DIMINISHING THE DIVINE: CLIMATE CHANGE AND THE ACT OF GOD DEFENSE

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Well now, how indeed mortal men do blame the gods!
They say it is from us evils come, yet they themselves
By their own recklessness have pains beyond their lot.[1]

From ancient times, humankind has often attributed the vicissitudes of the weather to divine intervention. Numerous stories—like the storms buffeting Odysseus on his return from Troy[2] and the biblical flood that carried Noah's ark[3]—described the storms as the handiwork of one or more divine beings beyond the control of the men and women who suffered the natural devastation that followed.

This cultural notion that weather and its consequences were divine and therefore beyond the control of humankind slowly seeped its way into the law. Storms, floods, earthquakes, and other natural disasters came to be viewed as and often called "Acts of God"—though some courts prefer to call it a "vis major"[4] or "force of nature."[5] As one court poetically put it:

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1. Zeus, speaking to the gods at Olympus, HOMER, THE ODYSSEY 32-34 (Albert Cook trans., W.W. Norton & Co.) (1967).

2. *Id.* at 405-25.

3. *See Genesis* 6:13 – 7:12.

4. In Pennsylvania, for example, the courts eschew the phrase "act of God," mandating, instead, jury instructions using the phrase "vis major" to refer to a natural phenomenon. The Pennsylvania Supreme Court described the rationale for this preference as follows:

> Man in his finite mind cannot pass upon the wisdom of the Infinite. There is something shocking in attributing any tragedy or holocaust to God. The ways of the Deity so surpass the understanding of man that it is not the province of man to pass judgment upon what may be beyond human comprehension. There are many manifestations of nature which science has not yet been able to analyze, much less cope with. In any event no person called into court to answer for a tort may find exoneration from the act of negligence charged to him by asserting that it was not he but the Supreme Being which inflicted the wound and the hurts of which the plaintiff complains. This does not mean that the defense of *vis major* has in any way been lessened in importance and authority. It merely means that the loose use of the name of the Deity in the realm of the law should not be a matter of our approval.

> The phrase "act of God" in the sense in which it is interpreted in the legal and commercial world did not have its genesis in the law. It emerged from the chrysalis of the primitive mind groping for comprehension in the primordial misty days when man sought to adjust to the universe and he craved explanation of what to him was unexplainable. In this failure to understand, innate intelligence was supplanted by superstition which proceeded to attribute to the heavens all that could not be spelled out in the blundering, amorphous language of the age. Thus, when the thunder blasted and the horizon cavernously echoed; when the lightning severed the skies in zigzag tumult, man said that God was angry and then if, in the accompanying electric storm, a tree crashed to the ground, man said that the Supreme Ruler had targeted it with a bolt of wrath.
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> As time passed, persons with cunning and cupidity sought to avail themselves of this superstition in order to avoid a responsibility which was the result of their own failings and neglect. If, for instance, a proprietor neglected to properly maintain a strong bridge over a stream on his land and the bridge broke, drowning a traveler, the proprietor would respond to charges of negligence by stating that rains had swollen the stream and since the rains were caused by God, the proprietor could not be held liable for what God had done.[6]

Bowman v. Columbia Tel. Co., 179 A.2d 197, 201 (Pa. 1962). *See* Goldberg v. R. Grier Miller & Sons, Inc. 182 A.2d 759 (Pa. 1962), which reiterates Bowman and states that trial judges should instruct juries on a vis major instead of an act of God defense because the "act of God" defense is "actually confusing," in that:

> Although judges and lawyers know that the phrase is not intended in its literal sense, all jurors do not know this, and when judges charge that a reputed accident may have been an act of God, there are many jurors who may be so awestricken by the concept of a divine manifestation that they cannot give to the facts the down-to-earth, tangible, mathematical analysis and deliberation which is required for a secular verdict . . . .
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> To instruct a jury to distinguish between what is commanded by the Lord and what is the result of man's carelessness is to intermingle religious loyalties with earthly considerations in such a manner as to produce results which may satisfy neither Church nor State.

Id. at 761, 763.

5. *See* Woodbine Auto, Inc. v. Se. Pa. Transp. Auth., 8 F. Supp. 2d 475, 481 (E.D. Pa. 1998) (applying Pennsylvania law to negligence claim arising out of flooding after heavy rainfall and referring to it as "the affirmative defense of *vis major* or force of nature (formerly "Act of God")").

6. *Goldberg*, 182 A.2d at 761-62.

First appearing in 1581 in the famous *Shelley's Case*,[7] the notion that Acts of God could provide a defense to liability took hold in the common law. While perhaps once viewed as literal intervention by God in the affairs of man,[8] the notion of an Act of God evolved to mean something beyond human agency and control, of which "storms, lightning, and tempests" were given as prime examples.[9] This notion, that climatic events like storms which are beyond the control of humans could shield a defendant from liability for the plaintiff's damages, worked its way into tort, admiralty, contract, and even modern environmental law. Even today, climatic events[10] like hurricanes, heavy rain and/or wind storms, and flooding associated with such climatic events can, under the legal and factual tests articulated in each of these areas of law, relieve a defendant of liability.

This notion of a climatic event (like a hurricane or storm) being an Act of God that can relieve a defendant of liability raises an interesting question: in a world of increasingly sophisticated weather forecasting and data, does the Act of God defense still make sense? This question takes on even greater significance when one considers that the Intergovernmental Panel on Climate Change (IPCC), established in 1988 by the World Meteorological Organization and the United Nations Environmental Programme "to provide the decision-makers and others interested in climate change with an objective source of information about climate change,"[11] has warned for years that the warming of the Earth's atmosphere will produce significant climatic changes. The IPCC's Fourth Assessment, released in 2007, and in particular its Impacts analysis,[12] expresses the IPCC's various levels of confidence that there will be increases in the frequency and intensity of hurricanes and heavy or severe storms, along with associated flooding.[13]

Given the historical recognition that climatic events significant enough to be Acts of God can give rise to liability avoidance, and the prediction that the types of events (hurricanes, significant rain and/or wind storms, and flooding) traditionally recognized as Acts of God will likely increase, the question naturally arises whether climate change will alter the Act of God defense. It is

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7. Shelley's Case, 1 Co. Rep. 93b, 97b, 76 Eng. Rep. 206, 219 (1581). *See infra* Part I(A).

8. In *Forward v. Pittard*, 1 T.R. 28, 99 Eng. Rep. 953 (1785), discussed more fully in Part I(A) *infra*, Lord Mansfield's formulation of the defense acknowledged that "everything is the act of God that happens by His permission; every thing, by His knowledge." *Id.* at 33, 99 Eng. Rep. at 956.

9. *Id.* at 33, 99 Eng. Rep. at 957.

10. There is nothing to suggest that the Act of God defense is limited to climatic events like storms. For example, earthquakes are certainly beyond human agency and control. Because this article is about climate change, the focus has been narrowed to climatic events.

11. IPCC website, *available at* http://www.ipcc.ch/about/index.htm (About IPCC).

12. CLIMATE CHANGE 2007: IMPACTS, ADAPTATION AND VULNERABILITY, CONTRIBUTION OF WORKING GROUP II TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (Martin Parry et al. eds., 2007) (hereinafter "IMPACTS REPORT").

13. *See id.* at 11, 18 tbl. SPM.1, 619, 627, 630, 795.

the thesis of this article that climate change will ultimately reduce the availability and utility of the Act of God defense by fundamentally altering the legal perception of Acts of God as their foreseeability increases.

This article contains three parts. The first explores the Act of God defense as it has been used in tort, admiralty/maritime, and environmental law contexts. For each area of law, the article explores how courts have viewed and defined Acts of God in order to recognize the defense as well as the limits on the defense that courts have placed. The notion of foreseeability emerges as key to the defense. In its second part, the article examines the predictions of how climate change will produce the types of climatic events that typically qualify as Acts of God. The third part will explore the theoretical bases for the defense, and how the notion of foreseeability in fact raises significant issues with the defense—issues that will only get more acute as the predicted effects of climate change come to pass. The article concludes that the theoretical problems with the defense, coupled with their amplification by climate change, will likely combine to reduce the applicability of the Act of God defense in a warmer world.

I. INVOKING THE DIVINE: WHAT IS THE ACT OF GOD DEFENSE?

The notion that Acts of God have some legal significance shows up in tort, admiralty, and environmental law. At its core, the Act of God defense is a form of liability avoidance. It is therefore important to understand how the law defines what an Act of God is, and how the law has limited the use of the defense.

Sir Edward Coke is generally credited[14] with first using the phrase "Act of God" in 1581 in the famous *Shelley's Case*,[15] although in that case the "Act of God" was the death of a person.[16] It appears that the phrase acquired some legal significance in common carrier and negligence cases by 1785, when Lord Mansfield, in *Forward v. Pittard*,[17] confronted a claim against a common carrier for damages suffered when a shipment of hops was burned in a fire started in a nearby storage stall through no fault of the carrier. In ruling against the

14. *See, e.g.*, Marsha Ternus Rundall, Note, *"Act of God" as a Defense in Negligence Cases*, 25 DRAKE L. REV. 754, 754 (1976); Bill B. Bozeman, Note, *Act of God*, 4 S.C.L.Q. 421, 421 (1951).

15. Shelley's Case, 1 Co. Rep. 93b, 97b, 76 Eng. Rep. 206, 219 (1581). The case is famous (or perhaps infamous) amongst first year property students for establishing the "Rule in Shelley's Case" that prohibits a grantor from giving a life estate to the grantee and a remainder to the grantee's heirs. *Id.* at 97b-97a.

16. *Id.* at 97b, 76 Eng. Rep. 219-20. There is some suggestion that Sir Coke also used the phrase to refer to things such as sudden tempests, *see* Cent. of Ga. Ry. Co. v. Hall, 52 S.E. 679, 683 (Ga. 1905); Rundall, *supra* note 14, at 754 (*citing* Cent. of Ga. Ry. Co.), but no citations to Coke's decisions have been found.

17. Forward v. Pittard, 1 T.R. 27, 99 Eng. Rep. 953 (1785).

carrier, Lord Mansfield provided the first real definition of what an "Act of God" could be:

> It is laid down that [a carrier] is liable for every accident, except by the act of God, or the King's enemies. Now what is the act of God? I consider it to mean *something in opposition to the act of man*: for every thing is the act of God that happens by His permission; every thing, by His knowledge. But to prevent litigation, collusion, and the necessity of going into circumstances impossible to be unravelled, the law presumes against the carrier, unless he shews [sic] it was done by the King's enemies or by *such act as could not happen by the intervention of man, as storms, lightning, and tempests.*[18]

Finding that the fire at issue "arose from the act of some man" as opposed to lightning, Lord Mansfield held the carrier liable.[19] A much later Maryland case,[20] purported to be "adopting" Mansfield's definition,[21] stated it this way: "By the act of God, is meant a natural necessity, which could not have been occasioned by the intervention of man, but proceeding from physical causes alone, such as the violence of the winds, or seas, lightning, or other natural accidents."[22] Thus, Lord Mansfield's formulation suggests two essential ingredients to any legal definition of an Act of God: (1) some act of nature (which, logically, "could not happen by the intervention of man"), and (2) no involvement of human action. These two components recur in various ways throughout the law of the Act of God defense.

A. Acts of God in Tort Law

In tort law, the exact definition of what constitutes an "Act of God" varies from jurisdiction to jurisdiction. Indeed, many courts explicitly state that it is difficult to articulate a comprehensive definition which covers all instances of Acts of God.[23] However, all of the definitions fall collectively within three general themes: forces of nature, lack of foreseeability, and sole proximate cause.

Forces of Nature. Consistent with Mansfield's formulation, many courts define Acts of God as forces of nature or physical/natural phenomena. Thus,

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18. *Id.* at 33, 99 Eng. Rep. at 956-57 (emphasis supplied).

19. *Id.* at 34, 99 Eng. Rep. at 957.

20. Kirby v. Wylie, 70 A. 213, 215 (Md. 1908).

21. *See* Mark Downs, Inc. v. McCormick Props., Inc., 441 A.2d 1119, 1128 n.10 (Md. Ct. Spec. App. 1982).

22. *Kirby*, 70 A. at 215 (quoting Fergusson v. Brent, 12 Md. 9, 31 (1858))

23. *See, e.g.*, Gulf, Colo. & Santa Fe Ry. Co. v. Tex. Star Flour Mills, 143 S.W. 1179, 1182 (Tex. Civ. App. 1912)("There is some difficulty in framing a concise, comprehensive, and accurate definition of the term 'act of God' as that term is used and understood when applied to occurrences causing damage for which the carrier is not liable, and it is sometimes difficult to determine from the facts of the particular case whether the occurrence causing the damage complained of should be considered an act of God."); *Kirby*, 70 A. at 215 ("The legal meaning of the term is not, perhaps, susceptible of a definition which will include every case to which it may be applied").

cases speak of Acts of God as events occasioned by the violence or force of nature[24] or simply a physical force.[25] These natural forces must be something more than simple, everyday natural events; rather, they must be "extraordinary,"[26] "unusual,"[27] "unprecedented,"[28] "unexpected,"[29] "sudden,"[30] "superior,"[31] and/or "irresistible,"[32] though some courts state that it need not be the greatest or harshest act ever experienced.[33] Whether or not a particular natural event warrants such an adjective is a function of such things as the intensity of the event, characteristics of the area, and climatic history.[34]

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24. *See, e.g.*, *In re* Flood Litig., 607 S.E.2d 863, 877 (W. Va. 2004); Belue v. City of Greenville, 84 S.E.2d 631, 633 (S.C. 1954); S. Air Transp. v. Gulf Airways, 40 So. 2d 787, 791 (La. 1949); Allen v. Simon, 888 So. 2d 1140, 1143 (La. Ct. App. 2004); McWilliams v. Masterson, 112 S.W.3d 314, 320 (Tex. App. 2003); Rector v. Hartford Accident & Indem. Co., 120 So. 2d 511, 515 (La. Ct. App. 1960).

25. *See, e.g.*, L. G. Balfour Co. v. Ablondi & Boynton Corp., 338 N.E.2d 841, 844 (Mass. App. Ct. 1975).

26. *See, e.g.*, Shea-S&M Ball v. Massman-Kiewit-Early, 606 F.2d 1245, 1248 (D.C. Cir. 1979); Woodbine Auto, Inc. v. Se. Pa. Transp. Auth., 8 F. Supp. 2d 475, 481 (E.D. Pa. 1998); *In re Flood Litig.*, 607 S.E.2d at 877; *S. Air Transp.*, 40 So. 2d at 791; *Allen*, 888 So. 2d at 1143; Engle v. W. Penn Power Co., 598 A.2d 290, 300 (Pa. Super. 1991); *Rector*, 120 So. 2d at 515.

27. *See, e.g.*, *Shea-S&M Ball*, 606 F.2d at 1248; *Woodbine Auto, Inc.*, 8 F. Supp. 2d at 481; *In re Flood Litig.*, 607 S.E.2d at 877; *Allen*, 888 So. 2d at 1143; Duboue v. CBS Outdoor, Inc., 996 So. 2d 561, 563 (La. App. Ct. 2008); Brown v. Williams, 850 So. 2d 1116, 1123 (La. Ct. App. 2003); *McWilliams*, 112 S.W.3d at 320; *Engle*, 598 A.2d at 300; *Rector*, 120 So. 2d at 515.

28. *See, e.g.*, *Shea-S&M Ball*, 606 F.2d at 1248; Dollar Thrifty Auto Group v. Bohn-DC, LLC, No. 08-CA-338, 2008 WL 4415920 at *3 (La. Ct. App. Sept. 30, 2008) (Hurricane Katrina); *McWilliams*, 112 S.W.3d at 320.

29. *See, e.g.*, *Woodbine Auto, Inc.*, 8 F. Supp. 2d at 481; *Duboue*, 996 So. 2d at 563; *Dollar Thrifty Auto Group*, 2008 WL 4415920 at *3; *Allen*, 888 So. 2d at 1143; *Brown*, 850 So. 2d at 1123; *Engle*, 598 A.2d at 300; *Rector*, 120 So. 2d at 515.

30. *See, e.g.*, *Woodbine Auto, Inc.*, 8 F. Supp. 2d at 481; *Allen*, 888 So. 2d at 1143; *Duboue*, 996 So. 2d at 563; *Brown*, 850 So. 2d at 1123; *Engle*, 598 A.2d at 300; *Rector*, 120 So. 2d at 515.

31. *See, e.g.*, *Allen*, 888 So. 2d at 1143.

32. *See, e.g.*, *Woodbine Auto, Inc.*, 8 F. Supp. 2d at 481; *Allen*, 888 So. 2d at 1143; Strange v. Bartlett, 513 S.E.2d 246, 248 (Ga. Ct. App. 1999) (citing Georgia statute (GA. CODE ANN. § 1-3-3(3)(2000)) defining act of God to mean "an accident produced by physical causes which are irresistible or inevitable, such as lightning, storms, perils of the sea, earthquakes, inundations, sudden death or illness").

33. *See, e.g.*, Gulf, Colo. & Santa Fe Ry. Co. v. Tex. Star Flour Mills, 143 S.W. 1179, 1182 (Tex. Civ. App. 1912); *McWilliams*, 112 S.W.3d at 320.

34. *See, e.g.*, Shea-S&M Ball v. Massman-Kiewit-Early, 606 F.2d 1245, 1249 (D.C. Cir. 1979); *Woodbine Auto, Inc.*, 8 F. Supp. 2d at 481; Keystone Elec. Mfg. Co. v. City of Des Moines, 586 N.W.2d 340, 351 (Iowa 1998); McCutcheon v. Tri-County Group XV, Inc., 920 S.W.2d 627, 632 n.2 (Mo. Ct. App. 1996); Sky Aviation Corp. v. Colt, 475 P.2d 301, 304 (Wyo. 1970); Carlson v. A. & P. Corrugated Box Corp., 72 A.2d 290, 292 (Pa. 1950); *But see* Lea Co. v. N.C. Bd. of Transp., 304 S.E.2d 164, 173 (N.C. 1983) (rejecting a definition in which "[t]he term 'Act of God,' in its legal sense, applies only to events in nature so extraordinary that the history of climatic variations and other conditions in the particular locality affords no reasonable warning

Both the original Restatement of Torts and the Restatement (Second) of Torts use the concept of "force of nature" in lieu of the phrase "Act of God."[35] The Proposed Final Draft No. 1 of § 3—Negligence of the Restatement (Third) of Torts changes this pattern and actually defines an Act of God as "a serious and unusual adverse natural event."[36]

Lack of Foreseeability. Many courts define Acts of God by whether or not the natural force or event could have been foreseen so that the defendant could have prevented the injury. Thus, after using one or more of the forces of nature adjectives, many courts require that the natural event be one that no amount of reasonable foresight, pain, or care could have prevented[37] or simply be "unanticipated."[38] The comments to the Proposed Final Draft of § 3 of the Third Restatement focuses on this foreseeability element:

> In a negligence action, acts of God relate to the issue of negligence in several ways. First, the foreseeable likelihood of acts of God—of adverse natural events—may bear on the foreseeable likelihood of harm occasioned by the actor's conduct. Second, even when adverse natural events are foreseeable, the question arises as to what reasonable precautions are available to the actor.
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> Several forms of precautions can be relevant in protecting against adverse natural events. The actor can be negligent in building facilities that are unreasonably inadequate in protecting against foreseeable natural events. Thus,

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of them" because it "incorrectly implies that an 'Act of God' is by definition an unforeseeable event" and adopting a definition based on the natural event being the sole proximate cause).

35. For the original Restatement, see RESTATEMENT OF TORTS (1934) §§ 195 cmt. e; 290 cmt. h; 302; 324 cmt. b; 338 cmt. b; 349 cmt. b; 365 cmt. a; 368 cmt. e; 377 cmt. c; 450; 451; 470 cmt. a; 510; 522; 817 cmt. l; 848 cmt. b (definition of harm). For the Restatement (Second), see RESTATEMENT SECOND OF TORTS (1965) §§ 7 cmt. c; 25 cmt. a; 195 cmt. e; 199 cmt. b; 290 cmt. i; 302; 314A cmt. d; 324 cmt. b; 338 cmt. b; 349 cmt. b; 365 cmt. a; 368 cmt. j; 377 cmt. c; 433A cmt. a; 442A cmt. a; 442B cmt. b; 443 cmt. a; 450; 451; 504; 510; 522; 817 cmt. m; *but see* 328A cmt. B.

36. *See* RESTATEMENT (THIRD) OF TORTS § 3 cmt.. 1 (Proposed Final Draft No. 1 2005) (hereinafter "RESTATEMENT (THIRD)").

37. *See, e.g.*, Brown v. Sandals Resorts Int'l., 284 F.3d 949, 954 (8th Cir. 2002) (quoting Nw. Bell Tel. Co. v. Henry Carlson Co., 165 N.W.2d 346, 349 (S.D. 1969)); *Shea-S&M Ball*, 606 F.2d at 1248 (quoting Barnard-Curtiss Co. v. United States, 257 F.2d 565, 568 (10th Cir. 1958)); *Woodbine Auto, Inc.*, 8 F. Supp. 2d at 481; *In re* Flood Litig., 607 S.E.2d 863, 877-78 (W. Va. 2004); *Allen*, 888 So. 2d at 1143 (quoting S. Air Transp. v. Gulf Airways, 40 So. 2d 787, 791 (La. 1949)); *Keystone Elec. Mfg. Co.*, 586 N.W.2d at 351; *McWilliams*, 112 S.W.3d at 320; *Sky Aviation Corp.*, 475 P.2d at 304; L. G. Balfour Co. v. Ablondi & Boynton Corp., 338 N.E.2d 841, 844 (Mass. App. Ct. 1975); Rector v. Hartford Accident & Indem. Co., 120 So. 2d 511, 515 (La. Ct. App. 1960).

38. *See* Mancuso v. S. Cal. Edison Co., 283 Cal. Rptr. 300, 310 (Cal. Ct. App. 1991).

> The defense that an event was an "act of God" exists and may be asserted in those limited cases where an unanticipated natural occurrence is the sole cause of a plaintiff's injury or damage. The natural event must be "so unusual in its proportions that it could not be anticipated by a defendant.

Mancuso, 283 Cal. Rptr. at 310 (emphasis omitted) (citation omitted).

> there can be negligence in designing or constructing a building that collapses in a severe windstorm or hurricane or in designing or constructing a dam that overflows in a severe rainstorm. In conducting a negligence analysis in such a case, the foreseeable likelihood of harm relates to which adverse natural events can be contemplated during the expected life of the facility. Also, an actor can be negligent for failing to adopt appropriate precautions when an adverse natural event is imminent—for example, for failing to fasten a vessel to a dock as a storm approaches. In such a case, the imminence of the adverse natural event reduces the significance of foreseeable likelihood as a negligence factor, although problems of foreseeability still concern the exact severity of the storm that might arrive. In addition, an actor can be negligent in failing to adopt appropriate precautions when an adverse natural event is already in progress—for example, in failing to drive more slowly when a severe snowstorm has sharply reduced visibility. In such a case, the ongoing natural event eliminates any issue of foreseeability; the only issue is reasonable precautions.[39]

Climatic history can be relevant to determining whether the natural event was foreseeable.[40] For example, a construction company's Act of God defense failed against a claim for damages caused by flooding after heavy rains because flooding which occurred after a hurricane 13 or even 48 years earlier should have caused the defendant to anticipate that it could happen again.[41] In another case the occurrence of a one hundred year flood was reasonably foreseeable[42]—presumably because the defendant could foresee that such a flood could occur at least once every hundred years.

Sole Proximate Cause. The third definitional category looks to whether the force of nature is the sole or exclusive cause of the injuries at issue. As one court said in adopting a definition that rests primarily on the natural event being the sole proximate cause:

> The term "Act of God" is more correctly defined as follows:
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> > An act occasioned exclusively by violence of nature without the interference of any human agency. It means a natural necessity proceeding from

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39. RESTATEMENT (THIRD), *supra* note 36, at § 3 cmt. l.

40. *See* Bradford v. Stanley, 355 So. 2d 328, 330 (Ala. 1978) ("In its legal sense an 'act of God' applies only to events in nature so extraordinary that the history of climatic variations and other conditions in the particular locality affords no reasonable warning of them"); Fairbury Brick Co. v. Chicago, R.I. & P. Ry. Co., 113 N.W. 535, 537 (Neb. 1907) ("Although a rainfall may be more than ordinary, yet if it be such as has occasionally occurred at irregular intervals, it is to be foreseen that it may occur again . . . "); Corrington v. Kalicak, 319 S.W.2d 888, 892 (Mo. Ct. App. 1959) (using same definition as *Bradford*, *supra*); Mitchell v. City of Santa Barbara, 120 P.2d 131, 133 (Cal. Dist. Ct. App. 1941) (rainstorm not unusual because there had been "several rainstorms of the same or greater intensity" during the previous year).

41. *See L. G. Balfour Co.*, 338 N.E.2d at 844 (13 years); Kennedy v. Union Elec. Co., 216 S.W.2d 756, 763 (Mo. 1948) (48 years).

42. *See* Lea Co. v. N.C. Bd. of Transp., 304 S.E.2d 164, 174 (N.C. 1983) (citation omitted).

> physical causes alone without the intervention of man. It is an act, event, happening, or occurrence, due to natural causes and inevitable accident, or disaster; a natural and inevitable necessity which implies entire exclusion of all human agency which operates without interference or aid from man and which results from natural causes and is in no sense attributable to human agency. It is an accident which could not have been occasioned by human agency but proceeded from physical causes alone.[43]

Under this view, if the Act of God is solely or exclusively the cause, then liability is avoided. However, if there is some element of human activity or intervention which contributes in some way to the injury, then the Act of God defense will not allow the defendant to escape liability,[44] though it may allow the defendant to limit liability to that portion of the injury its own conduct caused.[45] What these sole proximate cause analyses really focus on is the reasonableness of the defendant's response in light of the foreseeable consequences of that response: was there something the defendant could have done differently so that the plaintiff would not have been injured?[46] Thus, the defense failed in a case involving an ice storm that downed power

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43. *Id.* at 173-74. For similar language, see for example, Johnson v. Burley Irrigation Dist., 304 P.2d 912, 916 (Idaho 1956); Butts v. City of Fulton, 565 S.W.2d 879, 882 (Tenn. Ct. App. 1977).

44. *See, e.g.*, Millennium Partners, L.P. v. Colmar Storage, LLC, 494 F.3d 1293, 1296, 1301 (11th Cir. 2007) (negligence in storing coffee beans in warehouse at ground level in area of Miami prone to flooding meant jury could find Act of God defense did not relieve defendant of liability when tropical storm dumped 15 inches of rain near warehouse); Brown v. Sandals Resorts Int'l., 284 F.3d 949, 954 (8th Cir. 2002); Shea-S&M Ball v. Massman-Kiewit-Early, 606 F.2d 1245, 1249 n.6 (D.C. Cir. 1979); Mulkey v. Meridian Oil, Inc., 143 F.R.D. 257, 262 (W.D. Okla. 1992); *In re* Flood Litig., 607 S.E.2d 863, 878 (W. Va. 2004); City of Portsmouth v. Culpepper, 64 S.E.2d 799, 801 (Va. 1951); Belue v. City of Greenville, 84 S.E.2d 631, 633 (S.C. 1954); Pub. Serv. Co. v. Sonagerra, 253 P.2d 169, 171 (Okla. 1952); McFarland v. Entergy Miss., Inc., 918 So. 2d 697, 701 (Miss. Ct. App. 2004); Allen v. Simon, 888 So. 2d 1140, 1144 (La. Ct. App. 2004); McWilliams v. Masterson, 112 S.W.3d 314, 320 (Tex. App. 2003); Terre Aux Boeufs Land Co. v. J.R. Gray Barge Co., 803 So. 2d 86, 93-94 (La. Ct. App. 2001); Huber v. Oliver County, 602 N.W.2d 710, 713 (N.D. 1999); Strange v. Bartlett, 513 S.E.2d 246, 248 (Ga. Ct. App. 1999); Mark Downs, Inc. v. McCormick Props., Inc., 441 A.2d 1119, 1129 (Md. Ct. Spec. App. 1982).

45. *See, e.g.*, *In re Flood Litig.*, 607 S.E.2d at 878-79 (but note that defendant has burden to show "by clear and convincing evidence" that character and measure of damages that are not the defendant's responsibility, and if the defendant fails to do so, then defendant bears entire liability); Rix v. Town of Alamogordo, 77 P.2d 765, 770 (N.M. 1938); Wilson v. Hagins, 295 S.W. 922, 924 (Tex. 1927); McAdams v. Chicago, R.I. & P. Ry. Co., 205 N.W. 310, 311 (Iowa 1925); Republican Valley R. Co. v. Fink, 24 N.W. 691, 693 (Neb. 1885); *Mark Downs, Inc.*, 441 A.2d at 1129; *But see Strange*, 513 S.E.2d at 248 ("But where damages are caused by the combination of an act of God and the fault of man, such damages must be attributed entirely to human error . . . . The presence of the one excludes the existence of the other" (quoting W. & Atl. R.R. v. Hassler, 88 S.E.2d 559, 561 (Ga. Ct. App. 1955))).

46. *See, e.g.*, Woodbine Auto, Inc. v. Se. Pa. Transp. Auth., 8 F. Supp. 2d 475, 481 (E.D. Pa. 1998) ("[T]he test remains whether the defendant did all that a reasonable person could have been expected to do to avoid the happening which is the cause of the plaintiff's injuries. If he did, he is not liable in damages; if he did not, then he is liable").

lines because the power company failed to satisfy its duty to protect the public against downed lines,[47] or when a motorist could not stop his car in a rainstorm because of the way he was driving.[48] Other examples include instances when the defendant diverted flow or inadequately constructed structures (like culverts) that contributed to flooding,[49] or when injuries caused by a lightning strike were not found subject to an Act of God defense because the lightning was channeled through an improperly installed lightning protection system.[50] At the same time, plans and proper steps in light of a pending storm, however, can be sufficient to avoid liability.[51]

What emerges from tort law is a highly fact-specific analysis to determine whether a particular climatic occurrence qualifies for the Act of God defense. Hurricanes and tropical storms,[52] high winds,[53] flooding after heavy rains,[54]

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47. *See McFarland*, 918 So. 2d at 701-704.

48. *See Strange*, 513 S.E.2d at 248-49.

49. *See, e.g.*, Lea Co. v. N.C. Bd. of Transp., 304 S.E.2d 164, 174-75 (N.C. 1983); Riddle v. Balt. & Ohio Ry. Co., 73 S.E.2d 793, 801 (W.Va. 1952) (inadequately constructed culvert; "even if the flood . . . was unprecedented and of such character as to constitute an act of God, the defendant cannot effectively defend this action on that basis, for the reason that the inadequacy of its culvert was a contributing proximate cause of plaintiff's damages"); *City of Portsmouth*, 64 S.E.2d at 801-02 (uncompleted dam in canal); Atkinson v. Chesapeake & Ohio Ry. Co., 82 S.E. 502, 502-03 (W. Va. 1914) (diversion of water caused by inadequate culvert).

50. *See* Macedonia Baptist Church v. Gibson, 833 S.W.2d 557, 560 (Tex. Ct. App. 1992).

51. *See* Coex Coffee Int'l v. Dupuy Storage & Forwarding LLC, No. 06-4798, 2008 WL 1884041 at *3-4 (E.D. La. Apr. 28, 2008) (evidence that warehouse properly maintained before storm, existence of a hurricane preparation plan, and detailed precautions taken in months and days before Hurricane Katrina sufficient to overcome presumption of negligence in bailment-type situation); *accord* HRD Corp. v. Lux Int'l Corp., No. H-06-0730, 2007 WL 2050366 at *11-12 (S.D. Tex. July 17, 2007).

52. *See, e.g.*, Allen v. Simon, 888 So. 2d 1140, 1144 (La. Ct. App. 2004) (Hurricane Lili found to be act of God, but defense found not to apply to claim seeking cost for removal of tree that fell on plaintiff's property); Terre Aux Boeufs Land Co. v. J.R. Gray Barge Co., 803 So. 2d 86, 93-94 (La. Ct. App. 2001) (although Hurricane Georges was act of God, defense did not apply to claim for removal of barge deposited on plaintiff's property by Hurricane because the decision to abandon the barge was not related to the hurricane); Mark Downs, Inc. v. McCormick Props., Inc., 441 A.2d 1119, 1128-29 (Md. Ct. Spec. App. 1982) (finding that tropical storm David was "in fact, an 'Act of God,'" but finding that plaintiffs had sufficiently alleged actions by defendants that suggest some causative role).

53. *See* Brown v. Sandals Resorts Int'l., 284 F.3d 949, 954 (8th Cir. 2002) (upholding jury verdict that high winds knocking down a palm tree onto plaintiff gave rise to act of God defense).

54. *See, e.g.*, Shea-S&M Ball v. Massman-Kiewit-Early, 606 F.2d 1245, 1248-49 (D.C. Cir. 1979)(reversing the trial court holding of no act of God for flooding of construction site after heavy rains "There is no evidence in the district court record upon which the court could conclude that the rains . . . were extraordinary or unusual. The record is completely devoid of any evidence of the normal range of rainfall in Washington, D.C., and the amount of rain that actually fell during the time periods when the floods occurred."); Longview Fibre Co., v. CSX Transp., Inc., 526 F. Supp. 2d 332, 338 (N.D.N.Y. 2007)(two-year storm and any natural consequences such as flooding "are not unusual, extraordinary, or unprecedented" and

and snow storms,[55] were sometimes held to be Acts of God, while other times not. Sometimes, the result is a disputed question of fact which precludes summary judgment.[56]

B. Acts of God in Admiralty Law

In admiralty law, the Act of God defense has both a statutory and a common law source. In the statutory context, a carrier and the vessel are not liable for loss or damages arising from "Acts of God"[57] and from the related concept of perils of the sea.[58] In fact, "Act of God" and "perils of the sea" are often conflated together.[59] In admiralty common law, climatic conditions that constitute "heavy weather" can be sufficient to invoke the defense.[60] The defendant bears the burden to prove that the elements of the defense are present,[61] with any doubt or question resolved against the carrier.[62] From a

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therefore are not Acts of God); *In re* Flood Litig., 607 S.E.2d 863, 879 (W. Va. 2004) (floods resulting from heavy rainfall of several thunderstorms could be act of God, and if discrete portion of damages due to the act of God, defendant will be liable only for damages fairly attributable to the defendant's conduct); Huber v. Oliver County, 602 N.W.2d 710, 717 (N.D. 1999) (affirming jury verdict that flooding after heavy rains was act of God and not caused by County's road construction or culvert installations); L. G. Balfour Co. v. Ablondi & Boynton Corp., 338 N.E.2d 841, 844 (Mass. App. Ct. 1975) (affirming a jury verdict for plaintiff for damages from flooding of river after heavy rain, "The jury were also entitled to disregard [defendant's act of God defense] . . . . In light of the testimony of the flooding conditions during Hurricane Diane [which had occurred 13 years before], there was sufficient evidence from which the jury could find that the defendant should have anticipated flooding of that magnitude…."); Garner v. Ritzenberg, 167 A.2d 353, 354-55 (D.C. Mun. App. 1961)(" We take judicial notice that rains of heavy intensity and average duration are occurrences of common experience . . . . Such events, though infrequent, are to be expected . . . . The occasional filling of low-level or basement areas by rain water is a probable and foreseeable result of a heavy rain. To classify it as an act of God is an unwarranted extension of that doctrine not supported by the authorities.")

55. *See* McWilliams v. Masterson, 112 S.W.3d 314, 321 (Tex. App. 2003).

56. *See* Woodbine Auto, Inc. v. Se. Pa. Transp. Auth., 8 F. Supp. 2d 475, 481 (E.D. Pa. 1998) (dispute about heavy rains, with one expert calling the event a 100-year storm and another expert calling it a 25-year storm forced the court to "leave the question of whether the storm in question constituted such a force of nature and/or act of God as to absolve defendants of liability to the jury"); Mulkey v. Meridian Oil, Inc., 143 F.R.D. 257, 262 (W.D. Okla. 1992) (plaintiff's expert affidavit alleged negligence in fall of oil derrick stand on plaintiff during storm created genuine issue of fact on Act of God defense precluding summary judgment).

57. 46 U.S.C. § 30706(b)(2) (2007).

58. 46 U.S.C. § 30706(b)(1) (2007).

59. *See, e.g.*, Am. Int'l. Ins. Co. v. Vessel SS Fortaleza, 446 F. Supp. 221, 225 (D.P.R. 1978); Mamiye Bros. v. Barber S.S. Lines, Inc., 241 F. Supp. 99, 108 (S.D.N.Y. 1965), *aff'd*, 360 F.2d 774 (2d Cir. 1966) ("The exception for 'perils of the sea' is very like in principle to that for an act of God"); THOMAS J. SCHOENBAUM, 2 ADMIRALTY AND MARITIME LAW § 10-28 at 138 (3d ed. 2001) ("The cases do not distinguish clearly between act of God and peril of the sea").

60. *See* Skandia Ins. Co. v. Star Shipping AS, 173 F. Supp. 2d 1228, 1239 (S.D. Ala. 2001).

61. *Id.* at 1241-42, 1242 n.29.

62. *See* Quaker Oats Co. v. M/V Torvanger, 734 F.2d 238, 240-41 (5th Cir. 1984); *Skandia Ins. Co.*, 173 F. Supp. 2d at 1241-42, 1242 n.29.

definitional perspective, it appears that the concept is the same under statute and the common law.[63]

Defining the concept has not been easy. As one court noted:

> There is no hard and fast definition of what constitutes a sea peril or an Act of God. A definition frequently quoted but criticized by the Courts is the one found in *The Rosalia*: "The peril which forms a good exception in the bill of lading means something so catastrophic as to triumph over those safeguards by which skillful and vigilant seamen usually bring ship and cargo to port in safety."[64]

As with tort law, courts applying the defense in admiralty law contexts tend to define Acts of God in terms of the size and severity of the climatic force involved. Thus, courts use language such as "overwhelming forces/power,"[65] a "disturbance . . . of 'unanticipated force and severity,'"[66] the "violent action of the elements,"[67] and "events in nature so extraordinary that the history of climatic variations and other conditions in the particular locality affords no reasonable warning of them,"[68] as well as other factors[69] when describing Acts of God. Some courts use the Beaufort Scale—a system of rating wind speeds[70]—to assess whether a particular storm event qualifies as an Act of

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63. That is certainly the case with the burden of proof. *See Skandia Ins. Co.*, 173 F. Supp. 2d at 1242 n.29.

64. *Am. Int'l Ins. Co.*, 446 F. Supp. at 225 (quoting The Rosalia, 264 F. 285, 288 (2d Cir. 1920)).

65. *See* The Giulia, 218 F. 744, 746 (2d Cir. 1914); *Skandia Ins. Co.*, 173 F. Supp. 2d at 1239.

66. *See Skandia Ins. Co.*, 173 F. Supp. 2d at 1239; Wyler v. Holland Am. Line-USA, Inc., 348 F. Supp. 2d 1206, 1211 (W.D. Wash. 2003).

67. *See* Philippine Sugar Cents. Agency v. Kokusai Kisen Kabushiki Kaisha, 106 F.2d 32, 35 (2d Cir. 1939); *Am. Int'l Ins. Co.*, 446 F. Supp. at 226.

68. Warrior & Gulf Navigation Co. v. United States, 864 F.2d 1550, 1553 (11th Cir. 1989); *Skandia Ins. Co.*, 179 F. Supp. 2d at 1239.

69. *See Am. Int'l. Ins. Co.*, 446 F. Supp. at 226 ("This Court is mindful that heavy weather *per se* measured by the force of the winds or the height of the waves is not the only element that constitute a peril of the sea. Other considerations such as duration of the weather, size of the vessel, wave intervals, crossing seas, structural damage and other considerations all become important in answering the crucial question of whether a peril of the sea has taken place.").

70. "The Beaufort Scale apparently was invented before anemometers, so that an officer's trained eye looked at sea conditions and based on that, predicted wind speed." Desiderio v. Celebrity Cruise Lines, Inc., No. 97 Civ. 5185 (AJP), 1999 WL 440775 at *7 n.10 (S.D.N.Y. June 28, 1999). The Scale is described as "an international standard for determining wind and sea conditions." Leonard J. Buck & Co. v. M/V Susana, No. 84-0153P, 1986 WL 231 at *5 n.6 (D. Me. May 19, 1986). It is a scale "on which successive ranges of wind velocities are assigned code numbers from 0 to 12 or from 0 to 17." D'Agostino v. State Farm Fire & Cas. Co., No. 93-3904, 1994 WL 161249 at *3 n.2 (E.D. Pa. Apr. 21, 1994). The Beaufort Scale itself is as follows:

God or peril of the sea.[71] Thus, a "hurricane that causes unexpected and unforeseeable devastation with unprecedented wind velocity, tidal rise, and upriver tidal surge, is a classic case of an 'Act of God,'"[72] while "storms that

Beaufort #	Name	Wind Speed (mph)	Description
0	calm	<1	calm; smoke rises vertically
1	light air	1-3	direction of wind shown by smoke but not by wind vanes
2	light breeze	4-7	wind felt on face; leaves rustle; ordinary vane moved by wind
3	gentle breeze	8-12	leaves and small twigs in constant motion; wind extends light flag
4	moderate breeze	13-18	raises dust and loose paper; small branches are moved
5	fresh breeze	19-24	small trees in leaf begin to sway; crested wavelets form on inland water
6	strong breeze	25-31	large branches in motion; telegraph wires whistle; umbrellas used with difficulty
7	moderate gale (*or* near gale)	32-38	whole trees in motion; inconvenience in walking against wind
8	fresh gale (*or* gale)	39-46	breaks twigs off trees; generally impedes progress
9	strong gale	47-54	slight structural damage occurs; chimney pots and slates removed
10	whole gale (*or* storm)	55-63	trees uprooted; considerable structural damage occurs
11	Storm (*or* violent storm)	64-72	very rarely experienced; accompanied by widespread damage
12-17	Hurricane	73-136	devastation occurs

WEBSTER'S NEW COLLEGIATE DICTIONARY 138 (9th ed. 1987); *see* Yawata Iron & Steel Co. v. Anthony Shipping Co., 396 F. Supp. 619, 621 n.1 (S.D.N.Y. 1975). For a fascinating description of the story behind the Beaufort Scale and its creator, see SCOTT HULER, DEFINING THE WIND: THE BEAUFORT SCALE, AND HOW A 19TH CENTURY ADMIRAL TURNED SCIENCE INTO POETRY (2004), which describes the actual language of the Scale as "the best 110 words ever written." *Id.* at iii.

71. *See, e.g.*, Steel Coils, Inc. v. M/V Lake Marion, 331 F.3d 422, 433-35 (5th Cir. 2003) (winds of force 11 to 12 faced for a few hours held not to be a peril of the sea); J. Gerber & Co. v. S.S. Sabine Howaldt, 437 F.2d 580, 596 (2d Cir. 1971) (damages caused by ship in force 11 to 12 winds for ten hours held to be peril of sea; while "[n]o exact Beaufort Scale wind force can be referred to as the dividing line which will determine those cases in which a peril of the sea is present and those, below that mark, in which it is not," there are "few cases in which the winds are force 9 or below…in which there has been found to have been a peril of the sea, whereas there are many where the force has been 11 or above"); Middle E. Agency, Inc. v. John B. Waterman, 86 F. Supp. 487, 489 (S.D.N.Y. 1949) ("very heavy seas, a heavy rain squall and at times a windforce of 9 and 10 on the Beaufort Scale" off Cape Hatteras in March not an Act of God or peril of the sea because "that kind of weather in the North Atlantic at that time of the year . . . should have been anticipated in the stowage of this cargo").

72. *Skandia Ins. Co.*, 173 F. Supp. 2d at 1240. *See* Dammers & Van Der Heide Shipping & Trading (Antilles) Inc. v. SS Joseph Lykes, 300 F. Supp. 358, 366 (E.D. La. 1969), *aff'd*, 425 F.2d 991 (5th Cir. 1970) ("Betsy, which caused more devastation in New Orleans and

are usual for waters and the time of year are not"[73]—including some hurricanes.[74] As a result of these varying factors (including the erratic paths of storms like hurricanes[75]), courts view the application of the Act of God defense in admiralty law to be "highly fact specific" and that "the court's ultimate conclusions should turn on whether the weather conditions were foreseeable."[76]

There are two main limits on the Act of God defense recognized in admiralty law, and they are similar to the limits found in tort law: foreseeability and sole proximate cause.

The foreseeability limit looks at whether the weather conditions (or consequences arising from the conditions) were foreseeable in the exercise of ordinary care. It is, in a sense, the real emphasis of the defense.[77] The natural

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to the marine community than any hurricane of record, with unprecedented wind velocity, tidal rise and upriver tidal surge, is a classic case of an act of God"); Pizzetta v. Lake Catherine Marina, LLC, 995 So. 2d 26, 31 (La. Ct. App. 2008) (finding that "destruction of the vessel was the unavoidable consequence of the unprecedented devastation caused by Hurricane Katrina").

73. *Skandia Ins. Co.*, 173 F. Supp. 2d at 1240. *See, e.g.*, The Mauretania, 84 F.2d 408, 410 (2d Cir. 1936) ("The log recorded no wind higher than fresh or moderate gales, force 7 or 8 on the Beaufort scale. The sea was recorded as very rough, but such winds and seas are nothing more than expectable heavy weather in the North Atlantic in February"); The Skipsea, 9 F.2d 887, 889 (2d Cir. 1925) ("It is true that [the vessel] encountered rough seas, so that she rolled and pitched considerably; but at this season of the year such gales and seas were to be expected in the Atlantic waters. There was no peril of the sea, as that phrase is now understood"); New Rotterdam Ins. Co. v. S.S. Loppersum, 215 F. Supp. 563, 567 (S.D.N.Y. 1963) ("it was uncontroverted that although the ship ran through storms crossing the Atlantic, such storms were not unusual for that time of year in those waters. It must be expected that a freighter crossing the Atlantic will run into heavy seas and rolling seas in the month of March"); *Am. Int'l Ins. Co.*, 446 F. Supp. at 225 ("not all heavy weather encountered by a vessel can be classified as a peril of the sea or Act of God . . . . Some weather is not extraordinary for the time of year when the voyage is made"); *Middle E. Agency, Inc.*, 86 F. Supp. at 489 (March storms off Cape Hatteras to be expected).

74. *See* Bunge Corp. v. Freeport Marine Repair, Inc., 240 F.3d 919, 925-26 (11th Cir. 2001) (affirming district court ruling that Hurricane Opal, with winds between 85 and 103.5 miles per hour, did not amount to an act of God absolving defendant from liability); Moran Transp. Corp. v. N.Y. Trap Rock Corp., 194 F. Supp. 599, 602 (S.D.N.Y. 1961) ("Hurricane Hazel was not an Act of God. At Tomkins Cove it was neither so sudden nor so violent that Trap Rock's experienced men who had not less than twenty-four hours' warning could not have taken precautions to guard against it."). For a focused discussion on the defense and hurricanes, see James E. Mercante, *Hurricanes and Act of God: When the Best Defense is a Good Offense*, 18 U.S.F. MAR. L.J. 1 (2005-06).

75. *See Skandia Ins. Co.*, 173 F. Supp. 2d at 1240 ("However, forecasting the tracks, speeds and tidal surges of a hurricane is one of the most challenging and difficult tasks encountered by meteorologists, and despite aircraft, land, and shipboard reconnaissance, weather satellites, and other data sources, exact hurricane paths and associated flooding are rarely predicted with precision . . . . Instead, hurricane tracks exhibit "humps, loops, staggering motions, abrupt course and/or speed changes, and so forth[,]" which in turn, alter flood predictions") (quoting WILLIAM J. KOTSCH, WEATHER FOR THE MARINER 151 (2d ed. 1977)).

76. *Skandia Ins. Co.*, 173 F. Supp. 2d at 1240 (emphasis omitted).

77. *See* Wyler v. Holland Am. Line-USA, Inc., 348 F. Supp. 2d 1206, 1211 (W.D.

climatic condition can be deemed foreseeable in two ways. First, it can be a condition that is usual for waters and the time of year.[78] In effect, this type of foreseeability likely precludes the defense because the event is not so unexpected that it qualifies as an Act of God. As one court put it in rejecting the defense with respect to Hurricane Katrina:

> It is common knowledge that hurricanes are not completely predictable, a fact which is demonstrated by the hurricanes [Ivan, Dennis and Katrina] that have been briefly discussed here. Atlantic Marine's rationalization that it was reasonable to prepare for the hurricane only as precisely forecast is not reasonable. The forecast for Katrina changed significantly each day. With a category 4 hurricane heading towards the Gulf Coast, the court finds that . . . it was foreseeable that the winds might significantly exceed 75 mph.[79]

The second type of foreseeability, however, relates to the defendant's conduct in light of knowledge that the climatic event is coming. If reasonable precautions or the exercise of due care could have prevented the damage from the natural event, then the defense will fail.[80]

Wash. 2003) ("Phrases such as "rogue wave," "freak wave," "sneaker," etc. are synonyms for "an act of God." An "act of God" is a natural phenomenon of "such unanticipated force and severity as would fairly preclude charging the carrier with responsibility for damage occasioned by its failure to guard against it . . . . Hence the "rogue wave" defense is simply an alternative formulation of the argument that the inordinate size of the wave that struck the ZAANDAM was unforeseeable") (citing Compania De Vapores Insco, S.A. v. Mo. Pac. RR Co., 232 F.2d 657, 660 (5th Cir.1956)); SCHOENBAUM, *supra* note 59, § 10-28 at 137 ("The test here [for peril of the sea] is basically one of foreseeability"), 139 (as to acts of God, "[h]ere again, the emphasis is on the unforeseeable nature of the event").

78. *See The Mauretania*, 84 F.2d at 410; *The Skipsea*, 9 F.2d at 889; *Skandia Ins. Co.*, 173 F. Supp. 2d at 1240; *New Rotterdam Ins. Co.*, 215 F. Supp. at 567; *Cf.* Noritake Co. v. M/V Hellenic Champion, 627 F.2d 724, 726-28 (5th Cir. 1980) (unforeseeable and unpredictable severe localized flash flooding from thirteen inches of rain within a few hours where weather bureau had predicted only fifteen percent chance of rain that day rose to level of an act of God).

79. *In re* Atl. Marine, Prop. Holding Co., 570 F. Supp. 2d. 1369, 1378 (S.D. Ala. 2008). The 75 mph threshold was significant because, during a previous hurricane, there was concern that the vessel had trouble in winds of 70 mph. *Id.* at 1377.

80. *See* Crescent Towing and Salvage Co. v. M/V Chios Beauty, No. 05-4207, 2008 WL 3850481 at *14 (E.D. La. Aug. 14, 2008) (Act of God defense not available for damage caused by Hurricane Katrina because both the path of the hurricane and the accompanying surge in the Mississippi River were "reasonably foreseeable" and defendants ignored or misinterpreted weather information "at their peril"); *Skandia Ins. Co.*, 173 F. Supp. 2d at 1240; Pac. Alaska Fuel Servs. v. M/V Miyoshima Maru, No. A91-0549 civ. (JWS), 1994 WL 739434 at *11 (D. Alaska Feb. 1, 1994) (failure to monitor "obviously deteriorating weather conditions"); Weyerhaeuser Co. v. Vessels Atropos Island et al., No. 81-1075-FR, 1983 WL 629 at *2-4 (D. Or. July 26, 1983), *aff'd in part remanded in part*, 777 F.2d 1344 (9th Cir. 1985) (high winds and storm were Act of God, but crew took insufficient steps to ready ship for approaching gale); Mamiye Bros. v. Barber S.S. Lines, Inc., 241 F. Supp. 99, 108-09 (S.D.N.Y. 1965), *aff'd*, 360 F.2d 774 (2d Cir. 1966); Moran Transp. Corp. v. N.Y. Trap Rock Corp., 194 F. Supp. 599, 602 (S.D.N.Y. 1961); Grover-Ferguson Co. v. A/S Ivarans Rederi, 171 F. Supp. 766, 767-68 (E.D. Pa. 1959).

The sole proximate cause limit looks at whether the defendant's conduct contributed to the damages. Because it is sometimes viewed as a loss happening "in spite of all human effort and sagacity,"[81] which could not have been prevented by any amount of foresight, pains, or care,[82] *any* negligence or fault on the part of the carrier is normally fatal to the defense[83] - or, viewed another way, the absence of negligence by the carrier is an essential part of the definition of peril of the sea or Act of God sufficient to give rise to the defense.[84] The notion here is that the damage occurs despite all reasonable preparations to prevent damage.[85] Thus, for example, a defendant with sufficient information that the storm was approaching could not successfully assert the defense even though the storm would otherwise qualify as an Act of God.[86] However, "reasonable" does not mean that the highest possible level of precaution must be exercised.[87]

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81. The Majestic, 166 U.S. 375, 386 (1897); *Mamiye Bros.*, 241 F. Supp. at 107.

82. *See Skandia Ins. Co.*, 173 F. Supp. 2d at 1239.

83. *Id.* at 1240 ("regardless of the type of 'heavy weather,' 'it is certain that human negligence as a contributing cause defeats any claim to the 'Act of God' immunity' . . . . Indeed, an 'Act of God' will insulate a defendant from liability *only* if there is *no* contributing human negligence . . . ."); *Mamiye Bros.*, 241 F. Supp. at 108-09; SCHOENBAUM, *supra* note 59, § 10-28 at 137-39 ("The existence of negligence or fault prevents the carrier from coming within the definition of a peril of the sea" . . . "As with peril of the sea, human fault or negligence defeats a claim of act of God").

84. *See* GRANT GILMORE AND CHARLES L. BLACK JR., THE LAW OF ADMIRALTY 162-64 (2d ed. 1975).

85. *See* Fischer v. S/Y Neraida, 508 F.3d 586, 596 (11th Cir. 2007) ("[A]ct of God defense denies that the defendant's acts or omissions . . . caused the accident . . . . In other words, the accident would have happened anyway regardless of [the defendant's actions]. This defense sensibly requires a showing that all reasonable measures would have been futile"); *Skandia Ins. Co.*, 173 F. Supp. 2d at 1240 ("an 'Act of God' is not only one which causes damage, but one as to which reasonable precautions and/or the exercise of reasonable care by the defendant, could not have prevented the damage from the natural event"); *Mamiye Bros.*, 241 F. Supp. at 108-09; *Moran Transp. Corp.*, 194 F. Supp. at 602; Pizzetta v. Lake Catherine Marina, LLC, 995 So. 2d 26, 31 (La. Ct. App. 2008).

86. *See* Sidney Blumenthal & Co. v. Atl. Coast Line R. Co., 139 F.2d 288, 290-91 (2d Cir. 1943); Crescent Towing and Salvage Co. v. M/V Chios Beauty, No. 05-4207, 2008 WL 3850481 at *14 (E.D. La. Aug. 14, 2008) ("Here however, Hurricane Katrina posed no risk for the CHIOS BEAUTY until the defendants failed to heed the available weather data and intentionally placed the vessel in the path of Hurricane Katrina with apparent disregard for its safety"; defense rejected); Grover-Ferguson Co. v. A/S Ivarans Rederi, 171 F. Supp. 766, 767 (E.D. Pa. 1959) (because defendant had been warned of approach of Hurricane Connie, but failed to take action after such warnings, defense not available).

87. *See In re* Atl. Marine, Prop. Holding Co., 570 F. Supp. 2d. 1369, 1376 (S.D. Ala. 2008)("Applied to the context of hurricane preparations, reasonable care amounts to whether the owner 'use[d] all reasonable means and took proper action to guard against, prevent or mitigate the dangers posed by the hurricane . . . .' Although what 'reasonable care' requires changes with the circumstances, that standard recognizes the existence in every case of something more that could be done-and perhaps would be legally required under a 'highest

C. Acts of God in Environmental Law

The Act of God defense is recognized under federal environmental law. The Federal Water Pollution Control Act of 1972 ("FWPCA," commonly known as the Clean Water Act ("CWA")),[88] Oil Pollution Act ("OPA")[89] and Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"),[90] all recognize an Act of God defense. Under the CWA, the discharge of oil or a hazardous substance into or upon the navigable waters, adjoining shorelines, or the waters of the contiguous zone subjects the discharger to liability for administrative penalties,[91] civil penalties,[92] and reimbursement of costs for removing the oil or substance.[93] This liability is strict.[94] However, at least reimbursement liability does not exist where "the discharge was caused solely by . . . an act of God."[95]

Under the OPA, which draws heavily upon the CWA,[96] a responsible party for a vessel or facility from which oil is discharged or poses a substantial threat of oil discharge into a navigable water or adjoining shoreline is liable for specified removal costs and damages.[97] This liability is strict.[98] However, the OPA specifically provides that a responsible party is not liable for response costs and damages if the discharge of oil and the resulting damages and costs were caused solely by an Act of God.[99]

Under CERCLA, current and past owners and operators of a vessel or facility from which there is a release or threatened release of a hazardous substance has caused response costs, as well as arrangers and transporters of hazardous substances to such a vessel or facility, are liable for removal and

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degree of caution' standard-but that reasonable care does not demand.") (quoting *Fischer*, 508 F.3d at 594).

88. 33 U.S.C. §§ 1251 et seq. (2006).

89. 33 U.S.C. §§ 2701 et seq. (2006).

90. 42 U.S.C. §§ 9601 et seq. (2000).

91. *See* 33 U.S.C. § 1321(b)(6) (2000).

92. *See* 33 U.S.C. § 1321(b)(7) (2000).

93. *See* 33 U.S.C. § 1321(f)(1) (liability to United States government for costs associated with removal of a discharge of oil or hazardous substances); § 1321(i) (right of owner or operator or vessel or facility to recover removal costs from United States government).

94. *See* S. REP. NO. 96-848, at 34 (1980).

95. 33 U.S.C. §§ 1321(f)(1), (f)(2), (f)(3) (relating to liability to government). Such language is also found in § 1321(g) relating to third party liability, and § 1321(i) relating to the ability to recover removal costs.

96. The legislative history of the OPA indicates that it intended to rely upon and strengthen § 311 of the CWA (33 U.S.C. § 1321). *See* S. REP. NO. 101-94 (1989), at 11, *reprinted in* 1990 U.S. Code Cong. & Admin. News 722, 723-24, 732.

97. 33 U.S.C. § 2702(a) (2000). The removal costs for which the responsible party is liable are described in 33 U.S.C. § 2702(b)(1), and the damages are described in § 2702(b)(2). The terms "responsible party," "vessel," "facility," "discharge," and "navigable waters" are all defined in 33 U.S.C. § 2701.

98. *See In re* Metlife Capital Corp., 132 F.3d 818, 820-21 (1st Cir. 1997); Apex Oil Co. v. United States, 208 F. Supp. 2d 642, 652 (E.D. La. 2002); United States v. English, No. CV00-00016ACKBMK, 2001 WL 940946 at * 4 (D. Haw. Mar. 28, 2001).

99. *See* 33 U.S.C. § 2703(a)(1) (2000).

remedial costs, natural resource damages, and the costs of health assessments.[100] Like OPA, CERCLA liability is strict.[101] Also like the OPA, CERCLA liability does not attach if the release or threat of release and the damages resulting there from are caused solely by an Act of God.[102]

Both the OPA and CERCLA define "Act of God" in identical terms: "The term 'act of God' means an unanticipated grave natural disaster or other natural phenomenon of an exceptional, inevitable, and irresistible character, the effects of which could not have been prevented or avoided by the exercise of due care or foresight."[103] The CWA uses a truncated version of this definition.[104] This language suggests that Congress did not intend every natural disaster or natural phenomenon to qualify, for not every weather event is "grave," "exceptional," "inevitable," or "irresistible."[105] In the legislative history of CERCLA, Congress made it clear that this definition was intended to be narrower and more limited than the common law's view of the Act of God defense:

> The defense for the exceptional natural phenomenon is similar to, but more limited in scope than, the traditional "act of God" defense. It has three elements: the natural phenomenon must be exceptional, inevitable, and irresistible…. The "act of God" defense is more nebulous, and many occurrences asserted as "acts of God" would not qualify as "exceptional natural phenomenon." For example, a major hurricane may be an "act of God," but in an area (and at a time) where a hurricane should not be unexpected, it would not qualify as a "phenomenon of exceptional character."[106]

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100. 42 U.S.C. § 9607(a) (2000). The terms "owner or operator," "vessel," "facility," "release," "hazardous substance," "removal," and "remedial action" are, along with other terms, defined in 42 U.S.C. § 9601 (2000).

101. *See* Idaho v. Hanna Mining Co., 882 F.2d 392, 394 (9th Cir. 1989); *Apex Oil Co.*, 208 F. Supp. 2d at 652; *English*, 2001 WL 940946 at * 4.

102. *See* 42 U.S.C. § 9607(b)(1). For a more extensive discussion of the act of God defense under the CWA, OPA, and CERCLA, especially in the context of a natural disaster like Hurricane Katrina, see Joel Eagle, Note, *Divine Intervention: Re-Examining the "Act of God" Defense in a Post-Katrina World*, 82 CHI.-KENT L. REV. 459 (2007).

103. *See* 42 U.S.C. § 9601(1). The OPA uses the exact same language, but leaves out the comma after the word "character" found in the CERCLA definition. *See* 33 U.S.C. § 2701(1).

104. *See* 33 U.S.C. § 1321(a)(12)(2000), where "act of God" is defined simply as "an act occasioned by an unanticipated grave natural disaster."

105. *See* Sabine Towing & Transp. Co. v. United States, 666 F.2d 561, 565 (Ct. Cl. 1981) ("Furthermore, Congress restricted its definition to 'grave' disasters, making clear that the occurrence must be of great magnitude before it falls within the liability exception of section 1321 [of the CWA]"); Eagle, *supra* note 102, at 476.

106. H.R. REP. NO. 99-253 (IV) (1985), at 71, *reprinted in* 1986 U.S. Code Cong. & Admin. News 3068, 3101.

As a result, courts reject the use of common law Act of God defense case law when interpreting the defense under the federal environmental laws.[107] In addition, courts have construed the Act of God defense arising from the OPA/CERCLA definition very narrowly,[108] attributing this narrow construction to Congress's clear intent to impose liability except in very limited or rare circumstances.[109] As a result, courts rejected Act of God defenses under federal environmental laws in situations involving cold weather,[110] freshet conditions on a river related to rain and runoff from melted snow,[111] storms and heavy rainfall,[112] and hurricanes[113] on the grounds that

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107. *See Sabine Towing and Transp. Corp.*, 666 F.2d at 564.

108. *See* United States v. English, No. CV00-00016ACKBMK, 2001 WL 940946 at *4 (D. Haw. Mar. 28, 2001) (rejecting act of third party exception found (along with act of God exception) in OPA: "These defenses are narrowly construed, and only in a situation where the discharge was totally beyond the control of the discharging vessel would the responsible party be excused from liability"); United States v. M/V Santa Clara I, 887 F. Supp. 825, 843 (D.S.C. 1995) (rejecting act of God defense under CERLCA: "In order to be free from CERCLA liability, the potentially responsible party must establish by a preponderance of the evidence that the release or threat of release and the associated damages were caused solely by the defense asserted"); Kyoei Kaiun Kaisha, Ltd. v. M/V Bering Trader, 795 F. Supp. 1054, 1056 (W.D. Wash. 1991) (stating that exceptions to liability under Clean Water Act (including act of God) "must be narrowly construed"); United States v. Stringfellow, 661 F. Supp. 1053, 1061 (C.D. Cal. 1987) (referring to CERCLA's act of God defense as "narrow"). *See also* Reliance Ins. Co. v. United States, 677 F.2d 844, 849-50 (Ct. Cl. 1982) (rejecting act of third party exception found (along with act of God exception) in 33 U.S.C. § 1321, "Any conduct, however slight, on the part of an owner or operator contributing to a spill would negate relief, even though such conduct might have operated in concert with greater third-party conduct to produce the spill. In other words, only where the owner's or operator's conduct was so indirect and insubstantial as to displace him as a causative element of the discharge would he be relieved of responsibility and, correspondingly, financial liability."); United States v. Nat'l Wood Preservers, Inc., No. 84-0458, 1986 WL 12761 at *4 (E.D. Pa. Nov. 7, 1986) (rejecting third party defense under 33 U.S.C. § 1321, "Exceptions to liability under the statute, such as the sole cause provision invoked here, must be narrowly construed to effectuate Congress' strict liability scheme.").

109. *See, e.g.*, United States v. W. of Eng. Ship Owner's Mut. Prot. & Indem. Ass'n, 872 F.2d 1192, 1200 (5th Cir.1989); *Kyoei Kaiun Kaisha, Ltd.*, 795 F. Supp. at 1056; *Nat'l Wood Preservers, Inc.*, 1986 WL 12761 at *4.

110. *See* United States v. Barrier Indus. Inc., 991 F. Supp. 678, 679 (S.D.N.Y. 1998) (spill of hazardous substances caused by bursting of pipes following unprecedented cold spell).

111. *See Sabine Towing and Trans. Corp.*, 666 F.2d at 564-65. "Freshet" conditions are generally described as a sudden rise in the river level, coupled with an increased rate of flow due to rain and the spring runoff of melted snow, that is known to wash down sediment, gravel, logs, rocks, and other debris. *Id.* at 563.

112. *See M/V Santa Clara I*, 887 F. Supp. at 843 (rejecting an Act of God defense under CERLCA for loss of containers of arsenic trioxide overboard because of storm, "Even a poorly forecasted storm has been held under the Clean Water Act not to constitute an act of God because it was predicted and was avoidable. The evidence in the record is clear that inclement weather offshore was predicted by the National Weather Service and known by the captain and crew prior to their departure from Port Elizabeth. In fact, several crew members stated that they were told to expect bad weather and were directed to take extra precautions to insure that the vessel and its cargo were secure for rough seas. Even if the evidence demonstrated that the storm was worse than predicted, this court finds that the storm the M/V SANTA CLARA I encountered was not the type of "unanticipated grave natural disaster" or

the weather events did not satisfy the definition. In fact, there appears to be no reported cases actually finding the Act of God defense successful under these federal environmental laws.[114]

While this complete failure of the Act of God defense under the federal environmental laws rests at least in part on the fact that the natural condition simply did not rise to the level of "grave natural disaster or other natural phenomenon of an exceptional, inevitable, or irresistible character,"[115] at the core of most judicial rejections of the Act of God defense under federal environmental laws is human conduct that makes the natural condition not be the sole cause of the environmental damage at issue.[116] In many cases, the

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"other natural phenomenon of an exceptional, inevitable, and irresistible character, the effects of which could not have been prevented or avoided by the exercise of due care or foresight.")(citation omitted); *Kyoei Kaiun Kaisha, Ltd.*, 795 F. Supp. at 1056 n.2 (rejecting "half-hearted" attempt to assert act of God defense for liability under Clean Water Act arising from oil releases after grounding of vessel: "Defendants, however, fail to put forth any evidence that the weather on the night of the grounding could not have been foreseen or guarded against, as required by this defense"); *Stringfellow*, 661 F. Supp. at 1061 (rejecting the claim that heavy rainfall causing releases from hazardous waste site was act of God under CERCLA, "[T]he rains were not the kind of "exceptional" natural phenomena to which the narrow act of God defense of section 107(b)(1) applies. The rains were foreseeable based on normal climatic conditions and any harm caused by the rain could have been prevented through design of proper drainage channels. Furthermore, the rains were not the *sole* cause of the release.")(emphasis in original).

113. *See* United States v. Alcan Aluminum Corp., 892 F. Supp. 648, 658 (M.D. Pa. 1995). The court rejected a claim that Hurricane Gloria caused used oil emulsion placed in mine to discharge to Susquehanna River in Pennsylvania satisfied CERCLA act of God defense by holding:

> [N]o reasonable factfinder could conclude that Hurricane Gloria was the *sole* cause of the release and resulting response costs. Two million gallons of hazardous wastes were not dumped into the borehole by an act of God, and were it not for the unlawful disposal of this hazardous waste Hurricane Gloria would not have flushed 100,000 gallons of this chemical soup into the Susquehanna River.
>
> Second, the effects of Hurricane Gloria could "have been prevented or avoided by the exercise of due care or foresight." 42 U.S.C. § 9601(1). Clearly, exercise of due care or foresight would have militated against dumping hazardous wastes into mine workings that inevitably lead to such a significant natural resource as the Susquehanna River.
>
> Finally, as the Court in *Stringfellow* recognized, heavy rainfall is "not the kind of 'exceptional' natural phenomenon to which the act of God . . . [exception] applies."

Id. at 658. (emphasis in original).

114. *See also* Eagle, *supra* note 102, at 462 (noting that "the defense has never succeeded").

115. *See supra* notes 26-32.

116. Eagle, *supra* note 102, for example, argues that the act of God defense jurisprudence view the defense in terms of four elements: (1) whether the event was a grave

conduct appears to be negligence—for example, the depositing of hazardous substances in a place and manner that exposes the substances to weather so as to cause a release,[117] or choosing to transport barges of slurry oil in dangerous river conditions with a tug that was not powerful enough for the conditions.[118] Yet several cases find the human conduct that precludes an Act of God defense is ultimately rooted is the failure to act in light of knowledge about the weather conditions of the claimed Act of God.[119] Courts readily reject the defense when the natural phenomena are foreseeable "based on normal climatic conditions,"[120] even if poorly forecasted.[121] This is consistent with the congressional intent that the Act of God be "exceptional" and "irresistible"[122] and that the unforseeability of the event is critical. In fact, a 1970 Conference Report prior to the passage of the CWA drove this point home when it stated:

> The term "act of God" is defined to mean an act occasioned by an unanticipated grave natural disaster . . . . [O]nly those acts about which the owner could have had no foreknowledge, could have made no plans to avoid, or could not predict would be included. Thus, grave natural disasters *which could not be anticipated in the design, location, or operation of the facility or vessel by reason of historic, geographic, or climatic circumstances or phenomena would be outside the scope of the owner's or operator's responsibility.*[123]

Thus, the element of forseeability is central to the Act of God defense under the federal environmental laws. Combined with the narrow construction required of the defense, the ability to foresee weather conditions makes the Act of God defense of very limited utility under the federal environmental laws.

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natural phenomenon of an exceptional, inevitable, and irresistible character; (2) whether the event was anticipated; (3) whether the event was the sole cause of the release; and (4) whether the effects of the event could have been prevented or avoided by the exercise of due care or foresight. *Id.* at 462, 476. The second and fourth of these elements focus directly on human conduct: the ability to anticipate, foresee, and act with due care, and any human involvement triggers the third element.

117. *See Alcan Aluminum Corp.*, 892 F. Supp. at 658.

118. *See* Apex Oil Co. v. United States, 208 F. Supp. 2d 642, 656-57 (E.D. La. 2002).

119. *See Alcan Aluminum Corp.*, 892 F. Supp. at 658; United States v. M/V Santa Clara I, 887 F. Supp. 825, 843 (D.S.C. 1995); Kyoei Kaiun Kaisha, Ltd. v. M/V Bering Trader, 795 F. Supp. 1054, 1056 n.2 (W.D. Wash. 1991); United States v. Stringfellow, 661 F. Supp. 1053, 1061 (C.D. Cal. 1987).

120. *Stringfellow*, 661 F. Supp. at 1061.

121. *M/V Santa Clara I*, 887 F. Supp. at 843; Liberian Poplar Transp. v. United States, 26 Cl.Ct. 223, 226 (1992).

122. H.R. REP. NO. 99-253(IV) (1985), at 71, *reprinted in* 1986 U.S. Code Cong. & Admin. News 3068, 3100.

123. H.R. REP. NO. 91-940 (1970), at 37, *reprinted in* 1970 U.S. Cong. Code & Admin. News 2712, 2722 (emphasis added).

II. THE PROJECTED IMPACTS OF CLIMATE CHANGE

The Intergovernmental Panel on Climate Change (IPCC) was established in 1988 by the World Meteorological Organization and the United Nations Environmental Programme "to provide the decision-makers and others interested in climate change with an objective source of information about climate change."[124] In 2007, the IPCC released its Fourth Assessment Report, consisting of four parts that IPCC refers to[125] as "The Physical Science Basis,"[126] "Impacts, Adaptation and Vulnerability,"[127] "Mitigation of Climate Change,"[128] and the "Synthesis Report."[129] While a full analysis of IPCC's Fourth Assessment Report is beyond the scope of this article, the IPCC's assessment of likely impacts (the second of these four parts) bears a closer look.

In general, the IPCC's analysis is that climate change will have some impact on the natural forces that are usually the subject of Act of God defenses. On a global scale, IPCC believes that climate change will, to varying levels of confidence or likelihood,[130] result in the following effects:

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124. IPCC website, *available at* http://www.ipcc.ch/about/index.htm (About IPCC).

125. *Id.*

126. CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS, CONTRIBUTION OF WORKING GROUP I TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (Susan Solomon et al. eds., 2007).

127. IMPACTS REPORT, *supra* note 12.

128. CLIMATE CHANGE 2007: MITIGATION OF CLIMATE CHANGE, CONTRIBUTION OF WORKING GROUP III TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (Bert Metz et al. eds., 2007).

129. CLIMATE CHANGE 2007: SYNTHESIS REPORT (2007), *available at* http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf.

130. The IPCC uses a scale of differing levels of "confidence" to indicate the probability that a particular predicted event will occur. IPCC describes it this way:

> On the basis of a comprehensive reading of the literature and their expert judgment, authors have assigned a confidence level to the major statements in the Report on the basis of their assessment of current knowledge, as follows:
>
> *Terminology [:] Degree of confidence in being correct*
>
> Very high confidence[:] At least 9 out of 10 chance of being correct
> High confidence[:] About 8 out of 10 chance
> Medium confidence[:] About 5 out of 10 chance
> Low confidence[:] About 2 out of 10 chance
> Very low confidence[:] Less than a 1 out of 10 chance

IMPACTS REPORT, *supra* note 12, at 4. The IPCC also uses a scale of likelihoods, defined as follows:

> Likelihood refers to a probabilistic assessment of some well-defined outcome having occurred or occurring in the future, and may be based on quantitative analysis or an

- high confidence that "[b]y mid-century, annual average river runoff and water availability are projected to increase by 10-40% at high latitudes and in some wet tropical areas, and decrease by 10-30% over some dry regions at mid-latitudes and in the dry tropics, some of which are presently water-stressed areas. In some places and in particular seasons, changes differ from these annual figures";[131]

- high confidence that "[h]eavy precipitation events, which are very likely to increase in frequency, will augment flood risk";[132]

- very likely that "heavy precipitation events" and "frequency increases" of such events will occur "over most areas";[133]

- likely that "intense tropical cyclone activity increases" will occur.[134]

The Report also provides more specific projections of future climate change impacts for North America. These include:

- "[s]ea level is rising along much of the coast, and the rate of change will increase in the future, exacerbating the impacts of progressive inundation, storm-surge flooding, and shoreline erosion";[135]

- "[s]torm impacts are likely to be more severe, especially along the Gulf and Atlantic coasts";[136]

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elicitation of expert views. In the Report, when authors evaluate the likelihood of certain outcomes, the associated meanings are:

Terminology [:] Likelihood of the occurrence/outcome

Virtually certain[:] >99% probability of occurrence
Very likely[:] 90 to 99% probability
Likely[:] 66 to 90% probability
About as likely as not[:] 33 to 66% probability
Unlikely[:] 10 to 33% probability
Very unlikely[:] 1 to 10% probability
Exceptionally unlikely[:] <1% probability

Id.

131. *Id.* at 11.

132. *Id. See also id.* at 795.

> Precipitation is generally predicted in climate models to increase in high latitudes and to decrease in some mid-latitude regions . . . . These changes, together with a general intensification of rainfall events… , are very likely to increase the frequency of flash floods and large-area floods in many regions, especially at high latitudes.

Id. (citation omitted).

133. *Id.* at 18 tbl. SPM.1.

134. IMPACTS REPORT, *supra* note 12, at 18 tbl. SPM.1. *See also id.* at 795 ("Tropical cyclones (including hurricanes and typhoons), are likely to become more intense with sea surface temperature increases, with model simulations projecting increases by mid-century").

135. *Id.* at 619.

- high confidence that "[w]arming, and changes in the form, timing and amount of precipitation, will very likely lead to earlier melting and significant reductions in snowpack in the western mountains by the middle of the 21st century . . . . In projections for mountain snowmelt-dominated watersheds, snowmelt runoff advances, winter and early spring flows increase (raising flooding potential), and summer flows decrease substantially";[137]

- very high confidence that "[s]uperimposed on accelerated sea-level rise, the present storm and wave climatology and storm-surge frequency distributions lead to forecasts of more severe coastal flooding and erosion hazards. The water-level probability distribution is shifted upward, giving higher potential flood levels and more frequent flooding at levels rarely experienced today";[138]

- medium confidence that "[p]otenially more intense storms and possible changes in El Nino . . . are likely to result in more coastal instability";[139] and

- "[h]igher sea levels in combination with storm surges will cause widespread problems for transportation along the Gulf and Atlantic Coasts."[140]

These predictions are echoed in the May 2008 analysis[141] prepared by the Committee on the Environment and Natural Resources of the National Science and Technology Council pursuant to the requirements of the Global Change Research Act of 1990.[142]

There is some evidence to suggest that—at least to the predictions concerning frequency and intensity of storms—these predictions are coming true. In December 2007, the Environment America Research and Policy Center released a study[143] analyzing "daily precipitation records spanning from 1948 through 2006 at more than 3,000 weather stations in 48 states."[144] The study found that, "consistent with the predicted impacts of global warming," storms with extreme precipitation[145] have increased in frequency by 24%

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136. *Id.* at 619.

137. *Id.* at 627.

138. *Id.* at 630.

139. *Id.* (citation omitted).

140. IMPACTS REPORT, *supra* note 12, at 630.

141. SCIENTIFIC ASSESSMENT OF THE EFFECTS OF GLOBAL CHANGE ON THE UNITED STATES 91 (May 2008), *available at* http://www.climatescient.gov/Library/scientificassessment/Scientific-AssessmentFINAL.pdf [hereinafter "SCIENTIFIC ASSESSMENT"].

142. 15 U.S.C. §§ 2921- 2961 (2006).

143. Travis Madsen & Emily Figdor, WHEN IT RAINS, IT POURS: GLOBAL WARMING AND THE RISING FREQUENCY OF EXTREME PRECIPITATION IN THE UNITED STATES (2007), *available at* http://www.environmentamerica.org/uploads/oy/ws/oywshWAwZy-EXPsabQKd4A/When-It-Rains-It-Pours----US---WEB.pdf.

144. *Id.* at 4.

145. *Id.* at 5. The study defined "extreme precipitation" in the following way:

across the United States,[146] with 40 of the 50 states showing statistically significant frequency increases,[147] and regional increases as high as 61% in New England and 42% in the Mid-Atlantic states.[148] Data for metropolitan areas show even bigger increases in some areas.[149] The Report summarized the consequences of these meteorological changes as follows:

> We identified storms with extreme levels of precipitation relative to the local climate at each individual weather station. We chose to examine the frequency of 24-hour precipitation events with total precipitation magnitude with a 1-year recurrence interval or larger. For example, for a given weather station, we identified the 59 largest 1-day precipitation totals during the 59 year period of analysis. The smallest of these values equaled the threshold for a precipitation event with a 1-year recurrence interval. We defined any storm with a 24-hour precipitation total equal to or larger than this threshold as extreme. Figure 8 graphically presents the minimum thresholds for extreme precipitation used in this analysis.

Id. at 33. Figure 8 shows that the lowest threshold value was 0.52 inches (found primarily in areas of the Rocky and West), while the highest threshold value was 5.04 inches (found primarily in areas along of the Gulf Coast centered at New Orleans). *See id.* at 34.

146. *Id.* at 5. The study noted that "[a]ccording to a statistical analysis of the data, with 95 percent confidence, the increase has been between 22 and 26 percent." *Id.*

147. *Id.* According to the Report, only one state—Oregon—showed a statistically significant decrease in the frequency of extreme precipitation events. *Id.* Twenty eight states had mean increases in frequency above the 24% average, *see id.* at 36-37, with 6 above a 50% mean increase (Louisiana—52%; Massachusetts—67%; New Hampshire—83%; New York—56%; Rhode Island—88%; and Vermont—57%). *Id.*

148. Madsen & Figdor, *supra* note 143, at 35.

149. *Id.* at 38–40. The Report's table shows statistically significant increases in extreme precipitation events in 65 out of 67 metropolitan areas. Of those, 43 metropolitan areas had a mean increase in events of 50% or more, 15 with a mean increase in events of 80% or more, and 8 with a mean increase of 100% or more:

> Bloomington, IN—150%; Elkhart-Goshen, IN—103%; Baton Rouge, LA—110%; Portland, ME—112%; Jackson, MS—187%; Binghamton, NY—105%; Reading, PA—116%; Williamsport, PA—103%). *Id.* The Report admits that "[t]he precise detection of trends in the frequency of extreme precipitation becomes more difficult at the metropolitan level, where fewer weather stations contribute information." *Id.* at 38. The Table therefore provides lower and upper bounds at a 95% confidence level, but these show upper bounds at 100% or more for 30 metropolitan areas (Mobile, AL—129%; Bakersfield, CA—125%; Santa Barbara-Santa Maria-Lompoc, CA—116%; Hartford, CT—111%; Sarasota-Bradenton, FL—189%; Augusta-Aiken, GA/SC—138%; Bloomington, IN—252%; Elkhart-Goshen, IN—205%; Wichita, KS—103%; Baton Rouge, LA—212%; Alexandria, LA—190%; Shreveport-Bossier City, LA—116%; Lafayette, LA—107%; New Orleans, LA—100%; Springfield, MA—106%; Portland, ME—212%; Grand Forks, ND/MN—114%; Jackson, MS—267%; Binghamton, NY—171%; Elmira, NY—147%; Youngstown-Warren, OH—144%; Columbus, OH—109%; Reading, PA—202%; Williamsport, PA—202%; Harrisburg-Lebanon-Carlisle, PA—139%; State College, PA—125%; Providence-Warwick-Fall River, RI/MA—153%; Augusta-Aiken, GA/SC—138%; Longview-Marshall, TX—115%; El Paso, TX—118%; Charleston, WV—119%.
>
> *Id.* at 38-40.

> The trend toward increasingly frequent heavy rainstorms and snowstorms over the last century has had significant consequences for communities across the United States. As this trend continues, with major storms becoming more intense and more frequent in the future, serious impacts are likely to occur. Among those impacts could be flooding (both flash flooding and longer-term flooding), pollution of waterways with runoff and sewage, the spread of infectious disease, and damage to agriculture.[150]

The May 2008 Scientific Assessment Report likewise states that "Over the contiguous United States, annual precipitation totals have increased at an average rate of 6% per century from 1901 to 2005,"[151] with "the greatest increases in precipitation were in the East North Central climate region (12% per century) and the South (11%) [while] [t]he smallest increases . . . were in the Southeast (3%), the West North Central (3%) and the Southwest (1%)."[152] In addition to increases in total precipitation, the Assessment details significant increases in heavy precipitation events:

> Observations over the contiguous United States show statistically significant increases in heavy precipitation (the heaviest 5%) and very heavy precipitation (the heaviest 1%) of 14% and 20%, respectively, primarily during the last three decades of the 20th century. This increase is most apparent over the eastern parts of the country. Some evidence suggests that the relative increase in precipitation extremes is larger than the increase in mean precipitation. CCSP SAP 3.3 concluded that very heavy precipitation (the heaviest 1%) in the continental United States increased by 20% over the past century while total precipitation increased by 7%.[153]

A June 2008 report issued by the U.S. Climate Change Program of NOAA[154] finds that "[o]ne of the clearest trends in the United States observational record is an increasing frequency and intensity of heavy precipitation events,"[155] and after recent statistical analyses, "it is highly likely that the recent elevated frequencies in heavy precipitation in the United States are the highest on record."[156]

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150. *Id.* at 25.

151. SCIENTIFIC ASSESSMENT, *supra* note 141, at 61 (citing "an analysis of data from the NOAA National Climatic Data Center U.S. Historical Climate Network."). *Id.*

152. SCIENTIFIC ASSESSMENT, *supra* note 141, at 61.

153. *Id.* at 62-63 (internal citations omitted).

154. WEATHER AND CLIMATE EXTREMES IN A CHANGING CLIMATE, SYNTHESIS AND ASSESSMENT PRODUCT 3.3 (Thomas R. Karl et al. eds., 2008), *available at* http://www.climatescience.gov/Library/sap/sap3-3/final-report/default.htm. An earlier draft of this report was the basis for some of the conclusions contained in the SCIENTIFIC ASSESSMENT quotation set forth above.

155. *Id.* at 46.

156. *Id.* at 48.

Thus, climate change is predicted to increase the frequency and severity of the meteorological events (hurricanes and storms) and their associated effects (like flooding) that are typically at issue in cases considering the Act of God defense, and effects of these predicted changes are already showing up in the meteorological data. The question is: how do these predicted effects of climate change affect the applicability of the defense?

III. THE FUTURE OF THE ACT OF GOD DEFENSE FOR CLIMATIC EVENTS

In a world where the tumult of hurricanes and storms and the zigzag of lightning are more likely attributed to climatic forces than divine wrath, and as understanding of the climate suggests that it is highly probable that anthropocentric forces will cause the frequency and severity of storms to increase, it is certainly reasonable to ask whether Acts of "God" should continue to play a role in determining liability. Indeed, many have suggested the reference to the divine should at the very least be replaced.[157] The deeper issue, though, is not one of labeling; rather, should the law continue to recognize the notion that an extreme climatic event such as a hurricane, storm, wind, or flood—whether called an "Act of God," "vis major," or "force of nature"—can ever be allowed to relieve defendants from liability? Under the federal environmental laws, the answer is clear: although theoretically possible (because the statute expressly allows it), an Act of God has yet to relieve a defendant of liability because of strong public policy found in Congress's clear intent to impose liability except in very limited or rare circumstances.[158] In tort and admiralty/maritime law, however, no such strong public policy exists; instead, general tort principles drawn from the common law control. An examination of these principles suggests that the defense stands on shaky grounds that will only become shakier as the full effects of climate change take hold.

A. The Common Law's Theoretical Bases For The Act Of God Defense

The common law's approach to Acts of God appears to be based primarily on a theory of human fault. Lord Mansfield's definition viewed Acts of God as "*something in opposition to the act of man . . . or by such act as could not happen by the*

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157. *See, e.g.*, GUIDO CALABRESI, IDEALS, BELIEFS, ATTITUDES, AND THE LAW 65 n.252 (1985) ("The use of the term 'act of God' to refer to accidents resulting from natural causes . . . is particularly inapposite. It seems rather questionable theology to assign to divine intervention a natural occurrence whose most notable effect is to leave bodies strewn about") (internal citations omitted); Goldberg v. R. Grier Miller & Sons, Inc. 182 A.2d 759, 761 (Pa. 1962); Bowman v. Columbia Tel. Co., 179 A.2d 197, 201 (Pa. 1962).

158. *See, e.g.*, United States v. W. of Eng. Ship Owner's Mut. Prot. & Indem. Ass'n, 872 F.2d 1192, 1200 (5th Cir. 1989); Kyoei Kaiun Kaisha, Ltd. v. M/V Bering Trader, 795 F. Supp. 1054, 1056 (W.D. Wash. 1991); United States v. Nat'l Wood Preservers, Inc., No. 84-0458, 1986 WL 12761 at *4 (E.D. Pa. Nov. 7, 1986).

intervention of man, as storms, lightning, and tempests."[159] The underlying premise is that only an action by the defendant can give rise to liability. As Oliver Wendell Holmes said in his treatise on the common law a century later: "[t]he reason for requiring an act [by the defendant] is, that an act implies a choice, and that it is felt to be impolitic and unjust to make a man answerable for harm, unless he might have chosen otherwise."[160] The purpose of requiring the notion of choice "is to make the power of avoiding the evil complained of a condition of liability."[161] However, when the evil cannot be foreseen (as, say, with a climatic event that is an Act of God[162]), "there is no such power" to avoid the evil,[163] and thus liability will not lie with the defendant.[164] Thus, the common law notion was that a defendant's liability arose from some choice reflected in the action of the defendant, which of necessity included the ability to foresee consequences of that choice/action.

This notion of fault based on the foreseeable consequences of the defendant's choice helps explain the Act of God case law. In a definitional sense, adjectives describing Acts of God as "extraordinary," "unusual," "unprecedented," "unexpected," "sudden," "superior," and/or "irresistible" forces of nature in tort and admiralty law, and the statutory requirement of "natural phenomenon of an exceptional, inevitable, and irresistible character" or "unanticipated grave natural danger" in environmental law, all speak to an inability to foresee or to choose any other course of conduct. The case law expressly requiring that events or consequences be unforeseeable and that climatic history be used all go to the issue of foreseeability.

It appears that foreseeability applies in two different ways to the Act of God situation. The first involves the foreseeability of the climatic event itself and the consequent harm that the event will cause—what can be termed "Event Foreseeability." In determining Event Foreseeability, the court asks: Could the defendant have foreseen that the hurricane, rain or wind storm, or drought could have occurred? This sense of foreseeability is captured by the cases that speak of the climatic events in the adjectival terms of requiring the climatic events as extraordinary," "unusual," "unprecedented," "unexpected," "sudden," and "unanticipated" and those which use climatic history.

The second aspect of foreseeability relevant to the defense relates to the defendant's actions in the classic sense of negligence liability—what can be termed "Response Foreseeability." In determining Response Foreseeability,

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159. Forward v. Pittard, 1 T.R. 28, 99 Eng. Rep. 953, 956-57 (1785) (emphasis added).

160. OLIVER WENDELL HOLMES, THE COMMON LAW 54 (1881).

161. *Id.* at 95.

162. *See* CALABRESI, *supra* note 157, at 65 n.252 (attributing Holmes' language in these passages to Acts of God).

163. *Id.* at 65.

164. Instead, without such "fault" by the defendant, the loss falls on the victim (or plaintiff). *See* HOLMES, *supra* note 160, at 94-95; CALABRESI, *supra* note 157, at 65.

the court asks: was injury to the plaintiff foreseeable in light of what the defendant did in the circumstances of the case? In effect, this inquiry examines whether the defendant's response was reasonable in light of what effects of the climatic event were foreseeable. This picks up the notion of sole proximate cause discussed in the tort and admiralty/maritime case law. At its core, Response Foreseeability will likely inform whether or not the defendant's particular course of action is negligent.

Precisely because foreseeability is the underlying essence of this traditional tort analysis, some have suggested that the Act of God defense is no longer necessary given that the analysis is simply the application of traditional negligence theory. Professor Dobbs, in his treatise on torts,[165] has said that "[c]ourts often speak of natural forces as if special rules are needed in those cases, but . . . the decisions comport with the general rules of negligence and proximate cause. It is thus entirely possible to drop terms like 'act of God' altogether."[166] Professor Binder reaches a similar conclusion.[167] Likewise, the comments to Proposed Final Draft No. 1 of § 3 of the Restatement (Third), makes the same argument:

> In all, then, cases involving serious and unusual adverse natural events—'acts of God'—essentially call for application of the factors that enter into an ordinary analysis of negligence. Accordingly, so long as the jury is instructed on the basic elements of negligence and causation, a separate instruction on act of God may not be necessary.[168]

However, the Draft ultimately hedges its bet and leaves open the possibility of an instruction and hence the continued presence of Act of God considerations in the legal process.[169]

Declaring that extreme climatic events are simply part of the negligence calculus, however, underestimates the practical problems posed to both defendant and fact-finder in an Act of God situation. The fundamental need to show foreseeability raises a critical question: does the concept of foreseeability provide meaningful guidance in the context of climatic events that are considered Acts of God? This question takes on added significance in

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165. DAN B. DOBBS, THE LAW OF TORTS (2000).

166. *Id.* at 474.

167. *See* Denis Binder, *Act of God? or Act of Man?: A Reappraisal of the Act of God Defense in Tort Law*, 15 REV. LITIG. 1, 77-78 (1996).

168. RESTATEMENT (THIRD), *supra* note 36, at § 3 cmt. l.

169. *Id.* ("Still, there is an argument in favor of such an instruction. Ordinary jurors may be confused as to how serious adverse natural events that they may be inclined to think of as acts of God relate to the issue of the actor's possible negligence and liability. An instruction explaining the relationship between such events and the concepts of foreseeability, preventability, and causation may therefore be of assistance to the jury. Ultimately, the question whether such an instruction is appropriate is a matter for judgment by courts, derived from those courts' general strategies in instructing juries").

light of the predictions of climate change—which forecast an increase in the frequency and severity of the very types of climatic events that might qualify for the Act of God defense. There are strong arguments to support the conclusion that the defense has little utility today and will likely have even less utility in a warmer world. The remainder of this article will consider those arguments.

B. Flaws in The Common Law's Approach to The Act Of God Defense

Viewed in light of the common law's requirement of a lack of Event and Response Foreseeability in order for the Act of God defense to work, there appear to be two problems with the defense that relate directly to the concept of foreseeability. Each of these issues—problems for the defense in and of themselves—will likely further undermine the defense once the effects of climate change are considered.

1. The Problem of Increasing Event Foreseeability

In terms of Event Foreseeability, there are two independent trends which suggest a strong possibility that climatic events which historically qualified as Acts of God may become increasingly foreseeable: improved meteorological techniques and the effects of climate change.

It is undeniable that there is increased data available and increased forecasting powers inherent in the continuing development of meteorological science. Gone are the days when a hurricane can appear unannounced on the coast; the National Hurricane Center of the National Weather Service and NOAA monitor storms from their inception in the Atlantic and track their development into hurricanes, projecting paths of the storm and providing predictions and warnings all along the way. While the predictions are not perfect, it is not hard to envision that predictive models will continue to improve and gain greater accuracy. Similar improvements in terrestrial weather monitoring and prediction are also likely. This trend has two impacts on the foreseeability of such climatic events for purposes of the Act of God defense: (1) defendants can increasingly know that the hurricane or storm is coming with time to take some precautionary steps in response because they will be warned of it (so that it will be more difficult to say that the event was "unexpected" or "unanticipated"); and (2) climatic data of past storms will continue to accumulate (so as to support conclusions that the event is not "unusual" for the location at that time of year). In short, the climatic events which historically may have been considered Acts of God will be more foreseeable in the future and thus less likely to support the defense *simply because we will know more and more about the weather*. As one court succinctly put it, "as weather forecasting improves and attains sophistication and greater

accuracy, defenses of 'Act of God' may be more difficult to establish."[170] This result is likely regardless of the impacts that climate change may ultimately cause.

Climate change, however, will independently increase the foreseeability of the climatic events which historically may have been considered Acts of God. The expected increase in frequency and intensity of hurricanes and heavy storms from climate change has a direct impact on the expectations that putative defendants must have about climatic events occurring. Just as numerical and intensity increases have an impact on what is "usual" and "ordinary" in a definitional sense, so should such increases alter the expectations of defendants who live in regions likely to be affected by the increase in storm frequency and intensity. A defendant on the Gulf Coast, for example, will find it harder to claim that a hurricane is unexpected or unusual (though the case law suggests that a big enough storm might still qualify[171]). Because of the mere fact that the IPCC and others have emphasized the increase in storm frequency and intensity in connection with the public discussion of climate change, it seems inescapable that it will be more difficult for defendants to claim that they could not foresee the types of storms that climate change will likely bring.

In short, as climatic change increases the frequency and intensity of hurricanes, heavy storms, and the flooding associated with such climatic events, it appears that it will be harder for defendants to claim that the events themselves or the consequences of those events were not foreseeable. Thus, the defense is likely to be diminished in its utility simply because it will be harder to satisfy the legal requirements relating to the Event Foreseeability necessary to invoke the defense.

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170. Skandia Ins. Co. v. Star Shipping AS, 173 F. Supp. 2d 1228, 1241 n.24 (S.D. Ala. 2001).

171. *Id.* at 1240 ("Even though storms that are usual for waters and the time of year are not 'Acts of God,' a hurricane that causes unexpected and unforeseeable devastation with unprecedented wind velocity, tidal rise, and upriver tidal surge, is a classic case of an 'Act of God.'").

2. The Problem of Response Forseeability

As the climatic events themselves become more foreseeable, Response Forseeability becomes more critical to the Act of God defense because the burden is on the defendant to show that it took reasonable precautions in light of the foreseeable risk. It is here that foreseeability in the context of the Act of God defense really breaks down because of the inability of the defendant to foresee what the adequate response is *before the climatic event occurs*.

To illustrate the problem, consider a fact pattern taken from the Act of God case law: a warehouseman holding goods for a customer in a Gulf Coast state in which a hurricane could strike.[172] Given that a significant climatic event (i.e. a hurricane in the Gulf) is foreseeable, the court will have to analyze whether the defendant's actions were reasonable in light of the foreseeable risk.

The essential problem facing the hypothetical warehouseman is determining how much precaution must be undertaken to assure that a court—examining the situation after the fact—will conclude that the warehouseman acted reasonably. For the warehouseman, knowing that hurricanes are foreseeable, the question is: how stout of a warehouse must he build? The comment to the Proposed Final Draft of § 3 of the Restatement (Third) of Torts outlines this quite clearly:

> The actor can be negligent in building facilities that are unreasonably inadequate in protecting against foreseeable natural events. Thus, there can be negligence in designing or constructing a building that collapses in a severe windstorm or hurricane or in designing or constructing a dam that overflows in a severe rainstorm. In conducting a negligence analysis in such a case, the foreseeable likelihood of harm relates to which adverse natural events can be contemplated during the expected life of the facility.[173]

If the warehouseman designs the warehouse to withstand a Category 1 hurricane, or takes other precautions suitable for a Category 1 hurricane's wind and storm surge, he could be subject to a plaintiff's argument that he did not act reasonably when a Category 2 or higher hurricane hits. Worse, the warehouseman does not know whether the next hurricane will be a Category 1, 2, 3, 4, or 5 storm, and over the life of the warehouse might have to face several storms of different intensities. Because these possibilities are foreseeable, is the only reasonable course of action to build the warehouse to

172. *Id.* at 1233. In this case, plaintiff had stored reels of printing paper in containers at the Alabama State Docks which were damaged by tidal surge flooding as a result of Hurricane Georges.

173. RESTATEMENT (THIRD), *supra* note 36, at § 3 cmt. l.

withstand a Category 5 storm or undertake precautions suitable for a Category 5 storm? If so, then Response Foreseeability becomes irrelevant—because the question of negligence simply comes down to whether or not the defendant build the sturdiest, most-storm resistant design (and/or undertook every possible precaution), as anything less would be unreasonable in light of the possibility that a Category 5 storm would hit. If, however, the courts would say it is reasonable to design for, say, only a Category 3 storm, then it appears that Event Foreseeability becomes largely irrelevant, because the court would have to discount the fact that Category 4 or 5 storms are foreseeable—especially in light of the IPCC predictions that climate change will likely increase the frequency and intensity of hurricanes. Because of the uncertainty concerning the intensity of the climatic events, foreseeability in the context of Acts of God appears to be at war with itself, and the defendant is left to guess—perhaps years before the actual event occurs—how much of a response will be considered reasonable and adequate. The system encourages either over-design or rejection of any reasonable hope of the Act of God defense assisting the hypothetical warehouseman.

Climate change will simply make this problem with the defense even worse. A collateral effect of the knowledge that climate change will likely cause an increase in the frequency and intensity of storms is both more Event Foreseeability and a likely greater duty to take precautions as a result of Response Foreseeability. Knowing that the Gulf will suffer more frequent and more intense hurricanes would seem to require a defendant to foresee more severe consequences, so that the warehouseman in *Skandia Insurance*,[174] for example, might be expected to do more to protect the materials being stored from flooding that follows a hurricane.[175] The point is that the knowledge of both actual and projected weather changes arising from climate change must of necessity make more consequences foreseeable, and hence create a greater duty of care on behalf of defendants that must respond to such climatic events. As long as the Act of God defense rests on the common law's fundamental premise of foreseeability, the greater the Event or Response Foreseeability, the less likely it is that a defendant can successfully claim that the plaintiff's damages were solely the result of an Act of God.

This same problem can be seen from the economic perspective of Judge Learned Hand's classic formula for negligence. In *United States v. Carroll Towing Co.*,[176] Hand defined negligence in essentially economic terms. *Carroll Towing*

174. *Skandia Ins. Co.*, 173 F. Supp. 2d at 1239-41.

175. In *Skandia Ins. Co.*, the reels of printing paper were stored in containers sitting on the ground in the container yards at the State Docks. *Id.* at 1233-34. Tidal flooding caused by Hurricane Georges flooded the yard, damaging the paper. The court ultimately upheld the defense because the defendant did not have any notice of prior flooding of the container yard, *id.* at 1244-46, and that the defendant did not have advance notice of the hurricane's approach to the area because the National Weather Service predicted an impact away from Mobile, AL where the warehouse was located. *Id.* at 1246-52. In effect, the *Skandia* court found no Event Foreseeability.

176. United States v. Carroll Towing Co., 159 F.2d 169 (2d Cir. 1947).

involved the question of whether the owner of a barge had a duty to keep someone on board the barge while it was moored to prevent what in fact happened in that case: the barge breaking loose from the moorings and damaging other ships in the harbor.[177] Hand viewed the owner's duty as a function of three variables: the probability that the barge will break away (which he called *P*), the gravity of the resulting injury if the barge in fact breaks away (called *L*), and the burden on the owner of precautions adequate to prevent the barge from breaking away (called *B*).[178] Judge Hand ruled that negligence occurs when the burden to prevent the accident is less than the probability times the resulting injury, or $B < PL$.[179] Landes and Posner call this "the famous Hand formula of negligence"[180] which they interpret as epitomizing "the basic negligence standard."[181]

Applying the Hand formula to the Act of God situation, there is an immediate problem because of the inherent variability of both *P* and *L*. Climatic events vary greatly in their intensity—hurricanes come in five different categories of intensity, rainstorms can dump varying amounts of rain and pack varying amounts of wind speed. So the probability of any one kind of event is highly variable. With the varying levels of intensity come different levels of injury. Unlike the barge owner who can assess the harbor and make some calculation about the relative risks of the barge breaking the mooring and causing a certain type of damage because the unmoored barge will be moving at a predictable speed, the hypothetical warehouseman on the Gulf Coast cannot easily predict the exact type of storm or the likely resulting injury ahead of time. Thus, the level of *B* necessary to avoid liability is difficult if not impossible to predict. The safest course is for the defendant to use the highest amount of *B* (for example, designing for the Category 5 storm) even though that may be more than was in fact necessary for the storm that actually hits. In effect, the Act of God defense encourages economically inefficient activity because it holds out the hope that the defendant can avoid liability if his actions are found to have been sufficient.

The Hand formula also makes clear that climate change will exacerbate the problem. Even if one could somehow normalize the variability of *P* and *L* in

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177. *Id.* at 170-71

178. *Id.* at 173.

179. *Id.*

180. WILLIAM M. LANDES & RICHARD A. POSNER, THE ECONOMIC STRUCTURE OF TORT LAW 85 (1987).

181. *Id.* Landes and Posner alter the formula slightly to fit their economic model by substituting B_y (the marginal cost of care) for B, and $-p_yD$ (the marginal reduction in accident damage) for PL, so that the Hand formula becomes $B_y < -p_yD$, which "just means that it is negligent to use a level of care at which the marginal cost of accident avoidance is less than the marginal benefit from avoidance," *id.* at 87—a formulation they conclude is "the correct economic standard of negligence." *Id.* For purposes of this article, the Hand formulation will be sufficient.

a rational way, climate change predicts that hurricanes, storms, and the associated flooding will increase in frequency and intensity. That means that *P* will of necessity get larger, and under the Hand formula *B* must also increase by at least as much if the defendant wants to have any hope to avoid a finding of negligence that would doom the ability to escape liability via the Act of God defense. As *P* gets higher and higher, *B* (and its associated costs) gets higher and higher as well – regardless of whether or not a particular level of *B* is sufficient for the storm that actually hits. In short, climate change will require defendants to undertake much more in the way of precautions, thereby increasing the pressure to act in an economically inefficient way.

C. Ultimate Diminishment: Should the Act of God Defense Be Declared Dead?

Given these fundamental problems with the Act of God Defense, one is tempted to advocate that the Defense should no longer be recognized. Dobbs, Binder, and the Restatement (Third)'s suggestion to simply sweep extreme climate events into the usual negligence calculus would accomplish that in tort law—though re-labeling the defense does not confront the problems of increasing Event Foreseeability and the resultant overburden on defendants in Response Foreseeability. In addition, history and statutory barriers exist.

Environmental Law. While the Act of God Defense cannot be declared officially dead under federal environmental law as long as the statutes continue to recognize it, it is clear that the defense is functionally dead. The increasing Event Foreseeability that climate change will cause will make it even more difficult to satisfy the "exceptional" element of the statutory definition. The climate change-induced increase in Response Foreseeability will make it more difficult for a defendant to show that the extreme climatic events are "irresistible." Climate change means that the very narrow crack in the door to liability avoidance via Acts of God under the environmental laws has at the very least gotten even narrower and likely been slammed shut.

Admiralty/Maritime Law. Here, too, the Act of God defense cannot be declared officially dead because federal statutes continue to recognize that Acts of God and perils of the sea can support a carrier's avoidance of liability. However, the climate change-induced increase in Event Foreseeability and Response Foreseeability will of necessity reduce the number of situations in which a defendant is caught unaware by the climatic event itself or is unable to undertake precautions adequate to avoid or minimize the effects of the event. One result may be that the parties to contracts subject to these principles of admiralty law will increasingly resort to contractual provisions that consciously apportion the risk ahead of the climatic events.

Tort Law. Because there is (usually) no statutory source,[182] but a long history of judicial recognition, tort law is perhaps the hardest area of the law to declare the Act of God defense dead. Dobbs', Binder's, and the Restatement (Third)'s proposal to drop the label and simply treat extreme climatic events under ordinary principles of negligence does not appear to have changed judicial attitudes towards the defense. Indeed, as the cases confronting the defense against claims arising out of Hurricane Katrina show, the defense continues to be recognized and is alive and well.[183] Thus, change will likely have to come from convincing judges to re-orient their approach via a new understanding of the legal significance of climatic events.

The scientific reality of increasing Event Foreseeability and its impact on Response Foreseeability and the special issues created by climate change provide significant factual and legal fodder for litigants seeking to change judicial mindsets. Because tort law must change from the bottom up (that is, via litigating individual cases that ultimately lead to appellate courts articulating a fundamentally different approach to extreme climate events), plaintiffs must be prepared to (a) argue to the judge for a legal rejection of the defense, (b) make such arguments by articulating the fundamental problems with the defense and a set of workable replacement principles, and (c) work to develop jury instructions that minimize the possible confusion the Act of God Defense can create with the jury. Such a case-by-case approach will take time and a coordinated effort advancing an agenda to reduce and ultimately replace the Act of God defense.

The change will likely be incremental; the post-Hurricane Katrina litigation now starting to emerge suggests as much. Hurricane preparation plans—never discussed in previous hurricane litigation—have been the focus of analyzing defendant's actions.[184] It is likely that such plans will become a required part of defendant's pre-hurricane activity—thus raising the requirements of Response Foreseeability. The fact that such flooding or

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182. There are some statutes applicable to particular tort situations which recognize Acts of God. *See* Strange v. Bartlett, 513 S.E.2d 246, 248 (Ga. Ct. App. 1999) (citing Georgia statute (GA. CODE. ANN. § 1-3-3(3) (2000)).

183. *See, e.g.*, *In re* Atl. Marine Prop. Holding Co., 570 F. Supp. 2d 1369, 1377-78 (S.D. Ala. 2008); Coex Coffee Int'l v. DuPuy Storage & Forwarding LLC, No. 06-4798, 2008 WL 1884041 at *3 (E.D. La. Apr. 28, 2008); John W. Stone Oil Distrib. v. Bollinger Shipyards, Inc., No. 06-2377, 2007 WL 2710809 at *5-6 (E.D. La. Sept. 12, 2007); HRD Corp. v. Lux Int'l Corp., No. H-06-0730, 2007 WL 2050366 at *11-12 (S.D. Tex. July 17, 2007); Duboue v. CBS Outdoor, Inc., 996 So. 2d 561, 563 (La. Ct. App. 2008); Dollar Thrifty Auto Group v. Bohn-DC, LLC, No. 08-CA-338, 2008 WL 4415920 at *3 (La. Ct. App. Sept. 30, 2008); Pizzetta v. Lake Catherine Marina, LLC, 995 So. 2d 26, 31 (La. Ct. App. 2008).

184. *See Coex Coffee Int'l*, 2008 WL 1884041 at *3; *HRD Corp.*, 2007 WL 2050366 at *11-12. For a discussion of the general contents of such a plan, see *Coex Coffee Int'l*, 2008 WL 1884041 at *2.

damage had not occurred before gave defendants a pass this time,[185] but such an escape hatch is likely to become smaller and smaller as Event Foreseeability becomes greater and greater.

The Act of God Defense exists and continues to be relevant because it is ultimately a way for a defendant to avoid liability. The existence of the defense enables and encourages defendants to raise the defense because it appears to short-circuit the negligence process by suggesting that there is a set of "special rules" (as Dobbs called it[186]) that ultimately absolves them of liability. As long as defendants believe there is something to gain from raising the defense, they will continue to do so—even if, in light of the projected impacts of climate change, it promises little more than a fool's paradise. Thus, while change to tort law may be slow, climate change will likely accelerate the recognition that the Act of God defense needs to be limited or done away with entirely. Thus, to paraphrase Mark Twain, the rumors of the death of the Act of God Defense are greatly exaggerated. Its demise, however, may be on the horizon.

IV. CONCLUSION

Although it has enjoyed a long history of recognition by the courts, the Act of God defense for climatic events has fundamental problems fitting into the foreseeability-based notions of negligence in tort and admiralty law. The continued accumulation of climatic history and improving meteorological tools already put pressure on the defense by making the hurricanes, storms, and flooding that were once considered Acts of God more and more foreseeable, so that it already is harder for such climatic events to be considered "unexpected" and "unusual." The predicted increased frequency and intensity of such events due to climate change will make such events even more foreseeable and thus less likely to satisfy the traditional definitions of Acts of God. Concomitant with the increased foreseeability of these extreme climatic events is the increased burden on defendants to engage in precautions adequate to address the foreseeable results of such events. Because of the inherent uncertainty of the intensity of the events, defendants will have a strong incentive (and, with climate change, a perhaps inevitable requirement) to over-prepare in an economically inefficient way if the defendant wants to take advantage of the liability avoidance that the defense offers. In effect, the continued recognition of the Act of God defense in an increasingly sophisticated and warming world will offer a fool's paradise to defendants: a promise of liability avoidance that can only be obtained by jumping through a rapidly shrinking hoop as the legal requirements of the defense become more demanding and onerous. It is likely that the Act of God defense will lose legal

185. *See, e.g.*, *Dollar Thifty Auto Group*, 2008 WL 4415920 at *4; *Coex Coffee Int'l*, 2008 WL 1884041 at *3 ("Plaintiff has not submitted any evidence such as documentation of past flooding of these warehouses").

186. *See* DOBBS, *supra* note 165, at 474.

significance as the difficulty of its application becomes more and more apparent.