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## Smart Growth in Dumb Places: Sustainability, Disaster, and the Future of the American City

*Lisa Grow Sun*\*

### I. INTRODUCTION

On March 11, 2011, a magnitude 9.0 earthquake rocked Japan and triggered a massive tsunami that devastated the country's northern coast.<sup>1</sup> While the cautionary tales of this heart-breaking disaster will be written over many years or even decades, some critical lessons can already be discerned. Japan's experience confirms, for example, that strict, well-enforced building codes are crucial tools for mitigating disaster risk.<sup>2</sup> There is little doubt that an earthquake of this magnitude would have killed many more people had it occurred in almost any other densely populated urban area. Japan's famously strict building codes saved many, many lives—likely reducing the death toll by tens of thousands.<sup>3</sup>

The relative success of Japan's building codes, however, should not obscure an equally important lesson: we cannot “build away” all disaster risk. No matter how stringent, no matter how well enforced, no matter how costly, building codes cannot eliminate disaster risk.<sup>4</sup>

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1. See Norimitsu Onishi, *Reeling From Crises, Japan Approaches Familiar Crossroads*, N.Y. TIMES, Mar. 20, 2011, at A1, available at [http://www.nytimes.com/2011/03/20/world/asia/20future.html?\\_r=1&](http://www.nytimes.com/2011/03/20/world/asia/20future.html?_r=1&).

2. James Glanz & Norimitsu Onishi, *Japan's Strict Building Codes Saved Lives*, N.Y. TIMES, Mar. 12, 2011, at A1, available at <http://www.nytimes.com/2011/03/12/world/asia/12codes.html?>.

3. See Marlowe Hood, *Tokyo at Risk: Can Megacities Cope with Disaster?*, AFP.COM (Mar. 20, 2011), <http://tinyurl.com/85qxbyd> (quoting the assessment of Helena Molin Valdes, deputy head of the U.N. International Strategy for Disaster Reduction, that if the March 11, 2011 Japanese earthquake “had happened in a megacity with less preparedness capacity, the toll would have been in the millions, at least the hundreds of thousands”).

4. Perhaps different building standards could also have provided fuller protection against the ravages of the tsunami. Some experts suggest that more tsunami-resistant buildings can be designed. See Renata D'Alieso, *Engineers' Goal is Tsunami-Resistant Buildings*, THE

Even when life can be preserved, the cost of property and other economic damages can be staggering. Moreover, structural solutions to disaster risk—such as strengthening building codes or building seawalls and levees—can sometimes deceive communities into increasing their exposure to hazards by lending a false sense of security through the air of invincibility that surrounds much modern engineering and construction.<sup>5</sup> These measures can mask a basic truth: a community's location is likely to be the single most important factor in determining a community's vulnerability to natural disasters.<sup>6</sup> Poorly designed cities in relatively "safe" locations may well fare better than the most carefully designed cities in particularly hazard-prone regions.<sup>7</sup>

The fact that location is such a crucial determinant of disaster vulnerability might suggest, at first glance, that we have the capacity to mitigate disaster risk only at the margins, because settlement patterns were established, and major cities sited, long ago.<sup>8</sup> However, the deterioration of existing infrastructure, together with the infrastructure demands of a growing population, suggest that the largest potential gains in disaster mitigation can yet be achieved by making wise decisions about the location of new infrastructure.<sup>9</sup> In the United States, a large percentage—likely well more than half—of

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GLOBE & MAIL (Toronto) (Mar. 14, 2011), <http://www.theglobeandmail.com/news/world/asia-pacific/engineers-goal-is-tsunami-resistant-buildings/article1940635/>. Even if they are correct, however, significant residual risk is likely to remain. *Id.*

5. Structural flood protection measures "include dams, levees, floodwalls, channelization, and other engineered techniques." ASS'N OF STATE FLOOD PLAIN MANAGERS, FLOODPLAIN MGMT. 2050, REPORT OF THE SECOND ASSEMBLY OF THE GILBERT F. WHITE NAT'L FLOOD POL'Y FORUM 19 (2007) [hereinafter FLOODPLAIN MGMT]. Levees have a well-documented *Field of Dreams* effect—"if you build them, they will come"; that is, levees spawn additional building in their shadow. See John Ritter, *Several Cities are Dependent on Vulnerable Levees*, USA TODAY, Sept. 12, 2005, at A6, available at [http://www.usatoday.com/news/nation/2005-09-11-vulnerable-levees\\_x.htm](http://www.usatoday.com/news/nation/2005-09-11-vulnerable-levees_x.htm) (describing how aging agricultural levees have come to protect large populations).

6. See U.N., 2009 GLOBAL ASSESSMENT REPORT ON DISASTER RISK REDUCTION: RISK AND POVERTY IN A CHANGING CLIMATE 19 (2009) (concluding that disaster risk is "geographically highly concentrated").

7. Cf. DENNIS S. MILETI, DISASTERS BY DESIGN: A REASSESSMENT OF NATURAL HAZARDS IN THE UNITED STATES 155–56 (1996) ("No single approach to bringing sustainable hazards mitigation into existence shows more promise at this time than increased use of sound and equitable land-use management.").

8. See Ritter, *supra* note 5.

9. *Id.*

the infrastructure that we will need in 2050 to accommodate our growing population does not exist today.<sup>10</sup>

Thus, the most far-reaching and important question for disaster mitigation today is where we will channel the growth that will be needed to accommodate our expanding population. Increasingly, environmentalists are promoting sustainability agendas—such as Smart Growth—that have a ready-made answer to this question: channel growth into existing cities.<sup>11</sup> This preference for increasing the density of existing urban centers is understandable, as the costs of sprawl are substantial.<sup>12</sup> However, this prescription and the various legal tools being used to implement it throughout the country often fail to grapple both with the serious disaster exposure facing many of our great American cities and with the concomitant potential that channeling future growth back into these cities may significantly exacerbate the disaster risk faced by future generations. While Smart Growth has great potential for making our communities more livable, more cost effective, and more environmentally sound, “Smart Growth in dumb places”—those that are particularly disaster prone—is the antithesis of true sustainability. This Article explores this critical tension between disaster mitigation and current sustainability policies.<sup>13</sup>

Although environmental protection and disaster mitigation are often fellow travelers, these sustainability initiatives may put significant environmental policies on a collision course with the goal

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10. See, e.g., Arthur C. Nelson & Robert E. Lang, *The Next 100 Million*, PLAN., Jan. 2007, at 4 (arguing that the United States may reach 400 million by 2037, which will require the nation “to add about 40 million new housing units to its current inventory of 125 million and replace another 30 million homes that are likely to be damaged or torn down in the next three decades”).

11. See *infra* notes 29–41 and accompanying text; *supra* notes 5–6 and accompanying text.

12. See sources cited *infra* note 24.

13. Studies in other disciplines have documented that Smart Growth is occurring in some hazardous locations. See, e.g., Yan Song et al., *Smart Development in Dangerous Locations: A Reality Check of Existing New Urban Developments*, 27 INT’L J. OF MASS EMERGENCIES & DISASTERS 1, 1 (2009) (finding “that New Urbanist developments are vulnerable to floods throughout the U.S. and a substantial number (36%) of New Urbanist developments are exposed to flood[] . . . hazards”). They have also found that Smart Growth developments are “significantly” more likely than traditional developments to rely on structural solutions (such as stream channel modification) to mitigate flood risk. See *id.* at 17. While these studies have made important contributions to our understanding of the relationship between Smart Growth and hazards, they have not focused on the ways in which Smart Growth’s emphasis on urban renewal is actually driving this risky development.

of mitigating natural disaster risk. This result is particularly ironic given that much of the recent support for these initiatives has been motivated and framed by concerns about climate change.<sup>14</sup> Yet, our current sustainability policies may inadvertently be driving patterns of growth that will amplify, rather than mitigate, disaster risk, particularly in the face of the more frequent and ferocious hazard events climate change may spawn. This reality means that some of our current sustainability policies promoting urban living as a key method for decreasing greenhouse gas emissions may, in fact, be hindering efforts to adapt to the effects of climate change. This collision between climate change mitigation efforts and adaptation efforts is particularly problematic given the near consensus among scientists that some climate change is inevitable—and, indeed, is already under way—and that adaptation efforts will have to play a critical role in minimizing the effects of climate change on human populations.<sup>15</sup>

Moreover, redevelopment efforts designed to direct growth back into hazardous urban areas—particularly those along coasts or inland waterways—that have fallen into disuse run counter to the widespread recognition among disaster scholars and practitioners that retreating from hazardous areas is perhaps the most cost-effective, long-term disaster mitigation strategy.<sup>16</sup> Many European nations, such as the Netherlands, that have long battled the seas and rivers and have relied largely on structural solutions (such as dikes) to mitigate disaster risk are now recognizing the need to “make room

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14. See, e.g., Tania Katzschner & Gregg Oelofse, *Climate Change: A Tipping Point For a Move Towards Sustainable Development?*, in GREEN CITYNOMICS: THE URBAN WAR AGAINST CLIMATE CHANGE 16, 17 (Kenny Tang ed., 2009) (arguing that “climate change may represent a leverage point to move towards sustainability”).

15. See BRIAN FISHER ET AL., CLIMATE CHANGE 2007: MITIGATION OF CLIMATE CHANGE 225 (2008).

16. See, e.g., FLOODPLAIN MGMT., *supra* note 5, at 24 (“We need to begin a pattern of gradual and voluntary relocation or strategic retreat from the highest-risk and most ecologically sensitive areas, with climate change and long-term sustainability both in mind.”); ANNA PUSZKIN-CHEVLIN ET AL., LIVING ON THE EDGE: COASTAL STORM VULNERABILITY OF THE TREASURE COAST BARRIER ISLANDS 83 (2007), available at docs.cdsi.fau.edu/cues/LivingontheEdgeFinalacp-printversion.pdf (concluding that “strategic retreat” is “the most sustainable coastal hazard mitigation approach in the long term,” and thus that “[t]he sooner public policy can move away from hazard mitigation aimed at loss reduction through hardening and insurance risk-sharing to creating a resiliency through appropriate development that prevents loss damage, the faster our communities will reach a more optimal balance between cost-positive asset exposure and total storm damage costs”).

for the rivers” and to return some floodplain areas to their natural use.<sup>17</sup>

Unfortunately, retreat from hazardous areas is notoriously difficult to implement given pre-existing property rights, the costs associated with voluntary buy-outs, the likely disruption of existing community ties that relocation entails, and local political opposition to relocation efforts.<sup>18</sup> Even in the aftermath of devastating disasters, retreat from hazardous areas rarely occurs.<sup>19</sup>

Nonetheless, some “underutilized” urban areas near coasts, other waterfronts, or other natural hazards may present real opportunities for strategic retreat. Once redevelopment occurs, however, huge public investments in redeveloped areas (financed by borrowing against anticipated future tax revenues from the redevelopment),<sup>20</sup> increased property prices, and reinvigorated communities will intensify calls for structural protections and make retreat far more difficult, even if sea level rise or other conditions ultimately make retreat the most viable option.

Part II of this Article examines how current environmental initiatives, particularly sustainability initiatives such as Smart Growth, promote increasing population density and redevelopment of existing cities. Part III considers the ways in which channeling growth into some existing cities may exacerbate disaster risk. Part IV examines some of the legal tools used to channel growth into existing urban areas and concludes that these tools often fail to take adequate account of disaster risk. Finally, Part V considers possible first steps for making these sustainability initiatives more consonant with disaster mitigation.

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17. See FLOODPLAIN MGMT., *supra* note 5, at 24.

18. See, e.g., CHRISTOPHER TURBOTT & ANDREW STEWART, MANAGED RETREAT FROM COASTAL HAZARDS: OPTIONS FOR IMPLEMENTATION 2–3 (2006) (recounting some of the obstacles facing attempts at managed or strategic retreat from hazardous coastal areas).

19. See *id.* at 16–18.

20. One of the most popular methods for financing redevelopment efforts is tax increment financing. See George Lefcoe, *Competing for the Next Hundred Million Americans: The Uses and Abuses of Tax Increment Financing*, 43 URB. LAW. 427, 436–37 (2011) (explaining that many redevelopment projects are funded through tax increment financing and that every state but Arizona authorizes such financing). Tax increment financing is built on the premise that redevelopment will increase the city’s future property tax revenues. See *id.* at 437. To finance current public works needed to support the redevelopment, “[e]ither the public agency rebates the developer a share of TIF revenues as they are collected, and the developer borrows against this future cash flow, or the public agency floats bonds secured by the anticipated tax increment.” *Id.*

## II. ENVIRONMENTALISM AND URBANISM: AN EVOLUTION

Environmentalism and urbanism have a long and checkered history. For decades, if not centuries, cities have been the bane of environmentalists.<sup>21</sup> Cities epitomized all the evils of growth: the profligate consumption of natural resources, the obliteration of natural topography and land features, the destruction of green space, the pollution of air and watersheds, and the overwhelming of the natural carrying capacity of the environment.<sup>22</sup> To the environmental mind, cities were dirty, polluted, and oppressive consumers of Mother Earth.<sup>23</sup>

Today, in contrast, many mainstream environmentalists and environmental law scholars are engaged in a full-blown love affair with cities.<sup>24</sup> Suburban sprawl, rather than urbanization, has become public enemy number one.<sup>25</sup> Sustainability initiatives such as New Urbanism and Smart Growth extol the virtues of urban life and seek to replicate urban neighborhoods—with their mixed-use zoning and pedestrian-friendly streets—in areas outside the historic urban core.<sup>26</sup>

Beyond patterning suburban neighborhoods on their denser urban cousins, most conceptions of sustainability, including those adopted and popularized by various federal agencies and state and

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21. DAVID OWEN, GREEN METROPOLIS: WHY LIVING SMALLER, LIVING CLOSER, AND DRIVING LESS ARE THE KEYS TO SUSTAINABILITY 18 (2009) (“The hostility of many environmentalists toward densely populated cities is a manifestation of a much broader phenomenon, a deep antipathy toward urban life which has been close to the heart of American environmentalism since the beginning.”).

22. *See id.*

23. *See id.*

24. *See, e.g.*, Robert Cervero, *Growing Smart by Linking Transportation and Urban Development*, 19 VA. ENVTL. L.J. 357, 358 (2000) (“Sprawl stands as a serious threat to a sustainable future.”); Jeffrey R. Kenworthy, *The Eco-city: Ten Key Transport and Planning Dimensions for a Sustainable City Development*, 18 ENV’T & URB. 67, 70 (2006) (“Higher densities can bring greater protection of the natural environment and food-growing areas in and around cities.”); Peter Newman, *The Environmental Impact of Cities*, 18 ENV’T & URB. 275, 285 (2006) (“In terms of global sustainability, it is clear that [cities] should be stopping [their] sprawl and building up [their] density.”); *see also Stop Sprawl: Sprawl Overview*, SIERRA CLUB, <http://www.sierraclub.org/sprawl/overview/> (last visited Nov. 27, 2011) (advocating “smart-growth solutions” to the many harms of urban sprawl).

25. *See sources cited supra* note 24.

26. *See New Suburb?: Sprawl vs. “Smart Growth”*, NATIONALGEOGRAPHIC.COM, <http://www.nationalgeographic.com/features/00/earthpulse/sprawl/gallery1.html> (last visited Nov. 26, 2011) (contrasting New Urban development with traditional sprawl development); *What is Smart Growth?*, SMARTGROWTHAMERICA.ORG, <http://www.smartgrowthamerica.org/what-is-smart-growth> (last visited Nov. 27, 2011) (advocating Smart Growth mixed-use communities for urban, suburban, and rural areas).

local policymakers, incorporate a strong, explicit preference for channeling future growth into existing urban areas.<sup>27</sup> These initiatives thus encourage and promote revitalization and infill of existing urban areas, as well as other measures that would increase the density of existing cities.<sup>28</sup>

The Obama administration, for example, kicked off one of its primary sustainability initiatives in July 2009, with the establishment of the federal joint Partnership for Sustainable Communities between the Department of Housing and Urban Development (HUD), the Department of Transportation (DOT), and the Environmental Protection Agency (EPA).<sup>29</sup> One of the Partnership's six "guiding livability principles" is to "support existing communities."<sup>30</sup> The Partnership aims to implement this principle by "target[ing] federal funding toward existing communities—through strategies like transit-oriented, mixed-use development, and land recycling—to increase community revitalization and the efficiency of public works investments and safeguard rural landscapes."<sup>31</sup> These implementation priorities emphasize using federal money to redevelop ("recycle") land in existing cities and to increase density in those areas to support mixed-use neighborhoods and public transit.<sup>32</sup>

Similarly, one of the Smart Growth principles embraced and promoted by the EPA calls for "[s]trengthen[ing] and direct[ing] development towards existing communities."<sup>33</sup> President Obama's 2009 Executive Order on sustainability likewise emphasizes the need to channel new federal construction into "existing central cities."<sup>34</sup>

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27. See *infra* notes 29–32 and accompanying text.

28. See *infra* notes 29–32 and accompanying text.

29. *Partnership For Sustainable Communities: EPA-HUD-DOT*, WHITEHOUSE.GOV, [www.whitehouse.gov/sites/default/files/uploads/SCP-Fact-Sheet.pdf](http://www.whitehouse.gov/sites/default/files/uploads/SCP-Fact-Sheet.pdf) (last visited Nov. 27, 2011). The other five factors are to "provide more transportation choices," "promote equitable, affordable housing," "enhance economic competitiveness," "coordinate and leverage federal policies and investment," and "value communities and neighborhoods." *Id.*

30. *Id.*

31. *Id.*

32. *Id.*

33. ABOUT SMART GROWTH, EPA.GOV, [http://www.epa.gov/smartgrowth/about\\_sg.htm](http://www.epa.gov/smartgrowth/about_sg.htm) (last updated Oct. 24, 2011).

34. See Exec. Order No. 13,514, 3 C.F.R. § 251 (2010) (charging federal agencies to "advance regional and local integrated planning" by "ensuring that planning for new Federal facilities or new leases includes consideration of sites that are pedestrian friendly, near existing employment centers, and accessible to public transit, and emphasizes existing central cities").

Countless states and localities have adopted similar sustainability plans for increasing density in existing cities. New York, for example, recently passed the State Smart Growth Public Infrastructure Policy Act<sup>35</sup> to halt public funding of sprawl by requiring state agencies to submit a “smart growth impact statement”<sup>36</sup> for public projects and to “advance projects” that meet the state’s Smart Growth criteria. These criteria include “projects located in municipal centers,” “projects for the use, maintenance or improvement of existing infrastructure,” and “projects in developed areas or areas designated for concentrated infill development in a municipally approved comprehensive land-use plan, local waterfront revitalization plan, or brownfield opportunity area plan.”<sup>37</sup> In Portland, the city’s Bureau of Planning and Sustainability has adopted “Neighborhood Design Policies” that encourage “new development” in areas that are losing housing and “increases in residential density” through “residential infill development.”<sup>38</sup>

Scholars, planners, and commentators have likewise argued that increasing the density of existing cities is the best way to achieve sustainability aims like decreasing carbon footprint and minimizing

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35. See State Smart Growth Public Infrastructure Policy Act, N.Y. ENVTL. CONSERV. LAW § 6-0101 (McKinney 2005).

36. *Id.* § 6-0107.3.

37. *Id.* § 6-0107.2; see also *New York Governor Signs Measure Specifying Criteria for Smart Growth*, BNA.COM (Sept. 1, 2010), [http://climate.bna.com/climate/summary\\_news.aspx?ID=142539](http://climate.bna.com/climate/summary_news.aspx?ID=142539) (subscription required).

38. CITY OF PORTLAND BUREAU OF PLANNING AND SUSTAINABILITY, NEIGHBORHOOD DESIGN POLICIES (2008), available at <http://www.portlandonline.com/bps/index.cfm?c=49249&a=223708> (account required); see also Jim Redden, *Housing, Cars Don't Mix*, PORTLAND TRIB., Apr. 20, 2007, [http://www.portlandtribune.com/news/story.php?story\\_id=117701496867496300](http://www.portlandtribune.com/news/story.php?story_id=117701496867496300) (“City, regional and state land-use policies call for new development to be concentrated in existing urban centers and along major transportation corridors.”). Examples of other areas where smart growth policies are encouraging infill include several cities in Florida, see *Florida Sustainable Communities Demonstration Project*, SMART COMMUNITIES NETWORK (Aug. 1998), [http://www.smartcommunities.ncat.org/success/florida\\_sust\\_project.shtml](http://www.smartcommunities.ncat.org/success/florida_sust_project.shtml) (highlighting Florida cities in which sustainability policies are encouraging urban redevelopment), and Chicago, see *Infill and Redevelopment Regional Snapshot*, CMAP.ILLINOIS.GOV, <http://tinyurl.com/88angye> (last visited Nov. 27, 2011) (outlining how Chicago is pursuing “urban infill development [as] a planning strategy that redirects growth from the urban and suburban fringes, or greenfields, into more dense urban cores to create compact, livable, and sustainable communities”).

other environmental ills.<sup>39</sup> Sprawl has become the antithesis of sustainability<sup>40</sup> and urbanization its platonic form.<sup>41</sup>

Smart Growth initiatives appear to be having a real, demonstrable effect in shifting housing construction toward urban infill and redevelopment and away from outlying areas. A 2010 report by the EPA found that regions known for their Smart Growth management techniques, including Portland, Denver, Sacramento, and Atlanta, are among those cities where the “shift inward” toward redevelopment of urban centers “has been most dramatic.”<sup>42</sup> In eight regions—Chicago, Dallas, Los Angeles, Miami, Norfolk/Virginia Beach, Portland, San Diego, and San Francisco—urban redevelopment accounted for between twenty-five percent and fifty percent of new residential construction.<sup>43</sup> A recent ranking of the country’s most sustainable cities included six of these regions in its top fifteen.<sup>44</sup>

### III. URBAN DISASTER VULNERABILITY

These sustainability initiatives may well be on a collision course with efforts to mitigate disaster risk because increasing the density of existing cities presents several serious challenges for managing that risk. First, density itself, regardless of location, can heighten some kinds of disaster risk.<sup>45</sup> Second, increasing density in risky locations is

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39. See, e.g., PETER CALTHORPE, URBANISM IN THE AGE OF CLIMATE CHANGE 17 (2011) (“Cities and urban places produce the smallest carbon footprint on a per capita basis.”); see also sources cited *supra* note 24.

40. See, e.g., ROBERT H. FREILICH ET AL., FROM SPRAWL TO SUSTAINABILITY: SMART GROWTH, NEW URBANISM, GREEN DEVELOPMENT AND RENEWABLE ENERGY 29–36 (2d. ed. 2010) (cataloguing the costs of sprawl and contrasting sprawl to sustainable growth).

41. See, e.g., CALTHORPE, *supra* note 39, at 17 (“[T]ruly great urban places also happen to be the most environmentally benign form of human settlement and are at the heart of a green future.”).

42. See EPA, RESIDENTIAL CONSTRUCTION TRENDS IN AMERICA’S METROPOLITAN REGIONS 2010, at 6, available at [http://www.epa.gov/smartgrowth/pdf/metro\\_res\\_const\\_trends\\_10.pdf](http://www.epa.gov/smartgrowth/pdf/metro_res_const_trends_10.pdf).

43. See *id.* at 14. In eighteen other regions, urban redevelopment’s share of the housing market “increased significantly.” *Id.*

44. See *Large Cities*, NATURAL RES. DEF. COUNCIL, <http://smartercities.nrdc.org/maps/large> (last visited Nov. 29, 2011) (including Chicago, Dallas, Los Angeles, Portland, San Diego, and San Francisco in the top 15 sustainable cities).

45. Some commentators have previously identified urbanization as a factor in disaster risk. See MILETI, *supra* note 7, at 120; CHARLES PERROW, THE NEXT CATASTROPHE: REDUCING OUR VULNERABILITIES TO NATURAL, INDUSTRIAL, AND TERRORIST DISASTERS 30 (2007). However, the relationship between urbanization and disaster risk is likely more

almost certain to exacerbate disaster risk—and many of our existing cities are located in risky locations, such as in low-lying coastal areas, along major earthquake faults, and along major rivers. Moreover, in many of these cities, much of the land available for redevelopment and infill—often land along waterfronts—is particularly hazard-prone.

The relationship between population density and disaster risk is complex. Sometimes density can mitigate disaster risk, including disaster mortality. For example, large multistory buildings can provide refuge to victims of tsunamis and other flood events.<sup>46</sup>

On the other hand, density can increase disaster risk in a wide variety of ways. For example, density may correlate with higher percentages of impervious surfaces,<sup>47</sup> which can elevate flood risk by increasing both the amount and velocity of surface runoff.<sup>48</sup> Increased impervious surface area in cities may also contribute to the “heat island effect,”<sup>49</sup> which can exacerbate heat waves, among the

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complicated than has sometimes been assumed. See *infra* note 47 and accompanying text. In this Article, I focus on some of the unique challenges caused by increasing density in existing urban environments.

46. See Michael MacRae, *Tsunami Forces Debate Over Vertical Evacuation*, AM. SOC'Y OF MECH. ENGRS (Apr. 2011), <http://www.asme.org/kb/news---articles/articles/manufacturing---processing/tsunami-forces-debate-over-vertical-evacuation> (discussing the possibility of “vertical evacuation” to the higher floors of multistory buildings during tsunamis).

47. See Elizabeth Brabec et al., *Impervious Surfaces and Water Quality: A Review of Current Literature and Its Implications for Watershed Planning*, 16 J. PLAN. LIT. 499, 499 (2002) (“Increasing urbanization has resulted in increased amounts of impervious surfaces—roads, parking lots, roof tops, and so on—and a decrease in the amount of forest lands, wetlands, and other forms of open space that absorb and clean stormwater in the natural system.”). The increased flood risk associated with density may be localized to the development site, and these site-specific watershed effects can be minimized by a variety of techniques promoted by Smart Growth (such as creating or preserving greenways). However, many Smart Growth developments fail to take advantage of these opportunities to mitigate flood risk. See Song et al., *supra* note 13, at 17–18. On the flip side, sprawl can also increase flood risks. Larger lot sizes (associated with sprawl) may “decreas[e] imperviousness at a site-specific level” but increase “imperviousness per capita . . . largely due to the additional roadway lengths necessary to assess the larger lots.” Brabec et al., *supra*, at 503.

48. See U.N., *supra* note 6, at 72 (discussing how increasing impermeable surfaces can increase the quantity and speed of runoff).

49. Fei Yuan & Marvin E. Bauer, *Comparison of Impervious Surface Area and Normalized Difference Vegetation Index as Indicators of Surface Urban Heat Island Effects in Landsat Imagery*, 106 REMOTE SENSING ENV'T 375, 378, 385 (2007) (noting that “[t]he amount of impervious surfaces is related to population growth and urbanization” and that data “suggests that impervious surface area accounts for most of the variation in land surface temperature dynamics”).

deadliest of natural disasters.<sup>50</sup> Moreover, residents of dense urban areas often face long evacuation times, which can put them at increased risk of death in many different kinds of disasters, including fires, floods, nuclear disasters, and terrorist incidents.<sup>51</sup> Long evacuation times also mean that evacuations have to be ordered earlier for densely populated urban areas to allow sufficient time for the evacuation to occur. Earlier evacuations are more costly (because they generate more employment and business disruptions) and are also more likely to be unnecessary because they must be ordered when, for example, the path that a hurricane will take is not yet clear.<sup>52</sup> There are also good reasons to think that pandemics may be

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50. See Kevin A. Borden & Susan L. Cutter, *Spatial Patterns of Natural Hazards Mortality in the United States*, 7 INT'L J. HEALTH GEOGRAPHICS 64 (2008). Dense urban areas can, of course, employ techniques to mitigate the urban heat island effect, such as rooftop gardens and urban parks (and dense development might leave more land available for the latter). Additionally, one study has found that from 1956 until 2005, "the most sprawling cities" in the United States "experienced a rate of increase in [extreme heat events] that was more than double that of the most compact cities." Brian Stone et al., *Urban Form and Extreme Heat Events: Are Sprawling Cities More Vulnerable to Climate Change Than Compact Cities?*, 118 ENVTL. HEALTH PERSP. 1425, 1426 (2010). The authors conclude that "urban sprawl contributes to [extreme heat event] frequency" perhaps because "sprawling patterns of urban development" increase deforestation, which in turn may increase the urban heat island effect. *Id.* at 1427. However, the study considers only the rate of change in extreme heat events and does not consider whether the rate of change might be lower in compact urban areas because those areas already had higher absolute numbers of extreme heat events in 1956, the first study year. Moreover, the study's unit of analysis is the "metropolitan region," which may overlook variability within the metropolitan area. The urban heat island can be a very local phenomenon. See Kevin E. Trenberth et al., *Observations: Surface and Atmospheric Climate Change*, in CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS, CONTRIBUTION OF WORKING GROUP I TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 235, 243–45 (Susan Solomon et al. eds., 2007), available at [http://www.ipcc.ch/publications\\_and\\_data/ar4/wg1/en/ch3s3-2-2-2.html](http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch3s3-2-2-2.html) (observing that "[u]rban heat island effects are often very localized"). Thus, in a "compact" metropolitan region, there might be far fewer extreme heat events in outer areas of the region (because vegetative cover has not been depleted) and more extreme heat events in the city's densest, most urbanized areas. The relationship between density and the urban heat island effect is one that deserves further study.

51. A recent NPR report suggested, for example, that the January 2011 flooding in Brisbane, one of Australia's largest cities, might have been more "chaotic and deadly" if Brisbane's two million residents had been more "densely concentrated." Anthony Kuhn, *Australian City Empties as Floodwaters Crest* (NPR radio broadcast Jan. 12, 2011), <http://tinyurl.com/6prdfkm>.

52. See William R. Travis, *A Future of Mass Evacuations*, N.Y. TIMES (Aug. 29, 2011), <http://tinyurl.com/6sbmmsb> ("More troubling is that growing coastal populations mean evacuations must be ordered further in advance of the storm, while the iron-clad law of forecasting, that reliability decreases with lead time, means that more evacuations will be ordered with even less certainty of a storm.").

more lethal in dense, urban areas than in areas where people do not live in similar proximity. Studies of the 1918 influenza pandemic, for example, suggest a positive correlation between population density and epidemic mortality.<sup>53</sup>

Additionally, the cascading failure of interdependent critical infrastructure systems—such as water, electricity, and health care—during disasters can pose unique risks in dense urban areas, particularly because the massive scale of these systems makes quick repair difficult.<sup>54</sup> Urban dwellers are also likely to be most at the mercy of our increasingly “just-in-time” economy because they often lack space to store extra food and water and lack quick access to backup emergency supplies.<sup>55</sup> Thus, disaster-induced supply chain disruptions may create immediate and serious shortages in urban areas.

Increasing density concentrates not just population but also resources—including the resources needed for effective disaster response. This concentration of response resources can be advantageous if those resources emerge from the disaster unscathed. If, however, they are destroyed in the disaster event, the resulting equipment shortages and communication failures can seriously hamper response and relief activities.<sup>56</sup>

Channeling growth into existing cities also exacerbates disaster risks, above and beyond the general concerns of density, because many existing urban centers are located in relatively risky locations. Many of our biggest and oldest cities are built in areas with high exposure to natural hazards. “Throughout history, people have settled in places where Mother Nature is both friend and foe.”<sup>57</sup> Consequently, existing cities are often “hotspots of disaster risk.”<sup>58</sup>

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53. See Thomas A. Garrett, *Pandemic Economics: The 1918 Influenza and Its Modern-Day Implications*, FED. RES. BANK OF ST. LOUIS REV., Mar./Apr. 2008, at 80–82.

54. See STANLEY E. MANAHAN, ENVIRONMENTAL CHEMISTRY 745 (8th ed. 2005) (explaining how the “complexity of urban infrastructure” increases the likelihood of cascading infrastructure failures).

55. See DANIEL A. FARBER ET AL., DISASTER LAW AND POLICY 24 (2d ed. 2010).

56. See, e.g., THE WHITE HOUSE, THE FEDERAL RESPONSE TO HURRICANE KATRINA: LESSONS LEARNED 37 (2006) (recounting the difficulties in Katrina response created by the loss of the Orleans Parish Emergency Operations Center, “extensive damage” to the “facilities and equipment” of “[m]any State and local public safety agencies,” and the “complete devastation of the communications infrastructure”).

57. See, e.g., FARBER ET AL., *supra* note 55, at 23.

58. Mark Pelling, *Urbanization and Disaster Risk*, POPULATION–ENV'T RES. NETWORK, <http://tinyurl.com/6ssg2zu> (last visited Oct. 24, 2011).

This is hardly surprising as “disaster risk is often coupled with natural advantages” and because many hazardous locations also boast incredible natural beauty, recreational opportunities, and other amenities.<sup>59</sup> The settlement of America reflects this general settlement pattern:

As early Americans moved inland and westward from initial settlements on the eastern seaboard, they were attracted to the banks of America’s great rivers—the commercial lifeblood of the nation—which promised fertile soil and easy access to resources and distant markets. Others settled elsewhere on the shores of the great oceans, establishing ports that would service both national and international markets, and fisheries to exploit the ocean’s abundance. And many later pioneers would make their homes in the shadow and shelter of the majestic mountains of the West. Of course, the very natural advantages that attracted these settlers also pose great risks: rivers might overflow their banks, low-lying port cities are vulnerable to hurricanes and other storm damage, and the violent geological forces that created the majestic mountains might shake the earth again.<sup>60</sup>

While these settlement patterns made perfect sense, the result is that many of the most populous cities in the United States face alarming disaster risks.<sup>61</sup> Some of the cities with the highest natural disaster exposure include Miami, New Orleans, Oakland, San Francisco, Honolulu, San Jose, Houston, Los Angeles, and Long Beach.<sup>62</sup> While coastal cities are often at the greatest risk,<sup>63</sup> many interior cities—including Oklahoma City, Tulsa, Sacramento, and Memphis—also face serious hazard risks.<sup>64</sup>

The precarious location of so many of our existing cities suggests that efforts to promote their redevelopment without careful attention to natural hazard exposure may intensify and exacerbate

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59. FARBER ET AL., *supra* note 55, at 23.

60. *Id.*

61. See Kevin A. Borden et al., *Vulnerability of U.S. Cities to Environmental Hazards*, J. HOMELAND SEC. & EMERGENCY MGMT. 1, 1 (2007), available at <http://www.bepress.com/jhsem/vol4/iss2/5> (discussing the pattern of urban vulnerability to natural hazards in the United States and globally).

62. See *Natural Disaster Risk—2008 US Cities Sustainability Ranking*, SUSTAINLANE.COM, <http://tinyurl.com/4wrvvc> (last visited Nov. 28, 2011).

63. See Borden et al., *supra* note 61, at 11 (finding high hazard exposure “concentrated along the nation’s hurricane coasts (Atlantic Ocean and Gulf of Mexico)”).

64. See *id.*

disaster risk. Unfortunately, most sustainability initiatives and the legal tools that implement them fail to sufficiently consider the increased disaster exposure they may cause. Much of the relevant academic literature on sustainability likewise fails to recognize the potential disaster risk of proposals to channel growth into existing cities.<sup>65</sup> Moreover, as Part IV demonstrates, some of the legal tools used to implement sustainability initiatives' preference for existing urban areas have channeled growth, not only to cities with significant disaster exposure, but to the areas within those cities that are most at risk from natural hazards.

A striking example of Smart-Growth-driven efforts to channel growth into existing urban areas with severe hazard exposure is the Eastward Ho! initiative in South Florida. The Eastward Ho! initiative had its roots in a report promulgated in 1995 by the Florida Governor's Commission for a Sustainable South Florida.<sup>66</sup> The Commission's charge was to determine how the endangered Everglades ecosystem could be protected while ensuring a growing and sustainable economy in South Florida.<sup>67</sup> The Commission concluded that halting westward sprawl toward the Everglades could best be achieved by channeling most of the region's future growth into existing urban areas in the so-called Eastern Ho! Corridor,<sup>68</sup> which stretches along Florida's eastern coast from St. Lucie County in the north to Miami-Dade County in the south.<sup>69</sup>

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65. *See, e.g.*, CALTHORPE, *supra* note 39, at 17 (discussing the ways that green urbanism can shrink carbon footprint and help mitigate climate change without once mentioning the current disaster risks facing existing urban areas, much less considering the ways in which climate change is likely to exacerbate those risks); *see also* FREILICH ET AL., *supra* note 40, at 29–36 (no consideration of disaster risks faced by urban areas).

66. S. FLA. REG'L PLANNING COUNCIL, EASTWARD HO! REVITALIZING SOUTHEAST FLORIDA'S URBAN CORE 1 (1999) [hereinafter EASTWARD HO! REVITALIZING].

67. *See id.* Ensuring the health of the Everglades ecosystem was viewed as important, not only in its own right, but also to protect the recharge of underground aquifers that supply water to Southern Florida. *See id.* at 6.

68. *Id.* at 4.

69. *See* ROBERT W. BURCHELL ET AL., EASTWARD HO! DEVELOPMENT FUTURES: PATHS TO MORE EFFICIENT GROWTH IN SOUTHEAST FLORIDA 4 (1999) ("After the original designation by the South Florida Regional Planning Council, the Eastward Ho! area was expanded southward to Florida City in Miami-Dade County and northward to include the balance of Palm Beach, Martin, and St. Lucie counties, approximating the area between Route 1 and I-95/Florida Turnpike."). The corridor encompasses "primarily developed lands bounded by I-95/Florida Turnpike and Route 1 from St. Lucie County to Miami-Dade County." *Id.*

The obvious problem with redirecting South Florida's growth toward the east is that the region's eastern areas are primarily low-lying and coastal. Indeed, Florida's southeast coast is notoriously vulnerable to hurricane damage and flooding. As one recent report assessing South Florida's future explained:

South Florida is particularly susceptible to hurricane impacts. It is a low-lying region where, as of 2000, more than one million people lived in flood-prone areas and nearly 900,000 lived in Category 1 hurricane surge zones. Miami-Fort Lauderdale was ranked the worst place in the nation for an extreme hurricane to strike, with the potential for \$61.3 billion in insurance losses. Experts estimate that "if no other changes are made, and growth continues, a South Florida hurricane in 2020 might wreak physical damages and economic losses totaling \$500 billion."<sup>70</sup>

There is, nevertheless, some debate about exactly how vulnerable the Eastward Ho! Corridor is to hurricanes and floods. One of the initial reports exploring and supporting Eastward Ho! claimed that, while some of the Corridor is particularly susceptible to hurricane flooding, "[t]he vast majority of the [Corridor] area is free from the worst hazards of storm surges characteristic of the coastal high hazard areas of Southeast Florida"<sup>71</sup> because the Corridor "includes the coastal ridge," which is "an inland strip of relatively high ground running parallel to the coast" that serves as a "natural defense against a storm surge."<sup>72</sup>

Other assessments of the Corridor's hurricane and flooding risk have been far less sanguine about the Corridor's hazard exposure. For example, a report prepared for the state by two local universities identified high flood insurance rates in the Eastward Ho! Corridor as a significant financial impediment to redevelopment efforts in the Corridor: "[P]eople in the East are paying the higher rates, not residents in the suburbs. The reason insurance rates affect investments in the corridor in comparison to the suburbs is that

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70. CTR. FOR URBAN AND ENVTL. SOLUTIONS, FLA. ATL. UNIV., CHARTING THE COURSE: WHERE IS SOUTH FLORIDA HEADING? 36 (2006) (footnotes and citations omitted).

71. EASTWARD HO! REVITALIZING, *supra* note 66, at 8.

72. *Id.* at 7; *see also id.* at 8 ("The coastal ridge effectively blocks the inland movement of hurricane storm surges in Palm Beach County."). The report did acknowledge that the Corridor includes two areas "particularly susceptible to the effects of flooding from hurricanes: Central Broward County, east of I-95, which acts as the floodplain for the Middle and New Rivers, and Southern Dade County, south of Kendall Drive, where the coastal ridge loses its elevation and eventually terminates." *Id.*

much of the corridor lies within the ‘high risk’ area east of I-95.”<sup>73</sup> High flood insurance rates should be viewed not simply as a “financial impediment” to redevelopment efforts, but as a red flag that redevelopment of the area in question may concentrate both people and resources in areas with high hazard exposure.

Nonetheless, the Eastward Ho! initiative’s preference for channeling South Florida’s future growth into existing urban areas in the east has been codified in many regional and local planning documents. For example, Palm Beach County’s Comprehensive Plan, which was amended in 1996 and then again in 1997 in response to the 1995 report of the Florida Governor’s Commission, incorporates an explicit directive to “[r]edirect growth to the East where services and facilities can be provided and [to] encourage the revitalization/redevelopment of the coastal communities.”<sup>74</sup>

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73. FLA. ATL. UNIV./FLA. INT’L UNIV. JOINT CTR. FOR ENVTL. AND URBAN PROBLEMS, EASTWARD HO! FINANCIAL IMPEDIMENTS AND SOLUTIONS TO REDEVELOPMENT 46 (Jan. 15, 1998), *available at* [http://docs.cdsi.fau.edu/cues/fin\\_imp.pdf](http://docs.cdsi.fau.edu/cues/fin_imp.pdf).

74. PALM BEACH CNTY., FLA., PALM BEACH COUNTY 1989 COMPREHENSIVE PLAN: ORDINANCE 2010-17 1-IA (2010), *available at* [www.pbcgov.com/pzb/planning/comprehensiveplan/introduction.pdf](http://www.pbcgov.com/pzb/planning/comprehensiveplan/introduction.pdf). This directive is implemented throughout the more specific elements of the plan. For example, the County’s Future Land Use Element provides for “bonus densities,” beyond those typically allowed, in most existing urban and suburban areas. *See* PALM BEACH CNTY., FLA., FUTURE LAND USE ELEMENT, PALM BEACH COUNTY 1989 COMPREHENSIVE PLAN: ORDINANCE 2010-17 60 (2011), *available at* [http://www.pbcgov.com/pzb/planning/comprehensiveplan/2011/FLUE\\_11\\_1.pdf](http://www.pbcgov.com/pzb/planning/comprehensiveplan/2011/FLUE_11_1.pdf). The allowable bonuses are higher in the eastern “urban/suburban tier” than in the western areas “[i]n order to encourage eastward development and a tapering off of density towards the western edge of the Urban/Suburban Tier.” *Id.* The Land Use Element does state elsewhere that “future land designations, and corresponding density and intensity assignments, shall not exceed the natural or manmade constraints of an area,” taking into account, *inter alia*, “flood plains,” *id.* at 44; however, that admonition is immediately followed by an equally strong assertion that “[a]ssignments shall not be made that underutilize the existing or planned capacities of urban services,” *id.*, a command that may well lead to floodplain constraints being discounted in existing urban areas, particularly those targeted for redevelopment. Other plan elements attempt to limit both increased densities and public investment in certain high hazard areas, designated “coastal high-hazard areas.” *See, e.g.*, PALM BEACH CNTY., FLA., COASTAL MANAGEMENT ELEMENT, PALM BEACH COUNTY 1989 COMPREHENSIVE PLAN: ORDINANCE 2010-49 12 (2010) [hereinafter COASTAL MANAGEMENT ELEMENT], *available at* <http://www.pbcgov.com/pzb/planning/comprehensiveplan/coastal.pdf> (“Palm Beach County shall not subsidize new or expanded development in the coastal area.”); *id.* at 13 (“Palm Beach County shall direct population concentrations away from known or predicted coastal high-hazard areas, and shall not approve increases in population densities in the coastal high hazard area.”); *see also* FLA. STAT. § 163.3177(6)(g)(6) (2011) (requiring that local coastal management plan elements “[l]imit public expenditures that subsidize development in coastal high-hazard areas.”); *id.* § 163.3178(2)(h) (defining the “coastal high-hazard area” as “the area below the elevation of the category 1 storm surge line as established by a Sea, Lake, and Overland Surges from Hurricanes (SLOSH) computerized storm surge model”). While

Communities outside the designated Eastward Ho! Corridor, including those along Florida's Treasure Coast, have also adopted the initiative's focus on redirecting growth into existing urban areas along Florida's eastern coast.<sup>75</sup> The result has been "concerted public reinvestment in older coastal areas, despite their vulnerability to coastal storms."<sup>76</sup> As one researcher has noted:

Today, five of the Community Redevelopment Districts on the Treasure Coast are partially or entirely located in areas that fall within the Coastal High Hazard Area. Incentives provided by the Community Development Authority (CRA) [sic] to invest in the redevelopment of coastal urban areas run counter to the intent of hazard mitigation principles aimed at limiting coastal asset accumulation.<sup>77</sup>

In order to ensure that future growth is concentrated in South Florida's eastern regions, rather than its western suburbs, local governments have employed a number of legal tools, including the redevelopment districts mentioned above and urban growth boundaries. Miami-Dade, for example, has an urban growth boundary—called an urban development boundary—designed to promote growth in existing urban areas while preventing new suburban development in the west.<sup>78</sup> Part IV next examines how

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these restrictions may in theory help to limit growth in the most hazardous areas, some redevelopment efforts may be subject to less stringent restrictions. *See, e.g.*, COASTAL MANAGEMENT ELEMENT, *supra*, at 13 ("Infill or redevelopment densities and intensities in coastal high hazard areas shall be consistent with existing adjacent development but at densities and intensities no greater than the adopted future land use designations.").

75. *See, e.g.*, JAMES F. MURLEY ET AL., ASSESSMENT OF REDEFINING FLORIDA'S COASTAL HIGH HAZARD AREA 12–13 (Jan. 2008), *available at* docs.cdsi.fau.edu/cues/CHHAFINALREPORT-MAY212008.pdf ("While the Eastward Ho! initiative was not directed at the Treasure Coast, the principles of compact and higher density development have been adopted by the Treasure Coast Regional Planning Council in an effort to efficiently accommodate the housing and accompanying commercial development needed for the projected population growth in the region."); *see also id.* at 12 ("County and municipal planners throughout much of the Treasure Coast have sought to balance development demand with agricultural and open space conservation by steering development eastward and focusing on revitalizing the region's historic cities and towns.").

76. *Id.*

77. *Id.*

78. EPA, GROWING FOR A SUSTAINABLE FUTURE: MIAMI-DADE COUNTY URBAN DEVELOPMENT BOUNDARY ASSESSMENT 3 (2010) ("The UDB is used primarily to keep development from spilling toward highly sensitive lands like Everglades National Park."). Florida has recently enacted major changes to its growth management laws, which now allow for longer range planning and devolve most authority over growth management to local governments. H.B. 7207, 2011 Leg., Reg. Sess. (Fla. 2011). It will thus be up to local

these legal tools used to implement Smart Growth's preference for channeling growth into existing cities have incentivized redevelopment of particularly hazardous urban lands in other parts of the country.

#### IV. LEGAL TOOLS IMPLEMENTING SUSTAINABILITY'S URBAN PREFERENCE

As the prior discussion of Southeast Florida demonstrates, there are a variety of ways in which the preference for channeling growth into existing urban areas is being translated into law. Two common approaches include designation of redevelopment districts and growth management techniques such as urban growth boundaries. Both of these approaches are driving redevelopment of vulnerable cities—and, often, driving redevelopment of the most vulnerable areas within these at-risk cities. Additionally, California has recently adopted a complex new method for directing growth in that state, one that also has the potential to channel development into dense urban areas without giving adequate attention to hazard risk.<sup>79</sup>

##### *A. Redevelopment Districts*

One popular technique for channeling growth back into existing cities is the designation of redevelopment districts that promise revitalization and infill of underutilized urban land. These redevelopment districts often enjoy tax breaks (such as enterprise zone tax credits), an influx of federal and state spending, special funding techniques (such as tax increment financing),<sup>80</sup> the use of eminent domain to assemble buildable parcels, and sometimes fast-track approval processes to incentivize infill and redevelopment.<sup>81</sup>

One of the most striking characteristics of redevelopment districts is their tendency to cluster around any waterfront located within a city.<sup>82</sup> This pattern may exist for a number of reasons. First,

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governments to decide which growth management measures to keep in place. *See id.*

79. *See* Part IV.C., *infra* (discussing California's new growth management approach under SB 375).

80. *See supra* note 20 (explaining tax increment financing).

81. *See, e.g.*, CAL. REDEV. AGENCY, THE COMMUNITY GUIDE TO REDEVELOPMENT: CREATING SAFE, PROSPEROUS AND HEALTHY COMMUNITIES 16 (2002) (describing the tools available to California Redevelopment Authorities to promote redevelopment districts).

82. *See* BETSY OTTO ET AL., ECOLOGICAL RIVERFRONT DESIGN: RESTORING RIVERS, CONNECTING COMMUNITIES 6 (2004) [hereinafter ECOLOGICAL RIVERFRONT DESIGN]

the economic and spatial evolution of many waterfront cities has left waterfront areas behind, making them obvious targets for redevelopment. In fact, these neglected waterfront areas often represent the only large, contiguous tracts of land available for urban redevelopment. When many cities were first built, waterfront areas were prime property because rivers and oceans were the lifeblood of commerce.<sup>83</sup> Factories, warehouses, and shipping facilities all thrived at the water's edge.<sup>84</sup> Over time, as railroads displaced rivers as the primary mode of transporting goods, these industries abandoned their waterfront locations; waterfront areas fell into disuse, and "the city's downtown moved away from the river."<sup>85</sup> Related trends also marginalized ports.<sup>86</sup> When the highway construction boom began in earnest, these abandoned riverfronts provided the path of least resistance for building highways (with the cheapest land and the least disruption to existing uses).<sup>87</sup> Thus, "many highways were built along urban riverfronts," cutting the waterfront areas off "from the cities they had once spawned."<sup>88</sup> When forward-thinking planners began to worry about suburban sprawl—a concern that has become central to Smart Growth and other sustainability initiatives—targeting these abandoned areas for infill and redevelopment made perfect sense.

Second, the waterfront area's industrial pedigree often left the land contaminated.<sup>89</sup> While contamination is hardly an obvious selling-point for redevelopment, federal environmental programs have funded redevelopment of brownfields,<sup>90</sup> defined as property whose use or redevelopment "may be complicated by the presence or potential presence of a hazardous substance, pollutant, or

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(describing an accelerating trend of urban waterfront redevelopment). The City of Sacramento, for example, has three redevelopment areas, all of which are located along rivers. *See Sacramento Economic Development, Redevelopment Areas*, CITY OF SACRAMENTO, <http://www.cityofsacramento.org/econdev/opportunity-areas/redevelopment-areas.cfm> (last visited Oct. 24, 2011). As discussed in Part IV.B, Portland has eleven redevelopment districts, all but three of which are riverfront. *See infra* note 162.

83. *See* ECOLOGICAL RIVERFRONT DESIGN, *supra* note 82, at 2.

84. *See id.*

85. *Id.*

86. *Id.* at 2–3.

87. *Id.* at 3.

88. *Id.*

89. *Id.*

90. *See* EPA, BROWNFIELDS AND LAND REVITALIZATION: GRANTS AND FUNDING (2011), [http://epa.gov/brownfields/grant\\_info/index.htm](http://epa.gov/brownfields/grant_info/index.htm).

contaminant.”<sup>91</sup> Some waterfront areas are receiving brownfield money for redevelopment,<sup>92</sup> and sustainability initiatives in many cities are backing these revitalization efforts to restore the health of rivers by cleaning up toxins in riverfront land that may leach into the water.<sup>93</sup>

Third, waterfront redevelopment holds forth the promise of creating a unique draw that will bring people back to the city and create a sense of community place and history.<sup>94</sup> On this view, waterfront redevelopment is valuable not only in its own right, but also as a catalyst for renewing the entire urban landscape. Indeed, many Smart Growth advocates herald waterfront redevelopment as the centerpiece of a city’s urban renewal plans.<sup>95</sup> As one prominent sustainability expert explained, waterfront revitalization is “an opportunity to give buildings the advantage of waterfront views and access, and bring the public back to the water’s edge.”<sup>96</sup> Among the many cities that are pursuing this strategy of making the waterfront a cornerstone of downtown redevelopment efforts are Sacramento,

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91. 42 U.S.C. § 9601 (2004).

92. Andrew O. Guglielmi, Comment, *Recreating the Western City in a Post-Industrialized World: European Brownfield Policy and an American Comparison*, 53 BUFF. L. REV. 1273, 1306 (2005) (“Another similarity between successful urban brownfield projects, both in the U.S. and in Europe, is that they seemed to be tied to waterfront areas.”).

93. See, e.g., RIVER RENAISSANCE DIRECTORS, CITY OF PORTLAND, RIVER RENAISSANCE STRATEGY 3-3 (2004), available at <http://tinyurl.com/7om7lo7> (“Redevelopment offers the best opportunities to realize incremental benefits to watershed health” by “reduc[ing] the amount of urban pollutants that run off into our streams and rivers.”).

94. See Guglielmi, *supra* note 92, at 1308 (“In addition to the aesthetic and psychological benefits, brownfield projects focused around waterways can bring restaurants, shops, and tourist attractions to raise a city’s economic health.”).

95. SMART GROWTH NETWORK, GETTING TO SMART GROWTH II: 100 MORE POLICIES FOR IMPLEMENTATION 47 (2005), available at <http://www.smartgrowth.org/pdf/gettosg2.pdf>.

96. See JONATHAN BARNETT, THE FRACTURED METROPOLIS: IMPROVING THE NEW CITY, RESTORING THE OLD CITY, RESHAPING THE REGION 154 (1996); see also *Trinity Uptown Plan*, TRINITY RIVER VISION AUTH., <http://www.trinityrivervision.org/fwgc/trinityuptownplan.aspx> (last visited Oct. 24, 2011) (promoting Fort Worth’s riverfront vision based on Smart Growth principles and asserting that the planned waterfront redevelopment will “provide a cost-efficient and viable alternative to annexation and urban sprawl”).

California;<sup>97</sup> Norfolk, Virginia;<sup>98</sup> Dallas/Fort Worth, Texas;<sup>99</sup> Portland, Oregon;<sup>100</sup> and many cities in New York.<sup>101</sup>

Unfortunately, plans to revitalize waterfront areas often are conceptualized with little attention to disaster risk. One recent example comes from Augusta, Georgia, where officials heralded the city's plans to make waterfront revitalization along the Savannah River the foundation of its future growth.<sup>102</sup> Augusta's mayor proclaimed that "[r]iverfront development is key to the future of the city. We need to bring in projects that will develop a critical mass of people along the riverfront."<sup>103</sup> The mayor also noted that the "riverfront is a very underutilized asset for the city of Augusta. We still have large tracts that aren't producing [tax] revenue for the city."<sup>104</sup> Less than a week later, however, the Army Corps of Engineers declared Augusta's levees along the Savannah River—the levees that protect Augusta from serious flooding risk—unacceptable.<sup>105</sup>

As this example suggests, too many cities seem to be pursuing waterfront redevelopment plans—with all their available incentives and public money—without adequate attention to the hazards of reconcentrating population and property in flood zones. In

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97. See *The River District Redevelopment Area*, THE RIVER DIST., <http://www.riverdistrict.net/about-us/river-district-redevelopment.shtml> (last visited Oct. 18, 2011) ("Riverfront development is a key strategy for both establishing a sense of place for the district, and creating a recreation asset for the entire Sacramento region.").

98. See BARNETT, *supra* note 96, at 133–34 ("Norfolk, Virginia, is an example of a community that has almost completely remade its downtown in order to remain a regional center. . . . It has rebuilt its waterfront to attract convention visitors and tourists, creating a festival marketplace, two convention hotels and a convention center, a nautical museum, and a new downtown baseball stadium.").

99. *Trinity Uptown*, CITY OF FORT WORTH, TEX., <http://www.fortworthgov.org/PlanningandDevelopment/info/default.aspx?id=12426> (last visited Oct. 24, 2011) (describing planned revitalization of Fort Worth's riverfront).

100. See *infra* note 163 and accompanying text.

101. See *Cities by the Coast*, CUNY INSTITUTE FOR SUSTAINABLE CITIES, <http://www.cunysustainablecities.org/what-we-do/cities-by-the-coast.html> (last visited Oct. 24, 2011).

102. Erin Zureick, *City Hopes to Expand Near River*, AUGUSTA CHRON., Jan. 23, 2011, at B1, available at <http://chronicle.augusta.com/news/metro/2011-01-22/augusta-hopes-expand-near-river>.

103. *Id.*

104. *Id.*

105. See Brett Buffington, *Report Says Augusta's Levee "Unacceptable,"* ABC 6 WJBF-TV (Jan. 29, 2011), <http://www2.wjbf.com/news/2011/jan/29/5/report-says-augustas-levee-unacceptable-ar-1398337/>.

particular, communities are rebuilding in the shadow of levees without giving appropriate weight to residual flooding risks that exist if those structural flood control mechanisms fail or their design capacity is exceeded.

Examination of a prime waterfront redevelopment district in Sacramento, California sheds further light on this phenomenon. Sacramento's River District, one of three redevelopment areas managed by the City of Sacramento,<sup>106</sup> is located less than a mile from downtown Sacramento "at the confluence of two major California waterways: the Sacramento and American rivers."<sup>107</sup> Sacramento's redevelopment plan for the River District will "transform[]" the 1,050 acre district "from its current, mostly industrial, businesses into an eclectic, mixed-use community bordered by a ribbon of parks at the rivers' edge" that "will feature a wide range of employment, entertainment and housing options for families and individuals."<sup>108</sup>

Specifically, redevelopment plans feature "a 65-acre mixed-use development" called Township 9, funded in part by \$20 million in California state infrastructure grants, that will include "2,300 housing units (apartments, condos, townhomes, and live/work units); 150,000 square feet of neighborhood retail and restaurants; and over 800,000 square feet of office space."<sup>109</sup> Plans also include a new light rail station, the transformation of a historic waterfront street power station into the Powerhouse Science Center (housing a "science museum, restaurant and conference center, and a planetarium"), and a new headquarters for the California Highway Patrol.<sup>110</sup> Enterprise Zone tax credits are available to help finance River District redevelopment projects.<sup>111</sup>

Given that the River District redevelopment area is located at the intersection of the American and Sacramento Rivers,<sup>112</sup> it is no

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106. See Sacramento Economic Development, *Redevelopment Areas*, CITY OF SACRAMENTO, CAL., <http://tinyurl.com/7gz9ue2> (last visited Oct. 24, 2011).

107. See *River District*, CITY OF SACRAMENTO, <http://www.cityofsacramento.org/econdev/opportunity-areas/redevelopment-areas/river-district.cfm> (last visited Oct. 24, 2011).

108. *Id.*

109. CITY OF SACRAMENTO ECON. DEV. DEP'T, RIVER DISTRICT FACT SHEET (2009), available at <http://tinyurl.com/7hr9t7x>.

110. See *id.*

111. See *id.*

112. *Business*, RIVER DIST., <http://www.riverdistrict.net/business/> (last visited Oct. 24, 2011) ("The River District is defined by the American and Sacramento rivers on the north and

surprise that “[t]he majority of the [redevelopment] area is within a Federal Emergency Management Agency (FEMA)-designated 100-year floodplain.”<sup>113</sup> Because the California Environmental Quality Act (CEQA)<sup>114</sup> requires the preparation of an Environmental Impact Report (EIR) for this redevelopment project, there is at least some documentary record of the analysis that supported targeting this floodplain area for redevelopment.

The EIR explains that most of the River District redevelopment area is located in a FEMA “shaded Zone X” flood zone, which designates areas that are protected from a 100-year flood solely by the presence of levees and other structural flood control mechanisms.<sup>115</sup> Thus, the report notes, “[t]he levees along the American and Sacramento Rivers provide flood protection to the [River District redevelopment] area,”<sup>116</sup> as do “the upstream reservoirs and dams, including Folsom Dam and Shasta Dam.”<sup>117</sup> The EIR also acknowledges that “[t]he [redevelopment] area is within the dam inundation zone in the event of failure at the Folsom Dam,” located upstream from the project on the American River.<sup>118</sup>

In short, all that stands between these areas and severe flooding in the event of a 100-year storm are the river levees and upstream dams (which present their own flooding risks if the dams were to fail due to compromised structural integrity, an earthquake, or terrorist attack). However, when determining the project’s impact on flood risk, the EIR is only charged with determining whether the project will result in a “significant” impact that will “substantially increase the exposure of people and/or property to the risk of injury and damage in the event of a 100-year flood.”<sup>119</sup>

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west and by the Railyards and Central City residential neighborhoods on the south and east. In 1990, the area was designated as a Redevelopment Area pursuant to the provisions of the California Community Redevelopment Law.”).

113. CITY OF SACRAMENTO CMTY. DEV. DEP’T, RIVER DISTRICT SPECIFIC PLAN: DRAFT ENVIRONMENTAL IMPACT REPORT § 5.5-2 (2010) [hereinafter RIVER DISTRICT EIR]. The 100-year floodplain, also known as a “special flood hazard area,” is that “area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year.” See FED. EMERGENCY MGMT. AGENCY, FLOOD ZONES (2010), [http://www.fema.gov/plan/prevent/floodplain/nfipkeywords/flood\\_zones.shtm](http://www.fema.gov/plan/prevent/floodplain/nfipkeywords/flood_zones.shtm).

114. CAL. PUB. RES. CODE §§ 2100–02 (West 2011).

115. See RIVER DISTRICT EIR, *supra* note 113, § 5.5-3.

116. *Id.* § 5.5-2.

117. *Id.*

118. *Id.*

119. *Id.* § 5.5-9.

With the question so framed, the answer is easy, indeed almost tautological:

Because levees currently protect the proposed RDSP [River District Specific Plan] area from a 100-year flood and development in accordance with the Specific Plan would not be allowed by law to compromise the integrity of the levees, implementation of the RDSP would not increase exposure or people and/or property to risk of injury and damage from a 100-year flood. This impact is determined to be *less than significant*.<sup>120</sup>

Thus, the EIR reads as though the redevelopment will not alter the status quo in any meaningful way. It does not acknowledge that more resources and people will be concentrated in a flood hazard zone and will be subject to potentially catastrophic flooding in the event of levee failure or overtopping. The EIR's conclusion that the status quo would remain unchanged stands in stark contrast to one commentator's 2006 prediction that redevelopment of Sacramento's River Front and construction of new, dense residential properties would effectively create "a whole new town on the waterfront," bringing "an additional 30,000 residents" to the area.<sup>121</sup> He noted, by comparison, that West Sacramento then had 35,000 residents, while downtown Sacramento had 39,000.<sup>122</sup> Furthermore, he estimated that the redevelopment would bring an additional 80,000 new office workers and other laborers to the riverfront area.<sup>123</sup>

This blasé attitude toward the residual risk that exists in flood zones protected by levees from the 100-year storm also contrasts sharply with California's own attempts to raise awareness of residual risks among its citizens who live in at-risk areas. California's 2010 Flood Risk Notice—mailed to some 300,000 California residents—advises those living in the shadow of levees that "[e]ven if a levee is

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120. *Id.* § at 5.5-14; *see also id.* ("As previously noted, the portion of the RDSP [River District Specific Plan] area that could be developed is within either the shaded X or X Zone designations of FEMA; therefore, this area is protected from a 100-year flood. Because the existing parcels proposed for development within the RDSP are protected from a 100-year flood and FEMA allows the types of land uses within the flood zones that are proposed by the RDSP; the individual developments within the RDSP area would be protected from regional floods.").

121. Don Lipper, *Watermark: If Chris Calbadon Gets His Way, West Sacramento Will Have Its Own Left Bank*, COMSTOCK'S MAGAZINE (Sept. 16, 2011), [http://www.comstocksmag.com/Archive/1006\\_RF\\_Yolo-Watermark.aspx](http://www.comstocksmag.com/Archive/1006_RF_Yolo-Watermark.aspx).

122. *See id.*

123. *See id.*

designed for the FEMA standard of a 1% annual chance flood, there is a 1-in-4 chance of a larger flood occurring within any 30-year period (the life of a typical home mortgage)” and that “[s]ince 1983, Central Valley State-Federal project levees have been breached or overtopped more than 50 times.”<sup>124</sup>

Sacramento’s experience also demonstrates that cities and states will often face the temptation to catalyze redevelopment efforts by relocating public buildings and infrastructure to the redevelopment district. For example, one of the featured cornerstones of Sacramento’s River District redevelopment is a new headquarters for the California Highway Patrol.<sup>125</sup> The experience of Louisiana’s National Guard during Katrina, however, illustrates the dangers of locating public resources—particularly those that are critical to disaster response operations—in vulnerable areas. Katrina-induced flooding devastated the Louisiana National Guard’s headquarters in the Lower Ninth Ward at Jackson Barracks, where floodwaters reached depths of 18 feet.<sup>126</sup> The flooding necessitated the rescue of some 400 troops, first by boat to the Mississippi River Levees and then by Blackhawk helicopter to the Superdome,<sup>127</sup> a shelter of last resort. The flooding also disabled the Guard’s joint operations center, which lost all power and communications during the storm.<sup>128</sup>

The EPA, in partnership with the National Oceanic and Atmospheric Administration (NOAA), has recently issued Smart Growth guidance for coastal and waterfront areas to influence how cities plan their waterfront redevelopment districts, as well as other smaller-scale infill at the water’s edge.<sup>129</sup> Although the guidance does

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124. CAL. DEP’T OF WATER RES., CALIFORNIA FLOOD RISK NOTICE 2010 (2010), available at [http://www.water.ca.gov/floodmgmt/lra/fmo/fmb/fas/risknotification/links/pdfs/2010\\_Flood\\_Risk\\_Notice.pdf](http://www.water.ca.gov/floodmgmt/lra/fmo/fmb/fas/risknotification/links/pdfs/2010_Flood_Risk_Notice.pdf).

125. See RIVER DISTRICT FACT SHEET, *supra* note 109. Portland is also building “a new police stable in the River District,” a riverfront redevelopment district. See BETSY OTTO ET AL., *supra* note 82, at 140.

126. See Tarell J. Bilbo, *Louisiana Guard Rededicates Jackson Barracks*, NAT’L GUARD (Nov. 5, 2010), <http://www.ng.mil/news/archives/2010/11/110810-Louisiana.aspx>.

127. See Paul Purpura, *Life Returns to Historic Jackson Barracks*, TIMES-PICAYUNE, Oct. 31, 2010, at A1, available at [http://www.nola.com/politics/index.ssf/2010/10/jackson\\_barracks\\_welcomes\\_back.html](http://www.nola.com/politics/index.ssf/2010/10/jackson_barracks_welcomes_back.html).

128. See John Orrell, *Hurricane Katrina Response: National Guard’s “Finest Hour,”* NAT’L GUARD (Aug. 27, 2010), <http://www.ng.mil/news/archives/2010/08/082710-Katrina.aspx>.

129. See EPA & NAT’L OCEANIC AND ATMOSPHERIC ADMIN., SMART GROWTH FOR COASTAL AND WATERFRONT COMMUNITIES (2010), available at

go some distance in warning communities against waterfront revitalization that may increase a community's hazard vulnerability,<sup>130</sup> the primary emphasis is on using Smart Growth techniques to create dense, mixed-use, walkable communities when developing waterfronts.<sup>131</sup> Indeed, much of the guidance extols the potential advantages of waterfront redevelopment:

[P]roperties at the water's edge are prime redevelopment targets, since they are in or near the historic center of the community, are well connected to land- and water-based modes of transportation, and are close to jobs, services, and tourist sites. Waterfront revitalization can enhance historic, cultural, and scenic resources, supporting community efforts to maintain a strong sense of place while protecting the water and other natural resources.<sup>132</sup>

The guidance also stresses connecting people to the water and guaranteeing public access to the waterfront itself.<sup>133</sup> Sometimes the very planning tools the guidance identifies for increasing public access to waterfront areas both allow and encourage increased density at the water's edge. For example, in Fernandina Beach, Florida, "the city established a 'floating' overlay district" along the Amelia River waterfront area "that allows property owners to double their density if they grant the city an easement to build a public boardwalk along the riverfront, allow pedestrian access, and maintain a view corridor."<sup>134</sup>

On the whole, this federal guidance emphasizes the advantages of Smart Growth-style waterfront development, at the expense of hazard risks. Indeed, some of the cities that the Smart Growth guidance singles out as examples of successful waterfront renewal

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<http://coastalsmartgrowth.noaa.gov/report.html>.

130. *See id.* at 31 ("[A]ll coastal and waterfront communities need to consider their vulnerability to natural hazards such as storms and flooding, and, for those on the coast, the risks from sea level rise, so that revitalizing the waterfront does not make the community more vulnerable to natural disasters."); *id.* at 32 ("Communities facing the possibility of increased vulnerability from climate change-related impacts, such as increased flooding and sea level rise, may need to consider whether infill or redevelopment is appropriate.").

131. *See, e.g., id.* at 4.

132. *Id.* at 31.

133. *See id.* at 18 (urging communities, as one of the Smart Growth waterfront development principles, to "[c]reate walkable communities with physical and visual access to and along the waterfront for public use").

134. *Id.* at 19–20.

have experienced, or been threatened with, serious flooding many times in the last few years.<sup>135</sup>

In addition to the redevelopment of potentially risky waterfront areas, redevelopment districts have also been created in areas subject to other types of disaster risk. Like waterfront redevelopment, redevelopment of these vulnerable areas brings people and property back to disaster's edge. For example, many current redevelopment districts in San Francisco are located in areas that have significant seismic risk.

Relative to flooding risk, seismic risk is somewhat more difficult to mitigate through land-use choices, because major earthquakes can sometimes occur along previously unknown faults.<sup>136</sup> Nonetheless, it is possible to make some comparisons of the seismic risk faced by different neighborhoods and, in particular, to identify neighborhoods at serious risk for liquefaction—essentially, “earthquake-induced quicksand.”<sup>137</sup> In the San Francisco region, many of the neighborhoods at highest risk of liquefaction are essentially artificially created—built on new land created when the bay was filled. A 2000 Seismic Report by the California Department of Conservation identified the neighborhoods at highest liquefaction risk:

Ground failure associated with liquefaction has occurred during historical earthquakes in San Francisco. In the City and County of San Francisco the liquefaction zone is concentrated south of Market Street, in the Mission District, at Hunters Point, in areas of artificial fill (“made land”) along the waterfront, especially the Marina District and at Treasure Island, and along the beaches facing the ocean.<sup>138</sup>

Strikingly, San Francisco has redevelopment districts (or “project areas”) in three of these high-risk neighborhoods.<sup>139</sup> One of the

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135. *Compare id.* at 23 (pointing to Newburyport, Massachusetts, as an example of successful waterfront redevelopment), *with* Angeljean Chiamida, *Flooding Adds to Storm Woes*, NEWBURYPORT NEWS (Mar. 2, 2010), <http://www.newburyportnews.com/local/x253071011/Flooding-adds-to-storm-woes> (explaining recent flooding problems in Newburyport).

136. *See* FARBER ET AL., *supra* note 55, at 41.

137. *Id.* at 40 (“Liquefaction occurs when earthquake shaking of water-saturated, sandy soil causes that soil to liquefy and lose its strength . . .”).

138. CAL. DEP’T OF CONSERVATION, SEISMIC HAZARD ZONE REPORT FOR THE CITY AND COUNTY OF SAN FRANCISCO, CALIFORNIA, 2000, at vii (2001).

139. *See Project & Survey Areas*, CITY & COUNTY OF SAN FRANCISCO REDEVELOPMENT

most interesting of the redevelopment plans is for Treasure Island, which the 2000 Seismic report described as “consist[ing] entirely of sandy and silty artificial fill.”<sup>140</sup> The Treasure Island Redevelopment Plan has been heralded as “the most environmentally-sustainable large development project in U.S. history” for its transit-oriented character and open space, and is “one of sixteen founding projects of the Clinton Climate Initiative’s Climate Positive Development Program.”<sup>141</sup> The redeveloped Treasure Island will boast “8,000 new residential units (30% of which will be offered at below-market rates), three hotels, a 400-slip marina, restaurants, retail and entertainment venues—plus nearly 300 acres of parks and open space.”<sup>142</sup>

The EIR for this project tells a somewhat less rosy story about the extreme engineering and construction measures that will be necessary to compact Treasure Island’s soil enough to mitigate some of the liquefaction risk.<sup>143</sup> Perhaps the plan will be able to out-engineer a major earthquake; however, one thing is clear: thousands of new residents may be staking their lives on the ability of the project to do just that.

The revitalization of risky urban areas in redevelopment districts is being underwritten by federal money, including Community Development Block Grants (CDBG funds) allocated by HUD, and state and local tax dollars, through direct public investments and creative tax breaks and financing.<sup>144</sup> The River District Redevelopment Area in Sacramento, for instance, received more than

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AGENCY, <http://www.sfdevelopment.org/index.aspx?page=3> (last visited Oct. 24, 2011) (listing redevelopment project areas for “Bayview Hunters Point,” “South of Market,” and “Hunters Point Shipyard”); *Treasure Island: Redevelopment*, CITY & COUNTY OF SAN FRANCISCO, <http://www.sftreasureisland.org/index.aspx?page=6> (last visited Oct. 24, 2011) (describing the Redevelopment Plan for Treasure Island).

140. CAL. DEP’T OF CONSERVATION, *supra* note 138, at 6.

141. *Treasure Island: Redevelopment*, *supra* note 139.

142. *Id.*

143. See CITY & CNTY. OF S.F. PLANNING DEP’T, TREASURE ISLAND/YERBA BUENA ISLAND REDEVELOPMENT PROJECT DRAFT ENVIRONMENTAL IMPACT REPORT II.74 (2010), available at <http://www.sfplanning.org/index.aspx?page=1828> (describing how a more “stable ‘platform’” for “new buildings and roads” would have to be created by “densification of [Treasure Island’s] sandy soils” through “deep dynamic compaction” and “vibro-compaction,” and how the areas would also have to be “surcharged” through “preload[ing] the layer of Young Bay Mud that lies beneath the 50 feet of sand” by “temporarily placing approximately 15 to 30 feet of soil on the area to be surcharged”).

144. See, e.g., Charles Bartsh, *Financing Brownfield Cleanup and Redevelopment*, 18 GOV’T FIN. REV. 26, 28 exhibit 2 (2002).

a \$100 million in federal and local government money.<sup>145</sup> Because the disaster consequences of shifting our urban centers back into particularly vulnerable areas have been largely ignored, this public subsidization of disaster risk has not yet received the public scrutiny it deserves. Moreover, local governments have given inadequate consideration to the financial risk that a redevelopment project will be devastated by a natural disaster and the local government will still be obligated to repay the bonds that financed the project without the increased tax revenue that it was counting on to make the payments.

*B. Growth Management Laws: Urban Growth Boundaries*

Another popular technique for channeling growth into existing urban areas, and away from outlying suburbs or agricultural lands, is the adoption of urban growth boundaries<sup>146</sup> like that employed by Portland, Oregon—a city which is frequently heralded by sustainability advocates as a model of sustainability that other cities should emulate.<sup>147</sup> Urban growth boundaries aim to project the population (and concomitant housing and commercial development needs) of a region on some future date and then draw a boundary around the current metropolitan area in which growth to meet those needs must occur.<sup>148</sup>

Urban growth boundaries—particularly those drawn quite strictly—privilege the current urban form and, by restricting land available for growth, create pressure to develop (or redevelop) the land inside the urban growth boundaries at higher densities.<sup>149</sup> Indeed, the success of a strict urban growth boundary is premised on the existence of opportunities to increase density within the city

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145. *River District Redevelopment Area*, *supra* note 97.

146. Some states, including Oregon, Washington, and Tennessee, mandate that their cities designate urban growth boundaries. David Bollier, *Urban Growth Boundaries*, SPRAWL WATCH, <http://www.sprawlwatch.org/ubg.html> (last visited Oct. 24, 2011). Individual cities that have adopted urban growth boundaries include San Jose (and 14 other California communities), Boulder, Colorado, and Lexington, Kentucky. *See id.*

147. *See* Abby Haight, *Portland Gets Its Reward: Most Sustainable City*, THE OREGONIAN, Mar. 26, 2009 (recounting that Portland had earned SustainLane's "top award" for most sustainable city every year since the organization began its rankings in 2005).

148. *See* Bollier, *supra* note 146.

149. *See* Eric Mortenson, *Metro Says Portland Area has Room to Grow Inside Current Urban Boundary*, THE OREGONIAN (Sept. 15, 2009), [http://www.oregonlive.com/environment/index.ssf/2009/09/metro\\_says\\_growth\\_can\\_be\\_conta.html](http://www.oregonlive.com/environment/index.ssf/2009/09/metro_says_growth_can_be_conta.html) (discussing how much land is available in Portland for infill).

boundaries, primarily by increasing the availability of multifamily housing in existing neighborhoods and by infilling and redeveloping underutilized urban spaces.<sup>150</sup>

By restricting the land available for development to that within the urban growth boundary, the boundary is likely to create pressure to develop marginal lands, vulnerable to natural disaster, that have escaped development because of that risk,<sup>151</sup> as well as pressure to redevelop hazardous urban areas that have fallen into disuse.

Natural hazard vulnerabilities can, of course, play a role in the designation of urban growth boundaries. For example, Metro, the elected regional government for the Portland metropolitan area, encourages towns to use seismic hazard maps when designating “urban reserve areas”—areas that will “eventually be brought inside the urban growth boundary.”<sup>152</sup> Presumably, this discretion is meant to allow towns to ensure that areas with particularly high seismic risks will not be brought within the boundary as it expands. Moreover, in the designation of “rural reserves”—those lands outside the urban growth boundary that are designated for long-term protection from urban development—counties are required to consider a number of factors, including whether the land is “subject to natural disasters or hazards, such as floodplains, steep slopes, and areas subject to landslides.”<sup>153</sup>

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150. See *id.*; see also *Urban Growth Boundary*, OR. METRO (2011), <http://www.oregonmetro.gov/index.cfm/go/by.web/id=277> (explaining that one benefit of the urban growth boundary is incentivizing the “develop[ment] and redevelop[ment] of land and buildings in the urban core, helping keep core ‘downtowns’ in business”).

151. See generally Raymond J. Burby et al., *Urban Containment Policy and Exposure to Natural Hazards: Is There a Connection?*, 44 J. ENVTL. PLAN. & MGMT. 475 (2001) (suggesting that urban growth boundaries might increase urban exposure to natural hazards—and thus disaster losses—by funneling development toward riskier locations within the urban boundary that had previously gone undeveloped because of hazard exposure).

152. SPANGLE ASSOCS., OR. METRO, EVALUATION OF EARTHQUAKE HAZARD MAPS FOR THE PORTLAND METROPOLITAN REGION OF OREGON, FINAL PROJECT REPORT 13 (1999), available at <http://www.metro-region.org/index.cfm/go/by.web/id=15789>. According to the report,

Metro is encouraging towns to use the relative earthquake hazard map in designating urban reserve areas, which are areas that will eventually be brought inside the urban growth boundary. Metro also incorporated the maps into the Natural Hazards chapter of its Regional Framework Plan adopted by the Council in December 1997.

*Id.*

153. OR. DEP’T OF LAND CONSERVATION & DEV., DIVISION 27, URBAN AND RURAL RESERVES IN THE PORTLAND METROPOLITAN AREA 660-027-0060(3)(b) (2007), available at [http://www.oregon.gov/LCD/metro\\_urban\\_and\\_rural\\_reserves.shtml](http://www.oregon.gov/LCD/metro_urban_and_rural_reserves.shtml).

The initial urban growth boundaries are, however, determined primarily by the extant urban form and existing growth patterns. When deciding where to channel growth, the disaster risk of areas already within current city limits (and thus presumptively within the urban growth boundary) is not compared to the disaster risk of areas that are likely to be outside the urban growth boundary. This approach may be particularly problematic when the boundary is being drawn around a city with high disaster risk.

Portland, Oregon, is exactly such a city. Three major seismic faults run under the densest portions of Portland, and estimates are that a future earthquake along these faults might result in as many as 7800 deaths and injuries, and over \$12 billion in direct economic damages.<sup>154</sup> In addition to earthquakes, the City of Portland has other natural hazard risks, including floods, extreme weather, and landslides.<sup>155</sup> A Portland State University study of the city's hazard risks found that "thirteen neighborhoods are at risk in a 'triple hazard area,' which combines the highest rates of peak ground acceleration [during a 100-year earthquake], 100-year flood risk and potential toxic release sites."<sup>156</sup> Most of these neighborhoods are in the densest regions of the city, such as the downtown area.<sup>157</sup> Another study found that some of the most devastating landslides have occurred, and are likely to occur again, in the West Hills neighborhood,<sup>158</sup> which is within the metropolitan urban growth boundary and is experiencing rapid development.

Furthermore, despite the fact that the city's hazard mitigation plan observes that a storm more serious than the 100-year flood "could bring floodwaters over the downtown seawall and into the central business district,"<sup>159</sup> the City of Portland Bureau of Planning

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154. YUMEI WANG & J. L. CLARK, EARTHQUAKE DAMAGE IN OREGON: PRELIMINARY ESTIMATES OF FUTURE EARTHQUAKE LOSSES, SPECIAL PAPER 29, at 4, 5 (1999) (summary), available at <http://oregongeology.org/sub/earthquakes/SP29SUMMARY.pdf>.

155. *Id.*

156. Dana Dickman et al., *Spatial Analysis of Hazard Risk Factors for Vulnerable Populations in Portland, Oregon*, BROADMOOR PREPARES (April 30, 2007), [http://www.broadmoorprepares.com/resources/Spatial+Analysis+of+Hazrad+Risk+Factors+for+Vulnerable+Population+in+Portland\\$2C+Oregon.pdf](http://www.broadmoorprepares.com/resources/Spatial+Analysis+of+Hazrad+Risk+Factors+for+Vulnerable+Population+in+Portland$2C+Oregon.pdf).

157. *Id.*

158. SCOTT F. BURNS ET AL., LANDSLIDES GEOHAZARD MAP FOR PORTLAND, OR., USA 5 (2006), available at [http://www.iaeg.info/iaeg2006/PAPERS/IAEG\\_520.PDF](http://www.iaeg.info/iaeg2006/PAPERS/IAEG_520.PDF).

159. CITY OF PORTLAND BUREAU OF PLAN. & SUSTAINABILITY, HUMAN HEALTH AND SAFETY, PORTLAND PLAN 112 (2009), available at [www.portlandonline.com/portlandplan/index.cfm?a=346241&c=514271](http://www.portlandonline.com/portlandplan/index.cfm?a=346241&c=514271).

and Sustainability has urged reclamation of the downtown districts bordering the river.<sup>160</sup> Indeed, following the pattern noted in the prior section,<sup>161</sup> Portland's redevelopment districts are clustered around the riverfront. Portland currently has eleven "Urban Renewal Areas,"<sup>162</sup> eight of which front on either the Willamette or the Columbia River, or both.<sup>163</sup> Parts of many of these districts are undoubtedly in the 100-year floodplain, or at least the inundation plain of Portland's 1996 flood, which exceeded that of the predicted 100-year flood.<sup>164</sup>

In 2003, Portland's South Waterfront Redevelopment Project won a prestigious Phoenix award from an environmental foundation for its work in reclaiming underutilized urban sites.<sup>165</sup> The then-Executive Director of the Portland Development Commission explained that redevelopment projects like South Waterfront are "leading the way [in] reclaiming unproductive sites in the city," and that "this type of reclamation is going to be key to the city's economic future" because "Portland is facing a shortage of large developable sites."<sup>166</sup>

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160. *The River Plan*, CITY OF PORTLAND BUREAU OF PLAN. & SUSTAINABILITY, <http://www.portlandonline.com/bps/index.cfm?c=42540> (last visited Oct. 24, 2011).

161. See *supra* notes 81–104 and accompanying text.

162. *Current Projects*, PORTLAND DEV. COMM'N, <http://www.pdc.us/currentwork/default.asp> (last visited Nov. 29, 2011).

163. Portland's eight riverfront urban renewal areas are Airport Way, Downtown Waterfront, Interstate Corridor, River District, Central Eastside, North Macadam, Oregon Convention Center, and Willamette Industrial. See *Urban Renewal Area Map (All URAs)*, PORTLAND DEV. COMM'N, [http://www.pdc.us/pubs/inv\\_detail.asp?id=635&ty=57](http://www.pdc.us/pubs/inv_detail.asp?id=635&ty=57) (last visited Oct. 24, 2011) (showing the Airport Way Urban Renewal Area along the Columbia River; the Downtown Waterfront, River District, Central Eastside, North Macadam, Oregon Convention Center, and Willamette Industrial Urban Renewal Areas along the Willamette River; and the Interstate Corridor Urban Renewal Area, bordering both the Columbia and Willamette Rivers). Only the following three Portland Urban Renewal Areas are not located along the riverfront: Lents Towncenter, Gateway, and South Park Blocks. See *id.*

164. See *id.*; *Hazard Map*, OR. METRO, <http://tinyurl.com/85j8mhy> (follow "Hazard Map" hyperlink for map of Metro region) (last visited Dec. 3, 2011). Interestingly, despite the abundance of GIS data Metro makes available on its website, including the ability to overlay everything from the urban growth boundary to the FEMA 100-year floodplain, no map appears to allow overlay of urban renewal areas and either the FEMA 100-year floodplain or the 1996 inundation plain.

165. *News Release: South Waterfront Redevelopment Project Wins National Phoenix Award*, PORTLAND DEV. COMM'N, <http://www.pdc.us/new/releases/2003/20030917.asp> (last visited Oct. 24, 2011). The South Waterfront Redevelopment Area was formerly the North Macadam Urban Renewal Area. See ECOLOGICAL RIVERFRONT DESIGN, *supra* note 82, at 146.

166. See *News Release: South Waterfront Redevelopment Project Wins National Phoenix*

The urban growth boundary may also complicate efforts to set aside natural preserves in areas of high disaster exposure within the city's limits. Portland's Planning Bureau has acknowledged that the urban growth boundary has had the "unintended consequence" of communicating to residents that "all nature exists outside of the boundary, and there's nothing natural within."<sup>167</sup> This attitude has already been an obstacle to "preserv[ing] natural areas and creat[ing] new ones within Portland's city limits."<sup>168</sup> It seems equally likely to impede any efforts to avoid development or redevelopment of areas with high natural hazards exposure by designating them as large tracts of green, open space.

Portland's waterfront redevelopment efforts have won acclaim with environmentalists, in part, because the city employs many Smart Growth techniques to improve river ecology and to increase access to, and recreation along, the rivers. Those techniques tend to create larger development-free buffer zones along rivers, and thus mitigate some flooding risk.<sup>169</sup> However, the Smart Growth approach also dictates dense, transit-oriented development in these same riverfront urban renewal areas.<sup>170</sup>

Beautiful waterfront promenades and trails should not disguise the fundamental fact that Portland's efforts are likely increasing disaster vulnerability by bringing people and property back to the water's edge—or at least very close to it. Nor should we lose sight of the fact that this shift is being subsidized, in no small measure, by public funding—both state and federal. Portland's South Waterfront Development, for example, is being funded by "\$219 million in public investment[] and \$131 million in tax increment financing."<sup>171</sup> It represents the "largest single development project in Portland

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*Award, supra*, note 165.

167. See ECOLOGICAL RIVERFRONT DESIGN, *supra* note 82, at 138 (quoting Gil Kelley, Portland Planning Bureau).

168. *Id.*

169. For example, Portland's Planning Bureau has begun implementing a new mandatory 100-foot "greenway setback along the Willamette [River]," a significant improvement over the prior 25-foot setback. See *id.* at 140.

170. See, e.g., *River District, Objective*, PORTLAND DEV. COMM'N, <http://www.pdc.us/ura/river.asp> (last visited Oct. 24, 2011) (describing plans to transform the River District into a mixed-use, "high density urban residential neighborhood," with housing density averaging "100 units per acre").

171. ECOLOGICAL RIVERFRONT DESIGN, *supra* note 82, at 146. The development hopes to attract another \$1.6 billion in private funds. See *id.*

history.”<sup>172</sup> One can only imagine the predicament the city might find itself in if the redeveloped areas suffer serious flooding losses and the city loses the future revenue stream it is depending on to meet its bond obligations.<sup>173</sup>

*C. California’s New Growth Management Approach: SB 375*

California’s SB 375 is a new entry in the fight to halt suburban sprawl and direct growth back into existing urban areas.<sup>174</sup> Enacted in October 2008, SB 375 is intended to help California meet its statutory goal of reducing greenhouse gas emissions to 1990 levels by the year 2020. To accomplish this aim, SB 375 changes the way regional planning agencies allocate housing needs between different communities to promote transit-oriented development and thereby reduce vehicle miles traveled.<sup>175</sup>

While the precise effect of SB 375 is difficult to determine at this time, the nonprofit Partnership for Sustainable Communities predicts that SB 375 will likely allocate “more housing to already dense cities rather than to lower-density communities” because, even with increased density, suburbs may lack the critical mass necessary for successful public transportation. Thus, “[i]ncreasing the density of a sprawling suburb won’t necessarily reduce vehicle miles traveled

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172. *Id.*

173. Portland’s Development Commission explains the tax-increment financing it uses for urban renewal as follows:

Urban renewal districts raise money by borrowing against future growth in property taxes. The city uses the borrowed money to pay for capital improvements, which spur more development. The city then uses the incremental increase in property taxes from the district to repay the loan. When the urban renewal district expires in 20–25 years, the intent is to return a much higher property tax base to the tax rolls.

*Frequently Asked Questions*, PORTLAND DEV. CORP., [http://www.pdc.us/about\\_pdc/faqs.asp](http://www.pdc.us/about_pdc/faqs.asp) (follow “What is Tax Increment Financing”) (last visited Oct. 24, 2011). If that increase in property taxes does not materialize, the city’s ability to repay its loan obligations will be jeopardized.

174. *See* CAL. GOV’T. CODE §§ 65080–65086.5 (West 2009).

175. The California Global Warming Solutions Act of 2006 (AB 32), CAL. HEALTH & SAFETY CODE §§ 38.500–38.599 (West 2009), requires California to reduce greenhouse gas emissions to 1990 levels by 2020. *Id.* § 38.550. One of the eighteen emissions reduction measures adopted by the California Air Resources Board, which is charged with implementing the Act, is reducing vehicle miles traveled by promoting transit-oriented development. *See California: A Primer on AB 32 and SB 375*, PARTNERSHIP FOR SUSTAINABLE COMMUNITIES., <http://www.p4sc.org/articles/all/california-primer-ab-32-and-sb-375> (last visited Oct. 24, 2011).

in the region.”<sup>176</sup> “By contrast, increasing the number of people living in cities and compact suburbs where transit and amenities are already in place may have a bigger impact on regional emissions, because those people will tend to walk to stores and take transit to work.”<sup>177</sup>

When allocating housing needs on a regional basis, SB 375 directs councils of government to develop a methodology that incorporates a number of factors, including the opportunities for, and restraints on, growth in different jurisdictions.<sup>178</sup> As part of that analysis, the councils are directed to consider the “availability of land suitable for urban development” including “opportunities for infill development and increased residential densities.”<sup>179</sup> In determining what available land is suitable for urban development, the councils may—but are not required to—“exclude lands where the Federal Emergency Management Agency (FEMA) or the Department of Water Resources has determined that the flood management infrastructure designed to protect that land is not adequate to avoid the risk of flooding.”<sup>180</sup>

This discretionary power to exclude flood-prone land with inadequate “flood management infrastructure” from the calculation of land suitable for urban development provides only a weak assurance that councils will not channel growth into risky areas. The exclusion standard is both vague and underinclusive,<sup>181</sup> and, in any event, the decision to exclude land is at the council’s discretion. Although only time will tell how local councils will implement SB 375, and how they will exercise their discretion to exclude land subject to flood hazard from the calculus, the strong push toward increasing density raises the concern that, as with redevelopment districts and urban growth boundaries, natural hazard risk will be at most a secondary consideration in the growth planning process.

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176. *California: A Primer on AB 32 and SB 375*, *supra* note 175.

177. *Id.*

178. See CAL. GOV’T. CODE § 65584.04(d)(2)(B).

179. *Id.*

180. *Id.*

181. The standard does not take into account other hazard risks (like seismicity and wildfire) and also comes into play only when there is a judgment by FEMA or the state that the relevant levees or other structural flood protection infrastructure is lacking. Much of this flood protection infrastructure is inadequately monitored and evaluated.

## V. THE WAY FORWARD

One of the foundational and most often cited definitions of sustainability comes from the Bruntland Commission of the United Nations in 1987: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”<sup>182</sup> Cities typically have a very long lifespan. Committing future generations to patterns of urban development that increase disaster risk, rather than mitigate it, may compromise the ability of future generations to meet their needs just as surely as profligate consumption of finite resources or human-induced climate change. And yet, current approaches to sustainability appear to be driving exactly that kind of unsustainable development, by channeling growth back into particularly vulnerable existing cities and into the riskiest parts of those cities—a result we might aptly describe as “Smart Growth in dumb places.”

This failure to take adequate account of the disaster risks of redeveloping existing cities is not entirely surprising. There may be good reasons to expect that developers, city planners, local politicians, and the general public will systematically underestimate the disaster risks associated with redeveloping or increasing the density of existing urban areas. As Cass Sunstein has frequently argued, individuals faced with imperfect information about risk (and limited time, resources, and mental energy to devote to seeking out and processing further information) may form their own assessment of risk by relying on the perceived collective judgment of others.<sup>183</sup> Thus, an individual assessing the risk of building in a particular area where many others have already built—such as a densely populated urban area—may incorrectly conclude that the hazard risk is lower than it actually is simply because she observes that many other individuals have apparently concluded that it was a “safe enough” area in which to build.<sup>184</sup> The flood-risk analysis in the Sacramento

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182. U.N. G.A., *Report of the World Comm’n on Environment and Development: Our Common Future*, transmitted to the General Assembly as Annex to ¶ 1, U.N. Doc. A/42/427 (Mar. 20, 1987), available at <http://www.un-documents.net/ocf-02.htm>.

183. See Timur Kuran & Cass R. Sunstein, *Availability Cascades and Risk Regulation*, 51 STAN. L. REV. 683, 721–22 (1999).

184. Cf. *Half Truths v. Whole Truths*, REDWOOD CITY SALTWORKS, <http://www.insidesaltworks.com/?p=169> (last visited Oct. 24, 2011) (defending a plan to redevelop as residential property a salt harvesting facility on the San Francisco Bay in Redwood City, despite the fact that the area is an earthquake liquefaction zone, on the grounds that “the substrate at the Saltworks site is the same as many other areas in the Bay Area”).

River District EIR may exemplify this kind of thinking: the existing levees make current development “safe,” the expanded development will not damage the levees, ergo the expanded development is also “safe.”<sup>185</sup> Such thinking impedes our ability to take seriously the disaster risks inherent in urban infill when the existing development that surrounds the area is subject to similar risks.

Likewise, hazards that are viewed as familiar, commonplace, everyday risks are often underestimated.<sup>186</sup> Individuals who live in cities vulnerable to natural disasters may adopt the attitude that every place is risky in some way and may view that vulnerability as just one of the many risks of modern life.<sup>187</sup>

Moreover, local politicians almost always favor redevelopment and growth of existing cities, even in the face of substantial hazard risk. Growth is the bread and butter of city politics. The “conventional wisdom” is that a “bigger,” more populous city “means more jobs, more taxpayers, more revenue, better education, better services—in essence, a higher standard of living” for current city residents.<sup>188</sup> Once a city is established, city leaders work hard to encourage more people to move there. And, even when a city suffers large population declines, it typically fights hard to reinvigorate and redevelop neighborhoods that are “emptying out.”<sup>189</sup> Only a few American cities with declining population have affirmatively embraced their shrinking footprint, budget, and population.<sup>190</sup> Even

185. See *supra* note 121 and accompanying text.

186. See CASS R. SUNSTEIN, *LAWS OF FEAR: BEYOND THE PRECAUTIONARY PRINCIPLE* 37 (2005) (“A risk that is familiar, like that associated with smoking, will be seen as more serious than a risk that is less familiar . . . .”); see also *id.* at 43 (“People are far more willing to tolerate familiar risks than unfamiliar ones, even if they are statistically equivalent.”) (emphasis omitted); Rachel F. Moran, *Fear Unbound: A Reply to Professor Sunstein*, 42 *WASHBURN L.J.* 1, 3 (2002) (“By contrast, other risks are so familiar that ‘social attenuation of risk’ takes place. Because a danger is taken for granted, the risk is systematically underestimated and insufficient measures are taken to prevent it.”) (summarizing Sunstein’s arguments).

187. See, e.g., *With Earthquake Likely, Groups Promote Plans to Minimize Damage and Deaths*, BAY VOICES, <http://xpress.sfsu.edu/bayvoices/2011/01/with-earthquake-likely-groups.html> (last visited Oct. 24, 2011) (noting that many residents of San Francisco do not take earthquake risk into account in deciding where to live, citing one resident who explained that “Mother Nature is going to have her fury, no matter where you live in the country” and that the amount of earthquake retrofitting a particular building had undertaken mattered less to his housing decision than “location and a washer and dryer”).

188. Timothy Aepfel, *Shrink to Fit: As Its Population Declines, Youngstown Thinks Small—Rather Than Trying To Grow, Ohio City Plans More Open Space*, *WALL ST. J.*, May 3, 2007, at A1.

189. See *id.*

190. See, e.g., Brentin Mock, *Can They Save Youngstown?*, *NEXT AMERICAN CITY*, July

after major natural disasters lay bare the vulnerability of a particular urban location, a city typically engages in a concerted effort both to encourage the return of displaced residents and to attract new residents.<sup>191</sup> Moreover, politicians are hardly masters of delayed gratification, and the revenue benefits of redeveloping risky land are often realized in the short-term, whereas the costs of future disasters may not occur until long after any given politician (or city planner) has left the scene.<sup>192</sup>

These factors might suggest that the problems identified in this Article are intractable—and they are difficult indeed. Simply recognizing the tension between existing sustainability approaches and disaster risk is, however, an important first step. We must also recognize that there will, inevitably, be tradeoffs. If we choose not to revitalize existing urban cores, more rural lands (including prime agricultural land) will be consumed. If we choose not to redevelop waterfront brownfields, those brownfields may never be cleaned up. Moreover, despite the importance of disaster mitigation in minimizing future human suffering and economic losses, disaster risk can only be one consideration in deciding where to channel future growth. If, for example, we locate new growth farther from water, those areas may have difficulty securing and transporting an adequate water supply. Other relevant factors include culture, energy consumption and carbon footprint, economic potential, natural resources, transportation networks, and other environmental considerations. South Florida's predicament exemplifies these tensions: channeling growth to the east will likely exacerbate hurricane and other flooding risks; yet channeling growth to the west will endanger the Everglades eco-system and perhaps compromise the region's water supply.<sup>193</sup>

The question, then, is how we can best ensure that the tradeoffs we make are well informed and well considered. This Article surely

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2008, available at <http://americacity.org/magazine/article/can-they-save-youngstown/> (explaining how Youngstown, Ohio, is “owning its population deficit” and embracing a “shrinking city model,” in which “the shrunk city demolishes blocks, converting its abandoned buildings and houses into open space for neighborhood enterprises and to nurture greenery”).

191. See, e.g., Alana Gomez Dong, *Galveston Tries to Rebuild Population*, CLICK2HOUSTON (June 5, 2009), <http://www.click2houston.com/news/19671162/detail.html> (discussing Galveston, Texas's efforts to increase population after Hurricane Ike).

192. See MILETI, *supra* note 7, at 160.

193. See *supra* notes 66–78 and accompanying text.

raises more questions than it can answer, but I offer some preliminary thoughts.

First, we need to broaden the current conversation about sustainability to include discussion of disaster risk. Broadening the conversation will require bringing the right players to the table. At the federal level, the interagency Partnership for Sustainable Communities should be expanded to include the Federal Emergency Management Agency (FEMA). Currently, this interagency partnership brings together the federal agencies that exert the most direct and sustained influence on local land-use planning, with the conspicuous omission of FEMA. FEMA administers perhaps the most far-reaching of any federal program designed to influence local land-use decisions: the National Flood Insurance Program.<sup>194</sup> It also administers Pre-disaster Mitigation Grants and post-disaster Hazard Mitigation Grant Program funds<sup>195</sup> and oversees the development and approval of state and local hazard mitigation plans under the Disaster Mitigation Act of 2000,<sup>196</sup> which are supposed to help guide state and local development away from natural hazards.

The omission of FEMA from the Partnership may be a reflection, in part, of FEMA's current status as a mere sub-department of the Department of Homeland Security (DHS), as it was demoted from cabinet-level status by the Homeland Security Act of 2002<sup>197</sup> that created DHS.<sup>198</sup> Whatever the cause, FEMA's absence from the Partnership perpetuates a vision of sustainability in which consideration of natural hazards plays, at best, a secondary role. The failure to give a prominent role to disaster mitigation is perhaps confirmed by the Partnership's six "guiding livability principles," none of which mentions disaster risk.<sup>199</sup> Including FEMA in the

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194. See Oliver A. Houck, *Rising Water: The National Flood Insurance Program and Louisiana*, 60 TUL. L. REV. 61 (1985) (describing how the National Flood Insurance Program impacts local land-use decisions).

195. See *Hazard Mitigation Assistance (HMA)*, FED. EMERGENCY MGMT. AGENCY, <http://www.fema.gov/government/grant/hma/index.shtm> (outlining the hazard mitigation programs administered by FEMA).

196. Disaster Mitigation Act of 2000, Pub. L. No. 106-390, 114 Stat. 1558-59, § 322 (2000) (codified at 42 U.S.C. § 5165 (2006)).

197. Homeland Security Act of 2002, Pub. L. No. 107-296, 116 Stat. 2135 (2002) (codified at 6 U.S.C. §§ 101-557 (2006)) (conditioning hazard mitigation funds on state development of approved natural disaster mitigation plans).

198. See 6 U.S.C. § 316.

199. The Partnership's six livability principles are: (1) "provide more transportation choices," (2) "promote equitable, affordable housing," (3) "enhance economic

Partnership would ensure the presence of a strong proponent of disaster mitigation at the table to help generate interagency discussion of, and attention to, the issue. FEMA's inclusion in the Partnership would also have the benefit of signaling to planners and grant applicants that disaster mitigation is, indeed, an important component of sustainability.

At the state and local level, broadening the sustainability dialogue to include disaster mitigation will require bridging existing gaps between planners and emergency managers. Traditionally, land-use and growth issues are the province of local land-use planners, while disaster mitigation is the province of emergency managers.<sup>200</sup> To end the stove piping of these issues, local officials will have to see past some of these traditional boundaries. The federal government or state governments could help incentivize such cross-fertilization by requiring integration of state and local hazard mitigation plans, developed under the Disaster Mitigation Act of 2000, into local general plans that guide zoning decisions.<sup>201</sup>

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competitiveness,” (4) “support existing communities,” (5) “coordinate and leverage investment,” and (6) “value communities and neighborhoods.” *Partnership For Sustainable Communities: EPA-HUD-DOT*, *supra* note 29. How significant FEMA's omission from the Partnership is depends, of course, on both the role and influence of the Partnership and whether the existing agency partners nonetheless choose to bring disaster mitigation to the forefront in their decisionmaking. Thus far, the most visible Partnership activities have been joint administration of grants. HUD awarded \$100 million dollars in Sustainable Communities Regional Planning Grants in October, 2010. See Press Release, HUD, HUD Awards Nearly \$100 Million in New Grants to Promote Smarter and Sustainable Planning For Jobs and Economic Growth (Oct. 14, 2010), available at [http://portal.hud.gov/hudportal/HUD?src=/press/press\\_releases\\_media\\_advisories/2010/HUDNo.10-233](http://portal.hud.gov/hudportal/HUD?src=/press/press_releases_media_advisories/2010/HUDNo.10-233). The grant guidelines did encourage cities to address natural hazards in their regional planning, which suggests that FEMA's absence from the partnership may not mean that disaster risks are neglected. See *Notice of Funding Availability for HUD's Fiscal Year 2010 Sustainable Communities Regional Planning Grant Program*, DEP'T OF HOUSING & URBAN DEV., <http://www.hud.gov/offices/adm/grants/nofa10/scrpg.cfm> (last visited Oct. 24, 2011) (click through program section) (noting that funds will be available to support development of regional plans for sustainable development that, *inter alia*, “proactively consider[s] risks from disasters and climate change”). There is some value in putting the onus on HUD, DOT, and EPA to think about disaster risk themselves, and the agencies seem to be doing a decent job of considering disaster risk; however, even when agencies are trying to think holistically, they are likely to give the most weight to their primary existing mandates.

200. See *Integrating Hazard Mitigation into Local Planning*, AM. PLANNING ASS'N, <http://www.planning.org/research/hazards/index.htm> (last visited Oct. 24, 2011) (explaining that hazard mitigation is often the “exclusive domain” of emergency managers, and planners typically have little interaction or input in the mitigation process).

201. See, e.g., Raymond J. Burby, *Hurricane Katrina and the Paradoxes of Government Disaster Policy: Bringing About Wise Governmental Decisions for Hazardous Areas*, 604 ANNALS OF AM. ACAD. OF POL. & SOC. SCI. 171, 184 (2006) (urging that the Disaster

Because land-use decisions are typically a state and local prerogative and approaches to land-use planning vary from state to state, state legislatures may be in the best position to encourage intergration of hazard mitigation into land-use decisions by, for example, amending their state enabling acts to require consideration of hazard mitigation in land-use planning. Moreover, when a state or locality adopts sustainability policies or legislation, it should include disaster mitigation as an important component and goal of sustainability. New York, for example, should consider amending its recently adopted Smart Growth Public Infrastructure Policy Act to include attention to disaster risk as one of its Smart Growth criteria.<sup>202</sup>

Second, in addition to bringing more players to the table and bridging existing gaps between those players, we need more forums for discussion of the role of disaster mitigation in long-term sustainability. Regional visioning projects provide opportunities for comprehensive consideration of all of the factors—including disaster risk—that should influence decisionmaking about where future growth should occur. The post-Katrina vision for Louisiana, *Louisiana Speaks*, was the first regional vision to give serious consideration to disaster risk.<sup>203</sup> Regions now embarking on visioning projects should follow Louisiana's example; it should not take another tragic disaster to motivate regions to make disaster mitigation an important component of visioning. Including disaster mitigation in regional visioning is especially critical now that California lawmakers have given such visioning—also called blueprinting—a central role in that state's efforts to achieve greenhouse gas reductions, and other states may be inclined to follow suit.<sup>204</sup>

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Mitigation Act of 2000 be amended to require integration of mitigation plans into local comprehensive plans as a condition of receiving federal funding for hazard mitigation). At the federal level, integration is currently required only for "enhanced mitigation plans," that qualify the state for additional mitigation funds. 44 C.F.R. § 201.5(b)(1) (2010).

202. See *supra* notes 33–35 and accompanying text.

203. See *Louisiana Speaks*, LOUISIANA RECOVERY AUTH., <http://lra.louisiana.gov/index.cfm?md=subsite&tmp=home&ssid=1> (last visited Sept. 20, 2011).

204. See *SB 375 Connects Land Use and AB 32 Implementation*, THE PLAN. REP., [http://www.planningreport.com/tpr/?module=displaystory&story\\_id=1257&format=html](http://www.planningreport.com/tpr/?module=displaystory&story_id=1257&format=html) (last visited Oct. 24, 2011) ("[SB 375] requires the 18 metropolitan planning organizations across the state of California to show that their future planning scenarios will result in a reduction in carbon. The requirement will engage regions in a process similar to a process pioneered [in] Sacramento, known as 'the blueprint,' which essentially says that we need to

Additionally, states might experiment with procedural mechanisms for consideration of disaster risk akin to the EIR required by the California Environmental Quality Act (CEQA)<sup>205</sup> or the environmental impact statement (EIS) required for some federal projects by the 1969 National Environmental Policy Act.<sup>206</sup> Such experiments might involve expanding existing environmental impact assessments to include a more explicit focus on disaster risk or crafting new, separate disaster impact assessment requirements. Currently, however, California is moving in the opposite direction, limiting the reach of CEQA.<sup>207</sup> Indeed, California's legislature recently amended CEQA to sharply limit EIR requirements for the very kind of developments most at issue in this Article: infill projects.<sup>208</sup>

Third, broadening the conversation about sustainability and disaster risk also means expanding the options being considered when charting a sustainable future. The risks of redeveloping urban areas must, of course, be weighed against the costs and risks of alternative growth patterns. Sprawl, however, is not necessarily the only alternative strategy. States, regions, or cities might decide, for instance, that they should be planning for new urban cores in less risky locations, rather than publicly subsidizing either sprawling suburbs or the shifting of existing urban cores toward hazardous areas through strategies like waterfront redevelopment. The map of major cities does not always need to look exactly as it does today. Indeed, the creation of new cities or centers of growth may be inevitable, as existing urban centers are unlikely to be able to

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plan as a region, not just as individual cities and counties." (quoting Calif. Sen. Darrell Steinberg)).

205. See *supra* note 114 and accompanying text.

206. 42 U.S.C. §§ 4321–4347 (2006); see also *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989) (explaining that the EIS is designed to require agencies to take a "hard look" at the environmental impacts of prospective projects but does not impose any substantive mandate on agency decisionmaking).

207. See Richard Frank, *CEQA "Reform" in California: 3-For-3*, LEGAL PLANET: THE ENVTL. L. & POL'Y BLOG (Oct. 7, 2011), <http://legalplanet.wordpress.com/2011/10/07/ceqa-reform-in-california-3-for-3/> (summarizing recent amendments to CEQA limiting CEQA's reach).

208. See S. 226, 2011 Leg., Reg. Sess. § 6 (Cal. 2011) (expanding the definition of infill projects and limiting the scope of EIRs for qualifying projects by, inter alia, eliminating the need to consider significant effects addressed in prior EIRs, alternative locations, and "[g]rowth inducing impacts").

accommodate all future growth unless we redevelop them at densities that are unacceptable to many citizens.

Serious consideration should also be given to the controversial, indeed almost unthinkable, option that certain cities or regions simply should not grow at all. If South Florida, for example, cannot grow without either concentrating people and resources in areas with serious hurricane and flooding risk or threatening the region's water resources by encroaching on the Everglades, then perhaps local and state leaders need to be asking hard questions about whether, and under what circumstances, growth can reasonably occur. Unfortunately, it is unlikely that cities and states will ask these tough questions so long as the costs of disaster are largely externalized—by subsidized flood insurance and generous post-disaster relief—to the nation as a whole.

This dilemma suggests that we must take a hard look at subsidization of the development (and redevelopment) of hazardous areas—whether that subsidization takes the form of the National Flood Insurance Program, HUD money for urban redevelopment, or state and local tax dollars for urban infill. It is, of course, possible that the economic benefits of redeveloping certain risky urban locations justify the periodic disaster costs that will be incurred, but public underwriting of the costs of both redevelopment and disasters skews current development decisionmaking in favor of investment in hazardous locations.

Fourth, if cities do choose to redevelop particularly vulnerable areas despite the disaster risks, those redevelopment efforts should employ an urban form that either helps mitigate current risks or will facilitate strategic retreat in the future. For example, some experts have suggested that strategic retreat can be more easily accomplished if a waterfront community is built around a series of roads (and utilities) that run perpendicular to the coast, rather than being built around a coastal road that runs parallel to the waterfront's edge.<sup>209</sup> Such an urban design allows communities to make some concessions to the water over time (by ceding the property and stretches of road closest to the water) without losing all coastal access and road and utility infrastructure.<sup>210</sup> Urban redevelopment, then, can at least be

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209. See TURBOTT & STEWART, *supra* note 18, at 30–31 (explaining how networks of roads that run perpendicular to, rather than parallel to, shorelines can facilitate a process of managed retreat from coastal hazards).

210. *See id.*

an opportunity to ease the way to more permanent mitigation measures that may be necessary down the road.

Fifth, in assessing where we ought to channel growth we must employ a more thoughtful conception of risk than has traditionally been used in land-use decisions. For example, more attention needs to be given to the residual risk of areas protected from flooding by structural flood protection measures such as levees. Decision makers often entirely ignore this residual risk, despite the potentially catastrophic results of levee failure or overtopping.

Moreover, too often the litmus test for deciding the appropriateness of future floodplain development is whether that land is located in the FEMA-designated 100-year flood plain.<sup>211</sup> Although the 100-year flood designation has become a de facto safety standard, it was never intended as such and does not represent any kind of reasoned judgment about what kind of risk is acceptable, and for what purposes.<sup>212</sup> This standard is particularly problematic as the effects of climate change may mean that the 100-year storm becomes the 70-year storm, or even the 30-year storm.<sup>213</sup> Unfortunately, at least for floods and hurricanes, the historical record may no longer be a particularly accurate predictor of future disaster. As one beleaguered emergency manager dealing with flooding along the Red River recently complained, the 100-year storm seems to be coming “every year.”<sup>214</sup>

Of course, once we move away from the 100-year floodplain standard, it is hard to know what should replace it. Recent legislation in California will soon require that urban developments be protected

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211. See, e.g., *supra* note 120–122 and accompanying text.

212. See *Levee System Evaluation for the National Flood Insurance Program Fact Sheet*, U.S. ARMY CORPS OF ENG'RS (2010), [http://www.usace.army.mil/LeveeSafety/KeyDocuments/Pages/lev\\_keydocs.aspx#eval](http://www.usace.army.mil/LeveeSafety/KeyDocuments/Pages/lev_keydocs.aspx#eval) (“The FEMA 100-year flood is a flood insurance standard, not a public safety standard.”).

213. See, e.g., Paul Kirshen et al., *Coastal Flooding in the Northeastern United States Due to Climate Change*, 13 MITIGATION & ADAPTATION STRATEGIES FOR GLOBAL CHANGE 437 (2008) (concluding that under a high greenhouse gas emissions scenario, the 100-year storm in the northeastern United States could become the 30-year storm by 2050; under a lower emissions scenario, the 100-year storm could become the 70-year storm).

214. In *Minnesota, Melting Snow Means Major Floods*, NPR (Mar. 21, 2011), <http://www.npr.org/2011/03/21/134743008/In-Minnesota-Melting-Snow-Means-Major-Floods> (quoting the mayor of Moorhead, Minnesota, located across the river from Fargo, North Dakota).

from the 200-year flood.<sup>215</sup> However, simply picking another nice, round (but arbitrary) number cannot be the right answer.

In sum, what may be required is a more holistic approach, so that the cumulative effects of individual, disconnected development decisions do not remake our cities in much more vulnerable forms. Such a holistic approach would allow us to step back from individual land-use decisions, and the policy commitments and economic considerations that drive them, to view the contours of the cities we are creating and to ask again whether there might be a better approach. Many cities and regions are already attempting to reimagine themselves, and sustainability initiatives can be an important component of those visions, so long as inattention to natural hazards does not transform those visions into nightmares.

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215. See CAL. GOV'T. CODE § 65007(1) (West 2009) (defining “urban level of flood protection” as that necessary to withstand flooding that “has a 1-in-200 chance of occurring in any given year”).

