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## Incentivizing Municipalities to Adapt to Climate Change: Takings Liability and FEMA Reform as Possible Solutions

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# INCENTIVIZING MUNICIPALITIES TO ADAPT TO CLIMATE CHANGE: TAKINGS LIABILITY AND FEMA REFORM AS POSSIBLE SOLUTIONS

DAVID DANA \*

**Abstract:** This Article addresses a central question of climate adaptation in the United States: how can municipalities, which are best positioned to take a lead in climate change adaptation efforts, be incentivized to do so? The Article analyzes and ultimately rejects as doctrinally unmoored and counterproductive one idea that has been suggested by commentators and arguably endorsed in a few noteworthy recent cases—that is, that municipalities and other governments be held liable under the Takings Clause for their failing to take adaptive measures that protect private property. Instead, the Article argues that municipalities should be given an incentive to adapt by means of modifications in federal aid programs that in effect would require the municipalities to obtain private insurance against climate-change-related damage to public property and infrastructure. This proposal, if adopted, would be a salient first step toward the transformation of federal policy from one that actively discourages private adaptation to changing patterns of extreme weather and sea level rise to one that actively encourages such adaptation.

## INTRODUCTION

Municipalities and other local governments will be central to how well, or not well, the United States adapts to climate change and its attendant increase in extreme weather, change in sea level, and flooding.<sup>1</sup> Given the very strong tradition of localism in the United States, and the need for adaptation to be tailored to conditions on the ground, an effective adaptation regime will

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<sup>1</sup> For a succinct summary of climate change effects in the United States, see *Future Climate Change*, U.S. ENVTL. PROT. AGENCY, <http://www3.epa.gov/climatechange/science/future.html> [<https://perma.cc/532T-VCZP>] (stating that there is abundant evidence that sea level rise related to climate change will cause substantial flooding in parts of the coastal United States). Climate change is also associated with drought, extreme weather, and increased damage from wind and storm-related flooding. *Id.* See generally Peter Byrne, *The Cathedral Engulfed*, 73 LA. L. REV. 69 (2012) (summarizing sea level rise and its legal implications).

require municipalities to make climate-change-sensitive decisions informed by the best available information regarding how climate change has and will alter weather patterns, sea level, and risk of fire.<sup>2</sup>

Some municipalities like New York City have taken a leadership role with respect to climate change.<sup>3</sup> But that is only a partial picture.<sup>4</sup> Other municipalities have not taken efforts to adapt to climate change, or have not taken as extensive efforts as would be possible.<sup>5</sup> So one relevant question becomes: how can municipalities that have not taken adequate measures to address risks from flood, wind, storm, and fire associated with climate change be incentivized to do so?

This Article considers two possible ways to incentivize otherwise reluctant municipalities: (1) Takings Clause liability for a municipality that takes no, inadequate, or ineffective measures to protect private property from sea level rise, flood, wind, storm, and fire damage that is anticipated to be part of climate change, and (2) enhanced incentives for municipalities to carry private insurance against flood, wind, and storm damage to municipal property and infrastructure, perhaps in the form of an outright mandate, or more realistically, as an absolute condition on the receipt of federal aid.<sup>6</sup>

Although the Takings Clause solution finds some support in recent scholarship and case law, that solution is undesirable, both because it is doctrinally problematic and because it could create perverse incentives for municipalities to favor highly engineered but less effective forms of adaptation and channel the risks of climate change onto the most vulnerable populations.<sup>7</sup> It could also create perverse incentives for property owners to forego adapting to climate change risks.<sup>8</sup> Climatic takings liability is neither doc-

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<sup>2</sup> On the large local role in adaptation generally and especially in the United States context, see Thomas M. Gremillion, *Setting the Foundation: Climate Change Adaptation at the Local Level*, 41 ENVTL. L. 1221 (2011) and TERRI L. CRUCE, PEW CTR. ON GLOBAL CLIMATE CHANGE, ADAPTATION PLANNING—WHAT STATES AND LOCALITIES ARE DOING 1 (2009), <http://www.2es.org/docUploads/state-adapation-planning-august-2009.pdf> [<https://perma.cc/4338-SEUT>].

<sup>3</sup> *The Challenges We Face: Climate Change*, N.Y.C. MAYOR'S OFFICE OF SUSTAINABILITY, <http://www.nyc.gov/html/planyc/html/sustainability/climate-change.shtml> [<https://perma.cc/NR28-NHWQ>].

<sup>4</sup> Andrew Keatts, *Cities Focus on Mitigating Climate Change, Fail to Adapt*, GOVTECH.COM (Dec. 17, 2015), <http://www.govtech.com/dc/articles/Cities-Focus-on-Mitigating-Climate-Change-Fail-to-Adapt.html> [<https://perma.cc/68X8-4VVK>].

<sup>5</sup> *Id.*

<sup>6</sup> See *infra* notes 68–189 and accompanying text.

<sup>7</sup> See Christopher Serkin, *Passive Takings: The State's Affirmative Duty to Protect Property*, 113 MICH. L. REV. 345, 400–01 (2014) (expressing the related but different concern that the beneficiaries of passive takings would be wealthy owners who live by the sea and have the resources and sophistication to bring takings claims).

<sup>8</sup> OFFICE OF INSPECTOR GEN., DEP'T. OF HOMELAND SEC., FEMA'S PROCESS FOR TRACKING PUBLIC ASSISTANCE INSURANCE REQUIREMENTS 1 (2011), <https://www.oig.dhs.gov/assets/Mgmt/>

trinally sound nor good policy from the perspective of incentivizing adaptation.<sup>9</sup>

By contrast, incentivizing municipalities to carry private insurance with respect to climate-related damage to public property and infrastructure could have a number of salutary effects: bringing third-party insurers in as *de facto* pro-adaptation regulators, sensitizing municipal leaders to climate change risks they otherwise might be motivated to ignore, and raising the costs of new development in those areas most susceptible to flooding and storm damage. Private insurance may lead to more adaptive building, rebuilding, and planning, and (in places) the retreat from flood-prone areas that climate change arguably calls for, at least from an overall social welfare perspective.<sup>10</sup>

The current federal regime does not merely fail to incentivize localities to carry adequate private insurance for risks related to climate change.<sup>11</sup> Federal Emergency Management Agency (FEMA) disaster aid is configured in such a way as to affirmatively disincentivize localities to obtain insurance.<sup>12</sup> This disincentive should be removed.

For third-party private insurance of municipalities in areas subject to flooding and other climate-related risks to be economically-viable, the pool of insureds cannot be limited to those municipalities at the greatest risk. If that were the case, insurers either will not enter the market or will soon exit it. Thus, a reasonably broad pool of municipalities must be incentivized to purchase insurance. Insurers' incentives to promote climate change adaptation also would be enhanced if state insurance law permitted, and the applicable federal incentive policy required, that flood insurance policies be issued on a five-year, ten-year, or longer basis. The largest obstacles to making the required changes in federal and state law will be ones of political economy and political will.

Because *de jure* mandatory or *de facto* mandatory insurance raises problems of affordability for less wealthy municipalities, some form of fed-

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OIG\_12-18\_Dec11.pdf [https://perma.cc/7D85-8SWN] (addressing the concern that FEMA aid will duplicate private insurance, which could discourage adaptation).

<sup>9</sup> See *infra* notes 68–109 and accompanying text.

<sup>10</sup> See *infra* notes 110–189 and accompanying text. The topic of municipalities, climate change adaptation, and insurance has not received substantial attention in the academic literature. The most extensive analysis of the topic is an unpublished paper from the Emmet Center. RICHARD LOU ET AL., HARVARD L. SCH. EMMETT ENVTL. L. & POL'Y CTR., MUNICIPAL CLIMATE CHANGE ADAPTATION AND THE INSURANCE INDUSTRY (2012), [http://blogs.harvard.edu/environmentallawprogram/files/2013/10/Municipal-CC-Adaptation-and-Insurance-Industry\\_FINAL\\_revised-10-2-13.pdf](http://blogs.harvard.edu/environmentallawprogram/files/2013/10/Municipal-CC-Adaptation-and-Insurance-Industry_FINAL_revised-10-2-13.pdf) [https://perma.cc/R82U-PGTD].

<sup>11</sup> See OFFICE OF INSPECTOR GEN., *supra* note 8, at 1.

<sup>12</sup> *Id.*

eral government subsidies or support might be necessary, both as a matter of fairness and as a matter of political reality, even though such subsidies certainly are in tension with the goal of using insurance to motivate adaptation. Moreover, federal reinsurance guarantees may be needed to address private insurers' concerns about huge claims attached to Katrina-like storm activity.<sup>13</sup> The federal expenditures on insurance premium subsidies or reinsurance guarantees, however, would generate greater social welfare return than the current pattern of federal expenditures, which consists of *ex post* emergency aid and reconstruction funds that are provided whether or not municipalities have adequately sought to limit risk.

This Article does not address the question of incentivizing individual landowners and investors in particular localities, which has been much discussed in the context of calls for reform in federal and state flood insurance programs that (it is universally agreed) charge too low premiums and thus discourage adaptation.<sup>14</sup> The focus here on municipalities and hence municipal officials is justified in part because the role of federal law in failing to incentivize or actually disincentivizing their adaptation decisions has received comparatively less attention than the role of the federal government in disincentivizing individual property owners' adaptation via excessively cheap, government-operated insurance. But, of course, in order to move to a reasonably adaptive regime on the part of municipal officials, the incentives of individual property owners and investors must be addressed because, via local politics, individual property owners indisputably have a very large influence over the decisions of local officials.

Part I provides the legal background for the Takings Clause liability approach, describing recent scholarship and recent case law, such as *Arkansas Game & Fish Commission v. United States*, *Big Oak Farms, Inc. v. United States*, *Quebedeaux v. United States*, and *St. Bernard Parish v. Unit-*

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<sup>13</sup> Geoffrey Heal & Howard Kunreuther, *Environment & Energy: Catastrophic Liabilities*, in MEASURING AND MANAGING FEDERAL FINANCIAL RISK 235, 235–45 (Deborah Lucas ed., 2007) (discussing the impact from large claims on private insurer profitability).

<sup>14</sup> See Howard Kunreuther, *Reflections on U.S. Disaster Policy for the 21st Century* 1, 8–9 (Nat'l Bureau of Econ. Research, Working Paper No. 12449, 2006), <http://www.nber.org/papers/w12449.pdf> [<https://perma.cc/24QW-DLEU>] (explaining that the National Flood Insurance Program offers subsidized insurance rates for residents living in hazard zones and arguing for a risk-based approach to flood insurance). For other critiques of government-subsidized flood insurance, see Ernest Abbott, *Flood Insurance and Climate Change*, 26 FORDHAM ENVTL. L. REV. 10 (2014), Omri Ben-Shahar & Kyle D. Logue, *The Perverse Effects of Subsidized Weather Insurance*, 3–5 (U. Mich. Law Sch. Law & Econ. Working Papers, Paper No. 111, 2015), [http://repository.law.umich.edu/cgi/viewcontent.cgi?article=1221&context=law\\_econ\\_current](http://repository.law.umich.edu/cgi/viewcontent.cgi?article=1221&context=law_econ_current) [<https://perma.cc/H7CE-6VRU>], and Jennifer Wriggins, *Flood Money: The Challenge of U.S. Flood Insurance Reform in a Warming World*, 119 PENN ST. L. REV. 361 (2014).

*ed States* that would seem to provide a basis for that approach.<sup>15</sup> Part II explains why the various possible climatic takings claims are problematic in terms of both government and private property owner incentives.<sup>16</sup> Part III explains why the current post-natural disaster federal aid regime creates perverse incentives for municipalities to forego adequately insuring against flooding and other effects that may be tied to climate change.<sup>17</sup> It sketches options for reform and then considers objections to an approach to incentivizing adaptation by localities that relies on the greater use of private insurance.

## I. THE BACKGROUND LAW AND CONCEPTUALIZATION OF TAKINGS

One way to conceptualize the Takings Clause is as a liability provision. And one function of liability—or the possibility of liability—is to incentivize socially desirable conduct or disincentive socially undesirable conduct.<sup>18</sup> For example, we hold builders liable for construction defects in part because we want to incentivize them to build safely.<sup>19</sup> Similarly, in theory (although perhaps not in reality, as discussed below), one can imagine that Taking Clause liability for the loss of private property via climate-change-related sea level rise, flood, wind, fire, and such could motivate government actors to take actions to avoid or minimize the possibility of such property losses.<sup>20</sup>

But what, exactly, would takings claims against government actors related to weather patterns, sea level rise, flood, wind, and fire look like? There are at least four distinct categories of claims, each of which, *ex ante*, could incentivize somewhat different behavior on the part of government actors:

- *Inaction Claims*: Takings claims against governments for failing to take action to adapt to climate change.

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<sup>15</sup> See *Ark. Game & Fish Comm'n v. United States*, 133 S.Ct. 511 (2012); *St. Bernard Parish v. United States*, 121 Fed. Cl. 687 (2015); *Quebedeaux v. United States*, 112 Fed. Cl. 317 (2013); *Big Oak Farms, Inc. v. United States*, 105 Fed. Cl. 48 (2012); *infra* notes 18–67 and accompanying text.

<sup>16</sup> See *infra* notes 68–109 and accompanying text.

<sup>17</sup> See *infra* notes 110–189 and accompanying text.

<sup>18</sup> For discussions of the Takings Clause emphasizing its role in terms of investment incentives, see Lawrence Blume & Daniel L. Rubinfeld, *Compensation for Takings: An Economic Analysis*, 72 CAL. L. REV. 569 (1984), Lawrence Blume et al., *The Taking of Land: When Should Compensation Be Paid?*, 99 Q.J. ECON. 71 (1984), and David A. Dana, *Natural Preservation and the Race to Develop*, 143 U. PA. L. REV. 655 (1995).

<sup>19</sup> See *Acosta v. Glenfed Dev. Corp.*, 28 Cal. Rptr. 3d 92, 108 (Cal. Ct. App. 2005).

<sup>20</sup> See *infra* notes 68–109 and accompanying text.

- *Ineffective Action*: Takings claims against governments for taking adaptive actions that were insufficient to prevent property loss.
- *Counterproductive Action*: Takings claims against governments for taking action that not only was ineffective in preventing property loss, but also caused greater losses than otherwise would have occurred.
- *Improper Diversion*: Takings claims against governments for diverting the effects of climate change, such as flooding or fire, from one area/community to another, such that the latter area/community incurred greater property losses than it otherwise would have incurred, although the former area/community incurred less loss than it otherwise would have.

At first blush, none of these claims would seem to fit the traditional paradigm of the Takings Clause, wherein the government is held liable for directly causing a loss of property that otherwise would not have happened.<sup>21</sup> Takings Clause jurisprudence requires the government to be both the but-for and the proximate cause of the property loss, but the claims outlined above do not comport with that causation requirement.<sup>22</sup> Governments—in any case particular local governments—do not cause extreme weather and sea level rise associated (or not) with climate change.<sup>23</sup> Governments do not singularly cause people to invest in areas at risk from climate-change-related flooding or other risks. Governments are not usually held liable for trying, but not fully solving, a problem they did not directly

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<sup>21</sup> See U.S. CONST. amend. V.

<sup>22</sup> Jan G. Laitos & Theresa H. Abel, *The Role of Causation When Determining the Proper Defendant in a Takings Lawsuit*, 20 WM. & MARY BILL RTS. J. 1181, 1236, 1238 (2012) (noting that although the courts have not explained at great length or with great clarity the causation requirement for takings claims, reviewing courts in takings cases should first “determine whether the government-defendant is the factual and proximate cause of the plaintiff’s alleged harm”); see also *Penn. Cent. Transp. Co. v. City of New York*, 438 U.S. 104, 124 (1978) (referring to losses “proximately caused” by government as subject of Takings Clause liability); *Christy v. Hodel*, 857 F.2d 1324, 1335 (9th Cir. 1988) (finding that takings involve more than just the incidental result of regulation); *Akins v. California*, 71 Cal. Rptr. 2d 314, 340 (Cal. Ct. App. 1998) (finding that owner must show a substantial cause and-effect relationship between government and the injury). Another case, *Bowditch v. Boston*, can be understood as a seminal proximate causation case about when the government should and should not be held liable for a taking in a disaster setting. 101 U.S. 16, 18–20 (1879). In *Bowditch*, although the city workers damaging property as part of a fire containment effort were the but-for cause of the damage, they were not the proximate cause, as it was the fire (and whoever set or caused the fire) that compelled the fire containment effort. *Id.*; see also *Nicholson v. United States*, 77 Fed. Cl. 605, 619–20 (2007) (dismissing takings claim related to Katrina flooding where the plaintiffs did not allege an affirmative action by the government that caused the flooding).

<sup>23</sup> See Laitos & Abel, *supra* note 22, at 1182–83, 1238 (stating that to be responsible, the harm must be shown to be an “objectively foreseeable consequence of the initial act that eventually resulted in the harm”).

cause: we would not imagine that a city would be held liable for burglaries it sought to prevent, but did not prevent, through policing.<sup>24</sup>

In the counterproductive action and improper diversion scenarios, the government arguably is a more active, more directly causal actor, in the property loss resulting from sea level rise or flooding or other climate-related phenomena, but even in these scenarios, the government is merely endeavoring to protect property and (perhaps) life against a force—climate change and its effects—that are not directly of the government’s making.

Nonetheless, even if holding governments liable for not doing enough or not doing the right things to address climate change effects seems to stretch our traditional notions of causal responsibility for takings purposes, it is not unprecedented in our overall legal tradition for liability to be imposed for *not* preventing harm as opposed to directly causing harm.<sup>25</sup> Our overall legal tradition is complex and not particularly consistent on the question of causal responsibility. This point is the beginning point of the passive takings argument put forth by Christopher Serkin, Associate Dean for Research and Professor of Law at Vanderbilt Law School in a powerful and nuanced article arguing that the government’s failure to act *sometimes* should give rise to liability under the Takings Clause for property losses the government did not but could have prevented.<sup>26</sup>

Professor Serkin’s argument is partly based on doctrinal consistency—on the idea that Takings Clause liability based on inaction is consistent with liability imposed in other non-takings contexts for inaction—but he also appears to be arguing for passive takings in part out of a concern for incentivizing governments to take adequate action to adapt to phenomena such as climate change.<sup>27</sup> Climate change, and in particular sea level rise, is one of Serkin’s central examples.<sup>28</sup> And Serkin suggests what is in a way an appealing “what’s good for the goose is good for the gander” argument for the climate change context: since assertive government adaptation actions sometimes can result in Takings Clause liability (although the extent that is so or should be so is quite debatable), should not that disincentive to act be offset by an incentive to act in the form of potential Takings Clause liability for inaction or inadequate action?<sup>29</sup>

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<sup>24</sup> *Id.* at 1210 (discussing the causation requirement for takings liability).

<sup>25</sup> See Serkin, *supra* note 7, at 390 (describing government inaction as a basis for takings liability).

<sup>26</sup> *Id.* at 346–49.

<sup>27</sup> See *id.*

<sup>28</sup> *Id.*

<sup>29</sup> For arguments that affirmative government adaptation generally should not result in takings liability, see Robin Craig, *What the Public Trust Doctrine Can Teach Us About the Police Power*, Penn Central, and *the Public Interest in Natural Resource Regulation: A Tribute to Joe Sax*, 45



To his credit, Serkin recognizes and addresses many of the potential objections to passive takings and, in particular, the objection that once inaction and inadequate action can be the basis for Takings Clause liability, governments might face an avalanche of litigation and liability that would overwhelm the courts and chill the operation of the executive and legislative branches.<sup>30</sup> That is so because it is almost always possible to imagine some action the government did not take that could have prevented a given property loss.<sup>31</sup> Given government's broad powers, there is always something more, in theory, it could have done.<sup>32</sup> Serkin tries to limit the government's obligation to act—and hence government liability for not acting—to contexts where the government had been heavily involved in the relevant regulatory and physical context affecting the property at issue, and thereby has implicitly assumed some measure of affirmative responsibility to act to protect the property's value.<sup>33</sup>

It is not at all clear, however, that there is a logical way to cabin liability based on government inaction or inadequate action.<sup>34</sup> In the modern era at least, government has so much background involvement in the economy that there are few, if any, domains in which it could not be argued that the government had implicitly assumed an obligation to act.<sup>35</sup> In any case, in

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ENVTL. L. 519, 519–59 (2015) and Sean Hecht, *Taking Background Principle Seriously in the Context of Sea-Level Rise*, 39 VT. L. REV. 781, 784–97 (2015). A similar argument to Serkin's has been made by Jenna Schweitzer focusing on common law tort rather than takings liability. See Jenna Schweitzer, *Climate Change Legal Remedies: Hurricane Sandy and New York City Coastal Adaptation*, 16 VT. J. ENVTL. L. 243, 291–93 (2014) (criticizing the lack of government tort liability under current law for inadequate local adaptation and suggesting new legislation to create such liability to incentivize governmental adaptation efforts). Current tort doctrine shields the government in most cases from negligence suits related to climate change adaptation. In theory, takings liability could be more problematic from the government's perspective than tort liability because while tort liability would require a showing that the government acted unreasonably and hence negligently, takings liability would not necessarily be limited to scenarios in which the government acted unreasonably.

<sup>30</sup> Serkin, *supra* note 7, at 385–88.

<sup>31</sup> *Id.* at 385.

<sup>32</sup> *Id.* at 385–87.

<sup>33</sup> *Id.*

<sup>34</sup> *Id.* at 394–96. Serkin does suggest one demarcation line that would be relatively clear: that the government be held liable when it prohibits a property owner from engaging in self-help to protect his or her own property. See *id.* For example, when a government bars a property owner from constructing a sea wall on his or her own property, such self-help prohibitions are not passive takings at all—in those cases the government actively prohibits private action on private property, and indeed, such prohibitions have been the focus of many of the leading takings cases, including *Penn Central Transportation Co. v. City of New York*, 438 U.S. 104 (1978) and *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003 (1992). See *id.*

<sup>35</sup> For example, the financial, banking, and housing markets are in large part government creations, and hence, under a passive takings theory, whenever the government does not act to prevent losses in those markets, it arguably could be held liable for having taken property. If one

the climate change context, there will never be a physical space where the government has not been highly involved, as a regulatory and physical matter. Virtually all of our rivers, oceans, and landscapes have been deeply affected by government action, and in many cases, they have been completely engineered or re-engineered by governments, along with private actors. Some American cities were essentially swamps before major public fill projects.<sup>36</sup> Governments have a long history of acting to control, manage, and direct flooding, including coastal flooding and storm-related flooding. Governments have also been intimately involved in addressing fire risks, many of which involve government-owned land. Thus, even in those cases (if there are any) where governments very recently have been wholly inactive in addressing climate-related flooding or other climate-related effects, one can conceptually broaden the relevant time-frame and characterize the government as having been an active participant and hence (in Serkin's conception) an actor that has assumed some obligation to take action to address climate change effects.<sup>37</sup>

Moreover, given the political reality that governments almost always cannot afford to be seen as being wholly inactive with respect to risks such as flooding, even recent inaction on the part of governments almost always will be coupled with some recent action, even if only highly ineffective or perhaps symbolic action, to address the relevant risk. Thus, even if one can read Serkin's analysis as (in my terms) suggesting liability only for ineffective action and not pure inaction regarding climate change, a passive takings approach, if seized upon by the courts, might produce very far-reaching liability.<sup>38</sup>

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combines a relaxed conception of causal responsibility along the lines of passive takings and an expansive interpretation of "property" and property losses along the lines of *Koontz*, one could imagine an extremely expansive scope for takings liability that could in effect undo the post-*Lochner* consensus that courts will not scrutinize and second-guess routine economic regulation. See *Koontz v. St. Johns River Water Mgmt. Dist.*, 133 U.S. 2586, 2603 (2013) (holding that the government can face takings liability for conditioning issuance of a permit to a landowner on the landowner providing money for projects on sites not owned by the landowners); *Lochner v. New York*, 198 U.S. 45, 63–64 (1963) (holding that an economic regulation capping work hours interfered with the Fourteenth Amendment's right to liberty); David A. Dana, *Why Do We Have the Parcel-as-a-Whole Rule?*, 39 VT. L. REV. 617, 641–45 (2015) (arguing that the Supreme Court's recent decision in *Koontz* is doctrinally inconsistent with the principle of judicial deference to routine economic regulation).

<sup>36</sup> See, e.g., *Boston, Overview* INDAGARE, <http://www.indagare.com/destinations/north-america/new-england/boston/> [<https://perma.cc/J8P8-H2L3>] (describing how Boston's Back Bay neighborhood was a swamp prior to a major fill project).

<sup>37</sup> Serkin, *supra* note 7, at 361–63, 377–78.

<sup>38</sup> *Id.* at 377–79.

Like Serkin's passive takings, some recent cases arguably provide a basis for holding the government liable for taking property when it engages in inadequate, ineffective, counterproductive, or improper diversion responses to flooding and sea level rise.<sup>39</sup> The most notable case in this regard grows out of the Hurricane Katrina disaster and the terrible flooding in the Lower Ninth Ward, in particular.<sup>40</sup> The damage caused by Katrina certainly reflected a long pattern of ineffective and counterproductive adaptation on the part of the federal, state, and local governments, as well as private actors.<sup>41</sup> The New Orleans landscape was transformed by public and private actors so that it was, and continues to be, highly vulnerable to flooding.<sup>42</sup> Well before Katrina, government actors knew of this vulnerability, as presumably did sophisticated private actors who continued to invest there anyway.<sup>43</sup> New Orleans is certainly a case of collective public and private failure, and it offers one of the more compelling cases one can imagine for the idea that the government, especially the federal government, should be held liable for ineffectively acting (and not acting at all) to address flooding risks that were well understood.<sup>44</sup>

It is perhaps not surprising that the case that comes closest to endorsing a passive takings approach involved claims against the United States Army Corps of Engineers ("the Corps") for having taken private properties in New Orleans via flooding during Katrina.<sup>45</sup> In *St. Bernard Parish v. United States*, plaintiffs argued that the Corps had built a canal that added to flooding risks, and then did not take enough subsequent actions to address that flooding risk.<sup>46</sup> In that sense, liability was predicated on government action coupled with inaction.<sup>47</sup> The Court accepted the plaintiffs' factual claim that the Mississippi River Gulf Outlet ("MR-GO"), a deep channel authorized by Congress and built by the Corps to improve navigation, caused environmental damage and funneled storm surges such that the plaintiffs' properties were inundated more than they would have been in the

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<sup>39</sup> See Dan Swenson, *Anatomy of a Flood: How New Orleans Flooded During Hurricane Katrina*, TIMES-PICAYUNE (Aug. 20, 2015), [http://www.nola.com/katrina/index.ssf/2015/08/katrina\\_flooding\\_map.html](http://www.nola.com/katrina/index.ssf/2015/08/katrina_flooding_map.html) [<https://perma.cc/7MKE-VVHM>] (depicting the diversion of floodwaters from Hurricane Katrina).

<sup>40</sup> *Id.* (depicting the flooding of the Lower Ninth Ward).

<sup>41</sup> See Oliver Houck, *Can We Save New Orleans?*, 19 TUL. ENVTL. L.J. 1, 5–30 (2006) (tracing the history of environmental degradation in and around New Orleans).

<sup>42</sup> See *id.* at 3 (describing insufficient and ineffective actions and programs that made New Orleans vulnerable to flooding).

<sup>43</sup> *Id.*

<sup>44</sup> *Id.*

<sup>45</sup> See *St. Bernard Parish v. United States*, 121 Fed. Cl. 687, 724–37, 746–47 (2015).

<sup>46</sup> *Id.* at 724–37.

<sup>47</sup> *Id.*

absence of the MR-GO, and that instead of closing the MR-GO and/or taking other actions to abate storm damage and flooding, the Corps did next to nothing.<sup>48</sup>

But, as the United States argued in the litigation, the real problem with New Orleans at the time of Katrina was not the MR-GO per se, which was closed post-Katrina, but the fact that a range of actions over decades were not taken by the Corps, state and local governments, and private actors to address the risks of sea level rise and flooding notwithstanding a string of large pre-Katrina storms and reports stating that New Orleans was at risk.<sup>49</sup> The MR-GO was not the only canal or other force degrading the environment and making private property more susceptible to flooding.<sup>50</sup> What actions that were taken on the part of government and private actors were far too little too late, not only with respect to the MR-GO, but also with respect to flood control systems and management as a whole.<sup>51</sup> One could thus perhaps read the Court's imposition of takings liability as *implicitly* about not just the MR-GO, but also the need for the government, at least the federal government, to be held liable when it acts ineffectively or refuses to act to address a clear flooding risk, even when the risk has many causes other than direct government action.<sup>52</sup> So read, *St. Bernard Parish* could be understood as endorsing not just a takings liability theory of (in my typology) counter-productive action but also inaction and/or ineffective action.<sup>53</sup>

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<sup>48</sup> *Id.* at 746–47.

<sup>49</sup> *Id.* at 741.

<sup>50</sup> Even the Claims Court acknowledged that “causation is complicated by the mix of natural and man-made contributions to the flooding that Plaintiffs experienced” and that “[m]any of the areas that were wooded lowlands in the 1950s and 1960s are now developed, leveed, and drained[, and], canals other than MR–GO have been used for navigation, as well as to install gas pipelines and access well heads.” *Id.*

<sup>51</sup> *Id.*

<sup>52</sup> *Id.*

<sup>53</sup> See JENNIFER KLEIN, COLUMBIA LAW SCH. SABIN CTR. FOR CLIMATE CHANGE L., POTENTIAL LIABILITY OF GOVERNMENTS TO PREPARE FOR CLIMATE CHANGE 1, 25 (2015), [http://web.law.columbia.edu/sites/default/files/microsites/climate-change/klein\\_-\\_liability\\_of\\_governments\\_for\\_failure\\_to\\_prepare\\_for\\_climate\\_change.pdf](http://web.law.columbia.edu/sites/default/files/microsites/climate-change/klein_-_liability_of_governments_for_failure_to_prepare_for_climate_change.pdf) [<https://perma.cc/BWX4-5DAT>] (“Notably, *Saint Bernard Parish*, if it survives appeal, expands government liability from situations in which the government deliberately causes flooding, for example by releasing water from a dam, to include situations in which inaction by the government exacerbates flooding from severe weather . . .”). A relatively recent Florida case could also be read as imposing takings liability for inaction. See *Jordan v. St. Johns County*, 63 So. 3d 835, 839 (Fla. Dist. Ct. App. 2011) (holding that a landowner had stated an inverse condemnation claim when the owner alleged that the locality failed to rebuild a public road washed away by erosion and storm damage such that the owner no longer had any ground access to its property).

There are several cases addressing what I called, in the typology above, improper diversion takings claims.<sup>54</sup> These cases suggest a move toward a reduced causal requirement for takings liability, and hence are at least in the spirit of Serkin's passive takings approach. The United States via the Corps of Engineers has been repeatedly sued by private property owners whose land has been flooded as a result of flows from Corps-managed waters.<sup>55</sup> Traditionally, the courts held that temporary flooding could not constitute a taking, presumably because temporary flooding was either unavoidable or part and parcel of the Corps trying to manage excessive water flows during periods of heavy rains or some other external pressure requiring a management response.<sup>56</sup> Consistent with this traditional view, in *Big Oak Farms, Inc. v. United States*, the United States Court of Federal Claims found that the Corps had not taken flooded property when it flooded plaintiff's farmland as part of an effort to save the town of Cairo, Illinois from flooding as the flood waters managed by the Corps surged in the wake of heavy rains.<sup>57</sup> In effect, the Corps chose protecting a settlement over protecting essentially uninhabited farmland.<sup>58</sup>

But then came *Arkansas Game and Fish Commission v. United States*, a United States Supreme Court case that on its face seems quite innocuous, but that could be a building bridge to passive takings.<sup>59</sup> In *Arkansas Game*, the Supreme Court held that temporary flooding caused by federal management that favored one set of property owners over another set could constitute a taking if the flooding was foreseeable and exceeded the reasonable expectations of the landowners whose land was flooded.<sup>60</sup> Such cases should be evaluated under the *ad-hoc*, multi-factor approach of *Penn Central Transportation Co. v. City of New York*, the Court advised.<sup>61</sup> Following *Arkansas Game*, the plaintiff's claims in *Big Oak Farms, Inc.* were reinstated.<sup>62</sup>

*Arkansas Game* also played a central role in *Quebedeaux v. United States*, a case in which a class of property owners argued that the Corps

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<sup>54</sup> Ark. Game & Fish Comm'n v. United States, 133 S.Ct. 511, 518–23 (2012); *Big Oak Farms, Inc. v. United States*, 105 Fed. Cl. 48, 55–59 (2012).

<sup>55</sup> *Ark. Game & Fish Comm'n*, 133 S.Ct. at 518–21 (discussing some of these cases).

<sup>56</sup> *Big Oak Farms, Inc.*, 105 Fed. Cl. at 56.

<sup>57</sup> *Id.*

<sup>58</sup> *Id.* at 51, 55–56 (describing the “Jadwin Plan,” which diverted floodwaters to private farmland).

<sup>59</sup> See 133 S.Ct. at 518–23.

<sup>60</sup> *Id.* at 522–23.

<sup>61</sup> See *id.* at 518.

<sup>62</sup> Order Reinstating Plaintiffs' Takings Claims at 1, *Big Oak Farms, Inc.*, 105 Fed. Cl. 48 (2012) (No. 11-275L), [http://www.uscfc.uscourts.gov/conferences/2013/sites/default/files/downloads\\_page/Big%20Oak%20Farms%20Order.pdf](http://www.uscfc.uscourts.gov/conferences/2013/sites/default/files/downloads_page/Big%20Oak%20Farms%20Order.pdf) [<https://perma.cc/JS3R-NQUA>].

took their property when the Corps diverted surging flood waters onto their farmland and other properties to reduce the risk of the levees in Baton Rouge and New Orleans from becoming overwhelmed and those major cities flooded.<sup>63</sup> In refusing to dismiss the plaintiffs' claims, the Federal Claims Court held that even a single, temporary flood could constitute a taking, depending on the "multi-factored, factually-intensive" analysis called for by *Arkansas Game*.<sup>64</sup>

To be fair, none of these three cases—*Arkansas Game*, *Big Oak Farms, Inc.*, or *Quebedeaux*—establish that governments will always be held liable as having taken property when they divert flood waters (or for that matter fires or ocean tides) away from one set of properties that would have been destroyed toward another set of properties as part of an effort to minimize the net social loss given the natural forces beyond the governments' control.<sup>65</sup> But the cases certainly suggest that governments may well be held liable even in such cases of apparently reasonable government behavior. In other words, there is now substantial precedential support for improper diversion takings claims related to climate change.<sup>66</sup>

Taken together, Serkin's passive takings and *Arkansas Game/Big Oak Farms, Inc./Quebedeaux* provide some scholarly and case law support for the imposition of Takings Clause liability for inactive, ineffective, counter-productive, and/or improper diversion takings claims related to flooding and sea level rise (and more generally related to climate change effects).<sup>67</sup> These sources thus help frame the question: would the imposition of such liability result in better, more comprehensive climate change adaptation in the United States, and especially by local governments? As explained below, the answer seems to be likely not, and indeed quite the opposite may be true.

## II. GOVERNMENT ACTOR INCENTIVES, TAKINGS LIABILITY, AND CLIMATE CHANGE ADAPTATION

### A. *What Motivates Government and the Limited Impact of Uncertain Future Takings Liabilities*

As an initial matter, in asking the question of whether governments would act differently (and if differently, better or worse) if they faced Tak-

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<sup>63</sup> 112 Fed. Cl. 317, 319–20 (2013).

<sup>64</sup> *Id.* at 324–25.

<sup>65</sup> See *Ark. Game & Fish Comm'n*, 133 S.Ct. at 518–23; *Quebedeaux*, 112 Fed. Cl. at 324–25; *Big Oak Farms, Inc.*, 105 Fed. Cl. at 55–59.

<sup>66</sup> See *Ark. Game & Fish Comm'n*, 133 S.Ct. at 518–23; *Quebedeaux*, 112 Fed. Cl. at 324–25; *Big Oak Farms, Inc.*, 105 Fed. Cl. at 55–59; Serkin, *supra* note 7, at 372–76.

<sup>67</sup> See *Ark. Game & Fish Comm'n*, 133 S.Ct. at 518–23; *Quebedeaux*, 112 Fed. Cl. At 324–25; *Big Oak Farms, Inc.*, 105 Fed. Cl. at 55–59; Serkin, *supra* note 7, at 372–76.

ings Clause liability for doing too little by way of climate change adaptation or for diversions of floodwaters and tides from one area to another, it is necessary to ask: what motivates government actors who have control of decisions related to flooding and sea level rise and other climate-change risks? To be sure, there is unlikely to be a single answer to that question. In the United States, there will often be a large group of government actors from different governments that will play some role in the management and response to climate-related risks.<sup>68</sup> The federal government, notably, but not exclusively through United States Army Corps of Engineers, plays a large role, as do state and local governments.<sup>69</sup> Because climatic effects do not respect political boundary lines, a number of localities together may play a large role with respect to the relevant decisions in any particular geographic area.<sup>70</sup> Thus, in considering how the possibility of takings liability will affect government actors, a more refined inquiry compels us to ask: which government actors—and in what configuration—will be motivated by potential liability for inadequate or ineffective or improper adaptation and how?

The academic literature on the economics of takings liability provides a starting point but only a starting point.<sup>71</sup> In one strand of the academic literature, the government and government actors are viewed as budget-maximizers and expenditure-minimizers, in a way analogous to classical economics' wealth-maximizing *homo economicus*.<sup>72</sup> But recent commentators have questioned the robustness of this account of governmental motivations.<sup>73</sup> As Daryl Levinson, Associate Professor at University of Virginia School of Law has powerfully argued, government actors—especially elect-

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<sup>68</sup> FRANK T. LITZ, PEW CTR. ON GLOBAL CLIMATE CHANGE, TOWARD A CONSTRUCTIVE DIALOGUE ON FEDERAL AND STATE ROLES IN U.S. CLIMATE CHANGE POLICY 1 (2008), <http://www.c2es.org/docUploads/StateFedRoles.pdf> [<https://perma.cc/X6W7-TJ52>].

<sup>69</sup> *See id.*; *How Does Climate Change Affect USACE Mission Areas?*, RESPONSES TO CLIMATE CHANGE (Jan. 14, 2013), <http://corpsclimate.us/index.cfm> [<https://perma.cc/QA3B-QN3P>].

<sup>70</sup> The fact that many governments—federal, state, and local—in some sense may have failed to adapt in any particular location poses another problem for takings lawsuits. Presumably, defendants could sue a number of defendants, and the defendants could fight among themselves as to how to share any liability, but if liability were shared among many different governments, the *ex ante* incentive effects of such liability would be diluted.

<sup>71</sup> *See* Ronit Levine-Schnur & Gideon Parchomovsky, *Is the Government Fiscally Blind? An Empirical Examination of the Effect of the Compensation Requirement on Eminent Domain Exercises*, 45 J. LEGAL STUD. 1, 2–6 (forthcoming 2016) (working paper on file with author).

<sup>72</sup> For a helpful summary of this view in the takings context, which often goes by the label of the “fiscal illusion” view, *see id.* at 2–4.

<sup>73</sup> *See* Daryl J. Levinson, *Making Governments Pay: Markets, Politics and the Allocation of Constitutional Costs*, 67 U. CHI. L. REV. 345, 356–57 (2000); *see also* Nicole Garnett, *The Neglected Political Economy of Eminent Domain*, 105 MICH. L. REV. 101, 142–43 (2006) (arguing that political rather than economic considerations can drive eminent domain choices).

ed ones but also ones reporting to or under the oversight of elected ones—become such by gaining and maintaining political support, and are driven to keep that support to keep office.<sup>74</sup> Thus, government actors may act, and demonstrably do act, in ways that do not minimize government expenditures and may cost the government a great deal more than otherwise might be necessary when doing so maximizes political support.<sup>75</sup> Moreover, in many contexts, government actors need not be directly concerned with liabilities based on their actions because the liabilities will not necessarily come out of the budgets for which they are directly concerned.<sup>76</sup>

As Professor Serkin has argued, however, small government localities and local officials may be more sensitive to financial liabilities than state or federal government actors.<sup>77</sup> Smaller localities may feel that their overall budgets are constrained and have little slack. At the state and federal level, the overall budgets are larger and deficit spending is commonplace.<sup>78</sup> For small governments, any new liabilities may require reductions in local services that the populace regards as essential, such as schools and police, with tremendous political costs.<sup>79</sup> It is thus arguable that local governments are not only sensitive to potential Takings Clause liabilities, but risk averse with respect to such potential liabilities.<sup>80</sup>

But what is missing in the academic literature is any discussion of the time-frame and level of uncertainty of any such takings liabilities, and how those factors influence the extent to which such potential liabilities will motivate conduct by local government officials. Local officials in small localities may be very attentive to or even averse to imminent, near-certain liabilities, but not attentive to and certainly not risk averse to less immediate, quite uncertain liabilities. Human beings, of which government officials are a subset, and of which the electorate they must serve and please are another subset, discount costs that may be incurred in the future as opposed to those

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<sup>74</sup> See Levinson, *supra* note 73, at 356–57.

<sup>75</sup> See *id.* (contrasting government with a private, profit-maximizing business).

<sup>76</sup> *Id.* at 354; see 31 U.S.C. § 3104 (2012); INDEP. INST., PROPERTY RIGHTS: EMINENT DOMAIN AND REGULATORY TAKINGS RE-EXAMINED 203 (Bruce L. Benson ed., 2010) (discussing how takings judgments against the United States are paid out of the Federal Judgment Fund, rather than particular agency budgets).

<sup>77</sup> See Christopher Serkin, *Big Differences for Small Governments: Local Governments and the Takings Clause*, 81 N.Y.U. L. REV. 1624, 1645–52 (discussing how at the local government level, decision-makers internalize, to a greater extent than at other levels, the costs of their decisions).

<sup>78</sup> *Id.* at 1667.

<sup>79</sup> *Id.* at 1695–96.

<sup>80</sup> See *id.* at 1666–74; see also Christopher Serkin, *Strategic Land Use Litigation: Pleading Around Municipal Insurance*, 43 B.C. ENVTL. AFF. L. REV. 463, 475–76 (2016).



that are immediate or nearly so.<sup>81</sup> Discount rates vary.<sup>82</sup> Politicians may discount future costs in a particularly dramatic fashion because they may be especially attentive to what will happen on their watch and quite willing to pass possible future problems to the next generation of leaders.<sup>83</sup>

Discounting may be particularly dramatic when the choice political leaders face is between bearing certain financial costs now with accompanying political costs—as, for example, the costs of cutting funding for a popular program—and the uncertainty that the locality will bear a liability at some point in the future if it does not expend the funds now used on the popular program to boost climate change adaptation.<sup>84</sup> A strong body of psychological scholarship supports the view that people tend to overweigh the avoidance of certain costs as compared to the avoidance of uncertain, albeit much larger, costs.<sup>85</sup> And, to be sure, there are numerous examples of governments, local and others, apparently putting off problems and potential liabilities to a future day out of an unwillingness to bear certain costs now.<sup>86</sup> In many states and localities, for example, local officials have refused to make spending cuts and impose taxes even though doing so has exposed their states and localities to millions or even billions of dollars in possible unfunded liabilities for public employee pensions.<sup>87</sup>

None of this is to suggest that possible takings liability, even whether and when (if ever) the liabilities will be incurred is very uncertain, cannot motivate government behavior. But the more uncertain the timing and actual imposition of such liability is, the less that the threat of liability is likely

<sup>81</sup> See ALAN M. JACOBS, GOVERNING FOR THE LONG TERM: DEMOCRACY AND THE POLITICS OF INVESTMENT 28 (2011) (“One common view of democratic politics suggests both a clear prediction of policy myopia and a clear explanation of it. Office-seeking politicians, in this view, must regularly appeal to short-sighted voters and thus face a strong incentive to mortgage the future for near-term benefits and to leave long-term problems to their successors.”); see also JONATHAN BOSTON, CTR. FOR ENVTL. POLICY, SCH. OF PUB. AFFAIRS, AM. UNIV., GOVERNING FOR THE FUTURE: HOW TO BRING THE LONG-TERM INTO SHORT-TERM POLITICAL FOCUS 2 (2014), <http://www.american.edu/spa/cep/upload/jonathan-boston-lecture-american-university.pdf> [https://perma.cc/Y9QP-T8B6].

<sup>82</sup> See BOSTON, *supra* note 81, at 2.

<sup>83</sup> See *id.*

<sup>84</sup> See Angel Gurría, OECD Secretary-General, Remarks at OECD Forum 2008, Climate Change: A Matter of Political Will (June 3, 2008), <http://www.oecd.org/env/tools-evaluation/climate-changeamatterofpoliticalwill.htm> [https://perma.cc/9CQ6-72YR].

<sup>85</sup> See David A. Dana, *A Behavioral Economic Defense of the Precautionary Principle*, 97 NW. U. L. REV. 1315, 1320–21 (2003) (discussing this literature and arguing that it supports the institutionalization of a role for the precautionary principle in the climate change context).

<sup>86</sup> *Id.*

<sup>87</sup> For a comprehensive review, see the PEW CHARITABLE TR., A WIDENING GAP IN CITIES: SHORTFALLS IN FUNDING FOR PENSIONS AND RETIREE HEALTH CARE 1 (2013), [http://www.pewtrusts.org/~media/legacy/uploadedfiles/pes\\_assets/2013/pewcitypensionsreportpdf.pdf](http://www.pewtrusts.org/~media/legacy/uploadedfiles/pes_assets/2013/pewcitypensionsreportpdf.pdf) [https://perma.cc/C2YR-8SFU].

to be highly motivating.<sup>88</sup> Hence, the threat of liability may not motivate local leaders exactly where extra-political motivation to invest in adaptation is most needed: in localities where the threat of climate change effects is real but not so palpable that local politics already support adaptation investments.<sup>89</sup>

*B. Motivating the Wrong Kind of Adaptation: Liability as a Disincentive to Collaborative, "Light Footprint," Experimental Adaptation*

In determining how to adapt to climate change and its effects, localities have a range of choices. Presumably, the kind of adaptation we want to incentivize is not necessarily adaptation that can easily be defended *ex post* in takings litigation: that is, concrete, highly visible, well-understood measures designed to protect property, as opposed to the measures that actually might have been more effective but that are less visible, less easily understood by lay people, less well-established, and hence less litigation-proof.<sup>90</sup> In *ex post* litigation, collaborative adaptation efforts where a number of jurisdictions rely on one another for disaster responses also may be more susceptible to second-guessing than adaptation programs where each locality acts as independently as possible. Thus, *ex post*, each government can document that its efforts were fully directed at its own citizens and their properties, even though collaboration would have been the most (or only) efficient approach to disaster preparedness.

For example, imagine that a town is considering a range of measures to address flooding, including highly engineered, long used methods like sea walls, but also less well-established methods like dune replenishment and replanting of coastal scrub and coastal construction setbacks. From some perspectives, the reliance on sea walls might not be optimal, given that sea walls may simply displace water to other communities, ultimately may be counterproductive in terms of erosion, and can endanger wildlife.<sup>91</sup> But, *ex ante*, local leaders may well think that a sea wall is arguably a better adapta-

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<sup>88</sup> See *infra* notes 111–119 and accompanying text. As discussed below, one advantage of requiring or inducing localities to carry third-party climate change insurance is that premiums are a current, certain cost and local leaders will be motivated to reduce premiums even if they generally discount highly uncertain future costs. See *infra* notes 111–119 and accompanying text.

<sup>89</sup> BOSTON, *supra* note 81, at 1–2, 4.

<sup>90</sup> See *id.*

<sup>91</sup> See *What Causes Beach Erosion?*, SCI. AM. (Dec. 17, 2008), <http://www.scientificamerican.com/article/what-causes-beach-erosion/> [<https://perma.cc/5NH2-SY3P>] (quoting an expert opining: “Bulkheads and seawalls may accelerate beach erosion by reflecting wave energy off the facing wall, impacting adjacent property owners as well . . . .”); Tricia Woolfenden, *Sea Walls Designed to Save Beaches May Actually Speed Up Erosion*, WLRN (Feb. 19, 2013), <http://wlrn.org/post/sea-walls-designed-save-beaches-may-actually-speed-erosion> [<https://perma.cc/9XCC-UZHV>].

tion measure to point to if they ever were to face takings litigation than a less readily understood and perhaps less-tested approach of using dunes and vegetation.<sup>92</sup> In general, effective adaptation is ultimately going to require a degree of creativity and experimentation on the local level, but, *ex post*, creativity and experimentation may simply appear to be inadequate adaptation. Therefore, *ex ante*, local leaders may adhere to methods they think could most readily be defended in litigation if takings claims based on inadequate adaptation are regarded as a realistic possibility.<sup>93</sup>

*C. Motivating Distributive Inequities: Liability as a Disincentive to Adaptation That Protects Lower-Value Properties and Their Inhabitants*

The overall governmental response to climate change and its effects involves difficult distributive choices, assuming, as one must, some limits on the available resources to address those effects.<sup>94</sup> Government officials may need to make distributive choices within a given political jurisdiction as to which areas will receive the greatest protection from climate change effects and which areas will receive the least.<sup>95</sup> In New York City, for example, there may be questions as to what kinds of adaptive investments to protect against sea level rise to make in Manhattan as opposed to Brooklyn, or in some parts of Manhattan as opposed to others.<sup>96</sup> The state, county, and city governments in Florida, a state dramatically threatened by climate change, also may face distributive choices about where resources should be concentrated to protect against the tides.<sup>97</sup> Distributive choices and consequences are also obviously in play when governments act to divert flood

<sup>92</sup> See *What Causes Beach Erosion?*, *supra* note 91; Woolfenden, *supra* note 91.

<sup>93</sup> KELLY LEVIN ET AL., WORLD RES. INST., WORLD RESOURCES REPORT 2010–2011: DECISION MAKING IN A CHANGING CLIMATE 124 (2011), [http://www.wri.org/sites/default/files/pdf/world\\_resources\\_report\\_2010-2011.pdf](http://www.wri.org/sites/default/files/pdf/world_resources_report_2010-2011.pdf) [<https://perma.cc/3Z79-2YUE>] (discussing the limited resources available to governments to combat climate change).

<sup>94</sup> For a broad analysis of distributive fairness and climate change adaptation, see FAIRNESS IN ADAPTATION TO CLIMATE CHANGE (W. Neal Adger et al. eds., 2006).

<sup>95</sup> See *id.* at 240 (discussing distributive choices with regard to loss from climate change).

<sup>96</sup> *Id.*

<sup>97</sup> Even the question of how and what areas to save in Miami implicates difficult distributive questions. See, e.g., Elizabeth Kolbert, *The Siege of Miami*, NEW YORKER (Dec. 21 & 28, 2015), <http://www.newyorker.com/magazine/2015/12/21/the-siege-of-miami> [<https://perma.cc/ZJ5H-AN3T>]; Joe Romm, *Scientist: 'Miami, as We Know It Today, Is Doomed. It's Not a Question of If. It's a Question of When.'* CLIMATEPROGRESS (June 23, 2013, 12:40 PM), <http://thinkprogress.org/climate/2013/06/23/2199031/scientist-miami-as-we-know-it-today-is-doomed-its-not-a-question-of-if-its-a-question-of-when/> [<https://perma.cc/7KZ9-V2Y8>]; see also Justin Gillis, *Rising Sea Levels Seen as Threat to Coastal U.S.*, N.Y. TIMES (Mar. 13, 2012), <http://www.nytimes.com/2012/03/14/science/earth/study-rising-sea-levels-a-risk-to-coastal-states.html>.

waters or tides from one area to another; such diversions may occur within a single local jurisdiction, or, as suggested by the facts of *Big Oak Farms, Inc. v. United States*, across local jurisdictions.<sup>98</sup>

Assuming that the relevant government actors are motivated to minimize their liabilities, takings liability for inadequate or ineffective adaptation or for improper diversion adaptation could skew government actors to favor wealthy areas in preference to less wealthy ones.<sup>99</sup> Given the greater vulnerability of owners and residents of less wealthy areas, that may be exactly the opposite of enlightened social policy.<sup>100</sup> Consider a simple hypothetical example. A locality has a budget of \$1 million to invest in flood control protections. There is a wealthy part of the town and a poor part of the town, and the poor part actually faces greater flooding risk. But in the event of takings claims litigation for inadequate adaptation efforts, the potential liabilities for property losses in the wealthy area would be several orders of magnitude greater than the potential liabilities for property losses in the poorer areas. As a result, local leaders might invest relatively more in flood control in the wealthier areas and relatively less in the poorer areas than they would have in the absence of possible takings liability. Or consider a case like *Big Oak Farms, Inc.*, in which the Corps is confronted with the choice of saving expensive farmland or saving a relatively impoverished town from flooding.<sup>101</sup> The property claims by the farmers might exceed those by the residents of the small town, but the disruption to community life and wellbeing might be greater if the town were flooded. To avoid greater takings liability, one could imagine the Corps choosing to allow the town to be flooded even though, in the absence of such liability, it would have opted to divert the waters toward farmland.

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<sup>98</sup> See 105 Fed. Cl. 48, 51–52 (2012); Michael C. Blumm & Lucus Ritchie, *Lucas's Unlikely Legacy: The Rise of Background Principles as Categorical Takings Defenses*, 29 HARV. ENVTL. L. REV. 321, 362 (2005) (discussing *Avenal v. State*, 886 So. 2d 1085 (La. 2004), in which the Louisiana Supreme Court considered a takings claim following the state's diversion of water from the Mississippi River over marshes used for oyster cultivation, allegedly to prevent erosion).

<sup>99</sup> Larissa Pelham et al., *Natural Disasters: What Is the Role for Social Safety Nets* 8 (World Bank, SP Discussion Paper No. 1102, 2011), <http://siteresources.worldbank.org/SOCIALPROTECTION/Resources/SP-Discussion-papers/Safety-Nets-DP/1102.pdf> [<https://perma.cc/64JF-JPTK>] (stating that historically, wealthy areas are less prone to natural disasters than poorer areas).

<sup>100</sup> *Id.*

<sup>101</sup> See *Big Oak Farms, Inc.*, 105 Fed. Cl. at 51–52; see Pelham, *supra* note 99, at 8 (noting that poorer areas tend to be “more prone to natural disasters than wealthy areas”).

*D. Takings Liability as an Incentive for Residents and Investors to Engage  
in Non-Adaptive Building and to Oppose  
Local Adaptation Efforts*

Just like local leaders, investors and property owners in areas at risk from climate change may simply discount future risks so much that their behavior is unaffected by those risks.<sup>102</sup> But for many property owners, their property is a large part of their overall wealth, and standard economic analysis would assume risk aversion with respect to such a key asset. And for sophisticated investors and property owners with large portfolios, while we might assume they are not risk averse with respect to any give asset, we might think they would behave somewhat like the economically rational wealth-maximizer of classical economic theory and attend to how climate-related risks could affect their wealth. Thus, there is good reason to suppose that investors and property owners in areas known to face climate-change-related risks would sometimes, if not always, take those risks into account to some degree in their decision-making.

And yet we know that people and corporations continue to build in areas at risk from flooding and rising tides, and that when they are allowed to, they sometimes build or maintain their structures in a way that does not mitigate the risk of water and wind damage.<sup>103</sup> This behavior may not be as perplexing as it seems when we take two factors into account. First, national and state flood insurance programs provide full property coverage at premiums that do not come close to reflecting the real flooding risks; insurance is also afforded structures that, in their current form and location, arguably should not be insurable at all.<sup>104</sup> Second, even when property owners do not have flood insurance, they can sometimes receive reconstruction and repair funding through state and federal programs, including the Federal Emergency Management Agency (FEMA)'s post-disaster Individual Assistance program.<sup>105</sup> It is not a requirement for receiving Individual Assistance that the structure had been adequately insured through government or private insurance.<sup>106</sup> Thus, government policy acts to invite people and corporations

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<sup>102</sup> See Howard Kunreuther et al., *Overcoming Decision Bias to Reduce Losses from Natural Catastrophes*, in *THE BEHAVIORAL FOUNDATIONS OF PUBLIC POLICY* 398, 398–413 (Eldar Shafir ed., 2012) (stating that property owners in vulnerable areas may discount future risks, in part due to a belief that a large disaster will not occur, weighed against significant upfront costs).

<sup>103</sup> See *id.* at 400–01 (discussing biases in temporal planning).

<sup>104</sup> See *id.* at 399–400 (discussing how a family expecting to receive government relief after a loss has minimal incentive to invest in insurance).

<sup>105</sup> See *Assistance to Individuals and Households*, FED. EMERGENCY MGMT. AGENCY, <https://www.fema.gov/recovery-directorate/assistance-individuals-and-households> [<https://perma.cc/Z4VW-EDFD>] (discussing FEMA's treatment of individual assistance).

<sup>106</sup> *Id.*

to—rationally, from their perspective—overinvest in areas at risk from climate change and underinvest in adaptive building and rebuilding.

A change in takings doctrine to allow takings claims for inaction or inadequate or ineffective adaptation would only add to the moral hazard problem created by current government programs.<sup>107</sup> If investors knew that they could bring takings claims when their buildings were damaged from flood or fire based on government inaction or inadequate action, that would reduce their incentive to avoid or mitigate the risk in the first place.<sup>108</sup> The Takings Clause would provide a source of insurance—free insurance—on top of the insurance in the form of federally or state subsidized insurance and *ex post* disaster aid.<sup>109</sup> Because we might suppose that an understanding of the Takings Clause and an ability to litigate effectively generally will correlate with wealth and sophistication, we might anticipate that the possibility of bringing Takings Clause claims would in particular encourage larger, wealthier investors to take on more climate-related risk and invest less in mitigating that risk through adaptive building and rebuilding.

Moreover, the possibility of Takings Clause liability for inaction or inadequate action might encourage some investors and property owners to lobby local leaders against adopting climate change adaptation measures that would limit the property owners' and investors' building plans or otherwise cost them money in the form of higher fees or taxes. Consider, for example, a company that owns undeveloped coastal property and that would like to build a resort and hotel there. The locality, let us assume, is considering adopting a plan for coastal protections against flooding that would cost millions of dollars in new taxes. In the absence of possible Takings Clause liability for inadequate adaptation, the company might support the coastal protection plan and the tax increases, even though the tax increases would reduce its near term return on its investment. But if the company knows that it could sue the town in the event that the town did not invest in coastal protection and flooding damaged its property, the company might conclude that the profit-maximizing strategy would be to lobby against the coastal protection plan and tax increase, or at least not to push for its adoption. In sum, the possibility of takings claims for inaction or inadequate adaptation might alter local political economy to make inaction or inadequate adaptation, at least on the margin, more likely.

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<sup>107</sup> Serkin, *supra* note 7, at 387 (discussing the problem of moral hazard).

<sup>108</sup> *Id.* at 387–88 (discussing the potential for passive takings liability to reduce individual property owners' incentive to mitigate their exposure to climate-related risks).

<sup>109</sup> *Id.* at 387.

### III. OUR CURRENT INSURANCE REGIME, WHY IT IS COUNTERPRODUCTIVE, AND WHAT CAN BE DONE ABOUT IT

As explained above, using the threat of takings liability for the failure to adapt, or adapt adequately, to climate change would not produce the desired incentives.<sup>110</sup> But if the idea of Takings Clause liability for non-adaptation or ineffective adaptation to climate change by local governments is not sound social policy, the idea does bring into focus a real problem, namely, how can local officials be encouraged to engage in adaptation when their own judgment and local politics otherwise would not provide enough motivation?

One possible approach to encourage localities to invest in climate change adaptation would be to incentivize them to purchase private insurance against the effects of climate change—in the form of insurance for damages due to wind, flooding, and fire, notably—as regards property and infrastructure owned and operated by the locality and affiliated public entities, such as government buildings, bridges, roads, water collection distribution facilities, and electric power facilities.<sup>111</sup> There are several ways in which such insurance could incentivize climate change adaptation.<sup>112</sup>

First, private insurers would require insured localities to pay premiums, and they presumably would require higher premiums from localities and for facilities in localities that seemed to have the greatest exposure to climate-related flooding and other climate-related effects.<sup>113</sup> To garner a lower premium, localities might be willing to make improvements at facilities or take other measures that would reduce risk, such as building or modifying buildings to protect them against possible water damage, in much the same way that a car owner might install safety devices or alarms in his or her car to qualify for a lower premium.

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<sup>110</sup> See *supra* notes 68–109 and accompanying text.

<sup>111</sup> See MEGAN LINKIN, SWISS RE, CLIMATE CHANGE RISK IN NEW YORK CITY: THE VIEWPOINT OF THE INSURER 9, 11, 23 (2010), [http://sallan.org/EventPix\\_slideshow\\_Climate-Change-Adaptation/resources/M\\_Linkin-SallanFnd-Climate\\_Week\\_NYC-NYAS-Get\\_Past\\_The\\_Past.pdf](http://sallan.org/EventPix_slideshow_Climate-Change-Adaptation/resources/M_Linkin-SallanFnd-Climate_Week_NYC-NYAS-Get_Past_The_Past.pdf) [<https://perma.cc/9VV7-F79N>] (discussing the prospect of governments privately insuring public infrastructure against the dangers of climate change); Kevin McCarthy, *OLR Backgrounder: Implications of Climate Change for the Insurance Industry*, OFFICE OF LEGISLATIVE RESEARCH, CONN. GEN. ASSEMBLY (Dec. 20, 2011), <https://www.cga.ct.gov/2011/rpt/2011-R-0427.htm> [<https://perma.cc/V9C6-AXWB>].

<sup>112</sup> LINKIN, *supra* note 111, at 11 (discussing the ability of private insurers to enforce risk-based premium pricing).

<sup>113</sup> *Id.* at 11, 21 (explaining how risk-based premium pricing will incentivize governments to mitigate risk).

For their part, insurers might play a role in studying and effectively disseminating information regarding what measures would reduce risk.<sup>114</sup> It would be rational for insurers of municipalities to support efforts to identify and promote means of reducing climate-related risks, because the better and greater the adaptation, the lower the potential insurance proceeds outlays would be.<sup>115</sup>

Insurance, even when insurers do not offer advice as to how to lessen risk or offer premium reductions for risk mitigation, also may have a psychological effect by making certain risks more salient to municipal decision-makers. As a result, local officials may be more open to considering measures to address those risks. One might imagine that paying terrorism insurance premiums cannot but help focus one on the possible risk of terrorism—a risk that might not seem salient if one never had any direct contact with terrorism. Similarly, paying climate-change-related insurance for public infrastructure, in and of itself, may lead municipal officials to think about climate change risks that they simply would not think about otherwise, and/or to be less prone to dismiss such risks as too uncertain to warrant any attention.<sup>116</sup>

Moreover, even in contexts where it is infeasible for localities to reduce risk through adaptive improvements so that they cannot lower the premiums they must pay, the premiums might have the function of making the costs of government operation and hence (presumably) taxes relatively higher in those areas where risks from climate change would seem to be greatest, and relatively lower elsewhere.<sup>117</sup> Thus, insurance premiums will tend to make investment relatively more expensive where climate change risks are greater, and thus might have the climate-change-adaptive effect of discouraging development in those areas at greatest risk from flooding and other climate change effects.<sup>118</sup> Municipal insurance, in other words, would promote allocative efficiency in the era of climate change.<sup>119</sup>

This Part first details what we do and do not know about municipal insurance practices.<sup>120</sup> It then reviews the Federal Emergency Management

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<sup>114</sup> *Id.* (describing the private insurance industry's incentive to increase transparency of information and data to help the government mitigate risk).

<sup>115</sup> *See id.*

<sup>116</sup> McCarthy, *supra* note 111 (explaining that “the industry may also help insureds and governments adapt to climate change” through, among other things, incentives from risk-based premium pricing).

<sup>117</sup> LINKIN, *supra* note 111, at 27 (discussing the influence of risk-based premium pricing to discourage investment in risky areas).

<sup>118</sup> *See id.*

<sup>119</sup> *See id.*

<sup>120</sup> *See infra* notes 124–158 and accompanying text.



Agency (FEMA) Public Assistance program and argues that it effectively discourages the purchase of private insurance related to climate change effects and hence also discourages, at least to a degree, adaptation.<sup>121</sup> The Part then proposes two reforms: one admittedly politically unrealistic, which is a legal mandate that localities purchase flood and other relevant insurance in coastal areas and other areas broadly at some risk from climate-related effects; and one perhaps more politically realistic, that FEMA post-disaster public assistance to localities and/or federal flood insurance for individual owners be conditioned on localities' having privately and very adequately insured public buildings and infrastructure.<sup>122</sup> Finally, this Part considers some objections to the approach of greater reliance on private insurance to incentivize adaptation by local governments.<sup>123</sup>

### A. Municipal Insurance Practices and FEMA Policies

There is not a great deal known about the practices of municipalities in insuring against risks as a general matter. As Professor Serkin notes, municipal insurance is not well studied, perhaps because it sounds like a dry subject.<sup>124</sup> It is also likely the case that localities vary a great deal in their approach to insurance, so making generalizations is difficult.

What we do know is that municipalities do insure against at least some kinds of risks, especially tort liability risks.<sup>125</sup> Private insurance is available from traditional private insurance companies. In many states, localities have joined together to form insurance pools that operate, in effect, like third-party insurers with respect to their individual municipal members.<sup>126</sup> And some municipalities, especially larger ones, purport to self-insure against risks, either using explicit reserve funds or through less formalized arrangements.<sup>127</sup>

<sup>121</sup> See *infra* notes 124–158 and accompanying text.

<sup>122</sup> See *infra* notes 159–169 and accompanying text.

<sup>123</sup> See *infra* notes 170–189 and accompanying text.

<sup>124</sup> Serkin, *supra* note 80, at 465–66.

<sup>125</sup> Floyd B. Olson, *Municipal Tort Liability*, 13 WM. MITCHELL L. REV. 317, 317–19 (1987), <http://open.mitchellhamline.edu/cgi/viewcontent.cgi?article=2485&context=wmlr> [<https://perma.cc/SR7D-WXSH>].

<sup>126</sup> Rodd Zolkos, *Municipal Risk Pools Help Ease Financial Pressures*, BUS. INS. (June 5, 2011), <http://www.businessinsurance.com/article/20110605/ISSUE03/306059996/municipal-risk-pools-help-ease-financial-pressures> [<https://perma.cc/FC95-MQ9N>].

<sup>127</sup> See Serkin, *supra* note 80, at 466. For a factual overview of municipal insurance pooling, see ASS'N OF GOVERNMENTAL RISK POOLS, FACT SHEET: PUBLIC ENTITY RISK POOLS (2014), <http://www.nlc.org/Documents/NLC-RISC/PR%20Toolkit/Fact%20Sheet-3.docx> [<https://perma.cc/LGG6-LXXZ>]. Self-insurance has recently even been employed by localities to address workman compensation liabilities. See Hannah Bender, *Delaware Makes History with First State-Approved Municipal Insurance Trust for Worker's Compensation*, PROPERTY CASUALTY 360 (Oct. 16, 2014),

The risks most obviously posed by climate change—flooding risk and wind/hail damage risks in coastal areas—are not part of standard property insurance policies at all or are subject to high, percentage-based deductibles.<sup>128</sup> It seems likely that many municipalities do not purchase enough, or any, special insurance that would address flood and wind damage to public property and infrastructure. There is notably an absence of information available on the internet and web pages of major insurance companies regarding private flood insurance for public entities and governments. For its part, the National Flood Insurance Program (“NFIP”) has no special insurance program geared toward public infrastructure, and there is no evidence that localities do seek to purchase flood insurance as part of the NFIP commercial building insurance program.

The Emmett Center policy paper notes that “many municipalities self-insure” against the risks relevant to climate change, but it does not provide any data regarding how many municipalities self-insure against such risks, or how adequately they do so.<sup>129</sup> Most adaptation plans from major cities contain no discussion of insurance; one notable exception, Boston’s adaptation plan, does call for self-insuring against the possible effects of climate change by setting money aside for that purpose.<sup>130</sup> And it may be that other self-insuring cities are also setting aside money for climate-change-related risks. But even if this is true, it is unclear what self-insurance really means in particular cases, absent an explanation of how cities calculate the amounts that must be reserved for such self-insurance, how those amounts can be held secure and available for later use, or how the self-insurance is to be administered.<sup>131</sup> Self-insurance only works when there are safeguards

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<http://www.propertycasualty360.com/2014/10/16/delaware-makes-history-with-first-state-approved-m> [<https://perma.cc/MEE8-R5HA>]. For other discussions of self-insurance by municipalities, see Stephanie K. Jones, *10 Things to Know About Public Entities*, INS. J. (Apr. 21, 2014), <http://www.insurancejournal.com/magazines/features/2014/04/21/326378.htm> [<https://perma.cc/MVV8-LF9V>] and Mark R. McCrary, *Public Entity Insurance Isn’t Road Salt or Fill Dirt*, INS. J. (Feb. 6, 2012), <http://www.insurancejournal.com/magazines/features/2012/02/06/233732.htm> [<https://perma.cc/YWY4-WNQJ>].

<sup>128</sup> See *Hurricane and Windstorm Deductibles*, INS. INFO. INST. (June 2015), <http://www.iii.org/issue-update/hurricane-and-windstorm-deductibles> [<https://perma.cc/88GS-3QH2>] (providing an overview of hurricane and windstorm insurance deductibles).

<sup>129</sup> See LOU ET AL., *supra* note 10, at 5.

<sup>130</sup> CLIMATE PREPAREDNESS TASK FORCE, CITY OF BOS., CLIMATE READY BOSTON: MUNICIPAL VULNERABILITY TO CLIMATE CHANGE 20 (2013), [https://www.massport.com/media/266281/2013-October\\_Climate-Ready-Boston.pdf](https://www.massport.com/media/266281/2013-October_Climate-Ready-Boston.pdf) [<https://perma.cc/K9BH-N6ZV>] (explaining how the Office of Administration and Finance is responding to an increasingly higher amount of natural-hazard risks by gathering additional building data to ensure that the insurance modeling is accurate).

<sup>131</sup> Evan Goodenow, *High Costs Force Towns to Self-Insure*, N.Y. TIMES (Oct. 26, 2003), <http://www.nytimes.com/2003/10/26/nyregion/high-costs-force-towns-to-self-insure.html?pagewanted=all> (discussing the need for safeguards to prevent self-insurance funds from being raided).

from having the self-insurance fund tapped to meet more pressing, immediate needs, and of course many localities have pressing, immediate needs. Politicians—and not just local ones—may have a tendency to put the immediate need over the less immediate risk when push (and politics) comes to shove.<sup>132</sup> As one commentator explained:

Everyone always has good intentions from the get-go, but the question is, do you have the discipline? . . . . It's a minority of towns that it's actually an option for. You have to be big, you have to have an appetite for risk, you have to have good controls in place and you have to have the discipline.<sup>133</sup>

To the extent that localities do not currently insure adequately against climate-related risks, one reason may be that the federal government affirmatively creates a disincentive for them to do so.<sup>134</sup> FEMA's public assistance program discourages the purchase of adequate private insurance by providing federal funding to state and local governments for climate-related damages with few strings attached.<sup>135</sup> In effect, the federal government provides free insurance in the form of *ex post* federal aid, which cannot but reduce the *ex ante* incentive of localities to purchase insurance.<sup>136</sup>

Pursuant to the Stafford Act, FEMA provides supplemental assistance for state and local government recovery expenses connected to natural disasters and guarantees that the federal share will be at least seventy-five percent.<sup>137</sup> A state may request, and the President has often granted, a higher federal cost share when a disaster has had a significant impact on that state.<sup>138</sup> FEMA must reduce all project grants by the amount of actual private insurance proceeds received by the state or locality.<sup>139</sup> FEMA, however, does not require that a state or locality carry insurance against a particular risk and particular facility to qualify for disaster assistance.<sup>140</sup> Only if you have received “over \$5,000 in damages to any insurable facility” will “FEMA . . . require you to obtain and maintain insurance coverage on that

<sup>132</sup> *Id.*

<sup>133</sup> *Id.*

<sup>134</sup> See OFFICE OF INSPECTOR GEN., *supra* note 8, at 11.

<sup>135</sup> *Id.*

<sup>136</sup> See *id.*

<sup>137</sup> Robert T. Stafford Disaster Relief and Emergency Assistance Act, Pub. L. 93-288, 88 Stat. 143 (codified as amended at 42 U.S.C. §§ 5121–5208 (2012)); see *Public Assistance: Frequently Asked Questions*, FED. EMERGENCY MGMT. AGENCY [hereinafter *FEMA FAQ*], <http://www.fema.gov/public-assistance-frequently-asked-questions> [<https://perma.cc/YF5D-HR8K>].

<sup>138</sup> 42 U.S.C. § 5162; see *FEMA FAQ*, *supra* note 137.

<sup>139</sup> See *FEMA FAQ*, *supra* note 137.

<sup>140</sup> *Id.*

facility as a condition of receiving disaster assistance.”<sup>141</sup> But even then, the insurance required need only cover the hazard and the dollar amount of damage for which disaster assistance was received.<sup>142</sup> There is no general requirement that a locality carry comprehensive and adequate flood or wind insurance for all its insurable property and infrastructure.<sup>143</sup>

FEMA public assistance (“PA”) can be used to address a range of expenses incurred as a result of flooding and/or extreme weather.<sup>144</sup> PA provides funding to grantees for the repair and restoration of damaged public and eligible private nonprofit facilities, for emergency measures taken to protect lives and property, and in support of disaster-related debris removal.<sup>145</sup> When PA is authorized, such assistance may be provided for Debris Removal; Emergency Protective Measures; Repair of Roads and Bridges; Water Control Facilities; Public Buildings; Public Utilities; and Other Facilities.<sup>146</sup> The prerequisite for a locality obtaining PA (or individuals obtaining individual assistance (“IA”)) is that the locality falls within an area designated as a major disaster or emergency area.<sup>147</sup> A state governor must request a declaration that areas within his or her state are natural disaster or emergency areas, and, in theory, the declaration decision rests with the President’s discretion.<sup>148</sup> In practice, decisions about PA are channeled through

<sup>141</sup> *Id.*

<sup>142</sup> *See id.*

<sup>143</sup> *See id.* Moreover, although the wording of FEMA documents is somewhat ambiguous, it would seem that FEMA does not require localities to obtain insurance for items not normally and regularly insured for damage as part of standard commercial property policies—roads and bridges, for example. *See id.* (listing as insurable risks from FEMA’s perspective buildings, contents of buildings, vehicles, and equipment). Indeed, even as to conventionally insurable items, and even after aid for the repair of those items has once been received from FEMA, FEMA is statutorily limited in demanding full insurance coverage as a condition of future aid because the Stafford Act provides: “In making a determination with respect to availability, adequacy, and necessity under paragraph (1), the President shall not require greater types and extent of insurance than are certified to him as reasonable by the appropriate State insurance commissioner responsible for regulation of such insurance.” 42 U.S.C. § 5154. And states have an incentive to not certify that their localities can and reasonably should obtain more insurance than they currently do, because that would only increase local costs while in effect reducing the costs borne by federal taxpayers who live outside the state.

<sup>144</sup> *See FEMA FAQ, supra* note 137.

<sup>145</sup> *See id.*

<sup>146</sup> DEP’T OF HOMELAND SECURITY, FEDERAL EMERGENCY MANAGEMENT AGENCY NATIONAL FLOOD INSURANCE FUND: FISCAL YEAR 2013 CONGRESSIONAL JUSTIFICATION (n.d.), [https://www.fema.gov/pdf/about/budget/11h\\_fema\\_nfi\\_fund\\_dhs\\_fy13\\_cj.pdf](https://www.fema.gov/pdf/about/budget/11h_fema_nfi_fund_dhs_fy13_cj.pdf) [<https://perma.cc/A2BR-EW85>]. For a broad overview of FEMA Public Assistance, see JARED T. BROWN & DANIEL J. RICHARDSON, CONG. RESEARCH SERV., FEMA’S PUBLIC ASSISTANCE GRANT PROGRAM: BACKGROUND AND CONSIDERATIONS FOR CONGRESS 4–12 (2015), <https://www.fas.org/sgp/crs/homesecc/R43990.pdf> [<https://perma.cc/F66F-CVZZ>].

<sup>147</sup> *See FEMA FAQ, supra* note 137.

<sup>148</sup> *Id.*

FEMA and based on the level of state resources available to meet the damages caused by the natural disaster at issue.<sup>149</sup>

While there is variation in the number of declarations per year, the average number in recent years has been sixty, excluding pure emergency and fire emergency declarations (which also allow for the payment of PA and IA).<sup>150</sup> In 2011, there were ninety-nine declarations. Many of the declarations relate to the sort of natural disasters associated with climate change, notably flooding and severe storm damage.<sup>151</sup> For example, in 2014, forty-four of eighty-four declarations have involved flooding, and in part of 2015, forty of the seventy-seven declarations involved flooding, according to FEMA.<sup>152</sup>

It is not easy to calculate the exact amount expended yearly on PA to localities because FEMA often bundles individual and public assistance figures. But the numbers are clearly substantial.<sup>153</sup> According to my best estimate, FEMA provided over \$15.8 billion in 1996, \$19.4 billion in 2005, \$12.7 billion in 2012, and \$5.9 billion in 2013 in PA funds for eligible projects.<sup>154</sup> In addition, the federal government allocates additional funding for high-profile disasters, such as Hurricane Sandy, as well as some smaller incidents, and states also provide natural-disaster-related assistance to local-

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<sup>149</sup> 42 USC § 5170 (2012) (broadly defining a disaster qualifying for relief as one of “such severity and magnitude that effective response is beyond the capabilities of the State and the affected local governments”); BROWN & RICHARDSON, *supra* note 146, at 1; *FEMA FAQ*, *supra* note 137; *see also* FRANCIS X. MCCARTHY, CONG. RES. SERV., *FEMA’S DISASTER DECLARATION PROCESS: A PRIMER* 3 (2014), <https://www.fas.org/sgp/crs/homesecc/R43784.pdf> [<https://perma.cc/AT4T-QBKY>] (describing the process for a request for an emergency declaration and indicating that assistance depends on a finding that the severity and magnitude of the damage is beyond the capabilities of the state).

<sup>150</sup> ERWANN MICHEL-KERJAN, WHARTON RISK CTR., *RETHINKING GOVERNMENT DISASTER RELIEF IN THE U.S.: EVIDENCE AND A WAY FORWARD* 1, 3 (2015), [http://opim.wharton.upenn.edu/risk/conference/pprs/Michel-Kerjan\\_Rethinking-Disaster-Relief.pdf](http://opim.wharton.upenn.edu/risk/conference/pprs/Michel-Kerjan_Rethinking-Disaster-Relief.pdf) [<https://perma.cc/AMG4-KBBL>].

<sup>151</sup> *Id.*

<sup>152</sup> The relevant data is available from *Disaster Declarations*, FED. EMERGENCY MGMT. AGENCY, <https://www.fema.gov/disasters> [<https://perma.cc/7PQC-93TQ>].

<sup>153</sup> *Federal Emergency Management Agency Budget Submission for Fiscal Year 2015: Hearing Before the Committee on Appropriations, Subcommittee on Homeland Security* 2–3 (2014) (statement of Greg Fugate, Administrator, Fed. Emergency Mgmt. Agency), [http://www.fema.gov/media-library-data/1395864288969-5e9a4384875452d1ba0cd6871776b8be/3-26-14\\_The%20Federal%20Emergency%20Management%20Agency%20Budget%20Submission%20for%20Fiscal%20Year%202015.pdf](http://www.fema.gov/media-library-data/1395864288969-5e9a4384875452d1ba0cd6871776b8be/3-26-14_The%20Federal%20Emergency%20Management%20Agency%20Budget%20Submission%20for%20Fiscal%20Year%202015.pdf) [<https://perma.cc/3BKD-7YA9>] (indicating that in 2013, FEMA provided over \$5.9 billion in public assistance). Additional data was derived from compiling PA project funding per project per year as reported at *FEMA Public Assistance Funded Projects Summary—Open Government Initiative*, FED. EMERGENCY MGMT. AGENCY, <http://www.fema.gov/media-library/assets/documents/28344> [<https://perma.cc/F458-KPP4>].

<sup>154</sup> *See generally Public Assistance Funded Projects Summary—Open Government Initiative*, *supra* note 153 (providing relevant data).

ities.<sup>155</sup> For large disasters, PA may only account for a modest fraction of payments to localities.

There is no direct evidence that local leaders consciously forego wind, flood, or other insurance for public property and infrastructure in part because they know federal (and state) funding will be forthcoming in the event of major flooding or a severe storm. But given how well-entrenched our regime of federal funding for major disasters is, it is plausible that the availability of such *ex post* aid figures into their thinking, at least to the extent that they realistically focus on the threat of climate-related flooding and extreme weather.

The Heritage Foundation has come closest to a moral hazard critique of the Public Assistance Program, which it criticizes as part of the over-federalization of disaster preparedness and response in the United States.<sup>156</sup> The Heritage Foundation has called for decreasing the share for Public Assistance below seventy-five percent, and for reducing the discretion on the part of the federal government to exceed the default share of federal funding.<sup>157</sup> But Heritage has not addressed the role private insurance should or could play in addressing the incentives for localities created by PA.<sup>158</sup> As suggested below, increasing the state and local share of recovery funding would not be as effective as requiring more adequate insurance because, *ex ante*, a higher share requirement would not introduce pressure from a third party (private insurers) to engage in risk mitigation. Additionally, *ex post*, a state or locality could always claim that it thought it had reserved enough funding to meet its *ex post* share, but that it does not in fact have enough money. It would be very difficult, as a political matter, for the federal government to refuse to assume funding for what should have been the state's share.

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<sup>155</sup> See BRUCE R. LINDSAY & JUSTIN MURRAY, CONG. RESEARCH SERV., SUPPLEMENTAL APPROPRIATIONS FOR DISASTER ASSISTANCE: SUMMARY DATA AND ANALYSIS 1–2 (2014), <https://www.hsdl.org/?view&did=758597> [<https://perma.cc/8PWZ-5XKK>]; MCCARTHY, *supra* note 149, at 1.

<sup>156</sup> See David Inserra, *FEMA Reform Needed: Congress Must Act*, HERITAGE FOUND. (Feb. 4, 2015), <http://www.heritage.org/research/reports/2015/02/fema-reform-needed-congress-must-act> [<https://perma.cc/3V7E-X3GF>] (“[S]tates now request federal help whenever they can, since it will bring federal dollars. This creates a vicious cycle as states respond to increased federalization of disasters by preparing less and setting less funding aside for disasters. As a result, states are less prepared for disasters, they request more government help, and thus the cycle is perpetuated.”); see also Matt Mayer, *Federal Budget Makes Case That FEMA Reforms Are Needed*, HERITAGE FOUND., (Sept. 28, 2011), <http://www.heritage.org/research/reports/2011/09/federal-budget-makes-case-fema-reforms-needed> [<https://perma.cc/TW5T-7THN>].

<sup>157</sup> See Inserra, *supra* note 156.

<sup>158</sup> See *id.*

### B. Possible Reforms

Assuming that it would be productive in terms of climate adaptation for localities to carry private insurance, and that, without prompting, most will not, what are the possibilities for changing the status quo? For such insurance to work, localities with a range of risk exposures would need to insure; otherwise, insurance could never be profitable, as only those at risk would select insurance, and they would be the ones most apt to have large claims.<sup>159</sup> Moreover, because the effects of climate change ultimately will be broad, there are benefits in incentivizing adaptation even among those localities that are not at the most immediate, identifiable risk.<sup>160</sup> Thus the question, slightly refined, is: what are the possibilities for changing the status quo such that most or all coastal localities and localities in flood plains and otherwise vulnerable areas seek insurance?

One approach would be for Congress to outright mandate such insurance coverage, but that would be widely regarded as an unacceptable intrusion by the federal government into a traditional state regulatory domain (insurance) and would have no political traction.<sup>161</sup> For their part, states could require localities in floodplains and coastal areas and otherwise vulnerable locations to carry property insurance that protected their property and infrastructure from flooding and wind damage. A state-by-state approach, however, would require gaining political support for the reform in many separate jurisdictions. And, in many states, there is a strong tradition of deference to localities in the management of their affairs, and, increasingly, of reliance on the federal government to cover disaster-related expenses.<sup>162</sup> Overall, this approach would be at best slow and quite possibly altogether infeasible.

Another possibility would be to tie an insurance mandate to federal benefits. The most direct approach here would be to require that any locality that is eligible for FEMA PA to carry adequate flood and wind insurance for damage if the locality is in a coastal area, floodplain, or other vulnerable area. To the extent localities took this requirement seriously and did not be-

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<sup>159</sup> Heal & Kunreuther, *supra* note 13, at 235–45 (discussing the impact from large claims on private insurer profitability).

<sup>160</sup> See *Climate Change Impacts*, ENVTL. PROT. AGENCY, <http://www3.epa.gov/climatechange/impacts/> [<https://perma.cc/SHG9-Y2TY>] (detailing the broad effects of climate change).

<sup>161</sup> See *SEC v. Variable Annuity Life Ins. Co. of Am.*, 359 U.S. 65, 99 (1959) (holding that the insurance industry is the regulatory domain of the states).

<sup>162</sup> See, e.g., Tonya Adamski et al., *FEMA Reorganization and the Response to Hurricane Disaster Relief*, 2006 PERSP. IN PUB. AFF. 3, 3 (discussing the states' reliance on the federal government during natural disasters); Jeanne-Marie Col, *Managing Disasters: The Role of Local Government*, 67 PUB. ADMIN. REV. 114, 114 (2007) (discussing state deference to local authorities with regard to disaster relief).

lieve that they would receive aid even if they failed to obtain insurance and to the extent that the local leaders perceived any risk of needing PA funds after a natural disaster, this requirement could be a powerful incentive.<sup>163</sup> Even for local leaders who might not take concerted action to address climate-change-related effects, if left to their own devices, perhaps because they discounted future uncertain risks heavily, affirmatively making the choice to render their locality formally ineligible for PA might be a difficult choice to publically defend, and hence one they would not want to make.

From the perspective of the federal government, and Congress in particular, an insurance requirement tied to PA eligibility arguably would be appealing because it might constrain total federal outlays, thereby making more money available for other federal projects of interest to members of Congress.<sup>164</sup> There has, in fact, been concern and debate in Congress about FEMA spending.<sup>165</sup> And while there is a strong tradition of federal deference to state and local government control over local affairs,<sup>166</sup> there is also a strong tradition of federal conditions on federal aid.

Another possible approach to an insurance requirement would be to tie a locality having insured its property and infrastructure adequately to the availability of national flood insurance for individual private property owners in the locality. Under FEMA regulations, a locality's individual property owners qualify for national flood insurance if their locality adopts a floodplain management ordinance that meets FEMA's minimum standards.<sup>167</sup> As FEMA explains:

Joining the National Flood Insurance Program (NFIP) is an important step toward reducing a community's risk of flooding and making a speedier, more sustained recovery should flooding occur.

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<sup>163</sup> See Adamski et al., *supra* note 162, at 3 (discussing how the safety net of federal aid can affect a locality's incentive to obtain insurance).

<sup>164</sup> U.S. CONG. OFFICE OF TECH. ASSESSMENT, REDUCING EARTHQUAKE LOSSES 27 (1995), <http://ota.fas.org/reports/9536.pdf> [<https://perma.cc/9FUD-FM6A>] (describing the argument that increased investment in disaster mitigation would save the federal government money that would otherwise be used for disaster relief).

<sup>165</sup> Brian Koenig, *Hurricane Sandy Sparks Debate Over FEMA Budget Cuts*, NEW AM. (Oct. 31, 2012), <http://www.thenewamerican.com/usnews/politics/item/13454-hurricane-sandy-sparks-debate-over-fema-budget-cuts> [<https://perma.cc/FVR7-FZK7>].

<sup>166</sup> See U.S. HOUSE OF REPRESENTATIVES, COMM. ON GOV'T REFORM, CONGRESSIONAL PREEMPTION OF STATE LAWS AND REGULATIONS 11 (2006), [http://www.precaution.org/lib/06/federal\\_preemption.060606.pdf](http://www.precaution.org/lib/06/federal_preemption.060606.pdf) [<https://perma.cc/36AE-EGNM>] (discussing the federal government's traditional deference to state and local governments on environmental and land use decisions).

<sup>167</sup> *Floodplain Management Information for Communities*, FED. EMERGENCY MGMT. AGENCY, <https://www.fema.gov/floodplain-management-information-communities> [<https://perma.cc/TKU4-P7BE>].



It also allows property owners within a participating community to purchase NFIP flood insurance . . . . [M]ore than 22,000 communities have already agreed to adopt and enforce floodplain management ordinances that provide flood-loss reduction building standards for new and existing development.<sup>168</sup>

FEMA's requirements for a satisfactory ordinance are not particularly demanding, but they do provide a precedent for conditioning access to the NFIP for individual property owners on a locality obtaining fully adequate private insurance for its insurance and infrastructure.<sup>169</sup>

### C. Objections

#### 1. The Market Cannot and Will Not Fully Insure Localities at Risk

One potential objection to this proposal for greater private insurance of local government property and infrastructure against flood and similar risks is that private insurers will refuse to write such insurance and participate in that market. Notably, private insurers in recent years have been withdrawing from the private property flood insurance market in some parts of the country at greatest climatic risk, out of fear of huge claims liability.<sup>170</sup> If that is the case, why would we anticipate that private insurers would cover public property and infrastructure on a much larger scale than they currently do, and in particular, in those localities facing greatest risks of flooding and other climate-related effects?

In fact, there are reasonable reasons for hesitance on the part of private insurers, as commentators have explained in discussing the obstacles to expanding private flood insurance for private property.<sup>171</sup> For one thing, insur-

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<sup>168</sup> *Id.*

<sup>169</sup> Reforming the NFIP overall to make the program more realistic in pricing risk has proven extremely difficult for Congress, in part because of the pushback from property owners who would lose insurance or need to pay much more. But adding an insurance requirement for localities as part of the NFIP would be a much smaller reform and would not generally mobilize property owners in coastal areas and floodplains. It thus might well be a place to start from, although certainly it would only be a start. Until NFIP pricing and practices are reformed, it would be more useful to have localities insure through private insurers rather than through the NFIP.

<sup>170</sup> See, e.g., Paige St. John, *State Farm Leaving Flood Insurance Program*, HERALD-TRIB. (June 3, 2010), <http://www.heraldtribune.com/article/20100604/ARTICLE/6041050?p=2&tc=pg> [<https://perma.cc/BVF3-R9FD>] (explaining that State Farm decided not to write or administer its own federal flood insurance policies).

<sup>171</sup> See generally Erwann Michel-Kerjan et al., *Could Flood Insurance Be Privatised in the United States? A Primer*, 40 GENEVA PAPERS ON RISK & INS. 179 (2015) (arguing, separately, that the technology exists to model flood risk, that private flood insurance is available outside the United States, and that reinsurance has been used in other contexts within the United States to facilitate private insurance markets).

ers prefer to set rates based on a large data set from which they can accurately estimate future claims. In the context of extreme weather and flooding, accurate data is difficult to come by, in part because of inadequate data collection and assessment by government, but also because there is a limited but highly variable number of storm events per year and the effect of climate change in the near term is very hard to accurately factor into any model.<sup>172</sup> Moreover, insurers are traditionally conservative in the sense that they do not want to risk being unable to pay claims and face possible bankruptcy, and the nature of extreme weather and flooding is such that there is always a possibility of a year with extraordinarily large claims that would exhaust the insurer's financial capacity.<sup>173</sup> Moreover, insurers are heavily regulated by state authorities and may be justifiably concerned that state regulators will not allow them to charge the rates they believe are necessary, or to deny such insurance altogether once they have entered the market.<sup>174</sup>

These concerns notwithstanding, there is good reason to think that private insurers would expand their coverage to encompass a large number of localities' properties if there were market demand for such insurance—and, of course, there would be market demand if there were a legal mandate or strong legal incentives for localities to obtain such insurance. Modelling of flood and other risks has improved to the point that realistic premiums can now be estimated.<sup>175</sup> Insurance markets and products that were thought to be economically infeasible or impractical have in fact been developed once market demand materialized for one reason or another.<sup>176</sup> The insurance

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<sup>172</sup> See Mindy Lubber, *Extreme Weather Can't 'Surprise' Insurance Companies*, CLIMATE CENT. (Sept. 4, 2012), <http://www.climatecentral.org/blogs/wild-weather-a-new-normal-insurance-companies-must-act-14937> [<https://perma.cc/NR2B-WEAD>] (noting that insurers have repeatedly been surprised by patterns of extreme weather).

<sup>173</sup> See U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-14-127, FLOOD INSURANCE: STRATEGIES FOR INCREASING PRIVATE SECTOR INVOLVEMENT 17–24 (2014), <http://www.gao.gov/assets/670/660309.pdf> [<https://perma.cc/3GZW-C7S6>] (explaining why the GAO has emphasized the need to provide reinsurance protection for insurers in this context).

<sup>174</sup> LOU ET AL., *supra* note 10, at 17.

<sup>175</sup> See Michel-Kerjan et al., *supra* note 171, at 181.

<sup>176</sup> As Mark Cohen has observed: “[T]he insurance industry has a history of adapting to new liability caps and attracting the necessary capital to provide a market where demand exists.” Mark A. Cohen et al., *Deepwater Drilling: Law, Policy, and Economics of Firm Organization and Safety*, 64 VAND. L. REV. 1853, 1901 (2011). Despite the predictions made in the face of mandatory insurance proposals, insurance markets have consistently produced adequate insurance capacity once a mandate was enacted. For example, after the Exxon Valdez oil spill, Congress enacted a mandatory insurance or financial assurance requirement as part of the Oil Pollution Act of 1990, which requires companies engaged in offshore oil exploration to provide evidence of financial responsibility equivalent to their liability for a discharge of 1000 barrels of oil. See Oil Pollution Act of 1990, 33 U.S.C. §§ 2701–2761 (2012). There was talk then of the insurance market being unable to produce the coverage needed to meet this mandate. But that has not been the case. Rather, the insurance industry worldwide has produced \$1.5 billion in capacity to cover offshore

industry has a long history of creativity and innovation when there is a market opportunity.<sup>177</sup>

Having said that, private insurance for localities might be facilitated by a government promise to insure the localities that have too high risk a profile or lack the financial ability to cover insurance premiums, although such coverage should come with strict qualification requirements and safeguards so that the moral-hazard-reducing benefits of an insurance requirement are not subverted. The federal government could also ease insurer concerns by a government guarantee of reinsurance to backstop private insurers against unusually great claims liability in a given year, or by trying to locate private investors willing to assume the reinsurance risk. In general, the federal government could support and facilitate expansion of private insurance for localities in the same ways that the Government Accountability Office (“GAO”) and others have suggested the federal government could, in theory, support expansion of private insurance for private property owners.<sup>178</sup>

## 2. Insurers Will Not Promote Adaptation

Another concern is that even if private insurers do insure localities against flood and wind risks and the like, the insurers will not encourage risk mitigation by insureds and financially encourage insureds to engage in greater risk mitigation. And, in fact, we do not have much direct evidence that insurers will encourage risk mitigation in the flood and storm context. Several of the examples of mitigation programs associated with insurance in the United States have originated with state governments and not private

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drilling. BOOZ, ALLEN & HAMILTON, *THE OFFSHORE OIL AND GAS INDUSTRY REPORT IN INSURANCE—PART ONE 5* (2010) [<https://perma.cc/WV27-AXNS>] (original hyperlink no longer active).

<sup>177</sup> See Cohen et al., *supra* note 176, at 1901.

<sup>178</sup> The GAO identified the following as means to facilitate private insurance for flooding:

The federal government could also encourage private sector involvement by providing coverage for the highest-risk properties that the private sector is unwilling to insure. Providing residual coverage could increase the program’s exposure relative to the number of properties it insured, but NFIP would be insuring fewer properties, and charging adequate rates could reduce taxpayer costs . . . [O]ther strategies include[e] NFIP purchasing reinsurance from the private sector rather than borrowing from the U.S. Treasury, and NFIP issuing catastrophe bonds to transfer risk to private investors.

U.S. GOV’T ACCOUNTABILITY OFFICE, *supra* note 173, at 17–24; see also Kimberly Tallon, *Flood Insurance Presents Opportunity, Obstacles for Private Insurers*, MYNEWMARKETS.COM (Apr. 29, 2014), <http://www.mynewmarkets.com/articles/182169/flood-insurance-presents-opportunity-obstacles-for-private-insurers> [<https://perma.cc/NHR9-C36T>].

insurers.<sup>179</sup> There is mixed evidence as to whether private flood insurers in Germany encourage risk mitigation, and the relevance of the German experience to the United States is debatable.<sup>180</sup>

Outside the context of private flood and similar insurance for which we have limited or no relevant evidence, however, there is ample evidence of insurers encouraging risk mitigation by insureds.<sup>181</sup> As Omri Ben-Shahar and Kyle Logue argue, insurance is a market-based means of *ex ante* regulation of risk that is largely taken for granted in such fields as automobile safety, workplace safety, and household safety.<sup>182</sup> As they explain, “workplace safety is regulated at least as much by workers’ compensation liability insurers as it is by Occupational Safety and Health Administration (“OSHA”) regulators; and household safety is regulated as much, if not more, by homeowners’ insurance than it is by municipal regulators.”<sup>183</sup> As Haitao Yin, Howard Kunreuther, and Matthew White document, there was a dramatic decline in leaks from underground fuel tanks in certain states when those states required gas stations to carry private clean-up and liability insurance.<sup>168</sup> They explain that “the price structure for market-based insurance gives tank owners economic incentives to invest in equipment that reduces the chance of accidental fuel tank leaks.”<sup>184</sup> Environmental liability insurers outside oil and gas offer discounts for firms that implement environmental management systems that help detect and address possible risks and that

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<sup>179</sup> Massachusetts’ backstop property insurer implemented a program that reduced or removed windstorm or hail deductibles for policyholders, while concurrently providing premium relief and taking steps to limit wind damage in the event of storms. See LOU ET AL., *supra* note 10, at 10 (describing the Massachusetts program). Florida has required insurers to provide reductions in hurricane wind premiums if policyholders carry out specified “hurricane loss mitigation” actions. See *id.* (describing the Florida program).

<sup>180</sup> See Annegret Thieken et al., *Insurability and Mitigation of Food Losses in Private Households in Germany*, 26 RISK ANALYSIS 383, 392 (2006) (finding that only a minority of private German insurers reported encouraging flood mitigation measures).

<sup>181</sup> *Insurance Industry a Stronghold Against Climate Change*, INS. & RISK (Sept. 3, 2014), <http://www.insuranceandrisk.com.au/insurance-industry-a-stronghold-against-climate-change/> [<https://perma.cc/46WS-LUTD>].

<sup>182</sup> Omri Ben-Shahar & Kyle D. Logue, *Outsourcing Regulation: How Insurance Reduces Moral Hazard*, 111 MICH. L. REV. 197, 199, 202, 211 (2012); see also David A. Dana & Hannah J. Wiseman, *A Market Approach to Regulating the Energy Revolution: Assurance Bonds, Insurance, and the Certain and Uncertain Risks of Hydraulic Fracturing*, 99 IOWA L. REV. 1523, 1564–68 (2014); Kyle Logue, *Encouraging Insurers to Regulate: The Role (If Any) for Tort Law*, U.C. IRVINE L. REV. (forthcoming 2016), <http://ssrn.com/abstract=2547358> [<https://perma.cc/4JU2-JBHW>].

<sup>183</sup> Ben-Shahar & Logue, *supra* note 182, at 199, 202, 211.

<sup>184</sup> See Haitao Yin et al., *Does Private Insurance Reduce Environmental Accidents?*, 2012 REG. 36, 37, [http://opim.wharton.upenn.edu/risk/library/J2012Summer\\_Regulation\\_HY-HK-MW\\_EnvironmentalInsurance.pdf](http://opim.wharton.upenn.edu/risk/library/J2012Summer_Regulation_HY-HK-MW_EnvironmentalInsurance.pdf) [<https://perma.cc/K3RV-B47X>].

also cumulatively generate firm knowledge as to actual conditions on the ground and possible means of operational improvement.<sup>185</sup>

If it is true that insurers generally do promote risk mitigation for their own financial interests, the question becomes: is there any reason they should act differently in the context of flood and similar insurance for localities' properties? One explanation that has been set forth in the context of private flood insurance of private properties relates to the length of the term of the insurance contract and whether the insurance contract attaches to the owner/payer or to the property itself.<sup>186</sup> Insurance contracts and rates are typically set on an annual basis, and possibly they must be under current state insurance regulation.<sup>187</sup> Moreover, the available data suggest that insureds in many cases only maintain a flood insurance policy for a single year.<sup>188</sup> For an insurer, however, there is very little to be gained by investing in promoting mitigation for flooding and similar risks with regard to a property if that policy only lasts one year, as the risk of flooding in any given single year is quite small. If a contract were extended to a 5- to 10-year term, the incentive for investing in a risk mitigation program presumably would increase substantially. For their part, insureds also may lack an adequate incentive to invest in risk mitigation if they think that their policy may be changed, or their rate structure reset, after only a single year. With a long-term policy, any premium abatement or other incentive would be guaranteed over the period of the long-term policy and would thus be much more meaningful for the insured. In sum, with the move to longer-term policies, there is a very reasonable conceptual basis for thinking that insureds will promote risk mitigation by localities.

Moreover, because any effort to increase reliance on private insurance would be achieved through statutory and regulatory initiatives and programmatic changes, rather than a change in constitutional doctrine such as takings doctrine, it should be possible for government to experiment and observe whether private insurers helpfully promote risk mitigation and, if

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<sup>185</sup> See Benjamin J. Richardson, *Mandating Environmental Liability Insurance*, 12 DUKE ENVTL. L. & POL'Y F. 293, 315–16 (2002).

<sup>186</sup> See Howard Kunreuther & Erwann Michel-Kerjan, *The Need for Long-Term Flood Insurance and Mitigation Loans*, NAT. HAZARDS OBSERVER, Mar. 2009, at 1, 8–10, [http://opim.wharton.upenn.edu/risk/library/oped\\_NHO2009-03.pdf](http://opim.wharton.upenn.edu/risk/library/oped_NHO2009-03.pdf) [<https://perma.cc/VMX6-K6KX>]. With respect to the transferability of property, that is a problem for private property insurance and insureds' incentives to be sure, but not one for public property and infrastructure. Local governments do not in the usual course transfer or sell their property or infrastructure.

<sup>187</sup> See LOU ET AL., *supra* note 10, at 13, 18–19.

<sup>188</sup> See Howard Kunreuther, *The Role of Insurance in Reducing Losses from Extreme Events: The Need for Public-Private Partnerships*, 40 GENEVA PAPERS ON RISK & INS. 741, 744–45 (2015) (noting that out “of the 841,000 new policies bought in 2001, only 73 percent were still in force one year later . . . [and a]fter two years, only 49 percent were in force”).

they do not, adjust regulatory requirements accordingly.<sup>189</sup> Undoing changes to constitutional doctrine are, by contrast, not readily or quickly achieved, which is another reason why takings doctrine should not be employed as the vehicle to incentivize greater government adaptation efforts.

## CONCLUSION

Climate change adaptation is essential for the United States, as climate change and its effects are, to an extent, inevitable. The sea will rise and extreme weather will become more commonplace even if the nations of the world, collectively, are able to reduce their current annual emissions of greenhouse gasses. Local governments and local officials will need to play a key role in climate change adaptation, and hence it is important that they are properly incentivized to do so. But reconfiguring traditional Takings Clause doctrine to allow takings claims for inaction, inadequate/ineffective adaptation, improper diversion of floodwaters, and the like would not create the right incentives for local officials or investor/property owners, and indeed could be highly counterproductive. By contrast, FEMA reform to promote greater reliance on private insurance offers the promise of encouraging adaptation without creating counterproductive incentives or destabilizing established constitutional law doctrine.

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<sup>189</sup> One question that might be raised regarding this proposal relates to the extent that it would enrich private insurers at the expense of localities. Insurers will require that they not only are protected from great losses but also on average make a profit that compares favorably with alternative investments. One possible solution would be to allow localities to meet a private insurance requirement by using municipal insurance pools that are required to, and in the ordinary course would have an incentive to, administer the pool much like purely private insurers; that is, in such a way as to minimize claims liability. As compared to the case of pure self-insurance by individual localities, insurance pool assets cannot readily be raided to meet current needs because all pool members have an incentive to ensure that all of the other members make their agreed contributions and do not withdraw money from the pool. It may be, however, more difficult for an insurance pool to refuse coverage to a pool member who does not engage in adequate risk mitigation, and essentially remove that member from the pool, than it would be for a private insurer simply to refuse coverage or the renewal of coverage. From an incentives perspective, private insurance may be the most appealing, but insurance pools may strike the best balance of affordability for localities and creating incentives for risk mitigation.

