# CLIMATE ADAPTATION AND THE NEED FOR A NATIONAL LAND USE POLICY

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#### ABSTRACT

Climate change is arguably one of the greatest challenges facing any nation today. While efforts to mitigate climate change by, among other things, reducing greenhouse gas emissions are laudable, they are not enough. The long-lived nature of greenhouse gases means that the world is locked into a certain amount of climate change—and the consequences thereof. Thus, adapting to our new normal is equally as important as preventing further climate change.

A great deal of climate adaptation measures involve changing land use patterns, whether that means changing the way we build homes and infrastructure or enforcing managed retreat measures to prevent development in areas at high risk of climate-related disasters. Land use in the United States, however, is hyperlocal—approximately 35,879 local governments across the country enforce their own land use regulations with no legal obligation to coordinate or cooperate with one another. Climate adaptation is too large of an undertaking for any single municipality even in the best of circumstances. Add in uncooperative municipalities and officials that do not believe in climate change to begin with, and the result is a collective action problem of monumental proportions.

This Note argues that federal legislation is required to address the problem of climate adaptation. It looks specifically to the Land Use Policy and Planning Assistance Act of 1973, an unsuccessful attempt at harmonizing land use regulation across the United States. This Note suggests the creation of a new Land Use Policy and Planning Act, taking lessons from environmental statutes, like the Clean Air Act, to craft a cooperative federalism solution to climate adaptation through federal grant programs that condition funds on adherence to climate adaptation best practices, regional cooperation, and information sharing. This Note argues that by federalizing climate adaptation, the United

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States can overcome the collective action problem inherent in our land use traditions and prepare for the climate future.

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### INTRODUCTION

The effects of climate change are devastating, and they are here. Average temperatures in the United States increased by 0.7°C over the past few decades and are expected to increase by another 1.4°C in coming years regardless of future emissions.<sup>1</sup> This temperature increase is associated, among other things, with an increase in the frequency and intensity of extreme weather events.<sup>2</sup> Since 1980, the United States has sustained "285 weather and climate disasters where the overall damage costs reached or exceeded \$1 billion,"<sup>3</sup> the cumulative costs of which exceed \$1 trillion.<sup>4</sup> Reducing greenhouse gas emissions is, of course, critical to the planet's climate future.<sup>5</sup> The long-lived nature of certain greenhouse gases, however, means that some amount of climate change is inevitable no matter what mitigation strategies are employed.<sup>6</sup> Thus, governments must put in place effective strategies to adapt to the realities of climate change in addition to reducing greenhouse gas emissions. There are myriad ways to adapt to climate change, but this Note will focus on how the current state of land use policy in the United States hinders effective climate resilience. This Note uses the term "land use" to refer collectively to the various aspects that dictate the nature and form of the built environment, including general planning, zoning, permitting, and building codes.

Land use policy in the United States is hyperlocal—even large metropolitan areas are split into smaller subcommunities, each with their own land use powers and "no legal obligation to coordinate" with their neighbors.<sup>7</sup> This creates a plethora of problems, from urban and suburban sprawl<sup>8</sup> to a lacking affordable

<sup>&</sup>lt;sup>1</sup> U.S. GLOB. CHANGE RSCH. PROGRAM, FOURTH NATIONAL CLIMATE ASSESSMENT VOLUME II: IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES 74 (2021) [hereinafter FOURTH NATIONAL CLIMATE ASSESSMENT VOL. II].

<sup>&</sup>lt;sup>2</sup> Climate Change Indicators: Weather and Climate, EPA, https://www.epa.gov/climate-indicators/weather-climate [https://perma.cc/R62C-QUFB] (last visited Sept. 29, 2023).

<sup>&</sup>lt;sup>3</sup> Adam B. Smith, 2020 U.S. Billion-Dollar Weather and Climate Disasters in Historical Context, CLIMATE.GOV (Sept. 27, 2021), https://www.climate.gov/disasters2020 [https://perma.cc/XX8P-63BQ].

<sup>&</sup>lt;sup>4</sup> Id.

<sup>&</sup>lt;sup>5</sup> See FOURTH NATIONAL CLIMATE ASSESSMENT VOL. II, *supra* note 1, at 34 ("[T]he severity of future impacts [of climate change] will depend largely on actions taken to reduce greenhouse gas emissions . . . .").

<sup>&</sup>lt;sup>6</sup> *See id.* at 40 (discussing differing impacts of short-lived greenhouse gases, such as methane, and long-lived greenhouse gases, such as carbon dioxide).

<sup>&</sup>lt;sup>7</sup> Catherine J. LaCroix, *Land Use and Climate Change: Is It Time for a National Land Use Policy?*, 35 ECOLOGY L. CURRENTS 124, 125 (2008); *see also* Alice Kaswan, *Climate Adaptation and Land Use Governance: The Vertical Axis*, 39 COLUM. J. ENV'T L. 390, 393-94 (2014) ("[W]ith almost 40,000 local government entities in the nation, an effective adaptation response will require cross-jurisdictional collaboration and coordination." (footnote omitted)).

<sup>&</sup>lt;sup>8</sup> See LaCroix, supra note 7, at 124-25 (noting local land use control encourages "widespread, low-density, automobile-dependent development").

housing supply.<sup>9</sup> Of concern here, however, is the decreased ability of communities to adapt to climate change due to the patchwork nature of land use laws in the United States. Climate change presents an enormous collective action problem given the current tradition of local control over land use policy—the impacts of climate change are and will continue to be overwhelming to local governments due to the costs and political difficulties associated with adaptation.<sup>10</sup> Effective land use policy, however, is absolutely essential to increasing climate resilience throughout the United States.

Though there are many federal laws and programs that touch on land use, there is no comprehensive federal land use legislation.<sup>11</sup> Moreover, the existing framework of federal legislation and action is poorly integrated with state and local efforts to adapt to climate change.<sup>12</sup> If there is to be a unified response to the need for climate resilience, federal leadership is necessary. In 1973, Congress attempted to pass the Land Use Policy and Planning Assistance Act (the "Land Use Act" or the "Act").<sup>13</sup> The Act attempted to modernize land use institutions of the past based on state police power which had "left a legacy of uncoordinated, haphazard, inefficient land use patterns which often [did] not reflect the legitimate interests of various and increasingly diverse constituencies."14 The Land Use Act would have created grant-in-aid programs to develop and improve states' land use planning capabilities and promote interstate coordination of land use planning and management.<sup>15</sup> It also would have encouraged federal grants or contracts for research or training in land use related subjects and provided new authority to improve coordination between federal land use planning efforts on federal lands and state land use planning

<sup>&</sup>lt;sup>9</sup> See Spencer M. Cowan, Anti-Snob Land Use Laws, Suburban Exclusion, and Housing Opportunity, 28 J. URB. AFFS. 295, 296 (2006) ("Studies confirm that local land use and development regulations contribute significantly to the shortage of affordable housing in many communities." (citation omitted)).

<sup>&</sup>lt;sup>10</sup> See Kaswan, supra note 7, at 430-32 ("[C]ollective action barriers . . . impede desirable local adaptation measures, including inadequate information, insufficient funds, 'race-to-thebottom' competition among jurisdictions, and the risk of free-riding."); see also Madison Condon, Market Myopia's Climate Bubble, 2022 UTAH L. REV. 63, 68-69 (noting effect of elections on climate policy and potential bad outcomes of lackluster response).

<sup>&</sup>lt;sup>11</sup> See Alice Kaswan, *Climate Change Adaptation and Land Use: Exploring the Federal Role*, 47 J. MARSHALL L. REV. 509, 518-23 (2014) (discussing various federal statutes, agencies, and regulations dealing with land use).

<sup>&</sup>lt;sup>12</sup> See id. at 524-25 ("[E]xisting federal initiatives are fragmented and are not adequately integrated with each other or with state and local land use planning initiatives.").

<sup>&</sup>lt;sup>13</sup> See Roger C. Adams, *The Land Use Policy and Planning Assistance Act of 1973: Legislating a National Land Use Policy*, 41 GEO. WASH. L. REV. 604, 608 (1973) (describing contents of Land Use Act and how it would address land use issues of that time).

<sup>&</sup>lt;sup>14</sup> S. COMM. ON INTERIOR AND INSULAR AFFS., LAND USE POLICY AND PLANNING ASSISTANCE ACT, S. REP. NO. 93-197, at 35-36 (1973) [hereinafter LAND USE ACT SENATE REPORT].

<sup>&</sup>lt;sup>15</sup> Id.

efforts on nonfederal lands.<sup>16</sup> Ultimately, the Act failed by only a few votes, and we are still left with a complex, inefficient patchwork of federal and state land use laws and policies.<sup>17</sup> This Note will argue that in order to face the worsening effects of climate change and build a resilient society, Congress must pass a new Land Use Policy and Planning Assistance Act and unify the haphazard network of land use policies in the United States.

Part I explains the basics of climate adaptation, recounts the history of the Land Use Act, and provides an overview of how land use policy has evolved in the United States. Part II describes the issues we face, including the expected effects of climate change in the United States, the current state of climate resilience policy in the United States at the state and federal levels, and how land use policy specifically affects climate adaptation. Part III sets out one potential solution—a new federal Land Use Act—analyzing the pros and cons of such an approach, and addressing some possible objections to this kind of legislation.

#### I. CLIMATE ADAPTATION AND LAND USE POLICY

### A. An Overview of Climate Adaptation and Resilience

Because a certain amount of climate change is effectively locked in by current emissions, the response to climate change necessarily involves two prongs: mitigation and adaptation.<sup>18</sup> Mitigation is the effort to reduce climate change, mainly through reducing emissions of greenhouse gases ("GHG"s).<sup>19</sup> Adaptation—the focus of this Note—is the effort to adjust to the actual and expected impacts of climate change.<sup>20</sup>

Adaptation occurs in five stages: awareness, assessment, planning, implementation, and monitoring and evaluation. In the first two stages, awareness and assessment, actors become aware of a potential climate change-related risk and assess their vulnerability to such a risk.<sup>21</sup> The planning stage "involves identifying, evaluating, and selecting options for responding to and managing existing and future changes in the climate" once the risks are

<sup>&</sup>lt;sup>16</sup> See generally Land Use Policy and Planning Assistance Act, S. 268, 93d Cong. (1973). See also LAND USE ACT SENATE REPORT, *supra* note 14, at 42; Shelby D. Green, *The Search* for a National Land Use Policy: For the Cities' Sake, 26 FORDHAM URB. L.J. 69, 117-19 (1998) (explaining Land Use Act's provisions); Adams, *supra* note 13, at 608-09 (same).

<sup>&</sup>lt;sup>17</sup> Green, *supra* note 16, at 117-19 ("Congress came within a few votes of passing the Land Use Policy and Planning Assistance Act of 1973.").

<sup>&</sup>lt;sup>18</sup> See Responding to Climate Change, NASA, https://climate.nasa.gov/solutions/ adaptation-mitigation/ [https://perma.cc/F6F9-L4LL] (last visited Sept. 29, 2023) (explaining concepts of mitigation and adaptation).

<sup>&</sup>lt;sup>19</sup> See id.

 $<sup>^{20}</sup>$  See id.

<sup>&</sup>lt;sup>21</sup> See U.S. GLOB. CHANGE RSCH. PROGRAM, CLIMATE CHANGE IMPACTS IN THE UNITED STATES: THE THIRD NATIONAL CLIMATE ASSESSMENT 681 (JERRY M. MELILLO, TERESE RICHMOND & GARY W. YOHE EDS., 2014) [hereinafter THIRD NATIONAL CLIMATE ASSESSMENT].

assessed.<sup>22</sup> Once the plans are finalized, adaptation actions are implemented.<sup>23</sup> Most adaptation projects in the United States are midimplementation at best.<sup>24</sup> Finally, once adaptation actions are in place, they are monitored for their ongoing effectiveness, and ideally they should be periodically reevaluated to ensure they are operating as intended.<sup>25</sup> Considerations in this stage include overall success of the action, as well as metrics such as cost.<sup>26</sup> Adaptation is necessarily iterative—as various governments implement adaptation actions and go through the adaptation cycle, risks are reassessed or newly identified, and older actions are improved upon.<sup>27</sup>

Related to and contained within the concept of climate adaptation is climate resilience. In this context, resilience refers to the ability to prepare for, recover from, and adapt to the impacts of climate change.<sup>28</sup> Increased resilience, generally, is achieved by reducing vulnerability.<sup>29</sup> Vulnerability is made up of three components: sensitivity, exposure, and adaptive capacity.<sup>30</sup> Sensitivity refers to the "degree to which a system, population, or resource is or might be affected by hazards."31 Exposure is the presence of people and assets in places where they are at increased risk of being affected by hazards.<sup>32</sup> Adaptive capacity describes the ability of people, assets, and systems to "adjust to a hazard, take advantage of new opportunities, or cope with change."33 For example, a house built at ground level is more sensitive to flooding because it is more likely to take significant damage in a flood as compared to a house that is raised. If that house is built in a floodplain, it has increased exposure due to increased flooding rates in the area. Finally, if the owner of that house has limited resources, the adaptive capacity is reduced because they cannot take measures to protect themselves from hazards.

With the expected effects of climate change in the United States,<sup>34</sup> social factors have a great deal of influence over the resilience of certain populations and communities.<sup>35</sup> Marginalized populations are more likely to live in high-

<sup>28</sup> See Ctr. for Climate and Energy Sols., What Is Climate Resilience and Why Does It Matter? 1 (2019).

<sup>29</sup> See id. at 2 (identifying risk as function of vulnerability multiplied by threat).

<sup>31</sup> Id.

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

<sup>35</sup> See Ctr. for Climate and Energy Sols., *supra* note 28, at 3; *see also* EPA, Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts 4-8

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<sup>&</sup>lt;sup>22</sup> See id. at 682.

<sup>&</sup>lt;sup>23</sup> See id.

<sup>&</sup>lt;sup>24</sup> See FOURTH NATIONAL CLIMATE ASSESSMENT VOL. II, supra note 1, at 1315.

<sup>&</sup>lt;sup>25</sup> See THIRD NATIONAL CLIMATE ASSESSMENT, supra note 21, at 682.

<sup>&</sup>lt;sup>26</sup> See id.

<sup>&</sup>lt;sup>27</sup> See FOURTH NATIONAL CLIMATE ASSESSMENT VOL. II, supra note 1, at 1319.

 $<sup>^{30}</sup>$  Id.

<sup>&</sup>lt;sup>32</sup> Id.

<sup>&</sup>lt;sup>34</sup> See infra Section II.A.

exposure areas.<sup>36</sup> "Repossessed homes sold by the Department of Housing and Urban Development between 2017 and 2020 were almost 75 times more likely to be in federally designated floodplains than other homes sold during that timeframe . . . . . "<sup>37</sup> When extreme weather events do come, low-income communities are unable to respond effectively because of their reduced adaptive capacity. <sup>38</sup> For example, when funding was provided to communities hit by Hurricanes Katrina and Sandy to rebuild, low-income communities were not able to take advantage of those funds due to issues such as an inability "to take off time to deal with contractors."<sup>39</sup> More affluent communities, on the other hand, could and did use that funding to mitigate risk to their homes.<sup>40</sup>

Beyond resilience, adaptation measures can mitigate some of the harmful effects of climate change.<sup>41</sup> For example, increasing the energy efficiency of buildings reduces the demand on electricity during extreme weather, when energy is in high demand for things such as heating or cooling.<sup>42</sup> These adaptation measures can also reduce GHG emissions, making them an especially attractive option as they address climate change adaptation and mitigation at the same time.<sup>43</sup>

## B. Land Use Policy and Planning Assistance Act of 1973

The Land Use Policy and Planning Assistance Act was introduced in the Senate on January 9, 1973, by Senator Henry Jackson.<sup>44</sup> Senator Jackson was the architect of a number of national land use bills in the early 1970s, envisioning a coordinated, efficient land use system that encouraged federal, state, and local governments to work together and harmonize the occasionally competing interests of economic development, environmental protection, and social

<sup>37</sup> Carter, *supra* note 36.

<sup>38</sup> See CTR. FOR CLIMATE AND ENERGY SOLS., *supra* note 28, at 3.

<sup>39</sup> Id.

<sup>40</sup> See id.

<sup>(2021) [</sup>hereinafter CLIMATE CHANGE AND SOCIAL VULNERABILITY] (finding racial and ethnic minorities, low-income individuals, and those with no high school diploma face increased exposure to effects of climate change).

<sup>&</sup>lt;sup>36</sup> See Matt Carter, HUD Homes More Likely To Be in Floodplains: Report, INMAN (Sept. 13, 2021), https://www.inman.com/2021/09/13/hud-homes-more-likely-to-be-in-floodplains-report/ [https://perma.cc/NRG7-64HR]; FOURTH NATIONAL CLIMATE ASSESSMENT VOL. II, supra note 1, at 1062.

<sup>&</sup>lt;sup>41</sup> See Kaswan, *supra* note 7, at 407 (describing how land-use planning measures used to respond to urban heat island effects may also reduce impact of heat waves and high water demand).

<sup>&</sup>lt;sup>42</sup> J. Cullen Howe, *Buildings, in* THE LAW OF ADAPTATION TO CLIMATE CHANGE 209, 210 (Michael B. Gerrard & Katrina Fischer Kuh eds., 2012).

 $<sup>^{43}</sup>$  See id.

<sup>&</sup>lt;sup>44</sup> Jayne E. Daly, A Glimpse of the Past—A Vision for the Future: Senator Henry M. Jackson and National Land-Use Legislation, 28 URB. LAW. 7, 27 (1996) (recounting introduction of Land Use Act).

equity.<sup>45</sup> Senator Jackson ultimately proposed three national land use bills from 1970 through 1974, though none passed.<sup>46</sup> The Land Use Act was the third of these and incorporated the provisions of the previous versions.<sup>47</sup>

After creating this plan, and within five years of enactment, the Act would also have required states to develop land use plans that focus on five categories of critical areas and uses of more than local concern:

(1) areas of critical environmental concern (e.g., beaches, flood plains, significant wildlife habitats, historic areas); (2) key facilities (e.g., major airports, highway interchanges and frontage access highways, recreational facilities, and facilities for development, generation and transmission of energy); (3) large scale development (e.g., industrial parks or major subdivisions); (4) public facilities or utilities of regional benefit (e.g., solid waste disposal or sewerage systems); and (5) land sales or development projects (major recreational or second homesite developments in rural areas).<sup>50</sup>

These areas and uses were singled out because of their potential to give local decision makers, deciding based solely on local concerns, outsized influence over the environment and economy of the region, state, or country as a whole.<sup>51</sup> States would be given federal grants to develop and implement these plans and processes.<sup>52</sup>

The Act also provided for a grant-in-aid program to assist states to coordinate land use planning, policy, and programs with one another.<sup>53</sup> States would have been able to "use existing interstate entities or, subject to Congressional

<sup>&</sup>lt;sup>45</sup> See id. at 7 ("Senator Henry M. Jackson challenged the Congress and people of the United States to come to terms with the urgent need to better manage this nation's greatest resource—its land.").

<sup>&</sup>lt;sup>46</sup> See *id.* at 7-8.

<sup>&</sup>lt;sup>47</sup> See *id.* at 27.

<sup>&</sup>lt;sup>48</sup> LAND USE ACT SENATE REPORT, *supra* note 14, at 38; *see* Green, *supra* note 16, at 117-18.

<sup>&</sup>lt;sup>49</sup> LAND USE ACT SENATE REPORT, *supra* note 14, at 39; *see* Land Use Policy and Planning Assistance Act, S. 268, 93d Cong. § 202 (1973).

<sup>&</sup>lt;sup>50</sup> LAND USE ACT SENATE REPORT, *supra* note 14, at 39.

<sup>&</sup>lt;sup>51</sup> See id.

<sup>&</sup>lt;sup>52</sup> See *id.*; Green, *supra* note 16, at 117-18.

<sup>&</sup>lt;sup>53</sup> LAND USE ACT SENATE REPORT, *supra* note 14, at 42.

approval, negotiate interstate compacts to accomplish such coordination, study, planning, or implementation."<sup>54</sup> In addition, the Advisory Commission on Intergovernmental Relations would have conducted a study on interstate land use policy and produced recommendations for improvement in this area.<sup>55</sup> Federal, state, and local governments were also required to coordinate planning and management in areas where federal lands are adjacent to nonfederal lands.<sup>56</sup> To that end, the Act allowed for short-term ad hoc federal-state committees to address general or specific conflicts between uses of federal lands and uses of adjacent nonfederal lands.<sup>57</sup>

To ensure that states were complying with the Act, it included limited, nonsubstantive federal review and sanctions.<sup>58</sup> The sanctions, however, were limited to removing access to grant-in-aid funds established by the Act due to amendments that removed more harsh punishment, including loss of other federal funds.<sup>59</sup> Notably, the Act did not "provide substantial new land use decisionmaking [sic] authority on the Federal level."<sup>60</sup>

Ultimately, though the Senate passed the Land Use Act, the House version of the Act failed to pass by seven votes.<sup>61</sup> The bill enjoyed support from many constituent groups such as environmentalists, but opposition from interest groups, such as Liberty Lobby, the Chamber of Commerce, and the John Birch Society, contributed to its failure.<sup>62</sup> These groups argued the Act infringed on private property rights and would lead to federal zoning.<sup>63</sup> Following the failure in the House, an economic recession caused a severe drop in any kind of development, further reducing support for land use legislation.<sup>64</sup> This, along with the Ford administration pledging no new spending programs, effectively killed the effort to pass land use law at the federal level.<sup>65</sup> To date, there has not been another significant attempt to pass federal land use legislation.<sup>66</sup>

<sup>54</sup> Id.

<sup>60</sup> *Id.* at 41.

<sup>61</sup> See Daly, supra note 44, at 34-35 (describing reasons for Land Use Act's failure).

<sup>66</sup> See Green, supra note 16, at 69; see also Jake Blumgart, What Can the Biden Administration Do To Reform Zoning?, CITY MONITOR (Aug. 4, 2023, 8:25 AM), https://citymonitor.ai/housing/residential-construction/what-can-the-biden-administration-do-to-reform-zoning [https://perma.cc/5GJ5-USJL] ("No US presidential administration has been much concerned with land use and zoning.").

<sup>&</sup>lt;sup>55</sup> Id.

<sup>&</sup>lt;sup>56</sup> Id.

<sup>&</sup>lt;sup>57</sup> Id.

<sup>&</sup>lt;sup>58</sup> See id. at 41-42.

<sup>&</sup>lt;sup>59</sup> See *id.* ("It will be recalled that S. 3354 and S. 632, earlier versions of S. 268 reported by this Committee in former Congresses (and, in the case of S. 632, passed by the Senate) did contain sanctions which affected other Federal programs.").

<sup>&</sup>lt;sup>62</sup> See id.

<sup>&</sup>lt;sup>63</sup> See id.

<sup>&</sup>lt;sup>64</sup> Id.

<sup>&</sup>lt;sup>65</sup> Id.

## C. A Brief History of Land Use Policy

### 1. State and Local

This Section will focus on the advent of zoning in the United States, but the principles and developments described apply to land use control power in general.<sup>67</sup> The American system of land use ultimately traces its origins to the English common law of property.<sup>68</sup> "England's principal legacies to the United States are, first, strong support for the private ownership of land, with uses limited by nuisance doctrines, and, second, the legitimacy of regulation of building construction and of the location of noxious land uses by the local municipality."<sup>69</sup> In the colonial era, land grants from towns and colonial charter companies were often accompanied by simple land use restrictions.<sup>70</sup> For example, a 1632 ordinance in Cambridge, Massachusetts, regulated the height of buildings, roofing materials, and other aspects of how landowners could use their lots.<sup>71</sup>

As urbanization increased in the nineteenth and twentieth centuries, building and construction patterns began to affect various aspects of urban life, such as traffic patterns and public health.<sup>72</sup> In response, municipalities used the police power delegated to them by the states to begin regulating conditions on private property as well as limiting what types of buildings could be built in certain areas.<sup>73</sup> These regulations proved insufficient, however, and municipalities began looking for other ways to control land use in the early twentieth century.<sup>74</sup> In 1916, New York City enacted the first comprehensive zoning ordinance, which divided the city into land use districts or zones.<sup>75</sup> Private landowners were only permitted to use their land for the purposes specified within the applicable zone.<sup>76</sup> For example, a given zone could only permit retail use, to the exclusion of industrial use.<sup>77</sup> Variances from the established uses in a zone could be granted by the municipality if a landowner demonstrates that the existing zoning

<sup>71</sup> See JUERGENSMEYER ET AL., supra note 67, at 44.

<sup>72</sup> See Nolon, supra note 68, at 829.

<sup>76</sup> See Nolon, supra note 68, at 830; see also JUERGENSMEYER ET AL., supra note 67, at 45.

<sup>&</sup>lt;sup>67</sup> See Julian Conrad Juergensmeyer, Thomas E. Roberts, Patricia E. Salkin & Ryan Max Rowberry, Land Use Planning and Development Regulation Law 44 (4th ed. 2018).

<sup>&</sup>lt;sup>68</sup> See John R. Nolon, *Historical Overview of the American Land Use System: A Diagnostic Approach to Evaluating Governmental Land Use Control*, 23 PACE ENV'T L. REV. 821, 824 (2006).

<sup>&</sup>lt;sup>69</sup> Id.

<sup>&</sup>lt;sup>70</sup> See id.

<sup>&</sup>lt;sup>73</sup> See *id.* ("In 1915, for example, the U.S. Supreme Court upheld a regulation by the City of Los Angeles to prevent the operation of a dangerous brick kiln within a part of the city.").

<sup>&</sup>lt;sup>74</sup> See id. at 829-30.

<sup>&</sup>lt;sup>75</sup> See id. at 830; see also JUERGENSMEYER ET AL., supra note 67, at 45; LAND USE ACT SENATE REPORT, supra note 14, at 35.

<sup>&</sup>lt;sup>77</sup> See Nolon, *supra* note 68, at 830.

creates undue hardship.<sup>78</sup> The concept of zoning proved extremely popular—by the mid-1920s "nearly 400 local governments had adopted comprehensive zoning laws."<sup>79</sup>

In response to the rapid spread of zoning laws, states passed statutes specifically enabling zoning by delegating the power to regulate private land use to municipalities.<sup>80</sup> Generally, municipalities adopted a land use plan which all zoning regulations had to follow.<sup>81</sup> In addition, many state laws authorized municipalities to create "administrative and quasi-judicial agencies to review and adjudicate"<sup>82</sup> matters relating to land use and development, usually taking the form of a body such as a zoning or planning board.<sup>83</sup>

As more municipalities put limits on what some saw as the property rights protected by the common law and the Fifth Amendment, courts considered challenges to comprehensive zoning.<sup>84</sup> In 1926, the Supreme Court upheld comprehensive zoning. In *Village of Euclid v. Ambler Realty Co.*,<sup>85</sup> a real estate firm challenged a municipal zoning scheme on the grounds that it violated the Fourth Amendment by depriving the firm of property without due process.<sup>86</sup> The Court held that in order for a zoning ordinance to be unconstitutional it must be "clearly arbitrary and unreasonable, having no substantial relation to the public health, safety, morals, or general welfare."<sup>87</sup> Post-*Euclid*, what became known as Euclidian zoning swept the country.<sup>88</sup> Today, states have given municipalities additional power and flexibility to enable them to respond to development pressures and site development appropriately through "neo-Euclidian" zoning techniques.<sup>89</sup>

Though municipalities hold most of the authority under the traditional American land use scheme, some states have attempted to wrest back a portion of the power they delegated.<sup>90</sup> These efforts, however, have been limited in scope and face significant pushback from municipalities and constituents alike.<sup>91</sup> That said, the states are not completely powerless in the land use arena. Several

<sup>&</sup>lt;sup>78</sup> See id.

<sup>&</sup>lt;sup>79</sup> *Id.*; *see* JUERGENSMEYER ET AL., *supra* note 67, at 45.

<sup>&</sup>lt;sup>80</sup> See Nolon, supra note 68, at 830.

<sup>&</sup>lt;sup>81</sup> See id.

<sup>&</sup>lt;sup>82</sup> Id.

<sup>&</sup>lt;sup>83</sup> See id.

<sup>&</sup>lt;sup>84</sup> See id. at 827-28.

<sup>&</sup>lt;sup>85</sup> 272 U.S. 365, 397 (1926).

<sup>&</sup>lt;sup>86</sup> See id. at 384.

<sup>&</sup>lt;sup>87</sup> *Id.* at 395.

<sup>&</sup>lt;sup>88</sup> JUERGENSMEYER ET AL., *supra* note 67, at 45.

<sup>&</sup>lt;sup>89</sup> See Nolon, supra note 68, at 833.

<sup>&</sup>lt;sup>90</sup> See LaCroix, supra note 7, at 125.

<sup>&</sup>lt;sup>91</sup> See id.

states have established land use agencies that articulate overall state land use goals and have approval rights over certain types of development projects.<sup>92</sup>

## 2. Federal

Land use is widely considered an area of traditional—and even exclusive state power.<sup>93</sup> In the late 1960s and early 1970s, Congress passed or attempted to pass a number of statutes that would challenge state power over land use.<sup>94</sup> Specifically, the advent of federal environmental regulation, such as the National Environmental Policy Act ("NEPA"), the Clean Air Act ("CAA"), the Clean Water Act ("CWA"), and others, established some federal power over land use in the sense they limited the acceptable uses of private land by setting pollution standards that cannot be exceeded.<sup>95</sup>

More explicit attempts to allow federal land use regulations were unsuccessful, and indeed even specifically rebuked.<sup>96</sup> For example, in 1977, the CAA was amended to remove the federal government's ability to require land use controls as part of the State Implementation Plans ("SIPs") to achieve air quality goals.<sup>97</sup> Though there is no "overarching federal authority over land use," the federal government does affect land use through some statutes and programs it administers.<sup>98</sup> The Coastal Zone Management Act of 1972 ("CZMA") establishes "land use policies for land development in coastal areas" and provides funding for states and localities that adopt regulations that comply with these policies.<sup>99</sup> Stormwater runoff regulations promulgated by the Environmental Protection Agency ("EPA") require municipalities to meet certain control measures to limit runoff from industrial land uses.<sup>100</sup>

Ultimately, federal power over land use policy is subject to a number of common and constitutional law limitations.<sup>101</sup> Chief among them is the Takings

<sup>&</sup>lt;sup>92</sup> See Nolon, supra note 68, at 835-37 (describing varying land use control responses in New York, Oregon, and Utah).

<sup>&</sup>lt;sup>93</sup> See id. at 827 ("The power to control private land use is part of the states' police power, and it is regarded as a reserved power of the states . . . ."); Rapanos v. United States, 547 U.S. 715, 738 (2006) ("Regulation of land use . . . is a quintessential state and local power.").

<sup>&</sup>lt;sup>94</sup> See Nolon, supra note 68, at 832 (describing Congress's efforts under Commerce Clause power to adopt laws controlling land, air, and water pollution).

<sup>&</sup>lt;sup>95</sup> See id. at 837-38 (explaining federal law standards and steep criminal and civil penalties for violations).

<sup>&</sup>lt;sup>96</sup> See id. at 827 (recounting how early environmental attempts were perceived as threatening power of states to control land use); LaCroix, *supra* note 7, at 125.

<sup>&</sup>lt;sup>97</sup> See 42 U.S.C. § 7431 (2004) ("Nothing in this Act constitutes an infringement of existing authority of counties and cities to plan or control land use, and nothing in this Act provides or transfers authority over such land use."); LaCroix, *supra* note 7, at 125.

<sup>&</sup>lt;sup>98</sup> See Kaswan, supra note 7, at 408.

<sup>&</sup>lt;sup>99</sup> Nolon, *supra* note 68, at 838.

<sup>&</sup>lt;sup>100</sup> See id.; Kaswan, supra note 7, at 411.

<sup>&</sup>lt;sup>101</sup> See JUERGENSMEYER ET AL., supra note 67, at 410.

Clause of the Fifth Amendment,<sup>102</sup> which provides that private property cannot "be taken for public use, without just compensation."<sup>103</sup> The takings clause has been interpreted broadly to include regulatory actions affecting property that are the "functional equivalent of physical appropriations."<sup>104</sup> These actions are broadly referred to as regulatory takings or constructive takings.<sup>105</sup> The Fifth Amendment is also implicated in challenges to land use based on substantive due process.<sup>106</sup> The substantive due process limitations on land use in general are embodied in the *Euclid* decision, requiring land use to be rationally related to "public health, safety, morals, or general welfare."<sup>107</sup> Today, however, substantive due process claims are unlikely to succeed in land use cases.<sup>108</sup>

Though less likely to be applied to the federal government, the First Amendment is also a potential check on land use power.<sup>109</sup> Specifically, land use regulations that interfere with the rights to speech, assembly, and religion are not entitled to a presumption of constitutionality.<sup>110</sup> This limitation has most often arisen when municipalities attempt to regulate signs or religious uses of land.<sup>111</sup> That said, the First Amendment remains a potential check on federal forays into land use.

## II. THE CLIMATE ADAPTATION CRISIS

### A. Economic and Social Costs of Climate Change

1. Expected Effects of Climate Change in the U.S.

Inevitably, the climate will change.<sup>112</sup> This is due in large part to the enduring nature<sup>113</sup> of the main driver of human-caused climate change, GHGs.<sup>114</sup> Some GHGs, like methane, "are removed from the atmosphere by natural processes

<sup>111</sup> See JUERGENSMEYER ET AL., supra note 67, at 465.

<sup>&</sup>lt;sup>102</sup> See id.

<sup>&</sup>lt;sup>103</sup> U.S. CONST. amend. V.

<sup>&</sup>lt;sup>104</sup> JUERGENSMEYER ET AL., *supra* note 67, at 410.

<sup>&</sup>lt;sup>105</sup> See id. at 412; see also infra Section III.C.3.

<sup>&</sup>lt;sup>106</sup> See JUERGENSMEYER ET AL., supra note 67, at 448.

<sup>&</sup>lt;sup>107</sup> Id. (quoting Village of Euclid v. Ambler Realty Co., 272 U.S. 365, 395 (1926)).

<sup>&</sup>lt;sup>108</sup> See id.

<sup>&</sup>lt;sup>109</sup> See id. at 465 (explaining land use controls implicating First Amendment rights typically occur in regulating "billboards and other signage, sexually oriented adult businesses, and religious uses"); Nolon, *supra* note 68, at 828.

<sup>&</sup>lt;sup>110</sup> See Nolon, supra note 68, at 828.

<sup>&</sup>lt;sup>112</sup> See FOURTH NATIONAL CLIMATE ASSESSMENT VOL. II, *supra* note 1, at 40 ("Greenhouse gas emissions from human activities will continue to affect Earth's climate for decades and even centuries.").

<sup>&</sup>lt;sup>113</sup> Id. (discussing longevity of GHGs in atmosphere).

<sup>&</sup>lt;sup>114</sup> See U.S. GLOB. CHANGE RSCH. PROGRAM, FOURTH NATIONAL CLIMATE ASSESSMENT VOLUME I 10 (2017) ("[E]missions of greenhouse gases . . . are the dominant cause [of climate change] . . . .").

more quickly."<sup>115</sup> Others, like carbon dioxide, remain in the atmosphere longer.<sup>116</sup> Thus, even if all emissions were ended today, the world would face some amount of warming and climate change.<sup>117</sup> The effects of climate change in the United States are varied—different regions of the country will experience climate change in different ways.<sup>118</sup> In all of these regions, however, the effects of climate change are not felt equally. Frontline communities—communities that experience the first and often the worst effects of climate change—are generally made up of economically and socially disadvantaged populations.<sup>119</sup> Black people, for example, are forty percent more likely than non-Black people to "live in areas with the highest projected increases in mortality rates due to climate-driven changes in extreme temperatures."<sup>120</sup> Indigenous people are "48% more likely than [non-Indigenous people] to currently live in areas where the highest percentage of land is projected to be inundated due to sea level rise."<sup>121</sup>

In the Northeast, the amount and intensity of precipitation is expected to increase, potentially overwhelming existing stormwater management infrastructure.<sup>122</sup> Ocean acidification, temperature increases, and sea level rise will threaten coastal communities in the Northeast by reducing the productivity of fisheries and available coastal land.<sup>123</sup> Due to the urbanization of the Northeast and the urban heat island effect,<sup>124</sup> the region can expect

<sup>118</sup> FOURTH NATIONAL CLIMATE ASSESSMENT VOL. II, *supra* note 1, at 73-75 (explaining impact of climate change on ocean acidification, sea levels, temperatures, precipitation, arctic change, severe storms, coastal flooding, and long-term changes).

<sup>119</sup> See, e.g., *id.* at 1062 ("Frontline communities in the Northwest include tribes and Indigenous peoples, those most dependent on natural resources for their livelihoods, and the economically disadvantaged."); CLIMATE CHANGE AND SOCIAL VULNERABILITY, *supra* note 35, at 4.

<sup>120</sup> CLIMATE CHANGE AND SOCIAL VULNERABILITY, *supra* note 35, at 6.

<sup>121</sup> Id.

<sup>&</sup>lt;sup>115</sup> See FOURTH NATIONAL CLIMATE ASSESSMENT VOL. II, supra note 1, at 40.

<sup>&</sup>lt;sup>116</sup> Id.

<sup>&</sup>lt;sup>117</sup> *Id.*; see also Is It Too Late To Prevent Climate Change?, NASA, https://climate.nasa. gov/faq/16/is-it-too-late-to-prevent-climate-change/ [https://perma.cc/JN98-KMCQ] (last visited Sept. 29, 2023) ("Temperatures would then plateau but remain well-elevated for many, many centuries.").

<sup>&</sup>lt;sup>122</sup> See FOURTH NATIONAL CLIMATE ASSESSMENT VOL. II, *supra* note 1, at 671 ("The recent dominant trend in precipitation throughout the Northeast has been towards increases in rainfall intensity....").

<sup>&</sup>lt;sup>123</sup> See id. (explaining effects of climate change on coastal communities and marine ecosystems in Northeast).

<sup>&</sup>lt;sup>124</sup> Heat islands are areas that experience increased temperatures compared to outlying areas. Cities have high concentrations of buildings, roads, and other infrastructure that absorb and retain heat, leading to daytime temperatures about 0.5-3.8°C higher than surrounding areas. *See Heat Island Effect*, EPA, https://www.epa.gov/heatislands [https://perma.cc/UJZ8-5MDG] (last visited Sept. 29, 2023) (describing causes and effects of urban heat island effect).

"approximately 650 additional premature deaths per year from extreme heat by the year 2050" as temperatures increase.<sup>125</sup>

The Southeast is home to "vast expanses of coastal and inland low-lying areas."<sup>126</sup> These areas are particularly vulnerable to flooding, which is expected to become more frequent as sea levels rise and precipitation increases in the region.<sup>127</sup> "[H]igh tide flooding already poses daily risks to businesses, neighborhoods, infrastructure, transportation, and ecosystems in the region," and the flooding will only get worse.<sup>128</sup> Climate change is also expected to increase the prevalence of vector-borne diseases<sup>129</sup> in the Southeast, especially in cities.<sup>130</sup> The Southeast is also largely dependent on agriculture, and over 500 million labor hours could be lost by the end of the century as extreme heat makes it impossible to work outside.<sup>131</sup>

The Midwest is a major agricultural producer and provides food for domestic consumption and international trade.<sup>132</sup> Increasing precipitation and humidity in the region has "eroded soils, created favorable conditions for pests and pathogens, and degraded the quality of stored grain."<sup>133</sup> As conditions worsen, the agricultural capacity of the Midwest will be reduced to levels last seen in the 1980s.<sup>134</sup> Increased precipitation will also overwhelm existing wastewater management systems without adaptation, and extreme temperatures will put stresses on roads, bridges, and other transportation infrastructure.<sup>135</sup>

In the West, water is one of the biggest concerns.<sup>136</sup> Increased temperatures due to climate change may have accounted for one-tenth to one-fifth of the decreased soil moisture during droughts in California from 2012 to 2014.<sup>137</sup> Climate change has altered the water cycle in these regions significantly, and as temperatures continue to rise, droughts will become more frequent and more

<sup>130</sup> See FOURTH NATIONAL CLIMATE ASSESSMENT VOL. II, supra note 1, at 754.

<sup>&</sup>lt;sup>125</sup> FOURTH NATIONAL CLIMATE ASSESSMENT VOL. II, *supra* note 1, at 672.

<sup>&</sup>lt;sup>126</sup> Id. at 745.

<sup>&</sup>lt;sup>127</sup> See id. at 746 (describing effects of climate change on low-lying areas in Southeast).

<sup>&</sup>lt;sup>128</sup> Id.

<sup>&</sup>lt;sup>129</sup> Vector-borne diseases are those spread by animals, such as ticks and mosquitos. *See Diseases Carried by Vectors*, CDC, https://www.cdc.gov/climateandhealth/effects/vectors.htm [https://perma.cc/9FYC-TCZ7] (last updated Dec. 21, 2020) (discussing effects of climate change on vector-borne disease).

<sup>&</sup>lt;sup>131</sup> See id. at 780 ("[T]he Southeast is projected to have the largest heat-related impacts on labor productivity in the country, resulting in average annual losses of 570 million labor hours, or \$47 billion (in 2015 dollars, undiscounted) . . . .").

<sup>&</sup>lt;sup>132</sup> See id. at 880.

<sup>&</sup>lt;sup>133</sup> Id.

<sup>&</sup>lt;sup>134</sup> See id.

<sup>&</sup>lt;sup>135</sup> See id. at 900-01.

<sup>&</sup>lt;sup>136</sup> See id. at 1104 ("Water for people and nature in the Southwest region has declined during droughts, due in part to human-caused climate change.").

<sup>&</sup>lt;sup>137</sup> See id. at 1111.

severe.<sup>138</sup> These changes to the water cycle have driven the increase in wildfires seen in the region.<sup>139</sup> According to analyses estimates, had climate change not occurred, the area burned by wildfires between 1984 and 2015 would have been halved.<sup>140</sup> These wildfires have immense economic costs—wildfires in the Los Angeles area from 1990 to 2009 caused around \$3.1 billion in damages.<sup>141</sup>

#### 2. Case Studies

#### a. Texas Electrical Grid

In February 2021, Texas's electrical grid was brought to its knees by extreme cold weather resulting from winter storm Uri.<sup>142</sup> The storm caused systematic, cascading failures throughout the state's energy infrastructure and left approximately 4.4 million people without power on February 15, and over half a million people without power days later.<sup>143</sup>

"Texas is the only state in the contiguous U.S. that operates its own electric grid," managed by the Electric Reliability Council of Texas ("ERCOT"), which is not subject to federal oversight.<sup>144</sup> Over the past decade, legislators and regulators in the state have declined to put in place measures to address weaknesses in the state power grid and power generation systems.<sup>145</sup> During the storm, all electricity sources struggled to keep up with demand, and "transmission companies inadvertently cut power to parts of the natural gas supply chain when ERCOT ordered the utilities to reduce power demand or risk

<sup>144</sup> Schwartz et al., *supra* note 142.

<sup>145</sup> See id.

1859

<sup>&</sup>lt;sup>138</sup> See id. at 1112.

<sup>&</sup>lt;sup>139</sup> See id. at 1115.

<sup>&</sup>lt;sup>140</sup> See id. (adding further that "area burned from 1916 to 2003 was more closely related to climate factors than to fire suppression, local fire management, or other non-climate factors").

<sup>&</sup>lt;sup>141</sup> Unadjusted for inflation. See id. at 1116.

<sup>&</sup>lt;sup>142</sup> See Jeremy Schwartz, Kiah Collier & Vianna Davila, "Power Companies Get Exactly What They Want": How Texas Repeatedly Failed To Protect Its Power Grid Against Extreme Weather, TEX. TRIB. (Feb. 22, 2021, 5:00 PM CST), https://www.texastribune.org/ 2021/02/22/texas-power-grid-extreme-weather/ [https://perma.cc/57W2-K4SG]; James Doss-Gollin, David J Farnham, Upmanu Lall & Vijay Modi, How Unprecedented Was the February 2021 Texas Cold Snap?, ENV'T RSCH. LETTERS, June 2021, at 1, 1 (2021).

<sup>&</sup>lt;sup>143</sup> See Doss-Gollin et al., *supra* note 142, at 1; *The February 2021 Texas Power Outage*, AM. OVERSIGHT (May 12, 2021), https://www.americanoversight.org/investigation/the-february-2021-texas-power-outage [https://perma.cc/3SRQ-HVGM].

further damage to the grid."<sup>146</sup> Because many of Texas's power plants rely on natural gas to generate electricity, this further reduced available power.<sup>147</sup>

The winter weather that caused this crisis is far from unprecedented in Texas.<sup>148</sup> In fact, numerous storms, dating back to 1951, brought similarly severe conditions and heating demand.<sup>149</sup> Even with this data available, Texas did not adequately prepare its energy infrastructure.<sup>150</sup> In the climate change adaptation context, however, this data is still not a sound basis for predictions of future conditions.<sup>151</sup> The effects of climate change will only worsen in the coming years, meaning Texas can expect more extreme weather events like Uri.<sup>152</sup> Any adaptation measures must take this into account to avoid being obsolete by the time they are finished.<sup>153</sup> Here, land use policy could have required Texas's energy companies to prepare their infrastructure to withstand extreme cold through measures such as building codes.<sup>154</sup>

## b. New York City Subway

In September 2021, the New York City subway faced flooding due to the impacts of Hurricane Ida.<sup>155</sup> Ida "dropped more than half a foot of water on the region and gave New York City more rainfall in one hour than Chicago averages in an entire month."<sup>156</sup> As a result, underground subway stations throughout New York City were filled with rainwater—scenes of flooded stations and trains plowing through water spread across social media overnight.<sup>157</sup>

<sup>&</sup>lt;sup>146</sup> Mandi Cai, Erin Douglas & Mitchell Ferman, *How Texas' Power Grid Failed in 2021 – and Who's Responsible for Preventing a Repeat*, TEX. TRIB. (Feb. 15, 2022, 5:00 AM CST), https://www.texastribune.org/2022/02/15/texas-power-grid-winter-storm-2021/ [https://perma.cc/9JQL-3Q7R].

<sup>&</sup>lt;sup>147</sup> See *id.* ("Natural gas producers were unable to deliver enough fuel to power plants. At the same time, some wells were unable to produce as much natural gas due to the freezing conditions.").

<sup>&</sup>lt;sup>148</sup> See generally Doss-Gollin et al., *supra* note 142 (finding cold snaps dating back to 1951 brought similar conditions and heat demand to February 2021 storm).

<sup>&</sup>lt;sup>149</sup> See id. at 1 (finding temperatures and inferred heating demand per capita were more severe during December 1989 storm and cold snaps in 1951 and 1983 were nearly as severe).

<sup>&</sup>lt;sup>150</sup> See Schwartz et al., supra note 142.

<sup>&</sup>lt;sup>151</sup> See infra Section II.C.

<sup>&</sup>lt;sup>152</sup> See The February 2021 Texas Power Outage, supra note 143.

<sup>&</sup>lt;sup>153</sup> See infra Section II.C.

<sup>&</sup>lt;sup>154</sup> See infra Section II.C.

<sup>&</sup>lt;sup>155</sup> John Surico, *Why New York's Subway Keeps Flooding*, BLOOMBERG CITYLAB (Sept. 2, 2021, 5:35 PM), https://www.bloomberg.com/news/articles/2021-09-02/this-is-why-hurri cane-ida-flooded-the-nyc-subway.

<sup>&</sup>lt;sup>156</sup> Id.

<sup>&</sup>lt;sup>157</sup> Id.

Unlike in Texas,<sup>158</sup> however, New York City had worked to harden its subway against flooding.<sup>159</sup> Since Superstorm Sandy similarly overwhelmed the subway system in 2012, New York City has spent at least \$5 billion hardening the system.<sup>160</sup> Why, then, did Ida still overwhelm the subway? The answer lies in the differences between Ida and Sandy, specifically in how they caused flooding.<sup>161</sup> Sandy, as a coastal storm, caused storm surge, i.e., water from the ocean was pushed ashore by the storm.<sup>162</sup> Thus, the adaptation measures put into place after Sandy were aimed at preparing the system for saltwater storm surge floods, which can corrode electrical wires and cause other long-term damage.<sup>163</sup> Ida, on the other hand, brought a short burst of high-intensity rain which quickly overwhelmed drainage systems.<sup>164</sup>

As the effects of climate change progress, intermittent but extreme precipitation like that of Hurricane Ida will become more common in many areas.<sup>165</sup> This kind of precipitation, however, is much more difficult to prepare for than storm surge.<sup>166</sup> Even in places that have already been working toward climate resilience like New York City,<sup>167</sup> systems are not ready to face the worsening effects of climate change.<sup>168</sup> At the rate that New York City was repairing its subway drainage infrastructure the day after Ida hit, it would have taken "15 years to unclog the more than 400 miles of subway drains, a pace unfit for modern demands."<sup>169</sup> Infrastructure like the subway is inherently subject to the applicable land use controls in the place where it is built. To effectively adapt to threats like Superstorm Sandy and Hurricane Ida, building codes and other land use measures must be proactive rather than reactive. By incorporating the best knowledge and practices available at the time of their enactment and not relying on past data, existing infrastructure and buildings can increase their chances of surviving the new risks posed by climate change.<sup>170</sup>

<sup>&</sup>lt;sup>158</sup> See supra Section II.A.2.a.

<sup>&</sup>lt;sup>159</sup> See Surico, *supra* note 155 (explaining after 2012's Superstorm Sandy, New York City enacted "repairs designed to harden the system against the threats of inundation").

<sup>&</sup>lt;sup>160</sup> Id.

<sup>&</sup>lt;sup>161</sup> See id.

<sup>&</sup>lt;sup>162</sup> See id.; What Is Storm Surge?, NAT'L OCEANIC & ATMOSPHERIC ADMIN. (Jan. 20, 2023), https://oceanservice.noaa.gov/facts/stormsurge-stormtide.html [https://perma.cc/6R74-EJWH].

<sup>&</sup>lt;sup>163</sup> See Surico, supra note 155.

<sup>&</sup>lt;sup>164</sup> Id.

<sup>&</sup>lt;sup>165</sup> See supra Section II.A.1.

<sup>&</sup>lt;sup>166</sup> See Surico, supra note 155.

<sup>&</sup>lt;sup>167</sup> See, e.g., N.Y.C. MAYOR'S OFF. OF RESILIENCY, CLIMATE RESILIENCY DESIGN GUIDELINES 5 (2020).

<sup>&</sup>lt;sup>168</sup> See Surico, *supra* note 155 (emphasizing New York City's "subways were already experiencing a crisis of maintenance and modernization, let alone one of climate adaptation").

<sup>&</sup>lt;sup>169</sup> *Id.* (concluding New York City "will have to come up with a better game plan for regular yet severe rainfall").

<sup>&</sup>lt;sup>170</sup> See infra Section II.C.

## B. The Current State of Climate Adaptation Policy

#### 1. State and Local

Climate adaptation policy has been implemented at the state level in earnest.<sup>171</sup> Currently, nineteen states and the District of Columbia have a finalized climate adaptation plan,<sup>172</sup> up from sixteen in January 2012.<sup>173</sup> Of the remaining thirty-one states, five are currently planning their adaptation policies, leaving twenty-six states with no plans in place or forthcoming.<sup>174</sup> These adaptation plans attempt to identify anticipated climate impacts and develop recommendations for reducing or eliminating those impacts.<sup>175</sup>

These plans, however, are often not comprehensive.<sup>176</sup> "Communities have been less focused on reducing exposure through actions such as land-use change (preventing building in high-risk locations) and retreat."<sup>177</sup> Rather, these plans have been more focused on reducing sensitivity to climate impacts.<sup>178</sup> Like New York's subway hardening efforts,<sup>179</sup> adaptation actions on the state level tend to "arise and [be] funded in the context of recovery after an event, rather than taken proactively."<sup>180</sup> Because of this, many adaptation projects are not as comprehensive as they should be.<sup>181</sup> In addition, current adaptation plans tend to focus on particular problems and solutions with little regard for how many different types of adaptation actions can work synergistically.<sup>182</sup> Finally, existing plans tend to be developed under the assumption, express or implied, that the future climate will resemble the past—an assumption that is no longer valid in the face of worsening climate change.<sup>183</sup>

On the opposite side of the spectrum, there are states that not only lack adaptation plans, but also actively work to chill climate adaptation.<sup>184</sup> For example, in 2012, North Carolina enacted legislation "that ignored state scientists' sea level rise predictions and barred further statewide predictions for four years, chilling the state's role in facilitating local planning for sea level

<sup>&</sup>lt;sup>171</sup> See Kaswan, supra note 7, at 412.

<sup>&</sup>lt;sup>172</sup> See State and Local Adaptation Plans, GEO. CLIMATE CTR., https://www.georgetownclimate.org/adaptation/index.html [https://perma.cc/8L7V-6GPG] (last visited July 24, 2023).

<sup>&</sup>lt;sup>173</sup> See Kaswan, supra note 7, at 412.

<sup>&</sup>lt;sup>174</sup> See State and Local Adaptation Plans, supra note 172.

<sup>&</sup>lt;sup>175</sup> See Kaswan, *supra* note 7, at 412-13.

<sup>&</sup>lt;sup>176</sup> See FOURTH NATIONAL CLIMATE ASSESSMENT VOL. II, supra note 1, at 1317.

<sup>&</sup>lt;sup>177</sup> Id.

<sup>&</sup>lt;sup>178</sup> *Id.*; see also supra Section I.A.

<sup>&</sup>lt;sup>179</sup> See supra Section II.A.2.b.

<sup>&</sup>lt;sup>180</sup> FOURTH NATIONAL CLIMATE ASSESSMENT VOL. II, *supra* note 1, at 1317.

<sup>&</sup>lt;sup>181</sup> See id.

<sup>&</sup>lt;sup>182</sup> See id.

<sup>&</sup>lt;sup>183</sup> See id.

<sup>&</sup>lt;sup>184</sup> See Kaswan, supra note 7, at 413.

rise."<sup>185</sup> Regardless of the fact that adaptation actions have increased at the state and local level significantly in recent years, climate change is progressing faster than our plans for its impacts.<sup>186</sup>

2. Federal

Increasingly, the federal government is taking actions related to climate adaptation and resilience.<sup>187</sup> Prior to the current administration, however, most federal policy revolved around climate mitigation rather than adaptation.<sup>188</sup> The 117th Congress was extremely active in introducing proposals that touched on climate change, and "climate change legislation [was] referred to more than 35 committees."189 For example, the Infrastructure Investment and Jobs Act, 190 passed in November 2021, provides funding to promote "clean energy and increased resilience of U.S. infrastructure."<sup>191</sup> A bill titled the National Climate Adaptation and Resilience Strategy Act was also introduced, which would have established a council to provide recommendations on how the Federal Government can improve its climate resilience and adaptation operations.<sup>192</sup> President Biden signed an executive order in 2021 instructing the head of each federal agency to develop adaptation and resilience plans to address their agency's climate vulnerabilities.<sup>193</sup> The Inflation Reduction Act, passed in 2022, includes millions of dollars in funding for climate resilience and adaptation, including three billion dollars in block grants for nonprofits to pursue, among other things, increased climate resilience.194

<sup>&</sup>lt;sup>185</sup> Id.

<sup>&</sup>lt;sup>186</sup> See FOURTH NATIONAL CLIMATE ASSESSMENT VOL. II, *supra* note 1, at 1318.

<sup>&</sup>lt;sup>187</sup> See generally KATE C. SHOUSE, CORRIE E. CLARK, RICHARD K. LATTANZIO, GENEVIEVE K. CROFT, JANE A. LEGGETT, RENA S. MILLER, KEZEE PROCITA, MICHAEL I. WESTPHAL & JONATHAN L. RAMSEUR, CONG. RSCH. SERV., R46947, U.S. CLIMATE CHANGE POLICY 6-11 (2021) (summarizing history of U.S. climate change policy).

<sup>&</sup>lt;sup>188</sup> See id. at 11-13.

<sup>&</sup>lt;sup>189</sup> Id. at 14-15.

<sup>&</sup>lt;sup>190</sup> Pub. L. No. 117-58, 135 Stat. 429 (2021).

<sup>&</sup>lt;sup>191</sup> SHOUSE ET AL., *supra* note 187, at 15.

<sup>&</sup>lt;sup>192</sup> See National Climate Adaptation and Resilience Strategy Act, H.R. 6461, 117th Cong. § 4 (2022).

<sup>&</sup>lt;sup>193</sup> See Exec. Order No. 14,008, 86 Fed. Reg. 7619 § 211 (Feb. 1, 2021) [hereinafter Biden Climate EO]; see also Climate Resilient Infrastructure and Operations, COUNCIL ON ENV'T QUALITY, https://www.sustainability.gov/federalsustainabilityplan/resilience.html [https:// perma.cc/CS38-HFDY] (last visited July 24, 2023).

<sup>&</sup>lt;sup>194</sup> See Inflation Reduction Act Guidebook, WHITE HOUSE, https://www.whitehouse.gov/cleanenergy/inflation-reduction-act-guidebook/

<sup>[</sup>https://perma.cc/9DYC-2LVL] (last visited Aug. 8, 2023); see also Inflation Reduction Act Invests Over \$120 Million in Proven Projects To Advance Climate Resilience, Conservation and Equity, DEP'T OF INTERIOR (Mar. 7, 2023), https://www.doi.gov/pressreleases/inflationreduction-act-invests-over-120-million-proven-projects-advance-climate [https://perma.cc/EC2C-SV54].

Additionally, some federal programs, though not explicitly land use or adaptation related, have collateral effects on land use patterns.<sup>195</sup> For example, the Federal Emergency Management Agency's ("FEMA") National Flood Insurance Program ("NFIP") encourages development in floodplains.<sup>196</sup> The NFIP provides government-administered flood insurance at low rates.<sup>197</sup> Though the program ostensibly is in place to "reduce the socio-economic impact of floods,"<sup>198</sup> it also makes building in floodplains economically viable when it would otherwise be prohibitively expensive to insure buildings, if insurance was available at all.<sup>199</sup> Other programs simply incorporate land use incentives, such as the CZMA.<sup>200</sup> The CZMA provides resources to states that develop a coastal zone management plan, and one precondition for approval of such a plan is that it must at minimum include "a definition of what shall constitute permissible land uses . . . [in] coastal zone[s]."<sup>201</sup>

## C. The Impact of Land Use Policy on Climate Adaptation

Land use planning is intimately connected to climate adaptation.<sup>202</sup> Primarily, land use regulations play a large role in determining exposure<sup>203</sup> to climate risks.<sup>204</sup> By allowing continued development in high-risk areas, such as floodplains and seashores, governments increase the number of people and structures exposed to the risks that climate change will increasingly bring.<sup>205</sup> To

<sup>198</sup> Id.

<sup>200</sup> See id. at 409.

<sup>201</sup> The Coastal Zone Management Act, TEX. A&M: AGRILIFE EXTENSION, https://coastalresilience.tamu.edu/home/introduction-to-coastal-resilience/legal-framework-for-planning/federal/land-use/the-coastal-management-act/ [https://perma.cc/TY57-KYQR] (last visited July 25, 2023).

<sup>202</sup> See Kaswan, supra note 7, at 404; John R. Nolon, Disaster Mitigation Through Land Use Strategies, 23 PACE ENV'T L. REV. 959, 963 (2006).

<sup>203</sup> See supra Part I.

<sup>204</sup> See Kaswan, supra note 7, at 413; Blake Hudson, *Reconstituting Land-Use Federalism To Address Transitory and Perpetual Disasters: The Bimodal Federalism Framework*, 2011 BYU L. REV. 1991, 2001 (2011).

<sup>205</sup> See Mike Maciag, Building Homes in Flood Zones: Why Does This Bad Idea Keep Happening?, GOVERNING (July 27, 2018), https://www.governing.com/archive/gov-flood-zone-floodplain-development-homes-zoning.html [https://perma.cc/UFY7-BB8Q] ("Nationally, the number of Americans living in these high-risk areas in 2016 climbed 14 percent compared to those living in the same neighborhoods in 2000."); FOURTH NATIONAL CLIMATE ASSESSMENT VOL. II, *supra* note 1, at 209 ("Coastal regions . . . account for . . . 43% of all urbanization in the contiguous United States."); CLIMATE CHANGE AND SOCIAL VULNERABILITY, *supra* note 35, at 62, 69 (finding various socially vulnerable groups live in

<sup>&</sup>lt;sup>195</sup> See Kaswan, supra note 7, at 408.

<sup>&</sup>lt;sup>196</sup> *Id.* at 409-10.

<sup>&</sup>lt;sup>197</sup> *Flood Insurance*, FEMA, https://www.fema.gov/flood-insurance [https://perma.cc /2723-5U42] (last visited July 24, 2022).

<sup>&</sup>lt;sup>199</sup> See Kaswan, supra note 7, at 409-10.

combat this, governments may consider the using land use restrictions to force retreat from high-risk areas.<sup>206</sup> "In the rare instances where retreat policies have been implemented," however, "they have been implemented reactively (e.g., restricting rebuilding after a storm or flood event)."<sup>207</sup> Reactive measures such as these limit the impact that land use can have on exposure to risks.

Land use measures also dictate, in large part, the protective measures that people can take in the face of climate change.<sup>208</sup> Protective measures broadly fall into two categories: "hard" measures, such as sea walls and other physical barriers, and "soft" measures, such as beach nourishment and planting dune grasses.<sup>209</sup> Land use regulations specify when landowners can or cannot build hard protection measures on their property.<sup>210</sup> They can also help maintain existing soft measures by restricting development and rebuilding in and around natural buffers to climate impacts.<sup>211</sup>

Finally, land use measures have a huge impact on the resilience of buildings and infrastructure, as well as the effects of climate change on people themselves, through regulation of how the built environment is constructed, operated, and maintained.<sup>212</sup> The main way this is regulated is through building and energy codes.<sup>213</sup> Because the resulting buildings will have long life spans, changes to building codes are especially important and powerful in this area.<sup>214</sup> As we prepare for the worsening effects of climate change, energy efficient buildings will become increasingly important.<sup>215</sup> One such effect is more common, more intense heat waves, during which energy demand will rise as air conditioners

areas at risk of flooding due to climate change); J. Peter Byrne & Jessica Grannis, *Coastal Retreat Measures*, *in* THE LAW OF ADAPTATION TO CLIMATE CHANGE 267, 267 (Michael B. Gerrard & Katrina Fischer Kuh eds., 2012) ("With the advent of the National Flood Insurance Program, development in flood-prone areas has rapidly expanded, especially along the coast.").

<sup>&</sup>lt;sup>206</sup> See Kaswan, *supra* note 7, at 405-06; *Flood Plain Regulation*, AM. PLAN. ASS'N, https://www.planning.org/pas/reports/report53.htm [https://perma.cc/2UNB-VBT6] (last visited July 25, 2023) (showing floodplain regulation can help save lives); Byrne & Grannis, *supra* note 205, at 268-69.

<sup>&</sup>lt;sup>207</sup> Byrne & Grannis, *supra* note 205, at 268.

<sup>&</sup>lt;sup>208</sup> See id. at 273; Kaswan, supra note 7, at 404-05.

<sup>&</sup>lt;sup>209</sup> Robert R.M. Verchick & Joel D. Scheraga, *Protecting the Coast, in* THE LAW OF ADAPTATION TO CLIMATE CHANGE 235, 239 (Michael B. Gerrard & Katrina Fischer Kuh eds., 2012).

<sup>&</sup>lt;sup>210</sup> See Kaswan, supra note 7, at 404-05 (listing retaining walls and bulkheads as examples).

<sup>&</sup>lt;sup>211</sup> See id. at 405 (listing zoning tools, rolling restrictions, and buy-outs as examples).

<sup>&</sup>lt;sup>212</sup> See id. at 407; Howe, supra note 42, at 210.

<sup>&</sup>lt;sup>213</sup> See Howe, supra note 42, at 209-10.

<sup>&</sup>lt;sup>214</sup> See id.

<sup>&</sup>lt;sup>215</sup> See id. at 210-13.

and other devices are used to keep people cool.<sup>216</sup> By changing building energy codes to mandate increased efficiency, the peak energy demand can be reduced, reducing the need for rolling blackouts and other energy rationing measures.<sup>217</sup> In areas of the country increasingly subject to droughts, water efficiency will become a crucial aspect of land use planning.<sup>218</sup> "[C]ollectively, buildings in the United States use over 38 billion gallons of water *per day*."<sup>219</sup> By increasing water efficiency requirements in building codes, water demand can be reduced, and drought-prone areas can use those savings for other essential uses.<sup>220</sup>

Building codes can also be used to combat the urban heat island effect.<sup>221</sup> Though the base temperature increase caused by climate change cannot be changed by a building code, it can reduce the heat island effect by reducing heatabsorbing materials used in buildings.<sup>222</sup> Specifically, building codes can encourage the use of materials with high thermal mass,<sup>223</sup> such as concrete and stone.<sup>224</sup> These buildings "absorb energy slowly and hold it for much longer periods," which leads to "fewer spikes in the heating and cooling requirements" of these buildings and overall reduction of the heat island effect.<sup>225</sup> Building codes can also be designed to reduce the overall amount of hardscape in building designs, replacing it with vegetation or other materials that reflect heat.<sup>226</sup>

Damage from increasingly severe storms remains a huge concern, and building codes can also be leveraged to increase the resilience of new and renovated buildings.<sup>227</sup> Storm-resistant structural features, waterproofing techniques, and raising buildings in flood-prone areas can all be enforced through building codes.<sup>228</sup> In designing such adaptation measures, however, it is important that decision makers consider the projected impacts of climate change as well as current needs. Many adaptation measures are implemented with the assumption that current and future climate threats will be similar to those in the

<sup>&</sup>lt;sup>216</sup> *Id.* at 210. The same can be said for increased instances and severity of cold weather, during which energy demand for heating will go up. *See supra* Section II; Doss-Gollin et al., *supra* note 142, at 1.

<sup>&</sup>lt;sup>217</sup> See Howe, supra note 42, at 213.

<sup>&</sup>lt;sup>218</sup> See id. at 215.

<sup>&</sup>lt;sup>219</sup> *Id.* at 215-16.

<sup>&</sup>lt;sup>220</sup> See id.

<sup>&</sup>lt;sup>221</sup> See id. at 219-20; see also supra note 124 and accompanying text.

<sup>&</sup>lt;sup>222</sup> Howe, *supra* note 42, at 219-20.

<sup>&</sup>lt;sup>223</sup> Thermal mass refers to the property that enables buildings to "absorb, store, and later release heat." *Id.* at 220.

<sup>&</sup>lt;sup>224</sup> Id.

<sup>&</sup>lt;sup>225</sup> Id.

<sup>&</sup>lt;sup>226</sup> See id. at 221.

<sup>&</sup>lt;sup>227</sup> See Kaswan, supra note 7, at 405.

<sup>&</sup>lt;sup>228</sup> See id.; Howe, supra note 42, at 222.

past.<sup>229</sup> This is no longer true, and plans that fail to anticipate and adjust to worsening climate change will be obsolete before they are complete.<sup>230</sup>

#### III. A NEW NATIONAL LAND USE POLICY AND PLANNING ACT

#### A. Possible Elements of a New Land Use Act

A new Land Use Act is necessary to rise to the challenge of climate adaptation. Though the state of the world is obviously different now than when the original Land Use Act was proposed in 1973, many of the essential elements can and should be used in a modern version. Designing the specific provisions of a new Land Use Act is beyond the scope of this Note, but this Part will suggest the broad strokes and then address the benefits and potential issues with this approach.

#### 1. Federal Funding

The original Land Use Act would have created a number of grant-in-aid programs to fund, among other things, the planning programs it mandated states prepare.<sup>231</sup> The Act would have cost, adjusted for inflation, approximately \$6.7 billion<sup>232</sup> over an eight-year period.<sup>233</sup> A new Land Use Act should retain the grant-in-aid structure to fund the programs created and mandated by the bill. In addition, these funds should be conditioned on compliance with the substantive requirements that the Act would impose on the states.<sup>234</sup> A new Act should also add equity measures to this funding to ensure that funds go to communities that need them the most.<sup>235</sup> Given the general opposition to large expenditures in the current political climate,<sup>236</sup> a bill this expensive would likely have to be bundled

<sup>&</sup>lt;sup>229</sup> See FOURTH NATIONAL CLIMATE ASSESSMENT VOL. II, supra note 1, at 1318.

<sup>&</sup>lt;sup>230</sup> See, e.g., Tristan Baurick, *Gathering Storm: The Industrial Infrastructure Catastrophe Looming over America's Gulf Coast*, BULL. OF ATOMIC SCIENTISTS (Dec. 9, 2021), https://thebulletin.org/2021/12/gathering-storm-the-industrial-infrastructure-catastrophe-looming-over-americas-gulf-coast/ [https://perma.cc/7CF3-QUMC] ("Tomorrow's storm isn't going to act like lke or the relatively weak storms the lke Dike is built to withstand.").

<sup>&</sup>lt;sup>231</sup> See supra Section I.

<sup>&</sup>lt;sup>232</sup> See CPI Inflation Calculator, U.S. BUREAU OF LAB. STAT., https://www.bls.gov/data/inflation\_calculator.htm.

<sup>&</sup>lt;sup>233</sup> See LAND USE ACT SENATE REPORT, supra note 14, at 86 (allocating \$15 million annually for eight years in 1973).

<sup>&</sup>lt;sup>234</sup> See Nat'l Fed'n of Indep. Bus. v. Sebelius, 567 U.S. 519, 537 (2012) ("Congress may offer funds to the States, and may condition those offers on compliance with specified conditions.").

<sup>&</sup>lt;sup>235</sup> See Kaswan, supra note 7, at 470.

<sup>&</sup>lt;sup>236</sup> See, e.g., Jacob Pramuk, Senate Will Vote on Biden's Social Spending Plan Next Year Despite Manchin's Opposition, CNBC (Dec. 20, 2021, 3:31 PM), https://www.cnbc.com /2021/12/20/senate-to-vote-on-build-back-better-act-despite-joe-manchin-opposition.html [https://perma.cc/7Z74-BEUC] (detailing cost-based opposition to Build Back Better Act).

with a new revenue source for the federal government, such as a carbon tax or cap-and-trade program.<sup>237</sup>

## 2. State Land Use Plans

The cornerstone of the original Land Use Act was a requirement that states develop land use plans focusing on five critical areas: (1) areas of critical environmental concern; (2) key facilities; (3) large scale development; (4) public facilities or utilities of regional benefit; and (5) land sales or development projects.<sup>238</sup> This general concept should remain in a new Land Use Act, updated to address the pressing climate adaptation issues we face. A new Land Use Act should essentially provide minimum substantive requirements for state land use planning, preventing a race-to-the-bottom situation and forcing states that lag behind in climate response to begin the process of adaptation.

Current adaptation measures are mostly reactive—that is, they are responses to disasters or other major events.<sup>239</sup> In order to successfully respond to and prepare for the future of climate change, any land use plans must include a mix of proactive and reactive measures.<sup>240</sup> A major issue in climate adaptation is continued development in high-risk areas.<sup>241</sup> States should be required to consider a number of measures to discourage or restrict building in at-risk areas, such as floodplains.

Downzoning<sup>242</sup> at-risk areas to limit development can ensure that fewer people and structures are impacted when climate-related disasters and impacts hit.<sup>243</sup> Similar to downzoning, states may also consider rebuilding restrictions that prevent or limit the ability of landowners to rebuild in risky areas.<sup>244</sup> It should be noted, however, that such measures are open to challenges,<sup>245</sup> and should be designed and implemented carefully to prevent issues. Requiring setbacks and buffers can achieve the same goals as downzoning and rebuilding restrictions.<sup>246</sup> These measures require that new development "be sited sufficiently upland to protect structures from flooding" and can be calculated based on expected sea level rise or flooding impacts.<sup>247</sup> In other areas, setbacks and buffer requirements should be based on local concerns, for example

<sup>&</sup>lt;sup>237</sup> See Kaswan, supra note 7, at 467.

<sup>&</sup>lt;sup>238</sup> See supra Section I.

<sup>&</sup>lt;sup>239</sup> See Byrne & Grannis, *supra* note 205, at 268; FOURTH NATIONAL CLIMATE ASSESSMENT VOL. II, *supra* note 1, at 1318.

<sup>&</sup>lt;sup>240</sup> See supra Section II.

<sup>&</sup>lt;sup>241</sup> See Byrne & Grannis, supra note 205, at 267; Kaswan, supra note 7, at 409.

<sup>&</sup>lt;sup>242</sup> Downzoning "limits the intensity of uses... or allowable densities that can be developed on a parcel." Bryne & Grannis, *supra* note 205, at 272-73.

 $<sup>^{243}</sup>$  *Id.* at 273.

<sup>&</sup>lt;sup>244</sup> See id.

<sup>&</sup>lt;sup>245</sup> See infra Section III.C.

<sup>&</sup>lt;sup>246</sup> See Byrne & Grannis, supra note 205, at 272-73.

<sup>&</sup>lt;sup>247</sup> Id. at 273.

avoiding development in wildfire-prone areas in the West. Building codes are extremely powerful tools for adaptation, and a new Land Use Act could take the opportunity to set minimum building standards based on expected climate impacts.248

#### 3. **Regional Cooperation**

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The impacts of climate change are not confined to political borders, and in fact, many predictions are regional.<sup>249</sup> To that end, a new Land Use Act must mandate cooperation among states to ensure states cannot opt out of climate adaptation to the detriment of their neighbors. The original Land Use Act recognized this problem and authorized the use of appropriate interstate entities or compacts to coordinate land use policies.<sup>250</sup> A new Land Use Act should go one step further and establish interstate entities specifically tasked with overseeing land use measures to adapt to climate change. In the past, a lack of interstate coordination has stymied efforts to respond to environmental risks, such as with the response to Hurricane Katrina.<sup>251</sup> Though some regional- and substate-level coordination efforts were started in the absence of federal action, they are "often lacking" and could benefit immensely from the coordinating capabilities of the federal government.<sup>252</sup>

#### Information and Project Tracking 4.

Included in the original Land Use Act were several provisions regarding federal studies into the effectiveness of the Act overall, with particular focus on the effectiveness of interstate agencies.<sup>253</sup> This is another aspect that a new Land Use Act should retain to assess and reassess its effectiveness going forward. A concern regarding existing adaptation measures in the absence of major federal and regional action is the lack of information regarding measures in progress.<sup>254</sup> "It remains difficult . . . to tally the extent of adaptation implementation in the United States because there are no common reporting systems, and many actions that reduce climate risk are not labeled as climate adaptation."255 Thus, a new Land Use Act should establish such standardized reporting and labeling systems and create a centralized database of this information. This information should be at least accessible to governments, but ideally should also be available to the public as an accountability measure. This information gathering would serve two

<sup>&</sup>lt;sup>248</sup> See supra Section II.

<sup>&</sup>lt;sup>249</sup> See id.

<sup>&</sup>lt;sup>250</sup> See LAND USE ACT SENATE REPORT, supra note 14, at 102-03.

<sup>&</sup>lt;sup>251</sup> See Robert L. Glicksman, Climate Change Adaptation: A Collective Action Perspective on Federalism Considerations, 40 ENV'T L. 1159, 1183 (2010).

<sup>&</sup>lt;sup>252</sup> Kaswan, *supra* note 7, at 472.

<sup>&</sup>lt;sup>253</sup> See supra Section I; LAND USE ACT SENATE REPORT, supra note 14, at 103 (authorizing two-year study to review agencies and their procedures).

<sup>&</sup>lt;sup>254</sup> See FOURTH NATIONAL CLIMATE ASSESSMENT VOL. II, supra note 1, at 1315. <sup>255</sup> Id.

important purposes: (1) it would allow the federal government to track states' progress and compliance with the Act for potential sanctions,<sup>256</sup> and (2) it would allow states to look at the successes and failures of projects being implemented around the country and in their own regions to better inform ongoing and future projects they may be considering.

#### 5. Sanctions

Sanctions were a major sticking point during the proposal of the original Land Use Act.<sup>257</sup> Before amendments, the Act contained sanctions that would reduce noncompliant states' funding for "airport development, federal highways, and land and water conservation" by seven percent each year cumulatively, for a maximum of twenty-one percent after three years.<sup>258</sup> Adjusted for inflation, it was estimated this seven percent represented approximately \$772 million per year in funding for each state.<sup>259</sup> Ultimately, and much to the disapproval of the bill's architect, Senator Jackson, the sanctions were cut back to only the withholding of funds from the grant-in-aid programs the bill itself created.<sup>260</sup>

A new Land Use Act should incorporate harsher sanctions to ensure compliance, taking inspiration from the original act and an environmental statute that has successfully implemented similar sanctions: the CAA.<sup>261</sup> Under the CAA, the Administrator of the EPA can withhold federal highway funds if a state is found to be noncompliant.<sup>262</sup> This approach has been very successful, as the threat of losing these funds has "prompted substantial state action that would otherwise have been unlikely to emerge."<sup>263</sup> A new Land Use Act should follow this structure, potentially linking compliance to funds directly impacted by adaptation, such as infrastructure funds or disaster relief funds. These measures may seem harsh, but it is reasonable to link a failure to adequately prepare for climate impacts to the funds that would bail out the very states that fail to prepare.

## B. Advantages of a Federal Approach

## 1. Unified Policy Vision, Interstate and Intercity Cooperation

Because the current land use system is hyperlocal, it is necessarily fragmented and patchwork in nature.<sup>264</sup> There are approximately 35,879 local governments

<sup>&</sup>lt;sup>256</sup> See infra Section III.A.5.

<sup>&</sup>lt;sup>257</sup> See Daly, *supra* note 44, at 27-29.

<sup>&</sup>lt;sup>258</sup> Id. at 26.

<sup>&</sup>lt;sup>259</sup> *Id*. Not accounting for changes to programs. For inflation calculation, see U.S. BUREAU OF LAB. STAT., *supra* note 232.

<sup>&</sup>lt;sup>260</sup> Daly, *supra* note 44, at 30.

<sup>&</sup>lt;sup>261</sup> See 42 U.S.C. § 7509(b)(1) (2022).

<sup>&</sup>lt;sup>262</sup> See id.; Kaswan, supra note 7, at 467.

<sup>&</sup>lt;sup>263</sup> Kaswan, *supra* note 7, at 468.

<sup>&</sup>lt;sup>264</sup> See LaCroix, supra note 7, at 125.

in the United States,<sup>265</sup> and they are not obligated to work with one another in designing their land use policies.<sup>266</sup> Beyond this, different state and local governments face differing challenges and have differing priorities, and thus may not always make similar policy decisions.<sup>267</sup>

A new National Land Use Act would set out the major priorities for addressing climate impact and thereby reduce local discretion over what measures are implemented. The original Land Use Act recognized the potential for local officials to have outsized influence over a region due to their authority over land use policy.<sup>268</sup> Creating overarching guidelines that state and local governments could not stray from would help alleviate this issue and prevent minority rule over climate adaptation.

The impacts of climate change do not stop at political borders—cities and states will need to work together to address climate adaptation successfully.<sup>269</sup> Encouraging cooperation among state and local governments would help enable these governments to address the problems they share and overcome the collective action problem of climate change.<sup>270</sup> This cooperation also has the potential to help alleviate the costs of climate adaptation. Climate resilience and adaptation is an expensive proposition.<sup>271</sup> Global adaptation costs are estimated to be between \$140 billion and \$300 billion per year by 2030 and projected to rise as time goes on.<sup>272</sup> If state and local governments work together, however, they can share costs and increase efficiency, thereby overcoming some of the price barriers to adaptation.<sup>273</sup> A new Land Use Act would facilitate this sort of cooperation.

<sup>269</sup> See Kaswan, supra note 7, at 435; see also supra Section II.

<sup>&</sup>lt;sup>265</sup> Cities 101 — Number of Local Governments, NAT'L LEAGUE OF CITIES, https://www.nlc.org/resource/cities-101-number-of-local-governments/ (last visited July 25, 2023).

<sup>&</sup>lt;sup>266</sup> See LaCroix, supra note 7, at 125.

<sup>&</sup>lt;sup>267</sup> See id.

<sup>&</sup>lt;sup>268</sup> See supra Section I.

<sup>&</sup>lt;sup>270</sup> See Cary Coglianese, Solving Climate Risk Requires Normative Change, WHARTON SCH.: ENV'T SOC. & GOVERNANCE (ESG) INITIATIVE (July 26, 2019), https://esg.wharton.upenn.edu/climate-center/solving-climate-risk-requires-normative-change/ [https://perma.cc/QRQ7-VQHP] ("Climate change is a collective action problem on steroids.").

<sup>&</sup>lt;sup>271</sup> See Kaswan, supra note 7, at 430-32.

<sup>&</sup>lt;sup>272</sup> See Beate Antonich, UN Estimates the Global Cost of Climate Adaptation, GLOB. CTR. ON ADAPTATION (Feb. 14, 2020), https://gca.org/un-estimates-the-global-cost-of-climate-adaptation/ [https://perma.cc/YTP8-WD64].

<sup>&</sup>lt;sup>273</sup> See FOURTH NATIONAL CLIMATE ASSESSMENT VOL. II, supra note 1, at 1317.

## 2. Incentivize State Programs

A majority of states have no climate resilience programs or plans at all.<sup>274</sup> Even among states and municipalities that have such plans, they are largely reactionary—that is, they address immediate concerns related to a climate impact, like damage from a severe storm.<sup>275</sup> To successfully adapt to the reality of climate change, states will need to implement forward-looking adaptation policies.<sup>276</sup> Political resistance to policies related to climate change may explain some of this shortcoming,<sup>277</sup> but it could also be explained by a simple lack of resources.<sup>278</sup> A new Land Use Act would create guidelines to require forward-looking planning and thus avoid the issues of reactionary policy. In addition, it would be a major source of funding for states to create and implement plans for which they might otherwise lack funding. That said, a federal Land Use Act is unlikely to reach the issue of political resistance because it is not a direct result of land use or climate adaptation policy itself.

## C. Potential Issues and Objections

## 1. Climate Denial/Political Resistance to Climate Policy

Political resistance to climate-related policy and climate change denial is a fact of modern U.S. politics.<sup>279</sup> Approximately fourteen percent of Americans do not believe in climate change,<sup>280</sup> and "139 elected officials in the 117th Congress, including 109 representatives and 30 senators... refuse to acknowledge the scientific evidence of human-caused climate change."<sup>281</sup> Climate change denial in Congress is likely to act as a roadblock to climate-related policy.<sup>282</sup> Though the Biden Administration made climate change a

<sup>&</sup>lt;sup>274</sup> See State Action on Resilience, CTR. FOR CLIMATE AND ENERGY SOLS., https://www.c2es.org/content/state-action-on-resilience/ [https://perma.cc/D5M5-TZ6D] (last visited July 25, 2023); Kaswan, *supra* note 7, at 413 (finding number of states without substantial climate change plans is double that of states with significant climate change plans); *State and Local Adaptation Plans, supra* note 172 (showing climate change plans by state).

<sup>&</sup>lt;sup>275</sup> See Kaswan, supra note 7, at 414.

<sup>&</sup>lt;sup>276</sup> See id.

<sup>&</sup>lt;sup>277</sup> See infra Section III.

<sup>&</sup>lt;sup>278</sup> See Kaswan, supra note 7, at 430-32.

<sup>&</sup>lt;sup>279</sup> See id. at 417.

<sup>&</sup>lt;sup>280</sup> See Jennifer Marlon, Liz Neyens, Martial Jefferson, Peter Howe, Matto Mildenberger & Anthony Leiserowitz, *Yale Climate Opinion Maps 2021*, YALE PROGRAM ON CLIMATE CHANGE COMMC'N (Feb. 23, 2022), https://climatecommunication.yale.edu/visualizations-data/ycom-us/ [https://perma.cc/FFA7-A9AM].

<sup>&</sup>lt;sup>281</sup> Ari Drennen & Sally Hardin, *Climate Deniers in the 117th Congress*, CTR. FOR AM. PROGRESS (Mar. 30, 2021), https://www.americanprogress.org/article/climate-deniers-117th-congress/ [https://perma.cc/7CKT-4YD8].

<sup>&</sup>lt;sup>282</sup> See Coral Davenport & Lisa Friedman, 'Build Back Better' Hit a Wall, but Climate Action Could Move Forward, N.Y. TIMES (Jan. 20, 2022), https://www.nytimes.com/

policy priority,<sup>283</sup> many major climate-related bills have thus far failed to pass through Congress.<sup>284</sup> That said, as the effects of climate change become more widespread and the understanding of those effects increases among the general populace, pressure to act will increase until political resistance becomes untenable.<sup>285</sup>

## 2. Climate Impact Heterogeneity

The impacts of climate change will differ greatly among the various regions of the United States, and sometimes even within regions.<sup>286</sup> Because of this fact, some may argue that a national response risks overgeneralizing and may not provide the nuanced adaptation measures that state and local governments need. Some climate impacts, however, can only be addressed at the regional or even national level due to their border-crossing effects and the level of resources needed to adequately respond.<sup>287</sup> In addition, the new Land Use Act proposed in this Note retains an essential part of the original Act<sup>288</sup> that helps address this—namely, incentives for state land use programs.<sup>289</sup> By involving states in the implementation process, regional and local concerns can be adequately addressed while still meeting national standards, similar to SIPs under the CAA.<sup>290</sup>

## 3. Constitutional/Federalism Objections

## a. Police Power/Local Control

Land use is traditionally considered to be an area of local control based on state police powers.<sup>291</sup> To that end, there are many that would argue that federal

<sup>287</sup> See, e.g., Kaswan, *supra* note 7, at 435 ("The urban heat island effect is created in metropolitan areas... and can be addressed only through regional land-use measures."); FOURTH NATIONAL CLIMATE ASSESSMENT VOL. II, *supra* note 1, at 1311 (explaining adaptation should occur at regional and national level to address risks relevant to specific geographical areas).

<sup>291</sup> See LAND USE ACT SENATE REPORT, *supra* note 14, at 35 ("Many cities ... began invoking the police power delegated to them by their States and proceeded to adopt and apply

<sup>2022/01/20/</sup>climate/build-back-better-climate-change.html ("The New York Times asked each of the 50 Senate Republicans if he or she would support just the climate provisions in the Build Back Better Act if they were presented in a stand-alone bill. None said they would.").

<sup>&</sup>lt;sup>283</sup> See, e.g., Biden Climate EO, *supra* note 193.

<sup>&</sup>lt;sup>284</sup> See id.

<sup>&</sup>lt;sup>285</sup> See FOURTH NATIONAL CLIMATE ASSESSMENT VOL. II, *supra* note 1, at 1315 (noting adaptation actions across United States have increased due to increased awareness of effects of climate change).

<sup>&</sup>lt;sup>286</sup> See supra Section II.B.

<sup>&</sup>lt;sup>288</sup> See supra Section I.B.

<sup>&</sup>lt;sup>289</sup> See supra Section III.A.

<sup>&</sup>lt;sup>290</sup> See Nolon, supra note 68, at 827.

intrusion into land use is per se unconstitutional on federalism grounds.<sup>292</sup> Intrusion into areas of local control may be allowable, however, with a "clear and manifest' statement from Congress."293 A new Land Use Act would arguably be such a clear and manifest statement, allowing some impingement on land use regulations.

It may also be argued that land use regulation is beyond the commerce power because it is purely local activity. On the contrary, climate change has and will have a huge impact on interstate commerce.<sup>294</sup> Adaptation, then, will have a similar effect on interstate commerce and be presumptively constitutional under the Commerce Clause. Even if an adaptation action is purely local, it may still be reached under the commerce power so long as it affects interstate commerce.<sup>295</sup> A new Land Use Act could also be considered, in its totality, a comprehensive statutory scheme such that matters of local concern could be reached under the Necessary and Proper Clause.<sup>296</sup> Overall, the states and federal government largely have overlapping areas of authority in the modern form of federalism.<sup>297</sup> Thus, there should be no issues with a federal land use policy given the urgency of climate change, though the concept remains untested.<sup>298</sup>

#### Regulatory Takings Law b.

The Takings Clause of the Fifth Amendment forbids "private property [from] be[ing] taken for public use, without just compensation."299 The regulatory takings doctrine recognizes "that while property may be regulated to a certain

<sup>294</sup> See supra Section II.A.

<sup>295</sup> See Wickard v. Filburn, 317 U.S. 111, 125 (1942) ("But even if appellee's activity be local and though it may not be regarded as commerce, it may still, whatever its nature, be reached by Congress if it exerts a substantial economic effect on interstate commerce ....").

<sup>296</sup> See Gonzales v. Raich, 545 U.S. 1, 22 (2005) ("That the regulation ensnares some purely intrastate activity is of no moment. As we have done many times before, we refuse to excise individual components of that larger scheme.").

<sup>297</sup> See Hudson, supra note 204, at 2032-35.

<sup>298</sup> See id. (arguing dynamic federalism allows for overlapping action by states and Congress in area of land use even if land use is traditionally local issue).

<sup>299</sup> U.S. CONST. amend. V.

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building codes, zoning ordinances, subdivision laws, and other land use regulations."); Rapanos v. United States, 547 U.S. 715, 738 (2006) ("Regulation of land use ... is a quintessential state and local power.").

<sup>&</sup>lt;sup>292</sup> See Kaswan, supra note 7, at 419-20 (explaining federalism values are based on pragmatism, democratic legitimacy, and liberty); LaCroix, supra note 7, at 124 (arguing tradition of local land control is too strong for national land use policy).

<sup>&</sup>lt;sup>293</sup> Rapanos, 547 U.S. at 738 (quoting BFP v. Resolution Trust Corp., 511 U.S. 531, 544 (1994)) (holding phrase "waters of the United States" in Clean Water Act is not clear and manifest statement from Congress); accord Sackett v. EPA, 598 U.S. 651, 679 (2023) ("[T]his Court 'require[s] Congress to enact exceedingly clear language if it wishes to significantly alter the balance between federal and state power and the power of the Government over private property." (quoting U.S. Forest Serv. v. Cowpasture River Pres. Ass'n, 140 S. Ct. 1837, 1849-50 (2020)).

extent, if regulation goes too far it will be recognized as a taking."<sup>300</sup> Thus, land use regulations, if they "go[] too far,"<sup>301</sup> may be invalidated as a taking.<sup>302</sup> Because land use is traditionally a local power, the regulatory takings doctrine is most often applied against state and local governments via the Fourteenth Amendment.<sup>303</sup>

The Supreme Court, however, did weigh in on an enforced retreat measure relevant to this Note's proposals in *Lucas v. South Carolina Coastal Management Council.*<sup>304</sup> In *Lucas*, a South Carolina law preventing the construction of permanent structures in certain coastal zones was challenged as a regulatory taking.<sup>305</sup> The Court found that a regulation that destroys "all economically beneficial uses in the name of the common good" is a taking under the Fifth Amendment unless the background state law renders the use unavailable to the landowner regardless of the alleged taking.<sup>306</sup> While this may seem to be a stumbling block for any number of adaptation measures, this is not necessarily so. *Lucas* also acknowledges that the changing norms and needs of society may alter the permissible uses and thus allow more stringent regulations.<sup>307</sup> Thus, the exigencies of climate change may insulate a new Land Use Act and similar policies against regulatory takings claims.<sup>308</sup>

Since *Lucas*'s more categorical rule, the Court has sought to emphasize the flexibility of regulatory takings doctrine. The Court noted there are two competing objectives in regulatory takings doctrine that must be reconciled: the individual interest in retaining property rights and the government's "well-established power to 'adjus[t] rights for the public good."<sup>309</sup> In addition, the Court has recognized the possibility of new state laws and regulations becoming the necessary background principles that *Lucas* contemplated.<sup>310</sup> Because regulatory takings are generally evaluated in "ad hoc, factual inquiries, designed to allow careful examination and weighing of all the relevant circumstances," it

<sup>304</sup> 505 U.S. 1003 (1992).

<sup>307</sup> *Id.* at 1031 ("[C]hanged circumstances or new knowledge may make what was previously permissible no longer so ...."); *see also* JOHN R. NOLON, PROTECTING THE ENVIRONMENT THROUGH LAND USE LAW: STANDING GROUND 251 (2014) (arguing environmental law and cooperation among communities is essential for mitigating harms from climate change).

<sup>308</sup> See NOLON, *supra* note 307, at 251.

<sup>309</sup> Murr v. Wisconsin, 137 S. Ct. 1933, 1943 (2017) (alteration in original) (quoting Andrus v. Allard, 444 U.S. 51, 65 (1979)).

<sup>310</sup> See Palazzolo v. Rhode Island, 533 U.S. 606, 630 (2001) ("The determination whether an existing, general law can limit all economic use of property must turn on objective factors, such as the nature of the land use proscribed.").

<sup>&</sup>lt;sup>300</sup> Pa. Coal Co. v. Mahon, 260 U.S. 393, 415 (1922).

<sup>&</sup>lt;sup>301</sup> Id.

<sup>&</sup>lt;sup>302</sup> Byrne & Grannis, *supra* note 205, at 274.

<sup>&</sup>lt;sup>303</sup> JUERGENSMEYER ET AL., *supra* note 67, at 410.

<sup>&</sup>lt;sup>305</sup> See id. at 1003.

<sup>&</sup>lt;sup>306</sup> Id. at 1019.

is difficult to predict with any certainty how aspects of a new Land Use Act would fare in court.<sup>311</sup>

That said, new state laws and regulations encouraged by a new Land Use Act could very well become background principles that limit the application of Lucas, allowing more stringent regulations of land use in areas at increased risk of climate change-related damage.<sup>312</sup> Indeed, the effects of climate change on certain property may itself defeat a claim that a regulation has destroyed all economically beneficial uses-if a particular property is no longer valuable because climate change has made it uninhabitable, how can the owner maintain a claim that regulations preventing rebuilding afterwards destroyed economically beneficial uses? Several existing state common law principles could also serve as these background principles. The public trust doctrine, for example, is a common law principle adopted in many states "providing that the state, in its sovereign capacity, holds absolute title to 'all ... navigable waters and the soil under them for [the] common use.""<sup>313</sup> Thus, arguably, in areas threatened by flooding due to climate change, the state has the power to assert rights in private land for the public good.<sup>314</sup> Other existing common law principles, however, like public nuisance, have been held insufficient to justify regulatory takings.315

## c. Coercion

Under the tax and spend power, Congress may put conditions on funds it provides to states.<sup>316</sup> The conditions Congress puts on such funds, however, cannot be coercive to the point that states have no choice but to submit to the federal government's demands.<sup>317</sup> What qualifies as a coercive condition is not fully clear, but appears to generally be a function of how much money is at risk of being withheld should a state choose not to comply.<sup>318</sup> Thus, any large funding program that requires states to take certain actions, like a new Land Use Act would, is susceptible to claims that it is coercive.

The exact drafting of a new Land Use Act is beyond the scope of this Note, but it would need to be drafted in such a way that it is insulated, if not immune,

<sup>&</sup>lt;sup>311</sup> Murr, 137 S. Ct. at 1942.

<sup>&</sup>lt;sup>312</sup> See Palazzolo, 522 U.S. at 630 (adding law does not become background principle for subsequent owners by enactment itself); *Lucas*, 505 U.S. at 1019 (1992).

<sup>&</sup>lt;sup>313</sup> Save Mille Lacs Sportsfishing, Inc. v. Minn. Dep't of Nat. Res., 859 N.W.2d 845, 849 (Minn. Ct. App. 2015) (alterations in original).

<sup>&</sup>lt;sup>314</sup> See Fisher v. Town of Nags Head, 725 S.E.2d 99, 105 (N.C. Ct. App. 2012) (recognizing power of oceanfront municipalities to exercise eminent domain for flood protection purposes).

<sup>&</sup>lt;sup>315</sup> See Lucas, 505 U.S. at 1022-27.

<sup>&</sup>lt;sup>316</sup> Nat'l Fed'n of Indep. Bus. v. Sebelius, 567 U.S. 519, 537 (2012) ("Congress may offer funds to the States, and may condition those offers on compliance with specified conditions.").

 $<sup>^{317}</sup>$  Id. at 580.

<sup>&</sup>lt;sup>318</sup> See id.

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to claims of coerciveness. One of the easier ways to achieve this is to make the funds connected to the condition completely new, i.e. not threatening existing funds. This strategy, however, potentially excludes the possibility of sanctions.<sup>319</sup> Thus, this Note suggests approaching the coercion problem by modeling the new Land Use Act on the CAA, which contains sanctions that have not been deemed coercive.<sup>320</sup> By doing so, the new Land Use Act would be at least relatively safe from claims of coercion as courts would likely think twice about striking down sanctions so similar to those in another, long-standing statute.

#### CONCLUSION

No matter what we do, the climate is changing. In the coming years and decades, the United States will see significant changes in temperatures and weather patterns. As the weather becomes more extreme and climate-related disasters more commonplace, we need to adapt our buildings and infrastructure to meet these new challenges. The current patchwork system of local control has proven to be unreliable and unable to react to the existential threat of climate change. Thus, decisive action is critical on the federal level to address the need to adapt. In 1973, Congress came within seven votes of passing an act that would have changed land use planning as we know it, turning it into a more comprehensive, equitable, and effective system. As climate change looms, we must look to the past to protect our future. A new Land Use Act would break through the political and legal barriers that keep us from adapting to the reality of climate change. Adaptation is only one part of the climate change response equation, but if we fail to consider it adequately, it could draw much needed time and resources away from our mitigation measures. By leveraging the financial, coordinate, and regulatory powers of the federal government, a new Land Use Act could help ensure a safe and resilient future for the United States

<sup>&</sup>lt;sup>319</sup> See supra Section III.A.5.

<sup>&</sup>lt;sup>320</sup> See 42 U.S.C. § 7509(b)(1) (2022) (giving Secretary of Transportation authority to administer sanctions in safety-driven projects).