border of San Bernardino and Riverside Counties. No one knows for sure how many Flies are alive today, though estimates run from a couple hundred to less than a thousand. What everyone agrees upon, though, is that the number of Flies is shrinking and that the species may soon become extinct.

The Fly faces a variety of threats to its survival. Birds, reptiles, dragonflies, and the Argentine ant—an insect that is not native to the area—sometimes attack and kill a larval or adult Fly. Pesticides used for agricultural purposes eliminate the native vegetation upon which the Fly relies for its survival. Native plants have been smothered by local dairies that have dumped tons of cow manure on sections of the dunes—often without the landowner’s permission—thus providing nutrient-rich soil for exotic plants. Mustard, cheeseweed, the Russian thistle, and other plants that are new to the area affect the soil in a way that is harmful to the Fly. The native vegetation is trampled by off-road vehicle riders and removed for fire control efforts. The Fly lives best in those few areas that have yet to be disturbed by human activities. Also, the fact that so few populations of the Fly still exist makes the entire species vulnerable to catastrophic events such as fires and droughts. The small, scattered populations reduce the genetic variability of the Fly—and thus, its ability to respond to environmental stresses—as well.

Mostly, though, the Fly is on the brink of extinction because the Delhi sands are disappearing in the wake of human development. An estimated 98% of the Fly’s original habitat has been destroyed. By 1993, the Delhi sands that remained were threatened by a host of residential, commercial and industrial development projects. The most notable development to threaten the Fly was a hospital. Plans to replace San Bernardino’s aging County Medical Center began in the late 1970s. County officials designed a large regional medical center that could resist earthquakes and satisfy the demands of federal health officials. The site of the hospital was a vacant piece of land just north of I-10 in Colton. By September 1993, the county was finally ready to break ground for its new Arrowhead Regional Medical Center.

Meanwhile, the Fly had attracted the attention of Greg Balmer, a graduate student in entomology at the University of California at Riverside. Balmer viewed the Fly as “spectacular,” yet he quickly became concerned about its plight. The rapid residential, commercial and industrial development of the region posed a grave threat to the survival of the dunes, and thus to the survival of the Fly. So Balmer did what any smart entomologist would do: he filed a petition with the United States

Fish & Wildlife Service (FWS) to list the Fly as “endangered” under the Endangered Species Act of 1973.

Congress had enacted the ESA in 1973 during the heyday of federal environmental legislation. The proponents of the law evoked images of bald eagles, grizzly bears, alligators and other national symbols that were on the brink of disappearing from this land. Almost immediately, though, the ESA was deployed to protect much less popular creatures. The listing of the snail darter as endangered just months after the ESA became law resulted in the Supreme Court’s decision in [Tennessee Valley Authority v. Hill, 437 U.S. 153 \(1978\)](#) (reprinted in Chapter 2), confirming that the multi-million dollar Tellico Dam project could not be completed because of the threat that the dam posed to the snail darter’s survival. In more recent years, the law’s application to the northern spotted owl became a focal point for broader debates between the timber industry and environmentalists in the Pacific Northwest.

Balmer had asked the FWS to list the Fly on an emergency basis because of the urgency of the development pressures on all of the Fly’s remaining habitat. The agency did not act until September 1993, when it agreed to add the Fly to the permanent list of endangered species. That also happened to be the day before construction was to begin on San Bernardino County’s new hospital project smack in the middle of some of the Fly’s prime habitat. At the first meeting between local officials and the FWS, a FWS employee surveyed the scene and suggested that nearby I-10—the major east-west highway between the San Bernardino Valley and Los Angeles—would have to be closed two months each year when the Fly was above ground.

Local officials were stuck. They protested to Congress. And they tried to cut a deal with the FWS. At first, the parties agreed that the hospital could be built if it was moved three hundred feet to the north and if the county established a refuge for the Fly. The “refuge” was vacant land adjacent to the hospital that was bordered by orange plastic fencing. Happily, the Fly loved the fencing. Then the county realized that they would need to build a new electrical substation to power the hospital; that resulted in seven more acres for the refuge. But when the county sought permission to reconfigure the roads in the area surrounding the hospital, the FWS balked. The county sued, joined by local developers, claiming that the ESA could not be constitutionally applied to regulate construction projects involving a species like the Fly that lived in only one state and that neither moved within nor affected interstate commerce itself. The district court held that such an application of the ESA was constitutional, as did a divided D.C. Circuit, and any hope for a constitutional exit disappeared in June 1998 when the Supreme Court denied certiorari. See [National Ass’n of Home Builders v. Babbitt, 949 F. Supp. 1 \(D.D.C. 1996\)](#), *aff’d*, [130 F.3d 1041 \(D.C. Cir. 1997\)](#), *cert. denied*, [524 U.S. 937 \(1998\)](#).

The Fly, thanks to the ESA, now occupied a position of great strength in future discussions about the development of the region. A host of developments were challenged because of their possible impact on the Fly and its remaining habitat. The projects included:

- A 2.8 million square foot Wal-Mart distribution facility to be built in the dunes near Colton.
- A 27-hole golf course and accompanying 202-home development slated for Fontana, which a city official defended because the sighting of a couple of Flies there over a two-year period is “just not enough science to put people’s land at risk.”
- A truck stop and industrial center to be built by Kaiser Ventures, which estimated that the project could create 5,300 jobs and add \$75 million per year to the San Bernardino County economy.
- A cement plant and a facility that produces sidewalk pavers in Rialto that was blocked by a federal court when the FWS claimed that the plant would wipe out a major portion of the Fly’s habitat, but which the FWS approved in 1999 when the company agreed to set aside 30.5 acres of land for Fly habitat.
- A large project that would include new homes, theaters, and restaurants in Fontana.
- The proposal of Viny Industries, a paper products company, to create 400 jobs by building on sixty acres of land in Colton.
- A \$110 million plant to make fiberboard from recycled waste wood which opened in the Agua Mansa Industrial Center in May 1999 only after the industrial center contributed \$450,000 to purchase other habitat for the Fly.
- In August 2002, a single Fly was discovered on a parcel of land where the city of Colton had hoped to build a small-scale replica of an historic major-league sports complex. The project immediately stalled. The city finally abandoned it in 2006, complaining that the FWS “took a project and doubled it in price and shrunk it down over a fly.”

The hospital itself finally opened in March 1999 after the county set aside a total of twelve acres of land for a Fly refuge. The county estimated that moving the site of the hospital, establishing the Fly preserves, and otherwise accommodating the Fly cost the county nearly \$3,000,000.

The Fly also interfered with environmental cleanup activities in the area. When petroleum leaking from a nearby tank farm contaminated the groundwater, the presence of the Fly underground so complicated any remediation work that the tank farm owner planned to wait for the plume

of contamination to migrate past the Fly's habitat. Additionally, the vacant, sandy land favored by the Fly was an attractive spot for the illegal dumping of trash, including abandoned appliances, used diapers, and yard debris. Local officials wanted to remove that trash, but the FWS insisted that the trash must be picked up by hand instead of by the ordinary heavy machinery that could disturb the Fly larvae buried in the sand. To prevent additional trash from being dumped in the area, Riverside and Colton enacted ordinances authorizing the forfeiture of any vehicle used to transport trash that is dumped in the sands. Other local towns are considering similar ordinances, in part because of concerns that they will become havens from trash dumpers who fear the more stringent sanctions imposed in neighboring communities.

In early 1999, Fontana officials warned that the Fly could cause the city to default on \$42 million in municipal bonds. The city had issued the bonds in 1991 to build streets, sewers, lighting, and other improvements on vacant land adjacent to a small shopping center. The possibility that the Fly lived on the land prevented the expected commercial development of the land, and when the landowner stopped paying taxes on the land, the city began to use its reserve funds to pay the bondholders. The Fly did facilitate one source of new employment: developers hired consultants to determine the extent of the presence of the Fly in the area. It was only when the landowner paid its taxes after one such survey failed to find any Flies on the property that Fontana barely avoided defaulting on the bonds in October 1999.

The Fly continued to block the proposed road construction projects that resulted in the commerce clause litigation. Colton officials and the FWS had not reached an agreement that would permit the realignment of roads near the new hospital despite meetings held throughout 1999. Similarly, when Riverside County asked the FWS for permission to build new ramps for I-15 in Mira Loma, the federal agency responded that the county would need to establish a 200-acre preserve for the Fly. The agency reasoned that although the ramps would only displace a little more than eight acres of Fly habitat, the effect on the Fly of the accompanying development and increased traffic justified a larger reserve. The purchase of that much land would cost the county as much as \$32 million in an area where land sells for up to \$160,000 an acre, which would make the Fly reserve more expensive than the highway ramps themselves. More generally, when officials representing Colton, Fontana, Rialto, and other local cities met with the FWS in July 1999 to propose setting aside 850 acres of land for Fly habitat in exchange for permission to develop throughout the area, they were told that FWS biologists were seeking 2,100 acres that could cost \$220 million to purchase. Much of that land—including a former dairy in Ontario—would have to be rehabilitated in order to serve as viable habitat for the Fly.

The Fly was vilified. Fontana Mayor David Eshleman complained that the Fly “is costing the Inland Empire thousands of jobs and millions of dollars. I think we should issue fly swatters to everyone.” Colton’s city manager estimated the stalled development, uncollected tax revenue, and lost jobs attributable to the Fly totaled \$661 million. Local residents were quick to offer their own reactions to the predicament: one man claimed that the Fly “larva is the same I’ve seen in tequila bottles being imported here from Mexico,” and a woman worried that children and schools were “an endangered species that gets no help.” Julie Biggs, the Colton city attorney, characterized the Fly’s habitat as “a bunch of dirt and weeds.” Jerry Eaves, the chairman of the San Bernardino County Board of Supervisors, stated that “the Endangered Species Act was intended to save eagles and bears. Personally, I don’t think we should be spending this money to save cockroaches, snails and flies.” Advocates for reform of the ESA seized on the controversy as an example of the kinds of problems that the law created, with the “people vs. flies” argument being voiced frequently.

The Fly has been featured on network television news shows, leading newspapers across the country, *National Geographic*, and other national media. CBS described it as “superfly, with the power to stop bulldozers.” The *Los Angeles Times* reported that the Fly could become “the snail darter of the 1990s.” Many portrayals of the Fly have been unsympathetic. The *Washington Post* described the Fly as “a creature that spends most of its life underground, living as a fat, clumsy, enigmatic maggot.” The *Washington Times* editorialized that “one could build the flies their own mansion in Beverly Hills . . . fill it up from top to bottom with leftover potato salad and other fly delicacies, and it would still be cheaper than the royal estate Fish & Wildlife has in mind for them.”

By contrast, UCLA professor Rudy Mattoni described the Fly as “a national treasure in the middle of junkyards. . . . It’s a fly you can love. It’s beautiful.” A FWS official told CNN that the Fly “isn’t as charismatic as a panda bear or a sea otter, but that doesn’t make it any less important.” Another FWS official insisted that “the value of the fly to mankind is a very difficult thing to judge. It’s much more of a moral issue. Do we have the right to destroy another creature when we, in our day-to-day activities, have the ability not to destroy a creature?” The statement of county supervisor Jerry Eaves that the ESA was not intended to save flies provoked a letter to the editor of the *Los Angeles Times* complaining that “developers and their minions in public office will go to any length to satisfy their corporate greed.” Environmentalists also emphasized the importance of the dune ecosystem rather than the Fly. Greg Balmer, the entomologist who proposed the Fly’s listing under the ESA, explained that the Fly “is an umbrella species in that preserving its habitat preserves for posterity the entire community with which it lives.” A FWS biologist reminded that “every ecosystem has its intrinsic value, and

maybe we can't quite put a dollar value on it. But every time one disappears, it's an indication that something else is wrong." Dan Silver, the head of the Endangered Habitats League, asserted that the ESA "is saving Riverside County from itself, its own short-sightedness. It is forcing people to take a longer view."

Having lost in the courts, the local communities turned to Congress. They paid \$48,000 for a Washington lobbyist to persuade Congress to remove the Fly from the list of protected species. Democratic state representative Joe Baca introduced a resolution in the California legislature calling for lifting the ESA's protection of the Fly; the voters rewarded him by electing him to Congress in 1999. Republican Senate candidate Matt Fong was not so fortunate in 1998: he campaigned against the Fly's impact on development in the region, but he lost to incumbent Senator Barbara Boxer, a supporter of the ESA. The lobbying effort continued in 2002 when Colton Mayor Deirdre Bennett wielded a giant flyswatter while speaking at the press conference denouncing the Fly and its protectors. "To us and the majority of Americans with any common sense at all," protested Mayor Bennett, flies "are pests, nothing more, nothing less—pests we have historically grown up swatting." The protected status of the Fly survived all of these efforts.

Another strategy involved crafting a habitat conservation plan (HCP) that would set aside some land for habitat for the Fly and other wildlife while allowing other land—including wildlife habitat—to be developed (learn more about HCPs in Chapter 2). Eleven local cities joined San Bernardino County in planning a HCP that would encompass over 300,000 acres of land comprised of eight different kinds of ecosystems and containing the Fly and other rare species such as the San Bernardino kangaroo rat and the Santa Ana River wooly-star. Several years of negotiations failed to produce an agreeable plan. Indeed, Colton and other nearby cities and counties temporarily withdrew from their negotiations with the FWS in the summer of 2002, claiming that the anticipated \$3 million cost of setting aside 33 acres as habitat for the Fly amounted to "legalized extortion." A FWS spokesperson responded that the agency has worked with cities all across the country "in partnership to develop a plan that makes biological sense and balance the conservation needs of the species and opportunity for economic development." The federal Department of the Interior provided local communities with nearly three million dollars in grants in 2003 for the purchase of some of the Fly's habitat and for the continued preparation of the HCP.

Meanwhile, both economic development and protection of the Fly proceeded on a piecemeal basis. The typical approach involved a landowner agreeing to set aside some of its property to serve as habitat for the Fly in exchange for FWS permission to build on another part of its property. In other instances a developer simply paid for the purchase of other land that could be used by the Fly. For example, in August 2000

the developer of a warehouse project agreed to pay \$82,500 so that a community group could purchase habitat for the Fly. But neither side was really satisfied by such arrangements: environmentalists worried that the haphazard patches of protected land would not sustain a healthy population of the Fly, while developers watched as their proposed building sites remained vacant as the economic boom of the 1990s ended.

In June 2005, the FWS reached an agreement with Vulcan Materials Company, an Alabama rock and asphalt business that acquired land in Colton as a result of corporate mergers. According to the agreement, 150 acres of land owned by Vulcan will be permanently preserved as part of a new conservation bank containing habitat for the Fly. Greg Balmer described the land as the largest undeveloped parcel remaining of the Colton Dunes ecosystem. The conservation bank will be expanded as other businesses donate land that can serve as habitat for the Fly in order to receive development credits from the FWS. The first sale from the conservation bank occurred in January 2006, when a commercial developer paid \$300,000 for two credits, thus preserving two acres of habitat in order to obtain FWS approval to develop five acres of degraded habitat elsewhere in the area. Such conservation banks have become common throughout the nation, but this was the first such bank designed to protect a rare insect.

But even that device frustrated the city officials in Colton. In January 2006, the city council worried about the amount of lands set aside “by open space conservation agreements, easements, and other contractual mechanisms by their owners to insure that these properties will never be used for anything except open space conservation and Delhi Fly Habitat, despite the properties’ current land use and zoning designations which may allow for some reasonable development.” Accordingly, the city council passed an emergency ordinance requiring the rezoning of any protected land as “Open Space” and the receipt of a conditional use permit before any land within the city may be encumbered with an easement or other device to protect the Fly. At the same time, Mayor Bennett again asked the FWS to delist the Fly, claiming that (1) there is already sufficient habitat to protect the Fly; (2) the FWS had improperly acted as if critical habitat had been designated for the Fly without going through the formal designation process; (3) the recovery plan for the Fly is ambiguous and not achievable; and perhaps most strikingly, (4) the Fly is in fact an invasive species that is not native to the area, and actually threatens the native species there.

So government officials, developers, environmentalists, and other interested parties still debate the needs of the Fly, the dunes, and the people who live there. The FWS continues to meet with local county and city officials in an effort to resolve both specific proposed projects and the broader issues raised by the Fly. Scientists are trying to breed the Fly in captivity, though they have not succeeded yet. Private efforts to help the Fly have begun, such as the work of volunteers and local students to

restore a four-acre right-of-way owned by Southern California Edison. Nonetheless, scientists and federal officials still fear that the Fly will go extinct early this century despite all of the efforts to save it.

QUESTIONS AND DISCUSSION

1. What is the role of environmental law in the Susquehanna River and Delhi Sands Flower-Loving Fly disputes? What laws do you expect have played a role in those controversies so far?

2. What is the role of lawyers in resolving these problems? More specifically, as an attorney, what advice would you offer to American Rivers? The states of Maryland, New York, and Pennsylvania? People who own land along the Susquehanna River? An environmental group that wants to protect the Delhi Sands and the Fly? A commercial landowner in Colton? The United States Fish & Wildlife Service?

Or assume that you are the land use attorney for the City of Colton, and that you have been asked to report on how to protect the Delhi Sands Flower-Loving Fly while still accounting for human needs in the economically depressed city. What would you recommend?

3. The story of the Susquehanna River and the saga of the Delhi Sands Flower-Loving Fly raise innumerable questions about the nature of environmental policy, whether expressed directly or indirectly through the law. How would you answer the following questions:

- What are the appropriate uses of the Susquehanna River? Who should make that decision? Who should decide whether, where, and under what conditions, fracking should be permitted?
- Why should we preserve the Delhi Sands? Why should we preserve the Fly?
- What cost should we be willing to pay to protect the Susquehanna River? To save the Fly? Who should pay those costs?
- Are some rivers or species more worth saving than others? Who should make that decision?
- What role should private efforts play in protecting the Susquehanna River and preserving the Fly? What role should the law play?
- Is the condition of the Susquehanna River and the survival of the Fly best addressed by common law, local ordinances, state statutes, federal law, or international law—or some combination of those sources of law?

4. September 23, 2003 marked the tenth anniversary of the listing of the Fly. The *Riverside Press Enterprise* noted the event by condemning the “[m]illions spent, millions lost in 10 years to accommodate a rare fly that has

bedeviled developers and government officials from Colton to Mira Loma.” Ten years passed without the problem being solved. What report would you expect to read on the 35th anniversary of the listing of the Fly in 2018?

American Rivers ranked the Susquehanna River as the nation’s most endangered river in 2007, as well as in 2011. The two primary threats in 2007 were a proposed inflatable dam project and runoff from old abandoned coal mines. The dam project was scuttled and some progress was made on cleaning the mines, but then fracking emerged as a new threat. Then, in 2016, the Susquehanna River ranked third on the list of most endangered rivers. This time the threat is presented by the Conowingo Dam, which has trapped nearly a century’s worth of pollutants since it was built in 1928. The dam is up for relicensing by the Federal Energy Regulatory Commission, which could allow Maryland to impose its state water pollution standards to address the problem. See <https://www.americanrivers.org/endangered-rivers/2016-susquehanna/>.

What do you expect American Rivers to say about the condition of the Susquehanna River in the organization’s future reports?

5. Since fracking is occurring nationwide with major impacts on interstate commerce, you might think that this would be an important area for federal regulation. Surprisingly, though, the federal government plays only a small role supervising fracking on private lands. The reason lies in politics.

In 2005, an amendment to the Energy Policy Act exempted fluids used for the fracking extraction process from regulation under the Underground Injection Control program of the Safe Drinking Water Act. This was subsequently known as “The Halliburton Loophole,” in recognition of the role played by then-Vice President Dick Cheney, former CEO of Halliburton, in forcing the amendment through.

Given the widespread public concern that has developed over fracking and its impacts on water quality, why do you think Congress has not repealed the Halliburton Amendment?

In the absence of congressional action, in 2016, EPA moved forward using its Clean Air Act authority, enacting the first set of regulations governing methane emissions from new oil and gas fracking wells on private lands and began the process of promulgating similar regulations governing existing oil and gas fracking wells on private lands. These regulations are discussed in Chapter 3.

6. In the absence of congressional and EPA action to regulate fracking operations, cities, counties, and other local governmental entities have attempted to fill the gap through their zoning authority. In particular, cities in Texas, Colorado, and Pennsylvania have enacted extensive regulations governing the time of fracking operations, truck traffic, noise impacts, groundwater management, and well locations. Some have banned fracking entirely.

These local actions have prompted several state legislatures to preempt (or displace) local authority in order to ensure that oil and gas operators have a single, uniform set of laws to follow without additional local imitations. State supreme courts in Colorado, and Ohio have upheld state laws

preempting local fracking regulation while courts in New York and Pennsylvania have sided with local governments. *See, e.g.*, *City of Longmont v. Colo. Oil and Gas Ass'n*, 369 P.3d 573 (Colo. 2016); *State ex rel. Morrison v. Beck Energy Corp.*, 37 N.E.3d 128 (Ohio 2015); *Wallach v. Town of Dryden*, 16 N.E.3d 1188 (N.Y. 2014); *Robinson Twp. v. Commonwealth of Pennsylvania*, 83 A.3d 901 (Pa. 2013).

Throughout much of this textbook, we discuss the tensions that inevitably arise between the federal government and state governments over which level should have primacy over a host of environmental regulatory issues. As shown by the example of fracking regulation, similar tensions arise between state and local governments.

Which do you think is more important—that oil and gas operators have a uniform set of guidelines to follow for their operations within a state or that local governments are able to protect their citizens from what they regard as the adverse impacts from this type of industrial activity? At which level of government is there more concern over industry capture of the regulatory process?

7. We do not know how the stories of the Susquehanna River and the Delhi Sands will end. Given the complex decisions that need to be made in these two cases, perhaps that should not be surprising. In the meantime, American Rivers provides periodic updates about each of its listed rivers on its website, and the Susquehanna River Basin Commission (SRBC) provides current information about the river at <http://www.srbc.net/>. The best sources of new information about the controversy surrounding the Delhi Sands Flower-Loving Fly are the reports of the *Press-Enterprise* (the Riverside newspaper which is available on LEXIS and at its website at <http://www.pe.com/>). For additional material on the Fly's happenings, *see, e.g.*, [Determination of Endangered Status for the Delhi Sands Flower-loving Fly](#), 58 Fed. Reg. 49881 (1993); U.S. FISH AND WILDLIFE SERVICE, PACIFIC REGION, FINAL RECOVERY PLAN FOR THE DELHI SANDS FLOWER-LOVING FLY (1997); [National Ass'n of Home Builders v. Babbitt](#), 130 F.3d 1041 (D.C. Cir. 1997), *cert. denied*, 524 U.S. 937 (1998); Kenneth J. Kingsley, *Behavior of the Delhi Sands Flower-Loving Fly (Diptera: Mydidae), A Little-Known Endangered Species*, 89 ANNALS OF THE ENTOMOLOGICAL SOC'Y OF AMERICA 883 (1996). Both the Susquehanna River and the Delhi Sands are discussed in greater detail in JOHN COPELAND NAGLE, *LAW'S ENVIRONMENT: HOW THE LAW SHAPES THE PLACES WE LIVE* (2010).

II. THE DRIVERS OF ENVIRONMENTAL CONFLICTS

Environmental law covers a vast breadth, and the Susquehanna River and Fly case studies address the two major fields within its coverage—pollution control and natural resource conservation. While the basic aspects of pollution control—ensuring clean air and clean water or remediating contaminated soil—might on their face seem to present fundamentally different challenges than those present in natural resource conservation—whether protecting endangered species or managing national forests—these two seemingly disparate fields share

many important similarities. The actors, the location, and the nature of the concerns raised in pollution and natural resource conflicts may well be different in the particulars, but the *underlying* causes of the environmental problems can often be understood best as simple variants on common themes.

This section briefly introduces some basic themes that run throughout environmental law and policy—the themes of scientific uncertainty, market failure, mismatched scale, conflicting values, and environmental justice. It is no exaggeration to say that these resonate throughout the entire field of environmental law and policy, irrespective of the particular issue. Understanding their implications is a critical first step in understanding the practical challenges of resolving environmental conflicts. To put the point more starkly, environmental law conflicts are usually about much more than the law. Particular regulations or statutes may frame the specific contours of the problem, but the cause of the conflict runs far deeper. Only by understanding these drivers can one hope to find truly sustainable solutions.

A. SCIENTIFIC UNCERTAINTY

In many respects scientific uncertainty is *the* defining feature of environmental policy. Most environmental problems involve complex technical and economic issues. But lawmakers rarely have anything approaching perfect knowledge when asked to make specific decisions. Certainty may come too late, if ever, to design optimal legal and policy responses.

In the context of the Susquehanna River, for example, what are the likely effects of increased fracking on water quality? What are the likely impacts on drinking water quality? More specifically, what are the impacts of these potential actions *on the margins*? Environmental decisions are incremental. Should we allow one more fracking operation, or increase wastewater discharges by another 5%? We may be able to predict with reasonable certainty that a massive increase in discharges will cause particular harms, but the science is often too complicated to make such statements on the margins, where the real decisions often must be taken.

Troubling levels of uncertainty are present when conserving natural resources, as well. How much land needs to be set aside to provide adequate habitat for the endangered Fly population. Will an acre provide sufficient habitat for its survival? Does habitat set aside need to be connected by corridors so different Fly populations can interbreed? If so, how big should these corridors be? The simple fact is that we do not know enough about the Fly's life history or recent population declines to answer these management questions with certainty, yet actions need to be taken today or risk extinction of the species in the future, perhaps the near future.

In fact, uncertainties over the magnitude of environmental problems, their causes, and future impacts bedevil law and policy. What we would like to know as policy makers rarely approaches our actual knowledge. But if we do not understand well the current situation, then how can we predict the future impacts of our laws and policies? Does prudence dictate waiting until we have better information or taking early action in the face of potentially serious threats?

The obvious response to such arguments is that waiting for more scientific certainty, if it ever comes, imposes costs of its own. In the face of a credible and significant threat, the argument goes, we must act today so as to avoid the present and future harms (which may well be greater) imposed by delay. To employ a nautical metaphor, we should be bailing water out of our sinking ship as fast as possible, not standing on the deck studying the angle and rate of descent.

The exact same dynamic is at work in the examples of Susquehanna River pollution and the Fly. Delay while we study the threats to the river may result in an increase in fish kills and other environmental harms that could have been prevented. Delay in the case of the Fly may lead to greater understanding, but of a now-extinct species. Yet, as the voices of caution warn, overreaction imposes its own real costs in the form of higher prices, foregone development, and scarce public monies that could have been better spent elsewhere. In these and countless other examples, there are good reasons to wait and reduce the uncertainty, and good reasons to avoid potential future costs by acting now. Thus perhaps the first question of environmental law and policy is how to act in the face of uncertainty.

There are two basic strategies to address this intractable problem. The first is to develop better information. As we shall see later in the book, many environmental statutes require generation of considerable information to provide a surer basis on which to create policy. A second strategy is known as the *precautionary principle*. Influential in the field of international environmental law, in its simplest form the principle counsels caution in the face of significant but uncertain threats. It's hard to argue against such an obvious rule of conduct but people differ significantly over how the principle should be applied in practice. In its most extreme form, the principle would forbid any activity that potentially could produce significant harms, regardless of the likelihood that these harms may occur. The problem, though, is that such a view counsels inaction in the face of uncertainty, no matter what the cost. The strategy, moreover, is paralyzing in the context of risk-risk choices, where every alternative poses significant risks and one must choose among them. Such risk-risk choices arise commonly in the environmental field, such as deciding whether to build a nuclear power plant or a coal-fired plant. Each option poses environmental concerns and potential harms.

In the international context, the precautionary principle generally has been viewed as shifting the burden of proof from those who would prevent an offending activity to those who wish to commence or continue the activity. This shift in burden could shorten the time period between when a threat to the environment is recognized and a legal response is developed. In the Fly example, the developer would shoulder the burden of proving that the loss of habitat will not threaten the survival of the Fly. Fracking operators would bear the responsibility of justifying that increased withdrawals and effluent levels pose no significant ecological or health risks to the Susquehanna River.

This shift in burden changes the tenor and nature of the debate over *how well understood* the problem must be before taking action. But it does not shed light on an equally important question—*how serious* the problem must be before taking action (i.e., which risks are worth addressing), much less the appropriate action to take. As we shall see below, these are fundamentally political, not scientific, questions, and they pose additional levels of uncertainty.

B. MARKET FAILURES

Misaligned incentives underlie most environmental conflicts. While protecting the environment often provides a net benefit to society, the economic interests of individual parties involved often can encourage harmful activities. Thus a basic challenge to an environmental lawyer lies in understanding the reward structures of the parties and then changing incentives so that environmental protection reinforces rather than collides with the parties' self-interest. In the following examples, consider how costs and benefits are allocated.

Consider the case of hog farming in a watershed. A company may choose voluntarily to treat its manure, but it may end up raising its operating costs and losing market share if its competitors in other parts of the state, much less in other states, do not reduce their effluent as well. A downstream neighbor of a hog farm may be having constant stomach upsets because of effluent, but the bother isn't worth the cost of bringing a lawsuit. All of her neighbors have stomach aches, too, but they can't seem to get together to negotiate with or sue the hog farm.

On its face, one might think that the market would automatically promote environmental protection. The most basic principle of economics, after all, is supply and demand. As the supply of a valuable good becomes scarce, its price rises. Since clean air and water are clearly valuable, one would expect that as they become scarcer their price should also rise, making it more expensive to pollute. Yet this clearly does not happen in real life. The market has somehow failed, as it does when the hog farm refuses to reduce its effluent and the neighbors can't agree to sue. To correct these market failures and craft an effective legal response, we first need to understand the distortions at play.

1. PUBLIC GOODS

Try to buy some clean air. Sure, you can buy real estate in the wilds of Alaska where the air is clean, but you own the land there, not the air. In fact, your neighbor can breathe it right after it blows through. It turns out that many environmental amenities, such as clean air and scenic vistas, are *public goods*. Their benefits can be shared by everyone, but owned by no one. No one owns the air. No one can sell it or prevent others from using it.

The same is true for *ecosystem services*. Largely taken for granted, healthy ecosystems provide a variety of critical services. Created by the interactions of living organisms with their environment, these ecosystem services provide both the conditions and processes that sustain human life—purifying air and water, detoxifying and decomposing waste, renewing soil fertility, regulating climate, mitigating droughts and floods, controlling pests, and pollinating plants. Not surprisingly, recent research has demonstrated the extremely high costs to replace many of these services if they were to fail. Looking at just one ecosystem service that soil provides, the provision of nitrogen to plants, serves as an example. Nitrogen is supplied to plants through both nitrogen-fixing organisms and recycling of nutrients in the soil. If nitrogen were provided by commercial fertilizer rather than natural processes, the lowest cost estimate for crops in the U.S. would be \$45 billion; the figure for all land plants would be \$320 billion.

The value of \$320 billion is estimated by calculating replacement costs—what we'd have to pay to replace the ecosystem service of nitrogen fixing by other means. But what are these natural goods and services *really* worth? Perhaps surprisingly, in the eyes of the market they are not worth anything. We have no shortage of markets for ecosystem goods (such as clean water and apples), but the services underpinning these goods (such as water purification and pollination) are free. Make no mistake, these environmental amenities are valuable—just ask yourself how much it's worth to you to breathe unpolluted air—but they have no *market value*. There is no market to exchange public goods such as ecosystem services and, as a result, they have no price. This explains the riddle of why pollution does not become expensive as clean air is “used up.” Because there's no market for clean air or climate stability, there are no direct price mechanisms to signal the scarcity or degradation of these public goods until they fail. Hence, despite their obvious importance to our well-being, ecosystem services largely have been ignored in environmental law and policy. Partly as a result, ecosystems are degraded.

2. THE TRAGEDY OF THE COMMONS

Imagine you are a shepherd who grazes twenty sheep on a village common. Along with your pan pipes and bag lunch, you herd your flock to the common every day. So long as the number of sheep on the common

remains small, the grass remains plentiful and the sheep contentedly munch away. Assume, though, that shepherds from over the mountain have heard of the wonderful grass in the common and bring their flocks. With each hour these sheep graze, there is less grass available for future grazing. In fact, you soon realize that this increased level of grazing will nibble the grass down to the roots, with the result of not enough forage in the future for anyone's flock, including your own. Yet you and the other shepherds will likely continue to allow your sheep to overgraze. Why?

The answer lies in the economic incentives. The more the sheep graze the fatter and more valuable they will be when they come to market. You could stop your flock's grazing, of course, to try and preserve the pasture for other days; but there is no guarantee your fellow shepherds will be similarly conscientious. In that case, you're a chump, sacrificing your own interests for no benefit. As a result, you may well encourage your sheep to graze as much as possible, and your neighbors will do the same. "Might as well get the grass in my sheep's tummies before it disappears in others'," you think. The result is individually rational in the short term—if the resource will be depleted, you might as well ensure you get your fair share—but collectively disastrous in the long term. It would be far better for each shepherd to restrain her flock's grazing, but seeking to maximize immediate economic gain ensures long term economic—and environmental—collapse.

This same phenomenon, known as *the tragedy of the commons*, can be identified in many open access resources, as farmers race to pump water from an underground aquifer, fishing boats with ever larger nets chase fewer and fewer fish, and wildcat drillers race to pump out oil as fast as they can. In each case, individually rational behavior is collectively disastrous. Individuals' personal incentives work *against* the best long-term solution.

3. COLLECTIVE ACTION AND FREE RIDERS

So what is to be done? Perhaps you could negotiate with all the shepherds and collectively agree to graze less. This may work when there are a handful of shepherds who all come from the same village. But it becomes increasingly difficult to reach agreement as the number of shepherds increases (and more difficult still if they come from different places without shared cultural norms and informal means of enforcement). This obstacle is known as a *collective action problem* and is due to the increased transaction costs in negotiating solutions as the number of parties increases. At a certain point, it's simply too expensive and difficult to reach consensus agreement. To see this in action, try to decide on which movie to see or settle a restaurant check with more than four friends.

Perhaps, as a last resort, in frustration at the inability to agree on a common solution, some of you decide to stop grazing your flock so that the grass on the common can grow back. Noble intent, no doubt, but there

is a risk that other shepherds will take advantage of your generosity and keep their sheep on the common. More food for their flocks, they may smirk. These shepherds benefiting from your sacrifice are known as *free riders*. A similar phenomenon might occur even if all the shepherds agreed to graze less. New shepherds might come in and start grazing all the time, free-riding off of your sacrifice. Thus any solution to commons problems must overcome both the high transaction costs in reaching agreement among many parties (collective action) and counterproductive behavior by parties outside the agreement (free riders).

4. EXTERNALITIES

Assume you have sold your sheep, moved on from the now trampled and scraggly common, and own a chemical factory. When you balance your firm's financial books, you notice something odd. In figuring out your bottom line, you subtract your costs to operate (such as labor, materials, utilities, and so on) from the revenue you earn from selling your chemicals. But the pollution from your smokestacks does not reduce your bottom line. Make no mistake; your factory *is* causing real costs in the form of acid rain, smog, and reduced air visibility. But, as described above, because clean air is a public good you do not have to pay as you "use up" the clean air. It acts as a sink for your pollution at no cost. As a result, in seeking to maximize short-term economic gain, you do not consider the cost of your pollution. You can "overuse" the air and continue polluting. The costs from damage to forests, increased respiratory ailments, and reduced pleasure in clear vistas from your pollution are very real, but they are *external* to the costs you currently pay to operate. These costs are borne by the public and known as *externalities*.

If, on the other hand, your factory has to pay for the external harm it causes, then it will reduce its pollution. The process for forcing the factory to recognize environmental and social costs is known as *internalizing externalities* and reflects a basic lesson of economics—when we have to pay for something, we use less of it than if it is free. By internalizing externalities, we correct the market failure by charging for environmental harms and providing more accurate price signals to buyers.

This works both ways. Assume that you own a wetland beside your factory. The wetland provides a nursery for young fish to spend their first few months in relative safety before entering the adjacent river. The outdoors enthusiasts who fish along the river and the sporting good stores who sell fishing tackle all benefit from the services your wetland provides, but they don't pay you for them. While your factory's pollution generates *negative externalities*, your wetland provides *positive externalities*. Just as the fact that you don't have to pay for the costs caused by your pollution removes any incentive to reduce pollution so, too, does the fact that you are not paid for the benefits provided by the

wetland remove any incentive to conserve rather than pave it over for a parking lot.

If all negative externalities were internalized—if all costs imposed on the environment were borne by the polluting party—then environmentally harmful products and processes would be relatively more costly and the market would reinforce environmental protection. Equally, if positive externalities were internalized—if benefits generated by ecosystem services such as flood control and water purification were paid for by the recipients—then habitat conservation would be truly valued in the marketplace. A central problem, of course, is “getting the prices right.” Even if we had the authority to charge a factory for the damage its pollution caused, how much would that be? As with clean air, there are no markets for environmental harms, either; thus their costs must be estimated. But even rough estimates would be an improvement over the current situation where negative externalities are costless to polluters and positive externalities are not rewarded. One of the key goals of environmental law is to bring environmental externalities into the marketplace.

C. MISMATCHED SCALES

Natural boundaries rarely track political boundaries. The communities downstream of the hog farms along the Susquehanna River suffer the impacts of pollution, yet have no political control over local land management decisions upstream. At a larger scale, a map of the western United States shows states and counties with straight lines and right angles. Map the region’s watersheds, ecosystems, or forests, however, and nary a straight line will appear. Ecological concerns were, not surprisingly, far from the politicians’ and surveyors’ minds when these political jurisdictions were created, but the mismatch of natural and political scales poses difficult challenges for environmental management. Air pollution, water pollution, and wildlife certainly pay no heed to local, state or national borders, with the result that often the generator of the pollution is politically distinct from those harmed.

Acid rain was hard to control in the 1970s and 1980s because of political jurisdictions. The costs of reducing emissions downwind were borne by those who received no benefit and, similarly, those benefiting from reduced pollution upwind did not have to pay for it. Midwestern power plants were far removed from the polluted lakes and forests of the Northeast and Canada. New York, Vermont, and certainly Canadian voters couldn’t vote in Ohio or Pennsylvania. Thus those with the greatest cause for concern did not live in the areas where their concerns could be most effectively expressed. Similar problems of scale are evident in wildlife protection, where draining or filling prairie potholes in the Great Plains, for example, may benefit the local farmers but imperils migratory birds from Mexico to Canada. Pumping carbon dioxide in the air may not seem significant to someone driving an SUV in Montana, but

to an islander on a low-lying Pacific atoll the prospects of sea-level rise are a good deal more unsettling.

As a result of these *geographical spillovers* across jurisdictions, transboundary environmental problems often pose the challenges of collective action (the high transaction costs to bring differing parties together), equity (ensuring that the parties enjoying the benefits of environmental protection also bear a share of the costs), and enforcement (monitoring compliance at a distance from the source of authority). This is as true with national laws as with international ones.

Mismatched political and natural boundaries also pose challenges of management authority. This is often expressed as a problem of federalism. Who should control pollution and natural resource management: local or national authorities? Locals are closer to the problems, often understand them better, and have to live with the consequences of the environmental policy. At the same time, if the problem is one of transboundary pollution, the locals don't live with the consequences of their pollution. Those downstream do.

With natural resources, locals may well feel an entitlement. The inhabitants of Colton are furious over the loss of potential local development because some bureaucrats from Washington say they have to protect the Fly, even if the Fly lives on private land. Does the biodiversity represented by the Fly "belong" to the nation as a whole? If so, then perhaps it should be managed at the national level. But is it just or wise to effectively overrule local decisions about land uses, when it is the locals who must bear the opportunity costs from Fly conservation?

In another variant of this problem, scales can be mismatched as markets encompass multiple political jurisdictions. Imagine, for example, that in order to attract business Arkansas decides to lower its standards for water pollution from hog farms. This not only poses a transboundary concern for the border states of Louisiana and Alabama; it also pressures states with similar industries, such as North Carolina, to lower their standards as well in order to prevent industry relocation. The dynamic of local jurisdictions competing with one another by lowering environmental standards to attract industry is known as the *race-to-the-bottom*. Realize, as well, that concerns over the race-to-the-bottom can not only pressure jurisdictions to lower their standards but can also chill efforts in states seeking to strengthen standards (because industry will threaten to relocate if their costs of regulatory compliance are increased). If this is the case, then nationwide standards seem necessary. The same phenomenon can also occur in the international context, as nations compete with one another for business investment.

The fact that companies choose their locations based in part on costs of doing business is indisputable. There is a strong debate, however, over the extent to which a race-to-the-bottom really occurs in the environmental field. For one thing, states can compete on many grounds, perhaps lowering tax rates or workplace safety requirements to attract

business. Hence it's not a given that they would reduce environmental standards to attract industry. Indeed, because environmental quality is an important amenity, there's an argument that local jurisdictions are more likely to engage in a "race-to-the-top," competing for industry by offering *higher* environmental quality. The data on international industry relocation suggest that stringency of environmental regulation is less important to companies than proximity to markets, labor costs, raw material costs, political stability, etc. And this makes sense, since environmental costs are usually a small percentage of total business costs. In those industries where environmental costs are relatively high, though, such as in the chemicals sector, there is evidence that companies have relocated with environmental compliance costs in mind. Perhaps more important, though, is the fact that many regulators believe the race-to-the-bottom occurs, whether that is borne out in fact or not, and act accordingly.

Problems of scale occur in time as well as in space. Decisions must be made today that may prevent harm ten or twenty years from now or, indeed, in generations not yet born. Ozone depletion and climate change are two examples. CFCs (which are the major cause of stratospheric ozone depletion) and greenhouse gases we emit today will cause impacts over the next 50 years or longer. The same distributional asymmetry is at play here as with physical scale. The costs of refraining from an action fall on us today, while the benefits are enjoyed (most likely by others) far later. Yet these future beneficiaries can't express their preferences in today's voting booth or courtroom. Indeed, the temporal scale of many environmental problems makes it difficult even to hold current elected officials accountable, since many of their actions will not cause harms until they are no longer in office. Supporting overfishing today may keep a local politician in office, for example, while the stark impacts may not be evident until years later when the stock has collapsed. As a result, many environmental advocates claim to be acting on behalf of the interests of future generations, but deciding what the proper sacrifice today should be for future benefits that may or may not be appreciated is easier said than done.

D. CONFLICTING VALUES

Why should we care about protecting the Fly or the fish and freshwater ecosystems along the Susquehanna River? "Because it's important to do so" may be a heartfelt answer, but the fact is that not everyone attributes the same importance to environmental protection or nature conservation. In a democracy, that can (and does) make environmental management a tricky business. Consider, for example, the conflict in Colton. On the one side are those, supported by the Endangered Species Act, who argue that conserving the remnant populations of the Fly is important enough to slow, or even halt,

commercial development. And Mayor Deirdre Bennett's fly swatter pretty well sums up the contrasting perspective on the value of the Fly.

A vast subject in itself, environmental ethics encompasses our relationship with the environment. While seemingly secondary to the hard nuts and bolts of environmental law and policy, "soft" values often in competition with one another lie at the core of many environmental conflicts, and understanding the nature of the values conflict is essential to crafting durable solutions.

At one end of the spectrum lies the ethic of biocentrism. The term "deep ecology," for example, is based on the premise of a kinship with nature. Consider, for example, the core principles set out below.

1. The well-being and flourishing of human and nonhuman life on Earth have value in themselves. These values are independent of the usefulness of the nonhuman world for human purposes.
2. Richness and diversity of life forms contribute to the realization of these values and are also values in themselves.
3. Humans have no right to reduce this richness and diversity except to satisfy *vital* needs.
4. The flourishing of human life and cultures is compatible with a substantial decrease of the human population. The flourishing of nonhuman life requires such a decrease.
5. Present human interference with the nonhuman world is excessive, and the situation is rapidly worsening.
6. Policies must therefore be changed. These policies affect basic economic, technological, and ideological structures. The resulting state of affairs will be deeply different from the present.

BILL DEVALL & GEORGE SESSIONS, DEEP ECOLOGY: LIVING AS IF NATURE MATTERED ix, 65–70 (1985).

Certain animal rights advocates would likewise argue that non-humans have basic rights that must be respected.

At the other extreme lies the anthropocentric, human-based perspective. From this perspective, the most important measure of something's value is its value to us. Utilitarianism is perhaps the most widely accepted argument for anthropocentrism. As John Stuart Mill famously described, utilitarianism seeks to provide the greatest good to the greatest number of people. While some may find it odd to think of utilitarianism as an ethical viewpoint, it is a rights-based view of the world insofar as decisions ought to be made on the basis of social welfare (as measured for humans). In a classic defense of utilitarianism as the proper guiding ethic for environmental policy, William Baxter described a report that the use of DDT was harming penguin populations. Even if

that were true, however, he denied that we must therefore stop using DDT:

My criteria are oriented to people, not penguins. Damage to penguins, or sugar pines, or geological marvels is, without more, simply irrelevant. One must go further, by my criteria, and say: Penguins are important because people enjoy seeing them walk about rocks; and furthermore, the well-being of people would be less impaired by halting use of DDT than by giving up penguins. In short, my observations about environmental problems will be people-oriented, as are my criteria. I have no interest in preserving penguins for their own sake.

It may be said by way of objection to the position, that it is very selfish of people to act as if each person represented one unit of importance and nothing else was of any importance. It is undeniably selfish. Nevertheless I think it is the only tenable starting place for analysis for several reasons. First, no other position corresponds to the way most people really think and act—i.e., corresponds to reality. . . . I do not know how we could administer any other system. . . . Penguins cannot vote now and are unlikely subjects for the franchise—pine trees more unlikely still. Again each individual is free to cast his or her vote so as to benefit sugar pines if that is his inclination. But many of the more extreme assertions one hears from some conservationists amounts to tacit assertions that they are specially appointed representatives of sugar pines, and hence that their preferences should be weighted more heavily than the preferences of other humans who do not enjoy equal rapport with “nature.” * * *

I reject the proposition that we *ought* to respect “the balance of nature” or to “preserve the environment” unless the reason for doing so, express or implied, is the benefit of man.

I reject the idea that there is a “right” or “morally correct” state of nature to which we should return. The word “nature” has no normative connotations. Was it “right” or “wrong” for the earth’s crust to heave in contortion and create mountains and seas? Was it “right” for the first amphibian to crawl up out of the primordial ooze? . . . No answers can be given to these questions because they are meaningless questions.

All this may seem obvious to the point of being tedious, but much of the present controversy over environment and pollution rests on tacit normative assumptions about just such nonnormative phenomena: that it is “wrong” to impair penguins with DDT, but not to slaughter cattle for prime rib roasts. . . . Every man is entitled to his own preferred definition of Walden Pond, but there is no definition that has any moral superiority over another, except by reference to the selfish needs of the human race.

WILLIAM BAXTER, *PEOPLE OR PENGUINS: THE CASE FOR OPTIMAL POLLUTION* 4–9, 12 (1974).

Somewhere between the nature-based ethic of biocentrism and the human-based ethic of anthropocentrism lies what has probably become the most influential ethic in the American environmental movement—the Land Ethic. Its champion, Aldo Leopold, was a pioneer in the field of resource management. In addition to his efforts in the U.S. Forest Service to preserve wild tracts of land, Leopold helped found the Wilderness Society in 1935. In his collection of essays, published posthumously in *A Sand County Almanac*, Leopold traced the development of ethics, arguing that subsequent generations had progressively expanded the community of rights-holders. In the time of ancient Greece, girls suspected of misbehavior were hanged. “This hanging involved no question of propriety. The girls were property. The disposal of property was then, as now, a matter of expediency, not of right and wrong.” ALDO LEOPOLD, *A SAND COUNTY ALMANAC—AND SKETCHES HERE AND THERE* 201 (1949). Over time, ethics established rules over the relations between the individual and society, yet “[t]here is as yet no ethic dealing with man’s relation to land and to the animals and plants which grow upon it.” *Id.* at 203. In his Land Ethic, Leopold proposed:

The “key-log” which must be moved to release the evolutionary process for an ethic is simply this: quit thinking about decent land-use as solely an economic problem. Examine each question in terms of what is ethically and esthetically right, as well as what is economically expedient. A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.

Id. at 224–225.

Even if we could reached society-wide agreement regarding environmental values (which of course, we cannot), we would also need to address the conflicting values regarding governance and law. These conflicts seemed to be absent when an overwhelming bipartisan congressional majority enacted the landmark federal environmental laws of the late 1960s and early 1970s. Throughout 1970, President Nixon and Senator Edmund Muskie (the presumptive Democratic presidential candidate in 1972) tried to one-up each other by proposing more and more stringent versions of what became the Clean Air Act. But the honeymoon ended quickly. Congress has not enacted any sweeping new framework environmental laws since a lame-duck session rushed to enact hazardous waste legislation (CERCLA, which we study in Chapter 5) after the November 1980 elections. Congress has amended the original statutes on a number of occasions, perhaps most notably the 1990 amendments to the Clean Air Act, but even substantial statutory amendments have become less common in recent years. The House of Representatives narrowly approved the 1,428-page American Clean Energy and Security

Act in 2009, but the Senate failed to follow suit and such federal climate change legislation appears unlikely within the foreseeable future.

The current period of congressional dormancy is not the result of widespread satisfaction with our current environmental statutes. To the contrary, most experts, policymakers, and activists have numerous ideas about how each statute could be improved. Those ideas, however, are often diametrically opposed. Many environmentalists want to further empower administrative experts to employ scientific expertise to impose legally binding regulations needed to save the natural environment. Their opponents see agencies such as the Environmental Protection Agency as an out-of-control, unaccountable bureaucracy intent on reshaping American society regardless of the economic and other costs. Shared environmental values, in other words, are not enough if there is not an agreement on how to achieve those values.

E. ENVIRONMENTAL JUSTICE

A final driver of environmental conflicts arises from inequity. The burdens of environmental harms and regulations are not allocated equally among individuals and groups within our society. Indeed our environmental laws historically have ignored distributive issues. During the heady days of the 1970s when most of our framework statutes were passed, supporters of strong environmental laws emphasized environmental rights, while those more sympathetic to economic concerns argued for greater consideration of costs; virtually no one asked how environmental harms or regulatory costs were distributed.

This began to change in 1978 when Governor James Hunt of North Carolina proposed disposing of soil tainted with polychlorinated biphenyls (PCBs) in a new waste dump to be opened in Warren County, a poor region in the northeastern part of the state with a population that was sixty-four percent African American and Native American. Joined by national civil rights leaders, local residents blocked the entrance to the dump site for over two weeks, arguing that the county had been chosen for the site because it was a minority community with little political power. Although the campaign ultimately failed to keep the PCB-laced soils from the site, it attracted national attention to the issue of environmental justice and forced the governor to support state legislation prohibiting additional landfills in Warren County.

Warren County was not an anomaly. Study after study has since demonstrated that low-income communities and communities of color bear the greatest burdens of environmental harms. Studies have shown strong correlation between race and exposure to air pollution, race and lead poisoning, race and pesticides, race and exposure to occupational hazards, and other environmental harms. Similar correlations have been established for low income communities, as well. Consider the following summary of information taken from EPA sources:

Lead. Almost two-thirds of American housing units were built before 1970. Although the use of lead paint for houses was banned in the 1970s, older homes often contain paint with high concentrations of lead. Additional sources of lead in the home are: drinking water extracting lead from lead pipes and fixtures, lead in dust (usually from paint), and contaminated soils carried in from outside. The primary pathway for exposure is from ingestion of paint chips and dust containing lead. There is a particularly high concentration of lead problems in low-income and culturally diverse populations, who live in the inner city where the public housing units were built before 1970.

Waste Sites. Low income, and quite often culturally diverse populations, are more likely than other groups to live near landfills, incinerators, and hazardous waste treatment facilities.

Air Pollution. In 1990, 437 of the 3,109 counties and independent cities in the U.S. failed to meet at least one of EPA's ambient air quality standards. Many Americans live in these communities: 57 percent of all whites, 65 percent of African Americans, and 80 percent of Hispanics.

Pesticides. Approximately 90 percent of the 2 million hired farm workers in the United States are people of color, including Chicanos, Puerto Ricans, Caribbean blacks, and African Americans. Through direct exposure to pesticides, farm workers and their families may face serious health risks. It has been estimated that as many as 313,000 farm workers in the U.S. may suffer from pesticide-related illnesses each year.

Wastewater: City Sewers. Modern sewage systems were developed to carry sewage and storm water separately to prevent overflow problems that are common in older, urban areas. Many inner cities still have sewer systems that are not designed to handle storm overflow. As a result, raw sewage may be carried into local rivers and streams during storms, creating a health hazard.

Wastewater: Agricultural Runoff. More recently, streams and rivers in rural areas with concentrations of commercial truck farms and animal feedlots have suffered mysterious lesions in fish and algae blooms resulting in fish kills. High levels of phosphorus support algae growth, which blocks re-aeration, reducing the level of oxygen needed to support aquatic life. It is suspected that the increased use of commercial fertilizers and concentrations of animal wastes contribute to the degradation of receiving streams and rivers in rural areas, with communities that are often low income and culturally diverse.

Environmental justice focuses both on the distribution of environmental burdens and policies (*substantive* environmental justice) and on the process by which environmental decisions are made in the United States (*procedural* environmental justice). In the view of most advocates of environmental justice, local communities should have a significant, if not controlling voice in decisions and activities that impact their residents' lives. Decision-making processes in turn should be open to interested parties, which should also include access to the scientific studies and other information underpinning the policy proposals. Environmental justice advocates thus push for decisions to be made at the local level through democratic processes. This runs counter to the modern emphasis in American environmental policy on *federal* decision-making by *expert* agencies. Environmental justice advocates also have had concerns about traditional environmental groups, which tend to have few minority employees and accomplish much of their work in the courts and the halls of Congress rather than in local communities, though this has been changing in recent years.

Establishing the fact of a strong correlation between environmental burdens and both the poor and people of color made clear that something needed to be done. The problem, however, lies in what to do. Put another way, unless we understand the *drivers* of environmental injustice, then it is not at all clear how to remedy them. If the siting of hazardous waste facilities in poor communities of color is driven by racism, for example, the policy response may involve litigation under civil rights laws. Indeed, many residents of minority communities believe that racism is at work and have fought efforts to locate facilities in their communities, labeling such efforts *environmental racism*. If, by contrast, this correlation is driven primarily by the real estate market, the opportunity for government intervention is much smaller. A number of regional studies have suggested that housing dynamics are instead at fault: after a facility is located in a community, those who can relocate to other neighborhoods move out of the area and housing prices fall, making the community more attractive to minorities and poorer individuals who previously could not afford to live there. Vicki Been & Francis Gupta, *Coming to the Nuisance or Going to the Barrios? A Longitudinal Analysis of Environmental Justice Claims*, 24 *ECOLOGY L.Q.* 1 (1997). To the degree that more systemic problems such as housing underlie the greater exposure of minorities and the poor to industrial and waste facilities, changes in environmental policies by themselves will unfortunately not eliminate distributional inequities. Other studies have found a close correlation between the siting of undesirable land uses and a community's voting rate, with less politically active communities suffering greater environmental justice problems. James T. Hamilton, *Testing for Environmental Racism: Prejudice, Profits, Political Power?*, 14 *J. OF POLICY ANALYSIS AND MANAGEMENT* 107, 127 (1995). Thus many recent studies have sought to understand better the nature of the correlation between demographics and environmental justice.

Regardless of whether the governmental agencies that oversee the siting and permitting of such facilities intentionally discriminate, minority communities frequently have less political power and may be at a number of procedural disadvantages. Local residents may find it difficult to attend relevant hearings, which may be held in state or county capitals hundreds of miles away from the affected community; the siting agency might not publish notices and other materials in Spanish and other locally spoken languages or provide interpreters for hearings; and few minority communities have the resources to hire scientists and other experts needed to rebut the claims of the facility owners.

In response to such concerns, the federal government has taken a number of steps to improve environmental equity. In 1994, President Bill Clinton issued Executive Order 12898, still in effect, that requires all federal agencies to incorporate environmental justice into their decision making “by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects.” Some governmental agencies also have adopted their own policies designed to reduce the chances that their decisions will impact minority communities on a disproportionate basis. In licensing nuclear facilities, for example, the Nuclear Regulatory Commission engages in an environmental equity analysis designed to identify and avoid both intentional discrimination and disproportionate burdens. In 1997, the Commission rejected an application to build a uranium enrichment plant in the African American community of Homer, Louisiana, because the Commission’s staff had not adequately examined whether racial discrimination had played a role in the site selection process. *See In the Matter of Louisiana Energy Services, L.P.*, Decision of the Nuclear Regulatory Commission Atomic Safety and Licensing Board, May 1, 1997.

Community members seeking to keep environmentally hazardous facilities out of their neighborhoods increasingly have tried to use Title VI of the Civil Rights Act of 1964 to address issues of environmental racism. Title VI prohibits any program or activity that receives federal funds from discriminating on the basis of race, color, or national origin; most state and local environmental programs receive some federal funding and thus are subject to Title VI. Although a plaintiff who sues in court under Title VI must prove intentional discrimination, federal agencies may adopt a lower burden of proof for administrative proceedings.

EPA prohibits disproportionate impacts, whether or not caused by intentional discrimination, in programs receiving EPA funding. In 2000, faced by an increasing number of Title VI complaints, EPA issued a Draft Revised Guidance for investigating administrative complaints alleging violations of Title VI. The interim guidance proved controversial with state and local governments and EPA has yet to adopt a final guidance document.

Discriminatory siting decisions may not be the only or even the principal reason why environmentally dangerous facilities end up located disproportionately in minority communities. Although virtually all studies agree that minority and poor communities host a disproportionate share of industrial and waste facilities, they disagree as to why.

Although environmental justice discussions have focused on the siting of industrial and waste facilities, environmental justice also provides a framework for addressing environmental policy more broadly. Many advocates of environmental justice, for example, observe that the government provides for strong protection of environmental amenities such as biodiversity that have little immediate importance to the urban and rural poor while taking a more relaxed stance on issues such as pesticide exposure that are of immediate importance to these populations. The Endangered Species Act thus does not consider cost in protecting endangered species, but the Federal Insecticide, Fungicide, and Rodenticide Act permits cost to be considered in deciding whether to allow pesticides to be used in the United States.

Environmental justice advocates also suggest that the government should consider distributional impacts in choosing and designing its regulatory tools. As discussed in Chapter 3, for example, the government has adopted tradable emission credits under the Clean Air Act. Under the trading program, a factory that finds it relatively inexpensive to reduce its air emissions can reduce its emission by more than the regulations require and then sell its “excess credits” to a factory that finds it more expensive to reduce emissions; the second factory can then use the credits to help meet its regulatory requirements. Emissions trading can achieve the same overall emission reduction at a lower cost and is thus economically efficient. But if the trading system is not carefully designed and implemented, factories in poorer areas of a region might become net purchasers of the pollution credits—resulting in more pollution in the poorer areas, so-called “hotspots,” at the same time as the air becomes cleaner in other areas.

QUESTIONS AND DISCUSSION

1. Using the case of climate change, give examples of how the following drivers play out in the climate setting:
 - Uncertainty over impacts (biophysical and economic, current and future)
 - Uncertainty over policies (current and future)
 - The market failure of public goods
 - The market failure of externalities
 - The market failure of collective action and free riders

- Problems of physical and political scale
- Conflicting values

Explain the types of obstacles these drivers present to reducing greenhouse gas emissions.

2. Uncertainty can cut both ways—acting today to address an uncertain future harm may be an overreaction, causing immediate economic and social harm; yet not acting in the face of an uncertain future harm may prove an under-reaction, causing economic and social harm at a later date. Discuss the issue of nuclear power in terms of uncertainty and policy choices. Does the uncertain, though potentially massive, harm from climate change suggest we should move with all deliberate speed to shift toward non-carbon energy sources, including nuclear power? Or does the potential harm from the operation of nuclear power plants and dangers from transport and disposal of hazardous waste caution against its use? How should policy makers balance these competing sources of uncertainty?

3. For each school of environmental ethics described above, in whom (or what) do the rights inhere?

- In inanimate objects (e.g., rocks or a river)?
- In living things (e.g., a newt or whale)?
- In living communities (e.g., a particular forest)?
- In people living today in America?
- In future generations of people?

4. How would the major schools of thought described above (i.e., deep ecology, the land ethic, utilitarianism, etc.) analyze the decisions:

- To kill a few individual members of the Delhi Sands Flower-Loving Fly to build a new hospital;
- To kill half the population of the Fly to build a new hospital;
- To kill the only known population of the Fly to build a new hospital.

Assume that the Fly has been studied and has no clear commercial value. Assume the hospital will provide jobs and health care to an economically depressed community. Would the answers differ if the species were a cuddly panda instead of the Fly?

5. How does the vantage of environmental justice affect your consideration of the following conflicts?

- A Native American tribe has long suffered from high unemployment and poverty on its reservation. The Waste Company, Inc., approaches the tribal leadership and offers to open a hazardous waste disposal site on the reservation. The facility will produce significant income and employment for the tribe. Despite strong opposition from many tribal members, the tribal leadership decides to build the waste site on the reservation close to its border. A small farming town

just outside the reservation objects to the environmental risks posed by the hazardous waste site.

- Cars that sit idling in traffic produce significant pollution. Every morning, traffic piles up for miles trying to get on the bridges leading from the mainland into Bay City. To reduce both congestion and pollution, Bay City proposes charging significantly higher tolls for use of the bridges during the peak commuter hours of the morning and late afternoon. The higher tolls will pose a problem for the working poor, who will not be able to afford the higher tolls and do not have jobs with flexible working hours.

III. TOOLS FOR ENVIRONMENTAL PROTECTION—“THE FIVE P’S”

While values, market failures, scientific uncertainty and the other themes discussed in this chapter drive environmental conflicts, policies still need to be implemented. The rubber meets the road in determining which type of instrument to use in the regulatory toolkit. To explore the possibilities, let’s return to the classic environmental problem described above—the tragedy of the commons. Recall that you have a herd of sheep that grazes on the public common. The common, though, is an open access resource (the defining problem for many natural resource issues). This means that anyone can graze as many sheep as she likes. So long as the resource is under little pressure (i.e., few sheep are grazing) there is no need for government intervention because there is no problem of scarcity. Once significant competing uses of a resource develop, however, then the need for state action arises. In the context of the commons, once more and more people graze more and more sheep, the commons is in danger of becoming overgrazed and denuded. So we need to do something, but how should we best head off the tragedy currently in the making? What is the appropriate mix of property and regulation? It is useful to think of the range of policy instruments as “The Five P’s”—Prescriptive regulation, Property rights, Penalties, Payments, and Persuasion.

A. PRESCRIPTIVE REGULATION

In relying on prescriptive regulation, the government mandates behavior—thou shalt do this, thou shalt not do that. This strategy explicitly directs behavior of regulated parties and is the most common policy approach in environmental law. In the case of the commons, for example, the government might decide to limit access. The most obvious measure would be to restrict the number of sheep that may graze, perhaps allowing no more than 250 sheep per month. The government may further determine that certain commons areas must be set aside for re-vegetation and allow no grazing at all.

Such prescriptive regulation, also referred to as “command-and-control” regulation, can be very effective but there is considerable debate

over its efficiency. The underlying assumption, of course, is that the agency, staffed with experts, knows best. For the agency to make wise decisions, though, it must have access to accurate information and not be subject to capture by special interest groups or to other public choice pressures. It needs monitoring capabilities to check for compliance and credible sanctioning authority to ensure rules will be followed. In practice, none of these preconditions are guaranteed. And even if they are, satisfying these requirements suggests that administrative costs could be significant.

B. PROPERTY RIGHTS

A classic solution to the tragedy of the commons is reliance on private property rights. Assume the state carves up the common into square parcels of land and grants fee simple title to the current shepherds using the common, including you. Are you still as eager to overgraze as before? All of a sudden, your previous incentive to use up the resource as fast as possible (before everyone else did) is no longer relevant. Instead, your interests are probably best served by carefully tending your part of the common so it remains fertile long into the future—so it is sustainably managed. In a variant of the privatization approach, assume the entire commons now belongs to you. What would you do? You may well charge other shepherds to use the commons, or even let them on for free, but you would only do so to the extent that the resource base remains intact and productive—i.e., so long as the commons are not overgrazed. The property rights approach is based on the common sense intuition that people take better care of their own property. In financial terms, people will safeguard their assets over the longer term to maximize long term profits.

Implicit in a property rights approach is the importance of technology. To enforce your rights, you need both to know whether someone is making unauthorized use of your resource (an issue of monitoring capacity) as well as to have the ability to exclude others' use. It was only with the invention of barbed wire that settlers in the American west could effectively exclude cattle from grazing on their lands (i.e., could privatize the commons). Prior to this technology, there was no affordable way to keep cattle from grazing wherever they wanted. In a more modern context, decoders have allowed satellite television channels to privatize the airwave commons. Unless satellite channel providers could exclude other's use of their signal by scrambling it and then selling decoders, there would be no way for them to sell their product (since people would use it for free).

Despite the increasing interest and application of property rights approaches to environmental protection, there are some significant obstacles. The first is that many environmental resources are not easily amenable to commodification. Consider endangered species, for example. One might privatize their habitat, but what if the species is mobile?

There may be normative concerns, as well, that are raised by proposals for privatization of national parks or other environmental amenities in the public domain. If the Disney Corporation owned Yellowstone, for example, would you would feel the same way about your visit even if the experience were identical in every other way to that of the current national park?

Practically, there are difficult allocation issues for the initial privatization of environmental resources. Using the commons as an example, assume that the government has decided to divide up the land into 50 separate parcels. Whom should be given title? Should the land be auctioned to the highest bidder? This might ensure the most efficient use of the resource, but it would likely favor wealthier newcomers and corporate interests over traditional, small-scale users. Giving more deference to communities, perhaps the allocation should be based on historic use or current levels of consumption. This approach might seem more equitable, though realize that it freezes out newcomers who might use the land more efficiently or even set it aside for conservation. And if these lands belong to the nation, where's the fairness in effectively shutting out outsiders? Any allocation mechanism will tend to favor some groups at the expense of others.

Nor, finally, is it clear that privatization will lead to the most socially most beneficial use of the land. It is easy to imagine, for example, the problem of holding out. Perhaps the new owners of the commons wish to use it for mini-golf while the sheep starve. This may be economically efficient if it accurately reflects the land's most valuable use (as measured by willingness to pay). If the government wishes to ensure the important public goals of a secure food supply or supporting family farms, they will need to step in. Property rights advocates would approve of this course of action, so long as the government paid the property holders. But, one might ask, if the most valuable use, as demonstrated by the market, is for the commons to be used for mini-golf, why should government intervene at all?

Market-based thinking can lead to alternative ways of regulating property rights, however, as so-called "environmental markets" have been growing in popularity and represent a hybrid of private property and prescriptive regulation. To date, for example, emissions trading programs have reduced emissions of a wide range of pollutants, managed fisheries and lobster harvests, and channeled habitat development. The basis for trading environmental commodities is a regulatory proscription of behavior followed by regulatory permission of the behavior under controlled conditions.

In establishing an environmental market, the government first creates a new form of property—legal entitlements to emit pollutants, catch fish, develop habitat—then bans an activity absent these entitlements, and finally imposes a set of rules governing their exchange—i.e., creates a market. All trading programs therefore take

place within carefully constructed markets. Absent legal restrictions on pollutant emissions, fish landings, or wetlands development, and the creation of alienable entitlements to these activities, few if any trades would take place.

To make this more concrete, imagine how a trading program would work with grazing on the commons. Government policy makers decide that the commons can sustain no more than 400 sheep grazing per year. It therefore creates 400 permits. Each permit entitles the holder to graze one sheep for the calendar year. Unless the shepherd has a separate permit for each sheep grazing on the commons, he is breaking the law. The government then allocates the permits in some fashion and lets trading commence. In theory, those for whom grazing is most valuable will buy the permits, ensuring that the commons are dedicated to the most valuable use.

One downside of trading is similar to that for private property rights approaches—the difficulty of initial allocation of permits in an equitable fashion. Moreover, constructing smoothly functioning markets is not simple. There must be a refined currency of trade, one that is fungible and reflects the desired environmental quality. There must also be a sufficient and well-defined marketplace and community of market participants. Thus, for example, it would be a stretch to consider allowing coastal developers in Florida to “trade” wetland values they eliminate for increasing endangered species habitat in Oregon. But where the environmental good (or bad, so to speak) can be captured in a measurable unit (whether that be kilos of fish or tons of sulfur dioxide) and market service areas and participants are well-defined, trading programs have had demonstrable success in a variety of contexts, increasing the efficiency and flexibility of prescriptive instruments.

C. PENALTIES

Another strategy of environmental protection relies explicitly on economic incentives and disincentives. Using the commons example again, these may take the form of an entrance fee to graze on the commons. One might levy a tax, perhaps on the number of sheep or time spent grazing. Such market instruments are attractive because they lead to self-regulation of use. If the fees and taxes are set correctly, this instrument quite literally internalizes externalities and provides a direct incentive to modify behavior, aligning environmental and economic interests. People will find cheaper ways to conserve those scarce resources and less of the resource will be used over time.

Setting the correct level of the tax, though, can be difficult. After all, what managers care about is the overall effect of many polluting sources or resource users. What level should the individual tax or fee be set at to reach the desired aggregate resource extraction or pollution level? More practically, there is strong public and political opposition to significant taxes. In most cases, even when environmental taxes have been set,

they've been intended more for revenue-raising than serious behavior modification.

D. PAYMENTS

Another market approach with broad use is public subsidy. Rather than financially penalizing undesirable behavior, one rewards the desired behavior. In the context of the tragedy of the commons, the government can pay shepherds not to graze their sheep. In contrast to such “environmental subsidies,” however, many (in fact, most) subsidies actively promote degradation of environmental amenities. Suppose, for example, you graze your sheep on public lands. The government charges you less than the private lessee across the fence pays to graze her sheep. It sends you a check when you are unable to sell your lambs or their wool at a statutory target price. And it sells you water at a below-market price which you use to grow alfalfa to feed your sheep in the winter when the grazing land is covered with snow. If the subsidies are reduced, you may decide to stop grazing altogether, reduce the number of sheep you run, or perhaps find a more efficient way to graze, all of which will benefit an overgrazed range. Subjecting you to the discipline of the market can turn out to be good for the environment, but eliminating subsidies won't always produce environmental gains. Suppose that you stop grazing and the pasture is replaced with tract homes?

E. PERSUASION

Where regulatory or property approaches are politically infeasible, a “softer” approach may be found in laws requiring information production and dissemination. The theory behind such approaches is that forcing a regulated party or government agencies, themselves, to gather information and make it public, or at least to consider information, will change the party's behavior. In the context of the commons, the government might require shepherds to record and publish the number of sheep that graze or the amount of time they graze, subjecting them to peer pressure from the community. They may try to educate the shepherds with brochures or presentations on the causes and dangers of overgrazing. It may be more effective, though, to bypass the regulated party entirely and go directly to the consumer. For example, in the early 1990s, labeling cans of tuna “dolphin friendly” rapidly changed the fishing practices of tuna fleets in the Southern Pacific, from purse seine netting that killed tens of thousands of dolphins annually to much less harmful techniques. California passed a law requiring all 2009 model cars for sale to display a global warming score, on a scale of one to 10, based on how vehicles in the same model year compare to one another for emissions and fuel efficiency. New York adopted a similar measure for 2010. California's data is posted on the web at the state's DriveClean website, www.driveclean.ca.gov/index.php.

Similar (often nongovernmental) eco-labeling initiatives certify and label sustainably harvested timber, coffee, etc. The theory behind such programs is to provide green consumers reliable information on which to base their purchases and favor environmentally friendlier products in the marketplace. Government can also support pilot programs or demonstration projects to show industries or farmers the benefits of alternative approaches to production or farming.

In general, information approaches are used when there is either inadequate political support to impose regulatory instruments or such instruments are ill-suited to the problem. In a number of cases, particularly in the case of pollution, requirements to collect and disseminate information on regulated parties' behavior have led to concrete changes even in the absence of overt prescriptive regulation. See Eric Orts, *Reflexive Environmental Law*, 89 NW. U.L. REV. 1227 (1995).

QUESTIONS AND DISCUSSION

1. Apply the Five P's to the problem of reducing greenhouse gas emissions. Once you have come up with examples of policy instruments, assess the following:

- Which instrument do you think will be most effective?
- Which most efficient?
- And which most equitable?

2. The Five P's lists only government policy instruments. Nongovernmental P's might include Protest by concerned individuals or Private companies adopting their own corporate environmental policies. Can you think of other nongovernmental strategies (even if they don't start with a P . . .)?

3. While trading programs can reduce compliance costs by allowing regulated parties to pay for the least-cost solutions, they can also cause harmful side effects. In particular, the problem of "hotspots" can occur when pollutants are concentrated in a particular area (e.g., because the polluting factories are buying pollution credits from somewhere else). Hotspots often are located in or near poor communities of color, raising environmental justice concerns. Can you think of a way to design an air pollution trading program that avoids the danger of hotspots?

4. Given that public subsidies often result in environmentally-damaging resource allocation, a number of environmental groups have joined forces with taxpayers' groups and fiscal conservatives to lobby against particular congressional subsidies. The *Green Scissors Report*, for example, published annually by Friends of the Earth, the U.S. Public Interest Research Group, and Taxpayers for Common Sense, identifies environmentally wasteful programs. Operating for close to two decades, the Green Scissors Campaign claims to have "successfully cut or eliminated more than 20 environmentally wasteful programs, saving taxpayers more than \$26 billion." Their most recent report can be found at <http://www.greenscissors.com>. This strategy, however, can act as a double-edged sword. Should the campaign be concerned

over subsidies for renewable energy research and national park visitors? Is it possible, or fair, to pick and choose among subsidies or are subsidies simply the oil that makes the wheels of politics run?

5. The Political Economy Research Center (better known as PERC), is one of the leading think tanks for free market environmentalism. Their approach to resource management is based on four tenets:

- Private property rights encourage stewardship of resources.
- Government subsidies often degrade the environment.
- Market incentives spur individuals to conserve resources and protect environmental quality.
- Polluters should be liable for the harm they cause others.

None of these contentions are exceptional, so why is PERC so controversial? Primarily because their policy prescriptions often call for much stronger reliance on markets, property rights and the common law than the current emphasis on prescriptive regulation. In advocating repeal of the Endangered Species Act, for example, former PERC Executive Director Terry Anderson has argued that

This Act creates perverse incentives by penalizing people who oversee resources. I'd start by scrapping the approach that's there and implementing new ones. First, by encouraging private environmental groups to contract with land owners, and second, by using financial resources (from user fees on public land, for example) to compensate land owners for preservation procedures.

<http://www.perc.org/articles/article435.php>.

Does PERC's approach adequately account for the transaction costs incurred by those with diffuse interests? Consider for example, what it will take for multiple private environmental groups to marshal their resources to compete with a single landowner for the purchase of an old growth forest that provides critical habitat for an endangered species. While PERC's views have surely been controversial, it has succeeded in pushing the envelope of policy tools. PERC's website has a number of "success stories" it argues should serve as models for resource management. See <http://www.perc.org/psolutions.php>. For further reading on free market environmentalism, see TERRY L. ANDERSON & DONALD R. LEAL, *FREE MARKET ENVIRONMENTALISM* (2nd ed. 2001). For the views of the other influential free market environmentalist think tank, see the Foundation for Research on Economics and the Environment's website, at www.free-eco.org.

IV. WHAT DO ENVIRONMENTAL LAWYERS DO?

What is an *environmental* lawyer, and what do they do? To answer this requires some appreciation of the field of environmental law and the different settings within which it is practiced. Indeed, the remainder of this text is devoted to answering this question. The chapters in Part I explore the depth and breadth of substantive environmental law and Part II places the substance in different practice contexts.

A. AN EVOLVING FIELD OF LAW

The substantive scope of environmental law has evolved substantially since its emergence in the 1970s and is continuing to change rapidly. Of course, it is to some degree arbitrary to draw lines between what is and is not *environmental law*. Many fields of law have a profound influence on the environment. Land use law, for example, necessarily must consider environmental impacts of land use decisions. But that is not the primary focus of land use lawyers; rather, they are concerned with how particular land uses are approved or disapproved by government authorities, and the environment is just one consideration among many (others would include traffic, schools, aesthetics, demographics, fiscal burden, and so on). Likewise, environmental law at its broadest ought to include substantive laws the primary objective of which is managing the relation of humans to the physical environment.

Of course, there are many such laws, and we don't intend to list them all here. Rather, it is instructive to see how lawyers who hold themselves out as environmental lawyers have described their field. As mentioned above, for example, the American Bar Association has a section devoted to environmental law, and the related fields of energy law and natural resources law, known as the Section on Environment, Energy, and Resources (SEER), which in turn has committees devoted to different topics. The history of that section tells a lot about the evolution of environmental law as a field.

To begin with, SEER is the current denomination of the ABA section that originally went by the Section of Natural Resources Law (SNRL). For decades SNRL was focused primarily on the law of natural resource extractive industries, such as mining, water uses, oil and natural gas, and forestry. Indeed, even as of 1987 SNRL had only four committees in the section's "environmental group" (see Table 1). By 1997, SNRL had been renamed the Section on Natural Resources, Energy, and Environmental Law (SONREEL), and the number of committees had more than doubled. By 2007 SONREEL had become SEER, with "environment" getting top billing, and the number of committees under the environmental banner was close to 20.

Table 1: ABA SEER Environmental Committees 1987–2007

1987	1997	2007
Air Quality	Air Quality	Air Quality
Environmental Quality	Environmental Quality	—
Solid and Hazardous Waste	Solid and Hazardous Waste	Waste Management
Toxic and Environmental Torts Litigation	Environmental Litigation	Environmental Litigation and Toxic Torts
Water Quality	Water Quality and Wetlands	Water Quality and Wetlands
	New Committees	
	Agricultural Management	Agricultural Management
	Brownfields	Environmental Transactions and Brownfields
	Endangered Species	Endangered Species
	Environmental Crimes and Enforcement	Environmental Crimes and Enforcement
	International Environmental Law	International Environmental Law
	State and Regional Environmental Cooperation	State and Regional Environmental Cooperation
		New Committees
		Environmental Disclosure
		Environmental Justice
		Pesticides, Chemical Regulation, and Right to Know
		Site Remediation
		Superfund and Natural Resources Damages Litigation
		Sustainable Development, Ecosystems, and Climate Change
		Environmental Impact Assessment
		Environmental Values and Ethics
		Innovation, Management Systems and Trading

Notice also how the committees proliferated over time. In the days of SNRL, they were the obvious choices: air, water, waste, litigation, and the catch-all “environmental quality.” Air, water, waste, and litigation had staying power, but by 2007 SEER had unpacked environmental

quality into over a dozen subfields, every one of which, we are pleased to say, is covered in substantial detail in this text. Moreover, many of the committees that have traditionally been housed in the section's "resource group" have come to look increasingly like environmental law topics. For example, SEER includes in that category committees on forest resources, marine resources, Native American resources, public land resources, and water resources. The SEER committee structure has been relatively stable since 2007, with a few committees consolidated or eliminated and one, Smart Growth and Green Buildings, added. What would you predict the next new big issue in environmental law to be, and what would you name SEER's new committee charged to follow it?

Of course, few environmental issues involve all or even most of the different topics covered in that list, but most do involve more than one. Consider the Delhi Fly case study from Part I of this chapter. Clearly, it was first and foremost about the Endangered Species Act, the domain of SEER's Endangered Species Committee. But it raised questions that also would have fallen in the zone of interest of other committees SEER had in place in 2007:

- The Agriculture Management Committee would have an interest in how the agricultural land uses affected the Fly and were regulated under the ESA. (See Chapter 2)
- The Environmental Transactions and Brownfields Committee would have an interest in the effect of Fly habitat on transactions involving the transfer of land and facilities in the area of the Fly's range. (See Chapter 13)
- The Environmental Disclosure Committee would have an interest in how landowners and companies operating in the Fly's range disclose the presence of Fly habitat. (See Chapter 10)
- The Environmental Justice Committee would have an interest in the impact of ESA regulation on communities of color and low income. (See Chapter 1)
- The Sustainable Development, Ecosystems, and Climate Change Committee would have an interest in exploring how the Fly's habitat is being managed in a way that will adapt to climate change. (See Chapter 8)
- The Environmental Impact Assessment Committee would have an interest in how the presence or absence of Fly habitat in the region is reflected and evaluated in environmental impact assessments public and private entities prepare in connection with land use and environmental permits. (See Chapter 6)
- The Environmental Values and Ethics Committee would be interested in the ethical dimensions of protecting the Fly. (See Chapter 2)

- The Innovation, Management Systems and Trading Committee would be interested in exploring mechanisms to make protecting the Fly more efficient and effective, such as a habitat conservation bank. (See Chapter 2)

Suffice it to say, in other words, that environmental law has evolved considerably since its “air, water, waste, litigation” days. It is a broad field reaching far and wide into the social and economic life of Americans. And it changes rapidly, not only as we learn more about the environment, but also as the nature of human impacts on the environment change and as norms toward the environment change. Needless to say, this makes the practice of environmental law challenging, but by the same token this makes it stimulating and rewarding.

B. AN EVOLVING PRACTICE OF LAW

SEER’s evolution of substantive topics also traces an evolution of the practice of environmental law. In the “air, water, waste, litigation” days of environmental law, practitioners generally focused on rules, permits, and litigation in those narrow fields. Today, however, environmental practitioners necessarily must follow where the substantive law leads them, and that has become quite a diverse array of practice settings. Whereas it may have been possible in the early 1970s for one lawyer to grasp a wide reach of the field at the time—to be an “air, water, waste” lawyer—today that kind of Renaissance practitioner would likely commit malpractice in no time. It is simply not possible to practice competently in all of the substantive fields mentioned above. Most environmental lawyers today specialize, and private and public interest law firms as well as government agencies employ numerous specialists in practice groups to be able to offer “full service” environmental representation to their clients.

Consider the possibilities once again in the context of the Fly case study from Part I of this chapter. Which environmental lawyers doing what kind of practice might have become involved? Tracking the chapters in Part II of this text, the answer is, quite a few:

- *Rulemaking and Permits.* The listing of the Fly was a rulemaking event carried out by the U.S. Fish and Wildlife Service (FWS) pursuant to Section 4 of the Endangered Species Act. Lawyers for FWS review listing rules to ensure compliance with the standards of the ESA, and lawyers for potentially regulated parties, which could include state and local governments and private landowners, routinely do as well. So do lawyers for non-governmental organizations that represent environmental advocacy groups and trade and industry groups. (See Chapter 9)
- *Compliance Counseling.* Landowners and businesses in the area where the Fly is found face regulation under the “take

prohibition” of Section 9 of the ESA (see Chapter 2), which as the case study reveals can impose significant constraints on land development and business operations. Lawyers for these regulated entities may be asked to assist in evaluating the legal consequences and compliance strategies associated with the ESA. (See Chapter 10)

- *Enforcement.* The ESA contains a “citizen suit” provision allowing any citizen to bring an enforcement action against alleged violators of the ESA, including those who violate the take prohibition of Section 9 by modifying Fly habitat in such a way as to injure a Fly. Also, Section 7 of the ESA requires all federal agencies to “consult” with FWS regarding whether proposed funding and permit actions could jeopardize the Fly as a species. Lawyers for citizen groups and for their targeted defendants, public and private, would advise their respective clients about the litigation risks, procedures, and strategies associated with such suits. (See Chapter 11)
- *Private Litigation.* The impact of the Fly listing on the local economy and social context could lead to numerous private disputes. What if, for example, a landowner who knew that the Fly listing was imminent and that his or her parcel had Fly habitat on it sold the land to someone else without revealing those facts, or even while disclaiming the presence of Fly habitat? A contract fraud action might follow. (See Chapter 12)
- *Business Transactions.* Many businesses and land parcels affected by the Fly nonetheless are likely to forge ahead with plans to sell facilities and parcels. Lawyers for buyers and seller thus may be asked to advise about how to identify the risks associated with Fly habitat and reflect those risks in the business transaction negotiations. (See Chapter 13)

Like any complex legal matter, moreover, the mix of lawyers in the Fly events changed over time. As the case study discusses, in the early stages of the matter lawyers for FWS and the County negotiated a set of measures the hospital would take to avoid causing injury to the Fly. This set of lawyers consisted primarily of ESA permitting experts, the goal being to avoid the need for a permit by avoiding injury to the Fly. Later, however, litigation ensued over the need for a permit, and litigation expertise entered the arena. And as the regulatory effects of the Fly spread over time throughout the region, likely more and more of the kinds of environmental law practice settings mentioned above came into play.

For today’s students of environmental law—the readers of our text—there is good news in the rapid evolution of environmental law substance and practice: even the most seasoned practitioner cannot remain an

expert in the law or practice for very long without a constant effort to keep pace with the changes, meaning that new entrants to the field can relatively quickly “catch up.” Like the Red Queen from *Alice in Wonderland*, all environmental lawyers must run just to stay in place! The remaining chapters of this text, we hope, will give you a head start.