

# ESSAY

## STANDING AND THE PRECAUTIONARY PRINCIPLE

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*In Massachusetts v. EPA, the Supreme Court upheld Massachusetts's standing to challenge EPA's refusal to regulate greenhouse gas emissions from mobile sources. The majority and dissent disputed whether the science of global warming was sufficient to establish standing. Absent from both opinions was discussion of whether there would be standing if the science were uncertain but the potential harms large and irreversible. This Essay argues that "precautionary-based standing"—grounded upon a fundamental principle of environmental law, the precautionary principle—should apply in such cases.*

*Precautionary-based standing would not upset existing standing doctrine. First, its application would be limited, and could be further limited to cases brought by a sovereign. Second, there already are less stringent standing requirements in areas where courts have deemed precaution to be appropriate. Third, the catastrophic and uncertain nature of the injury in a precautionary-based standing approach would satisfy Article III.*

*The argument here is important in several ways. First, reliance upon the precautionary principle might attract the support of people who question the certainty of the science but recognize the large risks associated with global warming. Second, precautionary-based standing would be available to address future environmental crises where scientific understanding that the threat is real may lag. Third, precautionary-based standing eventually may generate a broader evolution of standing jurisprudence. Fourth, importation and application of the precautionary principle to questions of standing will provide a logical and stable setting in which the precautionary principle might develop and flourish.*

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INTRODUCTION

In the heralded case of *Massachusetts v. EPA*,<sup>1</sup> the United States Supreme Court decided by a 5-4 vote that the State of Massachusetts had standing to challenge the Environmental Protection Agency’s (EPA) refusal to regulate greenhouse gas emissions from automobiles and other mobile sources.<sup>2</sup> The majority grounded its holding on EPA’s failure to challenge Massachusetts’s assertions about the likelihood, and likely effects, of global warming. The majority accepted (at least for purposes of determining the presence of standing) the plaintiffs’ allegations—which, as the majority noted, were uncontested by EPA—that global warming was occurring as a result of anthropogenic greenhouse gas emissions, and that Massachusetts would suffer harm as a result.<sup>3</sup> A dissent authored by the Chief Justice assailed the majority opinion, questioning whether the science of global warming was sufficient to establish standing.<sup>4</sup>

Both the majority and dissent, then, disputed only whether the science underlying the anthropogenic greenhouse effect was adequate to establish standing. Presumably, if the majority agreed with the dissent that the science was lacking, it would have agreed that there was no standing. Presumably, as well, had the dissenting Justices accepted the science, they would have agreed that there was standing.

Notably absent from either the majority or dissenting opinion was explicit discussion of how standing would be affected if, in fact, the science was uncertain but the potential harms were large and irreversible. It would seem that the dissenting Justices would not think there was standing in such a case. The Justices in the majority dodged the question by stating that EPA did not contest the validity of the underlying science.<sup>5</sup>

1. 127 S. Ct. 1438 (2007).

2. The five-member majority also held that, contrary to the agency’s claim, EPA did have the authority to act under the Clean Air Act, and that the agency’s explanation for why it had not exercised its discretion to do so was inconsistent with the relevant legal standard. *Id.* at 1459–63.

3. *Id.* at 1457–58.

4. *Id.* at 1467–70 (Roberts, C.J., dissenting). A separate dissent by Justice Scalia challenged the majority opinion on the merits, arguing that EPA did not have authority to regulate greenhouse gas emissions and in any event justifiably exercised its discretion not to. *Id.* at 1474–77 (Scalia, J., dissenting). In the text, when I refer to “the dissent,” I refer to the Chief Justice’s dissent, not Justice Scalia’s.

5. *Id.* at 1457 (majority opinion).

In this Essay, I will argue that a fundamental principle of environmental law—the precautionary principle<sup>6</sup>—should inform the question left unanswered in *Massachusetts v. EPA*. The precautionary principle addresses situations such as this and explains that the absence of certainty in the face of a large risk does not justify inaction. Application of the precautionary principle to the question of standing would suggest that what I will call “precautionary-based standing” should apply in cases in which it can be shown that there is uncertainty as to whether irreversible and catastrophic harms may occur.

Precautionary-based standing would not upset the existing general law of standing. First, precautionary-based standing would be limited, in that it would apply only in cases in which there is uncertainty as to the occurrence of catastrophic, irreversible harm. Precautionary-based standing could further be limited to cases brought by sovereign states.<sup>7</sup> Second, there is already authority in standing jurisprudence to lessen the stringency of standing requirements in other areas where courts have deemed precaution to be appropriate: the First Amendment and declaratory judgment actions.<sup>8</sup> Third, though not as imminent as typical injuries that give rise to standing, the catastrophic nature of the injury—and the uncertainty regarding whether the injury might occur—in precautionary-based standing cases will be sufficient to satisfy Article III.

The argument I advance here is important in several ways. First, public reaction to the *Massachusetts* decision has been mixed. Several newspapers have featured editorials and op-ed pieces criticizing the Court’s reasoning.<sup>9</sup> The Court’s failure to address the question of precaution leaves the majority opinion much more subject to criticism. Reli-

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6. Cass Sunstein has presented the essence of the precautionary principle thus: “Avoid steps that will create a risk of harm. Until safety is established, be cautious; do not require unambiguous evidence. In a catchphrase: better safe than sorry.” Cass R. Sunstein, *Beyond the Precautionary Principle*, 151 U. Pa. L. Rev. 1003, 1003–04 (2003) [hereinafter Sunstein, *Beyond Precautionary*]. On the history and evolution of the principle, see generally Arie Trouwborst, *Evolution and Status of the Precautionary Principle in International Law* 7–31 (Daniel Bondansky & David Freestone eds., 2002).

7. Indeed, the majority in *Massachusetts* suggested this possibility, although the relevance of *Massachusetts*’s role as sovereign to the Court’s ultimate conclusion remains murky. See *Massachusetts*, 127 S. Ct. at 1454–55 (granting state “special solicitude” for standing analysis). This reworking makes better use of the point than did the majority. See *infra* text accompanying notes 88–92.

8. See, e.g., *MedImmune, Inc. v. Genentech, Inc.*, 127 S. Ct. 764, 772 (2007) (noting that justification for Declaratory Judgment Act is that it relieves party of having to wait until injury actually occurs to bring suit); *Gooding v. Wilson*, 405 U.S. 518, 521 (1972) (recognizing standing to challenge overbroad speech restriction even where narrowly drawn statute might have properly restricted party’s speech).

9. See, e.g., Editorial, *Black Robes, Hot Air*, N.Y. Post, Apr. 4, 2007, at 28 (arguing that Court improperly substituted its will for clearly expressed mandate of Congress); Holman W. Jenkins, Jr., *Op-Ed.*, *Climate of Opinion*, Wall St. J., Apr. 4, 2007, at A14 (criticizing Court for relying on “consensus” as evidence of “unproven” and “unprovable” theory); Editorial, *Jolly Green Justices*, Wall St. J., Apr. 3, 2007, at A14 (criticizing Court for judicial activism).

ance upon the precautionary principle might attract the support of people who question the absolute certainty of the science but who recognize the large risks associated with global warming in the event that the science is in fact correct.

Second, the use of the precautionary principle is important even to people who are persuaded by the amount of scientific evidence of global warming. Even if a consensus does now exist regarding global warming, that was not always the case.<sup>10</sup> The unavailability of precautionary-based standing has contributed to a delay, at least with respect to litigation over the issue. Also, scientific uncertainty regarding developing environmental challenges will always exist. An application of the precautionary principle to standing will enable courts to tackle future environmental problems before ironclad scientific consensus emerges.

Third, reliance upon the precautionary principle to determine standing need not be limited to matters of environmental law. Environmental law has in recent years served to push the envelope of federal court standing doctrine, but the developments in standing jurisprudence that these environmental law cases have secured are not limited to environmental law cases.<sup>11</sup> Similarly, it may be that precautionary-based standing will eventually generate a broader evolution of standing jurisprudence.

Fourth, importation and application of the precautionary principle to questions of standing will provide a logical and stable setting in which the precautionary principle could develop and flourish. Many commentators have long lamented the lack of certainty underlying the principle and its application.<sup>12</sup> Some have asserted that the principle is inherently contradictory.<sup>13</sup> Other commentators have struggled to explain how the

10. See, e.g., Neal F. Lane & Rosina Bierbaum, Recent Advances in the Science of Climate Change, 15 *Nat. Resources & Env't* 147, 147–48 (2001) (stating that much of evidence that global warming is caused by humans has been uncovered since 1996); *infra* note 63 and accompanying text.

11. See, e.g., *Parents Involved in Cmty. Sch. v. Seattle Sch. Dist. No. 1*, 127 S. Ct. 2738, 2751 (2007) (applying holding of *Friends of the Earth, Inc. v. Laidlaw Environmental Services, Inc.*, 528 U.S. 167 (2000), which provided that voluntary cessation of activity does not moot case unless subsequent events make it absolutely clear that allegedly wrongful behavior will not recur, to setting of challenge to school district policy to allot slots in schools); *Heckler v. Mathews*, 465 U.S. 728, 739–40 & n.7 (1984) (applying to setting of stigmatic harm holding of *Sierra Club v. Morton*, 405 U.S. 727 (1972), that noneconomic harms can give rise to standing).

12. See, e.g., John O. McGinnis, The Appropriate Hierarchy of Global Multilateralism and Customary International Law: The Example of the WTO, 44 *Va. J. Int'l L.* 229, 272 (2003) (observing that “the multiplicity of . . . meanings” attributed to principle “complicates the search for a general precautionary principle”).

13. See, e.g., Cass R. Sunstein, Irreversible and Catastrophic, 91 *Cornell L. Rev.* 841, 848 (2006) [hereinafter Sunstein, *Irreversible and Catastrophic*] (“[T]here are twenty or more definitions of the Precautionary Principle, and they are not all compatible with one another.”).

principle might be applied logically and coherently in legal practice.<sup>14</sup> Because the question of standing generally arises before the merits and generally does not prejudice any ultimate determination on the merits, the use of the precautionary principle to determine standing would allow the principle to function solely as a gatekeeper to merits questions. To make the first role of the principle in American jurisprudence the resolution of cases on the merits would serve only to highlight conflict over the principle's meaning and scope. Gatekeeping, by contrast, is a natural entry point for a principle dogged by confusion over its true meaning and import.

This Essay proceeds as follows. In Part I, I discuss the precautionary principle. I elaborate on the principle's evolution and explain its various interpretations and contradictions. In Part II, I provide an overview of federal court standing doctrine, including the Court's recent decision in the *Massachusetts* case.

In Part III, I argue for the inclusion of the precautionary principle in standing jurisprudence. I begin by explaining how precautionary-based standing would operate. I then discuss why this incorporation is normatively desirable. I conclude that consideration of the precautionary principle in standing inquiries will both improve standing jurisprudence and facilitate the development of the precautionary principle.

## I. THE PRECAUTIONARY PRINCIPLE

The precautionary principle is a normative principle of environmental law.<sup>15</sup> In its essence, the precautionary principle calls for the exercise of caution<sup>16</sup> in the face of risk and uncertainty.<sup>17</sup> While the principle can be applied in any setting in which risk and uncertainty are found, it has evolved predominantly in, and today remains most closely associated with, the environmental arena. This is not surprising: Environmental problems typically arise in settings of risk and uncertainty. For example,

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14. See, e.g. Mark Geistfeld, Implementing the Precautionary Principle, 31 *Env'tl. L. Rep.* 11326, 11326 (2001) ("The vagueness of the principle explains why it so hard to implement.").

15. See Trouwborst, *supra* note 6, at 30 (describing precautionary principle as "firmly anchored in environmental law and policy"); Frank B. Cross, Paradoxical Perils of the Precautionary Principle, 53 *Wash. & Lee L. Rev.* 851, 851 (1996) ("Few principles are better ensconced in the law and philosophy of environmentalism than is the 'precautionary principle.'").

16. David Dana explains: "Commentators trace the precautionary principle to the German concept of *Vorsorge*, which literally means 'beforehand or prior care and worry.' It connotes 'caring for or looking after, fretting or worrying about and obtaining provisions, or providing for.'" David A. Dana, A Behavioral Economic Defense of the Precautionary Principle, 97 *Nw. U. L. Rev.* 1315, 1315 n.3 (2003) [hereinafter, Dana, Behavioral Economic Defense] (quoting Sonja Boehmer-Christiansen, The Precautionary Principle in Germany—Enabling Government, *in* *Interpreting the Precautionary Principle* 31, 38 (Timothy O'Riordan & James Cameron eds., 1994)).

17. Risk and uncertainty differ from one another, and in ways that may matter to application of the precautionary principle. See *infra* note 39.

existing science and data may be inadequate to establish that (i) a particular activity or substance poses a hazard; (ii) assuming that it does, exactly what harmful effects will result from the activity or substance; and (iii) harmful effects that are observed today in fact resulted from the activity or substance in question, as opposed to some other source. Moreover, even if scientific evidence tends to support limiting (or even banning) an activity or the use of a substance, environmental harms often do not manifest themselves until an extended period of time has elapsed. This further complicates the scientific study and validation of environmental risks.

The precautionary principle is nothing short of ascendant on the international stage,<sup>18</sup> so much so that many categorize it as constituting customary international law.<sup>19</sup> It is recited in numerous international environmental statements and treaties.<sup>20</sup> While it has gained a solid foothold in European Union environmental treaties and law,<sup>21</sup> its success at infiltrating American environmental law has been far more limited.<sup>22</sup>

18. See, e.g., Cross, *supra* note 15, at 854 (“The precautionary principle has recently assumed added prominence with the growth of international environmental concern.”); James E. Hickey, Jr. & Vern R. Walker, *Refining the Precautionary Principle in International Environmental Law*, 14 *Va. Env'tl. L.J.* 423, 423–24 (1995) (noting that, since 1987, international environmental instruments have “increasingly” included references or allusions to precautionary principle).

19. See, e.g., Geistfeld, *supra* note 14, at 11326 (noting that principle is “considered by the European Union . . . to be a ‘full-fledged and general principle of international law’” (quoting Comm’n of the European Cmty., *Communication from the Commission on the Precautionary Principle* 11 (2000))); McGinnis, *supra* note 12, at 269 (“While not all scholars agree that the precautionary principle is a matter of customary international law, many respected scholars do.”); Richard B. Stewart, *Environmental Regulatory Decision Making Under Uncertainty*, 20 *Res. L. & Econ.* 71, 75 (2002) (noting that “[i]t has been claimed that [the precautionary principle] is already, or is becoming established as[,] a binding principle of customary international law,” but also that critics and skeptics of principle “deny that [it] has been established as customary international law”); Sunstein, *Irreversible and Catastrophic*, *supra* note 13, at 843 n.6 (citing Trouwborst, *supra* note 6, as “discussing the Precautionary Principle as a foundational principle of international law”).

20. For compilations and lists, see Hickey & Walker, *supra* note 18, at 432–36; McGinnis, *supra* note 12, at 276–84; Sunstein, *Irreversible and Catastrophic*, *supra* note 13, at 843–44.

21. See, e.g., Sunstein, *Beyond Precautionary*, *supra* note 6, at 1015 (noting that European Commission has formally adopted precautionary principle); Sunstein, *Irreversible and Catastrophic*, *supra* note 13, at 848–49. For discussion of European application of the principle, see generally Nicolas de Sadeleer, *The Precautionary Principle in EC Health and Environmental Law*, 12 *Eur. L.J.* 139 (2006).

22. See, e.g., Jonathan B. Wiener, *Precaution in a Multirisk World*, in *Human and Ecological Risk Assessment: Theory and Practice* 1509, 1510 (Dennis D. Paustenbach ed., 2002) [hereinafter Wiener, *Precaution in a Multirisk World*] (“[A] common inference today is that Europe endorses the precautionary principle . . . and seeks proactively to regulate risks, while the United States opposes the precautionary principle and waits more circumspectly for evidence of actual harm before regulation . . .”). Still, the precautionary principle does underlie, if informally, certain aspects of United States environmental laws. See, e.g., Cross, *supra* note 15, at 855–56; Sunstein, *Irreversible and Catastrophic*, *supra* note 13, at 844–45 (linking statutory focus on avoiding irreversible loss

In its basic form, the precautionary principle calls for the use of caution in making regulatory decisions when risk or uncertainty is present.<sup>23</sup> But this formulation is, if unobjectionable,<sup>24</sup> misleadingly simple as well as somewhat toothless.<sup>25</sup> Some argue that the precautionary principle is hampered by a lack of clarity,<sup>26</sup> or, at least, agreement as to the principle's meaning.<sup>27</sup> Professor Wiener has set out three possible versions of

to precautionary principle); Wiener, *Precaution in a Multirisk World*, *supra*, at 1510. Moreover, Cass Sunstein and Jonathan Wiener have each argued that the United States takes more precaution in dealing with other risks, such as terrorism. See Cass R. Sunstein, *Irreversible and Catastrophic: Global Warming, Terrorism, and Other Problems*, 23 *Pace Envtl. L. Rev.* 3, 3–4 (2005–2006); Cass R. Sunstein, *On the Divergent American Reactions to Terrorism and Climate Change*, 107 *Colum. L. Rev.* 503, 515–16 (2007); Jonathan B. Wiener, *Whose Precaution After All? A Comment on the Comparison and Evolution of Risk Regulatory Systems*, *Duke J. Comp. & Int'l L.*, Summer 2003, at 207, 225–30 [hereinafter Wiener, *Whose Precaution After All?*]. This juxtaposition suggests that neither region has a monopoly on precaution. See Wiener, *Precaution in a Multirisk World*, *supra*, at 1511; Wiener, *Whose Precaution After All?*, *supra*, at 209 (“[T]he broader reality in transatlantic risk regulation is a process of ‘hybridization,’ in which both systems borrow legal concepts from each other in a complex and continuous mutual evolution.”). Indeed, the same version of the precautionary principle arguably undergirds domestic views toward important issues such as freedom of speech and the criminal justice system. See *infra* text accompanying notes 99–102.

The precautionary principle has established a United States beachhead. The city of San Francisco has followed Europe's lead and become “the first [city and county] in the nation to formally adopt a ‘precautionary principle.’” Carolyn Whetzel, *Scientists, Policy Makers Argue Benefits, Perils of Employing ‘Precautionary Principle,’* 34 *Env't Rep. (BNA)* No. 35, at 1966 (Sept. 5, 2003).

23. See Dana, *Behavioral Economic Defense*, *supra* note 16, at 1315 (“As a general matter, the precautionary principle counsels serious contemplation of regulatory action in the face of evidence of health and environmental risk, even before the magnitude of risk is necessarily known or any harm manifested.”).

24. See Sunstein, *Beyond Precautionary*, *supra* note 6, at 1012 (noting that there are “weak versions” of principle “to which no reasonable person could object”); Sunstein, *Irreversible and Catastrophic*, *supra* note 13, at 850 (“The weak versions of the Precautionary Principle are unobjectionable and important.”).

25. See, e.g., Richard A. Posner, *Catastrophe: Risk and Response* 140 (2004) (“The ‘precautionary principle’ (‘better safe than sorry’) . . . is not a satisfactory alternative to cost-benefit analysis, if only because of its sponginess . . .” (footnote omitted)); Geistfeld, *supra* note 14, at 11326 (“[I]f the core aspects of the principle cannot yield a well-defined decision rule[,] . . . the hard question arises whether the precautionary principle is anything more than sentiment or political slogan.”).

26. See, e.g., Geistfeld, *supra* note 14, at 11326 (“The vagueness of the principle explains why it so hard to implement.”); Andrew Jordan & Timothy O’Riordan, *The Precautionary Principle in Contemporary Environmental Policy and Politics*, in *Protecting Public Health and the Environment: Implementing the Precautionary Principle* 15, 22 (Carolyn Raffensperger & Joel A. Tickner eds., 1999) (“Sceptics . . . claim [that the principle’s] popularity derives from its vagueness; that it fails to bind anyone to anything or to resolve any of the deep dilemmas that characterize modern environmental policy making.”).

27. See, e.g., Stephen M. Gardiner, *A Core Precautionary Principle*, 14 *J. Pol. Phil.* 33, 37–45 (2006) (setting out various possible forms of principle); Hickey & Walker, *supra* note 18, at 424 (“The assertion and ‘codification’ in international agreements and instruments of an ill-defined, ambiguous ‘[precautionary] principle’ has created

the principle.<sup>28</sup> Professor Stewart has identified four possible interpretations of the principle.<sup>29</sup> Professor Sunstein explains that Professor Stewart's four interpretations help to identify two axes along which the principle might vary: "the level of uncertainty that triggers a regulatory response," and "the tool that will be chosen in the face of uncertainty."<sup>30</sup> This understanding, Professor Sunstein continues, allows for one to "easily imagine many other variations on these themes."<sup>31</sup> And, having surveyed international declarations and agreements that include statements of the precautionary principle, Professor McGinnis concluded that "[s]ometimes" a single declaration or agreement itself "encompasses several meanings."<sup>32</sup>

Further complicating the spread of the precautionary principle is the fact that, in some of its forms, the principle becomes inherently contradictory. It is easy to say that one should take steps to avoid large and unnecessary risks, but this ignores the fact that there probably are risks and uncertainties not only to allowing an activity to proceed or a substance to be used, but also to regulating that activity or substance.<sup>33</sup> Fol-

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uncertainty in international environmental law."); McGinnis, *supra* note 12, at 272 (observing that "the multiplicity of . . . meanings" attributed to principle "complicates the search for a general precautionary principle"); Stewart, *supra* note 19, at 75 ("With a very few exceptions, there is a remarkable lack of analytic care or rigor regarding the substance of, and justification for, various versions of [the precautionary principle] by those who advocate or favor their adoption."); Sunstein, *Beyond Precautionary*, *supra* note 6, at 1011 (noting that principle has "numerous definitions" that "are not compatible with one another"); Sunstein, *Irreversible and Catastrophic*, *supra* note 13, at 848 ("[T]here are twenty or more definitions of the Precautionary Principle, and they are not all compatible with one another."); Wiener, *Precaution in a Multirisk World*, *supra* note 22, at 1513 (noting that "[s]tatements of the precautionary principle are varied and often vague," and citing Per Sandin, *Dimensions of the Precautionary Principle*, 5 *Hum. & Ecological Risk Assessment* 889 (1999), as identifying "19 different formulations" of principle).

The precautionary principle is not alone in this regard. The "polluter pays principle" is another primary normative principle of environmental law and (especially) international law that suffers from a lack of clarity. See Jonathan Remy Nash, *Too Much Market? Conflict Between Tradable Pollution Allowances and the "Polluter Pays" Principle*, 24 *Harv. Envtl. L. Rev.* 465, 472–78 (2000) (elucidating various interpretations of polluter pays principle).

28. Wiener, *Precaution in a Multirisk World*, *supra* note 22, at 1513–21 (elucidating three variants of principle).

29. Stewart, *supra* note 19, at 76.

30. Sunstein, *Beyond Precautionary*, *supra* note 6, at 1014; cf. Per Sandin, *Dimensions of the Precautionary Principle*, 5 *Hum. & Ecological Risk Assessment* 889, 890–91 (1999) (elucidating four dimensions along which precautionary principle might vary: threat, uncertainty, action, and command).

31. Sunstein, *Beyond Precautionary*, *supra* note 6, at 1014; see also *id.* at 1014–15 (describing as examples "Information Disclosure Precautionary Principle" and "Economic Incentive Precautionary Principle").

32. McGinnis, *supra* note 12, at 272. He also laments that "even a single strand of the precautionary principle is open to different operational meanings." *Id.*

33. See Sunstein, *Beyond Precautionary*, *supra* note 6, at 1020–29; Sunstein, *Irreversible and Catastrophic*, *supra* note 13, at 862–63; see also Richard A. Epstein, *In Defense of the "Old" Public Health: The Legal Framework for the Regulation of Public*

lowed to its logical conclusion, the principle in such forms would utterly paralyze societal actors.<sup>34</sup>

Along similar lines, the precautionary principle could, but should not, be read to halt virtually all potentially risky activities and the use of all potentially risky substances. While the precautionary principle may appropriately draw attention to the risk and uncertainty involved in failing to regulate,<sup>35</sup> the principle does not require that one focus on that risk and uncertainty while ignoring the countervailing risk incurred by regulation itself. Such a mistaken approach would reduce the risk of not regulating false negatives, but it would also—perhaps in some situations more dangerously—advocate regulating in the face of possible false positives. Taken to its logical extreme, it would “bring valuable activities to a halt,” and would “be impossible” to apply broadly.<sup>36</sup>

The general absence of agreement over the proper scope of the principle notwithstanding, some commentators have endeavored to construct practically applicable, and normatively desirable, formulations of the precautionary principle. Recent commentary tends to advance narrower, more cabined versions of the principle, and to coalesce around three

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Health, 69 *Brook. L. Rev.* 1421, 1458 (2004) (“[I]t is a mistake to rely on any version of a precautionary principle that attaches enormous weight to errors that allow dangerous activities to go forward while slighting the losses associated with the beneficial activities that turn out to be thwarted.”).

34. See Sunstein, *Irreversible and Catastrophic*, *supra* note 13, at 850–53. See generally Cross, *supra* note 15 (recounting rise of precautionary principle and critiquing it).

35. See Dana, *Behavioral Economic Defense*, *supra* note 16, at 1316–17 (arguing that precautionary principle is countervailing balance to cognitive biases that tend, wrongly, to influence public policy away from regulating activities and substances that pose large risks and uncertainties); Sunstein, *Irreversible and Catastrophic*, *supra* note 13, at 870–71.

36. Wiener, *Whose Precaution After All?*, *supra* note 22, at 224. Professor Wiener elucidates:

Precaution may avoid the harms of inaction on false negatives (risks thought to be minor that turn out to be serious) but incur the harms of overreaction to false positives (risks thought to be serious that turn out to be minor). Both types of errors are harmful to society. The harms of ignoring false negatives include the health and environmental damages from the unrestricted risk. The harms of regulating false positives include high costs to consumers and workers, unemployment, lost innovations of helpful new products, restrictions on personal choices, and public cynicism about exaggerated risks (“crying wolf”). An extreme policy of zero risk would bring valuable activities to a halt; applied broadly it would be impossible. The goal is not zero false negatives but the best balance of the two types of errors that we can achieve.

*Id.* at 223–24 (footnote omitted). See also Sunstein, *Beyond Precautionary*, *supra* note 6, at 1035–54 (arguing that those who rely upon precautionary principle to reach concrete conclusions often do so in tandem with various cognitive biases, and that this process tends to render precautionary principle, used in this way, a blunt instrument with which to attain policy guidance). But cf. Douglas A. Kysar, *It Might Have Been: Risk, Precaution, and Opportunity Costs*, 22 *J. Land Use & Envtl. L.* 1, 44–48 (2006) [hereinafter Kysar, *Might Have Been*] (arguing that there may be moral basis on which to distinguish between acts and omissions).

characteristics of settings in which the principle appropriately might be invoked:<sup>37</sup> (i) settings in which the risks of harm are uncertain; (ii) settings in which harm might be irreversible and what is lost irreplaceable; and (iii) settings in which the harm that might result would be catastrophic. First, the heartland of the precautionary principle encompasses situations where the risk cannot be effectively assessed or reliably cabined<sup>38</sup>—i.e., settings in which there is uncertainty rather than simply risk.<sup>39</sup> Second, if a failure to regulate may result in irreversible harm, then an investment in regulation may be justified by a desire to retain flexibility by avoiding irreversible results. Put economically, regulation in the face of serious irreversible costs is equivalent to purchasing an option to preserve the opportunity to take steps to avoid the irreversible harm in

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37. That some commentators may agree on when some version of the precautionary principle should apply does not mean that they necessarily agree on what version of the principle should apply, i.e., exactly what “directive” follows from the principle. For example, Professor Kysar presents the precautionary approach as an option distinct from cost-benefit analysis, see generally Kysar, *Might Have Been*, *supra* note 36, while Judge Posner and Professors Stewart and Sunstein present the precautionary principle as an adjunct to traditional cost-benefit analysis. E.g., Posner, *supra* note 25, at 148 (calling for “a modest version of the precautionary principle” in cases of catastrophic risk that would “plac[e] a thumb on the cost side of the cost-benefit analysis”). My proposal is limited to granting judicial standing and does not address how the substance of any claim should be decided on the merits. See *infra* text accompanying notes 83–84.

38. Professor Kysar explains that the precautionary principle “can be defended as a pragmatic decisionmaking heuristic that is particularly well-suited to the task of fostering consideration of how best to safeguard life and the environment under conditions of uncertainty and ignorance.” Kysar, *Might Have Been*, *supra* note 36, at 14. (Professor Kysar defines uncertainty as situations where probabilities are poorly defined and outcomes well defined, and ignorance as settings in which both probabilities and outcomes are poorly defined. *Id.*) See also Gardiner, *supra* note 27, at 50 (describing Rawlsian version of principle that would apply in cases of uncertainty, but not risk or ignorance); Sandin, *supra* note 30, at 892–93 (describing “uncertainty dimension” of precautionary principle).

Professor Sunstein argues that situations of uncertainty indeed come to pass and are not trivial. Sunstein, *Irreversible and Catastrophic*, *supra* note 13, at 875–77, 882–92. He explains: “In my view, uncertainty is both real and rare in the environmental domain; but this is an empirical judgment, and it may be wrong.” *Id.* at 886.

With an apparent nod to some sort of precaution, Judge Posner suggests different ways that standard cost-benefit analysis might be adjusted to deal with situations of uncertainty. Posner, *supra* note 25, at 175–87.

39. Under traditional definitions, “risk is variability in outcomes that can be captured by a probability distribution, but uncertainty cannot be quantified in this way.” Henry E. Smith, *Property and Property Rules*, 79 *N.Y.U. L. Rev.* 1719, 1724 (2004).

Commentators who otherwise endorse the use of cost-benefit analysis as the preferred tool for regulatory guidance argue that the precautionary principle is least applicable where the risks of harm that may result are readily and accurately quantifiable. E.g., Stewart, *supra* note 19, at 85–86; see also *id.* at 86–87 (recognizing other factors that may influence decisions). They also argue that the precautionary principle should not be applied where the risks are susceptible to estimation within a reliable range but are not precisely quantifiable. See Posner, *supra* note 25, at 173; Stewart, *supra* note 19, at 87–90.

the future.<sup>40</sup> Third, the possibility of catastrophic harm may justify precautionary regulation. Even if the probability of a catastrophe occurring is low, the costs of the possible catastrophe could be so large that they outweigh the benefits associated with the activity that make the occurrence of the catastrophe possible.<sup>41</sup> Further, if the probability of catastrophic harm is low (or very uncertain), people may improperly discount it, since people sometimes tend to undervalue low-probability and uncertain harms.<sup>42</sup> When these features—uncertainty, the possibility of irreversible harm, and the possibility of catastrophic harm—coincide, the case for the precautionary principle is strongest.<sup>43</sup>

## II. STANDING

In this Part, I briefly explain the genesis and contours of federal court standing doctrine. I also discuss how and why environmental cases have often been on the outer edge, and at the forefront of the evolution, of standing over the last forty years. I then summarize the debate over standing between the majority and Chief Justice Roberts in dissent in the *Massachusetts* case, with a focus on the odd absence of discussion of the precautionary principle in the case.

### A. Federal Standing Doctrine

Federal court standing limitations arise directly out of the Constitution, and also out of prudential concerns.<sup>44</sup> Article III of the United States Constitution vests the federal judicial power with respect to “cases” and “controversies” in the Supreme Court, and any lower federal courts.<sup>45</sup> The Court has interpreted the core constitutional standing requirement to call for a plaintiff to allege (i) personal injury that is both (ii) “fairly traceable” to the defendant’s unlawful conduct and (iii) likely

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40. As Judge Posner puts it in the context of the greenhouse effect, it may make sense for society to, in effect, “purchas[e] an option to enable global warming to be stopped or slowed at some future time at a lower cost” when the other option is to do nothing and risk harm that cannot be reversed. Posner, *supra* note 25, at 162. “Should further research show that the problem of global warming is not a serious one, the option would not be exercised.” *Id.*

41. *Id.*

42. See, e.g., Dana, Behavioral Economic Defense, *supra* note 16, at 1326 n.38 (noting that, while “[t]here is some evidence that people overestimate low probability risks,” there is also “some evidence that, when faced with low probability risks, people refuse to take them into account and simply treat them as nonexistent”).

43. See, e.g., Sunstein, Irreversible and Catastrophic, *supra* note 13, at 894 (“It is possible to combine a concern about catastrophe with a focus on irreversible harm in a way that generates an Irreversible and Catastrophic Harm Precautionary Principle.”); see also Kenneth J. Arrow & Anthony C. Fisher, Environmental Preservation, Uncertainty, and Irreversibility, 88 *Q.J. Econ.* 312, 314–15, 318 (1974) (emphasizing importance of uncertainty and irreversibility in environmental problems).

44. E.g., *Allen v. Wright*, 468 U.S. 737, 751 (1984).

45. U.S. Const. art. III, § 2.

to be redressed by the requested relief.<sup>46</sup> The Court has elucidated that, to be sufficient for standing purposes, an injury must be “distinct and palpable,” and not “abstract” or “conjectural.”<sup>47</sup> A generalized grievance is insufficient.<sup>48</sup>

The Court over the years has also created other limitations on federal courts’ ability to hear cases. These limitations are often called “prudential” standing doctrines, since they are said to be based not on any constitutional command, but on courts’ conceptions of when they should as a matter of prudence decline to hear a certain type of case. Examples of prudential standing doctrines include the prohibition against raising the claims of third parties<sup>49</sup> and the “zone of interest” test.<sup>50</sup>

Real refinement of standing requirements is a relatively recent development. Before the middle of the last century, “most litigants asserted legal interests plainly recognized at common law.”<sup>51</sup> But courts were prompted to craft standing doctrines by trends such as “the advent of the administrative state and the enactment of statutes to protect interests, unprotected at common law, that were shared by large numbers of people.”<sup>52</sup> It is hardly surprising, then, that environmental law disputes have played a major role in raising issues on the edges of existing standing doctrine: While common law standing doctrine evolved out of and focused on economic injuries, the injuries in environmental law cases tend to be of a much less concrete nature.<sup>53</sup>

46. *Allen*, 468 U.S. at 751. But cf. Richard H. Fallon, Jr., Daniel J. Meltzer & David L. Shapiro, *Hart and Wechsler’s The Federal Courts and the Federal System* 131 (5th ed. 2003) (noting commentators who have questioned claim that injury-in-fact is required by citizens suing government to establish standing).

47. E.g., *Allen*, 468 U.S. at 751.

48. E.g., *Lujan v. Defenders of Wildlife*, 504 U.S. 555, 573–76 (1992).

49. See, e.g., *Warth v. Seldin*, 422 U.S. 490, 499–500 (1975) (stating that prohibition on raising third party claims is prudential standing doctrine).

50. See *Bennett v. Spear*, 520 U.S. 154, 162–63 (1997) (describing zone of interest test as prudential standing doctrine).

51. Fallon et al., *supra* note 46, at 126.

52. *Id.* at 127.

53. See Richard J. Lazarus, *The Making of Environmental Law* 82 (2004) (characterizing Court’s early environmental standing jurisprudence as “fairly straightforward and flexible”). For example, it was in environmental cases that the Supreme Court was confronted with, and resolved, the following questions:

- Whether a non-economic, aesthetic interest may qualify as an “injury” for standing purposes and, if so, whether such an injury must be particular to the plaintiff. The Court answered both questions in the affirmative. See *Sierra Club v. Morton*, 405 U.S. 727, 734–35 (1972).
- Whether generalized allegations by a single member of an environmental organization that their recreational opportunities might be impinged by possible government action were sufficient to give the environmental organization standing. The Court held that they were not. See *Lujan v. Nat’l Wildlife Fed’n*, 497 U.S. 871, 889 (1990).
- Whether standing to challenge a polluter’s alleged noncompliance with the Clean Water Act could rest upon allegations of the plaintiffs’ concern that their property had become polluted by virtue of the defendant’s actions. The Court held that it

The Supreme Court has explained that standing requirements serve the purpose of sharpening the issues that courts must decide by harnessing the presentation of those issues by true adversaries who have a sufficiently concrete interest in the case.<sup>54</sup> They also, thus, preclude courts from issuing unconstitutional advisory opinions.<sup>55</sup> The Court has also emphasized the role of standing in bolstering the separation of powers between the judicial branches and the other branches of government.<sup>56</sup> Commentators have recently suggested that standing serves other purposes as well. Professor Stearns, for example, argues that standing rules have developed, and are desirable, because they make it difficult for ideologically motivated plaintiffs to opportunistically manipulate courts' dockets,<sup>57</sup> while Professor Kontorovich suggests that the absence of standing

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could. See *Friends of the Earth, Inc. v. Laidlaw Envtl. Servs., Inc.*, 528 U.S. 167, 181 (2000).

Commentators in environmental law often advocate the expansion of standing to accommodate more environmental claims. See, e.g., Lazarus, *supra*, at 134–35 (criticizing modern Court's requirement of individualized harm as particularly difficult to meet in environmental cases); William W. Buzbee, *Standing and the Statutory Universe*, 11 *Duke Envtl. L. & Pol'y F.* 247, 271–82 (2001) (arguing in favor of judicial deference to legislative definitions of harm and standing); Robin Kundis Craig, *Removing "The Cloak of a Standing Inquiry": Pollution Regulation, Public Health, and Private Risk in the Injury-in-Fact Analysis*, 29 *Cardozo L. Rev.* 149, 222–24 (2007) (arguing that standing doctrine should be expanded to recognize probabilistic risks to health as sufficient to satisfy injury-in-fact analysis); David A. Dana, *Existence Value and Federal Preservation Regulation*, 28 *Harv. Envtl. L. Rev.* 343, 397–99 (2004) (arguing that standing doctrine should be expanded to recognize "existence-value" of environmental amenities, thus ridding standing doctrine of "rigid . . . geographic formalism" (quoting *Lujan*, 504 U.S. at 595 (Stevens, J., dissenting))).

54. See, e.g., *Valley Forge Christian Coll. v. Ams. United for Separation of Church & State, Inc.*, 454 U.S. 464, 472 (1982) (noting that standing's injury requirement "tends to assure that the legal questions presented to the court will be resolved, not in the rarified atmosphere of a debating society, but in a concrete factual context conducive to a realistic appreciation of the consequences of judicial action").

55. See, e.g., *FEC v. Akins*, 524 U.S. 11, 23–24 (1998) (arguing that abstract harms should be left to "political process" and not "judicial process" to "prevent[ ] a plaintiff from obtaining . . . an advisory opinion").

56. See *Allen v. Wright*, 468 U.S. 737, 750 (1984) ("The case-or-controversy doctrines state fundamental limits on federal judicial power in our system."); see also Antonin Scalia, *The Doctrine of Standing as an Essential Element of the Separation of Powers*, 17 *Suffolk U. L. Rev.* 881, 881 (1983) ("[T]he judicial doctrine of standing is a crucial and inseparable element of [separation of powers], whose disregard will inevitably produce . . . an overjudicialization of the processes of self-governance.").

57. See Maxwell L. Stearns, *Standing Back from the Forest: Justiciability and Social Choice*, 83 *Cal. L. Rev.* 1309, 1323 (1995) (noting that standing is "device used by federal courts to fend off challenges to governmental conduct that are brought primarily on an ideological basis"); see also Kenneth E. Scott, *Standing in the Supreme Court—A Functional Analysis*, 86 *Harv. L. Rev.* 645, 670–72, 683–85 (1973) (arguing that standing serves purpose of rationing scarce judicial resources and defining courts' policymaking role); Maxwell L. Stearns, *Standing and Social Choice: Historical Evidence*, 144 *U. Pa. L. Rev.* 309, 348–459 (1995) (drawing on historical evidence and caselaw to support point that standing doctrines prevent manipulation).

would short-circuit private bargaining by people who would be affected by broad court decisions.<sup>58</sup>

### B. *Standing in Massachusetts v. EPA*

The Supreme Court grappled with standing in *Massachusetts v. EPA*, where environmental organizations and governmental entities—Massachusetts among them—claimed that EPA’s failure to regulate greenhouse gas emissions from motor vehicles violated the Clean Air Act.<sup>59</sup> The issue of greenhouse gas emissions has risen to the forefront of environmental concerns over the past decade. Over time, a growing consensus of scientists has argued that the increasing presence of anthropogenic greenhouse gases in the upper atmosphere has acted as a shield that acts, much like a greenhouse, to retain heat instead of allowing it to radiate out into space.<sup>60</sup> The greenhouse effect, then, results—and, according to many scientific predictions, will continue to result more and more—in increasing temperatures on the earth, with concomitant melting of the polar ice caps, rises in the world’s ocean levels, and flooding of low lying areas.<sup>61</sup>

Recent American public debate over greenhouse gases and the greenhouse effect has focused on the question of whether scientific evidence of the greenhouse effect is sufficient to warrant remedial action.<sup>62</sup>

58. See Eugene Kontorovich, *What Standing Is Good For*, 93 Va. L. Rev. 1663, 1675 (2007) (showing that “broad standing to challenge certain types of government action could result in inefficient outcomes because of high transaction costs and the possibility of strategic behavior”).

59. The original rulemaking petition was brought by various environmental interest groups. The governmental entities, including Massachusetts, subsequently intervened as plaintiffs. See *Massachusetts v. EPA*, 127 S. Ct. 1438, 1451 (2007).

60. Bradford C. Mank, *Standing and Global Warming: Is Injury to All Injury to None?*, 35 *Envtl. L. J.* 12–17 (2005) [hereinafter Mank, *Standing and Global Warming*]; Thomas C. Schelling, *What Makes Greenhouse Sense?*, 38 *Ind. L. Rev.* 581, 581–82 (2005); Lewis D. Solomon & Bradley S. Freedberg, *The Greenhouse Effect: A Legal and Policy Analysis*, 20 *Envtl. L. J.* 83, 84–85 (1990).

61. See, e.g., Mank, *Standing and Global Warming* supra note 60, at 15–17; Solomon & Freedberg, supra note 60, at 86 & n.10.

62. There has also been much public debate on a second issue—whether, even if global warming is validly a matter of world concern, the United States should act to reduce its greenhouse gas emissions when other countries do not. In 1992, the United States and 153 other countries entered into a treaty—the Framework Convention on Climate Change. Five years later, parties to the Convention drafted a follow-up protocol—the Kyoto Protocol. While the original convention set up only a framework for dealing with greenhouse gas emissions, it did not impose upon signatories any substantive obligations with respect to emissions. In contrast, the Kyoto Protocol does impose emissions reductions on developed countries, but not on developing countries. Many in the United States argued that, insofar as global warming is a global problem that results from a global pollutant—i.e., a pollutant for which the place of origin is irrelevant to the ultimate environmental effect, which is global—it made little sense for the United States to commit to reduce its greenhouse gas emissions when developing countries (especially China and India, whose greenhouse gas emissions are predicted to rise substantially in the coming decades) undertook no such obligations. The United States Senate unanimously passed a

Some question the validity of scientific studies that conclude that human activity contributes to global warming, or demand a larger consensus of scientists on the issue.<sup>63</sup> This debate, which one might have expected to dominate a current Supreme Court opinion on global warming, was strangely absent from the opinions in *Massachusetts v. EPA*.

*Massachusetts v. EPA* raised three questions: whether the plaintiffs—several environmental organizations joined by several states as interveners—lacked standing to challenge EPA’s decision not to regulate greenhouse gas emissions from mobile sources;<sup>64</sup> whether EPA had authority under the Clean Air Act to regulate greenhouse gas emissions from automobiles; and, if so, whether EPA justifiably had declined to exercise it. A fractured panel of the United States Court of Appeals for the District of

resolution expressing the view that the United States should not enter into the Kyoto Protocol as drafted. S. Res. 98, 105th Cong. (1997) (enacted). President Clinton never forwarded the Kyoto Protocol to the Senate for possible ratification. *Massachusetts*, 127 S. Ct. at 1449.

The issue of whether the United States should undertake emissions reductions—while other countries do not—also arose in the context of standing in *Massachusetts v. EPA*. EPA argued that the expectation that increased emissions from countries like China and India would exacerbate the greenhouse effect even if the United States undertook cuts meant that the relief that the plaintiffs sought would not in fact solve the problem of which they complained, meaning that the standing doctrine’s redressability prong was not met. The majority opinion dismissed that argument, explaining that “[a] reduction in domestic emissions would slow the pace of global emissions increases, no matter what happens elsewhere.” *Id.* at 1458. In dissent, Chief Justice Roberts argued that the fact that emissions from the United States “are likely to be overwhelmed many times over by emissions increases elsewhere in the world,” made it not likely—as required by standing doctrine—that the relief the plaintiffs sought would redress the problems they alleged. *Id.* at 1469–70 (Roberts, C.J., dissenting).

63. Professor Kysar has explained:

[U]ncertainty pervades, we might even say defines, the climate change problem. We are unsure how much of observed warming is attributable to greenhouse gas emissions. We do not know with certainty what the size of the human population will become over the next century. We do not know what the reference case of economic growth will be. We do not understand and therefore cannot model how sulfate particles, water vapor, and clouds interact in the atmosphere to mitigate or to enhance warming effects. We do not know with any degree of precision how temperature increases will impact agriculture, forests, vector-related diseases, heat-related deaths, flood zones, coastlines, storm intensity levels, freshwater supplies, or species extinctions. Perhaps most troubling, we cannot begin to pinpoint the likelihood of catastrophic climate-related events such as the disintegration of the West Antarctic Ice Sheet, the shutdown of thermohaline circulation in the Atlantic, or the release of frozen methane deposits. In short, we do not know with anything other than an anemic level of confidence what will be the consequences of our atmospheric experiment.

Douglas A. Kysar, *Climate Change, Cultural Transformation, and Comprehensive Rationality*, 31 B.C. Envtl. Aff. L. Rev. 555, 563–64 (2004) (footnotes omitted).

64. The Clean Air Act provides: “The Administrator shall . . . prescribe . . . standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.” Clean Air Act § 202(a)(1), 42 U.S.C. § 7521(a)(1) (2000).

Columbia Circuit ruled in favor of EPA.<sup>65</sup> Judge Randolph delivered the judgment of the court in an opinion that upheld EPA's decision to not regulate greenhouse gases from mobile sources.<sup>66</sup> Dissenting in part and concurring in the judgment, Judge Sentelle reasoned that the plaintiffs lacked standing<sup>67</sup> but, finding that neither of his co-panelists agreed with him, decided to vote with Judge Randolph in order to provide a majority for disposition of the case.<sup>68</sup> Finally, Judge Tatel dissented, reasoning that the plaintiffs had standing, that EPA had authority to regulate, and that EPA had improperly declined to exercise that authority.<sup>69</sup>

The Supreme Court's opinion in *Massachusetts v. EPA*, authored by Justice Stevens, adhered to the view that EPA did not contest either that anthropogenic emissions were exacerbating the greenhouse effect, or that over time major ramifications would occur as a result. In noting that "[t]he harms associated with climate change are serious and well recognized," the Court observed that "EPA regards as an 'objective and independent assessment of the relevant science'" a report by the National Research Council that "identifies a number of environmental changes that have already inflicted significant harms."<sup>70</sup> In response to the Chief Justice's assertion, in dissent, that Massachusetts's alleged harm was "conjectural," Justice Stevens, implicitly referencing EPA's acquiescence in Massachusetts's allegations of current and prospective harm, noted that "[n]o one, save perhaps the dissenters, disputes those allegations."<sup>71</sup> And, summing up its resolution of the standing issue, the majority observed that "the rise in sea levels associated with global warming has already harmed and will continue to harm Massachusetts."<sup>72</sup> In support of this proposition, the opinion cites the petitioners' affidavits which, the opinion notes, were "uncontested."<sup>73</sup>

The only allusion in the majority opinion to reasoning grounded in some version of the precautionary principle is Justice Stevens's statement that "[t]he risk of catastrophic harm, though remote, is nevertheless real."<sup>74</sup> This lone statement, however, appears only in the concluding paragraph of the Court's discussion of standing. Nowhere in the meat of the majority's standing analysis is there consideration given to the facts as

65. *Massachusetts v. EPA*, 415 F.3d 50 (D.C. Cir. 2005), rev'd, 127 S. Ct. 1438 (2007).

66. *Id.* at 56–58.

67. *Id.* at 59–60 (Sentelle, J., dissenting in part and concurring in the judgment).

68. *Id.* at 60–61.

69. *Id.* at 61–82 (Tatel, J., dissenting).

70. 127 S. Ct. at 1455 (citations omitted).

71. *Id.* at 1457 n.21.

72. *Id.* at 1458.

73. *Id.* The lone judge to explicitly find standing in the court below followed similar reasoning. See *Massachusetts*, 415 F.3d at 66 (Tatel, J., dissenting) ("[I]f EPA wants to challenge the facts petitioners have set forth in their affidavits, it has an obligation to respond to the petitioners . . . EPA makes no such challenge."); *id.* at 67 ("EPA nowhere challenges petitioners' declarations . . .").

74. *Massachusetts*, 127 S. Ct. at 1458.

presenting a harm that may or may not occur but that, if it does occur, would be catastrophic. Nor is there discussion of, or reliance upon, the existence of uncertainty<sup>75</sup> or the potential for irreversibility. Rather, the majority presented global warming as a problem that is already occurring and is virtually certain to worsen.

Chief Justice Roberts's dissenting opinion took issue with the majority opinion's presentation of the facts underlying global warming. Chief Justice Roberts criticized the majority for basing its conclusions about the likely loss by Massachusetts of coastal lowlands on a lone, unelaborated, and unsubstantiated statement in one affidavit.<sup>76</sup> The Chief Justice also assailed the majority for concluding that future harm was "imminent" based upon computer models that had margins of error that rendered the majority's conclusion, in his view, questionable.<sup>77</sup> He emphasized that "accepting a century-long time horizon and a series of compounded estimates renders requirements of imminence and immediacy utterly toothless."<sup>78</sup>

Chief Justice Roberts's dissent, then, expressly adheres to the traditional view that harms that have not been shown to be either actual or imminent are not sufficient to support standing. Implicit in the dissent is the additional point that this rule holds *even if* the harm that may occur would be catastrophic. In effect the Chief Justice's dissent rejects incorporation of the precautionary principle into standing jurisprudence. But it dismisses the notion summarily, with no analysis of whether the Constitution would admit such an incorporation, or whether such an incorporation would vindicate the policies that underlie standing.

In sum, the dissent rejected the application of the precautionary principle implicitly and without discussion. The majority treated the case as if existing standing doctrine controlled the outcome.<sup>79</sup> It had no need

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75. Perhaps related to uncertainty is Justice Stevens's comment—found in a footnote—that Chief Justice Roberts characterized Massachusetts's assertions as "conclusory," *id.* at 1467 (Roberts, C.J., dissenting), "presumably because they do not quantify Massachusetts land loss with the exactitude he would prefer. . . . Yet the likelihood that Massachusetts coastline will recede has nothing to do with whether petitioners have determined the precise metes and bounds of their soon-to-be-flooded land." *Id.* at 1456–57 n.21 (majority opinion).

76. *Id.* at 1467 (Roberts, C.J., dissenting).

77. *Id.* at 1467–68.

78. *Id.* at 1468.

79. The majority did suggest that the case at bar differed from run-of-the-mill standing cases in one aspect: As a state, the plaintiff was owed "special solicitude." *Id.* at 1454 (majority opinion) ("It is of considerable relevance that the party seeking review here is a sovereign State and not . . . a private individual."); *id.* at 1455 (noting that Massachusetts "is entitled to special solicitude in our standing analysis"). Oddly, however, the majority soon thereafter described the basis for Massachusetts's standing as its actual ownership of title in lands that might be submerged as a result of global warming. *Id.* at 1456 ("Because the Commonwealth 'owns a substantial portion of the state's coastal property,' it has alleged a particularized injury in its capacity as a landowner." (footnote omitted) (quoting Standing Appendix at 171, *Massachusetts*, 127 S. Ct. 1438 (No. 05-1120)

to discuss the possible application of the precautionary principle because, on its presentation of the facts, the presence of standing was clear.

### III. INCORPORATING THE PRECAUTIONARY PRINCIPLE INTO STANDING DOCTRINE

In this Part, I discuss the incorporation of the precautionary principle into standing jurisprudence. I begin with an explanation of how the principle could have been used by the Court in *Massachusetts v. EPA* to support its conclusion that plaintiffs had standing. I then explain how the incorporation of the precautionary principle would not upset existing standing jurisprudence, but instead is consistent with it. Last, I elucidate why importing the principle is not simply possible, but in fact is normatively desirable.

#### A. *A Proposal for Precautionary-Based Standing*

My basic proposal for incorporating the precautionary principle into standing doctrine is relatively straightforward.<sup>80</sup> Courts should find that the “injury” prong of standing is satisfied where the plaintiff can show that the harm that it might suffer would be catastrophic and irreversible, and that its occurrence is subject to great uncertainty.<sup>81</sup>

Application of precautionary-based standing to the facts in *Massachusetts v. EPA* would change the reasoning, but not the outcome, of the case. The emission by humans of greenhouse gases presents the possibility of catastrophic and irreversible harm, but it is uncertain, under current scientific understanding, whether this harm will occur.<sup>82</sup> Thus, the propo-

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(declaration of Karst R. Hoogeboom))). Given that ownership of land that might itself be harmed is an accepted basis for standing and not a status that is particular to sovereigns, Panel Discussion, Access to the Courts After *Massachusetts v. EPA*: Who Has Been Left Standing, 37 *Env'tl. L. Rep.* 10,692, 10,696 (2007) (statement by Professor Buzbee that Court’s language “sounds more like standard standing analysis”), one is left to wonder why the majority thought it necessary to invoke Massachusetts’s special status as sovereign in the first instance. As the Chief Justice’s dissent comments, while “[i]t is not at all clear how the Court’s ‘special solicitude’ for Massachusetts plays out in the standing analysis, except as an implicit concession that petitioners cannot establish standing on traditional terms,” *Massachusetts*, 127 S. Ct. at 1466 (Roberts, C.J., dissenting), “[t]he good news is that the Court’s ‘special solicitude’ for Massachusetts limits the future applicability of the diluted standing requirement applied in this case.” *Id.* at 1471.

Below, I explain that it might make sense to limit application of the precautionary principle in the standing inquiry to cases in which sovereigns assert claims. See *infra* text accompanying notes 88–92. In this sense, my proposed incorporation of the precautionary principle makes better use of the special sovereign status in standing doctrine than does the majority opinion.

80. Below I explain that the basic proposal could be narrowed to apply only in cases in which the plaintiff is a state sovereign. See *infra* text accompanying notes 88–92.

81. Courts also might use precautionary standing to find the “causation” prong to be met where the relevant causal link is subject to uncertainty. Arguments similar to those advanced in the text for the “injury” prong would apply.

82. See *supra* notes 62–63 and accompanying text.

sal would allow courts to conclude that plaintiffs have standing without having to decide definitively whether those harms are actually “concrete” and “imminent” in the traditional sense.

Invocation of precautionary-based standing would in no way affect the litigation of the issues in the case on the merits. For this reason, some of the interpretive problems that have dogged the implementation of the precautionary principle in other—generally merit-based—contexts would not arise here. For example, the possibility of competing irreversibilities—that is, both irreversibilities that may result if the government fails to act and irreversibilities that may result if the government does act—may make it difficult to determine whether the precautionary principle would counsel us to take steps today to reduce greenhouse gas emissions.<sup>83</sup> By contrast, such potential conflicts ought not to paralyze application of the principle in aid of determining standing, insofar as standing is merely a preliminary hurdle on the way *to* a determination on the merits.<sup>84</sup> And, since the use of the principle in aid of determining standing would in no way require that the principle also be used at the subsequent merits stage, the proposal also would not itself raise the specter of such conflicts at a later stage in any litigation.

Since it relies upon a narrow construction of the precautionary principle, the proposal is consistent with it. Situations in which there is uncertainty as to whether catastrophic and irreversible harm may occur fall within the heartland of the precautionary principle.<sup>85</sup> Some might prefer broader application of the principle—in terms of either the trigger or the set of situations in which it applies, or both<sup>86</sup>—but the limited application of the principle called for under the proposal surely does not expand the reach of the precautionary principle.

The proposal is also largely consistent with existing standing doctrine. To be sure, it would work a change in some cases. But the set of cases in which there is uncertainty as to whether catastrophic, irreversible

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83. See, e.g., Sunstein, *Irreversible and Catastrophic*, *supra* note 13, at 863 (noting conflict between Judge Posner, who advocates such steps, and “many economists [who] have concluded, unlike Judge Posner, that the existence of uncertainty and irreversibility argue for less, not more, in way of investments in reducing greenhouse-gas emissions”).

84. Any consideration of precaution in the face of irreversible harm should consider the possibility of irreversible harm that might result from the exercise of that precaution; in other words, irreversible harm might result from regulation as well as from the absence of regulation. See *supra* text accompanying notes 33–34. Because a grant of standing to pursue a lawsuit does not resolve the case on the merits, this concern, though valid, would not seem to be of import in the setting of standing. The possibility of conflicting irreversibilities would be considered at the merits stage, and the adoption of the precautionary principle to aid in determining standing would in no way require the merits also to be determined with reference to any version of the precautionary principle.

85. See *supra* text accompanying notes 37–43.

86. See *supra* note 37.

harm will occur is a limited one. Indeed, it is likely that the minority of environmental cases will fall within this category.<sup>87</sup>

At the same time, one justifiably might be concerned that, even if the proposal would not result in standing being achieved in many more cases, the proposal might suboptimally encourage more people to file suit and *try* to prove standing under the slightly more relaxed, if limitedly applicable, standard. In other words, one might worry not that the proposal would lead to a large amount of litigation regarding the merits of any particular issue, but that it would result in too much litigation over standing itself.

To respond to this concern—and to the related argument that the proposal as structured would effect too large a change in existing standing doctrine—there is a way in which the proposal can further be cabined. The relaxed standing rule under circumstances of precaution could be made available only to state governments that bring lawsuits in their sovereign capacity.<sup>88</sup> To justify this additional possible restriction, I need to demonstrate that it accords with existing standing doctrine and responds logically to the criticisms of the basic proposal that I have identified.

First, the Court since the *Lochner* era has recognized that a state's sovereignty confers upon it greater latitude than private actors typically enjoy in seeking relief.<sup>89</sup> Indeed, the majority in *Massachusetts v. EPA* went out of its way to recognize the "special solicitude" due to states who advance claims in federal court in their capacity as sovereigns.<sup>90</sup>

87. See Sunstein, *Irreversible and Catastrophic*, supra note 13, at 886 ("In my view, uncertainty is both real and rare in the environmental domain; but this is an empirical judgment, and it may be wrong."); cf. Craig, supra note 53, at 158–69 (noting that health risks—though perhaps not catastrophic in nature—generally pervade federal clean air and clean water regulation).

88. In addition, Congress could always narrow the availability of standing generally by narrowing the relevant statutory "zone of interest." The drawback to such a blunderbuss approach is that it would narrow the availability of standing in all cases, not just those in which precautionary standing would be invoked. Presumably, however, Congress could simply narrow the "zone of interest" only as it relates to parties seeking to invoke precautionary standing. The justifications for such congressional action would be the same as those discussed in the text for the courts to impose such a restriction.

89. See Ann Woolhandler & Michael G. Collins, *State Standing*, 81 Va. L. Rev. 387, 450–64 (1995) (describing evolution of standing doctrine during *Lochner* era to allow states to advance claims based upon their sovereignty). In comparison, the early Court only recognized state standing where states could bring claims grounded in the common law. See *id.* at 397–434.

90. 127 S. Ct. 1438, 1455 (2007); see also Thomas W. Merrill, *Global Warming as a Public Nuisance*, 30 Colum. J. Envtl. L. 293, 299–306 (2005) (arguing in favor of less stringent standing hurdles in cases brought by public officials); supra note 79. While Justice Stevens was correct in drawing this distinction, the majority opinion's actual use of the distinction to resolve *Massachusetts v. EPA* remains obscure. See 127 S. Ct. at 1455. Ironically, then, the proposal in this respect would make better use of this distinction than did the majority that purported to rely upon it.

Second, there is a certain logic to restricting access to precautionary-based standing to sovereigns.<sup>91</sup> Even if one is concerned that people are likely to believe that precautionary-based standing applies in a host of cases where it in fact does not, one might be more sanguine that states will take a more deliberative approach and be more hesitant to try to invoke a court's jurisdiction. One also might think that the democratic process would constrain states from bringing suit with great frequency and with little chance for success.<sup>92</sup> And, even if that is not entirely true, the restriction would in any event constrain the number of cases in which standing would be found on the basis of precaution.

Finally, I note that precautionary-based standing provides a workable standard for courts to apply. While the courts would have to develop notions of catastrophic and irreversible harms, that is hardly an insurmountable task.<sup>93</sup> Presumably, the legal standard for catastrophic harm would consider both the scope and extent of possible harm.<sup>94</sup> Courts are already called upon to make analogous judgments. For example, tort law allows one to enter onto land possessed by someone else, and to commit an act which would otherwise be a trespass to a chattel or a conversion, if

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91. Cf. Woolhandler & Collins, *supra* note 89, at 502–17 (arguing in favor of limits on sovereign authority to file suit, in part on ground that sovereigns should not be allowed standing when private individuals would have standing to file similar claims). One also might consider extending (whether initially or at some point later) the availability of precautionary standing to localities. This would depend on the frequency with which localities seek to pursue relief even while the states of which they are a part do not, on the desirability of allowing them to so act, and on the costs of allowing additional actions to be litigated in federal court.

92. Cf. David A. Dana, *Democratizing Preemption: Why and How Federal Courts Should Consider the Weight of Democratic Support for Non-Federal Alternatives* (July 4, 2007) (unpublished manuscript, on file with the *Columbia Law Review*), available at <http://ssrn.com/abstract=998102> (arguing that democratic preferences should matter for purposes of evaluating and setting federal law and policy).

93. Cf. Posner, *supra* note 25, at 5–6 (offering preliminary definition of catastrophic harm).

94. In addition, the framing of the harm could affect the extent to which the harm is seen as catastrophic. Cf. Daryl J. Levinson, *Framing Transactions in Constitutional Law*, 111 *Yale L.J.* 1311, 1313–14, 1371–75 (2002) (arguing that frames through which matters are seen affect legal outcomes); Robert V. Percival, “Greening” the Constitution—Harmonizing Environmental and Constitutional Values, 32 *Env'tl. L.* 809, 859–60 (2002) (critiquing extant standing doctrine on ground that, by focusing on individualized injury, it erroneously omits broader impact of environmental regulatory regimes). In particular, the loss of any one thing could be seen as catastrophic if the thing in question is viewed in isolation. Takings jurisprudence solves the analogous problem of “conceptual severance,” see Margaret Jane Radin, *The Liberal Conception of Property: Cross Currents in the Jurisprudence of Takings*, 88 *Colum. L. Rev.* 1667, 1676 (1988), by viewing property on a broader scale and generally rejecting narrow framings of property rights. See, e.g., *Tahoe-Sierra Pres. Council, Inc. v. Tahoe Reg'l Planning Agency*, 535 U.S. 302, 331 (2002) (refusing to use conceptual severance). But see, e.g., John E. Fee, *The Takings Clause as a Comparative Right*, 76 *S. Cal. L. Rev.* 1003, 1031–33 (2003) (highlighting problems with notion of conceptual severance, and noting Court's difficulty with it). Similarly, the legal inquiry into whether harm is catastrophic should require that the harm in question have effect on an objectively broad scale.

such actions are necessary to, or are reasonably believed to be necessary to avoid “a public disaster.”<sup>95</sup>

Moreover, to whatever extent application of precautionary-based standing may prove to present a challenge to courts, it does not seem to present any more of a challenge than does existing standing doctrine. Indeed, existing standing doctrine may demand *more* of courts. After all, existing standing doctrine calls upon courts to decide when an injury is “concrete” and “imminent.” In many environmental cases, this requires courts to examine, and reach conclusions with respect to scientific evidence, which is generally not the forte of courts.<sup>96</sup> On the other hand, precautionary-based standing asks courts to examine scientific evidence only, in effect, to determine whether the question of injury has been sufficiently “put at issue” by that evidence, a task to which courts would seem equally, if not better, suited.

### B. *Consistency of Precautionary-Based Standing with Existing Standing Doctrine*

In this Section, I consider whether precautionary-based standing is consistent with existing law. I first highlight applications of precaution under American law to demonstrate that the importation of the precautionary principle to the law of standing has precedent in American jurisprudence. I then examine whether precautionary-based standing is consistent with standing jurisprudence. As part of this endeavor, I consider the proposal’s fidelity to the policies underlying standing and also its consistency with the strictures of Article III.

To begin, the incorporation of the precautionary principle is foreign neither to domestic law, nor indeed to the law of standing. The Supreme Court has fashioned numerous “prophylactic rules”<sup>97</sup> that are not called for by the language of the Constitution but are designed to minimize the

95. Restatement (Second) of Torts §§ 196, 262 (1965); see *id.* § 196 cmt. a (defining “public disaster” as including “a conflagration, flood, earthquake, or pestilence”); see also *Commonwealth v. Capitolo*, 471 A.2d 462, 480 (Pa. Super. Ct. 1984) (finding that alleged harms of incident at nuclear plant would meet “‘public disaster’ requirement of the Restatement” because comparable to Restatement examples), *rev’d* on other grounds, 498 A.2d 806 (Pa. 1985).

96. See, e.g., *Fed. Power Comm’n v. Fla. Power & Light Co.*, 404 U.S. 453, 463 (1972) (“Particularly when we consider a purely factual question within the area of competence of an administrative agency . . . and when resolution of that question depends on ‘engineering and scientific’ considerations, we recognize the relevant agency’s technical expertise and experience, and defer to its analysis . . . .”); *Natural Res. Def. Council, Inc. v. EPA*, 16 F.3d 1395, 1401 (4th Cir. 1993) (“[I]n reviewing EPA’s actions here, this court does not sit as a scientific body, meticulously reviewing all data under a laboratory microscope.”).

97. See generally David A. Strauss, *The Ubiquity of Prophylactic Rules*, 55 U. Chi. L. Rev. 190 (1988) (arguing that prophylactic rules are central and necessary features of constitutional law).

chances that constitutional violations will in fact occur.<sup>98</sup> Further, the precautionary principle can be said to undergird the American approach to criminal law.

In addition to the criminal law's various prophylactic rules, [t]he presumption of innocence, the right to remain silent, the right to a public trial by an impartial jury, and the requirement that the prosecutor must prove each case beyond a reasonable doubt all reinforce the public's perception that the criminal justice system operates under the precautionary principle announced by Blackstone more than two hundred years ago: "better that ten guilty persons escape than that one innocent suffer."<sup>99</sup>

The First Amendment directs that government—and courts—take a cautionary view toward regulation of speech.<sup>100</sup> For example, the doctrine of prior restraints imposes a heavy presumption against attempts to regulate speech before it in fact occurs.<sup>101</sup> Indeed, the Court has explained, in language quite reminiscent of the precautionary principle, that the justification for the doctrine of prior restraints is that, as com-

98. See Joseph D. Grano, *Prophylactic Rules in Criminal Procedure: A Question of Article III Legitimacy*, 80 Nw. U. L. Rev. 100, 105 (1985) (defining "prophylactic constitutional rule" as "a rule that functions as a preventive safeguard to insure that constitutional violations will not occur"); Brian K. Landsberg, *Safeguarding Constitutional Rights: The Uses and Limits of Prophylactic Rules*, 66 Tenn. L. Rev. 925, 926 (1999) (defining "prophylactic rules" to mean "those risk-avoidance rules that are not directly sanctioned or required by the Constitution, but that are adopted to ensure that the government follows constitutionally sanctioned or required rules"); see also Webster's Third New International Dictionary 1818 (1993) (defining "prophylactic" as "preventing or contributing to the prevention of disease" or "tending to prevent or ward off: preventative, cautionary"); Evan H. Caminker, *Miranda and Some Puzzles of "Prophylactic" Rules*, 70 U. Cin. L. Rev. 1, 2 (2001) ("[B]ecause courts frequently cannot determine with much certainty whether or not a constitutional violation has occurred in a given case, and yet courts are charged with trying to protect against constitutional violations, it is sometimes entirely appropriate for the Supreme Court to develop prophylactic rules safeguarding constitutional rights.").

99. Peter A. Joy, *The Relationship Between Prosecutorial Misconduct and Wrongful Convictions: Shaping Remedies for a Broken System*, 2006 Wis. L. Rev. 399, 404–05 (footnotes omitted) (quoting 4 William Blackstone, *Commentaries* \*358). One also might consider the rule of lenity and the requirement of a unanimous jury verdict in this regard.

100. See, e.g., Matthew D. Bunker, *Critiquing Free Speech: First Amendment Theory and the Challenge of Interdisciplinarity* 8 (2001) (stating that practice of freedom of speech and of press in United States "leads us to exercise great caution before silencing viewpoints with which we disagree"); cf. Stuart Minor Benjamin, *Proactive Legislation and the First Amendment*, 99 Mich. L. Rev. 281, 326 n.158 (2000) ("The very uncertainty that leads courts and commentators to err on the side of safety (i.e., environmental protection) should similarly lead us, in the First Amendment context, to err on the side of protecting speech interests.").

101. See, e.g., *N.Y. Times Co. v. United States*, 403 U.S. 713, 714 (1971) (stating that "[a]ny system of prior restraints on expression comes to this Court bearing a heavy presumption against its constitutional validity" (quoting *Bantam Books, Inc. v. Sullivan*, 372 U.S. 58, 70 (1963))); Keith Werhan, *Freedom of Speech: A Reference Guide to the United States Constitution* 141 (2004).

pared to punishment after the fact, “[a] prior restraint, . . . by definition, has an immediate and irreversible sanction. If it can be said that a threat of criminal or civil sanctions after publication ‘chills’ speech, prior restraint ‘freezes’ it at least for the time.”<sup>102</sup> While these areas of law generally take a precautionary view *against* government regulation (as opposed to environmental law’s precautionary principle, which generally takes a precautionary view against the *absence* of government regulation), the reliance upon a precautionary approach remains.

There are several procedural devices that also adopt a precautionary approach. In determining whether to grant preliminary injunctions and temporary restraining orders, courts are directed to weigh, among other things, the irreparable harm to the defendant if the injunction issues against the irreparable harm to the plaintiff if the injunction does not issue.<sup>103</sup> In criminal procedure (and in a reverse of the usual precautionary approach in criminal law that militates against government action), bail requirements guard against the risk of irreparable harm that would result if the defendant were to flee the jurisdiction and avoid trial. And, at the appeals stage, the “collateral order doctrine” provides an exception to the usual rule in federal court that appeals may only be had once a final order has been entered in cases where the occasion of a delayed appeal might *itself* constitute an irreparable harm.<sup>104</sup>

102. *Nebraska Press Ass’n v. Stuart*, 427 U.S. 539, 559 (1976).

The doctrine of prior restraints bears a feature in common with standing. Just because the doctrine of prior restraints dictates that speech must be allowed to go forward, that does not mean that the speech will ultimately be found to be protected by the First Amendment, and thus that the speaker will emerge unpunished. In other words, the applicability of the doctrine of prior restraints does not speak to the ultimate question of whether the First Amendment applies to the speech in question. Similarly, simply because a court decides that a party has standing to litigate an issue does not mean the party will be successful on the merits. See *supra* text accompanying notes 83–84.

103. See, e.g., *Am. Hosp. Supply Corp. v. Hosp. Prods. Ltd.*, 780 F.2d 589, 593 (7th Cir. 1986); see also Sunstein, *Irreversible and Catastrophic*, *supra* note 13, at 866–69 (discussing preliminary injunctions in environmental cases in context of irreversible harm precautionary principle). For an argument that courts should take their own uncertainty as to final outcome into account in fashioning injunctive relief, see Joshua P. Davis, *Taking Uncertainty Seriously: Revising Injunction Doctrine*, 34 *Rutgers L.J.* 363, 428–60 (2003).

In a recent essay, Professor Lichtman critiques traditional preliminary injunction analysis for assessing irreparable harm while ignoring the counterpart “irreparable benefits.” See Douglas Lichtman, *Irreparable Benefits*, 116 *Yale L.J.* 1284, 1294 (2007). Putting Professor Lichtman’s observation in precautionary terms, traditional preliminary injunction analysis takes a precautionary approach to harms that may result in the event that an injunction issues or does not issue. His argument that benefits may also result both from the issuance of an injunction and from the failure of an injunction to issue translates to the point that an approach that is pervasively precautionary will often identify large risks on both sides of a possible action, and may thus often result in inherent contradiction. See *supra* text accompanying notes 33–34.

104. See, e.g., *Mathews v. Eldridge*, 424 U.S. 319, 331 n.11 (1976) (noting “core principle that statutorily created finality requirements should, if possible, be construed so as not to cause crucial collateral claims to be lost and potentially irreparable injuries to be suffered”); *Cohen v. Beneficial Indus. Loan Corp.*, 337 U.S. 541, 546 (1949) (approving of

The rules governing preliminary injunctions, interlocutory appeals, and bail requirements are all directed against the possibility of some sort of irreversible harm, the occurrence of which may be uncertain.<sup>105</sup> Importantly, they also share in common another characteristic: They all resolve matters preliminarily but do not determine the ultimate outcome on the merits. That is true of standing as well: The use of precautionary-based standing would neither predetermine an outcome on the merits, nor even mandate that the precautionary principle would be used to determine the merits.<sup>106</sup> Thus, the application of the precautionary principle in other “preliminary” procedural doctrines strongly suggests that it would be at home as well in standing jurisprudence.

In fact, standing jurisprudence itself is already a home to special rules that are premised upon precaution. First, while the ordinary rule in standing is that one does not have standing to raise the rights of others, a special rule applies in First Amendment cases.<sup>107</sup> Overbreadth doctrine allows parties to raise objections to speech regulations that are overbroad, even if the regulations do not by their terms reach the parties’ speech. In effect, then, overbreadth doctrine recognizes the standing of parties to raise other parties’ claims in First Amendment cases.<sup>108</sup> The justification for this special rule is the concern that overbroad speech restrictions might chill constitutionally protected speech, to the detriment of all.<sup>109</sup> In other words, in these cases, precaution justifies a loosening of traditional standing doctrines.

A second special standing rule that is premised upon precaution is the notion of standing in declaratory judgment actions. The Declaratory Judgment Act permits federal courts to “declare the rights and other legal relations of any interested party seeking such declaration, whether or not further relief is or could be sought.”<sup>110</sup> Professor Borchard’s justifica-

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interlocutory appeal despite statutory language authorizing only appeals of final judgments on ground that, after final order was entered, “it will be too late effectively to review the present order, and the rights conferred by the statute, if it is applicable, will have been lost, probably irreparably”).

105. The same may be said, as I explain below, of standing in declaratory judgment actions. See *infra* text accompanying notes 110–113.

106. See *supra* text accompanying notes 83–84. The same can be said of the applicability of the doctrine of prior restraints as compared to the ultimate question of the applicability of the First Amendment to the speech in question. See *supra* note 102.

107. See Werhan, *supra* note 101, at 144–45 (discussing how overbreadth doctrine allows individuals to challenge statutes as they apply to other parties); Michael C. Dorf, *Facial Challenges to State and Federal Statutes*, 46 *Stan. L. Rev.* 235, 263–64 (1994) (arguing that overbreadth doctrine should extend beyond First Amendment); Richard H. Fallon, Jr., *Making Sense of Overbreadth*, 100 *Yale L.J.* 853, 898–90 (1991) (noting how overbreadth holdings seldom apply only to part before court). But see Henry Paul Monaghan, *Overbreadth*, 1981 *Sup. Ct. Rev.* 1, 21–30 (arguing that standing rules that apply in First Amendment overbreadth cases are not special).

108. See, e.g., *Gooding v. Wilson*, 405 U.S. 518, 521 (1972) (discussing reasons for allowing party before court to raise other parties’ claims in overbreadth attack).

109. See *id.*

110. 28 U.S.C. § 2201(a) (2000).

tion for declaratory judgments rested on the ground that a “prospective victim” ought not to be told “that the only way to determine whether the suspect is a mushroom or a toadstool is to eat it.”<sup>111</sup> Just this past term, the Supreme Court underscored the precautionary anchor of the Act by recognizing as a basic proposition that,

where threatened action by government is concerned, we do not require a plaintiff to expose himself to liability before bringing suit to challenge the basis for the threat . . . . The plaintiff’s own action (or inaction) in failing to violate the law eliminates the imminent threat of prosecution, but nonetheless does not eliminate Article III jurisdiction.<sup>112</sup>

The Court then affirmed that the same reasoning applies “to situations in which the plaintiff’s self-avoidance of imminent injury is coerced by threatened enforcement action of a *private party* rather than the government.”<sup>113</sup>

Having established that precaution is not foreign to standing jurisprudence, I turn to the specific question of whether precautionary-based standing is consistent with existing standing doctrine. As an initial matter, the precautionary-based standing proposal (whether in its basic form, or as further limited to state sovereigns) would not undermine the purposes underlying the doctrine of standing. First, there is little doubt that there would be true disputation of issues with a live adversarial process in a case in which precautionary-based standing would be found. To whatever extent that the uncertainty with which any risks in such a case may reduce a party’s incentive to litigate the matter with zeal, that would be outweighed by the fact that the harms in the case would also have to be shown to be irreversible and catastrophic.

Second, though it would expand standing to a few more cases where it might not exist under existing doctrine, precautionary-based standing would not throw open the floodgates of litigation—especially if access to it is restricted to states in their sovereign capacity. Thus, standing would continue to function, as Professor Stearns argues, to frustrate attempts by private litigants to manipulate courts’ dockets and thus to take advantage of the path dependence of law.<sup>114</sup> The resulting slight expansion of standing might to some degree undermine the role that, as Professor Kontorovich has argued, standing serves to preserve private parties’ rights to negotiate around, rather than assert, their rights.<sup>115</sup> Restricting the availability of precautionary-based standing to states would ameliorate this problem. And, to the extent that, as Professor Carlson has argued, existing standing doctrine in the long run aids environmentalists by forc-

111. Edwin M. Borchard, *The Constitutionality of Declaratory Judgments*, 31 *Colum. L. Rev.* 561, 589 (1931).

112. *MedImmune, Inc. v. Genentech, Inc.*, 127 S. Ct. 764, 772 (2007).

113. *Id.* at 773.

114. See *supra* text accompanying note 57.

115. See *supra* text accompanying note 58.

ing them to relate environmental problems to human beings and institutions,<sup>116</sup> precautionary-based standing would not alter the anthropocentricity of the standing inquiry.

Moreover, while precautionary-based standing presumably would not displace, and instead would coexist with, the political question doctrine, it seems that the political question doctrine would be at low ebb in cases where precautionary-based standing is likely to apply. Political economy predicts—and experience unfortunately often bears out<sup>117</sup>—that the political branches are generally unlikely to respond *ex ante* to catastrophic risks. The benefits of expenditures *ex ante* are less tangible and more uncertain than benefits associated with government expenditures in general.<sup>118</sup> As such, government actors are comparatively unlikely to supply such expenditures. Public demand for *ex ante* planning and expenditures is also likely to be muted. People often tend to undervalue the likely occurrence of low-risk events, and a similar devaluing may result from the desire to avoid contemplating catastrophic events and damage.<sup>119</sup> To the extent that the political branches are thus less likely to confront possible catastrophic events, the notion of relying upon standing to assure deference to those branches seems misplaced.

The question remains whether application of precautionary-based standing would be consistent with the Article III standing requirements. One answer to this question is that, as some have argued, the Court has been too stringent in its interpretation of Article III in constructing the current “injury” component of standing.<sup>120</sup> Under this view, while pre-

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116. See Ann E. Carlson, *Standing for the Environment*, 45 *UCLA L. Rev.* 931, 995–97 (1998) (arguing that standing rules may force environmental advocates to rethink environmental problems and express them in terms of how they may affect human beings, and that resulting refocusing of environmental advocacy would benefit courts, public, and ultimately environment).

117. See generally William F. Shughart II, *Katrinanomics: The Politics and Economics of Disaster Relief*, 127 *Pub. Choice* 31 (2006) (discussing why government failed to adequately prepare New Orleans for Hurricane Katrina).

118. See Ben Depoorter, *Horizontal Political Externalities: The Supply and Demand of Disaster Management*, 56 *Duke L.J.* 101, 111 (2006). One might argue that the absence of public demand that the government address potential disasters, see generally Ann E. Carlson, *Heat Waves, Global Warming and Mitigation* (UCLA Sch. of Law, Research Paper No. 07-20, 2007), available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=998899](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=998899) (on file with the *Columbia Law Review*) (explaining why public does not demand government action to mitigate heat waves), bolsters the case that such a question is a matter of policy that should be committed to the political branches. At the same time, the salient aspect of the “absence of public demand” is that groups that demand action are not powerful enough to affect political action, meaning that policymakers are not encouraged to take action. See Depoorter, *supra*, at 111. Thus, the point remains that the political branches are suboptimally unlikely to take action, which in turn makes judicial intervention more appropriate.

119. See Depoorter, *supra* note 118, at 121–22; see also Jeffrey J. Rachlinski, *The Psychology of Global Climate Change*, 2000 *U. Ill. L. Rev.* 299, 303–13.

120. See, e.g., David M. Driesen, *Standing for Nothing: The Paradox of Demanding Concrete Context for Formalist Adjudication*, 89 *Cornell L. Rev.* 808, 890 (2004); Percival,

cautionary-based standing may not be consistent with the current “injury” jurisprudence, that jurisprudence calls for more than is required by the Constitution.

Precautionary-based standing can be seen, however, to be essentially consistent with the Court’s current “injury” jurisprudence. To begin, the Court’s recognition of standing to issue declaratory judgments<sup>121</sup> suggests that Article III tolerates some attenuation between an injury and a possible victim.

Further, when there is uncertainty surrounding an injury’s occurrence and the injury, if it occurs, will be catastrophic and irreversible, a strong case can be made that Article III’s injury requirement has been satisfied. Consider first uncertainty.<sup>122</sup> Professor Farber has advanced the view that the mere imposition of uncertainty may sometimes itself rise to the level of injury sufficient to satisfy Article III’s requirements. He explains that societal actors often take affirmative steps in the face of uncertainty, and that indeed an entire industry—insurance—has arisen to allow actors to mitigate uncertainty.<sup>123</sup> Thus, he suggests, the presence of a market for insurance indicates the existence of real concern over the risk, and thus should militate in favor of a finding of standing.<sup>124</sup>

Consider the catastrophic nature of injury<sup>125</sup> in addition to uncertainty. That an injury is catastrophic means that, even if the odds that the injury will come to pass are small and the time horizon large, the “expected value” of the injury will likely remain of great magnitude. The requirement that, for standing to exist, there must be injury that is “actual” and “imminent” is designed to ensure that litigants have a true incentive to vigorously pursue their claims.<sup>126</sup> Viewed economically, these

supra note 94, at 859–60; cf. Michael Herz, *The Rehnquist Court and Administrative Law*, 99 *Nw. U. L. Rev.* 297, 348–54 (2004) (criticizing Court’s standing jurisprudence as result-oriented and as biased in favor of regulated entities and against regulatory beneficiaries).

121. See supra text accompanying notes 110–113.

122. A related, but distinct, question is whether probabilistic harms are sufficient to give rise to standing. The Supreme Court has yet to decide the issue. See *Me. People’s Alliance & Natural Res. Def. Council v. Mallinckrodt, Inc.*, 471 F.3d 277, 284–87 (1st Cir. 2006) (recognizing an injury in fact “based on a probabilistic harm” where plaintiff can show “a substantial probability that harm will occur”), cert. denied, 128 S. Ct. 93 (2007); see also Craig, supra note 53, at 188–205 (reviewing current jurisprudence on whether increased risk is sufficient to give rise to standing).

123. Daniel A. Farber, *Uncertainty as a Basis for Standing*, 33 *Hofstra L. Rev.* 1123, 1123 (2005).

124. *Id.* at 1126–29.

125. The Court has never held that the possibility of catastrophic damage may not form the basis of a constitutionally sufficient injury, even if the damage is not traditionally concrete or imminent. See *Duke Power Co. v. Carolina Envtl. Study Group, Inc.*, 438 U.S. 59, 73 (1978) (“For purposes of the present inquiry, we need not determine whether all the putative injuries identified by the District Court, particularly those based on the possibility of a nuclear accident and the present apprehension generated by this future uncertainty, are sufficiently concrete to satisfy constitutional requirements.” (citations omitted)).

126. See supra text accompanying note 54.

factors can be understood to affect the value of the injury, and thus the incentive of the litigants: The less “imminent” the injury, the less valuable, thanks to discounting, the injury can be said to be. The same can be said as the injury becomes less “actual”—i.e., more contingent. For garden variety injuries, a remote, highly contingent injury is likely to be worth little, and thus to provide litigants with little incentive to pursue a claim in relation thereto. The same cannot be said for potentially catastrophic injuries. In such cases, while a low likelihood of the injury occurring and a longer time horizon will tend to reduce the expected value of the injury,<sup>127</sup> the enormity of the injury’s magnitude may serve to offset this reduction. Put another (if somewhat less precise) way, a catastrophe is of such large magnitude and scope that a small percentage of it standing alone is still a catastrophe. The offset that is afforded by a small risk is mitigated where the risk is uncertain: An uncertain risk is not necessarily a small one, and may turn out to be a large one indeed. The combination of uncertainty and potentially catastrophic harm may combine to produce a sizeable expected injury.<sup>128</sup>

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127. One might formulate an argument that militates against discounting catastrophic and irreversible harm. Dean Revesz has argued, in the context of the treatment of the loss of human lives under cost-benefit analysis, that the dread, and involuntary, nature of the result of exposure to environmental hazards may justify discounting future harms at a discount rate less than the rate one would use for simply financial obligations. Richard L. Revesz, *Environmental Regulation, Cost-Benefit Analysis, and the Discounting of Human Lives*, 99 *Colum. L. Rev.* 941, 968–74 (1999). But see Matthew D. Adler, *Fear Assessment: Cost-Benefit Analysis and the Pricing of Fear and Anxiety*, 79 *Chi.-Kent L. Rev.* 977, 1005 n.97 (2004) (noting that suggestion of discounting at lower rate because of dread was considered and rejected by EPA’s Science Advisory Board “for lack of sufficient evidence about the size of the fear premium”). Perhaps the dread nature of impending catastrophe, combined with the fact that exposure to catastrophe is generally involuntary, similarly justifies a reduction in the discount rate in the context of standing. Cf. Albert C. Lin, *The Unifying Role of Harm in Environmental Law*, 2006 *Wis. L. Rev.* 897, 946 (“The latent hazards characteristic of environmental problems are dreaded not only because of their involuntary nature, catastrophic potential, and fatal consequences, but also because they often have no clearly defined end.” (footnotes omitted)).

Dean Revesz has also argued that the discounting of human lives is ethically unjustified where the harm will occur so far in the future that it will affect future generations. See Revesz, *supra*, at 989–1007. Once again, perhaps catastrophic harm that will affect future generations similarly ought not to be discounted in the standing analysis.

128. To see this mathematically, let  $I$  = the magnitude of the injury,  $p$  = the likelihood that the injury will come to pass,  $r$  = the applicable discount rate, and  $t$  = the amount of time over which discounting is to occur (i.e., the amount of time until the injury will occur if it in fact occurs). Then the expected value of the injury is expressed as  $(pI)/(1+r)^t$ . If the probability of an injury occurring is especially small and/or the time until the injury occurs is large, then the expected value will be a small number. If the injury is catastrophic, then the injury  $I$ , which falls in the numerator of the expected value formula, will also be very large. Mathematically, the quotient of a very large number divided by another very large number may either be very small, very large, or anything in between. Viewing the problem as the numerator and denominator both approach infinity, this depends upon the relative rates at which the numerator and denominator increase. For example, the limit, as  $n$  goes to infinity, of  $n/n^2$  is 0, the limit of  $n/n$  is 1, and the limit of

The combination of catastrophic and irreversible injury the likely occurrence of which is uncertain puts the argument for standing at its apex. Even if a low probability of a catastrophic, irreversible harm is not generally sufficient to meet Article III's requirements, the fact that a catastrophic, irreversible harm's likelihood of occurring is uncertain means that one cannot confidently state that the expected value of the injury is so low that Article III will not be satisfied. On this basis, then, precautionary-based standing ought to meet Article III's strictures.

A final objection to Article III compatibility with the application of precautionary-based standing is that, insofar as catastrophic harm is broad in scope, the harm might be said to be "generalized" in many cases in which precautionary standing might be invoked.<sup>129</sup> The policy reasons I discussed above, however, demonstrate why the usual justification for not allowing standing with respect to generalized harms—that generalized harms are best left to the political branches rather than judicial de-

$n^2/n$  is infinity. The last example is one in which the magnitude of the numerator compared to the denominator is so large (even though both the numerator and denominator standing alone are themselves large) that the division by the denominator has no reductive effect as the limit approaches infinity. Interpreting this example in light of the expected value formula, this a situation in which the injury is so catastrophic that even a low probability of occurrence and substantial time horizon do not meaningfully reduce the catastrophic impact of the expected value. Loosely speaking, a fraction of a catastrophe (with damage approaching infinity) may still be catastrophic (and itself still be infinite).

One might object that the actual magnitude of the injury is not relevant to the standing inquiry; for example, an injury of one dollar is sufficient to confer standing, provided that it is concrete and imminent. As such, the relevant formula for courts is not the expected value of the injury, but rather the ratio of the expected value to the anticipated injury. Traditional standing doctrine, then, would allow standing only when the value of this ratio is sufficiently close to 1. One response to this argument is that perhaps the size of the injury does in fact matter, at least where the injury is quite large. Moreover, as discussed in the text, insofar as the risk with which the catastrophic harm may occur is assumed to be uncertain, the factor by which the injury will be reduced—i.e., the denominator—will not predictably be small, and is likely to be overwhelmed by the sizeable numerator.

I present this mathematical representation of how standing analysis might be seen to proceed simply to illustrate the point in the text, not to suggest that standing analysis might effectively be reduced to some simple mathematical formulae. See *Allen v. Wright*, 468 U.S. 737, 751 (1984) (observing that "the constitutional component of standing doctrine incorporates concepts concededly not susceptible of precise definition"); Erwin Chemerinsky, *Federal Jurisdiction* 68, 280–82 (4th ed. 2003) (explaining that "[n]o formula exists for determining what types of injuries are adequate to allow a plaintiff standing to sue in federal court"). Compare *Am. Hosp. Supply Corp. v. Hosp. Prods. Ltd.*, 780 F.2d 589, 593 (7th Cir. 1986) (Posner, J.) (developing formula to describe dispositions of preliminary injunction requests), with Linda J. Silberman, *Injunctions by the Numbers: Less Than the Sum of Its Parts*, 63 *Chi.-Kent L. Rev.* 279 (1987) (criticizing Judge Posner's formula). For a general argument against reducing civil procedure to formulae, see generally Linda S. Mullenix, *Burying (with Kindness) the Felicitic Calculus of Civil Procedure*, 40 *Vand. L. Rev.* 541 (1987).

129. See Mank, *Standing and Global Warming*, *supra* note 60, at 80–81.

termination—are not persuasive in the context of catastrophic harms.<sup>130</sup> Moreover, to the extent that the bar against assertion of generalized harms is compelled by Article III,<sup>131</sup> the restriction of precautionary-based standing to states would presumably allow the states to elaborate upon the potential for catastrophic harm that would be less likely to be generalized (even among prospective plaintiff states).

### C. *The Normative Desirability of Precautionary-Based Standing*

Having established that precautionary-based standing can be implemented and would not be inconsistent with existing standing doctrine or its underpinnings, I turn to the question of whether it is a good idea to implement the proposal. I argue that precautionary-based standing is normatively desirable for several reasons.

First, consider *Massachusetts v. EPA* itself. Many commentators have criticized the Court's opinion for improperly weighing in on scientific evidence, and for thus intruding upon questions that are inherently policy-based and political in nature.<sup>132</sup> The Court would have avoided criticisms of this sort had it embraced precautionary-based standing. Reliance upon precaution also would have garnered support for the Court's holding on standing from those who question the strength of the scientific evidence establishing global warming, yet who recognize that global warming poses the possibility of extreme harm in the event that some predictions are accurate.

Invocation of precautionary-based standing would have lessened the need for the Court to draw strong conclusions about the science of global warming. Some have expressed concern that the Court's holding on standing leaves EPA little room on remand to address scientific questions.<sup>133</sup> While the Court may ultimately be right on the scientific issues, the use of precautionary-based standing would have afforded the Court wider berth in avoiding the heart of the scientific controversy, in keeping with the general restraint of courts on such matters.<sup>134</sup>

Second, consider the import of precautionary-based standing for environmental problems in the future. In this regard, even those who fully

130. See *supra* notes 117–119 and accompanying text.

131. The exception for taxpayer challenges to congressional expenditures under the Establishment Clause draws this at least somewhat into question. See *Flast v. Cohen*, 392 U.S. 83, 101, 104–06 (1968) (announcing availability of standing in such cases). Compare *Hein v. Freedom from Religion Found., Inc.*, 127 S. Ct. 2553, 2565–68 (2007) (plurality opinion) (recognizing continued vitality of *Flast*, but holding that challenge to federal agency's expenditures did not fall within *Flast*'s "narrow exception"), with *id.* at 2572 (Kennedy, J., concurring) (defending distinction and continued vitality of *Flast*), and *id.* at 2573–74 (Scalia, J., concurring) (calling for *Flast* to be overruled as inconsistent with Article III), and *id.* at 2584 (Souter, J., dissenting) (finding no basis for plurality's decision that *Flast* did not apply).

132. See *supra* note 9.

133. See *supra* note 9.

134. See *supra* note 96 and accompanying text.

support the Court's holding in *Massachusetts v. EPA* may feel that the majority missed an important opportunity to integrate precaution into the standing inquiry. It may well be that there is adequate scientific consensus to justify action now, but that was not always the case. On this understanding, the absence of precautionary-based standing has already delayed a response to global warming.<sup>135</sup> There likely are other environmental problems lurking down the line where, again, the timing of a response may be critical. To the extent that precautionary-based standing at least forces the government to address problems at an earlier juncture, its availability is likely to be of recurring importance.

Third, there is in theory no reason why precautionary-based standing needs to be limited to cases raising environmental problems. For example, commentators have argued in favor of extending standing to more cases that raise allegations of stigmatic harm.<sup>136</sup> And stigmatic harm, like some environmental harm, might at least sometimes and in some ways be characterized as irreversible and catastrophic.<sup>137</sup> Perhaps experience with precautionary-based standing in the environmental context will ultimately convince courts to extend its reach to other areas.

I realize that there is some degree of inconsistency in arguing, as I have, on the one hand that precautionary-based standing is consistent with existing standing doctrine in part because it is so limited,<sup>138</sup> and on the other hand that precautionary-based standing might be desirable because it could eventually be used as a vehicle to expand standing on a broader scale. Yet while the points may be somewhat inconsistent, they are not incompatible. The introduction of precautionary-based standing in environmental cases would be a very limited step. And it may well be that experience will show that it should not be extended to other areas. Certainly, the Court has been circumspect about extending overbreadth doctrine beyond First Amendment cases, emphasizing that the doctrine constitutes "strong medicine."<sup>139</sup> And it may well be that that attitude should apply as well to precautionary-based standing, in that courts should be reticent to invoke it except in appropriate cases. On the other hand, experience may show that precautionary-based standing provides a valid basis for the evolution of standing doctrine on a broader scale.

135. As Chief Justice Roberts noted in dissent, "it may be that governments have done too little to address" global warming. *Massachusetts v. EPA*, 127 S. Ct. 1438, 1463 (2007) (Roberts, C.J., dissenting).

136. See, e.g., Thomas Healy, *Stigmatic Harm and Standing*, 92 *Iowa L. Rev.* 417 (2007).

137. See *id.* at 453–58 (discussing the experience of the stigmatized); see also *Brown v. Bd. of Educ.*, 347 U.S. 483, 494 (1954) ("To separate [children in grade and high school] from others of similar age and qualifications solely because of their race generates a feeling of inferiority as to their status in the community that may affect their hearts and minds in a way unlikely ever to be undone.").

138. See *supra* text accompanying note 114–115.

139. *Broadrick v. Oklahoma*, 413 U.S. 601, 613 (1973).

That brings us to a fourth normative justification for introducing precautionary-based standing. Development and implementation of the precautionary principle has lagged, in no small part because of uncertainty as to exactly what the principle means.<sup>140</sup> In some sense, there is a vicious cycle: The absence of development in the principle's meaning deters others from implementing the principle, which in turn feeds the absence of development of the principle's meaning. The introduction of the principle into standing would be a progressive step toward explicitly establishing the principle in American jurisprudence and thus at eliciting judicial interpretations of the principle.<sup>141</sup> Those interpretations, in turn, may provide a base upon which further development and expansion of the principle might take place. Although scholars have produced thoughtful and useful analyses of the precautionary principle, nothing can truly substitute for ensconcing the principle in the law and having the principle scrutinized and fleshed out by courts. As Professor Geistfeld has explained:

The vagueness of the precautionary principle suggests that its development and implementation will proceed in stages. Initially, implementation is likely to involve the least controversial aspects of the principle. If these minimal requirements of the principle can be turned into a regulatory decision rule, the rule would at least partially satisfy most proponents of the precautionary principle. Disagreements about other aspects of the principle can then be framed in terms of alterations to the regulatory decision rule.<sup>142</sup>

Thus the introduction of precautionary-based standing may facilitate the development and spread of the precautionary principle in other contexts.

#### CONCLUSION

In this Essay, I have argued that the Supreme Court in *Massachusetts v. EPA* missed an opportunity to recognize precautionary-based standing. Precautionary-based standing would enable courts to hear cases where it can be shown that harm that might result would be catastrophic and irreversible, and that the likelihood of such harm coming to pass is subject to great uncertainty. Reliance on precautionary-based standing would have garnered greater support for the Court's decision in *Massachusetts v. EPA*.

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140. See *supra* text accompanying notes 26–32.

141. One might argue that the precautionary principle should be interpreted instead by other institutions. However, domestic legislatures and agencies have not shown much interest in adopting or elucidating the principle. Moreover, attempts to explicate amorphous principles of environmental law in the abstract are not always successful. See, e.g., Nash, *supra* note 27, at 468–72 (describing various attempts by international organizations and treaties to codify and explicate polluter pays principle). Perhaps, then, courts are well positioned to interpret such principles, or at least to contribute to the debate over their meaning.

142. Geistfeld, *supra* note 14, at 11326.

The use of precautionary-based standing would have a very limited impact on existing standing doctrine. At the same time, the introduction of precautionary-based standing would provide two long-term benefits. First, even though the mere introduction of precautionary-based standing would be limited, it would provide a model for broader relaxation of standing requirements, were that to be deemed to be desirable. More importantly, the introduction of precautionary-based standing would enshrine the precautionary principle in the legal system. The courts, over time, would generate judicial interpretations of the precautionary principle, which in turn could be used to further applications of the principle in areas beyond standing.

