

# ELR

NEWS & ANALYSIS

## ARTICLES

### Strange Bedfellows? The Precautionary Principle and Toxic Tort: A Tort Paradigm for the 21st Century

by Lynda M. Collins

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*Editors' Summary: This Article explores the relationship between the "precautionary principle," statutory regulation, and the law of toxic torts, with a focus on personal injury. The Article introduces the concept of precautionary environmental law through an analysis of the prevailing risk-based paradigm of statutory environmental regulation contrasted with a more precautionary, ecological approach. Next, it identifies the dominant injury-based paradigm in environmental tort law and concludes that if tort is to meaningfully contribute to environmental protection in the 21st century, a paradigm shift is in order. The Article next applies an "ecological paradigm" to the tort context, exploring the potential for a precautionary approach to the law of toxic torts. In particular, three proposals for precautionary reform in tort law are presented: a relaxation of the single cause-of-action rule; an increased use and liberal treatment of the tort of environmental battery; and the imposition of a reverse burden of proof on causation in environmental torts. The Article concludes that the adoption of such proposals is necessary both from the ecological perspective and in order to ensure that tort meets its core goals of compensation and deterrence in environmental cases.*

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"People, not chemicals, have the right to be presumed innocent until proven guilty. People also have the right not to be experimented on without informed consent; no one has ever been given the opportunity to grant or deny their consent before being exposed to the [toxic] burden that now contaminates us all."<sup>1</sup>

#### I. Introduction

We live in a time of environmental crisis. Overwhelming evidence indicates that we are degrading and destabilizing the natural systems upon which life as we know it depends.<sup>2</sup> We are all familiar with the major manifestations of this phenomenon: deforestation; climate change; species loss; water scarcity; and air and water pollution.<sup>3</sup> As microcosmic expressions of the ecological macrocosm, human bodies are also exhibiting signs of degradation and destabilization. Each year in the United States alone, more than one-half

million people die of cancer,<sup>4</sup> and scientists believe that many thousands of these deaths are caused by environmental pollution.<sup>5</sup> Meanwhile, ongoing discharges of toxic chemicals into air and water continue to compromise ecosystems, planting the seeds of future illness.

This environmental and human health crisis exists despite a very high level of consensus in society that environmental protection is a top priority.<sup>6</sup> Even more remarkable, the environmental crisis persists despite the existence of two overlapping forms of legal regulation—statutory and tort—that are supposed to express shared societal values. Why? The answer may be that we have adopted paradigms

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Lynda M. Collins is an environmental attorney currently practicing in San Francisco. The author expresses her thanks to Stewart Elgie for helpful comments on an earlier draft.

1. JOE THORNTON, PANDORA'S POISON: CHLORINE, HEALTH, AND A NEW ENVIRONMENTAL STRATEGY 353 (2000).
2. See generally UNITED NATIONS (U.N.) ENVIRONMENT PROGRAM, GLOBAL ENVIRONMENT OUTLOOK 3 (2002).
3. *Id.*; see also AL GORE, EARTH IN THE BALANCE (1993).

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4. NATIONAL CENTER FOR HEALTH STATISTICS, CENTERS FOR DISEASE CONTROL & PREVENTION, U.S. MORTALITY PUBLIC USE DATA TAPE 2001 (2003).

5. See Troyen A. Brennan, *Causal Chains and Statistical Links: The Role of Scientific Uncertainty in Hazardous Substance Litigation*, 73 CORNELL L. REV. 469, 473-74 (1988) (citing PUBLIC HEALTH SERVICE, U.S. DEPARTMENT OF HEALTH & HUMAN SERVICE, FOURTH ANNUAL REPORT ON CARCINOGENS 5 (1985)); R. WINTER, CANCER-CAUSING AGENTS 1-2 (1979). See also M. SARA ROSENTHAL, STOPPING CANCER AT THE SOURCE (2001); SANDRA STEINGRABER, LIVING DOWNSTREAM: A SCIENTIST'S PERSONAL INVESTIGATION OF CANCER AND THE ENVIRONMENT (1998).

6. For a review of the empirical evidence of this consensus, see DANIEL FARBER, ECO-PRAGMATISM: MAKING SENSIBLE ENVIRONMENTAL DECISIONS IN AN UNCERTAIN WORLD 1-2 (1999) [hereinafter FARBER, ECO-PRAGMATISM].

of environmental protection that simply do not work.<sup>7</sup> They do not work because they have failed to come to terms with the problem of scientific uncertainty that inheres in most environmental questions and because they have failed to appreciate the resulting ethical imperative of precaution in ecological matters.<sup>8</sup>

This Article explores the relationship between the “precautionary principle,”<sup>9</sup> statutory regulation, and the law of toxic torts, with a focus on personal injury. Part II presents a brief analysis of the unique role of tort in environmental protection. Part III reviews the problem of scientific uncertainty in environmental law. Part IV introduces the concept of precautionary environmental law through an analysis of the prevailing risk-based paradigm of statutory environmental regulation contrasted with a more precautionary, ecological approach proposed by Prof. Joe Thornton and others.<sup>10</sup> Part V identifies the dominant injury-based paradigm in environmental tort law and concludes that if tort is to meaningfully contribute to environmental protection in the 21st century, a paradigm shift is in order. Part VI applies Professor Thornton’s “ecological paradigm” to the tort context, exploring the potential for a precautionary approach to the law of toxic torts. In particular, Part VI presents three proposals for precautionary reform in tort law: a relaxation of the single cause-of-action rule; an increased use and liberal treatment of the tort of environmental battery; and the imposition of a reverse burden of proof on causation in environmental torts. The Article concludes that the adoption of such proposals is necessary both from the ecological perspective and in order to ensure that tort meets its core goals of compensation and deterrence in environmental cases.

## II. The Role of Tort in Environmental Protection

Despite the existence of a complex and comprehensive web of environmental statutes and regulations, tort has a critical role to play in environmental protection for at least two reasons. First, notwithstanding its size and clout, statutory environmental law sometimes proves inadequate. Whether because of political pressure, mistake, or inertia, environmental regulators sometimes simply fail to prevent or remedy significant environmental problems.<sup>11</sup> In such cases, tort may be the only means to provide redress to injured victims and deter environmental wrongdoing.<sup>12</sup> Second, even where

a strong regulatory regime exists, tort’s unique characteristics enable it to supplement, and in some cases even outperform, statutory environmental law.<sup>13</sup>

Significantly, tort does not suffer from the inconsistencies and variations in enforcement that accompany statutory regimes. Rather than relying on bureaucracies that can be eviscerated through budget cuts, manipulated for political ends, or “captured” by regulated industries,<sup>14</sup> environmental tort is enforced by a stable, highly motivated, and well-resourced plaintiffs’ bar. Free from the political constraints that limit government action, tort also has a greater ability to attach financial consequences to environmental wrongdoing that are substantial enough to seriously impact corporate profit margins.<sup>15</sup> In effect, tort damage awards force corporate actors to internalize the environmental costs of their behavior. Thus, more than its statutory sibling, tort has the potential to actually change the economic equation—making it cheaper to protect than to pollute the environment.<sup>16</sup> Finally, on a symbolic level, tort liability “provides a signal of the limits of propriety in the creation of chemical and other risks in the environment.”<sup>17</sup>

To be sure, tort suffers from important limitations as a vehicle for environmental protection, most notably its focus on human-centered harms, as well as the problems of proof discussed at length in this Article. However, because of its unique strengths, tort law will undoubtedly play a role in shaping the environmental history of the 21st century.

## III. Scientific Uncertainty and Environmental Law

Be it statutory or tort-based, environmental law must grapple with the problem of scientific uncertainty that pervades most, if not all, environmental issues. At its most fundamental, the phenomenon of scientific uncertainty in the realm of ecology can be summed up as follows: despite our best efforts, we do not now—and may never—fully understand how nature works, and, in particular, how new human-made synthetic chemicals interact with and affect natural systems, including the human body.

There are many reasons for this uncertainty including the massive complexity of natural systems,<sup>18</sup> the (ethical) im-

7. See THORNTON, *supra* note 1, at 117-20; Thomas O. McGarity, *MTBE: A Precautionary Tale*, 28 HARV. ENVTL. L. REV. 281 (2004) (discussing theories of environmental regulation and regulatory failure).

8. See FRANK ACKERMAN & LISA HEINZERLING, *PRICELESS: ON KNOWING THE PRICE OF EVERYTHING AND THE VALUE OF NOTHING* 117-21 (2004).

9. The precautionary principle, discussed in detail in Part IV, holds that, “[w]hen there is substantial scientific uncertainty about the risks and benefits of a proposed activity, policy decisions should be made in a way that errs on the side of caution with respect to the environment and the health of the public.” David Kriebel et al., *The Precautionary Principle in Environmental Science*, ENVTL. HEALTH PERSP., Sept. 2001, at 875, cited in ACKERMAN & HEINZERLING, *supra* note 8, at 118.

10. See THORNTON, *supra* note 1.

11. See, e.g., McGarity, *supra* note 7, at 303-04, 337 (describing the U.S. Environmental Protection Agency’s (EPA’s) acceptance of severely inadequate industry standards for underground storage tank regulations, contributing to widespread contamination of groundwater).

12. Marshal S. Shapo, *Tort Law and Environmental Risk*, 14 PACE ENVTL. L. REV. 531, 531 (1997).

13. See generally Keith N. Hylton, *When Should We Prefer Tort Law to Environmental Regulation?*, 41 WASHBURN L.J. 515 (2002).

14. See *id.*; McGarity, *supra* note 7, at 325-27 (discussing the phenomenon of “agency capture”).

15. As an example, elected governments will almost always hesitate to impose financial consequences on bankrupt polluters that are significant employers, even where such dire consequences are necessary to deter extremely harmful behavior. Mass tort suits, on the other hand, frequently result in the bankruptcy of the offenders. See *Latent Harms and Risk-Based Damages*, 111 HARV. L. REV. 1505, 1515 (1998) [hereinafter *Latent Harms*].

16. Since corporate directors have a legal duty to maximize current shareholder returns, making pollution more expensive than protection may be the only way to achieve environmental sustainability. See Margaret A. Berger, *Eliminating General Causation: Notes Toward a New Theory of Justice and Toxic Torts*, 97 COLUM. L. REV. 2117, 2138-40 (1997); *Ileto v. Glock, Inc.*, 370 F.3d 860, 868 (9th Cir. 2004) (“Imposing novel tort theories on economic activity significantly affects the risks of engaging in that activity, and thus alters the cost and availability of the activity within the forum jurisdiction.”).

17. Shapo, *supra* note 12, at 531.

18. See Daniel A. Farber, *Probabilities Behaving Badly: Complexity Theory and Environmental Uncertainty*, 37 U.C. DAVIS L. REV. 145 (2003).

possibility of testing industrial chemicals on humans,<sup>19</sup> the extreme novelty of synthetic chemicals in evolutionary history,<sup>20</sup> the sheer number of synthetic chemicals in the environment,<sup>21</sup> and the dearth of data on the health and environmental effects of such chemicals.<sup>22</sup>

This last factor, the lack of environmental and health data, is perhaps both the most significant and the most surprising. In 1984, the National Research Council found that there was no toxicity data at all for approximately 80% of the 48,523 unregulated chemicals then in commerce.<sup>23</sup> When the Environmental Defense Fund updated this research in the late 1990s, it found that chronic toxicity data was missing for 70% of the top-selling synthetic chemicals.<sup>24</sup> The National Institute for Occupational Safety and Health reports that millions of chemical mixtures in commercial use have never been tested for their reproductive effects.<sup>25</sup> Even chemicals that are commonly found in homes, those one might reasonably expect to be most closely studied, remain poorly understood; EPA admits that “not much is known about what health effects occur from the levels of organics usually found in homes.”<sup>26</sup>

In contrast to the “preventable scientific uncertainties”<sup>27</sup> that result from the simple failure to investigate, there are also inherent, “trans-scientific”<sup>28</sup> limitations on researchers’ ability to identify the health and environmental impacts of synthetic chemicals.<sup>29</sup> Key aspects of scientific

analysis, such as the ability to test hypotheses, break down in the environmental arena. Professor Thornton provides a compelling illustration of this problem in the context of environmental “risk assessments” (discussed in greater detail below):

Suppose a risk assessment for an incinerator predicts that the local community will experience exposures that pose cancer risks of one per million. . . . Suppose further that the prediction turns out to be grossly wrong, with cancer risks 10, 000 times higher than expected. . . . [The incinerator’s actual impacts] will probably never be studied at all, since most places are never the subject of epidemiological or ecological studies. If the effects are somehow discovered, they will never be definitively linked to the emissions from the incinerator, because the contribution of that facility can never be clearly distinguished from that of other contributing factors, including chemicals from other kinds of sources, other incinerators in the region, and other incinerators halfway across the world. Testing a risk assessment’s prediction in the real world would require a mode of environmental monitoring and causal analysis that is far beyond the reach of any foreseeable science. Even a weather forecast turns out to have been observably right or wrong, allowing meteorologists to refine their methods of prediction with each passing day; whether a risk assessment was perfectly accurate or grossly off-base we will never know.<sup>30</sup>

Whatever the reasons, the reality is that even for the small minority of chemicals that have undergone intensive study, science has not been able to achieve certainty in evaluating their impacts.<sup>31</sup> Many thousands of others have undergone little or no investigation for health and environmental effects.<sup>32</sup> In either case, we cannot delineate with any precision the real-world consequences of releasing synthetic chemicals into the environment. In specific instances of suspected environmentally induced illness, the generic uncertainty regarding chemical contaminants is compounded by factors specific to particular diseases and individuals.

Typically, a toxic plaintiff’s injury is produced at an invisible, subcellular level, with no witness to attest that chemical X initiated disease process Y.<sup>33</sup> The toxic plaintiff’s disease (often cancer) is usually multifactorial, poorly understood, and/or involves long latency periods.<sup>34</sup> Sometimes, the substance at issue was produced by multiple defendants who dispersed it into the environment making it difficult or impossible for the plaintiff to identify which defendant caused her harm.<sup>35</sup> In some cases, there are so many sources emitting so many potentially harmful contaminants that it

19. Ann Taylor, *Public Health Funds: The Next Step in the Evolution of Tort Law*, 21 B.C. ENVTL. AFF. L. REV. 753, 759 (1994).

20. Consider the fact that our species has existed for approximately 160,000 years while synthetic chemicals have only been in widespread use since the mid-20th century. See GORE, *supra* note 3, at 147-48; THORNTON, *supra* note 1, at 156; M.M. Lahr & P.A. Foley, *Palaeoanthropology: Human Evolution Writ Small*, 431 NATURE 1043-44 (2004).

21. See INSTITUTE OF MEDICINE, CANCER, AND THE ENVIRONMENT: GENE-ENVIRONMENT INTERACTIONS 68 (2002).

22. *Id.* (“[T]here are approximately 80,000 industrial chemicals now registered for use, but very few have been tested for their health effects singly, synergistically, or with different kinds of genetic patterns.”); Wendy E. Wagner, *Choosing Ignorance in the Manufacture of Toxic Products*, 82 CORNELL L. REV. 773 (1997); Holly E. Pettit, *Shifting the Experiment to the Lab: Does EPA Have a Mandatory Duty to Require Chemical Testing for Endocrine Disruption Effects Under the Toxic Substances Control Act?*, 30 ENVTL. L. 413, 413 (2000).

23. STEERING COMMITTEE ON IDENTIFICATION OF TOXIC AND POTENTIALLY TOXIC CHEMICALS FOR CONSIDERATION BY THE NATIONAL TOXICOLOGY PROGRAM, NATIONAL RESEARCH COUNCIL, TOXICITY TESTING: STRATEGIES TO DETERMINE NEEDS AND PRIORITIES 60, 151-63 (1984).

24. See D. ROE ET AL., TOXIC IGNORANCE: THE CONTINUING ABSENCE OF BASIC HEALTH TESTING FOR TOP-SELLING CHEMICALS IN THE UNITED STATES (1997).

25. NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY & HEALTH, THE EFFECTS OF WORKPLACE HAZARDS ON MALE REPRODUCTIVE HEALTH (1996) (observing that the majority of the approximately four million chemical mixtures in commercial use have never been tested for their reproductive effects).

26. U.S. EPA, *Sources of Indoor Air Pollution—Organic Gases (Volatile Organic Compounds—VOCs)*, at <http://www.epa.gov/iaq/voc.html> (last visited Mar. 24, 2005).

27. See Wagner, *supra* 22 note, at 780-82.

28. *Id.* at 777-80.

29. One noteworthy distinction between the two kinds of uncertainty is that while advances in information technology may reduce the scope of trans-scientific uncertainty (see Daniel C. Esty, *Environmental Protection in the Information Age*, 79 N.Y.U. L. REV. 115 (2004)), preventable scientific ignorance will persist as long as the law (and the market) allow it.

30. THORNTON, *supra* note 1, at 414.

31. ACKERMAN & HEINZERLING, *supra* note 8, at 117 (observing that scientific debate persists regarding the effects of well-known contaminants such as radiation, arsenic, and dioxin despite decades of investigation, and concluding that “[i]f technical doubts and partisan debate still surround the effects of [such widely studied contaminants] there is no hope of waiting for definitive proof and scientific consensus on the effects of other environmental contaminants”).

32. See *supra* notes 22-26 and accompanying text.

33. See MICHAEL R. HADSKIS, FINDING OUR WAY OUT OF THE CAUSATION JUNGLE IN TOXIC TORTS 97 (1993).

34. See Daniel A. Farber, *Toxic Causation*, 71 MINN. L. REV. 1219, 1227-28 (1988).

35. See, e.g., *Sindell v. Abbot Labs.*, 26 Cal. 3d 588 (Cal. 1980), *cert. denied*, 449 U.S. 912 (1980).

becomes virtually impossible for a plaintiff to prove who or what caused her harm.<sup>36</sup>

Thus, on both the macroscopic and microscopic levels, certainty in the evaluation of contaminant impacts is virtually unattainable. Nonetheless, environmental law is tasked with the mandate of regulating contaminants to protect human health and the environment and doing justice in individual cases of environmental wrongdoing.

#### IV. Paradigms for Environmental Protection I: Statutory Environmental Law

If we accept that environmental law must do its work in the presence of pervasive and profound uncertainty, the next question is how environmental law should relate to this uncertainty. Should we err on the side of caution, or should we err on the side of minimal disruption to business as usual? The answer to this question depends in part upon the assumptions we bring to the analysis. Two kinds of collective assumptions inform the debate—the material and the normative. Material assumptions are beliefs about physical reality.<sup>37</sup> Normative assumptions, in contrast, are beliefs about ethics or morality, i.e., the way things *should* be.<sup>38</sup>

I will argue that our current systems of both statutory and tort environmental law are based on material assumptions about the environment and our ability to predict ecological consequences that are overly optimistic at best. Further, environmental law in both forms incorporates normative assumptions that no longer make sense in our chemicalized society. These inappropriate assumptions have birthed paradigms for environmental regulation that fail to achieve the consensus goal of environmental protection.

##### A. The Risk Paradigm

In his comprehensive analysis of the regulation of organochlorines, Professor Thornton, of the University of Oregon's Center for Ecology and Evolutionary Biology, has elucidated the prevailing "risk paradigm" of statutory envi-

ronmental regulation in the United States.<sup>39</sup> Briefly, the risk paradigm is based on the idea that science can identify "acceptable" levels of particular contaminants in the environment, and regulation should be designed to achieve these acceptable levels.<sup>40</sup>

For our purposes, the salient feature of the risk paradigm is that it places the burden of proving the characteristics of synthetic chemicals on regulators rather than producers. This approach starts with a kind of "chemists-in-Wonderland" material premise that if science lacks evidence of the harmfulness of a substance, the substance is probably safe (despite the fact that we likely have not studied it and even if we did we could not achieve certainty in delineating its impacts).<sup>41</sup> The result is a system that requires government to prove the potential for harm in order to justify regulation, while sidestepping the scientific reality that such proof may be unavailable unless and until serious (and possibly irreversible) damage has been caused. On the normative level, the risk paradigm appears to be animated by a misplaced deference to industrial choices.<sup>42</sup> The system prioritizes business as usual over precaution and actually perpetuates uncertainty regarding the effects of environmental contaminants, since the innocent-until-proven-guilty policy creates obvious economic disincentives to the discovery of evidence of harmfulness.<sup>43</sup>

Methodologically, the centerpiece of the risk paradigm is the risk assessment, in which scientists examine a particular chemical in isolation and attempt to quantify the harm that would result from its release at various concentrations.<sup>44</sup> We have already seen that the risk assessment methodology suffers from a fatal flaw in that the crucial scientific principle of testability is absent.<sup>45</sup> Another critical problem with risk assessments is that they typically fail to account for the synergistic interactions of a particular chemical with the thousands of others currently present in the environment.<sup>46</sup> In addition, the process of risk assessment is highly vulnerable to the personal and institutional biases of the assessors<sup>47</sup> since there are multiple and divergent modes of performing risk assessment and since variations in the model can result in vastly different outcomes:

When a group of scientists at EPA, for example, used four acceptable models to calculate the cancer risk posed by trichloroethylene in drinking water, they found that the resulting risk estimates varied by a factor of 100 million. The authors concluded, "These estimates provide a range of uncertainty equivalent to not knowing whether one has enough money to buy a cup of coffee or pay off the national debt."<sup>48</sup>

In other words, the results of risk assessments are, in many cases, so uncertain as to be meaningless. Undaunted by this reality, the current risk-driven system of regulation uses

36. See *Bockrath v. Aldrich Chem. Co.*, 21 Cal. 4th 71, 83 (Cal. 1999) (in dicta) ("A cancer-afflicted plaintiff suing every manufacturer of an airborne substance found in the Los Angeles basin probably would be exposed to sanctions for the suit, even if certain defendants eventually were found to have made a product that was a substantial factor in the onset of the plaintiff's cancer."). For another striking acknowledgment by toxic defendants of the pervasiveness of chemical contamination, see *Miranda v. Shell Oil Co.*, 17 Cal. App. 4th 1651, 23 ELR 20779 (Cal. Ct. App. 1993):

Defendants worry that allowing claims for medical monitoring will open the "floodgates" of litigation. As they see it, *the general public is regularly exposed to all sorts of unhealthy contaminants in the environment*; thus, recognition of medical monitoring costs as a proper item of damages will foment a multitude of lawsuits against an "enormous" range of potential defendants.

*Id.* at 1656-60 (emphasis added).

37. To illustrate the concept, imagine that there was a societal consensus that all harms are caused by supernatural forces. If we shared such a material assumption, then it would not make sense to design a statutory or tort system that imposes liability on human defendants for their actions. However, the societies that have shaped tort law share a material assumption that physical conduct produces physical harm, and, based on this assumption, we do impose such liability.

38. For example, as a society we believe that a person who wrongfully harms another should generally be required to compensate her victim for the resulting loss.

39. See THORNTON, *supra* note 1.

40. *Id.* at 7.

41. *Id.* at 100.

42. *Id.* at 353.

43. See Wagner, *supra* note 22; Berger, *supra* note 16.

44. THORNTON, *supra* note 1, at 7-8.

45. *Id.* at 414.

46. *Id.* at 9.

47. *Id.* at 422; Shapo, *supra* note 12, at 542 ("[S]cientific risk assessment may be as unavoidably value-laden as legal risk assessment.").

48. THORNTON, *supra* note 1, at 422.

these results to generate statutes and regulations to (purportedly) protect health and the environment. Indeed, in recent years environmental regulation has taken its reliance on risk assessment one step further by using the results of such assessments as the starting point for economic cost-benefit analyses.<sup>49</sup> There is a substantial body of scholarship arguing both for and against cost-benefit analysis as a tool for environmental decisionmaking,<sup>50</sup> and I will not repeat those arguments here. It suffices to point out that cost-benefit analysis is entirely dependent on the risk paradigm for its validity since it begins with the very soft outputs of risk assessments.

### B. The Ecological Paradigm

As an alternative to the risk paradigm, Professor Thornton advocates for the adoption of an “ecological paradigm” of environmental regulation. The ecological paradigm is based on the precautionary principle, which holds as follows:

Environmental measures must anticipate, prevent and attack the causes of environmental degradation. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.<sup>51</sup>

Prof. Thomas McGarity argues that the “essence” of the precautionary principle “can be captured in three familiar phrases: look before you leap; it is better to be safe than sorry; and when in doubt, err on the side of safety.”<sup>52</sup> The precautionary principle rejects risk-based assumptions about the capacity of the environment (including human bodies) to assimilate contaminants on the one hand and the ability of science to predict this capacity on the other.<sup>53</sup> From a normative perspective, the precautionary principle recognizes an ethical imperative to do the best we can to avoid creating risks of serious or irreversible harm.

The precautionary principle has been criticized for its amorphous nature, and Thornton<sup>54</sup> concedes that the princi-

ple is too vague to function as a regulatory standard.<sup>55</sup> Accordingly, he proposes three additional policy guidelines to provide specific guidance on the implementation of the precautionary principle.<sup>56</sup> These are clean production, zero discharge, and reverse onus. Clean Production mandates a shift from our current focus on pollution control to a proactive and precautionary rule favoring pollution prevention.<sup>57</sup> It requires that industry make use of the most benign available methods and materials and seek to prevent the release of hazardous materials by preventing their production in the first place.<sup>58</sup> The policy of zero discharge prohibits absolutely the release of persistent and/or bioaccumulative chemicals.<sup>59</sup> Reverse onus would invert current regulatory policy by requiring proponents of synthetic chemicals to demonstrate their safety before being permitted to produce and release them.<sup>60</sup> As Thornton points out, this is the policy currently in force with respect to pharmaceuticals.<sup>61</sup> Further precedent for such an approach can be found in environmental assessment statutes, which require that proponents of physical projects elucidate the environmental impact of proposed projects before approval can be granted.<sup>62</sup>

In contrast to risk paradigm approaches, “[r]ather than asking how much toxic pollution we can live with, the precautionary principle [focuses on the] kind of . . . world we want to live in, and provides a decision-making framework for getting there.”<sup>63</sup> Thornton’s ecological paradigm provides a viable policy framework to guide the implementation of the precautionary principle in statutory environmental law. The remainder of this Article examines the extent to which tort law can or should, in turn, embrace this ecological paradigm in its own treatment of environmental wrongs.

## V. Paradigms for Environmental Protection II: Environmental Tort Law

### A. The Injury Paradigm

The traditional articulation of the law of personal torts is based on what I will call the injury paradigm. According to this paradigm, actors are generally free to conduct themselves as they choose unless and until their conduct causes injury. At that point, the tortfeasor must compensate the plaintiff for her damages, thus disgorging any benefit the wrongdoer received at her victim’s expense.<sup>64</sup> Even in the

49. As its name implies, cost-benefit analysis is an economic method that attempts to put a dollar figure on both costs and benefits of environmental (and other) regulation. Advocates of cost-benefit analysis argue that we should limit environmental rules to those that result in a net economic benefit. In order to determine economic optimality, cost-benefit analysis requires economists to quantify the fiscal value of things like life, health, and the “existence” value of the Grand Canyon. See ACKERMAN & HEINZERLING, *supra* note 8; FARBER, *supra* note 6, at 37-58.

50. See, e.g., COST-BENEFIT ANALYSIS (Mathew Adler & Eric Posner eds., 2001); Cass Sunstein, *Is Cost-Benefit Analysis for Everyone?*, 53 ADMIN. L. REV. 299 (2001); ACKERMAN & HEINZERLING, *supra* note 8; FARBER, *supra* note 6.

51. Bergen Ministerial Declaration on Sustainable Development in the ECE Region, U.N. Doc. A/CONF. 151/PC/10 (1990), reprinted in 1 Y.B. INT’L ENVTL. L. 429, 431 (1990). Some definitions of the principle import an economic element. See, e.g., Rio Declaration on Environment and Development, June 14, 1992, 31 I.L.M. 874, 879:

In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

52. McGarity, *supra* note 7, at 334.

53. THORNTON, *supra* note 1, at 102.

54. See James E. Hickey Jr., *Refining the Precautionary Principle in International Environmental Law*, 14 VT. ENVTL. L.J. 423, 425, 437 (1995).

55. THORNTON, *supra* note 1, at 345.

56. *Id.* at 346.

57. *Id.* at 348.

58. *Id.*

59. The International Joint Commission has described the concept as follows: “Zero discharge means just that: halting all inputs from all human sources and pathways to prevent any opportunity for persistent toxic substances to enter the environment . . .” INTERNATIONAL JOINT COMMISSION, SIXTH BIENNIAL REPORT ON GREAT LAKES WATER QUALITY (1992), cited in THORNTON, *supra* note 1, at 347-48.

60. THORNTON, *supra* note 1, at 346.

61. *Id.*

62. See National Environmental Policy Act (NEPA) of 1969, 42 U.S.C. §§4321-4370d, ELR STAT. NEPA §§2-209.

63. ACKERMAN & HEINZERLING, *supra* note 8, at 119 (citing Ann Maria Bell, *Taking Externalities Seriously: An Economic Analysis of the Precautionary Principle*, REDEFINING PROGRESS (forthcoming)).

64. See Ernest J. Weinrib, *Corrective Justice*, 77 IOWA L. REV. 403, 409 (1992).

context of injunctive relief, tort requires an imminent, provable, and irreparable injury before it will take action.<sup>65</sup> Whether actual or imminent, the law of personal torts is always looking for an injury in order to justify the imposition of liability.<sup>66</sup> In addition to the existence of a concrete injury, the plaintiff in a personal injury suit must prove that a defendant's conduct was the factual and legal cause of her harm in order to justify remedying her loss out of the defendant's pocket.<sup>67</sup> Thus, in its traditional articulation, environmental tort law is actually more conservative than its statutory sibling, insisting on an even greater degree of scientific certainty before the law will act to prevent or remedy injuries to the person.<sup>68</sup>

The traditional injury paradigm approach works well in the context of nonchemical harms. In the classic tort scenario, a defendant commits a culpable, e.g., negligent, act, a plaintiff suffers a concrete and observable injury, and that injury is readily traceable to the defendant's conduct, e.g., defendant drops a piano out the window, plaintiff is struck and suffers broken bones. In such traditional tort scenarios, certainty is the norm, and, conversely, "causal uncertainty arises randomly and always signifies a substantial chance that the defendant in fact harmed no-one."<sup>69</sup> In contrast, causal uncertainty in toxic torts results from the inherent nature of the processes, substances, and injuries at issue.

As a result of the overlapping layers of uncertainty canvassed in Part III above, toxic plaintiffs are frequently unable to establish proof of causation and/or injury by traditional standards.<sup>70</sup> Very often, the most that can be proved is that the defendant materially increased the plaintiff's probability of sustaining a particular personal injury.<sup>71</sup> But as noted above, tort traditionally denies relief in such circumstances unless the extent of probability rises to the level of imminence. Again, this policy decision is based on an underlying material assumption that if a defendant has in fact caused harm (or is about to cause imminent harm), the plaintiff will be able to prove it. As we have seen, this assumption is generally invalid in the context of environmental harms.

As a result, the application of the traditional approach has repeatedly denied recovery to victims of toxic wrongdoing.<sup>72</sup> In response to the clear potential for injustice, courts

have crafted doctrines that allow toxic plaintiffs to avoid the strictures of traditional doctrines of injury and causation.<sup>73</sup> These doctrines allow plaintiffs to recover, in certain limited circumstances, when all they can prove is an increased risk of injury.

### B. Innovations Addressing Risk

The three primary innovations addressing risk in toxic tort are medical monitoring damages, recovery for fear of future illness, and—most clearly—recovery for enhanced risk itself. In a medical monitoring action, a plaintiff who has no present disease but can prove that the defendant has culpably exposed her to an increased risk of developing a particular illness can recover for the costs of reasonable medical monitoring necessitated by the exposure.<sup>74</sup> The recognition of medical monitoring damages "[did] not create a new tort. [Medical monitoring] is simply a compensable item of damage when liability is established under traditional tort theories of recovery."<sup>75</sup> In order to justify an award of medical monitoring damages, courts generally require the plaintiff to show that the illness in question is susceptible of early detection and treatment.<sup>76</sup> Some also require a showing of present injury.<sup>77</sup>

The "fear of future illness" cause of action is a species of emotional distress claim.<sup>78</sup> The plaintiff generally must prove that the defendant has exposed her to an increased risk of disease, and that as a result of the exposure she has suffered some present physical manifestation, although relatively minor, stress-related symptoms may suffice.<sup>79</sup> More significantly for our purposes, the plaintiff's fear must be "reasonable."<sup>80</sup> Some courts have gone further, requiring that plaintiffs prove that their fear stems from a knowledge, corroborated by reliable medical or scientific opinion, that it is more likely than not that they will develop cancer in the future as a result of their toxic exposure.<sup>81</sup> Tying recovery to proof that an illness will likely develop resurrects the almost insurmountable barrier of scientific uncertainty.

With respect to the enhanced risk claim, courts have fashioned a kind of hybrid cause of action. Although "[i]ncreased risk alone is not actionable,"<sup>82</sup> courts have allowed plaintiffs to recover for enhanced risk where: (1) some present injury—however minimal—exists; and (2) the plaintiff can demonstrate that the disease at issue is more likely than not to occur.<sup>83</sup> Some courts have mitigated the present injury

65. See, e.g., *Tucker Anthony Realty Corp. v. Schlesinger*, 888 F.2d 969, 975 (2d Cir.1989) (plaintiff seeking an injunction must demonstrate "an injury that is neither remote nor speculative, but actual and imminent").

66. See Ernest J. Weinrib, *Causation and Wrongdoing*, 63 CHI. KENT L. REV. 407, 410 (1987) ("Through injury the general risk which the [defendant's] wrongdoing has unreasonably created lodges in a particular person."), cited in Berger, *supra* note 16, at 2132.

67. RESTATEMENT (SECOND) OF TORTS ch. 16 (1965) [hereinafter RESTATEMENT]; Palma J. Strand, *The Inapplicability of Traditional Tort Analysis to Environmental Risks: The Example of Toxic Waste Pollution Victim Compensation*, 35 STAN. L. REV. 575, 577 (1983).

68. See Farber, *supra* note 34, at 1232-36 (explaining that compensation in tort requires a far higher degree of certainty than would be required to justify preventive regulatory action). Note, however, that in the context of property torts, courts have recognized that the creation of threatened harm may constitute an actionable injury. See, e.g., *Spaulding v. Cameron*, 38 Cal. 2d 265 (Cal. 1952) (presence of fill posing threat of repeated inundations constituted nuisance).

69. D. Rosenberg, *The Causal Connection in Mass Exposure Cases: A "Public Law" Vision of the Tort System*, 97 HARV. L. REV. 851, 858 (1984).

70. See Taylor, *supra* note 19.

71. See Farber, *supra* note 34, at 1227-28.

72. See Taylor, *supra* note 19, at 756-69.

73. *Id.* at 771-88.

74. See, e.g., *Potter v. Firestone Tire & Rubber Co.*, 6 Cal. 4th 965 (Cal. 1993); *Ayers v. Jackson Township*, 106 N.J. 557, 17 ELR 20858 (N.J. 1987).

75. *Potter*, 6 Cal. 4th at 1006-07.

76. Taylor, *supra* note 19, at 785.

77. *Id.*

78. See David F. Partlett, *Tort Liability and the American Way: Reflections on Liability for Emotional Distress*, 45 AM. J. COMP. L. 171, 178 (1997).

79. See Taylor, *supra* note 19, at 772-73, for a survey of the degree of physical injury required to permit recovery for fear of future illness.

80. *Id.*

81. See, e.g., *Potter v. Firestone Tire & Rubber Co.*, 6 Cal. 4th 965, 997-98 (Cal. 1993).

82. *Whiteley v. Philip Morris, Inc.*, 117 Cal. App. 4th 635, 701 (Cal. Ct. App. 2004).

83. See Andrew R. Klein, *A Model for Enhanced Risk Recovery in Tort*, 56 WASH. & LEE L. REV. 1173 (1999).

requirement by allowing cellular or subcellular impacts to fulfill the requirement.<sup>84</sup> However, once again the requirement to prove, on a balance of probabilities, that the illness will in fact occur frequently thwarts recovery.<sup>85</sup>

In sum, tort works predominantly on an injury paradigm, supplemented by risk-based innovations developed specifically for toxic torts. Under the injury-based approach, plaintiffs are systemically undercompensated, and defendants are never forced to internalize the real costs (or even a fraction of the costs) of their use and dispersal of toxic substances.<sup>86</sup> The risk-based innovations have similarly failed to provide meaningful compensation and deterrence (and therefore environmental protection) in many, if not most, cases.<sup>87</sup> Many plaintiffs who can demonstrate that a defendant culpably created a significant increase in their risk of disease will not be able to recover, either because they have not developed any present physical manifestation or because they cannot demonstrate the requisite level of probability.<sup>88</sup> Even where recovery can be had, plaintiffs that eventually become ill may be seriously undercompensated because of the single cause-of-action rule (discussed below). As a result, the risk-based innovations also fail to force toxic defendants to internalize the costs of pollution and, thus, underdeter environmental wrongdoing.<sup>89</sup>

On a more fundamental level, both the injury paradigm and the risk-based innovations rely on a false material assumption that the impacts of synthetic chemicals are capable of being proven and quantified. These approaches—even in the most plaintiff-friendly jurisdictions—presume chemicals innocent until proven guilty. They allow defendants to subject the environment, including human beings, to a large-scale, uncontrolled experiment. As a result, as long as tort remains wedded to either the injury paradigm or risk-based innovations, it will fail to make a significant contribution to the goal of environmental protection. Conversely, in order to meet the task of environmental protection and remain relevant in the 21st century, tort is in need of a paradigm shift.

## VI. Toward an Ecological Tort Law: Precautionary Proposals

Whether in statutory or tort law, an ecological paradigm is centered on the precautionary principle. The ecological paradigm thus favors “prudent pessimism” over “hazardous optimism” in the presence of scientific uncertainty.<sup>90</sup> In the

statutory context we have seen that an ecological approach would implement the precautionary principle by requiring the cleanest possible methods of production, by prohibiting absolutely the release of the worst kinds of environmental contaminants, and by placing the burden on industry to prove the safety of the substances they wish to produce and release.<sup>91</sup> At first blush, it is difficult to see how these regulatory policies would translate into the tort context. What would an ecological tort law look like? Would a shift to the ecological paradigm in tort require a radical overhaul of the common law?<sup>92</sup> Are toxic tort and the precautionary principle indeed strange bedfellows?

In fact, they are not. The seeds of a precautionary approach to environmental tort law already lie dormant within core tort norms that date back hundreds of years. All that is required is a revitalization of these key tort concepts, coupled with the adoption of reasonable accommodations for the special problems inherent in the new toxic torts. While the wholesale “greening” of tort law may be an admirable long-term goal, we do not need a massive environmentalist conversion of jurists in order to entrench ecological paradigm principles in judicial decisionmaking. Sound ecological decisions can be made in toxic tort cases by reference to ancient principles of tort law with a few reasonable reforms.

### A. Relaxing the Single Cause-of-Action Rule

A major cause of underdeterrence and undercompensation in toxic tort is the long latency periods associated with many pollution-related illnesses. During this latency period, the plaintiff’s chances of recovery may be destroyed through loss of evidence, supervening causal events, and defendant bankruptcies.<sup>93</sup> As a result, a precautionary approach to tort would allow plaintiffs to sue before the ultimate disease develops so that a deterrence effect may be achieved immediately (before more harm is done).<sup>94</sup> The risk-based innovations discussed above theoretically allow plaintiffs to seek redress before the onset of disease, but these approaches suffer from a profound limitation. Because they provide compensation for injuries short of the ultimate illness, for those plaintiffs who do get sick, these approaches produce serious undercompensation and underdeterrence. This is because under the “single cause-of-action rule,” a plaintiff has but one chance to plead and prove all damages resulting from a tort. The court in *Richmond v. A.P. Green Industries*<sup>95</sup> summarized the toxic plaintiff’s dilemma neatly:

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*Environmental Protection in the Face of Scientific Uncertainty*, 31 WILLAMETTE L. REV. 495, 501 (1995).

84. See, e.g., *Jackson v. Johns-Manville Sales Corp.*, 758 F.2d 936 (5th Cir. 1986) (treating inhalation of asbestos fibers as present physical injury); *Sterling v. Velsicol Chem. Corp.*, 855 F.2d 1188, 19 ELR 20404 (6th Cir. 1988), discussed in Klein, *supra* note 83, at 1180.

85. See *Latent Harms*, *supra* note 15, at 1511.

86. See Klein, *supra* note 83, at 967; Taylor, *supra* note 19, at 769; Carl B. Meyer, *The Environmental Fate of Toxic Water: The Certainty of Harm, Toxic Torts, and Toxic Regulation* 19 ENVTL. L. 321, 370 (1988).

87. *Latent Harms*, *supra* note 15, at 1511.

88. In California, for example, a demonstrated 30% increase in risk would fail to justify a claim for fear of future illness even where all other elements are met. See *Potter v. Firestone Tire & Rubber Co.*, 6 Cal. 4th 965 (Cal. 1993).

89. Klein, *supra* note 83, at 1182.

90. MICHAEL JACOBS, *THE GREEN ECONOMY: ENVIRONMENT, SUSTAINABLE DEVELOPMENT, AND THE POLITICS OF THE FUTURE* 100 (1991), cited in Gregory D. Fullem, *The Precautionary Principle:*

91. See *supra* Part III.

92. James M. Olson, *Shifting the Burden of Proof: How the Common Law Can Safeguard Nature and Promote an Earth Ethic*, 20 ENVTL. L. 891, 891 (1990) (advocating for a “radical restructuring of the law’s conceptualization of human responsibility”). See also Terry W. Frazier, *The Green Alternative to Classical Liberal Property Theory*, 20 VT. L. REV. 299, 310 (“Limited recognition of only some human relationships is the functional equivalent of ecological ignorance.”).

93. See *Latent Harms*, *supra* note 15, at 1507-08.

94. See Klein, *supra* note 83, at 1182 (“[A] tort system that does not address enhanced risk shortly after exposure may fall far short of providing optimal deterrence against those that expose others to toxins.”).

95. 78 Cal. Rptr. 2d 356 (Cal. Ct. App. 1998).

[T]he general rule of American jurisprudence [is] that all claims arising from a single wrongful act must be asserted in a single cause of action. . . . To assert any cause of action, however, the plaintiff . . . must be able to allege that the damages, including future consequences resulting from the defendant's wrongful act are certain. A cause of action will not lie if the damages are only speculative. The single action and certainty of damage rules are on a potential collision course in the case of injuries from asbestos exposure.<sup>96</sup>

The toxic plaintiff stands in the path of this doctrinal collision. If she chooses to seek damages for medical monitoring or fear of future illness, and later contracts a disabling cancer, she may not be able to bring an additional suit to recover her now exponentially increased damages.<sup>97</sup> As a result, even under the risk-based innovations, innocent plaintiffs are left to bear a substantial portion of the costs of toxic wrongdoing, and, conversely, toxic tortfeasors pay for only a fraction of the expenses they have caused.

A number of courts have relaxed the single cause-of-action rule in asbestos cases, treating the earlier, less damaging asbestos-related health impacts (such as plural thickening) as distinct from the later, more devastating diseases (such as mesothelioma), thus allowing separate suits for each category of injury.<sup>98</sup> As a preliminary, modest, and necessary step in creating a tort system that is both more precautionary and more just, the single cause-of-action rule should be relaxed in all toxic tort cases in order to allow plaintiffs proceeding under either the risk-based innovations or the toxic battery cause of action (discussed below) to obtain full recovery if and when they develop a disease that is causally traceable to their exposure. Allowing splitting serves both deterrence and compensation by ensuring that toxic defendants internalize the full costs of their tortious behavior and that those plaintiffs who ultimately get sick are not forced to pay the costs of environmental wrongdoing.

### B. A Precautionary Tort—Toxic Battery

The tort of toxic battery<sup>99</sup> has great potential to further the entrenchment of the ecological paradigm in tort law. The ancient tort of battery is rooted in the common law's recognition of personal sovereignty over the body.<sup>100</sup> "The funda-

mental principle, plain and incontestable, is that every person's body is inviolate."<sup>101</sup> American courts have recognized that the battery cause of action vindicates an individual's right to physical security and bodily integrity.<sup>102</sup>

A prima facie case for battery exists where the plaintiff can demonstrate that the defendant intentionally subjected her to a harmful or offensive touching.<sup>103</sup> A battery may occur even where the plaintiff is not aware that the contact has occurred.<sup>104</sup> Significantly, the plaintiff in a battery action need not prove causation of physical harm or illness, "[s]ince the essence of the plaintiff's grievance consists in the offense to the dignity involved in the unpermitted and intentional invasion of the inviolability of his person and not in any physical harm done to his body."<sup>105</sup> The defendant need not directly touch the plaintiff in order for a battery to occur. "All that is necessary is that the actor intend to cause the other, directly or indirectly, to come in contact with a foreign substance in a manner which the other will reasonably regard as offensive."<sup>106</sup> The element of intent is established where a plaintiff can show that the defendant intended to cause the offensive touching of the plaintiff or a third person or knew that the touching was substantially certain to result from his or her conduct.<sup>107</sup> Express or implied consent is a defense but such consent is only effective if the consenting person understands "the nature and quality of the invasion intended by the conduct."<sup>108</sup>

Battery is singularly well equipped to address toxic wrongdoing.<sup>109</sup> The absence of any physical (as opposed to legal) injury requirement prevents plaintiffs from being hamstrung by the frequently impossible task of establishing causation of harm in the face of intractable uncertainty. The intention requirement for battery should be easily met in most cases of known emissions since the science of contaminant fate and transport has clearly demonstrated that the emission of a persistent substance virtually anywhere on earth is substantially certain to result in human exposure somewhere.<sup>110</sup> Finally, given the stakes involved and the law's traditional respect for personal autonomy, implied consent to touching by potentially harmful chemicals should rarely be found.<sup>111</sup>

101. *Collins v. Wilcock*, 3 All E.R. 374, 378 (Eng. Q.B. 1984).

102. *See, e.g., Davis*, 506 F. Supp. at 915.

103. RESTATEMENT, *supra* note 67, §18.

104. *Id.* cmt. d.

105. *Id.* cmt. c; *Ezenwa v. Gallen*, 906 F. Supp. 978, 983 (M.D. Pa. 1995) ("[P]hysical harm is not an element of a cause of action for battery."); *see also* Christopher J. McAuliffe, *Resurrecting an Old Cause of Action for a New Wrong: Battery as a Toxic Tort*, 20 B.C. ENVTL. AFF. L. REV. 265, 289 (1993).

106. RESTATEMENT, *supra* note 67, §18, cmt. c.

107. *See id.* §8A, cmt. b.

108. *Barnes v. American Tobacco Co.*, 161 F.3d 127, 147 (3d Cir. 1998) (citing *W. PAGE KEETON ET AL., PROSSER AND KEETON ON THE LAW OF TORTS* §18, at 114 (5th ed. 1984)) [hereinafter *PROSSER & KEETON*].

109. *See generally* Meyer, *supra* note 86; McAuliffe, *supra* note 105; Kathy Steward Northern, *Battery and Beyond: A Tort Law Response to Environmental Racism*, 21 WM. & MARY ENVTL. L. & POL'Y REV. 485 (1997).

110. *See Meyer, supra* note 86, at 365; note that the intent to cause a harmful or offensive contact with any person, coupled with an actual contact with the plaintiff, satisfies the intent element of battery. RESTATEMENT, *supra* note 67, §18.

111. McAuliffe, *supra* note 105, at 290. The risk perception literature confirms that most people do not view toxic exposure as an ordinary,

96. *Id.* at 359-60 (citing *Crowley v. Katleman*, 8 Cal. 4th 666, 681 (Cal. 1994)); *Marinari v. Asbestos Corp., Ltd.*, 417 Pa. Super. 440 (Pa. Super. Ct. 1992); *Devlin v. Johns-Manville Corp.*, 202 N. J. Super. 556, 568 (N.J. Super. Ct. 1985); *Sheppard v. A.C. & S. Co.*, 498 A.2d 1126, 1134 (Del. Super. Ct. 1985); *Potts v. Celotex Corp.*, 796 S.W. 2d 678, 682 (Tenn. 1990).

97. *See Klein, supra* note 83, at 1181-82.

98. *See, e.g., General Foundry Serv. v. Workers' Comp. Appeals Bd.*, 42 Cal. 3d 331, 336 (Cal. 1986); *Armstrong World Indus., Inc. v. Aetna Cas. & Sur. Co.*, 45 Cal. App. 4th 1, 37 (Cal. Ct. App. 1996); *Chevron, U.S.A., Inc. v. Workers' Comp. Appeals Bd.*, 219 Cal. App. 3d 1265, 1268 (Cal. Ct. App. 1990); *Marinari*, 417 Pa. Super. at 440; *Potts*, 796 S.W. 2d at 678; *Mauro v. Raymark Indus., Inc.*, 116 N.J. 126, 143-44 (N.J. 1989); *Hagerty v. L&L Marine Serv., Inc.*, 788 F.2d 315, 320 (5th Cir. 1986); *Eagle-Picher Indus., Inc. v. Cox*, 481 So. 2d 517, 522 (Fla. Dist. Ct. App. 1985).

99. The term "toxic battery" refers to a battery committed by means of an environmental contaminant. *See, e.g., Gulden v. Crown Zellerbach Corp.*, 890 F.2d 195 (9th Cir. 1989) (battery cause of action viable where defendant directed plaintiffs to scrub floors covered in polychlorinated biphenyls at concentrations over 500 times the EPA standard without adequate protective clothing).

100. *See Davis v. Hubbard*, 506 F. Supp. 915, 930 (N.D. Ohio 1980) ("[T]here is perhaps no right which is older than a person's right to be free from unwarranted personal contact.").

Small-scale contamination—such as leaving poisoned food out for another—has already been recognized as battery.<sup>112</sup> There is no reason in law or logic not to extend such recognition to more widespread contamination of common resources such as air and water. Where a substance is known to be harmful, battery prevents a defendant from escaping liability by casting doubt on the origin of disease in a particular plaintiff (otherwise known as “specific causation”). Perhaps more significantly, where the effects of a substance are uncertain (making generic causation problematic), battery can also provide redress to plaintiffs who undergo an involuntary exposure, even if they are not yet sick. This is because personal sovereignty over the body—at the heart of battery—is violated any time an individual is nonconsensually exposed to a foreign substance in a way that reasonable people would find offensive.<sup>113</sup> Research on risk perception lends support to the common sense proposition that most people would find it offensive to be used as test subjects for poorly understood but potentially harmful industrial chemicals, without consent or compensation.<sup>114</sup>

Yet our current systems of both statutory and tort law rely to a large extent on de facto mass experimentation on the public at large.<sup>115</sup> Because substances are presumed innocent until proven guilty, companies are frequently allowed to discharge poorly understood chemicals into the environment until clear health damage appears in the epidemiological data.<sup>116</sup> This “body count method” of regulation is not only “an unconscionable approach to environmental policy,”<sup>117</sup> it is also battery. Involuntary experimentation is a recognized form of battery.<sup>118</sup> Indeed, without informed consent, medical treatment or experimentation of any kind—even where it may be beneficial—gives rise to tort liability:

The common law over the centuries has always protected individuals from unwanted intentional contacts with their person. . . . The common-law action of battery developed out of the law’s recognition of an individual’s interest in personal autonomy and bodily integrity—that is, the right of a person to participate in and make decisions about his own body. The law of informed consent emerged from the law of battery, which was applied to unauthorized touchings by a physician. The rules of informed consent are built on the principle that only the patient has the right to weigh the risks attending the particular treatment and decide for himself what course of action is best suited for him.<sup>119</sup>

Although most jurisdictions view the informed consent cause of action as a species of negligence,<sup>120</sup> where consent

acceptable form of contact in the modern world. Rather, most people are highly averse to being exposed to environmental hazards with the potential to cause serious health damage such as cancer. See ACKERMAN & HEINZERLING, *supra* note 8, at 131-147.

112. PROSSER & KEETON, *supra* note 108, at 40.

113. RESTATEMENT, *supra* note 67, §18, cmt. c.

114. ACKERMAN & HEINZERLING, *supra* note 8, at 131-47.

115. See Pettit, *supra* note 22, at 414-15.

116. THORNTON, *supra* note 1, at 105-06.

117. *Id.* at 106.

118. See Kus v. Sherman Hosp., 268 Ill. App. 3d 771 (Ill. Ct. App. 1995).

119. People v. Medina, 705 P.2d 961, 9 (Colo. 1985).

120. See, e.g., Kennis v. Mercy Hosp. Med. Ctr., 491 N.W.2d 161, 164 (Iowa 1992); Smith v. Globe Life Ins., 460 Mich. 446 (Mich. 1999); Kohoutek v. Hafner, 383 N.W.2d 295, 298-300 (Minn. 1986);

is never requested or obtained, battery remains the operative tort.<sup>121</sup>

In the “involuntary experimentation” formulation of battery, toxic defendants should be able to exculpate themselves by proving that before they produced or released the substance in question, they investigated it to an extent that its impacts were substantially understood, such that its release into the environment (or the market) was not a de facto experiment on the exposed population, and the touching was not offensive. Similarly, if a defendant can prove that the substance was known to be innocuous at the time of production or release, there would be a strong basis for finding implied consent. The common sense distinction here is that as inhabitants of an industrialized world, we all implicitly consent to be exposed to some level of synthetic chemicals but we do not consent to exposure to untested chemicals that have the potential to cause cancer, birth defects, and other serious health damage.<sup>122</sup>

Of course, even if involuntary chemical exposure is recognized as a battery, plaintiffs still face the problem of proving causation of their damages. Remedies for battery include nominal, compensatory, and punitive damages,<sup>123</sup> and because battery is an intentional tort, both special and consequential damages are available, even where the damages were not foreseeable.<sup>124</sup> For all of the reasons discussed above, it may be difficult or impossible for plaintiffs who are already ill to prove that their health problems were caused by the defendant’s chemical. However, Christopher J. McAuliffe suggests that while compensatory damages may be difficult to prove, evidence of egregious conduct on the part of defendants, and/or serious health damage on the part of plaintiffs, may lead juries to couple nominal damages with substantial punitive damages awards.<sup>125</sup> For those plaintiffs who are not yet sick, a relaxation of the single cause-of-action rule is necessary in order to allow immediate redress for, and deterrence of, involuntary exposure while still permitting full recovery if a serious illness ultimately develops.<sup>126</sup>

An increased use and liberal treatment of environmental battery claims, particularly the involuntary experimentation subspecies of battery, has the potential to create incentives for corporate polluters to adequately investigate synthetic

Baltzell v. Van Buskirk, 752 S.W.2d 902, 906 (Mo. Ct. App. 1988); Howard v. University of Med. & Dentistry of N.J., 172 N.J. 537, 546-48 (N.J. 2002); McPherson v. Ellis, 305 N.C. 266, 287 (N.C. 1982); Ashe v. Radiation Oncology Assocs., 9 S.W.3d 119, 121 (Tenn. 1999); Lounsbury v. Capel, 836 P.2d 188, 193-94 (Utah. Ct. App. 1992); Martin v. Richards, 192 Wis. 2d 156 (Wis. 1995).

121. E. Haavi Morreim, *Litigation in Clinical Research: Malpractice Doctrines Versus Research Realities*, 32 J.L. & MED. ETHICS 474, 478 (2004); see also Mole v. Jutton, 381 Md. 27, 47 (Md. 2004); Howard, 172 N.J. at 550 (battery applicable where no consent is obtained); Lounsbury, 836 P.2d at 193 (battery applicable where patient consents to one procedure but receives another); Baltzell, 752 S.W.2d at 906 (claim in battery may lie where an operation is performed without the patient’s consent, or where procedure was not that to which patient gave consent).

122. Again, risk perception literature confirms that most people are in fact highly averse to being exposed to environmental hazards, a result that is inconsistent with a finding of implied consent. See ACKERMAN & HEINZERLING, *supra* note 8, at 131-47.

123. McAuliffe, *supra* note 105, at 290.

124. Meyer, *supra* note 86, at 375.

125. McAuliffe, *supra* note 105, at 292-93.

126. *Id.* at 293.

chemicals *before* they are released into the environment. Rather than incentivizing inadequate research as the current injury- and risk-based torts do, toxic battery promotes industrial precaution as well as respect for personal autonomy and bodily integrity. However, as we have seen, causation remains a significant hurdle to plaintiffs even in the battery cause of action.

### C. Reversing the Burden of Proof on Causation

Causation has been widely recognized as the most significant barrier to recovery for toxic tort plaintiffs.<sup>127</sup> As explained above, tort's current approach irrationally places the enormous burden of chemical investigations on injured plaintiffs, while encouraging industry to "choose[ ] ignorance and manufacture[ ] uncertainty . . ."<sup>128</sup> It institutionalizes "hazardous optimism"<sup>129</sup> and unjustly denies recovery to plaintiffs who have been injured or exposed to unreasonable risk by tortious pollution. Accordingly, a number of commentators have suggested that the burden of proof on causation should be reversed in toxic tort cases.<sup>130</sup>

Such a shift finds support in a number of theoretical bases. Because tort traditionally allocates the burden of proof to the person seeking to change the status quo, James M. Olson asserts that tort should redefine the status quo from an ecological perspective.<sup>131</sup> Thus, rather than viewing the status quo as a state of human conduct, e.g., the discharge of airborne contaminants, the status quo should be defined as an unpolluted or less-polluted environment, e.g., clean air.<sup>132</sup> Since it is the toxic defendant who seeks to change, or has already changed, the status quo, the burden should be on her to prove that the change is or was justified.<sup>133</sup> Prof. Margaret Berger, taking a more traditional tort approach, argues that we should eliminate the plaintiff's duty to prove causation because the causation requirement inappropriately severs liability from moral responsibility.<sup>134</sup> In other words, conditioning liability on the fortuitous ability to prove causation, rather than the culpability of a defendant's behavior, makes no moral sense.

Causation reform can also be justified by reference to concern for fairness to the victims of toxic exposure. The concept is simple: as between innocent plaintiffs who have been involuntarily exposed to chemical risks (lacking information or ability to prevent the exposure) and defendants who release dangerous or poorly understood chemicals for private profit (while possessing the ability to study the chemical and/or prevent its release), the latter should bear

the burden of scientific uncertainty.<sup>135</sup> The strength of this proposition is substantially increased when a defendant negligently creates a risk of harm and the plaintiff actually sustains harm within the area of risk.

Whatever the theoretical foundation for a policy reversing the onus of proof on causation in toxic tort cases, the question remains as to how courts would administer such a rule. Clearly, a plaintiff's bare assertions should not give rise to a duty on the part of defendants to disprove causation. Instead, plaintiffs should be required to put forward some kind of prima facie case in order to trigger the reverse onus. One possibility would be to impose a reverse onus only after a plaintiff has proven that the defendant materially increased her risk of developing the type of illness she ultimately contracted.<sup>136</sup> This approach would vastly increase plaintiff's chances of success in many cases. However, the approach could still preclude recovery in cases in which a contaminant is so poorly understood that the plaintiff cannot even demonstrate an increased risk. Manufacturing total ignorance would still shield defendants from liability.

Prof. Wendy Wagner and Professor Berger have proposed stronger, more precautionary reforms that would solve the intentional ignorance problem. Under both models, proof of a failure to discover and disseminate adequate health information about a substance stands in for proof of causation of harm.<sup>137</sup> Like the "involuntary experimentation" formulation of environmental battery, this cause of action turns the uncertainty dilemma on its head. Rather than penalizing plaintiffs for their inability to prove the characteristics of a substance, the information-based claims impose liability on defendants for releasing the substance before discovering these characteristics themselves.<sup>138</sup> Once a plaintiff has made a prima facie case that the defendant released an inadequately investigated chemical, the defendant could then exculpate itself by disproving causation—either by showing that the substance in question was incapable of causing the type of illness suffered by the plaintiff, i.e., disproving general causation, or by proving that a particular plaintiff's illness was caused by other factors, i.e., disproving specific causation.<sup>139</sup> If a plaintiff is unable to prove inadequate testing, then the traditional allocations of burden of proof would apply.

While Professor Berger does not define the level of investigation that would qualify as adequate, Professor Wagner argues that "minimal" safety research should suffice.<sup>140</sup> "Minimal [research] generally consists of one or more short-term laboratory tests designed to determine if a product is likely to constitute a serious hazard . . ."<sup>141</sup> In contrast, "the comprehensive level of research consists of a series of studies sufficient to resolve most remaining, scientifically answerable questions regarding the extent of the hazard."<sup>142</sup> Professor Wagner acknowledges that under her approach, companies would have little or no legal incentive to conduct

127. See *id.*; Taylor, *supra* note 19, at 765; Farber, *supra* note 34; Jean Macchiaroli Eggen, *Toxic Torts, Causation, and Scientific Evidence After Daubert*, 55 U. PITT. L. REV. 889, 896 (1994); Brennan, *supra* note 5, at 469; Wagner, *supra* note 22, at 793-94.

128. McGarity, *supra* note 7, at 331 (citing Wendy E. Wagner, *Commons Ignorance: The Failure of Environmental Law to Produce Needed Information on Health and the Environment*, 53 DUKE L.J. 1619 (2004)).

129. JACOBS, *supra* note 90, at 100.

130. See, e.g., Olson, *supra* note 92; Berger, *supra* note 16; Lynda M. Collins, *Material Contribution to Risk and Causation in Toxic Torts*, 11 J. ENVTL. L. & POL'Y 106, 140 (2002).

131. Olson, *supra* note 92, at 894.

132. *Id.*

133. *Id.*

134. Berger, *supra* note 16, at 2133-34.

135. See Wagner, *supra* note 22.

136. See Collins, *supra* note 130, at 122, 140; HADSKIS, *supra* note 33, at 117-18.

137. Wagner, *supra* note 22, at 834-36; Berger, *supra* note 16, at 2117.

138. *Id.*

139. Wagner, *supra* note 22, at 835-36; Berger, *supra* note 16, at 2144-45.

140. Wagner, *supra* note 22, at 835-36.

141. *Id.* at 781-82.

142. *Id.*

comprehensive testing when minimal research reveals some cause for concern, but argues that the need for a clear standard of adequacy (among other pragmatic considerations) supports her proposal.<sup>143</sup>

Given the significant uncertainties inherent in contaminant assessments,<sup>144</sup> and the very high stakes involved, I would argue that minimal research generally should not be sufficient to avoid the reverse onus. Rather, the reverse onus model should define adequacy according to the precautionary principle, on a case-by-case basis using expert testimony as well as jurors' common sense. Although the precautionary principle may be seen as ambiguous when compared to Professor Wagner's more mechanical approach, it is no more ambiguous than many core tort concepts (such as the notion of due care in negligence) that are applied by juries every day. A precautionary approach demands that manufacturers investigate their substances comprehensively wherever there is reason to suspect a threat of serious or irreversible health or environmental damage.<sup>145</sup> If such research confirms the potential (albeit uncertain) for serious harm, then the substance should not be released.<sup>146</sup> Accordingly, under an ecological tort law approach, where minimal testing revealed a serious threat, a defendant who failed to undertake further research should not be relieved of the reverse onus. Minimal testing should preclude the reverse onus only where such testing confidently ruled out threats of serious or irreversible harm.

With that caveat, the models proposed by Professors Wagner and Berger are extremely compelling from both ecological and core tort value perspectives. Their implementation would create clear and powerful incentives for industry to "look before it leaps," resulting in significant gains in environmental protection and public health. Under these models, defendants would be held responsible for the true social costs of their activities and would be motivated to reduce these costs to socially efficient levels. Similarly, the information-based models would substantially improve tort's ability to meet its own traditional goals of compensation and deterrence.

Of the three "precautionary proposals" put forth in this Article, reversing the burden of proof on causation is decidedly the most ambitious. However, the common law is designed to evolve and adapt to changing circumstances in society,<sup>147</sup> and doing justice sometimes requires that the law revise or even abandon particular rules in order to remain true to its basic values.<sup>148</sup> In addition to the compensation of injured parties, deterrence of harmful conduct is a major goal of tort law, and fairness is an overarching principle gov-

erning the imposition of liability through tort. As currently framed, "the law is so ill-equipped to deal with the uncertainties inherent in toxic tort cases that the application of common-law tort doctrine to such cases significantly undermines the objectives of the tort system."<sup>149</sup> Just as physicists have had to abandon the Newtonian worldview in some cases,<sup>150</sup> tort jurists should let go of classical doctrines that cannot reasonably be applied to chemical wrongdoing.<sup>151</sup> As one court has put it:

The simple fact is that rules developed against the relatively unsophisticated backdrops of barroom brawls, intersection collisions and slips and falls lose some of their relevance in these days of miracle [chemicals] with their wondrous, unintended, unanticipated and frequently long-delayed side effects.<sup>152</sup>

A tort system based on the ecological paradigm would reverse the burden of proof on causation. More specifically, tort should reverse the burden on generic causation when plaintiffs can prove that a defendant conducted inadequate testing of its product before releasing it into the environment (including the market). While a plaintiff should still have to lead evidence of specific causation, including evidence of exposure, she should not be required to prove that the substance at issue was capable of causing the kind of injury she sustained when the defendant's own conduct (or inaction) has placed such proof beyond her reach.

## VII. Conclusion

Scientists and legal scholars have made a compelling case for a precautionary approach to statutory environmental regulation. Common-law tort must also embrace a precautionary paradigm if it is to realize its potential to play a meaningful role in arresting environmental degradation and doing justice to the victims of environmental torts. Given the important role of tort law in our hybrid legal system of environmental protection, it is incumbent on scholars and jurists alike to ensure that tort improves its ability to respond to environmental wrongdoing. Indeed, tort's response to environmental pollution will play a significant role in determining the extent to which ordinary people are exposed to untested toxic chemicals in the coming decades.<sup>153</sup>

In order to contribute effectively to environmental protection, tort needs to embrace the ecological paradigm and abandon the scientifically questionable assumptions of the risk and injury paradigms. As a starting point, the single cause-of-action rule should be relaxed in all toxic tort cases in order to allow for early deterrence and full compensation of injured plaintiffs. For cases in which a plaintiff has not yet fallen ill, toxic battery (coupled with a relaxation of the single cause-of-action rule) offers an appropriately precaution-

143. *Id.* at 837 & 837 n.238, 842 & 842 n.253. Wagner does suggest providing a complete defense to defendants who conduct comprehensive testing that indicates the product is safe. *Id.* at 838. However, in her formulation, this "carrot" is unaccompanied by the requisite "stick" to encourage companies to vigorously investigate substances that are likely to be found unsafe. It is of course this latter category of substances that is most in need of investigation.

144. See *supra* notes 30-48 and accompanying text.

145. See *supra* notes 51-63 and accompanying text.

146. *Id.*

147. Taylor, *supra* note 19, at 770.

148. See *Sindell v. Abbot Labs.*, 26 Cal. 3d 588, 610 (Cal. 1980), *cert. denied*, 449 U.S. 912 (1980) (noting courts have a choice "either to adhere rigidly to prior doctrine, denying recovery to those injured by [new chemical] products, or to fashion remedies to meet these changing needs").

149. Melanie B. Leslie, *Liability for Increased Risk of Harm: A Lawyer's Response to Professor Shafer*, 22 CARDOZO L. REV. 1835, 1837 (2001).

150. See Rosenberg, *supra* note 69, at 925.

151. See Leslie, *supra* note 149, at 1837 ("the law is so ill-equipped to deal with the uncertainties inherent in toxic tort cases that the application of common-law tort doctrine to such cases significantly undermines the objectives of the tort system").

152. *Martinez-Ferrer v. Richardson-Merrel, Inc.*, 105 Cal. App. 3d 316, 324 (Cal. Ct. App. 1980).

153. See *Ileto v. Glock, Inc.*, 370 F.3d 860, 868 (9th Cir. 2004); J. Swaigen, *The Role of the Civil Courts in Resolving Risk and Uncertainty in Environmental Law*, 2 J. ENVTL. L. & POL'Y 199, 217 (1991).

ary tort response. For cases in which health damage has already occurred, the ecological paradigm demands a reversal of the burden of proof on generic causation where a defendant has failed to adequately research its product. All three approaches vindicate the individual's interest in bodily integrity, and, by proxy, our collective interest in ecological

integrity. Until trees have standing,<sup>154</sup> these approaches may be the most effective way for the common law to do its part in safeguarding the environment.

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154. See Christopher D. Stone, *Should Trees Have Standing?—Toward Legal Rights for Natural Objects*, 45 S. CAL. L. REV. 450 (1972).