

TRADEOFFS IN ENVIRONMENTAL LAW

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For decades, environmental law and policy initiatives have wrestled with the argument that well-intended efforts to protect the environment can instead create harm. This claim appears often in risk regulation literature, an area of legal scholarship commonly fixated on the notion that laws to reduce risks to human health, safety, or the environment may themselves create risks, alongside

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conventional costs. This concern drives calls for “risk tradeoff analysis,” that is, a reckoning of regulatory benefits against new, so-called countervailing risks.

The concept of risk tradeoffs has passed without scrutiny as a dominant framework for detecting and assessing environmental law’s “unintended consequences.” This Article identifies the partisan and political objectives in the campaign for risk tradeoff analysis. In function, risk tradeoff analysis is a hunt for perverse effects; in form, it foments alarmism and gives ammunition to anti-regulatory rhetoric. By these traits, the concept of tradeoffs impoverishes an area of inquiry that could otherwise have value for the positive advancement of environmental law.

This Article argues against this hindrance—not specifically to promote or defend environmental law’s success rate—but rather to restore footing for critical inquiry, apart from polemics, for examining and understanding the negative effects of environmental intervention.

I. INTRODUCTION

The relentless prospecting for perverse effects may itself have a perverse effect; it is apt to make the reformer insufficiently alert to newly emerging dangers.

--Albert Hirschman¹

Wind turbines kill birds.² Efficient fluorescent light bulbs contain dangerous mercury.³ The chemical dispersants used for oil spills can themselves be polluting and, by some evidence, inhibit spill recovery.⁴ The “ban” on the pesticide DDT increased deaths from malaria and other mosquito-borne illnesses.⁵ These claims,

1. ALBERT HIRSCHMAN, A PROPENSITY TO SELF-SUBVERSION 64 (1996) [hereinafter A PROPENSITY TO SELF-SUBVERSION].

2. See, e.g., Wendy Koch, *Wind turbines kill fewer birds than do cats, cell towers*, USA TODAY (Sept. 15, 2014), <https://www.usatoday.com/story/money/business/2014/09/15/wind-turbines-kill-fewer-birds-than-cell-towers-cats/15683843/> (“ . . . critics often blame giant turbine blades for bird deaths.”).

3. See, e.g., Suzanne Bohan, *Unrecycled new light bulbs release mercury into the environment*, L. A. TIMES (Apr. 7, 2011), <http://articles.latimes.com/2011/apr/07/business/la-fi-lightbulb-mercury-20110407> (“ . . . a new generation of energy-efficient bulbs is raising an environmental concern: the release of tons of mercury every year.”).

4. See, e.g., Ed Yong, *Oops! Deepwater Horizon Dispersants Backfired*, ATLANTIC (Nov. 9, 2015) (Against intentions, “dispersants [actually] suppressed oil-busting bacteria and slowed their ability to degrade oil.”); Andrew Nikiforuk, *Why We Pretend to Clean Up Oil Spills*, SMITHSONIAN.COM (July 12, 2016), <http://www.smithsonianmag.com/science-nature/oil-spill-cleanup-illusion-180959783/?no-ist> (calling dispersants an “example of response theater designed to hide the real damage”).

5. Restricted as an environmentally persistent threat to wildlife, some claim that

and innumerable, similar others,⁶ all chime with a common motif, i.e., the assertion that some law, effort or policy to improve or maintain environmental quality threatens to instead precipitate environmental decline. This litany summons a vivid dissonance that, rightly or not, casts a pall on our motivation to act for environmental protection.⁷

Provocative incongruities of this type also resonate with the evergreen theme of *unintended consequences*⁸—a theme that thrives with special vigor in social discourse and polemics on subjects of environmental law and policy.⁹ Whether by rhetoric or reality,

“DDT may well be the best method for combating serious health risks in many countries.” See CASS SUNSTEIN, *WORST-CASE SCENARIOS* 126–27 (2007) [hereinafter SUNSTEIN, *WORST-CASE SCENARIOS*]; *but see* SONIA SHAH, *THE FEVER: HOW MALARIA HAS RULED HUMANKIND FOR 500,000 YEARS* 205, 209 (2010) (explaining how less than perfect eradication campaigns with DDT could be “much deadlier than no eradication campaign at all.”; describing DDT-induced roof collapses and rat plagues in villages in Borneo and Malaysia). Objections to the DDT ban are often vituperative and inflammatory, e.g., asserting environmentalists have blood on their hands or have killed more people than Hitler. Of note, this genre also specially revels in villainizing Rachel Carson. *Id.* at 233. This has been called the *Rachel was wrong* chorus—a denialist tactic within a broader political strategy: “. . . free marketeers realized that if you could convince people that an example of successful government regulation wasn’t, in fact, successful—that it was actually a mistake—you could strengthen the argument against regulation in general.” NAOMI ORESKES & ERIK M. CONWAY, *MERCHANTS OF DOUBT: HOW A HANDFUL OF SCIENTISTS OBTAINED THE TRUTH ON ISSUES FROM TOBACCO SMOKE TO GLOBAL WARMING* 217–33 (2011) [hereinafter MERCHANTS OF DOUBT]. More soberly, critics observe that acutely toxic organophosphates substituted for DDT, increasing risks to pesticide applicator farmers and workers. George M. Gray & John D. Graham, *Regulating Pesticides, in RISK VERSUS RISK: TRADEOFFS IN PROTECTING HEALTH AND THE ENVIRONMENT* 174 (1995) [hereinafter RISK VERSUS RISK]; AARON WILDAVSKY, *BUT IS IT TRUE? A CITIZEN’S GUIDE TO ENVIRONMENTAL HEALTH AND SAFETY ISSUES* 72–73, 79 (1995) [hereinafter WILDAVSKY, *BUT IS IT TRUE?*] (“[C]ompletely banning DDT did more harm than good.”).

6. See, e.g., Rachel Cernansky, *When Recycling is Bad for the Environment*, *DISCOVER MAG.* (July 6, 2009), <http://discovermagazine.com/2009/jul-aug/06-when-recycling-is-bad-for-the-environment> (explaining plastics marked #1 and #2 are generally considered recyclable but not all containers, so marked, actually are); Jonah Goldberg, *The environmental nightmare that is ethanol*, *BALT. SUN* (Sept. 5, 2016) (citing a new university study proclaiming that “corn-based ethanol ‘created more problems than solutions’”). Critiques of actions or policies assumed to be environmentally-friendly are stock-in-trade for journalists and opinion writers, and designers of academic studies understand that investigative angles of this type are provocative and can attract media interest.

7. “[P]recautionary thinking . . . seem[s] far less attractive when people believe that precautions would produce significant burdens and risks.” SUNSTEIN, *WORST-CASE SCENARIOS*, *supra* note 5, at 221.

8. See Christopher Hood, et al., *The Drive to Modernize: A World of Surprises?, in PARADOXES OF MODERNIZATION: UNINTENDED CONSEQUENCES OF PUBLIC POLICY REFORM* 4 (2012) [hereinafter PARADOXES OF MODERNIZATION] (“ . . . probably as old as human storytelling”); IVAN ILLICH, *MEDICAL NEMESIS: THE EXPROPRIATION OF HEALTH* 35 (1976) [hereinafter MEDICAL NEMESIS] (identifying Nemesis of Greek mythology as nature’s response to arrogant, ignorant decisions); see also AESCHYLUS (Trans. Alan H. Sommerstein), *ORESTIA* 343 (2009). Orestes, as dramatized by the tragedian Aeschylus, committed matricide to end a stain on his family line, but by his act “acquired an unenviable *pollution* from [the] victory.” *Id.* Pollution (Greek: *miasma*) carried its ancient sense of spiritual defilement, but its contagion-like workings are akin to cross-media environmental contamination we could recognize today.

9. See ALBERT HIRSCHMAN, *THE RHETORIC OF REACTION: PERVERSITY, FUTILITY,*

negative (and, as certain logic dictates, *unintended*) effects are familiarly said to manifest from actions and laws aimed at environmental protection.¹⁰ Environmental law and policy, enmeshed as it is with complex systems of the earth, presents a singular paradigm for the study of unintended consequences.

Existing legal scholarship provides no systematic study of unintended consequences, rightly considered. At times, it is instead tinged with the trappings of anti-regulatory rhetoric. This Article argues against this state of affairs, seeing environmental law's positive development is hobbled by undue prospecting for perverse results. By marking the contours of this trope and isolating it, the Article aims to restore footing for social scientific and scientific objectivity on the negative effects of environmental intervention as is needed to inform lawmaking actions and essential public policy discussions.

Part I further describes the concept of unintended consequences, delineating its role in critical perspectives on the law, generally, and environmental law, specifically. Honing focus, Part II identifies the significance of "tradeoffs" in the tradition of risk regulation scholarship. Part III briefly surveys several existing, long-running criticisms of risk tradeoff analysis. On a novel pathway, Part IV uses the paradigm of unintended consequences to detect weaknesses in the concept of risk tradeoffs. In summary form, the concept warrants criticism for: (1) its disaffiliation from rhetorical tradition; (2) its ahistoricism; (3) the symmetric difference between risks tradeoffs and broader conceptions of unintended consequences; (4) problems of misattribution; (5) linearity and selective holism; and (6) what I call "countervailing heuristics." Moving away from these

JEOPARDY 26 (1991) [hereinafter RHETORIC OF REACTION] (Social analysts are "irresistibly attracted to deriding those who aspire to change the world for the better."); see also Richard W. Parker, *Grading the Government*, 70 U. CHI. L. REV. 1347-48 (2003) (discussing the role of anecdotal "horror stories" in the ascendancy of the antiregulatory movement).

10. See Christopher DeMuth, *Unintended Consequences and Intended Non-Consequences*, AM. ENTER. INST. at 3 (June 2009) ("It is a custom of democratic politics, certainly of American politics, to give one's adversary the benefit of the doubt regarding intentions and motivations"); see also STEPHEN BREYER, *BREAKING THE VICIOUS CIRCLE: TOWARD EFFECTIVE RISK REGULATION* 11 (1993) [hereinafter *BREAKING THE VICIOUS CIRCLE*] (stating flawed regulatory actions "do not show that EPA, or the other regulatory agencies, are somehow 'out of control,' or that their staffs are wicked or foolish."). On the acrimonious fringes of social discourse, however, this custom is not followed. See, e.g., Ed Straker, *Trump's EPA nominee makes eco-misanthropes and red-greens howl*, AM. THINKER (Dec. 8, 2016), http://www.americanthinker.com/blog/2016/12/trumps_epa_nominee_makes_ecomisanthropes_and_redgreens_howl.html (remarking that a "red-green movement . . . wants to force America to deindustrialize"); Josiah Ryan, *Senator: EPA is "brainwashing our kids"*, CNNPOLITICS (Mar. 16, 2017), <https://www.cnn.com/2017/03/16/politics/james-inhofe-epa-cantv/index.html>.

defects, Part V examines the serviceability of an unintended consequences paradigm to environmental law. Part VI concludes.

II. PARSING THE CONCEPT OF “UNINTENDED CONSEQUENCES”

There exists a profusion of names for the various concepts that connect and correspond to unintended consequences,¹¹ and the label of unintended consequences, while having unrivaled popularity,¹² is pointedly dissatisfying in its precision.¹³ According to a parsing of the literal meaning, what is unintended need not also be unanticipated or unwelcome, yet these added traits often converge in the prevailing mental picture of the unintended consequence as the *bad surprise*.¹⁴ This negative association has taken hold over

11. For example, in medicine, the phenomenon of doctors, remedies, and hospitals contributing to patient sickness is termed *iatrogenesis*, from the Greek words for physician (*iatros*) and origin (*genesis*). MEDICAL NEMESIS, *supra* note 8, at 27. There is also: “irony, paradox, and surprise.” PARADOXES OF MODERNIZATION, *supra* note 8, at 13. Technologist Edward Tenner calls them “revenge effects.” EDWARD TENNER, WHY THINGS BITE BACK: TECHNOLOGY AND THE REVENGE OF UNINTENDED CONSEQUENCES 6 (1996) [hereinafter WHY THINGS BITE BACK]. And the list could certainly continue: blowback, backlash, boomerang effect, double-edged sword, counterproductivity, contradictions (in the vein of Hegel and Marx), etc. One writer proposes that many such terms can be considered a “sub-class of *perverse effects*.” RAYMOND BOUDON, THE UNINTENDED CONSEQUENCES OF SOCIAL ACTION 9 (1982); see also ELENA ERMOLAEVA & JESSICA ROSS, UNINTENDED CONSEQUENCES OF HUMAN ACTIONS ix (2011) [hereinafter UNINTENDED CONSEQUENCES OF HUMAN ACTIONS] (proposing “*incongruent consequences*” as a catch-all term).

12. To take one line of sociolinguistic evidence, the Google Books Ngram Viewer Corpus shows that “unintended consequences” has ever-increasing usage and roughly five times the usage of closely-connected terms such as unanticipated or unforeseen consequences. The Ngram Viewer graphs the statistical occurrence of phrases in a corpus of books over selected years. See “About Ngram Viewer,” <https://books.google.com/ngrams/info>.

13. See, e.g., Frank de Zwart, *Unintended but not unanticipated consequences*, THEORY & SOC. (2015) (criticizing the pervasive conflation of unintended and unanticipated consequences). The sociologist Robert Merton popularized the label “unanticipated consequences” in his classic article, *The Unanticipated Consequences of Purposive Social Action*, AM. SOC. REV. 894 (1936). As de Zwart notes, this descriptor has special utility, but even Merton in later writings had laxly favored the more encompassing label of unintended consequences.

14. “Bad surprise” draws from the social theorist Perri 6 who offers a typology of eight consequences based on the permutations that follow from whether an outcome is anticipated/unanticipated, intended/unintended, or welcome/unwelcome. The four types of unintended consequences are: the happy surprise (unanticipated/welcome); the bad surprise (unanticipated/unwelcome); the benign side effect (anticipated/welcome); and the risk knowingly run (anticipated/unwelcome). Perri 6, *When Forethought and Outturn Part: Types of Unanticipated and Unintended Consequences*, in PARADOXES OF MODERNIZATION, *supra* note 8, at 53. While not the focus of this Article, polluting or environmentally destructive actions can also bring certain positive effects. See WHY THINGS BITE BACK, *supra* note 11, at 10 (toxic arsenals in Colorado and eastern Germany host rare animal species); see also John Nagle, *Good Pollution: A Response to Arden Rowell, Allocating Pollution*, 79 U. CHI. L. REV. 31, 32 (2012) (noting arguable benefits of pollution). Even malicious or self-interested actions can yield results that are contrary to the actor’s expectations. Cf. JOHANN WOLFGANG VON GOETHE, FAUST 1335–36 (Mephistopheles declaring he wants to do evil but ever does good);

time,¹⁵ fitting with a natural human interest in outcomes that are said to be “specifically contrary to . . . what was . . . conceived or intended or wanted in advance.”¹⁶ Despite this baggage in meaning, this Article employs *unintended consequence* as a serviceable and aspirationally neutral umbrella term.¹⁷ As used here, the secondary meaning or strong connotation of perverse effects is not controlling, even as it must be acknowledged and made a central point of discussion.

As this Part explains, critical perspectives on environmental law and policy are suffused with the concept of unintended consequences. To that end, this Part introduces three general lenses that problematize this phenomenon in law and addresses how they uniquely pertain to environmental law. The brightest spotlight falls on the so-called “tradeoff,” a concept with special application to various areas of law and regulation intended to benefit the environment, health, or safety.

A. The Secondary Meaning or Connotation of Perverse Effects

The term *unintended consequences* is most neutral or impartial in isolation from its clichéd secondary meaning, which applies to policy consequences not just negative but contended to be outright counterproductive or *perverse*—what one writer calls the “harder-edged proposition.”¹⁸ The theorist Albert Hirschman, along these same lines, branded the *perverse effect* as the “special and extreme” case of the unintended consequence.¹⁹ Hirschman coined the descriptor “perversity thesis” or thesis of the perverse effect to help

see also Merton, *supra* note 13, at 902 (citing Adam Smith’s “invisible hand” for the doctrine that individual profit-seeking makes society wealthier).

15. There are several plausible reasons for this. Hirschman suggests semantic drift: “unintended’ easily slides over to ‘undesired’ and from there to ‘undesirable.’” RHETORIC OF REACTION, *supra* note 9, at 38. Next, negative outcomes, particularly those that are surprising in some way, draw greater scholarly attention. *See* Perri 6, *When Forethought and Outturn Part, in* PARADOXES OF MODERNIZATION, *supra* note 8, at 45. Positive unintended consequences can also be harder to credit and discover. *See* WHY THINGS BITE BACK, *supra* note 11, at 7. Relatedly, unanticipated positive consequences might be treated in revisionist fashion as having been anticipated to better trumpet policy success.

16. Perri 6, *When Forethought and Outturn Part, in* PARADOXES OF MODERNIZATION, *supra* note 8, at 51.

17. *See* A PROPENSITY TO SELF-SUBVERSION, *supra* note 1, at 61 (“Social scientists are forever (and properly) eager to detect unintended effects . . .”).

18. DeMuth, *supra* note 10, at 6.

19. RHETORIC OF REACTION, *supra* note 9, at 36.

elucidate an especially familiar argument that is long favored by reactionaries who oppose progressive initiatives and governmental intervention.²⁰

At base, the perversity thesis holds that any purposive action to improve some feature of the political, social, or economic order only serves to exacerbate the condition one wishes to remedy.²¹ While this kind of counterproductivity undoubtedly manifests to an observable, objective degree in some real-world scenarios, claims-making, rhetoric and argumentation on the danger and prevalence of perverse effects is a major, if understudied, presence in its own right.

In public policy discourse as well as environmental legal disputes, allegations of perverse effects are not just relegated to special and extreme cases, as may perhaps be said for interventions in other areas of human affairs;²² they are instead common fare.²³ Some claim the potential for harmful or counterproductive effects is at work, even inevitably so, in the most ordinary cases of environmental intervention.²⁴

20. *See id.* at 35.

21. *Id.* at 7.

22. Many such claims have popular recognition. *See, e.g.*, MILTON FRIEDMAN, CAPITALISM AND FREEDOM: FORTIETH ANNIVERSARY EDITION 180 (2002) (“Minimum wage laws are about as clear a case as one can find of a measure the effects of which are precisely the opposite of those intended by the men of good will who support it.”); FRED HIRSCH, SOCIAL LIMITS TO GROWTH 39–40 n.21 (1976) (explaining how zoning strategies in the Northeastern U.S. “no longer work, and may even promote the very sprawl, scrambled land use and urban chaos that these strategies were intended to prevent” (citing Kathleen Vilander, *Outer-City: Suburbia Seeks New Solutions*, REAL EST. REV. (Summer 1973))); Avraham Ebenstein, *The “Missing Girls” of China and the Unintended Consequences of the One Child Policy*, 45 J. HUM. RESOURCES 87, 87115 (2010).

23. CASS SUNSTEIN, LAWS OF FEAR: BEYOND THE PRECAUTIONARY PRINCIPLE 32 (2005) [hereinafter SUNSTEIN, LAWS OF FEAR] (“[S]ubstitute risks are the rule, not the exception.”); AARON WILDAVSKY, SEARCHING FOR SAFETY 69 (1988) [hereinafter SEARCHING FOR SAFETY] (“Life is full of misguided efforts to reduce danger to human beings or the natural environment.”); Frank B. Cross, *Paradoxical Perils of the Precautionary Principle*, 53 WASH. & LEE L. REV. 851, 860 (1996) (asserting that unanticipated adverse effects from actions aimed at public health protection “are demonstrably common”); *but see* Thomas O. McGarity, *MTBE: A Precautionary Tale*, 28 HARV. ENVT. L. REV. 281, 310 (2004) (documented cases of perverse results are “rare,” although “not impossible to find.”).

24. *Environmental intervention* as used here denotes any sort of organized and deliberate effort to alleviate or prevent environmental harm. This would include laws, governmental action, customs, and habits that are informed or motivated by environmental policy, generally, working under an adapted vision of sociological conceptions of human action. *See* SAM SIEBER, FATAL REMEDIES: THE IRONIES OF SOCIAL INTERVENTION 9 (1981) (defining “social intervention” as “any . . . deliberate effort to alter a human situation in some desired direction”; Merton, *supra* note 13, at 89596 (defining “purposive” social “action”); *see also* WHY THINGS BITE BACK, *supra* note 11, at 7 (“Only when we anchor [technology] in laws, regulations, customs, and habits does an irony reach its full potential.”).

*B. Critical Perspectives in the Theme of
Unintended Consequences*

Critical perspectives on environmental law may address unintended consequences—including cases of alleged perverse effects—from several avenues. Three core critiques, none of which are necessarily unique to environmental law, stand out.

1. Design-Based Critiques

First, as with most any other area of law that intervenes in markets and otherwise seeks to constrain private actors, environmental law can be criticized for defective “design” and inefficiencies in achieving desired results, including undesirable outcomes in the form of perverse incentive structures.²⁵ Axiomatically, laws and legal structures are meant to work as designed, producing targeted benefits or ameliorating certain targeted harms.²⁶ In this regard, nearly any trouble or setback in achieving a law’s aims could fit this theme.²⁷

Concretely, however, this line of criticism often sounds in economics. For one vivid example, the United Nations learned an object lesson on market actor behaviors when it assigned lucrative carbon credit incentives to the destruction of stocks of the highly

25. See generally Jonathan Nash & Richard Revesz, *Grandfathering and Environmental Regulation: The Law and Economics of New Source Review*, 101 NW. U. L. REV. 1677 (2007) (requiring stringent pollution controls on new facilities helps prolong lives of older, more polluting facilities); see also *Chevron v. NRDC*, 467 U.S. 837, 863 n.36 (1984) (quoting a comment about perverse incentives to operate “old, more polluting sources”). Laws that burden new market entrants are found throughout U.S. regulatory policy, because they are politically expedient and can even appear to be cost-effective (at least under a short-term view, until a perverse incentive structure shows). See Robert Stavins, *The Effects of Vintage-Differentiated Environmental Regulation*, AEI-BROOKINGS JOINT CTR. FOR REGULATORY STUD., 2005, at 2; but see Cross, *supra* note 23, at 863, 875 (classing this problem as one of risk from alternatives, where strictness toward new risks, perpetuates the retention of old risks).

26. Of course, this is an idealized, simplified view, since legislators may work to betray the declared purpose of a law with “end-of-the-game jockeying.” William H. Rodgers, Jr., *Where Environmental Law and Biology Meet: Of Pandas’ Thumbs, Statutory Sleepers, and Effective Law*, 65 U. COLO. L. REV. 25, 57 (1993). From a systems perspective, the rhetoric of a stated goal of a law does not necessarily show a law’s purpose; this is deduced from behavior: “If a government proclaims its interest in protecting the environment but allocates little money or effort toward that goal, environmental protection is not, in fact, the government’s purpose.” DONELLA MEADOWS, THINKING IN SYSTEMS: A PRIMER 14 (2008) [hereinafter THINKING IN SYSTEMS].

27. Cass Sunstein does not isolate environmental regulations for criticism in asserting that regulations have sometimes “imposed enormously high costs for speculative benefits[.] . . . accomplished little or nothing[.] and . . . aggravated the very problem [they were] designed to solve.” Cass Sunstein, *Paradoxes of the Regulatory State*, 57 U. CHI. L. REV. 407, 411 (1990).

potent greenhouse gas hydrofluorocarbon-23 (HFC-23).²⁸ Responding to these incentives, overseas factories reportedly ramped up production of the pollutant simply to destroy it for the purpose of earning carbon credits.²⁹ Environmental and natural resource laws yield many such examples,³⁰ but it is equally undeniable that other fields of law produce occasional, unwanted incentives and bad behaviors that run counter to legislative aspirations.³¹

2. Complexity-Based Critiques

Second, environmental laws are nested within a greater socio-legal system of considerable complexity; by its traits and behavioral interactions, the system may itself produce a great array of unintended consequences.³² Even in the generic point that laws and

28. See generally Lambert Schneider & Anja Kollmuss, *Perverse Effects of Carbon Markets on HFC-23 and SF₆ Abatement Projects in Russia*, NATURE CLIMATE CHANGE, Aug. 24, 2015.

29. This kind of backfiring bounty is sometimes called the “cobra effect” after the possibly apocryphal story that a colonial-India bounty on cobra skins spurred entrepreneurial cobra farming. The Cobra Effect: Full Transcript, FREAKONOMICS (Oct. 11, 2012, 9:30 AM), <http://freakonomics.com/2012/10/11/the-cobra-effect-full-transcript/>.

30. See, e.g., Paul Godek, *The Regulation of Fuel Economy and the Demand for “Light Trucks,”* 40 J.L. & ECON. 495 (1997) (explaining that the movement away from station wagons to more fuel-consuming sport utility vehicles was driven by regulation, i.e., the implementation nuances of the standards for Corporate Average Fuel Economy (CAFE)).

31. Environmental law may, however, yield examples that are comparatively approachable and engaging, particularly as compared to undesired activities aggravated or produced in circumvention of criminal laws (consider, e.g., the chaos of alcohol Prohibition). An infamous critique of the Endangered Species Act is that landowners would plausibly seek to eradicate a species from the property in anticipation of an imminent listing that would otherwise give it protected status and restrict landowner activities. See Dean Lueck & Jeffrey A. Michael, *Preemptive Habitat Destruction Under the Endangered Species Act*, 46 J.L. & ECON. 27 (2003) (analyzing landowner responses to section 9 of the ESA); Jonathan H. Adler, *Anti-Conservation Incentives*, REGULATION, Winter 2008, at 54 (providing anecdotes on landowner behaviors that undermine species conservation). The National Historic Preservation Act similarly raises the concern that a property owner may take potentially destructive liberties with a property in anticipation of future-applicable preservation restrictions. See J. Peter Byrne, *Precipice Regulations and Perverse Incentives: Comparing Historic Preservation Designation and Endangered Species Listing*, 27 GEO. INT’L ENVTL. L. REV. 343, 35254 (2015).

32. See Douglas Kysar, *Ecologic: Nanotechnology, Environmental Assurance Bonding, and Symmetric Humility*, 28 UCLA J. ENVTL. L. & POL’Y 201, 21819 (2010) (governmental regulatory intervention in markets generates unanticipated effects akin to unpredictable ecosystem changes); J.B. Ruhl & James Salzman, *Mozart and the Red Queen: The Problem of Regulatory Accretion in the Administrative State*, 91 GEO. L.J. 757, 814 (2003) (“The unintended consequences of a rule . . . emerge from the complex interactions between the full set of rules and the human behaviors they motivate.”); J.B. Ruhl et al., *Harnessing Legal Complexity*, SCIENCE (Mar. 31, 2017) (endnote omitted), <http://science.sciencemag.org/content/355/6332/1377.full> (“[L]egal systems are . . . complex adaptive systems.”); see also Rodgers, Jr., *supra* note 26, at 5758 (1993) (finding metaphorical instruction on the workings of law in the ideas of evolutionary biology, including certain maladaptations that Rodgers calls *sleepers*, i.e., “provisions with consequences exceeding the formal legislative vision”).

human responses to them may characteristically yield unexpected twists, there is no ignoring that environmental law (surpassing other areas of law) specially intersects with still more systems, viz. complex systems of the earth. These added dynamics can catalyze unintended effects in dramatic, often surprising ways.³³

3. Regulatory Economic and Risk Analysis-Based Critiques of Tradeoffs

Last, the field of risk regulation—imposing in presence since the 1990s³⁴—tangentially relates to environmental law, putting critical focus on regulatory practices and outcomes intended to address environmental, health, and safety risks. Risk regulation literature often goes beyond the staid premise that studying costs and benefits may add value to the regulatory process.³⁵ As a principle of administrative lawmaking, it is broadly accepted that lawmakers and regulators ought to work toward informed choices to enhance and optimize social welfare. But many scholars in risk regulation are uniquely skeptical of regulatory intervention, having long

33. See, e.g., RICHARD LAZARUS, *THE MAKING OF ENVIRONMENTAL LAW* 47 (2004) [hereinafter *THE MAKING OF ENVIRONMENTAL LAW*] (“Environmental law is frequently characterized as paradoxical because of its peculiar twists, turns, and tendencies toward unintended, contradictory consequences.”); Daniel C. Esty, *Toward Optimal Environmental Governance*, 74 N.Y.U. L. REV. 1495, 150910 (1999) (few areas of government activity “face the pervasive information inadequacies that are found in the environmental realm.”). Doubtlessly, other areas of law can feature unintended consequences, but even there, environmental anecdotes are often cited for vibrantly epitomizing the phenomenon. See, e.g., Margaret Howard, *The Law of Unintended Consequences*, 31 S. ILL. U. L.J. 451, 45152 (2007) (expounding on unintended consequences of Bankruptcy Code amendments after first citing to invasive kudzu and post-Valdez spill laws to increase liability-exposure for Tanker operators—laws that shifted business to independent operators “with leaky ships and iffy insurance”).

34. As explained in Part II, risk tradeoff discussions came to the fore in the 1990s. In 1988, Aaron Wildavsky, a political scientist and risk theorist, wrote: “[V]irtually no attention has been paid to the many ways in which direct efforts to reduce identified risks can, perversely, bring about a net increase in those same or other risks.” *SEARCHING FOR SAFETY*, *supra* note 23, at 191. Even supposing that to be true, the same could not be said several years forward.

35. As affirmed by *Michigan v. EPA*, 135 S. Ct. 2699 (2015), reasonable regulation ordinarily requires paying attention to advantages *and* disadvantages of agency decisions. See also Office of Mgmt. & Budget, Exec. Office of the President, OMB Circular A-4, *Regulatory Analysis* (2003), <https://obamawhitehouse.archives.gov/sites/default/files/omb/assets/omb/circulars/a004/a-4.pdf> [hereinafter OMB Circular A-4] (providing guidance to “standardiz[e] the way benefits and costs of Federal regulatory actions are measured and reported.”); DAVID SCHOENBROD, *BREAKING THE LOGJAM* 49 (2010) [hereinafter *BREAKING THE LOGJAM*] (stating the practice of cost benefit analysis is now “entrenched, though sometimes criticized for antiregulatory bias.”).

viewed interventions through the conceptual filter of *tradeoffs*.³⁶ This concept assumes higher potency and analytical piquancy as narrowed to *risk tradeoffs*.³⁷

Risk tradeoffs, on a level of high abstraction, have a uniformly accepted definition: a risk tradeoff will occur when an intervention to reduce some “target risk” generates (whether knowingly or inadvertently) some *countervailing risk*.³⁸ Here, the basic underlying insight and critical concern, however facile, is that regulations to reduce risks sometimes create risks. According to many risk analysts, the phenomenon recurs with even the most mundane decisions to protect human health and the environment.³⁹ Here, we see the thesis of perverse effects operating in a narrower vocabulary of risks.⁴⁰ Note also that while the focal point of the tradeoffs inquiry is often countervailing human health and safety risks, the notion of the tradeoff also transfers with some ease to *environmental* tradeoffs, where a supposed give-and-take that is “on-screen” for an observant decision maker would register in environmental or ecological dimensions that are not necessarily tied

36. See, e.g., W. KIP VISCUSI, *FATAL TRADEOFFS: PUBLIC AND PRIVATE RESPONSIBILITIES FOR RISK* 37 (1992) [hereinafter VISCUSI, *FATAL TRADEOFFS*]. In this work, Viscusi principally focuses on what he terms “risk-dollar tradeoffs,” which includes value of life considerations, though he notes “tradeoffs do not always involve money.” Viscusi cites to car size choices as epitomizing the task of selecting the appropriate rate of tradeoff, with larger cars being more protective of passenger safety and smaller cars incurring smaller fuel costs. The tradeoff, in the generic sense of an “offsetting advantage,” is inevitable, as Viscusi and others view it, wherever the individual or society at large chooses to incur a risk. *Id.*

37. Variants on the phrase risk tradeoffs present little discernible change in meaning. For example, risk-risk tradeoffs, health-health tradeoffs, countervailing risks, and ancillary risks of regulation are all employed by Cass Sunstein and all evidently are, for his purposes, fairly equivalent. See generally, CASS SUNSTEIN, *RISK AND REASON: SAFETY, LAW, AND THE ENVIRONMENT* (2002) [hereinafter SUNSTEIN, *RISK AND REASON*]; but see Samuel J. Rascoff & Richard L. Revesz, *The Biases of Risk Tradeoff Analysis: Towards Parity in Environmental and Health-and-Safety Regulation*, 69 U. CHI. L. REV. 1763, 1770 (2002) (“risk tradeoff analysis has been riddled by terminological confusion”; noting how, to some, “health-health tradeoff” can convey what is more aptly labeled a health-wealth tradeoff.).

38. John D. Graham & Jonathon B. Wiener, *Confronting Risk Tradeoffs*, in *RISK VERSUS RISK*, *supra* note 5, at 21, 23.

39. *Id.* at 2; Cross, *supra* note 23 at 860 (“... regulation will often cause more health harm than good.”); Cass Sunstein, *Health-Health Tradeoffs*, 63 U. CHI. L. REV. 1533, 1535–36 (1996) (asserting the problem is “pervasive” and “ubiquitous”). This is a focused and especially resonant line of criticism from proponents of broader cost-benefit analysis. See Kysar, *supra* note 32, at 216–17 (“CBA begins with an assumption that government regulatory efforts are especially likely to lead to unintended consequences, lost opportunities, interest group distortions, and a variety of other harmful perturbations of the various complex systems that comprise the regulatory market.”).

40. Emphasis on questions of “risk” arose in the 1970s in reaction to conceptions of hazards, dangers, and threats that had emerged in environmental policy formulation. Shifting to the conception of risk instills uncertainty and an inherent willingness to balance relative costs and benefits. See LANGDON WINNER, *THE WHALE AND THE REACTOR* 145 (1986) [hereinafter *THE WHALE AND THE REACTOR*] (“What does one do with a risk? Sometimes one decides to *take it*.”).

to human health.⁴¹ There is a cognizable tradeoff of sorts, albeit one imperfectly framed to risks, wherever a purposive action or intervention to secure an environmentally positive result would instead or also produce environmental harms.⁴²

Risk professionals make it their credo that risk tradeoffs occur and proliferate, at least in part, because of regulatory inattention to their existence. Thus, would-be reformers urge that regulators should explicitly and more deeply analyze risk tradeoffs to enhance regulatory outcomes and minimize net risks.⁴³ The central idea, in charitable terms, is to avoid ill-considered and ill-designed regulations.⁴⁴ This objective is useful to consider and undoubtedly influential even as it gets close to immediate common sense.⁴⁵ But risk tradeoffs—more or less a framing of perverse effects in technocratic risk management terms—are not precisely synonymous with nor properly comprehensive of the phenomenon of unintended consequences in environmental law.⁴⁶ Subsequent parts make this evident by tracing the ideological pedigree of the campaign for risk tradeoff analysis.⁴⁷

41. The metaphor of having information “on-screen” occasionally appears in cost benefit literature and is meant to suggest the regulator or decision maker has an optimized view of the systemic effects of regulation. *See, e.g.*, SUNSTEIN, *RISK AND REASON*, *supra* note 37, at 107.

42. Risk professionals might protest that “countervailing risk” is a catch-all designed to encompass more than human health and safety risks. For example, OMB Circular A-4, defines a countervailing risk as “an adverse economic, health, safety, or environmental consequence that occurs due to a rule and is not already accounted for in the direct cost of the rule[.]” OMB Circular A-4, *supra* note 35. But this definition overreaches such that the presence of countervailing risks could be asserted in regulations other than classically understood risk regulation.

43. *See, e.g.*, Jonathan B. Wiener, *Protecting the Global Environment*, in *RISK VERSUS RISK*, *supra* note 5, at 194; *See* Steve P. Calandrillo, *Responsible Regulation: A Sensible Cost-Benefit, Risk Versus Risk Approach to Federal Health and Safety Regulation*, 81 B.U. L. REV. 957, 964 (2001); *BREAKING THE VICIOUS CIRCLE*, *supra* note 10, at 47.

44. In less charitable terms, the idea is to oppose and frustrate regulation altogether. JUDITH A. LAYZER, *OPEN FOR BUSINESS: CONSERVATIVES’ OPPOSITION TO ENVIRONMENTAL REGULATION* 4 (2012) [hereinafter *OPEN FOR BUSINESS*] (identifying “risk balancing” and cost-benefit analysis as a subtle strategy, couched “in the language of reason and moderation,” for challenging stringent federal environmental protections).

45. HOWARD MARGOLIS, *DEALING WITH RISK: WHY THE PUBLIC AND EXPERTS DISAGREE ON ENVIRONMENTAL ISSUES* 165 (1996) [hereinafter *DEALING WITH RISK*]; Beth S. Dorris, *It’s Not Easy Being Green: Evolving Legal Frameworks to Address the Unanticipated Consequences of New Environmental Programs*, 3 J. BUS. ENTREPRENEURSHIP & L. 237, 253 (2010) (“One of the best ways to help protect against unanticipated environmental harm is, quite simply, to look for it beforehand.”); NAT’L RES. COUNCIL OF THE NAT’L ACADS., *SCIENCE AND DECISIONS: ADVANCING RISK ASSESSMENT* 72 (2009) (processes for assessing risks need to consider the complete impact of decisions because of the potential to inadvertently contribute to increased risk.)

46. *See* Rascoff & Revesz, *supra* note 37, at 1766 n.16 (“Risk tradeoffs are essentially a case of a broader phenomenon of actions that bring about unanticipated or undesirable side effects.”).

47. John D. Graham and Jonathan B. Wiener asserted in 1995, “Americans are engaged in a national campaign to reduce risk,” an understandable, albeit poorly cabined description

III. TRADEOFFS IN THE TRADITION OF RISK REGULATION

Regulatory critics often raise the alarm that some regulation will kill more people than it saves.⁴⁸ Anecdotes of tradeoff examples, from the trivial to the hotly contested, fuel and fan this concern. Professors Frank Ackerman and Lisa Heinzerling have called the notion of a fatal regulation an “urban legend”—one of the “the supermarket tabloid sensations of Washington policy debate.”⁴⁹ Still, regulatory critics, whether repeat players or one-off opponents to an individual regulatory initiative, exploit this theme to win political and legal advantages, taking special aim at agencies tasked to regulate health and safety matters. As viewed cynically, some critics might even welcome a result where an agency would become so fixated, diverted, and burdened by an investigation of tradeoffs that it never does anything else.⁵⁰ Excessive “proceduralism” and extensive information demands can obstruct desirable as well as undesirable regulations.⁵¹ Relatedly, there stands the amusing but unoriginal insight that unduly intensive cost-benefit analysis (and related tradeoff analysis) can fail cost-benefit analysis.⁵²

This Part offers a historic perspective on the role of risk tradeoffs in environmental law and policy discourse, describing how tradeoffs

for decades of societal initiatives to address threats to health and environmental quality. See Graham & Wiener, *Confronting Risk Tradeoffs*, in *RISK VERSUS RISK*, *supra* note 5, at 1. Ironically, this statement is better recognized as an artifact of a full-press, reductionist campaign for net risk minimization. They certainly took no pains to explain how disparate concerns elevated by seminal texts such as Rachel Carson’s *SILENT SPRING* and Ralph Nader’s *UNSAFE AT ANY SPEED* could signal some zeitgeist or coordinated consciousness on matters of risk reduction. For several theories on the rise of environmental consciousness see JOHN A. HANNIGAN, *ENVIRONMENTAL SOCIOLOGY: A SOCIAL CONSTRUCTIVIST PERSPECTIVE* 23–29 (1995) (describing the reflection hypothesis, post-materialism thesis, and regulationist/political closure explanation).

48. The more familiar drumbeat today is that laws imposing costs on the private sector—with environmental regulation as a prime example—kill, crush, or otherwise do harm to jobs. Risk regulation literature accepts those cost objections and others to distinctly claim that regulations also harm health and take lives. See e.g., Frank B. Cross, *When Environmental Regulations Kill: The Role of Health/Health Analysis*, 22 *ECOLOGY L.Q.* 729 (1995).

49. FRANK ACKERMAN & LISA HEINZERLING, *PRICELESS: ON KNOWING THE PRICE OF EVERYTHING AND THE VALUE OF NOTHING* 59 (2004) [hereinafter ACKERMAN & HEINZERLING, *PRICELESS*].

50. Sunstein, *Health-Health Tradeoffs*, *supra* note 39, at 1552 n.68. More broadly, those who would take contrarian positions and sow confusion and distrust in any science-grounded case for governmental intervention have been dubbed “merchants of doubt.” See generally *MERCHANTS OF DOUBT*, *supra* note 5.

51. See Cass Sunstein, *The Cost-Benefit State* 5 (Coase-Sandor Inst. for Law & Econ., Working Paper No. 39, 1996).

52. *Id.*

have been organized and explained, and connecting this concept with broader considerations of cost-benefit analysis and opposition to regulatory expenditures.⁵³

A. *The Campaign for Risk Tradeoff Analysis*

The risk analyst Lester Lave is credited with having first explained the concept of “risk-risk” (also captured in its essential meaning in the term “risk balancing”) in a 1981 book.⁵⁴ In legal circles, buzz surrounding this concept achieved a peak volume in the 1990s through a flurry of articles, books, and court cases engaged with an emergent (or at least emergently-described) risk-risk problem.⁵⁵ As an added backdrop, the 1994 elections of the 104th Congress brought new fervor for business-oriented laissez faire proposals to curtail government regulatory activity.⁵⁶ In 1995, there was the publication of an influential analytical overview on the theme, entitled RISK VERSUS RISK, edited by John Graham and Jonathan Wiener.⁵⁷

As a kind of capstone moment, Justice Stephen Breyer invoked the same theme in the 2001 Clean Air Act standard-setting case of *Whitman v. American Trucking Associations, Inc.*⁵⁸ Specifically, Breyer’s concurrence gave special credence to arguments made by opponents of a tightened ozone health standard, entertaining their sensationalized hypothetical of a countervailing risk of deindustrialization that would result from an overly expensive

53. Cost-benefit analysis is also known in more archaic, transposed form as benefit-cost analysis.

54. See Rascoff & Revesz, *supra* note 37, at 1763–64 n.1 (citing LESTER LAVE, *THE STRATEGY OF SOCIAL REGULATION: DECISION FRAMEWORKS FOR POLICY* 15 (1981) [hereinafter *THE STRATEGY OF SOCIAL REGULATION*]).

55. In 1996, Judge Stephen Williams of the D.C. Circuit even heralded the “era of ‘risk-risk,’” in specially introducing two articles on the theme by leading regulatory scholars Cass Sunstein and Kip Viscusi. Stephen F. Williams, *The Era of “Risk-Risk” and the Problem of Keeping the APA Up to Date*, 63 U. CHI. L. REV. 1375 (1996); see also *Competitive Enterprise Inst. v. NHTSA*, 956 F.2d 321, 324–27 (D.C. Cir. 1992) (striking down certain fuel economy standards for not accounting for the safety losses of smaller vehicles); *Corrosion Proof Fittings v. EPA*, 947 F.2d 1201, 1220–27 (5th Cir. 1991) (striking down EPA ban on asbestos uses for not accounting for the safety losses of not using asbestos in vehicle brake linings). “EPA . . . cannot even prove that its regulations will increase workplace safety. Eager to douse the dangers of asbestos, the agency inadvertently actually may increase the risk of injury Americans face.” *Id.* at 1221.

56. See generally Thomas O. McGarity, *A Cost-Benefit State*, 50 ADMIN L. REV. 7, 8–12 (1998). This was the “Contract with America” Congress—with Republican majorities in the both the House and Senate for the first time since 1953. *Id.* at 8.

57. See, e.g., Michael A. Livermore and Richard L. Revesz, *Rethinking Health-Based Environmental Standards*, 89 N.Y.U L. REV. 1184, 1249 (2014) (citing Graham and Wiener’s edited book as the “first major work to call attention” to indirect consequences of regulation)

58. 531 U.S. 457, 490 (2001).

environmental standard.⁵⁹ Breyer conjured the picture of economic effects taking form as an unhealthy “return of the Stone Age”—this, an undisguised invitation to risk tradeoff alertness in rulemaking and legal interpretation.⁶⁰

By the early 2000s, scholarly discussion regarding tradeoffs had more or less played out. The “simple” guiding idea that regulations to reduce risks often promote other risks maintains, no less now than then, an intellectual appeal,⁶¹ but there is little unexplored terrain for novel scholarly forays and little potential for new technocratic adornments.

Similarly, the obvious and simple prescription that regulators should be appropriately conscious of tradeoffs is already well-announced. In 2003, the U.S. Office of Management and Budget, the office that provides guidance and oversight on the implementation of instructions to federal agencies to undertake cost-benefit analysis (including most prominently, Executive Order 12,866) published its lastingly important “Circular A-4.”⁶² Under the guidance of the circular, agencies should “consider any important ancillary benefits and countervailing risks.”⁶³ The circular continues: “An effort should be made to quantify and monetize ancillary benefits and countervailing risks” or at least present them as “non-quantified benefits and costs.”⁶⁴ This is fine, even uncontroversial guidance, for an imagined world where countervailing risks are not contested or exaggerated by cost-bearing opponents of regulatory intervention. As a distilled principle, certainly all legislative or rulemaking actions should be based, at minimum, on a reasonable supposition that “a government intervention is likely to do more good than

59. *Id.* at 495 (“ . . . regulators must often take account of all a proposed regulation’s adverse effects, at least where those adverse effects clearly threaten serious and disproportionate public harm”; stating the Clean Air Act does give sufficient discretion to avoid “extreme results that some of the [industry] parties fear.”).

60. *Id.* at 495–96 (“A rule likely to cause more harm to health than it prevents is not a rule that is ‘requisite to protect the public health’ . . . a standard demanding the return of the Stone Age would not prove ‘requisite to protect the public health.’”). Justice Breyer’s concurrence endorsed risk tradeoff analysis in the verbiage of taking account of “comparative health” risks or consequences. *Id.*

61. See Rascoff & Revesz, *supra* note 37, at 1763–66.

62. OMB Circular A-4, *supra* note 35.

63. *Id.* at 26. EPA’s Guidelines for Preparing Economic Analyses follows a different vernacular. The analyst should consider “potential distortionary effects,” given that policy options may interact in non-intuitive ways with pre-existing policies, including ways that could result in “unintended environmental consequences.” ENVTL. PROT. AGENCY, NAT’L CTR. FOR ENVTL. ECON., GUIDELINES FOR PREPARING ECONOMIC ANALYSES 4–17 (2010). This does not necessarily belie hostility to the concept of tradeoffs or countervailing risks—the notion of tradeoffs is primarily highlighted in the economic concept of “[w]illingness to pay,” i.e., what an individual would pay to obtain an environmental improvement—stated differently, the tradeoff between income and favorable effects. See *id.* at xi.

64. OMB Circular A-4, *supra* note 35, at 26.

harm.”⁶⁵ Moreover, where so-called risk tradeoffs are viewed to be and actually are important, they should of course be analyzed. Thus, the general theme appears to have become timeworn, even banal, as a topic in settings of scholarly discourse.⁶⁶

In the meantime and quite predictably, polemics on the theme unendingly roil environmental law. In litigation settings, the concept of the risk tradeoffs lodges deeper in the antiregulatory imagination. A 2015 Supreme Court case, *Michigan v. Environmental Protection Agency*, signals the enduring allure of risk tradeoff argumentation.⁶⁷ There, Justice Antonin Scalia derided a particular statutory interpretation offered by the EPA because the agency’s interpretation would have foreclosed consideration of “harms that regulation might do to human health or the environment.”⁶⁸ Regulation could not be appropriate, Scalia wrote in the opinion for the Court, where it does “significantly more harm than good,”⁶⁹ invoking a scenario where “technologies needed to eliminate [damaging] emissions do even more damage to human health[.]”⁷⁰ This imagined outcome—very plainly an archetypal risk tradeoff—was not grounded in the factual record, nor did Justice Scalia cite any real-world examples of an EPA-sponsored technology or regulation doing more harm than good. Even so, the Court’s opinion well assumes the nontrivial possibility of such an outcome, endowing the risk-risk problem with an aura of plausibility and insisting on its importance for locating a proper understanding of statutory authority.

There are real-world, albeit less dramatic, examples of risk tradeoffs. Risk regulation literature collects and curates examples of risk tradeoffs (and other supposed regulatory mishaps) with seeming relish.⁷¹ By a composite view, these efforts tend to reinforce

65. *Id.* at 4. As some have argued, the Administrative Procedure Act’s ban on arbitrary and capricious action by federal agencies can even be credibly framed as a bar against ignoring or acting despite evidence the action would produce more harm than good. SUNSTEIN, *RISK AND REASON*, *supra* note 37, at 120.

66. The N-gram incidence of terms such as risk-risk, risk tradeoff, health-health, countervailing risk, and ancillary risk peaked in the period of 1995–2000 and thereafter generally trended downward or plateaued. *See also supra* note 12; Sherzod Abdukadirov, *Risky Business: When Safety Regulations Cause Harm*, 6 WM. & MARY POL’Y REV. 1 (2014) (giving a recent and cogent precis on risk trade-off considerations, but with notably heavy reliance on literature from the 1990s and earlier).

67. *Michigan v. EPA*, 135 S. Ct. 2699 (2015).

68. *Id.* at 2707.

69. *Id.* Decades before this, then-Professor Scalia wrote of an arbitrary rule with the defect that it “probably does more harm than good,” proving this particular bugaboo has considerable vintage. *See* Edward W. Warren and Gary E. Marchant, “*More Good than Harm*”: A First Principle for Environmental Agencies and Reviewing Courts, 20 *ECOLOGY L.Q.* 379, 381, n.5 (1993).

70. *Michigan*, 135 S. Ct. at 2707.

71. Lisa Heinzerling, *Reductionist Regulatory Reform*, 8 *FORDHAM ENVTL. L. J.* 49, 478

the impression that environmental law is plagued with meaningful risk-risk problems, including extreme scenarios where a law or regulation is viewed to produce more harm than good, i.e., create net risks.

In real-world regulatory contexts, the threat and possibility of a “more harm than good” result is predictably a disputed record matter. Begin with the obvious: No lawmaker or regulator would be expected to defend a law aiming for health benefits while fully and freely conceding the law works perversely to produce *even more* harm to health. Meanwhile, whatever the record findings, challengers of a regulation are wont to exaggerate claims that a regulation will produce perverse results (or persist in claims that such a threat looms from uncertainties and deficiencies in studying the potential for perverse results). In this way, claimed risk tradeoffs are never-surrendered ammunition for opposition to regulatory action.

By way of illustration, in the circuit court litigation that culminated in *Whitman v. American Trucking*, the challengers of EPA’s new ozone standard had asserted that required ozone reductions would increase risks of skin cancers and cataracts, arguing these countervailing risks of reducing ozone pollution warranted fuller consideration.⁷² Ultimately, the EPA determined that these asserted, countervailing harms had no weighty importance as compared to the health benefits of stricter ozone regulation.⁷³ Even with that, certain entrenched opponents of stricter ozone regulation were disinclined to stipulate that these offsetting risks were fully and fairly considered.⁷⁴ In this way, the contention that regulation does more harm than good defies repose. Even where consensus would acknowledge the possibility of a tradeoff, the arguments may then shift to whether the tradeoff analysis had sufficient detail and accuracy to support a decision to regulate.

(1997); see e.g., Cass Sunstein, *Cost-Benefit Default Principles*, 99 MICH. L. REV. 1651, 1653 (2001) (describing, in quick succession, multiple unintended consequences that followed from efforts at risk reduction).

72. *Am. Trucking Ass’n v. EPA*, 175 F.3d 1027, 1051–53 (D.C. Cir. 1999) (per curiam).

73. See National Ambient Air Quality Standards for Ozone: Final Response to Remand, 68 Fed. Reg. 613, 639 (Jan. 6, 2003).

74. *Id.* at 638 (responding to comment disagreeing that EPA “has simply discounted” proffered evidence of the potential beneficial screening effects of ground level ozone).

B. Tradeoff Typologies

Aside from the core, nonspecific claim of the perverse result, various scholars have offered typologies or listings of the varieties of risk tradeoffs that can be described.

For example, Professor Frank Cross posits three types of countervailing risks that arise from choices and interventions.⁷⁵ He identifies these as: (1) Risks from Alternatives;⁷⁶ (2) Foregone Benefits;⁷⁷ (3) and Risks of Remediation.⁷⁸ Quite similarly, Professor Cass Sunstein believes risk regulation can increase aggregate risks by many mechanisms, but he specially emphasizes three: “replacement” risks, forgone opportunity benefits, and indirect health risks.⁷⁹ The term indirect health risks, as Sunstein explains it, generally corresponds to what is more broadly recognized under the label of “health-wealth tradeoffs”—i.e., the assertion that economic costs of regulation can impair individual or community health as it connects to reduced individual or societal wealth.⁸⁰

A more visual typology is published in table format in RISK VERSUS RISK. There, Professors John Graham and Jonathan Wiener suggested a four-quadrant typology of risk tradeoffs, according to risk type (same/different) and affected population (same/different).⁸¹ Starting clockwise from the upper left quadrant, the countervailing risk that would operate to reduce or negate the

75. Cross, *supra* note 23, at 861.

76. He provides three key examples: the environmental tradeoffs from shifting to different energy sources (e.g., coal plants vs nuclear vs wood burning); the tradeoffs of pesticides, not only synthetic pesticides but also cancer-causing, natural pesticides; and the tradeoffs of regulating new sources of risks more stringently—the “new source bias” that keeps older, more polluting plants and cars in longer use. *Id.* at 863–82.

77. He provides several key examples: chlorination of public water, which is a risky chemical that also beneficially eliminates waterborne illnesses; drug lag, where restrictions that delay or prevent the introduction of new drugs involve foregone health benefits; banning pesticides which could diminish the availability and consumption of healthy produce and aggravate pest damage (e.g., the gypsy moth returned with a vengeance after DDT’s banning). *Id.* at 882–97.

78. The examples he provides include: asbestos removal risks; risks to Superfund cleanup workers; shifting of risks in media, e.g., when measures to cut air pollution shift the problem to water. *Id.* at 898–908.

79. SUNSTEIN, RISK AND REASON, *supra* note 37, at 155–56. Sunstein has also notably proposed that risk tradeoffs could warrant special consideration according to the gravity of the risk that might be avoided. Thus, he conceptualizes what he terms risk-catastrophic risk tradeoffs and catastrophic risk-catastrophic risk tradeoffs. SUNSTEIN, WORST-CASE SCENARIOS, *supra* note 5, at 134–35, 174. He sees efforts to control greenhouse gas emissions, at the very least, to “pose risk-catastrophic risk tradeoffs.” *Id.* at 144.

80. Sunstein, *Health-Health Tradeoffs*, *supra* note 39, at 1541; BREAKING THE VICIOUS CIRCLE, *supra* note 10, at 23 (asserting “deprivation of real income itself has adverse health effects, in the form of poorer diet, more heart attacks, more suicides.”).

81. Graham & Wiener, *Confronting Risk Tradeoffs*, in RISK VERSUS RISK, *supra* note 5, at 19–25.

impact of the original target risk reduction is marked as a “risk offset.”⁸² Next, a “risk substitution” emerges when a new type of risk springs from efforts to reduce the target risk.⁸³ In the next quadrant, we face “risk transformation” when the countervailing risk hits a new population and differs from the original target risk.⁸⁴ Last, the displacement of the same risk to a different population is “risk transfer.”⁸⁵

Professors Samuel Rascoff and Richard Revesz have also listed four categories of risk tradeoffs: most prominently “direct risk tradeoffs,” along with three kinds of indirect tradeoffs whose emergence, they say, is mediated by an attenuating chain of events: substitution effects, lulling effects,⁸⁶ and health-health tradeoffs.⁸⁷ Here, as with Sunstein’s “indirect health risks” label, the label of health-health tradeoffs is perhaps better recognized under the label of health-wealth tradeoffs.

While Professor Lisa Heinzerling is no proponent of the campaign for risk tradeoff analysis, she distills two kinds of risk tradeoffs from the literature: first, alleged health-wealth tradeoffs and, second—evidently undifferentiated to her mind—“risks offsets’ or ‘substitution risks.”⁸⁸ For the latter concept of offsets and substitutions, she cites the example of air bags that were designed to protect adults but showed to be deadly to children—-an example that, interestingly enough, does well to undercut any presumed analytical distinction in terms.⁸⁹ By this example, either substitution or offsets could be apt.

For illustration on how these typologies could work in company, consider the classic tradeoff claim that asbestos removal and remediation work results in environmental and health harms that would not otherwise materialize. This example chiefly puts focus on health risks to removal workers but also stresses the problem of

82. *Id.* at 22.

83. *Id.*

84. *Id.*

85. *Id.*

86. Lulling effects can be described as offsetting behavior of consumers affected by a rule. Professor Viscusi describes it to apply in cases where consumers reduce their safety precautions because they overestimate the product’s safety. VISCUSI, *FATAL TRADEOFFS*, *supra* note 36, at 224–25. For example, Viscusi is well known for advancing the position that introduction of child-resistant caps on aspirin containers worked to increase cases of accidental ingestion by children because adults were made less vigilant. See W. Kip Viscusi, *The Lulling Effect: The Impact of Child-Resistant Packaging on Aspirin and Analgesic Ingestion*, 74 *AM. ECON. REV.* 324 (1984).

87. Samuel J. Rascoff & Richard L. Revesz, *The Biases of Risk Tradeoff Analysis: Towards Parity in Environmental and Health-and-Safety Regulation*, 69 *U. CHI. L. REV.* 1763, 1769 (2002).

88. Heinzerling, *Reductionist Regulatory Reform*, *supra* note 71, at 478.

89. *Id.*

general environmental release; such risks would not arise, at least no time soon it is argued, if the asbestos remained in place.⁹⁰ Utilizing various terms above, this asbestos example demonstrates, at minimum, a risk of remediation (Cross), a risk offset (Graham & Wiener), and a direct risk tradeoff (Rascoff & Revesz).

Taking another example, the discretely viewed problem of DDT's market replacement with less persistent but more acutely toxic organophosphates could fairly count as a risk from alternatives, a risk substitution, and an example of substitution effects—all similar labels aligned in meaning.⁹¹ Meanwhile, the discretely viewed problem of restricted DDT use contributing to a greater incidence of mosquito-borne illnesses would likely qualify as a foregone benefit, a risk substitution, and a direct (yet arguably also an *indirect*) risk tradeoff. As succinctly seen here, in the fact that actions can have multiple effects falling under multiple types or quadrants,⁹² various labels in existing literature do not necessarily impose any simplifying order.

These various typologies do well to sketch several identifying traits for cataloguing purposes, but they do not offer any real insights on their underlying causes (or *etiology*, to borrow a medical term), nor their practical or legal significance, nor their practical avoidability.⁹³ These shortcomings may chime with a broader observation that the theme of unintended consequences, despite its prevalence of study across many fields, finds little integration of framework or cumulation of theory and knowledge.⁹⁴ Risk regulation would appear to invite the same criticism, as these typologies seemingly provide categories with hit-and-miss convenience for classifying or recalling types of tradeoffs. Perhaps only the distinction between direct risk tradeoffs and indirect risk tradeoffs has potential analytical relevance, for it at least implicates

90. See, e.g., WILDAVSKY, BUT IS IT TRUE?, *supra* note 5, at 195–200; BREAKING THE VICIOUS CIRCLE, *supra* note 10, at 23.

91. See *supra* note 7 and accompanying text.

92. See Graham & Wiener, *Confronting Risk Tradeoffs*, in RISK VERSUS RISK, *supra* note 5, at 25 (noting that multiple tradeoff types can be evident in one case study). Another oft-made tradeoff claim is that stringent arsenic regulation could threaten to make local water systems so costly that people resort to relatively unsafe private wells. See SUNSTEIN, LAWS OF FEAR, *supra* note 23, at 32. Just to apply Sunstein's labels, this might represent a replacement risk or an indirect health risk, or both.

93. See e.g., Ruhl & Salzman, *supra* note 32, at 821 (noting that legal scholarship has mined policy consequences with concepts such as tradeoffs and unintended consequences, but those treatments of the subject do little to describe the causes).

94. Perri 6, *When Forethought and Outturn Part*, in PARADOXES OF MODERNIZATION, *supra* note 8, at 48.

stopping points;⁹⁵ we might presume the greater the indirectness of a risk tradeoff, the more challenging its evaluation or identification to be a candidate for evaluation.⁹⁶

As a final note on taxonomy, it yields scarcely any additional insight to style the various types of risk tradeoffs as different “risk errors” spurred by a decision maker’s ignorance.⁹⁷ In 1988, Wildavsky set out a rogue’s gallery of risk errors not terribly indistinct from these tradeoff varieties already mentioned. He did so according to six non-exclusive categories: (1) ignoring opportunity benefits;⁹⁸ (2) ignoring risks of a proposed remedy;⁹⁹ (3) ignoring large existing benefits while concentrating on small existing risks;¹⁰⁰ (4) ignoring the effects of economic costs on safety;¹⁰¹ (5) ignoring the inevitable tradeoff between errors of commission and

95. Meanwhile Perri 6, *see id.*, provides a typological breakdown based on whether an outcome was anticipated or unanticipated, a distinction that these risk-tradeoff typologies elide. Additionally, technologist Edward Tenner has a typology of “revenge effects” that in some aspects correlate with risk tradeoffs: 1) the rearranging effect—somewhat akin to risk transfer, 2) the repeating effect, 3) the recomplicating effect 4) the regenerating effect—somewhat akin to risk offsets, and 5) the recongesting effect. WHY THINGS BITE BACK, *supra* note 11, at 9–11.

96. Indirect risk tradeoffs can be powerfully interesting, perhaps because they are inherently nonobvious or even surprising. But interestingness can be mistaken for non-triviality. Even non-trivial consequences would not necessarily counsel inaction. *See, e.g.*, Jonathan H. Adler, *Are Plastic Grocery Bag Bans Bad for Public Health?*, VOLOKH CONSPIRACY (Jan. 24, 2013), <http://volokh.com/2013/01/24/are-plastic-grocery-bag-bans-bad-for-public-health/> (citing a claim that reusable plastic bags lead to an increase in food-borne illness); Jeffrey Gettleman, *Meant to Keep Malaria Out, Mosquito Nets are Used to Haul Fish In*, N. Y. TIMES (Jan. 24, 2015), <https://www.nytimes.com/2015/01/25/world/africa/mosquito-nets-for-malaria-spawn-new-epidemic-overfishing.html> (reporting that insecticide-treated nets distributed on a humanitarian basis across Africa are widely used for fishing, spurring concerns of ecological damage and water contamination).

97. SEARCHING FOR SAFETY, *supra* note 23, at 191.

98. *Id.* at 191–94. This was already noted as forgone benefits. Again, the phenomenon known as “drug lag”—i.e., restrictions that hamper approvals and production of new drugs that could be medically helpful—is the prime example. *See, e.g.*, SUNSTEIN, WORST-CASE SCENARIOS, *supra* note 5, at 126.

99. SEARCHING FOR SAFETY, *supra* note 23, at 195–97. Again, this was already noted as risks of remediation, but it also aligns with risk substitution, replacement, offsetting and sundry other labels—arguments against banning or remediating asbestos are a prime example.

100. *Id.* at 197–98. Continuing the last example, asbestos removal projects are claimed to target small risks at the costs of greater risks to removal-workers and passersby. Along the same lines, it is claimed that curtailing use of small-cancer-risk artificial pesticides would increase dependency on crop varieties with “natural pesticides” that are equally or more carcinogenic. *See* BREAKING THE VICIOUS CIRCLE, *supra* note 10, at 23 (stating “regulation of small risks can produce inconsistent results”).

101. SEARCHING FOR SAFETY, *supra* note 23, at 198–99. This category yields diverse examples, but a popular one is the already mentioned case of the stringent arsenic regulation that makes local water systems so costly that people resort to relatively unsafe private wells. *See* SUNSTEIN, LAWS OF FEAR, *supra* note 23, at 32.

errors of omission;¹⁰² and (6) ignoring risk displacement.¹⁰³ This listing assumes both that a decisionally-significant countervailing risk would materialize (how else to construe the word *error*?) and that a decision maker's ignorance helped make it. This framing of the issues is doubly presumptuous for tradeoffs are probably most often neither decisionally-significant nor products of ignorant decision making.

C. *Supposed Root Causes of Tradeoffs*

For proponents of risk tradeoff analysis, regulatory mistakes happen principally because regulators often ignore countervailing risks.¹⁰⁴ This is premised on the view that government officials often act with inappropriately limited information and are prone to selective attention, which translates to ignorance or inattention to countervailing risks.¹⁰⁵ Professor Frank Cross attributes this inattention to the workings of the precautionary principle which features, he claims, a "truly fatal flaw" of an "unsupported presumption that an action aimed at public health protection cannot possibly have negative health effects on public health."¹⁰⁶ Selective attention—i.e., single-minded focus on a regulatory target and general inattention to tradeoffs—supposedly arises from offsetting risks being outside the regulator's mandate. Moreover, when risks are transferred or substituted onto groups outside the purview of the regulatory action, an "omitted voice" is supposedly not heard to inform regulatory choice making.¹⁰⁷

Risk regulation literature also often points to the role of heuristics, or mental shortcuts, as having undue influence on regulators and the public. Heuristics supposedly heighten the urgency and perceived need for regulatory action.¹⁰⁸ Finally, regulatory critics assert that problems are worked in fragmented ways that produce tunnel vision. In sum, they accuse lawmaking

102. SEARCHING FOR SAFETY, *supra* note 23, at 199–201. This can manifest as government "devot[ing] resources to little problems rather than big ones." SUNSTEIN, RISK AND REASON, *supra* note 37, at viii.

103. SEARCHING FOR SAFETY, *supra* note 23, at 201–03.

104. Jonathan B. Wiener & John D. Graham, *Resolving Risk Tradeoffs*, in RISK VERSUS RISK, *supra* note 5, at 226.

105. Sunstein, *Health-Health Tradeoffs*, *supra* note 39, at 1555.

106. Cross, *Paradoxical Perils of the Precautionary Principle*, *supra* note 23, at 859–60.

107. Wiener & Graham, *Resolving Risk Tradeoffs*, in RISK VERSUS RISK, *supra* note 5, at 226, 230.

108. *Id.* at 233–35. Key among these, according to Sunstein, is the availability heuristic "making people think that some risks are much larger, and others much smaller, than they really are." SUNSTEIN, RISK AND REASON, *supra* note 37, at 289. The availability heuristic works to make people prefer options that readily come to mind.

institutions of helping to create countervailing risks because of their flawed institutional design and connected deficiencies in their statutory tools and analytical approaches.¹⁰⁹

An undercurrent in all these critical observations is that the regulator or regulatory process itself bears fault and that, absent reform (or regulatory inaction altogether), the pattern should repeat. These criticisms condense into a complaint that government too often works on problems by making “stabs in the dark.”¹¹⁰ This is an interpretive, blame-casting overlay on a deeper, less assailable point that risks, as with most everything in the world, are parts of systems.¹¹¹ Therefore, any effort to reduce a single risk will bring about consequences, including the likely potential for unintended consequences.¹¹² This truism is at least one principled reason for supporting substantial public participation in governmental decisions and regulations relating to the environment.¹¹³ The public participation process often puts “on screen” assertions regarding possible unintended consequences, such that unintended consequences become *risks knowingly run*, rather than unacceptably bad surprises. (This is not to say public participation promotes anything close to full and perfect knowledge of countervailing risks.)

Just as it may serve a narrative to exaggerate the incidence and gravity of countervailing risks, there may be a tendency to inflate ignorance and ineptitude on the part of the regulator. For example, it is surely fanciful to assert that a regulator supporting asbestos remediation could be categorically ignorant of the risks of remediation or unfamiliar with commonplace assertions (as old as remediation itself) that it might be better to leave hazardous materials in place, undisturbed. Yet, this classic tradeoff example supposedly illustrates risk regulation’s essential problem of ignorance or inattention to countervailing risks?

109. See, e.g., *BREAKING THE VICIOUS CIRCLE*, *supra* note 10, at 11 (“ . . . well-meaning, intelligent regulators, trying to carry out their regulatory tasks sensibly, can nonetheless bring about counterproductive results. This is why institutional design is important.”).

110. SUNSTEIN, *RISK AND REASON*, *supra* note 37, at 6.

111. At its best, risk tradeoff literature underscores this point. See, e.g., Wiener & Graham, *Resolving Risk Tradeoffs*, in *RISK VERSUS RISK*, *supra* note 5, at 242 (comparing risk tradeoffs to iatrogenesis, which is “fostered in large part” by inability of our institutions to see and treat the “whole patient.”).

112. See Sunstein, *Cost-Benefit Default Principles*, *supra* note 71, at 1653.

113. *THE MAKING OF ENVIRONMENTAL LAW*, *supra* note 33, at 189 (2004) (“ . . . in the absence of substantial and ongoing public participation, there are likely to be significant mistakes in lawmaking, including unintended economic and environmental consequences. Public participation does not, of course, eliminate such consequences, but it can reduce them considerably.”).

No blame-the-regulator root cause is needed for undesired and undesirable effects to follow from environmental intervention. Environmental tradeoffs or risk-risk problems need not emerge from regulatory ineptitude—they are often problems of systems science and environmental engineering, following from deeper, intrinsic challenges in managing resources and impacts.¹¹⁴

D. Relationship to Cost Benefit Analysis

Proponents of regulatory reform have urged that current laws and agency decisions should take better account of tradeoffs, noting the particular importance of risk-risk tradeoffs and cost-benefit tradeoffs.¹¹⁵ The relationship between cost benefit analysis and risk tradeoff analysis can be seen in several ways.¹¹⁶ To some, risk tradeoffs are “an intriguing part of cost-benefit assessment”—an area for elaboration and refinement within a comprehensive accounting of all costs and benefits;¹¹⁷ to others, it is a substitute with self-standing advantages.¹¹⁸ Supporters of the latter view understand that the focused project of balancing risks against risks may encounter less resistance and hostility than general utilitarian tradeoffs.¹¹⁹ Theoretically, risk tradeoff analysis can be conducted without translating risks to life and health in monetary terms; on that basis, supporters argue it can provide a “compelling moral perspective” for evaluating the supposed outcomes of a law or

114. As a different kind of wrong-headed blame shifting, there is also a tendency to deny human agency in calamitous events and instead focus on and exaggerate natural forces, i.e., the proverbial act of god. We are less inclined to ponder the civil engineer who devised the levee to hold back floodwaters, even as the intervention increases the destructive threat: high waters can surge over a levee bringing greater damage to a protected area than would happen if waters spread unimpeded across a flood plan. TED STEINBURG, *ACTS OF GOD: THE UNNATURAL HISTORY OF NATURAL DISASTERS IN AMERICA* 64, xvi (2000). Driven by population and land use pressures, people are inhabiting the earth’s hazardous zones and making the environment more prone to environmental disturbance. ANDERS WIJKMAN & LLOYD TIMBERLAKE, *NATURAL DISASTERS: ACTS OF GOD OR ACTS OF MAN?* 29 (1984).

115. Jonathan B. Wiener, *Radiative Forcing: Climate Policy to Break the Logjam in Environmental Law*, 17 N.Y.U. L.J. 210, 224 (2008).

116. At this point, it bears noting that cost-benefit analysis can take various forms along a spectrum of formality and informality, where formality trends toward monetization and quantification, while informality trends toward qualitative considerations or the “prudential algebra” of Benjamin Franklin. See generally Amy Sinden, *Formality and Informality in Cost-Benefit Analysis*, 1 UTAH L. REV. 93 (2015). Risk tradeoff analysis has theoretically formal applications, but challenges in subjecting risks to quantification under a common metric preclude anything like a formal analogue to the “objective” quantitative analysis economists expect in cost benefit analysis.

117. Sunstein, *Health-Health Tradeoffs*, *supra* note 39, at 1535; see also Wiener, *Radiative Forcing*, *supra* note 115, at 224 n.38 (observing that risk tradeoffs “can be incorporated into benefit-cost analysis.”).

118. See generally Sunstein, *Health-Health Tradeoffs*, *supra* note 39.

119. Williams, *The Era of ‘Risk-Risk,’ supra* note 55, at 1378.

regulation.¹²⁰ A demonstration of perverse results in the same domain or metric as the benefits being sought would count strongly against the adoption of the instantiating law or regulation.¹²¹

Risk tradeoff analysis can also be treated as a subset of a cost benefit analysis, where the costs of countervailing risks fall under the cost column and the benefits of target risk reductions fall under the benefits column.¹²² But such cost translations would be non-essential if the calculation of lives lost under a current standard could simply be compared with lives lost under a proposed standard.

A fatal regulation scenario, to the extent the urban legend could be validated, would give some semblance of “compar[ing] moral equivalents,”¹²³ at least, that is, from an all-too-simple perspective that projected mortality or cancer rates from two courses of action could be compared as equal risks.¹²⁴ But even for real-world cases, there is little prospect for reliable numbers crunching--simply consider the case of some banned carcinogenic substance being replaced by another substance of less determinate carcinogenicity. Suppose this risky substitute promotes a different kind of cancer with different or more uncertain latency and treatment success rates.¹²⁵ Difficulties in this vein suggest the general obstacle of what has been called *non-fungibility*, referring to the entrenched challenges posed by integrated value judgments based on incongruent biological, economic and social factors, a problem only further compounded by possible variance within those factors across

120. Mark Eliot Shere, *Building Trust: Conservatives and the Environment*, 20 HARV. J.L. & PUB. POL'Y 829, 854–55 (1997).

121. See Sunstein, *Health-Health Tradeoffs*, *supra* note 39, at 1550.

122. *But see* Weiner, *Radiative Forcing*, *supra* note 115, at 224 n.38 (stating that risk-risk tradeoffs are the “vector of positive and negative effects on the benefits side, irrespective of compliance cost,” and observing that “benefit-cost analysis often ignores risk-risk tradeoffs by focusing only on the target risk and on industry compliance cost.”); *see also* OMB Circular A-4, *supra* note 35, at 26 (“Although it is theoretically appropriate to include disbenefits on the cost side, legal and programmatic considerations generally support subtracting the disbenefits from direct benefits.”).

123. Eliot Shere, *Building Trust*, *supra* note 120, at 837.

124. As Lester Lave noted, a risk-risk framework requires the quantification of risk; without that, there would be “no method for balancing unmatched risks (for example, chronic respiratory disease versus broken legs).” *THE STRATEGY OF SOCIAL REGULATION*, *supra* note 54, at 15. Moreover, Stephen Breyer was right in noting the false promise of conclusive results from these comparisons. The populace rightly and rationally prefers to avoid outcomes that are “involuntarily suffered, new, unobservable, . . . catastrophic, delayed, a threat to future generations, or likely accompanied by pain or dread.” *BREAKING THE VICIOUS CIRCLE*, *supra* note 10, at 33.

125. In studying and comparing medical interventions, there is a measure known as the quality-adjusted life year (QALY). Even having ideal information, a quantitative tradeoff analysis using QALY would present a false either/or proposition (e.g., for perhaps the problematic market substitute should be regulated, as well) and suggests that a higher QALY outcome would be decision-determinative, but this is not so when trends or effects that are not “on-screen” could rationally inform the judgment.

space, type, and time.¹²⁶ In practical application, risk tradeoff analysis ultimately must operate in a “framework less comprehensive than benefit-cost analysis,” holding its appeal in the undelivered promise of simplistic comparisons under a common metric of risks.¹²⁷ Risk tradeoff analysis holds promise, as one writer puts it, as a “fallback” from a full cost-benefit analysis,¹²⁸ but this description goes too far in suggesting this fallback could—except in cases that are already obvious and susceptible to consensus agreement—reliably validate a claim of net risks.

E. Health-Wealth Tradeoffs (“Richer is Safer”)

Adding to the direct physical risks of regulation, many proponents of risk tradeoff analysis urge special alertness to health risks caused *indirectly* with a foremost theory being that health risks can arise simply by dint of the costs that regulation imposes on society.¹²⁹ This possibility advances somewhat beyond the idea that regulation sometimes creates risks and more precisely assails expensive regulations on the theory that they endanger human lives by their very expensiveness.¹³⁰ Postulating that greater income and wealth contributes to longer life expectancies and better health,¹³¹ the essential claim is that the monetary costs of regulation would make people poorer, decreasing life expectancies and even inducing so-called statistical fatalities.¹³² As Professor Douglas Kysar has

126. See generally James Salzman & J.B. Ruhl, *Currencies and the Commodification of Environmental Law*, 53 STAN. L. REV. 607 (2000). Connected to this, Cass Sunstein has meditated on the unavailability of any single metric for ordering valuations of relevant goods, a problem he labels *incommensurability*. See Cass Sunstein, *Incommensurability and Valuation in Law*, 92 MICH. L. REV. 779, 796 (1994).

127. See THE STRATEGY OF SOCIAL REGULATION, *supra* note 54, at 111 (explaining how consequences of increases in atmospheric carbon dioxide could only be satisfactorily assessed in a cost benefit framework that encompasses a diversity of effects, including health, endangered species, equity, and future problems versus current benefits).

128. DEALING WITH RISK, *supra* note 45, at 179.

129. See Cross, *Paradoxical Perils of the Precautionary Principle*, *supra* note 23, at 908. Frank Cross also asserts that health risks arise from “misallocation of government resources to attack the wrong problems,” which is an arguable tradeoff of sorts in any scenario where an agency is diverting attention and resources away from problems whose resolution could provide more overall health protection. *Id.*

130. See Heinzerling, *Reductionist Regulatory Reform*, *supra* note 71, at 459–61.

131. A classic exposition on this topic is Aaron Wildavsky, *Richer is Safer*, PUB. INT., Summer 1980, at 23–39.

132. ACKERMAN & HEINZERLING, PRICELESS, *supra* note 49, at 56–59 (2004); Sunstein, *Health-Health Tradeoffs*, *supra* note 39, at 1544 (offering that compliance costs may produce less employment and more poverty, both relating to worse health and life expectancy); Cross, *When Environmental Regulations Kill*, *supra* note 48, at 732 (listing three theories for “why richer is safer”: richer individuals can make “protective expenditures,” being poorer induces stress and ill-health, and wealth promotes safety on the level of general social changes).

observed, under any view that regulatory expenditures can create adverse health consequences, “all of regulation truly is a risk-risk proposition.”¹³³

On consideration of linkages between GDP per capita and environmental quality, some have even suggested there may be room for cruder conjecture that regulatory expenditures could lead to a decline in environmental quality.¹³⁴ This would extend the macroeconomic claim that richer is safer to the still more questionable claim that *richer is more environmental*. Certainly, wealthy societies can better expect laws and institutions to, for example, provide safe water supplies and guard against unfettered natural resource exploitation, but this theory offers nothing to illustrate how regulatory expenditures could create environmental decline in an already developed economy. After all, economic expansion typically correlates with greater environmental disruption and greater industrial use of natural resources. Moreover, regulatory interventions are classically justified on the precise basis that market failures have led to unacceptable negative externalities. Since GDP does not typically or directly account for negative externalities, the claim that higher GDP could correlate with higher environmental quality is less than credible, even spurious.

Purveyors of the richer is safer theory are keen to point out that it is “controversial,”¹³⁵ but this concession hardly dampens zeal for claims-making that regulations cost lives in the aggregate.¹³⁶ As we see, the campaign for risk tradeoff analysis is not simply an exercise in reductionist prospecting for countervailing risks; it shows as a multi-front campaign against regulatory intervention, against the associated costs, and against supposed impediments to free enterprise.

133. See Douglas Kysar, *It Might Have Been: Risk, Precaution and Opportunity Costs*, 22 J. LAND USE & ENVTL. L. 1, 13 (2006).

134. See *id.*; Cross, *Paradoxical Perils of the Precautionary Principle*, *supra* note 23, at 920.

135. See Sunstein, *Health-Health Tradeoffs*, *supra* note 39, at 1544. For a succinct summary of the specific grounds of opposition to health-wealth tradeoffs see generally Richard W. Parker, *Grading the Government*, *supra* note 9. “Ultimately, then, the regulatory expenditure-mortality link rests on little more than a suggestive statistical correlation that lacks grounding in a persuasive model of causation.” *Id.* at n. 220.

136. Sunstein, *Health-Health Tradeoffs*, *supra* note 39 at 1546. These feints at detachment are not always consistent. Compare SUNSTEIN, WORST-CASE SCENARIOS, *supra* note 5, at 128 (“Some evidence suggests that any expensive regulation will have adverse effects on life and health”) with SUNSTEIN, LAWS OF FEAR, *supra* note 23, at 32–33 (“A great deal of evidence suggests the possibility than an expensive regulation can have adverse effects on life and health”).

IV. POPULAR CRITICISMS OF RISK TRADEOFF ANALYSIS

Risk tradeoff analysis, much like cost-benefit analysis, is not without critics. Indeed, in good measure, the criticisms overlap. A leading charge is that risk tradeoff analysis fails to be neutral and is functionally biased against regulatory intervention. Some see risk tradeoff analysis as having a deregulatory or antiregulatory orientation, and the same has been said for cost benefit analysis. This Part describes several popular criticisms of risk tradeoff analysis: ignoring ancillary benefits, conflict with the precautionary principle, and reductionism.

A. "Ignoring" Ancillary Benefits

Critics of risk tradeoff analysis charge that its proponents tend to emphasize the negative collateral consequences of regulation while overlooking so-called ancillary benefits.¹³⁷ Inattention to ancillary benefits is, according to Professors Richard Revesz and Michael Livermore, "a hallmark of the leading academic and judicial writing on risk-tradeoff analysis."¹³⁸ Risk analysts typically do not disclaim the existence of such benefits so much as they dismiss their rates of incidence and their relevance. For example, Professors Graham and Wiener freely acknowledged the possibilities of so-called "coincident risk" reductions, but they surmised the phenomenon should be less plentiful than countervailing risks.¹³⁹ For their example of a coincident risk reduction, they furnish a single unimpressive, attenuated example, citing how policies to reduce carbon monoxide emissions from vehicles have reduced accidental and suicide fatalities from exhaust fumes.¹⁴⁰ In another writing, Professor Sunstein catalogues a series of provocative risk tradeoff examples before declaring, as an afterthought, that "of course" there can be desirable unintended consequences.¹⁴¹ But the question is whether these desirable results are hunted with equal

137. See RICHARD REVESZ & MICHAEL LIVERMORE, *RETAKING RATIONALITY: HOW COST BENEFIT-ANALYSIS CAN BETTER PROTECT THE ENVIRONMENT AND OUR HEALTH* 55 (2008) [hereinafter *RETAKING RATIONALITY*]; see also Rascoff & Revesz, *The Biases of Risk Tradeoff Analysis*, *supra* note 37, at 1766. Just as there are various labels for risk tradeoffs, ancillary benefits might also be called co-benefits, coincident benefits, or simply unintended beneficial consequences. See Kysar, *Environmental Assurance Bonding*, *supra* note 32, at 221.

138. See *Retaking Rationality*, *supra* note 137, at 60.

139. *RISK VERSUS RISK*, *supra* note 5, at 2, 232.

140. *Id.* at 232.

141. Sunstein, *Cost-Benefit Default Principles*, *supra* note 71, at 1653 (citing, for example, "when regulation spurs new pollution-control technologies").

effort; as Professors Revesz and Livermore colorfully explain it: “If we look under the rug to find costs, we have to look between the couch cushion for the benefits.”¹⁴²

Relatedly, cost-benefit analysis garners a familiar objection that it is methodologically biased against a fair accounting of benefits, and this objection fairly transfers to ancillary benefits or co-benefits that reduce risks. For cost-bearing opponents of a regulation, costs of any kind have assumed, automatic legitimacy for offsetting narrowly viewed benefits; meanwhile, broadly viewed benefits are said to be out of bounds or not fairly calculable. It illustrates something of the vacuity of risk tradeoff analysis, first outlined decades ago, that challenges to discard and devalue co-benefits are as pitched as ever.¹⁴³ Under such asymmetry, the principle of “more harm than good” is adulterated by demands to discount and ignore good, positive results.

B. Conflict with the Precautionary Principle

The famous precautionary principle goes by many formulations but its essential meaning can be found in the decidedly simple wisdom of the term itself, i.e., *as a principle we should favor precautionary measures*. The principle presses the rational and moral case that environmental, health, and safety regulations are warranted even when there is scientific uncertainty over the existence and magnitude of a threat. This is the canon of “decide in favor of safety” that drives much legislation, including legislation of environmental laws, and is embedded in regulatory schemes.¹⁴⁴ By some crude caricatures, the precautionary principle looks to halt activity and technology altogether, but more rightly, its proponents see it as a morally-based reminder to pause to consider the “potentially catastrophic or irreversible consequences of our actions.”¹⁴⁵

From the perspective that risk reduction itself produces risks, Professor Sunstein has stated the “Precautionary Principle is

142. See RETAKING RATIONALITY, *supra* note 137, at 65.

143. See INST. FOR POLICY INTEGRITY, THE IMPORTANCE OF EVALUATING REGULATORY “CO-BENEFITS” 1 (2017), policyintegrity.org/files/media/Co-Benefits_Factsheet.pdf (describing how “[i]n recent years” the calculation of indirect benefits has been challenged); In a colloquy during oral arguments in the *Michigan v. EPA* case, Chief Justice Roberts repeatedly questioned the role of co-benefits in the record, calling them “a disproportion,” an “end run,” “bootstrapped,” and a “red flag” in relation to the “tiny proportion” of direct benefits. See Oral Argument at 59–64, *Michigan v. EPA*, 135 S. Ct. 2699 (2015), https://www.supremecourt.gov/oral_arguments/argument_transcripts/2014/14-46_1b5p.pdf.

144. WILDAVSKY, BUT IS IT TRUE?, *supra* note 5, at 8 (citing the Clean Air Act and the well-known Delaney Clause, which bans food additives that causes cancer in lab animals).

145. See Kysar, *It Might Have Been*, *supra* note 133, at 9–12.

paralyzing.”¹⁴⁶ Putting the issue somewhat differently, he has also explained that regulations that proceed despite countervailing or substitute risks “violate” the Precautionary Principle.¹⁴⁷ Precautionary regulation supposedly only proceeds because countervailing health consequences are overlooked and otherwise neglected.¹⁴⁸ According to Sunstein, the precautionary principle works and gives guidance only when the regulator takes a blinkered look at only a subset of the harms involved.¹⁴⁹ Thus, it is imagined that a regulator under the sway of the precautionary principle does not have opportunity costs in view—i.e., the foregone benefits, substitute risks, and the harms of restricting technology and innovation. Professor Frank Cross has asserted that the basis for the precautionary principle collapses “[i]f it is true that environmental and public health regulations frequently produce health or other environmental harms.”¹⁵⁰

These objectors cite the precautionary principle as a prime motivator, even a general stand-in, for regulatory intervention to protect the environment and human welfare.¹⁵¹ On this front, the argument surely loses traction as it begins to take on an ideological cast. By these criticisms, the problem is not precaution, but rather undue caution; yet risk tradeoff analysis, in any given case, can also be the driver of undue caution. To flip the criticism on its head, the basis for concerted study of countervailing risks arguably collapses *if it is true that the inaction or delays from risk tradeoff analysis would frequently produce unchecked health or other environmental harms*. The case for risk tradeoff analysis is at its weakest when it is dismissive of the moral underpinnings for regulatory intervention.

As Professor Cross rightly acknowledges, “no one wants to induce unnecessary thalidomide tragedies”¹⁵²—in that statement referring to a scandal from a drug of the 1960s that was responsible for deformities at birth in more than 10,000 children around the world. This tragedy was heroically averted in the United States by the vigilance of a medical officer at the Food and Drug Administration (FDA) who, despite heavy pressure from the drug maker, repeatedly refused to accept the completeness of the

146. SUNSTEIN, WORST-CASE SCENARIOS, *supra* note 5, at 218.

147. See SUNSTEIN, LAWS OF FEAR, *supra* note 23, at 32.

148. See Kysar, *It Might Have Been*, *supra* note 133, at 7.

149. SUNSTEIN, RISK AND REASON, *supra* note 37, at 103.

150. Cross, *Paradoxical Perils of the Precautionary Principle*, *supra* note 23, at 861.

151. *Id.* at 852–53 (describing the precautionary principle as a “mantra of the green movement” whose “precepts . . . consistently reappear in environmental policy.”).

152. *Id.* at 885.

application to approve the drug for sale.¹⁵³ Supposing the maker of thalidomide had sponsored a risk tradeoff analysis to support its application, should the result have differed? Not remotely. The request to sell the drug for its medical *benefits* was precisely the purpose of the application—there was no missing that any delay or denial of the request would be an asserted opportunity cost or foregone benefit. Moreover, under the law of the time, thalidomide would have been approved automatically following 60 days of FDA inaction on the application; under that framework, precaution in fact carried the day, intriguingly enough, through the FDA's concern for the countervailing health consequences of *inaction*.

Precaution is thus vindicated in every case where a protective regulation avoids unacceptable harms. The mere argument that some regulation could cause harms or, in the worst case, show itself to cause net risks does not undermine the moral case for protective regulation. Moreover, we see that cost-bearing opponents of regulatory action, such as the maker of thalidomide, cannot be uncritically accepted as credible messengers on the nature and extent of asserted countervailing harms. Nor are regulatory opponents credible in denigrating the values that often drive regulations, such as natural preferences to avoid outcomes that are “involuntarily suffered, new, unobservable, [. . .] catastrophic, delayed, a threat to future generations, or likely accompanied by pain or dread.”¹⁵⁴ As noted by Justice Breyer, public reactions to these distinctly concerning qualities of threats are not always rational and often suffer from misguided notions of the underlying risk-related facts, but the values are rational. Proponents of risk tradeoff analysis miss that the identification of countervailing risks can as easily point to the need for follow-on regulations. Perhaps, for example, the market substitute for a banned substance or pesticide needs restrictions of its own. In this way, proponents of risk tradeoff analysis have a self-inflicted loss of credibility by assailing the precautionary principle.

C. Reductionism

Risk tradeoff analysis can further be criticized for reductionism on the same grounds as cost benefit analysis, although its flaws in methodology arise through the accounting in the currency of risks

153. The United States had only 17 children with thalidomide-associated teratogenic deformities, and the medical officer was bestowed with medal for Distinguished Federal Civilian Service by President John F. Kennedy in 1962. Linda Bren, *Frances Oldham Kelsey: FDA Medical Reviewer Leaves Her Mark on History*, FDA CONSUMER MAG. (March-April 2001).

154. BREAKING THE VICIOUS CIRCLE, *supra* note 10, at 33.

as opposed to dollars. These accounting flaws may translate into biases against regulation. Professors Frank Ackerman and Lisa Heinzerling have offered four arguments against cost benefit analysis, as commonly practiced: first, it uses economic approaches to valuation that are “inaccurate and implausible”; second, it misuses discounting in a fashion that “trivializes future harms and the irreversibility of some environmental problems”; third, its focus on “aggregate, monetized benefits excludes questions of fairness and morality”; last, it shows a general lack of objectivity and transparency in what is a decisively “value-laden and complex” process for determining costs and benefits.¹⁵⁵ Risk tradeoff analysis, whether it might be conducted as part of cost-benefit analysis or more narrowly aim for a pure comparison of risks versus risks, is similarly doomed by uncertainties in quantification and the false conceit that there is an agreeable formula that could allow for consideration of tradeoffs on a plane of common valuation.¹⁵⁶

Specific to environmental law, Professor Heinzerling has accused cost-benefit analysis, risk tradeoff analysis, and regulatory expenditure health tradeoffs of glaring *reductionism*.¹⁵⁷ She takes particular aim at the problems in estimating the regulatory expenditures that would produce one fatality. The methodology fails to eliminate the possibility that health-wealth correlations are showing that greater health produces greater wealth and not the converse.¹⁵⁸ Moreover, she identifies this methodology as ignoring the distribution of regulatory costs, even though health-wealth correlations are non-linear.¹⁵⁹ Put simply, health impact assumptions are not on solid footing where costs of a regulation are principally borne by relatively wealthy business entities or individuals.

Adding to this, risk tradeoff analysis typically fails to give proper recognition or accounting to environmental law’s designs for natural resource protections. Health-health analysis “as the name suggests” considers only the impact of regulation on human health.¹⁶⁰ Thus, the ecological benefits of regulation (as well as the ecological

155. Frank Ackerman & Lisa Heinzerling, *Pricing the Priceless: Cost-Benefit Analysis of Environmental Protection*, 150 U. PA. L. REV. 1553, 1563 (2002).

156. Side-stepping problems of monetization does not avoid arbitrariness, because then the problem becomes: “How many acres of wetlands or tons of carbon dioxide are worth a human life?” See ACKERMAN & HEINZERLING, PRICELESS, *supra* note 49, at 209.

157. Heinzerling, *Reductionist Regulatory Reform*, *supra* note 71, at 479.

158. *Id.*

159. *Id.* at 479–80.

160. *Id.*; see also THE STRATEGY OF SOCIAL REGULATION, *supra* note 54, at 16 (The “risk-risk framework . . . precludes consideration of nonhealth effects. Cases . . . where the risk-risk framework is invaluable, are the exception.”).

consequences of non-regulation) are not in view. This one-dimensional perspective, when applied to regulatory decisions that affect both human health and natural resources, suggests an incomplete and materially flawed tradeoff calculus. To the extent a quantification of risks, benefits, and tradeoffs is mandated or expected, the upshot would be less regulation, because the methods for estimating and valuing risks to natural resources elude us.¹⁶¹

Risk tradeoff analysis purports to provide something more than background information on multiple environmental impacts, but in practical application it is less an aid to judgment than a technique for criticizing intervention. The effect, whether or not intended, is that reasonable laws and regulations for environmental protection may be frustrated, delayed, or vulnerable to judicial review on fear of substitution risks and other adverse outcomes. As Justice Holmes once wrote, “most people think dramatically, not quantitatively,”¹⁶² and the contention that some aspect of environmental law does more harm than good is nothing if not dramatic.

V. EXPANDED CRITICISMS FROM THE UNINTENDED CONSEQUENCES PARADIGM

The campaign for risk tradeoff analysis casts a long shadow over environmental law. Its tenets are broadly circulated and calculated to cast doubt on regulatory results. But why not try to understand, apart from rhetoric, whether the phenomenon could inform design enhancements in environmental laws and regulations?

Modern environmental law developed over many decades before the era of risk-risk. We can rightly question whether focus on risk tradeoffs works to promote judicious understandings of this area of law and its implementation history. As this Part explores, risk tradeoff analysis is a distorted lens for understanding the unintended consequences of environmental intervention and, by extension, environmental law. To that end, this Part present several expanded criticisms of the campaign for risk tradeoff analysis under the following categories: (1) disaffiliation from rhetorical tradition; (2) ahistoricism; (3) the symmetric difference; (4) misattribution and coding errors; (5) linearity and selective holism; and (6) countervailing heuristics.

161. Heinzerling, *Reductionist Regulatory Reform*, *supra* note 71, at 496.

162. BREAKING THE VICIOUS CIRCLE, *supra* note 10, at 37 (citing *Holmes-Sheehan Letters: The Letters of Justice Oliver Wendell Holmes and Canon Patrick Augustine Sheehan* 45 (David H. Burton, ed. 1976)).

A. Disaffiliation from Rhetorical Tradition

Some legal commentators have previously noted how critics of laws, regulation, and other governmental actions for environmental protection tend to embrace the rhetorical strategy of the perversity thesis described by Albert Hirschman.¹⁶³ Affinities between the rhetoric classically used against social reforms and the rhetoric used to oppose environmental regulation are clear, yet this connection has been minimally exposed.¹⁶⁴ Being most charitable, the avowed purpose of the proponent of the risk tradeoff analysis is to give “serious and pragmatic (rather than ideological)” consideration to the problem of perverse effects.¹⁶⁵ On the level of academic discourse, there is a general unwillingness to align with unstudied, workaday, acrimonious claims that environmental protection efforts are worse than no efforts at all.¹⁶⁶

Curiously, however, there is no claimed ownership or acknowledgment of shared lineage with a longer intellectual tradition of arguments against perverse policy consequences. Conservative think tank scholar Christopher DeMuth identified two historic branches of the argument: first, a *neoconservative* branch, beginning in the 1960s, that has pressed claims that various aspects of social welfare programs only made matters worse; and second, since at least the New Deal, an *economic* branch that has challenged the wisdom of governmental market interventions. These opponents of market intervention brought judgment on the work and programs of regulatory agencies, reaching a new pitch and fervor against 1970s programs of “social regulation” spearheaded by agencies such as the EPA and Occupational Safety and Health Administration (OSHA).¹⁶⁷ To say that proponents of risk tradeoff analysis can be

163. See McGarity, *A Cost-Benefit State*, *supra* note 56, at 40–41; McGarity, *MTBE: A Precautionary Tale*, *supra* note 23, at 310–12; Thomas O. McGarity, *The Supreme Court Gives Power Plant a Mercury Break*, CTR. FOR PROGRESSIVE REFORM BLOG, <http://www.progressivereform.org/CPRBlog.cfm?idBlog=B0D88F20-BF5D-C9FF-07FF674539A06A12> (describing Justice Scalia’s use of the perversity thesis as “riding a conservative warhorse”); Lisa Heinzerling & Frank Ackerman, *The Humbugs of the Anti-Regulatory Movement*, 87 CORNELL L. REV. 648, 670 (2002).

164. Heinzerling & Ackerman, *The Humbugs of the Anti-Regulatory Movement*, *supra* note 163, at 670.

165. Wiener & Graham, *Resolving Risk Tradeoffs*, in *RISK VERSUS RISK*, *supra* note 5, at 227.

166. See, e.g., Christopher C. DeMuth & Douglas H. Ginsburg, *Review: Revesz & Livermore: Retaking Rationality: How Cost-Benefit Analysis Can Better Protect the Environment and Our Health*, 108 MICH. L. REV. 887 at 883–84, 888 (2010) (rejecting the thesis that ancillary benefits and countervailing benefits arise equally but also pointedly disclaiming any impediments—“certainly not from us”—to treating them equally in cost-benefit analysis and regulatory design).

167. DeMuth, *Unintended Consequences and Intended Non-Consequences*, *supra* note 10, at 10; see also Open for Business, *supra* note 44, at 45–47.

placed in these traditions only takes recognizing that the opposition to social regulation manifests in the narrower subject of risk regulation. Avowed reformers of risk regulation may state their focus is non-ideological, but they are also wont to “focus on extremes”¹⁶⁸—a hallmark of antiregulatory conservatism.¹⁶⁹

In *RISK VERSUS RISK*, Graham and Wiener noted that analysts “over the last few centuries have decried the problem of well-intentioned programs causing perverse outcomes,” even citing Albert Hirschman for this point, but this nod to the forbears gives short-shrift to prevailing affinities.¹⁷⁰ Although framing of regulatory consequences in the vocabulary of risks was, one could say, being newly pioneered,¹⁷¹ regulatory criticism was no new invention, and the long-circulated examples of newly-called risk-risk problems were far from being newly discovered or the critiques newly advanced.¹⁷² Going back to the 19th century, the political theorist Herbert Spencer was preeminent in haranguing failed governmental interventions and early progressivism,¹⁷³ and the thesis of the perverse effect echoes back to at least his time.¹⁷⁴

As explained by Hirschman, the perversity thesis has long fueled its own distinct, formal type of argument or rhetoric, serving as a major and enduring polemical posture and maneuver.¹⁷⁵ Hirschman’s focus was principally on the reactionary politics of social intervention—for example, implementation of welfare and education policy; he was not directly attuned to the nuances of the

168. *BREAKING THE VICIOUS CIRCLE*, *supra* note 10, at 28. These extreme examples suggest, but do not prove to Breyer, that “the smaller the risks at issue, the more likely the costs will be excessive.” *Id.*

169. *See, e.g., OPEN FOR BUSINESS*, *supra* note 44, at 177.

170. Graham & Wiener, *Confronting Risk Tradeoffs*, in *RISK VERSUS RISK*, *supra* note 5, at 17.

171. *SEARCHING FOR SAFETY*, *supra* note 23, at 191 (“virtually no attention has been paid to the many ways in which the direct effort to reduce identified risks can, perversely, bring about a net increase in those same or other risks.”); *SUNSTEIN, RISK AND REASON*, *supra* note 37, at 133 (The pervasive problem of health risk tradeoffs “has only started to receive public attention.”).

172. Judicial captivation with claims of environmental counterproductivity is also not new, tracing to even the earliest litigation against federal pollution controls standards. *See, e.g., BRUCE A. ACKERMAN & WILLIAM T. HASSLER, CLEAN COAL/DIRTY AIR* (1981) (citing *Essex Chemical Corp. v. Ruckelshaus*, 486 F.2d 427, 441 (D.C. Cir. 1973), wherein coal plant operators challenged EPA for not fully considering the environmental wastes of scrubber controls).

173. Herbert Spencer (1820–1903) is noted as the “intellectual father of contemporary conservatism[.]” SAM D. SIEBER, *FATAL REMEDIES: THE IRONIES OF SOCIAL INTERVENTION* 4–6 (1981); *see also RHETORIC OF REACTION*, *supra* note 9, at 26 (describing Spencer as one who “had chosen the perverse effect as his leitmotif.”).

174. Hirschman in fact had pinpointed that the idea of unintended consequences as perverse effects came to the fore “only with the experience of the French Revolution.” A *PROPENSITY TO SELF-SUBVERSION*, *supra* note 1, at 47.

175. *RHETORIC OF REACTION*, *supra* note 9, at 6.

reactionary politics in environmental law and policy, much less how these pressures manifest in adversarial legal settings. Nonetheless, his observations are strikingly generalizable. As he notes, rhetoric alleging perverse outcomes can be invoked by any group that opposes new policy proposals or newly enacted policies.¹⁷⁶

The polemics of environmental law and policy are uniquely suited to this form of rhetoric, particularly as perversity arguments in this context may as a matter of advocacy uniquely subsume two otherwise distinct forms of arguments noted by Hirschman, i.e., claims of *jeopardy* and *futility*. To run through Hirschman's trichotomy: perversity applies where a purposive action for societal—or as we say here, environmental—improvement is argued “to exacerbate the condition one wishes to remedy;”¹⁷⁷ jeopardy aligns with claims that a policy will have an unwelcome effect in areas that were not targeted by the policy—where “the cost of the proposed change or reform is too high as it endangers some previous, precious accomplishment;”¹⁷⁸ and last, futility aligns with the claim that a policy will have little or no effect (i.e., “. . . attempts at social transformation will be unavailing.”).¹⁷⁹ For illustration, Herbert Spencer hit the essence of all three points in quick succession in writing, thusly: “[a]cts of Parliament do not simply fail; they frequently make worse. . . . [W]hen . . . topical remedies applied by statesmen do not exacerbate the evils they were meant to cure, they constantly induce collateral evils.”¹⁸⁰ In environmental legal argumentation, a scenario where a policy may improve air pollution but undesirably pollute groundwater would be temptingly analogous to a jeopardy scenario, but perversity argumentation is no stretch. One can well imagine that the policy's opponents would contend the policy or action hurts the environment writ large.

Similarly, an environmental futility argument—e.g., criticizing “billions of dollars wasted in a pointless search for perfect safety”¹⁸¹—would easily transmute into a perversity argument. This argument would flow as follows: *this* futile action is misallocating resources from areas where *real* safety or environmental gains could be had; by the illogical diverting of resources, the action is harmful.¹⁸² Since even the best measures for pollution prevention

176. *Id.* at 7.

177. *Id.*

178. *Id.*

179. *Id.*

180. HERBERT SPENCER, *THE MAN VERSUS THE STATE* 92–94 (1916).

181. *Breaking the Vicious Circle*, *supra* note 10, at ix; *see also* *Entergy v. Riverkeeper, Inc.*, 556 U.S. 208, 233 (2009) (Breyer, concurring) (agreeing with respondents that it is irrational to “spend billions to save one more fish or plankton.”).

182. *Entergy*, 556 U.S. at 233 (“[I]n an age of limited resources available to deal with

will have costs and side effects, opponents and critics of those measures have stock arguments that gravitate into an indictment of perverse results.

Rhetoric as used here is simply a functional label for the perversity argument, and it does not necessarily suggest a lack of sincerity or good faith. Proponents of risk tradeoff analysis do not generally embrace these ideological undercurrents in transparent fashion.¹⁸³ Yet the campaign for risk tradeoff analysis undeniably fits within a broader movement, sharing in preoccupations that laypersons often conceptualize in terms of unintended consequences.¹⁸⁴ The theme of unintended consequences is, across many contexts, a “key weapon in the arsenal against liberalism” and a “springboard for a more sweeping indictment of government activism.”¹⁸⁵ If it is fair to brand the precautionary principle as rhetoric, or worse,¹⁸⁶ then it may be fair to hold the same mirror to perversity claims.¹⁸⁷

Professors Heinzerling and Ackerman have remarked that opponents of environmental regulation seemingly engage in a modern version of an ancient form of rhetoric, one that tactically “hides stubborn resistance behind a mask of constructive criticism.”¹⁸⁸ As a matter of strategy, the perversity argument is

grave environmental problems . . . too much wasteful expenditure devoted to one problem may well mean considerably fewer resources available to deal effectively with other (perhaps more serious) problems.” Wildavsky might have styled this as the error of “ignoring the inevitable tradeoff between errors of commission and errors of omission.” *SEARCHING FOR SAFETY*, *supra* note 23, at 199–201. This can manifest as government mistakenly devoting “resources to little problems rather than big ones.” See SUNSTEIN, *RISK AND REASON*, *supra* note 37, at viii. This critical angle also has a distinctly vintage feel, as the push for comparative risk projects for input in priority-setting and budget processes also dates to the 1990s. See, e.g., U.S. Env’tl. Prot. Agency, EPA 230-B-93-0003, *A Guidebook to Comparing Risks and Setting Environmental Priorities* (1993).

183. *But see* Eliot Shere, *Building Trust*, *supra* note 120, at 861 (“Risk-risk analysis . . . suggests that it is liberals who are unfeeling, . . . unwilling even to ask whether that state may be killing the people it purports to protect. [It] provides a formal framework for saying what many conservatives feel intuitively, that government is commonly bad for health.”).

184. *RHETORIC OF REACTION*, *supra* note 9, at 11 (explaining that most typically, it is urged that an opposed action “will produce, via a chain of unintended consequences, the *exact contrary* of the objective being proclaimed and pursued”).

185. STEVEN M. GILLON, *THAT’S NOT WHAT WE MEANT TO DO: REFORM AND ITS UNINTENDED CONSEQUENCES IN TWENTIETH-CENTURY AMERICA* 26 (2000) (“[T]he argument goes, why act at all?”).

186. Wildavsky called the precautionary principle a “marvelous piece of rhetoric.” Cross, *Paradoxical Perils of the Precautionary Principle*, *supra* note 23, at 859 (also asserting, disparagingly, rhetorical appeal “is not the same as wisdom.”).

187. As one antiregulatory conservative unabashedly explains it, risk tradeoff analysis casts doubt on which side caution lies, neutralizing “the advantage that the media gives to the side making the most alarming health claims.” Eliot Shere, *Building Trust*, *supra* note 120, at 858.

188. Heinzerling & Ackerman, *The Humbugs of the Anti-Regulatory Movement*, *supra* note 163, at 670.

advantageous precisely because it does not attack an abhorred policy “head-on.”¹⁸⁹ The proponent may disclaim opposition to, and even endorse—“sincerely or otherwise,” the announced aim of environmental improvement.¹⁹⁰ Relating to this, Hirschman identifies the perversity argument as an excellent debating point that appears with almost inevitable recurrence in any polemic; it is “popular with generations of ‘reactionaries’ as well as fairly effective with the public at large.”¹⁹¹

The argument is popular by its own force, carrying intellectual appeal for advocates and resonating with personal beliefs and biases.¹⁹² Casting a harsher light on the prevailing inner psychology, Hirschman has observed that social scientists who analyze perverse effects “experience a great feeling of superiority—and revel in it.”¹⁹³ He explains that the concept carries an “elementary sophistication and paradoxical quality that can carry conviction for those who are in search of instant insights and utter certainties.”¹⁹⁴ This notion that a push in a certain direction will result in movement in the opposite direction is powerful for at least these three reasons: it is simple, intriguing, and “devastating (if true).”¹⁹⁵ Here, therefore, is a worldview that sees perverse outcomes arising from failures of foresight by “ordinary humans groping in the dark.”¹⁹⁶ Meanwhile the reactionary scholar of tradeoffs and policy failures is made to seem comparatively perspicacious.

While the non-charged concept of unintended consequences carries the sense that the universe—social, economic, environmental—is uncertain and open-ended, the purveyors of the perversity thesis judge it to be predictable for those with the right analytical acumen.¹⁹⁷ We could question whether Hirschman’s

189. RHETORIC OF REACTION, *supra* note 9, at 8 (describing this kind of feigned moderation as a hallmark of reactionary rhetoric). The futility and jeopardy types of argument can also take this stance—to illustrate: *We all want clean air but this regulation will (1) make the air worse (perversity), (2) not do anything to actually improve the air (futility), (3) interfere with governmental or market processes that produce other societal goods (jeopardy).*

190. *Id.* at 11.

191. *Id.* at 12.

192. The intellectual appeal is backed up by deeply rooted myths, such as the Hubris-Nemesis sequence wherein: “Man undertakes an action and is successful at first, but success leads to arrogance and, in due course, to setback, defeat, disaster.” *Id.* at 37. Beginning with Mary Shelley’s *Frankenstein*, which riveted audiences in years after its 1818 publication, there has also been a sustained public fascination with the unforeseen impacts of technology. See WHY THINGS BITE BACK, *supra* note 11, at 14–15.

193. RHETORIC OF REACTION, *supra* note 9, at 36.

194. *Id.* at 43.

195. *Id.* at 11–12.

196. *Id.* at 36.

197. Those who are focused on perverse effects view the social universe as predictable,

recriminating picture of the reactionary (and, by extension, the proponent of risk tradeoff analysis) is entirely fair, but the greater wonder is that the dominating presence of risk tradeoff argumentation—as a particular form of perversity argumentation—goes largely unquestioned in legal disputes. This is remarkable for a simple argument with the demonstrated power to undo years of deliberative efforts and stoke additional years of intransigent litigation.¹⁹⁸

As a counteracting force, Hirschman proposed an unflattering counterpart to the perversity thesis, pointing to the workings of exaggeration and obfuscation by those who press for new policies. But this counteracting rhetorical maneuver is one of escalation—the invocation of what Hirschman identified as the “desperate predicament.”¹⁹⁹ This rhetorical posture is not well suited to the unexcitable setting of judicial review, and as a consequence, the opponents of environmental intervention expectedly hold an asymmetric advantage. The end sum is that risk tradeoff analysis, despite its veneer of moderation, closely connects to arguments and rhetoric used to challenge environmental intervention. This affiliation suggests that risk tradeoff analysis is a less than neutral paradigm for examining environmental law’s unintended consequences from a spirit of objective social scientific inquiry.

B. Ahistoricism

Next, the campaign for risk tradeoff analysis is beset with profound ahistoricism. In this, there are two key symptoms. First, it is generally imagined, though easily disproved, that environmental tradeoffs and risk tradeoffs are new to the scene, some unique fault and outgrowth of work specifically done by regulatory agencies. Second and relatedly (and no less easily disproved), it is imagined that identification of the threat of environmental and risk tradeoffs arose as a novel insight by regulatory critics in recent history.

These imaginings are starkly counter to the historical record. When President Richard Nixon famously established the

not uncertain or open-ended, which is the emphasis of the concept of unintended consequences. *Id.* at 36–37.

198. See e.g., *Corrosion Proof Fittings v. EPA*, 947 F.2d 1201, 1207 (5th Cir. 1991) (finding EPA “failed to muster substantial evidence” to support its rule for asbestos prohibition that was developed from 1979–1989); see also *Competitive Enterprise Inst. v. NHTSA*, 956 F.2d 321, 324–27 (D.C. Cir. 1992) (asserting power to order retroactive reconsideration of a corporate average fuel economy standard long after the passage of the 1990 model year)

199. RHETORIC OF REACTION, *supra* note 9, at 162.

Environmental Protection Agency with Reorganization Plan No. 3 of 1970, his accompanying message to the Congress explained that “sources of air, water, and land pollution are interrelated and often interchangeable.”²⁰⁰ Accordingly, a proclaimed advantage to consolidating authority for controlling pollution was that it might “help assure that we do not create new environmental problems in the process of controlling existing ones.”²⁰¹ Thus, EPA was established to minimize an already well-acknowledged phenomenon and major category of tradeoffs, namely cross-media contamination.

Risk regulation literature gives curiously scant attention to the role of Congress and other lawgivers in the creation of tradeoffs.²⁰² At bottom, disjointed legislation can give rise to disjointed regulatory programs for environmental protection.²⁰³ This is not a point to shift blame from regulatory agencies to the organic lawmakers, but rather to demonstrate how general claims of regulatory inattention to the problem of tradeoffs often suffer the symptoms of selective anecdotalism. At times, more antiquated examples of risk tradeoffs are uncritically dusted off to indict current-day regulatory processes. More accurately, they only highlight the continuation of a now-old predicament, wherein environmental problems prove confounding and environmental solutions prove elusive, whatever the form and level (if any at all) of governmental intervention. Legislation itself shows that environmental tradeoffs are not any insight that is the special province of regulatory critics. Statutes such as the Clean Air Act have provisions, dating to 1977 and earlier, that expressly acknowledge the workings of environmental tradeoffs. For example, it was Congress that required air pollution permitting authorities to impose the “best available control technology” on certain, large, stationary sources of air pollution by expressly taking into account “energy, environmental, and economic impacts and other costs.”²⁰⁴

200. 5 U.S.C. app., Reorganization Plan No. 3 of 1970 (2010). “Control of the air pollution may produce more solid wastes, which then pollute the land or water. Control of the water-polluting effluent may convert it into solid wastes, which must be disposed of on land.” *Id.*

201. *Id.*

202. Treatments of this point are surprisingly brief. See Cass Sunstein, *Health-Health Tradeoffs*, *supra* note 39, at 1567 (pointing out how Congress has a fragmented committee structure that impedes due examination of tradeoffs); but see Wiener & Graham, *Resolving Risk Tradeoffs*, in *RISK VERSUS RISK*, *supra* note 5, at 250 (“There appears to be significant room for improvement in the way legislatures like the U.S. Congress consider risk tradeoffs.”).

203. “[Environmental] statutes are obsolete [for] . . . [h]iding of trade-offs between environmental protection and other goals.” BREAKING THE LOGJAM, *supra* note 35, at 20.

204. 42 U.S.C. §7479(3) (2018); see also 42 U.S.C. § 7491(g)(2) (2018). Similarly, a requirement for the “best available retrofit technology” on certain older sources of air pollution (specifically, those impacting visibility at protected areas like National Parks) demands due consideration of “energy and nonair quality environmental impacts of compliance.” *Id.*

A more serious lapse for proponents of risk tradeoff analysis is a characteristic inattention to the existence of tradeoffs in the greater spectrum and dynamics of impactful human actions. History shows that unintended consequences materialize with or without formal governmental sponsorship, including from purposive actions thought to be environmentally beneficial and undertaken by individuals, communities, and consumers. Many technologies and initiatives now seen as problems for the environment were once thought to solve them. Early-twentieth-century Americans, for example, regarded the automobile as an environmental improvement, not a dangerous polluter.²⁰⁵ Additionally, the earliest utility and factory smokestacks were built ever skyward to diffuse and disperse the problem of local smoke pollution; by 1963, the tallest stacks had reached the seven-hundred-foot level.²⁰⁶ As we recognize today, these added heights catalyzed processes for acid rain formation as sulfur and nitrogen oxides remained aloft to reactively brew with moisture.²⁰⁷ For yet another example: the first sanitary landfills were supposed to dispose of waste with an occasional, supposed co-benefit of filling-in undesirable wetlands; aside from the ignorance of lost ecosystem services from wetlands destruction, the environmental tradeoffs of leachate runoff, groundwater pollution, and possible long-term health hazards were all unknown or ill-considered.²⁰⁸

The greatest parable of a technological innovation for environmental improvement that proved instead to be a serious threat was the fits-and-starts adoption of sewerage systems in the United States. Baltimore in 1911 was the last major city to adopt the system.²⁰⁹ Environmental historian Joel Tarr chronicled this problem:

It is one of the great ironies in the history of technology and its relationship to the environment that a technology designed to improve local health conditions and eliminate nuisances--water-carriage technology or sewerage--had extremely devastating effects on both the environment and human health.²¹⁰

205. JOEL A. TARR, *THE SEARCH FOR THE ULTIMATE SINK: URBAN POLLUTION IN HISTORICAL PERSPECTIVE*, xxxii (1996) [hereinafter *THE SEARCH FOR THE ULTIMATE SINK*].

206. *Id.* at 19.

207. *Id.* at 20.

208. Brian Tomasovic, *Soundscape History and Environmental Law in the Supreme Court*, 45 *ENVTL. L.* 895, 924 (2015).

209. *THE SEARCH FOR THE ULTIMATE SINK*, *supra* note 205, at 12.

210. *Id.* at 104.

Before these systems were fully introduced, some households took advantage of running water and water closets without having any outbound, community sewer line.²¹¹ These partway measures upended existing systems of waste disposal, creating problems of both sanitary nuisance and higher out-of-pocket costs for cesspool cleaning.²¹² Looking to shift the pollution sink from land to water, communities then began to establish sewer lines to adjacent waterways.²¹³ This was supposed to provide local health benefits and convenience by removing untreated wastes completely and rapidly, but the disposal method was also grossly unsanitary and dangerous for downstream and neighboring users of the waterway.²¹⁴ Each upstream adoption of sewerage systems lessened the dilution of untreated sewage and impacted more downstream users.²¹⁵ The composite effect was a rise in health costs—including increased deaths from typhoid—where health benefits had first been predicted.²¹⁶ By this historic example, as in many cases, there is no need for abstractions of risk and costs or for blame against any particular regulator.

History provides non-ideological lessons of tradeoffs instead grounded in natural-human system dynamics: Placing a polluting waste into a sink can prove only temporary; it can cause harm in place; it can migrate into other media. Most of all, the countervailing environmental harms of actions and technologies conceived as environmentally helpful may not be evident from limited, initial activities. The development of evidence to understand environmental harm may emerge in time as the impacts of widespread adoption and popularization of new consumption patterns come to fruit. For the risk analyst, these are case studies that might be susceptible to categorization under the concepts of risk substitution and displacement. But, far from proving any virtues in risk tradeoff analysis (since there is no regulator to fault), these examples affirm need for laws to examine and expertly address environmental problems.

Thus, environmental tradeoffs well predate risk regulation, modernly understood. Critics of environmental laws and regulation who put critical focus on failed efforts of contemporary government and its bureaucratic instruments miss how the phenomenon of unintended consequences arises more broadly. The crude

211. *Id.* at 10.

212. *Id.*

213. *Id.* at 150.

214. *Id.*

215. *Id.* at 151.

216. *Id.* at 151–52.

prescription that laws and decision makers should not ignore risk tradeoffs could be urged for any governmental or regulatory system making environmental and safety rules;²¹⁷ indeed, we could question whether this normative claim is even distinctly useful for actions by governmental actors. Private actors and policy makers are free of administrative processes that formalize decision making but they should arguably no less ignore so-called tradeoffs.

Proponents of risk tradeoff analysis therefore miss an entire realm and history of unintended consequences for drawing possible contrasts and demonstrating, as is important, whether there is anything distinctly governmental in the mechanisms that produce environmental tradeoffs. There are at least two consequences for this neglected point of study. First, the proponents of risk tradeoff analysis are vulnerable to criticism that such analysis is just a tool to reinforce specific, anti-regulatory biases to leverage criticisms of governmental intervention more generally. Second, acknowledging that governmental actors are not beyond criticism, there is a strongly missed opportunity for a coherent, historically-based examination of how state actors by their own unique characteristics might induce and aggravate tradeoffs from environmental intervention.²¹⁸ Ultimately, this ahistoricism taxes the credibility of the campaign for risk tradeoff analysis. Proponents of risk tradeoff analysis should not necessarily be specially trusted in retelling the past, just as ideological promoters of environmental alarmism should not necessarily be trusted in foretelling the future.²¹⁹ Even as the campaign for risk tradeoff analysis is not overtly anti-regulatory in its stance and purports to embrace a “risk-superior future,”²²⁰ it warrants scrutiny. At times, the proclaimed need for

217. History again bears this out. For example, as Los Angeles first sought to institute meaningful air pollution control measures in the 1950s, it faced drawn-out, popular resistance to a ban on the customary practice of backyard trash incineration. Opponents not only railed against the new costs of trash collection, but also fretted over the supposed consequences of increased pests, disease, and fire hazards. CHIP JACOBS & WILLIAM J. KELLY, *SMOGTOWN: THE LUNG-BURNING HISTORY OF POLLUTION IN LOS ANGELES* 119 (2008).

218. Criticisms of the State’s role in the production of unintended consequences can examine activities that predate modernly understood market intervention. For example, James Scott describes the failure of “high modernist planning” in the parable of 18th and 19th century German forestry science, whereby regimented management of a geometric, uniform forest was meant to maximize the yield of the commodity, but resulted instead in less timber of lesser quality because of the disrupted ecology and nutrient cycles. JAMES SCOTT, *SEEING LIKE A STATE: HOW CERTAIN SCHEMES TO IMPROVE THE HUMAN CONDITION HAVE FAILED* 11–22 (1998).

219. See generally PAUL SABIN, *THE BET: PAUL ERLICH, JULIAN SIMON, AND OUR GAMBLE OVER EARTH’S FUTURE* (2013) (tracing contemporary political divides on environmental issues in part to backlash against extreme claims of the environmental movement).

220. Risk tradeoff analysis does not presuppose regulatory action, but it at least presupposes an informed, deliberative regulator. See RISK VERSUS RISK, *supra* note 5, at 41.

risk tradeoff analysis is justified with a sunny revisionism that is also inimical to objective study of unintended consequences in environmental law.²²¹

C. *The Symmetric Difference*

In mathematics, the symmetric difference describes the area of non-intersection between two sets.²²² Picture the classic Venn diagram where two circles partly overlap each other. The area where they meet is an area of shared identity, but the non-overlapping portions are the symmetric difference. Now, mark one circle as the unintended consequences of environmental intervention and the other as phenomenon of risk tradeoffs in risk regulation.

This depiction is demonstrably valid in several ways. To start, we need only note that risk regulation and environmental law are not coterminous. The universe of risk tradeoffs principally emerges from a special preoccupation with human health consequences. Meanwhile, regulations for environmental protection can often promote benefits that range beyond calculable human health improvements. To the extent environmental law is not purely or entirely an exercise in human health risk reduction, there is symmetric difference, and the phenomenon of unintended consequences would expectedly arise outside the context of risk tradeoffs. Moreover, to the extent risk regulation is not purely or entirely an exercise in environmental protection—as is plainly the case on account of safety regulations, such as “[r]egulation of cars’ steering columns, unvented space heaters, airplanes’ fire safety devices, and children’s sleepwear”²²³—there is symmetric difference, and risk tradeoffs would manifest outside of environmental law.

221. For example, it is asserted that fallout from the MTBE contamination crisis, as discussed in the next section, made EPA “more aware of the tradeoff effect of cross-media pollution” and more routine in its consideration of this type of tradeoff effect when assessing proposed pollution control rules. See Ruhl & Salzman, *Mozart and the Red Queen*, *supra* note 32, at 814 n.193; see also McGarity, *MTBE: A Precautionary Tale*, *supra* note 23, at 340 (speculating that EPA erred by its “general lack of political will to require the industry to produce . . . the information necessary to understand the multi-media aspects of its decisions.”). Without disputing that the MBTE case had striking elements, the EPA’s routine consideration of adverse impacts of its environmental rules dates to its earliest beginnings, many decades earlier. See, e.g., *Portland Cement Ass’n v. Ruckelshaus*, 486 F.2d 375, 386 n.45 (D.C. Cir. 1973) (describing how a Clean Air Act rule challenger objected to the waste disposal problems of a pollution control technique).

222. See PIJUSH K. GHOSH & KOICHIRO DEGUCHI, *MATHEMATICS OF SHAPE DESCRIPTION: A MORPHOLOGICAL APPROACH TO IMAGE PROCESSING AND COMPUTER GRAPHICS* 49 (2008).

223. Heinzerling, *Reductionist Regulatory Reform*, *supra* note 71, at 464 (citing John Morrall’s 1986 table of figures comparing the cost per life saved of various federal regulations).

We could easily populate the model of symmetric difference with examples or anecdotes that further bear out its existence. For one, only under the most strained conception of risk would a species introduction experiment run amok be amenable to study under a risk-risk tradeoff framework. Here, consider the case of a species introduction to control an undesired, target species—the introduction of the cane toad in Australia, the mongoose in Hawaii, and so forth. In such a case, the basis for species introduction and resultant outsized ecological damage are hardly cognizable under a risk/countervailing risk framework. Yet oddly, pesticide use, an alternative method for controlling an undesired, target species—e.g., to promote greater agricultural yields—is a favored example for proponents of risk tradeoff analysis.²²⁴ The question of one pesticide’s worth, according to the dutiful risk analyst, should be judged against the risks of alternative chemical pesticides, the risks of natural pesticides, and the possible foregone benefits of available, healthful produce. On the other side of the Venn diagram, safety requirements such as mandatory seatbelts or helmets present asserted risk tradeoffs by promoting negative, offsetting behaviors, e.g., greater recklessness in driving or riding.²²⁵ This correlates with the Professor Kip Viscusi’s famously theorized “lulling effect”—the notion that a regulation “may produce misperceptions that lead consumers to reduce their safety precautions because they overestimate the product’s safety.”²²⁶

Why is this symmetric difference important? Above all, it shows that the concept of tradeoffs, as typically pressed, does not intelligibly bracket the phenomenon of unintended consequences of environmental intervention. Correspondingly, not all theories on risk errors or explanations of the mechanisms of risk tradeoffs have utility for understanding and implementing environmental law. We could consider for illustration on this point the disconnect in two prominent, historic cases of intervention gone drastically wrong—two cases where human actions unleashed far-reaching negative

224. Gray & Graham, *Regulating Pesticides*, in *RISK VERSUS RISK*, *supra* note 5, at 190–91.

225. Analogous compensating behaviors by consumers can have environmental implications. One writer dubs it the “Prius fallacy,” where being an environmental do-gooder in one respect might consciously or unconsciously induce environmentally wasteful or careless behavior in other areas. See generally DAVID OWEN, *THE CONUNDRUM: HOW SCIENTIFIC INNOVATION, INCREASED EFFICIENCY, AND GOOD INTENTIONS CAN MAKE OUR ENERGY AND CLIMATE PROBLEMS WORSE* (2011) (describing the Prius Fallacy as the belief that ostensibly more benign forms of consumption are an environmental positive).

226. See Viscusi, *The Lulling Effect*, *supra* note 86, at 324. This is also in the ambit of what is known as risk compensation or the Peltzman effect. *Id.*

repercussions: the rabbit problem of 19th century Australia and the methyl tert-butyl ether (MTBE) contamination problem of the United States in the 1990s.²²⁷

Starting with Australia, in 1859, a man named Thomas Austin with a fondness for hunting decided to release twenty-four rabbits in Barwon Park, Victoria.²²⁸ By 1926, Australia was teeming with ten billion rabbits—an infestation responsible for the destruction of pasture lands, soil erosion, water contamination, and stress on native wildlife.²²⁹ Turning to the infamous case study on MTBE contamination, we have another problem that began with similarly benign intentions. MTBE was a gasoline additive that was chemically engineered to reduce air pollution, but as it came into widespread use, problems posed by its chemical solubility became more evident.²³⁰ Rain and runoff would wash minor, incidental spills and leaks of MTBE into water supplies, creating a pernicious source of water contamination.²³¹ Burgeoning alarm over the acute, ongoing damage led to MTBE's market restriction.²³²

For the proponents of risk tradeoff analysis, the case study of MTBE is a fairly pristine match for the narrative.²³³ It features a regulatory actor, the Environmental Protection Agency, who—though not specifically mandating or endorsing use of the MTBE formulation—had at least set the gasoline additive objectives that drove its market penetration.²³⁴ In addition, contrasted against the health harms of air pollution, the problem of water contamination is a plainly understood threat to human health.²³⁵ But Australia's rabbit problem, in fairness, is no less a case of environmental intervention gone wrong—there, an individual's effort to foster an environmental amenity resulted in grave environmental burdens of historic dimension and near-continental scale.²³⁶ While the case study of Australian rabbits features no regulator or governmental

227. This anecdotal comparison, while here expanded, credits to Jeffrey Civins, *MTBE Use in Gasoline Opens Pandora's Box*, TEX. LAWYER, Nov. 25, 2002, at 29.

228. UNINTENDED CONSEQUENCES OF HUMAN ACTIONS, *supra* note 11, at 55–56.

229. *Id.* at 56. Aside from that uniquely calamitous case, there is no shortage of analogous, governmentally-sponsored blunders. The USDA Natural Resource Conservation Service distributed kudzu, Russian olive, and multiflora rose to slow erosion, but they have all become major environmental weeds. DANIEL SIMBERLOFF, *INVASIVE SPECIES: WHAT EVERYONE NEEDS TO KNOW* 135 (2013). The United States also has at least 150 wasp species that were purposefully introduced as biological control agents for insect pests. *Id.* at 134.

230. McGarity, *MTBE: A Precautionary Tale*, *supra* note 23, at 286–89.

231. *Id.* at 288–89.

232. *Id.* at 281.

233. *But see id.*, at 310–12, 340 (MTBE groundwater contamination is not a perverse result of governmental action to phase out leaded gasoline).

234. *Id.* at 308.

235. *Id.* at 286.

236. UNINTENDED CONSEQUENCES OF HUMAN ACTIONS, *supra* note 11, at 56–57.

actor, problems of this very type can as easily originate through purposive governmental action (e.g., sponsored species introductions) or neglectful governmental inaction (e.g., lack of regulation of importation or other restrictions on non-native species).²³⁷ Still, risk regulation theorists would likely consider the rabbit invasion problem to be a less enticing tale of intervention gone wrong. The time, place, and type of consequences at issue, as well as the prospects for locating blame, are far afield from risk regulation frameworks.²³⁸ How, after all, does the risk prism cast any light on effects such as stress to native wildlife?²³⁹ In contrast, an unintended consequences paradigm—one that begins with respect for system complexities—may better assign value to how these and other cases relate and compare.

D. Misattribution and Coding Errors

Yet another flaw in the campaign for risk tradeoff analysis lies in its disregard for coding of outcomes and its unconcern for misattribution. The social theorist Perri 6 observes that studies of unintended consequences across the social sciences literature too often code policy outcomes as showing unanticipated consequences “when it is quite likely that either a more careful coding of agreed facts or discovery of a modest number of new facts about the policy process would suggest they may be examples of risks knowingly run.”²⁴⁰ The campaign for risk tradeoff analysis similarly shows no

237. Australia in fact provides such an example in the government-sponsored introduction of the cane toad, which was intended to control the cane beetle but itself became an ecologically disruptive pest. See Luke Keogh, *Introducing the Cane Toad*, QUEENSL. HISTORICAL ATLAS (Mar. 25, 2011), www.qhatlas.com.au/introducing-cane-toad; see also Eric Biber, *Exploring Regulatory Options for Controlling the Introduction of Non-Indigenous Species to the United States*, 18 VA. ENVTL. L.J. 375, 388–89 (1999) (discussing the perils of using non-indigenous species to do war with invasive species).

238. For another example, consider Rachel Carson’s observation that blanket spraying of herbicides “result[ed] in more ragweed, not less,” exemplifying how efforts to control nature sometimes boomerang. RACHEL CARSON, *SILENT SPRING* 80 (1962). Governmental interventions restricting private actors, moneyed interests, and “free enterprise,” are apparently more compelling to the proponents of risk tradeoff analysis. Stated differently, the concern for risk tradeoffs appears greatest where areas of regulatory activity impose costs on businesses, costs which according to the standard rundown translate into higher prices, lower wages, unemployment, and—according to the health-wealth tradeoff theory—illness and death. See SUNSTEIN, *RISK AND REASON*, *supra* note 37, at viii.

239. As Lisa Heinzerling observes, Justice Breyer’s famous critique of current regulatory approaches, *BREAKING THE VICIOUS CIRCLE*, “contains scarcely a single reference to a living thing other than a human.” Heinzerling, *Reductionist Regulatory Reform*, *supra* note 71, at 462.

240. Perri 6, *When Forethought and Outturn Part: Types of Unanticipated and Unintended Consequences*, in *PARADOXES OF MODERNIZATION*, *supra* note 8, at 54. A risk “knowingly run,” according to Perri 6, describes the case of anticipating, to some degree, that an unwelcome outcome may flow from a policy and, though it may be feared and unintended,

special concern or caution for the methodological issues of attempting to establish intention or anticipation in retrospect.²⁴¹ Instead, supposed tradeoffs are often credited to ignorance and risk perception errors on the part of regulators (and stakeholder supporters of intervention). Thus, many cases of negative effects are presented as cases of “bad surprise” without any objective, meticulous inquiry into the true state of mind or state of knowledge that governed formulation of a decision or policy.²⁴² Troublingly, the threshold question of “who anticipated or intended what” result is not seriously engaged.²⁴³

Environmental legal disputes feature a range of institutional actors and stakeholders with different anticipations and intentions. With risk tradeoff analysis, we see that stakeholders opposed to environmental intervention may also have an agenda to lambaste the institutional competence of regulators in their abilities to anticipate and minimize adverse results. This agenda cares little for validating whether outcomes properly count as unanticipated or unintended.²⁴⁴ After all, if negative effects of intervention would instead more rightly count as a case of a risk knowingly run, then the persuasive weight of a claimed threat of perverse results is much diminished.

Illustrating these points, Professor Heinzerling has disputed several cases that, others say, purport to show insufficient attention to risk tradeoffs.²⁴⁵ First, some contend EPA’s decision to ban DDT showed ignorance of the risks of more acutely toxic substitutes (organophosphates, including methyl parathion), yet she answers that the regulatory record shows that EPA explicitly acknowledged the risk tradeoffs between DDT and methyl parathion.²⁴⁶ Heinzerling also sees it mythologized that the since-overturned decision to ban asbestos was ignorant of substitute risks, including less effective substitutes for asbestos brake linings used in cars.²⁴⁷ Although the Fifth Circuit Court of Appeals in overturning the

proceeding to act anyway. *Id.*

241. Christopher Hood et al., *The Drive to Modernize: A World of Surprises?*, in PARADOXES OF MODERNIZATION, *supra* note 8, at 12.

242. *Cf.* Perri 6, *When Forethought and Outturn Part*, in PARADOXES OF MODERNIZATION, *supra* note 8, at 53.

243. *Id.* at 58, 60 (identifying need for clarity about whose anticipations and intentions are of interest).

244. *Id.* at 56 (case-based research on unanticipated outcomes is rarely undertaken with a qualitative sensitivity analysis of the boundary between bad surprises and risks knowingly run, as determined by whether aspects of an outcome are anticipated according to “likelihood, centrality, detail, causal chain, and temporality”).

245. Heinzerling, *Reductionist Regulatory Reform*, *supra* note 71, at 480.

246. *Id.* at 481.

247. *Id.* at 483.

asbestos ban faulted EPA for a “decision not to evaluate” substitution risks, the regulatory record discloses that EPA was not ignorant of the possible existence of substitution risks.²⁴⁸ EPA declined to make a quantitative analysis of the risks posed by market substitutes for asbestos, but this is not the same as ignorance or rejection of the premise that there would be substitution risks.²⁴⁹ Of course, in consideration of the administrative law principle that claims are best raised with an agency for suitable record development before judicial review, this should be expected. In this sense, perversity claims that arise in environmental legal disputes are invariably and inherently hyperbolic; the decision maker may have a different evaluative judgment regarding claimed perverse effects but would not expectedly be ignorant of the claims.

Outside this combative context, environmental law could be enriched with greater equanimity about the benefits and drawbacks of past decisions. As an example, the great era of federal dam construction passed many decades ago, but we rightly still take the measure of those decisions. Certain unintended consequences of dam construction were surely obvious and anticipated to many, e.g., sedimentation build-up, impairment of the river system and its wildlife.²⁵⁰ Yet not all dam construction risks and benefits were so easily anticipated.²⁵¹ While dam construction projects were controversial in their day and indeed could be said to embody, in monumental fashion, a case study of the unintended consequences of environmental intervention by government, it is conspicuously not a subject of great interest in risk tradeoff literature. Thus, even as there may be a kind of universal understanding with any statement that dam construction comes with “tradeoffs,” we should question whether the framework—and the campaign that pushes it—has any essential value.

E. Linearity and Selective Holism

Connecting to whether tradeoffs are an overused trope, we should also question whether its vocabulary is best attuned to constructive, dispassionate study of unintended consequences. The

248. *Id.* (citing *Corrosion Proof Fittings v. EPA*, 947 F.2d 1201, 1221 (5th Cir. 1991)).

249. *Id.*

250. *See, e.g.*, *Udall v. FPC*, 387 U.S. 428, 440-443 (1967) (“The ecology of a river is different from the ecology of a reservoir built behind a dam”).

251. For example, the construction of the Hoover Dam spurred interest in how dams and reservoirs cause earthquakes. Edward Bryant, *Natural Hazards* 188–89 (2d ed. 2005). Moreover, the policy notion that hydroelectric dams could be favored for decarbonization of energy production did not inform thinking in the era of dam construction.

vocabulary of risk tradeoff analysis is problematically linear and subtly ideological in application. One definition of a tradeoff is a “giving up of one thing in return for another.”²⁵² By definition, the term suggests an exchange of meaningful items or a balancing of non-trivial factors. Calling something an environmental tradeoff or risk tradeoff thereby gives it a stature that implies a need for balancing even where its significance to decision making has not been shown. The word *countervailing*, as used in countervailing risk, is even more presumptuous, for its etymology is that an effect is offset or countered “with something of equal force.”²⁵³ Under the framework of risk tradeoff analysis, there are offsets, tradeoffs, and countervailing risks—all of which imply or presume, without well demonstrating, a heft to the alleged tradeoffs and costs asserted to weigh against governmental intervention. Thus, we see that the terminology of the campaign for risk tradeoff analysis is linear, an intriguing trait for an analytical method that is a supposed remedy for governmental shortcomings in handling complex decisions.

Hirschman observed that the perverse effect “acts as a magnet for all those who abhor complexity and crave certainty and therefore feel basically uncomfortable with the notion of unintended consequences.”²⁵⁴ In keeping with that, the essential concern here is that the very language of the campaign for risk tradeoff analysis poorly conveys true, operative linkages. Perhaps a term such as “distortionary effects,”²⁵⁵ despite the market context connotation, would better encompass the diversity of forces that work to generate unintended consequences. Perhaps also “ripple effects” counts as a better term, as derived from the metaphor of the ripples caused by throwing a stone in a pond.²⁵⁶ The tradeoff concept, in contrast, is a model or metaphor that coarsely represents how consequences of all types flow from decision points for environmental intervention (or inaction). While the term unintended consequences is not comparatively lucid, it is at least not so detrimental in its preconceptions. To briefly illustrate, tradeoff might be compared to another word, “repercussion,” which would also imply a kind of backlash. Despite this commonality, referring to a “minor” or “mild”

252. *Trade-off*, Webster's Third New International Dictionary (1986).

253. *Countervailing*, Webster's Third New International Dictionary (1986). This follows from the Latin *contra valere* (be of worth against).

254. A PROPENSITY TO SELF-SUBVERSION, *supra* note 1, at 47.

255. See OMB Circular A-4, *supra* note 35, at 33.

256. See Patrick Hofstetter et al., *Tools for Comparative Analysis of Alternatives: Competing or Complementary Perspectives?* 22 RISK ANALYSIS 833, 836 (2002) (crediting Professors Graham and Wiener for the metaphor).

repercussion would be a natural, sensible phrasing; in contrast, a minor or mild tradeoff or a minor or mild countervailing risk is vaguely oxymoronic.²⁵⁷

Thus, from the very word choices that instruct the paradigm, the concept of tradeoffs is decidedly imperfect. In application, the upshot is another kind of oxymoron—a selective holism. This selective holism is also found in the already-discussed criticisms of reductionism and inattention to ancillary benefits.²⁵⁸ This follows from the operation of language: “we don’t talk about what we see; *we see only what we can talk about.*”²⁵⁹ An inquiry into tradeoffs necessarily looks to understand whether a trade is good or bad, passing judgment on the decision maker. The consequences of inaction are not seen or talked about. The possible irrelevance of the decision maker’s judgment is not seen or talked about. Take the example of air pollution control equipment creating solid, hazardous waste—here we have a case of complex, undesired system behaviors that build on still more actions to influence system behaviors. It provides no special insight, nor is it at all accurate, to allege that such a case is part of a broader phenomenon of perverse results or inattention to tradeoffs. In contrast, these wording-based preconceptions and limitations are beneficially absent from the paradigm of unintended consequences. Environmental law and policy should prefer the mode of inquiry that is dispassionate and open to complexity, and the hunt for countervailing risks and tradeoffs fails on that account.

In the end, there is irony in using tradeoffs as the filter to critique environmental intervention. The critique is based on the supposed incapacity of regulators, fraught with faulty risk perceptions, to handle complex decisions, yet it posits a remedy in trying to view and manage risks linearly. But aside from crude simplifications, risks do not trade against risks or follow any straight line for purposes of managing human impacts.²⁶⁰ Environmental threats, like patterns of growth and consumption, connect in many directions simultaneously. The human mind is not

257. Along these lines, Garrett Hardin once explained: “side-effects [do not] deserve the adjective ‘side’ . . . It is hard to think in terms of systems, and we eagerly warp our language to protect ourselves from the necessity of doing so.” Thinking in Systems, *supra* note 26, at 95.

258. See *supra* Part III.

259. THINKING IN SYSTEMS, *supra* note 26, at 174 (quoting Fred Kofman, *Double-Loop Accounting: A Language for the Learning Organization*, 3 SYS. THINKER, no. 1, Feb. 1992).

260. For example, the complexity of impacts from pollution may allow that some pollutants are harmless below a threshold of exposure or, indeed, that some are beneficial or necessary beneath a threshold. See Arden Rowell, *Allocating Pollution*, 79 U. CHI. L. REV. 985, 1012–17 (2012).

well adapted to interpreting the patterns and behaviors of systems—this, not any particular need for correctives in risk perception, is the great challenge of environmental law.²⁶¹

F. Countervailing Heuristics

As a final matter, the campaign for risk tradeoff analysis often echoes claims by proponents of cost benefit analysis that evidence from heuristics and biases literature shows need for analytical emphasis on tradeoffs as a way of disciplining and improving collective judgment.²⁶² Regulatory inattention to tradeoffs and resultant regulatory errors supposedly arise from the workings of cognitive biases in regulators and the public.²⁶³

Without doubting the realities of mismatches between objective risks and subjective risk perception, risk regulation literature is conspicuously silent about the potential for undue or unbalanced attention to tradeoffs to result in its own cognitive biases.²⁶⁴ For example, where there are mixed results, the “bias favoring the perception of negative side effects makes for a rush to judgment.”²⁶⁵ Thus, there may well be biases and heuristics that can give undue and inordinate hold to claims of perversity.

We should question whether faulty risk perceptions that supposedly counsel toward extravagant efforts at environmental protection also show in extravagant opposition to environmental intervention. Just as regulatory critics may accuse people of being too easily motivated to demand regulation by “media-generated horror stories,”²⁶⁶ media-generated stories of regulatory mistakes motivate regulatory opposition and feed skepticism of regulatory efforts that may be irrational. One of the criticisms of risk regulation is that errors can be made when “vivid images and concrete pictures of disaster can ‘crowd out’ other kinds of thoughts.”²⁶⁷ Yet rancorous accusations of counterproductive regulation are no less vivid—what

261. See, e.g., Jay Forrester, *Counterintuitive Behavior of Social Systems*, 2 THEORY & DECISION 109, 110 (1971).

262. See Kysar, *Environmental Assurance Bonding*, *supra* note 32, at 229.

263. See, e.g., RISK VERSUS RISK, *supra* note 5, at 232–35.

264. Paul Rozin & Edward B. Royzman, *Negativity Bias, Negativity Dominance, and Contagion*, 5 PERSONALITY & SOC. PSYCHOL. REV. 296, 296–320 (2002) (explaining negativity bias, where negative events are more salient, potent, and efficacious than positive events); Cleotilde Gonzalez et al., *The Framing Effect and Risky Decisions: Examining Cognitive Functions with fMRI*, 26 J. ECON. PSYCHOL. 1, 1 (2005) (not only does it take longer to make decisions when gains are framed as losses, but it takes greater cognitive effort to select a “risky gain”).

265. RHETORIC OF REACTION, *supra* note 9, at 40.

266. McGarity, *A Cost-Benefit State*, *supra* note 56, at 18.

267. SUNSTEIN, RISK AND REASON, *supra* note 37, at 46.

else could be said of claims that a regulation crushes jobs or, worse, kills more than it saves? Relating to this, Cass Sunstein describes the phenomenon of cascades and social bandwagons, “in which apparently representative anecdotes and gripping examples move rapidly from one person to another.”²⁶⁸ Once several people start to take an example as probative, cascade effects happen.

To the human mind, risk tradeoffs are also exotic and prone to being framed as something new—i.e., a new threat, a loss from the status quo.²⁶⁹ This would implicate the cognitive phenomenon of loss aversion, the same phenomenon that supposedly distorts risk judgments and operates through the precautionary principle.²⁷⁰ Perhaps it should be unsurprising that the rhetoric of tradeoffs, focusing on the risks of governmental action, could activate the same biases.

If regulators have an “availability effect bias” in the tendency to emphasize risks they can easily think of,²⁷¹ then risk tradeoff analysis is arguably an effort to exploit that bias and give outsized effect to supposed harms of intervention. Dogmatic focus on countervailing risks could therefore be a vehicle for cognitive biases on its own. This disturbing result would follow from the supposedly balanced position that all of regulation is a risk-risk proposition. In the end, we must take account of the threat of “countervailing”²⁷² heuristics, something the proponents of risk tradeoff analysis strikingly, ironically, fail to enunciate.

VI. SERVICEABILITY OF THE UNINTENDED CONSEQUENCES PARADIGM TO ENVIRONMENTAL LAW

In the prime of the era of risk-risk, it was said that “there is no escaping risk analysis”²⁷³—that “there is no other metric available that allows policy choices to be made coherently.”²⁷⁴ According to the argument, where risk tradeoff analysis is not done explicitly, risk tradeoffs will occur implicitly. Because of this predicament, we would supposedly do better to dispense with “anti-risk rhetoric” and

268. Cass Sunstein, *Precautions Against What? The Availability Heuristic and Cross-Cultural Risk Perception*, 57 ALA. L. REV. 75, 94 (2005).

269. *Cf.* DEALING WITH RISK. *Supra* note 45, at 183.

270. Cass Sunstein, *Beyond the Precautionary Principle*, 151 U. PA. L. REV. 1003, 1036 (2003).

271. *See* Abdukadirov, *supra* note 66, at 13.

272. As discussed *supra* in Part E of this section, the word countervailing literally means to oppose with equal force, and I apply the word here half-seriously. The human mind, according to studies of neural processes, is risk averse and not comfortable with risky gains. *See* Gonzalez et al., *supra* note 264.

273. Daniel C. Esty, *What's the Risk in Risk?*, 13 YALE J. ON REG. 603, 603 (1996).

274. *Id.* at 612.

accept the analytical framework.²⁷⁵ Now, twenty years forward, these are quaint thoughts, not because risks concepts and risk assessments are unimportant or dispensable, but rather because risk tradeoff analysis, in particular, never demonstrated any special importance or indispensability. At the time of this writing, proposed legislation entitled the “Regulatory Accountability Act of 2017” would mandate that every agency rulemaking expressly consider “the countervailing risks that may be posed by alternatives for new agency action.”²⁷⁶ Similar legislative language has been proposed in the past.²⁷⁷ Thus, the risk tradeoff paradigm is perennially fashionable for some, but evidently not critical for legislative attention. On the legislative front, it manifests simply as one pet idea among many to make the regulatory process cripplingly deliberative and to curtail regulatory output.²⁷⁸

We therefore *can* escape risk analysis merely by recognizing that environmental law has, in fact, made coherent policy choices for some decades, deliberating on the impacts and potential consequences of laws under consideration without risk tradeoff analysis. As for the observation that risk tradeoffs will occur implicitly, we could question why potential disadvantages or negative effects of a regulatory intervention must necessarily be cast as risk tradeoffs. Far from adding value, in large measure this framework is a hindrance. With all the marshalled resources of regulatory opposition across several decades, risk tradeoff analysis does not yield empirically what it promises ideologically. Risk tradeoffs have not developed far from where they started: a freighted term, a gimmick, to suggest that environmental interventions broadly fall under the shadow of counter productivity.

This is not to trivialize the negative effects of environmental intervention, for these effects exist and can be important. Most significantly, people certainly make decisions on what they are willing to pay for reduced risks to health and safety. In economic literature, this manner of decision point is fairly denoted a

275. *Id* at 603–04, 606.

276. Regulatory Accountability Act of 2017, H.R. 5, S. 951 115th Cong. §103 (2017). The Senate version would narrow the requirement only to those rules that are “major” or “high-impact.”

277. The first proposed federal legislation to require study of so-called “countervailing risks” was apparently the Regulatory Accountability Act of 2011, 112 H.R. 3010. “Substitution risks” featured in even earlier legislative initiatives in the 1990s. *See, e.g.*, H.R. 1022, 104th Cong. 1st Sess. § 105(4) (1995).

278. Legislative proposals to require more labyrinthine regulatory impact analyses have featured in unsuccessful bills since at least the 104th Congress in 1995, and proponents of less regulation laud these efforts at making “red tape” for rulemaking agencies. Esty, *What’s the Risk in Risk?*, *supra* note 273, at 604.

tradeoff.²⁷⁹ The extension of this concept to generally portray environmental intervention as itself risky or environmentally-harmful is, however, a distinction with a great difference. We may not escape that environmental law and policy can yield unintended consequences, including negative effects in some cases, but this does not necessitate a framework that artificially inflates the salience of those effects.

What, instead, are the contours of an unbiased, unintended consequences paradigm? And how can it inform future directions in environmental legal scholarship? To begin, this mode of inquiry eschews each trait rejected in the last Part. It is cognizant of the trappings of rhetoric in regulatory opposition. It is attuned to historic evidence demonstrating that effects, both negative and positive, resultant from environmental intervention well predate risk regulation frameworks. It precisely focuses on the unintended consequences from environmental and natural resource protection efforts, unimpressed with the notion that risk professionals are better poised than environmental professionals to oversee legal and regulatory judgments for environmental protection.²⁸⁰ It acknowledges the strong potential for coding errors and incautious, inflated charges that legislators or regulators are ignorant of tradeoffs. It is open to complexity, recognizing that actions intended to benefit the environment can negatively impact the environment, a topic that warrants study as with any other human impacts on the environment. Generally, the unbiased study of unintended consequences would reject the defective mindset that Hirschman criticized as the “single-minded search for perverse effects alone, such effects being considered the ultimate triumph of the analyst.”²⁸¹

Doubtlessly, epistemic limits and biases can confound efforts to optimally address serious environmental problems while avoiding or minimizing new problems. Environmental legal scholarship

279. Cost-benefit analysis is often reliant on peer-reviewed studies on “willingness to pay” for some amenity or risk avoidance. As one commentator quipped, “Would you prefer to have condos or condors? You may not be able to afford both.” *THE WHALE AND THE REACTOR*, *supra* note 40, at 126.

280. Proponents of cost-benefit analysis typically espouse the view that technocrats are more immune to cognitive errors than the benighted citizenry. See SUNSTEIN, *RISK AND REASON*, *supra* note 37, at 54. Simply put, however, environmental legal professionals can well examine unintended consequences without need or use for the argot of risk management professionals. See, e.g., Ann Carlson, *Unintended Consequences and Environmental Policy*, *LEGAL PLANET* (Apr. 16, 2010), <http://legal-planet.org/2010/04/16/unintended-consequences-and-environmental-policy/> (expressing interest in the unintended consequences of environmental policy with reference to the case of a Los Angeles water conservation program that stressed the water pipeline system and led to a rash of water main breaks).

281. *A PROPENSITY TO SELF-SUBVERSION*, *supra* note 1, at 49.

should not discount this reality. These limits and biases have a role, at times, in producing unintended consequences of environmental interventions; studying such results may be consistent with the kind of inquiry that is basic to critical work across the social sciences.²⁸² Environmental law and policy is no ordinary social intervention, however. From environmental and systems science, there is often no single cause or pathway to the creation of unintended, negative effects. Meanwhile, the analogical labels of offsets, substitutes, replacement risks, tradeoffs, etc., are not rightly marked as the mechanisms of unintended consequences. These are instead the descriptors for properties of built environments, consumer dependencies, human behaviors, and biological and physiochemical systems that are susceptible to a variety of effects from all manners of human action, with or without governmental compulsion or sponsorship. Future legal scholarship should describe the unintended consequences of environmental intervention according to these points to promote environmental law's positive evolution and serve as a corrective for tradeoff argumentation and its inordinate clout in policy discourse.

VII. CONCLUSION

The goal at hand was to evaluate risk tradeoff analysis in its role as a contemporary fixture of regulatory impact analysis and as a leading conceptual framework for evaluating the supposed risky, counterproductive results threatened by environmental law and policy objectives. The campaign for risk tradeoff analysis is premised on serious concerns for the effects of governmental intervention, yet it has undercurrents belonging to a broader anti-regulatory agenda that should not go unremarked. Even as proponents of risk tradeoff analysis have diverse views and motives, they promote an instrument with a decidedly asymmetric focus on perverse results. Consider a Senator's opening remarks for the confirmation hearing of EPA Administrator Scott Pruitt in 2017:

[R]egulatory zeal . . . has violated a fundamental principle of environmental stewardship, which is *do no harm*. This failed environmental leadership has contributed to two of the worst

282. Karl Popper, for example, asserted the main task of theoretical human sciences "consists in identifying the non-intentional social repercussions of intentional human actions." BOUDON, *supra* note 11, at 1 (quoting Conjectures and Refutations).

Government-created environmental disasters in decades: the Gold King Mine spill and Flint, Michigan's water crisis.²⁸³

Here, a jumble of negative stories coheres into an unsurprising, sadly partisan narrative that environmental law stands as a symbol of failed government. As George Orwell observed in criticizing the inflated style of political language, "A mass of Latin words falls upon the facts like soft snow, blurring the outlines and covering up all the details."²⁸⁴ Risk tradeoff analysis is a symptom and perhaps even a contributing cause for the insincerity that hinders environmental law's positive advancement.

In these times, more than one third of the American public considers it probable or certain that the environmental movement has done "more harm than good," yet just ten percent of the same polled individuals admitted to being "unsympathetic toward the environmental movement."²⁸⁵ Several theories might explain this incongruity, but some credit should owe to the antiregulatory movement and its success in sowing doubts over the success of environmental law even among ostensible supporters. Risk tradeoff analysis and associated advocacy in legal settings, despite its more rarified sphere of influence, no less serves to foster these doubts.

The solution is not to deny the reality of occasional, blinkered decision making, but rather to give credit to the complexity, both primordial and human-made, of the effects that flow from environmental interventions. Humility, not despair, is the appropriate response to our pressing environmental challenges.²⁸⁶ We should embrace that environmental problems can be vexing and resist easy human understanding. Justice Breyer had proposed the remedy for this "inhuman type of problem" in widespread public education in risk analysis or, more feasibly from his standpoint, in reform of institutions to generate greater public trust in the measures to reduce risks and environmental harms.²⁸⁷ But against declared intentions, the rubric and rhetoric of risk tradeoff analysis has only damaged that trust, working to coarsen public understandings of risk and sharpen institutional distrust. Regulatory reform advocates, well-intended or otherwise, aimed to

283. *Hearing on Nomination of Attorney General Scott Pruitt to be Administrator of the U.S. Environmental Protection Agency Before the S. Comm. on Env't and Pub. Works* 4 (2017) (statement of the Honorable John Barrasso, A United States Senator from the State of Wyoming).

284. George Orwell, *Politics and the English Language*, in *GEORGE ORWELL: IN FRONT OF YOUR NOSE* 1946–50, 136–37 (2000).

285. In *Depth: Topics A to Z, Environment*, GALLUP, <http://www.gallup.com/poll/1615/environment.aspx> (polling conducted "2010 Mar 4–7").

286. Cf. GILLON, *supra* note 185, at 249.

287. BREAKING THE VICIOUS CIRCLE, *supra* note 10, at 39.

break a so-called vicious circle of regulatory failings, but this is today eclipsed by a corrupting and corrosive politicization of environmental law and science. The paradigm of unintended consequences will provide a much needed return to the moorings of dispassionate inquiry.