Tales from a Troubled Marriage: Science and Law in Environmental Policy

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Early environmental policy depended on science, with mixed results. Newer approaches continue to rely on science to identify problems and solve them, but use other mechanisms to set standards and legal obligations. Given the important role that science continues to play, however, several cautionary tales are in order concerning "scientific management," "good science," the lure of money, and the tension between objectivity and involvement in important issues of our time.

“The scientific debate remains open. Voters believe that there is no consensus about global warming within the scientific community. Should the public come to believe that the scientific issues are settled, their views about global warming will change accordingly. Therefore, you need to continue to make the lack of scientific certainty the primary issue in the debate..." [Frank Luntz, political strategist, 2002 (J)].

This essay explores the relationship between science and law in environmental policy. The relationship has not been easy, nor has it achieved closure after more than 30 years of marriage. Two alpha partners are still trying to figure out who does what. Both agree on the importance of an environmental policy. The debate is about what it should be based on and how it should be carried out.

Back in the pre-dawn of public environmental statutes, there were private remedies for environmental harms, in tort and nuisance. If someone contaminated your apple orchard, or your child, you could seek damages and even an injunction against the activity. These remedies proved insufficient for at least two reasons. The first is that a civil law response to harm already done is small solace for someone who has lost her livelihood or the health of her child. The second is illustrated by the real-life saga described in A Civil Action, involving the contamination of drinking water from, in all probability, industrial waste sites (2). Children died, others were rendered vegetables for life, and their parents suffered a grief that is impossible to describe. But their legal case failed, as many others did, over the requirements of proof and causation. Which chemical, of the many toxins in the waste sites, caused these strange infirmities and through exactly what exposure pathways? Which waste sites were responsible: this one, operated by a company with lawyers on tap and a war chest of money available for its defense; or that one, now abandoned, once owned by a corporation long dissolved? Civil law failed because the science could not make the proof.

First-Generation Environmental Law: Science Embraced

Beginning in the 1960s, Congress surmounted these difficulties with new public environmental statutes, each based on standards of performance. The standards would operate by preventing rather than compensating for harm. They would, further, bypass the rigors of causation and proof: Once a standard was set, one had only to see whether or not it was met. The question remained, however: Who would set the standard? The answer seemed apparent. Scientists would, on the basis of scientific analysis. After all, it was the scientists, such as Rachel Carson, Jacques Cousteau, and Yuri Timoshenko, who had sounded the alarm; they were the ones to put out the fire.

The first wave of environmental law, therefore, was science-based environmental policy in action. One of the first was the Water Quality Act of 1965 (3), which sought the attainment of water quality criteria. It was soon followed by the National Environmental Policy Act of 1969 (4) and the analysis of environmental impact. Then came the Clean Air Act in 1970 (5), focused on the attainment of national ambient air quality stan-
standards, soon followed by the Resource Conservation and Recovery Act (RCRA) (waste disposal) (6), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (abandoned waste sites) (7), the Toxic Substances Control Act (TOSCA) (chemicals) (8), the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (pesticides) (9), and the Safe Drinking Water Act (10), all with the same premise: Science would tell us what was safe and what was not. Scientists would draw the lines.

It didn’t work. None of these laws worked well, and some, after enormous investment, failed utterly (11). We began to realize that science, although endlessly fascinating and constantly revelatory, is rarely dispositive.

And in the world of environmental policy, that which is not dispositive is dead on arrival. The reason is political: Environmental policy faces a degree of resistance unique in public law. No one who has to comply with environmental law likes it, and many hate it outright. A conventional explanation is money, and that is certainly a factor; it takes more capital to install pollution controls or to raise the causeway on stilts. Environmental law is also intrusive: It involves other people, state bureaucrats for one, in the operation of your oil refinery, pig farm, or real estate portfolio. Worse, it puts the general public in there too, whose lives might be impacted by the oil refinery, pig farm, or real estate portfolio.

The “scientific” part of the act was equally fluid. It involved extrapolating “acceptable” concentration limits from laboratory experiments to natural surroundings; from single pollutants to cocktails of multiple pollutants; and from rapid, observable, lethal effects to long-term, sublethal, and reproductive effects. Then came dilution factors, fate, and dispersion and mixing zones. Conclusions differed by factors of 10, scientist against scientist. When it came next to enforcement, someone had to prove who and what were causing the exceedance of the standards. If Lake Pontchartrain turned en- tropic, was it the cattle farming, the shoe tannery, the local sewage system, or Mother Nature? The higher the stakes, the more contested the science. The problem was not information, it was closure. We had returned to the difficulties of A Civil Action. Whether in tort law or public law, the proofs failed.

Environmental statutes addressing toxicity record the problem in a more acute form. In the early 1970s, a number of laws were enacted based on determinations of “unreasonable risk to human health in the environment” (17). The challenges to scientists here were even more demanding. How were they to determine risk to human health, except through experiments with rodents? But what was the dose-response relationship in a rat, and what was the relationship of a rat to a human, and were these relationships linear, parabolic . . . who knew? Further, exactly which toxins, including many carcinogens, for which they could establish no known threshold of safety? And finally, even if they could arrive at a scientific-looking determination of risk (18), what risk level was acceptable: one death in ten thousand, one in a million? The dioxin standards for the states of Minnesota and Virginia, for exactly the same dischargers, differ by more than a thousand times (19).

Facing these difficulties, and with each of their decisions subject to legal challenges, the toxic programs of the air, water, pesticide, and related laws fell into a swoon. Mountains of paper spanning decades produced only a handful of standards, against a backlog of thousands of toxic substances. Some of the biggest actors—lead, polychlorinated biphenyls (PCBs), trichloroethene (TCEs), and dioxins to this day—stalled out and were only moved forward through litigation or overwhelming public outcry. For the opponents of these standards, there was always an unexplored factor. That is the essence of science. Meanwhile, global temperatures are rising. Parts of the Arctic ice shelf are breaking off into the sea.

Perhaps the most celebrated mess in environmental policy is the Superfund program, whose cleanups run into millions of dollars per site (20). The actual money expended on the cleanups is only part of that sum; a major amount is spent on the science-based determination of “how clean is clean.” The disputes, uncertainties, and costs of this approach led Judge Steven Breyer, now a justice of the U.S. Supreme Court, after just one trial of a Superfund cleanup, to write a book calling for the establishment of an unreviewable panel of scientific experts to decide these questions once and for all (21).

Second-Generation Environmental Law: Science Rejected

Fortunately, Congress did not buy Judge Breyer’s suggestion. It took a different route. As a result, air emissions, water emissions, and toxic discharges have plummeted, for some industries all the way down to zero. In 1972, after 15 years of futility with the water quality standards program, during which the Cuyahoga River and the Houston Ship Canal caught fire; lakes the size of Erie were declared dead; fish kills choked the Chesapeake Bay; and Louisiana’s Secretary of Agriculture declared Lake Providence, poisoned by the pesticide toxaphene, safe for humans so
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long as nobody went near it or ate the fish (22); Congress changed the rules of the clean water game and adopted a new standard: best available technology (BAT) (23).

The theory of BAT was very simple: If emissions could be reduced, just do it. It did not matter what the impacts were. It did not matter whether the plant was discharging into Rock Creek, the Potomac River, or the Atlantic Ocean. It didn’t matter what scientists said the harm was or where it came from (24). Just do it. Within 5 years, industrial discharges of conventional pollutants were down by 80% in most industrial categories (25). Receiving water quality improved by an average of 35% across the board (26). For all BAT-controlled sources, the amendments were a stunning success. Permit writers no longer had to deal with dueling scientists, mounds of impenetrable data, or the pressures of local politics. Once the technology was identified, they had their discharge limit. Compliance was equally straightforward. Even a judge could see it. That made the policy enforceable, and that made it law, and that meant it would happen.

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demics in the sciences receive their salaries and technical support through grants and outside funding, nearly a third of it from industry. Their promotions and tenure are based on the amounts of money they bring in. In 1998, the New England Journal of Medicine published an article with the unremarkable but statistically documented conclusion that there was a “significant difference” between the opinions of scientists who received corporate funding and those who did not, on the very same issues (42). Hearing this, do we fall over with surprise? To put it crudely, money talks, and among scientists, the money is too often hidden. Even the conclusions can be hidden, if they are unwelcome to the sponsors. On important public issues, the public never knows.

A final caution is the lure of the “safe” life, the apolitical life, free from the application of what scientists know to the issues around them. One must respect anyone’s liberty to choose to be a player or not, and the additional need of the profession for the appearance and fact of objectivity. The question is, notwithstanding: Given the pressure of environmental issues today and their dependence on science, can scientists afford to sit it out? As we speak, an increasing number of scientists are being pulled off of studies, sanctioned, and even dismissed for conclusions that contradict the ideology of their bosses (43). This question does not concern who pays for what conclusions. It concerns a duty to act and to defend your own.

In the early 1990s, the so-called Contract with America (44) identified a series of laws to be amended or repealed, many of which were environmental. At the top of the list was the ESA. As Speaker of the House Newt Gingrich began work to implement the contract, the ESA was in serious trouble. Gingrich was also, however, an intellectual who at least enjoyed a good discussion. More than that, he harbored a lifelong passion for zoos. At least enjoyed a good discussion. More than that, he harbored a lifelong passion for zoos.

chat with E. O. Wilson. Gingrich accepted, a long meeting. They agreed to meet again. Over time, Gingrich would assure these scientists that the ESA was in serious trouble. Gingrich was also, however, an intellectual who at least enjoyed a good discussion. More than that, he harbored a lifelong passion for zoos.