



UNC
SCHOOL OF LAW

University of North Carolina School of Law
Carolina Law Scholarship Repository

Faculty Publications

Faculty Scholarship

2022

Public Investment in Climate Resiliency: Lessons from the Law and Economics of Natural Disasters

Donald T. Hornstein

University of North Carolina School of Law, dhornste@email.unc.edu

Follow this and additional works at: https://scholarship.law.unc.edu/faculty_publications



Part of the [Law Commons](#)

Publication: *Ecology Law Quarterly*

This Article is brought to you for free and open access by the Faculty Scholarship at Carolina Law Scholarship Repository. It has been accepted for inclusion in Faculty Publications by an authorized administrator of Carolina Law Scholarship Repository. For more information, please contact law_repository@unc.edu.

Public Investment in Climate Resiliency: Lessons from the Law and Economics of Natural Disasters

Donald T. Hornstein*

This Article takes issue with an important claim in the public choice and climate disaster literature: that American political markets will not allow appropriate investments in disaster preparedness and prevention, even when those investments are cost-benefit bargains. The claim is significant because the costs of climate disasters in the twenty-first century are estimated to be in the trillions of dollars due to the presence of legacy greenhouse gases in the atmosphere. Thus, even assuming a sustained, successful global campaign to limit future greenhouse gases, the ingredients for decades of droughts, wildfires, storms, and floods are already locked into the atmosphere. Yet, for fifteen years, public choice economists have modeled disaster politics as a political commons riddled with externalities that lead to tragic underinvestment in disaster preparedness and resiliency.

This Article is the first to offer a sustained critique of the public choice claim. It argues that the claim has both theoretical and empirical limitations. As importantly, resiliency faces challenges that the public choice claim masks. These include the possibility of other institutional constraints standing in the way of optimal resiliency investments, as well as the possibility of resiliency haves and have-nots: of wealthier communities even going on resiliency “binges” while poorer communities suffer disinvestment and decades of disaster-augmented poverty. The Article invites a new wave of scholarly attention to resiliency’s prospects.

DOI: <https://doi.org/10.15779/Z387S7HT2D>

Copyright © 2022 Regents of the University of California.

* Aubrey L. Brooks Professor of Law, University of North Carolina School of Law. I am grateful for feedback I received at the Southeast Environmental Law Scholars Workshop in July 2021 and at the Faculty Seminar Series (UNC School of Law) in February 2021. And I am deeply indebted, for outstanding research assistance, to Meredith Doswell, Lily Faulconer, and Hannah Petersen.

Introduction..... 138

I. Resilience, Public Choice, and the Political Commons Claim: An Overview 141

II. Framing the Public Choice Debate..... 145

 A. Disasters and Resilience in Legal Discourse 145

 B. Political Support for Ex Ante versus Ex Post Resilience Strategies..... 148

 1. The Political Science Literature on Disasters 148

 2. The Political Commons Claim That Politicians Will Prefer Ex Post Disaster Relief over Ex Ante Disaster Preparation... 151

 C. Critiquing the Political Commons Claim..... 153

 1. The Inevitable Attraction of Greater Federal Investments in Resiliency 153

 2. The Political Benefits of Ex Ante Resiliency May Exceed the Benefits of the Blame Game 156

 3. The Public’s Cognitive Dissonance as to Disasters is Changing with the Increasing Frequency of Disasters, Making Ex Ante Resilience More Salient..... 163

III. Reconceptualizing *Ex Ante* Resiliency: What the Public Choice Critique Misses 167

 A. Century of Federal Expenditures and Experiments in Ex Ante Flood Control 168

 1. The Growth of Federal Flood Control Efforts 168

 2. The Federal Commitment to Structural Flood Protection Begins to Slow 171

 3. The Re-Emergence of Federal and State Interest in Ex Ante Resilience..... 173

 B. Resiliency’s Other Problems and Potential Solutions..... 174

 1. Three Problems, Even without Political Gamesmanship 177

 2. Resiliency Haves and Have Nots 180

Conclusion 185

INTRODUCTION

Throughout 2020 and 2021, climate resiliency was a commonly expressed aspiration. Whether linked to 2020’s record number of named storms,¹ the

1. See, e.g., *Record-breaking Atlantic hurricane Season Draws to an End*, NAT’L OCEANIC AND ATMOSPHERIC ADMIN., <https://www.noaa.gov/media-release/record-breaking-atlantic-hurricane-season->

extreme-cold catastrophe in Texas in the winter of 2021,² or innumerable reports of drought, extreme heat, or wildfires, arguments supporting greater resilience seemed to be everywhere.³ In November 2021, President Joe Biden signed a bipartisan infrastructure bill that included a \$50 billion commitment to support climate resiliency in the United States.⁴ This came within days of the United States and other wealthier economies responding to international demands that they increase their support for climate resiliency worldwide.⁵ Heading into 2022, Congress passed the National Defense Appropriation Act, funding major Defense Department programs in climate-change preparedness,⁶ a forward-looking commitment to climate resiliency already expressed in the plans of more than twenty other federal agencies.⁷

However, the widespread interest in resiliency only highlights a considerable gap in the legal literature. Despite an uptick in legal scholarship

draws-to-end (June 10, 2021) (“In total, the 2020 season produced 30 named storms . . . the most storms on record, surpassing the 28 from 2005.”).

2. See, e.g., Andrew Freedman, *Deadly Texas Blackout Shows Our Vulnerability to Coming Climate Extremes*, WASH. POST (Feb. 22, 2021), <https://www.washingtonpost.com/weather/2021/02/22/texas-blackout-climate-change-resilience/> (“The event provides a glimpse of a ‘hellscape’ future if we don’t build resilience.”).

3. See, e.g., Becca Lucas, *New Pilot Program for California Producers to Build Drought Resilience*, CALCAN (June 16, 2021), <https://calclimateag.org/new-pilot-program-for-california-producers-to-build-drought-resilience/> (announcing new \$22 million program of water-conservation contracts); *Extreme Heat Risk Initiative FY2021 Notice of Funding Opportunity*, NOAA CLIMATE PROGRAM OFF., <https://climate.noaa.gov/Funding-Opportunities/Extreme-Heat-Risk-Initiative-2021-Funding-Opportunity> (last visited Apr. 5, 2022) (publicizing competition for investments to improve neighborhood-level resilience to extreme heat); Laura Bliss, *Scientists Are Trying to Make California Forests More Fire Resilient*, BLOOMBERG GREEN (June 14, 2021), <https://www.bloomberg.com/news/features/2021-06-14/scientists-are-trying-to-make-california-forests-more-fire-resilient?sref=jruCbP7U> (experimenting with spatial pattern of tree reforestation to minimize losses from future wildfires).

4. See Emma Newberger, *Biden’s Infrastructure Bill Includes \$50 Billion to Fight Climate Change Disasters*, CNBC (Nov. 15, 2021, 4:38 PM), <https://www.cnbc.com/2021/11/15/biden-signs-infrastructure-bill-how-it-fights-climate-change.html> (“The infrastructure bill designates \$50 billion for climate resilience and weatherization, as more frequent and severe droughts, heat waves, floods and wildfires ravage the country.”).

5. See, e.g., Mizan R. Khan, *In the End, It’s About Money*, STATESMAN (Nov. 20, 2021, 1:55 PM), <https://www.thestatesman.com/opinion/in-the-end-its-about-money-1503025828.html> (describing record contributions for climate adaptation pledged going forward by richer countries to poorer ones at the twenty-sixth United Nations Climate Change Conference in November 2021); Jocelyn Timperley, *The Broken \$100-Billion Promise of Climate Finance – and How to Fix It*, NATURE (Oct. 20, 2021), <https://www.nature.com/articles/d41586-021-02846-3> (“At Glasgow’s COP26 summit, countries will argue for more money to mitigate and adapt to the effects of climate change.”).

6. See Nico Portuondo, *What’s in and What’s out of Final Defense Bill*, E&E NEWS: E&E DAILY (Dec. 6, 2021, 6:49 AM), <https://www.eenews.net/articles/whats-in-and-whats-out-of-final-defense-bill/> (bill requires Defense Department to “incorporate climate change and extreme weather into the core of its processes”).

7. *Fact Sheet President Biden Signs Executive Order Catalyzing America’s Clean Energy Economy Through Federal Sustainability*, THE WHITE HOUSE (Dec. 8, 2021), <https://www.whitehouse.gov/briefing-room/statements-releases/2021/12/08/fact-sheet-president-biden-signs-executive-order-catalyzing-americas-clean-energy-economy-through-federal-sustainability/> (“In 2021, more than 20 major federal agencies released plans describing how they will integrate climate-readiness across missions and programs and bolster resilience of Federal assets.”).

addressing resiliency and climate adaptation in general,⁸ very little of it analyzes the historic disparity between greater *ex post* public expenditures to recover from disasters and relatively smaller *ex ante* investments in disaster preparedness and prevention. The disparity is notable not only because such *ex ante* investments can reduce widespread human suffering but also because such investments are often cost-benefit bargains,⁹ potentially avoiding billions (or trillions) of dollars in *ex post* costs.¹⁰ The gap in the legal literature is even more significant in that it fails to address public choice¹¹ scholars' claim that political forces in the United States inherently trap us in this world of missed pre-disaster opportunities and ruinous post-disaster bailouts.¹² At its most extreme, the claim is that public investments in resiliency on a sustained basis are impossible.¹³

This Article addresses the gap in the literature and identifies the circumstances under which investments in disaster preparedness and prevention occur. It concludes that, although these investments are more likely to occur than

8. See generally, e.g., Robin Kundis Craig, *Resilience Theory and Wicked Problems*, 73 VAND. L. REV. 1733 (2020); Kenneth W. Costello, *Electric Power Resilience: The Challenge for Utilities and Regulators*, 37 YALE J. ON REG. BULL. 1 (2019); Robert L. Fischman, *Letting Go of Stability: Resilience and Environmental Law*, 94 IND. L.J. 689 (2019); Omri Ben-Shahar & Kyle D. Logue, *The Perverse Effects of Subsidized Weather Insurance*, 68 STAN. L. REV. 571 (2016). On the overlap between legal systems and adaptation, see generally Donald T. Hornstein, *Complexity Theory, Adaptation, and Administrative Law*, 54 DUKE L.J. 913 (2005).

9. See, e.g., Shelly Ross Saxer, *Paying for Disasters*, 68 U. KAN. L. REV. 413, 489–90 (2020) (listing cost-effective precautionary measures to reduce wildfire losses such as prescribed burning, power shutoffs during high-risk periods, and replacing wooden transmission line poles with metal ones); NAT'L INST. OF BLDG. SCIS., NATURAL HAZARD MITIGATION SAVES: 2019 REPORT 9 (2019), http://2021.nibs.org/files/pdfs/NIBS_MMC_MitigationSaves_2019.pdf (urging investments in riverine flood mitigation measures promising a 6:1 benefit/cost ratio; investments in wind mitigation promising a 10:1 benefit/cost ratio, and earthquake resilience measures promising a 12:1 benefit/cost ratio); Ben-Shahar & Logue, *supra* note 8, at 616–17 (describing potential cost-effective disaster mitigation measures homeowners can take to protect their properties from storms).

10. See J. David Cummins et al., *Federal Financial Exposure to Natural Catastrophe Risk, in MEASURING AND MANAGING FEDERAL FINANCIAL RISK* 61, 63 (Deborah Lucas ed., 2010) (estimating the net present value of the unfunded liability of the next seventy-five years' worth of federal extreme weather expenditures to be between \$1.2 trillion and \$7.1 trillion, in comparison to the net present value over the same time period of a projected Social Security shortfall of \$4.9 trillion). A related literature documents the cost-effectiveness of pandemic-prevention measures. See, e.g., Beatrice Jin, *How to Stop a Pandemic Before It Starts, Illustrated*, POLITICO, <https://www.politico.com/interactives/2021/preventing-the-next-pandemic/> (last visited Mar. 23, 2022) (estimating that a total investment of \$21.31 billion in pandemic-prevention methods could have prevented worldwide COVID-19 costs of \$8–15 trillion).

11. Public choice theory has been “defined broadly as the application of the assumptions and methodology of microeconomics to describe or predict the way public officials exercise power[.]” Jim Rossi, *Public Choice Theory and the Fragmented Web of the Contemporary Administrative State*, 96 MICH. L. REV. 1746, 1746 (1998).

12. See Ben Depoorter, *Horizontal Political Externalities: The Supply and Demand of Disaster Management*, 56 DUKE L.J. 101, 102–03 (2006) (arguing that, when political accountability is shared, no single actor bears the full brunt of accountability, resulting in a significant undersupply of disaster preparedness in comparison to a relatively inefficient oversupply of governmental aid after a disaster occurs); see also sources cited *infra* note 81.

13. See Depoorter, *supra* note 12, at 104 (“Because political actors lack the incentive to confer benefits on other actors, they will undersupply disaster preparation policies.” (emphasis omitted)).

the public choice scholarship suggests, they face challenges that the public choice claim masks. Both conclusions are important.

After introducing in Part I the growing interest in *ex ante* resilience and the public choice claim that optimum resiliency will not materialize, Part II examines the public choice claim in greater detail. At bottom, the public choice claim conceptualizes the politics of disaster preparation as a commons within which various forms of political externalities combine to produce inefficient outcomes or, in game-theoretic terms, a tragedy of the political commons. Part II takes issue with this claim, at least in its strongest form, positing several reasons why political outcomes will be less inescapably tragic than the public choice claim suggests. In Part III, however, the Article argues that the debate over optimum resiliency needs to expand beyond the boundaries of the political commons paradigm. In particular, the political commons argument misses other structural problems with investments in climate resiliency as well as growing evidence of resiliency haves and have-nots: that greater resilience is more likely to be achieved disproportionately by the wealthy, with climate vulnerability increasingly felt by lower-wealth communities and communities of color. The Article concludes by suggesting for legal scholars a broader agenda on climate resiliency than currently exists.

I. RESILIENCE, PUBLIC CHOICE, AND THE POLITICAL COMMONS CLAIM: AN OVERVIEW

Within the past decade, it certainly seemed as if resilience was poised to have its moment in the sun. In 2012, the National Academies of Sciences, Engineering, and Medicine called it a “national imperative.”¹⁴ In 2013, the Obama administration issued Executive Order 13653,¹⁵ requiring all federal agencies to adopt climate adaptation and resilience plans,¹⁶ and in 2016 awarded state and local governments \$1 billion in matching grants through a national disaster resilience competition.¹⁷ Although President Donald Trump revoked the Obama administration’s executive order in 2017,¹⁸ within months the Trump administration launched its own \$12 billion program to incentivize flood

14. COMM. ON INCREASING NAT’L RESILIENCE TO HAZARDS & DISASTERS, NAT’L ACADS. OF SCI., ENG’G, & MED., *DISASTER RESILIENCE: A NATIONAL IMPERATIVE* 1 (2012).

15. Preparing the United States for the Impacts of Climate Change, Exec. Order No. 13653, 78 Fed. Reg. 66,819, 66,819 (Nov. 1, 2013) (stating, “to prepare the Nation for the impacts of climate change” will require “undertaking actions to enhance climate preparedness and resilience”).

16. *Id.* at 66,821 (mandating in section 5 that “each agency shall develop or continue to develop . . . Adaptation Plans [describing] . . . how the agency will consider the need to improve climate adaptation and resilience.”).

17. See *FACT SHEET Obama Administration Highlights Opportunities for Building Climate Resilience Across the Nation*, THE WHITE HOUSE: PRESIDENT BARACK OBAMA (Oct. 31, 2016), <https://obamawhitehouse.archives.gov/the-press-office/2016/10/31/fact-sheet-obama-administration-highlights-opportunities-building>.

18. Promoting Energy Independence and Economic Growth, Exec. Order No. 13783, 82 Fed. Reg. 16,093, 16,094 (Mar. 28, 2017) (revoking in section 3, *inter alia*, Executive Order 13653).

mitigation projects.¹⁹ In late 2018, bipartisan congressional majorities enacted the Disaster Recovery Reform Act,²⁰ described as “transformational” in the country’s approach to resilient infrastructure.²¹ In November 2019, the Federal Reserve dedicated a major research conference to the possibility that natural disasters could affect the long-term resilience of the U.S. economy,²² and in November 2020 warned that the effects of climate change could disrupt financial assets and governmental budgets tied to real estate markets.²³ In his 2020 election campaign, President Biden promised large-scale, direct federal investment in infrastructure that “can withstand the impacts of climate change,”²⁴ and immediately upon taking office restored Executive Order 13653 and its emphasis on federal agency engagement with resiliency.²⁵ In May 2021, President Biden increased to \$1 billion the amount of federal funding available for a resilient infrastructure grant program.²⁶ Three months later, he committed an additional \$3 billion in funding for pre-disaster mitigation grants.²⁷ And in July 2021, \$50 billion in funding for climate resiliency was one of the few parts of President Biden’s proposed infrastructure legislation that was supported in the

19. See Letter from Mick Mulvaney, Dir., Off. of Mgmt. & Budget, Exec. Off. of the President, to Paul D. Ryan, Speaker, House of Representatives 2 (Nov. 17, 2017), <https://www.politico.com/f/?id=0000015f-caf2-dc43-a37f-cff29bd10000>; see also Rob Moore, *Trump Announced a \$12 Billion Resilience Competition??*, NRDC (Nov. 21, 2017), <https://www.nrdc.org/experts/rob-moore/trump-announced-12-billion-resilience-competition>.

20. Disaster Recovery Reform Act of 2018, Pub. L. No. 115-254, 132 Stat. 3438 (2018) (Division D of Title VII of the FAA Reauthorization Act of 2018).

21. See ENV’T & ENERGY STUDY INST., FACT SHEET: CONGRESSIONAL ACTION ON RESILIENT INFRASTRUCTURE: AREAS OF PROGRESS AND FUTURE NEEDS 3 (Apr. 2019), https://www.eesi.org/files/IssueBrief_Resilient_Infrastructure.pdf.

22. See *The Economics of Climate Change*, FED. RSRV. BANK OF S.F. (Nov. 18, 2019), <https://www.frbsf.org/economic-research/events/2019/november/economics-of-climate-change/>.

23. See BD. OF GOVERNORS OF THE FED. RSRV. SYS., FINANCIAL STABILITY REPORT 59 (2000), <https://www.federalreserve.gov/publications/files/financial-stability-report-20201109.pdf>.

24. *The Biden Plan for a Clean Energy Revolution and Environmental Justice*, BIDEN HARRIS (Jan. 15, 2019), <https://joebiden.com/climate-plan/>.

25. See Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis, Exec. Order No. 13,990, 86 Fed. Reg. 7037, 7041 (Jan. 20, 2021) (in Section 7, revoking President Trump’s Order of March 28, 2017).

26. FACT SHEET *Biden Administration Invests \$1 Billion to Protect Communities, Families, and Businesses Before Disaster Strikes*, THE WHITE HOUSE (May 24, 2021), <https://www.whitehouse.gov/briefing-room/statements-releases/2021/05/24/fact-sheet-biden-administration-invests-1-billion-to-protect-communities-families-and-businesses-before-disaster-strikes/> (directing the Federal Emergency Management Agency to “provide \$1 billion in 2021 for the Building Resilient Infrastructure and Communities (BRIC) program”). However, it is noteworthy to contrast this \$1 billion commitment with the prediction that the Biden administration could increase such investments by significantly larger amounts. See Christopher Flavelle, *New U.S. Strategy Would Quickly Free Billions in Climate Funds*, N.Y. TIMES, <https://www.nytimes.com/2021/01/25/climate/fema-climate-spending-biden.html> (Oct. 7, 2021) (noting that Biden administration may increase funding for pre-disaster climate mitigation from \$500 million to \$10 billion).

27. See *Biden Administration Commits Historic \$3.46 Billion in Hazard Mitigation Funds to Reduce Effects of Climate Change*, FED. EMERGENCY MGMT. AGENCY (Aug. 5, 2021), <https://www.fema.gov/press-release/20210805/biden-administration-commits-historic-346-billion-hazard-mitigation-funds>; see also Flavelle, *supra* note 26.

Senate,²⁸ and remained in the legislation that was later approved by the House and signed by the president.²⁹

A flurry of activity among the states has matched the growing federal interest in resiliency, including the appointment of state resiliency officers and the adoption of statewide disaster-mitigation programs.³⁰ Bond rating agencies have begun incorporating resiliency metrics into their determinations of state and local credit risk,³¹ and a larger slice of public debt issuances have focused on resiliency-oriented construction projects.³² There have even been claims of a new asset class of “resiliency bonds.”³³

28. See Aatish Bhatia & Quoc Trung Bui, *The Infrastructure Plan: What's in and What's out*, N.Y. TIMES (July 30, 2021), <https://www.nytimes.com/interactive/2021/07/28/upshot/infrastructure-breakdown.html> (noting that \$47 billion in President Biden's proposed infrastructure legislation for “upgrading the nation's infrastructure to better withstand the effects of climate change such as intensifying wildfires, hurricanes and flooding” was one of those few areas that “got bigger or stayed the same” when it received Senate approval to advance consideration of the bill); Emily Cochrane & Jim Tankersley, *\$1 Trillion Infrastructure Deal Scales Senate Hurdle with Bipartisan Vote*, N.Y. TIMES, <https://www.nytimes.com/2021/07/28/us/politics/senate-infrastructure-deal.html> (Aug. 10, 2021) (noting that sixty-seven Senators supported advancing consideration of the bill).

29. See Newberger, *supra* note 4.

30. See INT'L ECON. DEV. COUNCIL, STATES OF RESILIENCE: A COMPARISON OF RESILIENCE EFFORTS IN U.S. STATES AND TERRITORIES 12–16 (2019), <https://www.insurance.wa.gov/sites/default/files/documents/states-of-resilience.pdf> (identifying governmental resilience efforts and programs among the 50 U.S. states); see also *The Rockefeller Foundation Launches New Climate and Resilience Initiative; Commits An Initial \$8 million to Continue Supporting Global Network of Cities and Chief Resilience Officers*, THE ROCKEFELLER FOUND. (July 8, 2019), <https://www.rockefellerfoundation.org/news/rockefeller-foundation-launches-new-climate-resilience-initiative-commits-initial-8-million-continue-supporting-global-network-cities-chief-resilience-officers/> (announcing a new climate and resilience initiative building on efforts of the Foundation's 100 Resilient Cities program that designated 100 cities worldwide as resilient cities and the chief resilience officers that many jurisdictions had created).

31. See, e.g., Mark Hand, *Warning to Local Governments: Adopt Climate Adaptation Strategies or Face Credit Downgrades*, RESILIENCE (Nov. 29, 2017), <https://www.resilience.org/stories/2017-11-29/3469471/>; Natalie Ambrosio & Yoon Kim, *Community Development Innovation Review: Community Resilience and Adaptive Capacity: A Meaningful Investment Across Assets*, FED. RESRV. BANK OF S.F. (Oct. 17, 2019), <https://www.frbsf.org/community-development/publications/community-development-investment-review/2019/october/community-resilience-and-adaptive-capacity-a-meaningful-investment-across-assets/> (“As credit rating agencies increasingly incorporate climate risks into municipal ratings, municipal bond investments may be affected by downgrades, reflecting a concern that extreme weather events will adversely affect a city's ability to repay its debt.”); Savannah Cox, *Inscriptions of Resilience: Bond Ratings and the Government of Climate Risk in Greater Miami, Florida*, 54 J. INDEXING & METRICS 295, 295 (March 1, 2022), <https://journals.sagepub.com/doi/abs/10.1177/0308518X211054162> (“In recent years, credit rating agencies have begun to incorporate a municipality's resilience and vulnerability to climate change into their US municipal bond rating methods.”).

32. See, e.g., Kate Boicourt, *A Growing Green Bond Market to Finance Resiliency*, WATERFRONT ALL.: WATERWIRE (Oct. 19, 2018), <https://waterfrontalliance.org/2018/10/19/a-growing-green-bond-market-to-finance-resiliency>. *But cf.* Gaia Larsen et al., *So Far, Green Bonds Fail to Raise Much Money for Resilience. The Climate Resilience Principles Aim to Change That*, WORLD RES. INST. (Oct. 15, 2019), <https://www.wri.org/insights/so-far-green-bonds-fail-raise-much-money-resilience-climate-resilience-principles-aim> (finding less than \$12 billion, only 3.5 percent of new green bond issuances were related to climate resilience).

33. See, e.g., Vanora Bennett, *World's First Dedicated Climate Resilience Bond, for \$US 700m, Is Issued by EBRD*, EUR. BANK FOR RECONSTRUCTION & DEV. (Sept. 29, 2019), <https://www.ebrd.com/news/2019/worlds-first-dedicated-climate-resilience-bond-for-us-700m-is-issued>

This widespread interest in resiliency makes all the more important the claim by public choice scholars that political markets will undermine efforts to make the country more prepared for disaster. The public choice theory claims that asymmetric political incentives will cripple political coalitions that might want to plan for disasters and invest sufficient resources in *ex ante* precaution.³⁴ The argument is that political incentives overwhelmingly reward politicians who merely spend money on after-the-fact recovery and disaster relief.³⁵

Although the public choice claim is not without some explanatory power, there are reasons why it may be overblown. In part, the claim overlooks other public-choice-oriented positions that support, rather than undercut, the attractiveness to self-interested politicians of public expenditures on *ex ante* disaster prevention. As has been repeatedly found, special interests stand to gain significantly from such expenditures. The claim is also empirically overblown because it fails to account for almost a century of federal investment in flood prevention, expenditures that at the time were among the largest public expenditures in U.S. history.³⁶ Nor does it necessarily account for a spate of even-more-recent programs and expenditures in climate preparedness that reflect the possibility of winning political coalitions that the public choice model views as unlikely.³⁷

The public choice model is also appreciably under-inclusive because it fails to identify a range of important issues involving disaster preparedness. By focusing on its claim that pre-disaster resiliency efforts occur suboptimally, it misses issues that arise when pre-disaster measures *are* taken. In particular, the model does not adequately emphasize the perverse possibility that the rich may become more resilient and the poor more vulnerable to disasters. This is no small matter. The disproportionate impact of natural disasters on racial minorities, low-wage workers, and low-income communities is becoming increasingly well documented.³⁸ Yet by overemphasizing how much politicians will always favor post-disaster aid, the public choice model understudies the many instances in which *both ex ante* and *ex post* political action may fail to help those most in

by-ebrd.html; Shalini Vajjhala, *Financing Infrastructure Through Resilience Bonds*, BROOKINGS (Dec. 16, 2015), <https://www.brookings.edu/blog/the-avenue/2015/12/16/financing-infrastructure-through-resilience-bonds>; RE:FOCUS PARTNERS, A GUIDE FOR PUBLIC-SECTOR RESILIENCE BOND SPONSORSHIP (2017), <http://www.refocuspartners.com/wp-content/uploads/pdf/RE.bound-Program-Report-September-2017.pdf>; WATER INFRASTRUCTURE & RESILIENCY FIN. CTR., EPA, DC WATER'S ENVIRONMENTAL IMPACT BOND: A FIRST OF ITS KIND (2017), https://www.epa.gov/sites/production/files/2017-04/documents/dc_waters_environmental_impact_bond_a_first_of_its_kind_final2.pdf.

34. See *infra* text accompanying notes 73–77 (discussing Healy-Malhotra hypothesis) and 76–87 (discussing Depoorter hypothesis).

35. See Depoorter, *supra* note 12, at 102–03 (arguing that, when political accountability is shared, there will be a significant undersupply of disaster-preparedness expenditures in comparison to an oversupply of post-disaster recovery expenditures).

36. See *infra* Part III.

37. See, e.g., Newberger, *supra* note 4 (describing bipartisan federal legislation passed in November 2021 authorizing \$50 billion for resilience infrastructure); sources cited *infra* notes 248–251 (describing resilience efforts underway in Boston, South Florida, and Houston).

38. See *infra* notes 273–277 and accompanying text.

need.³⁹ Only by viewing disaster policy outside the lens of the public choice model can we begin to analyze this distinct type of political failure more deeply and evaluate measures that might correct it.

Thus, after challenging the public choice claim that resilience is impossible, this Article outlines an expanded scholarly inquiry into broader social investments that may pay dividends in both disaster resilience and social equity.

II. FRAMING THE PUBLIC CHOICE DEBATE

A. *Disasters and Resilience in Legal Discourse*

Legal scholarship focusing on climate resilience is still relatively sparse when compared to legal theorists' focus on greenhouse gas mitigation or when compared to the significant resiliency literature by social scientists in general.⁴⁰ Indeed, resiliency has for so long been the subject of inquiry in academic fields other than law that a search of the scholarly literature in 2017 “produced nearly 100,000 results”⁴¹ with one observer concluding, “‘resilience’ is everywhere.”⁴² Although disciplines sometimes differ in their definitions,⁴³ most go beyond the definition of resiliency given most often at the turn of the twentieth century—that resiliency simply means “to bounce back.”⁴⁴ At its broadest, some social

39. As the COVID-19 pandemic has shown, a society's resilience may depend as much on tertiary social benchmarks like wealth and job security as it does on ventilators, vaccines, and sea walls. *See infra* note 300 (The City of New Orleans has defined resiliency benchmarks to include improvements in employment, wages, and education).

40. Professor J.B. Ruhl was one of the first legal scholars to speak of the legal academy's neglect of climate adaptation as an “adaptation deficit” in which there was “stunted progress on forging [the] theory, design, and implementation [of] climate adaptation.” *See* J.B. Ruhl, *Climate Change Adaptation and the Structural Transformation of Environmental Law*, 40 ENV'T L. 363, 372 (2010); *see also* Robin Kundis Craig, “Stationarity is Dead” — *Long Live Transformation Five Principles for Climate Change Adaptation Law*, 34 HARV. ENV'T L. REV. 9, 14 (2010) (“American environmental law and policy are not keeping up with climate change impacts and the need for adaptation.”); Peter Hayes, *Resilience as Emergent Behavior*, 15 HASTINGS W.-NW. J. ENV'T L. & POL'Y 175 (2009) (“[T]he main game is now adaptation which renders mitigation no less urgent, but shifts the political equation in dramatic ways that cannot be ignored any longer.”).

41. Kate Knuth, *The Term “Resilience” Is Everywhere – But What Does It Really Mean?*, ENSIA (May 7, 2019), <https://ensia.com/articles/what-is-resilience/> (citing Susanne Moser et al., *The Turbulent World of Resilience Interpretations and Themes for Transdisciplinary Dialogue*, 154 CLIMATIC CHANGE 21, 22 (2019) <https://link.springer.com/content/pdf/10.1007/s10584-018-2358.0.pdf>).

42. Knuth, *supra* note 41.

43. As to engineering, see, for example, Bernhard-Johannes Jesse et al., *Adapting the Theory of Resilience to Energy Systems A Review and Outlook*, 9 ENERGY SUSTAINABILITY & SOC'Y 27 (2019). As to urban planning, see, for example, Sara Meerow et al., *Defining Urban Resilience A Review*, 147 LANDSCAPE & URB. PLAN. 38 (2016). As to ecology, see, for example, C.S. Holling, *Resilience and Stability of Ecological Systems*, 4 ANN. REV. OF ECOLOGY & SYSTEMATICS 1 (1973). As to disaster risk reduction, see, for example, D. E. Alexander, *Resilience and Disaster Risk Reduction An Etymological Journey*, 13 NAT. HAZARDS & EARTH SYS. SCIS. 2707 (2013). As to psychology, see, for example, David Fletcher & Mustafa Sarkar, *Psychological Resilience A Review and Critique of Definitions, Concepts, and Theory*, 18 EUR. PSYCH. 12, 12–23 (2013).

44. Alexander, *supra* note 43, at 2710 (“In synthesis, before the 20th century, the core meaning [of resiliency] was ‘to bounce back.’”).

scientists propose resilience as a “boundary” concept capable of integrating social-science and natural-science inquiries into the ability of systems generally to change as they cope with myriad forms of “uncertainty and surprise.”⁴⁵

Although legal scholarship on resiliency is late to the table,⁴⁶ its early intellectual footprint has been wide ranging. Some legal scholars, perhaps taking a page from social scientists’ boundary-change literature,⁴⁷ argue that resilience and climate adaptation will need or result in an altogether new legal field,⁴⁸ with many making the case, given climate uncertainties, for innovative legal institutions that are experimental by design.⁴⁹ Other thoughtful scholarship has speculated on the emergence of a common law duty to adapt,⁵⁰ has analyzed the

45. Fridolin Simon Brand & Kurt Jax, *Focusing the Meaning(s) of Resilience Resilience as a Descriptive Concept and a Boundary Object*, 12 *ECOLOGY & SOC’Y* 1, 8 (2007) (“[T]he concept is used by various scientific disciplines as an approach to analyze ecological as well as social-ecological systems. As such, it promotes research efforts across disciplines and between science and policy.” (internal citation omitted)). Those arguing for resilience as a boundary concept have organized into the Resilience Alliance and often advocate through two journals, *Ecology and Society* and *Global Environmental Change*. See Lennart Olsson et al., *Why Resilience Is Unappealing to Social Science Theoretical and Empirical Investigations of the Scientific Use of Resilience*, *SCL. ADVANCES*, May 22, 2015, at 1, 7 (reporting results from a bibliometric analysis of the resiliency literature).

46. See generally Craig, *supra* note 40; see also Michael B. Gerrard, *Introduction and Overview*, in *THE LAW OF ADAPTATION TO CLIMATE CHANGE* 3, 3 (Michael B. Gerrard & Katrina Fisher Kuh eds., 2012) (“At least until a few years ago, adaptation received far less attention than mitigation.”).

47. See Knuth, *supra* note 41.

48. See, e.g., J.B. Ruhl & James Salzman, *Climate Change Meets the Law of the Horse*, 62 *DUKE L.J.* 975, 1019–22 (2013) (speculating on features of a distinct legal field to address issues presented by climate-change adaptation); Jaqueline Peel, *Climate Change Law The Emergence of a New Legal Discipline*, 32 *MELBOURNE U. L. REV.* 922, 924 (2009) (predicting that climate-change adaptation will precipitate “profound” changes in law).

49. For recent examples, see Craig, *supra* note 8, at 1764, arguing that resilience theory reconceptualizes problem solving as adapting to a constantly changing world, and Fischman, *supra* note 8, at 702, stating that “resilience is equally helpful in framing a legal system that facilitates transformations to new conditions that better serve people.” For earlier examples, see Ruhl, *supra* note 40, at 428–29, (claiming that the legal literature on adaptation emphasizes “New Governance” and “Dynamic Federalism” principles found in trans-governmental network theory whereby “nonhierarchical horizontal and vertical networks . . . are built among the officials of those national and international institutions to exchange information, identify best practices, harmonize approaches, and enforce the overall international policy program.”); see also Holly Doremus, *Adapting to Climate Change with Law That Bends Without Breaking*, 2 *SAN DIEGO J. CLIMATE & ENERGY L.* 45 (2010); and Alejandro E. Camacho, *Adapting Governance to Climate Change Managing Uncertainty Through a Learning Infrastructure*, 59 *EMORY L.J.* 1 (2009).

50. See, e.g., Jacqueline Peel & Hari M. Osofsky, *Sue to Adapt?*, 99 *MINN. L. REV.* 2177, 2181 (2015); Jim Rossi & Michael Panfil, *Climate Resilience and the Private Duty to Adapt*, 100 *N.C. L. REV.* (forthcoming 2022) (manuscript at 4); Thomas Landers, Note, *A New Path to Climate Justice Adaptation Suits Against Private Entities*, 30 *GEO. ENV’T L. REV.* 321 (2018). *But cf.* *St. Bernard Parish Gov’t v. United States*, 887 F.3d 1354 (5th Cir. 2018) (Hurricane Katrina-related litigation holding U.S. Army Corps of Engineers not liable under takings theory for failure to maintain Mississippi River Gulf Outlet canal); Jenna Schweitzer, *Climate Change Legal Remedies Hurricane Sandy and New York Coastal Adaptation*, 16 *VT. J. ENV’T L.* 243, 293 (2014) (finding adaptation suits against New York City unlikely to succeed).

details of specific public adaptation projects,⁵¹ and has identified impediments to adaptation such as low flood-insurance rates that blunt market signals about climate risk.⁵²

But legal scholars have largely missed an important shift in how resilience is framed, especially in the growing literature on disaster risk reduction (DRR). In 2012, the National Academies of Sciences, Engineering, and Medicine framed resilience in a way that was broader than the term's historical meaning (to bounce back) yet narrower than some of the expansive approaches taken in the social science literature. The Academies defined resilience as “the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events.”⁵³ Thus, in the DRR literature, resiliency revolves around two core temporal elements: actions taken *ex ante*, before disaster strikes, and those taken afterward, *ex post*.⁵⁴ At the heart of the contemporary DRR literature is the idea that resiliency is more than simply the ability to bounce back and depends increasingly on measures taken before disaster strikes. As the National Academies found, “enhanced resilience allows better anticipation of disasters and better planning to reduce disaster losses—rather than waiting for an event to occur and paying for it afterward.”⁵⁵

Yet as the DRR literature began emphasizing the importance of *ex ante* action, public choice scholars claimed that our political systems were inherently skewed toward *ex post* disaster recovery and were relatively incapable of supporting prolonged efforts at *ex ante* disaster prevention.⁵⁶ And if the public choice claim is valid, the effects of future disasters will be all the more

51. See generally, e.g., Justin Pidot, *Deconstructing Disaster*, 2013 BYU L. REV. 213 (2013) (discussing the cultural, historical, and political reasons for Vermont's mixed success in rebuilding better in the aftermath of Hurricane Irene).

52. See, e.g., Ben-Shahar & Logue, *supra* note 8, at 577 (“[A]s a result of government intervention in property insurance markets . . . private markets no longer generate price signals regarding the cost of living in severe-weather regions. The cost of insurance . . . is suppressed . . .”); accord Sarah Fox, *This Is Adaptation: The Elimination of Subsidies Under the National Flood Insurance Program*, 39 COLUM. J. ENV'T L. 205, 205 (2014); Jennifer Wriggins, *Flood Money: The Challenge of U.S. Flood Insurance Reform in a Warming World*, 119 PENN ST. L. REV. 361, 361 (2014).

53. COMM. ON INCREASING NAT'L RESILIENCE TO HAZARDS & DISASTERS, *supra* note 14, at 1.

54. See, e.g., Richard S. Olson et al., *From Disaster Risk Reduction to Policy Studies: Bridging Research Communities*, 21 NAT. HAZ. REV. 04020014-1 (2020) (“[T]he principal problem is not so much improving response to damaging hazard events, although that is still important, but rather attacking . . . the root causes of disasters.”). This approach then evaluates disaster resilience with the understanding that resilient entities do not necessarily mean unchanged or static entities. See generally Moser et al., *supra* note 41, at 27 (citing sources emphasizing features of resiliency such as adaptability, capacity for innovation, and the ability to embrace change). Indeed, resilience is sometimes achieved only through change, and resilient entities defined as those capable of adapting. See, e.g., SUSANNE C. MOSER ET AL., RISING TO THE CHALLENGE, TOGETHER: A REVIEW AND CRITICAL ASSESSMENT OF THE STATE OF THE US CLIMATE ADAPTATION FIELD 68 (2017), https://kresge.org/sites/default/files/library/rising_to_the_challenge_together_linked_0.pdf (resilient organizations adopt a culture of adaptive thinking and acting in a world of constant change).

55. COMM. ON INCREASING NAT'L RESILIENCE TO HAZARDS & DISASTERS, *supra* note 14, at 1.

56. See Andrew Healy & Neil Malhotra, *Myopic Voters and Natural Disaster Policy*, 103 AM. POL. SCI. REV. 387, 388 (2009); see also Depoorter, *supra* note 12, at 103; *infra* text accompanying notes 79–80.

catastrophic because the public choice model predicts that politicians will eschew money-saving, *ex ante* resiliency projects in favor of profligate, repetitive spending on *ex post* recovery efforts despite mounting long-term budget deficits. Hence, the question: how persuasive is the public choice claim?

B. Political Support for Ex Ante versus Ex Post Resilience Strategies

1. The Political Science Literature on Disasters

There is a significant body of work about the political economy of disasters.⁵⁷ At its broadest, the literature documents the loss of popular support for those in power whenever bad things happen. The evidence ranges from historical descriptions of Egyptian pharaohs being blamed (or killed) when the Nile River failed to flood,⁵⁸ to a regression analysis of U.S. presidential elections between 1896 and 2000 showing “that droughts and wet spells in general had a negative effect on electoral support for the president’s party.”⁵⁹ In general, the phenomenon is known as retrospective voting,⁶⁰ a term coined by political

57. See, e.g., Matthew Davis et al., *The Impact of Political Influence on Appointees Evidence from the Small Business Association Disaster Loan Program*, 84 S. ECON. J. 771, 771 (2018) (making the claim that, because SBA declarations are subject to the same political influences as presidential disaster declarations, “[d]isasters occurring during reelection years, as well as those occurring in electorally important states, are more likely to receive SBA declarations.”); James Ming Chen, *Correlation, Coverage, and Catastrophe The Contours of Financial Preparedness for Disaster*, 26 FORDHAM ENV’T L. REV. 56 (2015); Charles Cohen & Eric D. Werker, *The Political Economy of Natural’ Disasters*, 52 J. CONFLICT RESOL. 795 (2008); Thomas A. Garrett & Russell S. Sobel, *The Political Economy of FEMA Disaster Payments*, 41 ECON. INQUIRY 496 (2003); Healy & Malhotra, *supra* note 56, at 388 (“Our central finding is that voters offer scant incentive to presidents to pursue cost-effective preparedness spending, but do encourage them to send in the cavalry after damage has been done and lives have been lost.”); Mary W. Downton & Roger A. Pielke Jr., *Discretion Without Accountability Politics, Flood Damage, and Climate*, NAT. HAZARDS REV. 157, 163 (2001) (claiming that presidents tend to issue disaster declarations more generously in years when they are facing reelection); Richard Stuart Olson, *Towards a Politics of Disaster Losses, Values, Agendas, and Blame*, 18 INT’L J. MASS EMERGENCIES & DISASTERS 265, 266 (2000) (“Disasters constitute ‘exogenous shocks’ to which modern political systems must respond, so it should not come as a surprise therefore that literally within minutes after any major impact, disasters start becoming political.”); F. Glenn Abney & Larry B. Hill, *Natural Disasters as a Political Variable The Effect of a Hurricane on an Urban Election*, 60 AM. POL. SCI. REV. 974, 975 (1966) (one of the earliest research papers investigating the political effects of natural disasters through an analysis of the effect of Hurricane Betsy on the mayoral race in New Orleans).

58. See CHRISTOPHER H. ACHEN & LARRY M. BARTELS, *DEMOCRACY FOR REALISTS* 116 (2017) (hard times have been known to threaten governments since ancient Egypt, explaining why Egyptian court officials were known to have wished their pharaoh “a good Nile flood”).

59. *Id.* at 25 (emphasis omitted).

60. In general, debates over retrospective voting are often at the flash point among social scientists. As framed by political scientist Morris Fiorina, the core claim of retrospective voting was that voters can accurately hold politicians accountable for their substantive political performance by focusing on relatively simple performance metrics, such as “are you better off now than you were four years ago?” Morris P. Fiorina, *Economic Retrospective Voting in American National Elections A Micro-Analysis*, 22 AM. J. POL. SCI. 426, 430 (1978) (phrasing the question as “[d]uring the last few years, has your financial situation been getting better, getting worse, or has it stayed the same?”). To the extent these rough measures of substantive political performance could be tied to voter behavior, it underscored the legitimacy of the political process. Since then, insights into human rationality that focus on widespread

scientist Morris Fiorina in 1981.⁶¹ Its core claim is that voters can accurately hold politicians accountable for their substantive political performance by focusing on relatively simple performance metrics, such as “are you better off now than you were four years ago.”⁶²

More discriminating studies have refined the political salience of disasters. For example, there seems to be a greater political price to pay when “cultural understandings of causation and responsibility” view the disaster as part of the “social world,” meaning that politicians can be blamed for not doing enough to prevent or ameliorate its effects. In contrast, politicians do not pay as heavy a price when constituents view disasters as part of the “natural world.”⁶³ This allows social scientists to explain why President Woodrow Wilson’s political party seemed not to pay an electoral price for the Influenza Pandemic of 1918, perhaps the worst disaster in U.S. history, because people viewed the pandemic as an act of God.⁶⁴ In contrast, many think President Trump lost the election of 2020 in significant part due to the belief that his administration mishandled the COVID-19 pandemic.⁶⁵ A century of natural disasters lie between the two pandemics, along with the emergence of a growing literature documenting how such disasters can affect a politician’s political standing. Thus, for example, a study of the political effects of Tropical Storm Allison, which in 2001 caused a 500-year flood in downtown Houston just months before its mayoral election, found that most voters “believed that government flood policy (federal, state, or local) was responsible for how devastating the flood [was]” and were “willing to hold elected officials accountable . . . if they perceive[d] the government could have done more to cushion the blow.”⁶⁶

cognitive errors have been used to question the capacity of voter rationality on which Fiorina based the value of retrospective voting. As Healy and Malhotra would claim in a later paper, “[n]o one would claim that voters are either perfectly sophisticated optimizers or completely clueless rubes . . . [but] recent research suggests a middle ground where voters sometimes, but not always, make mistakes.” Andrew Healy & Neil Malhotra, *Retrospective Voting Reconsidered*, 16 ANN. REV. POL. SCI. 285, 286–87 (2013).

61. See generally Fiorina, *supra* note 60.

62. See Elaine Kamarck, *Are You Better Off Now Than You Were 4 Years Ago?*, WBUR: COGNOSCENTI (Sept. 11, 2012), <https://www.wbur.org/cognoscenti/2012/09/11/better-off-2012-elaine-kamarck> (attributing the question to Ronald Reagan during the 1980 presidential debates).

63. Achen & Bartels, *supra* note 58, at 142.

64. *Id.*

65. See, e.g., Josh Dawsey, *Poor Handling of Virus Cost Trump His Reelection, Campaign Autopsy Finds*, WASH. POST (Feb. 1, 2021), https://www.washingtonpost.com/politics/poor-handling-of-virus-cost-trump-his-reelection-campaign-autopsy-finds/2021/02/01/92d60002-650b-11eb-886d-5264d4ceb46d_story.html; Summer Lin, *Why Did Trump Lose? His Own Top Pollster Blames COVID, More in Newly Released Report*, MCCLATCHY, <https://www.mcclatchydc.com/news/politics-government/article248943964.html> (Feb. 2, 2021, 3:11 PM). *But see* Seth Masket, *How Much Did COVID-19 Affect the 2020 Election?*, FIVETHIRTYEIGHT (Jan. 27, 2021, 6:00 AM), <https://fivethirtyeight.com/features/how-much-did-covid-19-affect-the-2020-election/> (“Most likely, it worked against Trump. . . . Yet the damage to his prospects was far from enormous.”).

66. Kevin Arceneaux & Robert M. Stein, *Who Is Held Responsible When Disaster Strikes? The Attribution of Responsibility for a Natural Disaster in an Urban Election*, 28 J. URB. AFFS. 43, 44, 47–48 (2006). For this reason, it is possible to explain why voters, “do not punish politicians for deaths caused

The link between disasters and retrospective voting has not gone unchallenged, especially considering insights from behavioral economics that the public makes cognitive errors in divining the circumstances in which they are (or are not) better off. As one retrospective put it, although “[n]o one would claim that voters are either perfectly sophisticated optimizers or completely clueless rubes . . . recent research suggests a middle ground where voters sometimes, but not always, make mistakes.”⁶⁷ Within the space provided by these errors some researchers find opportunities for politicians to ‘get away with’ disaster-related decisions that favor special interests at the expense of the public interest.⁶⁸ Yet others find that, as to extreme weather events, “[t]he electorate is both responsive to severe weather and attentive to its elected officials.”⁶⁹ In 2011, political scientists John Gasper and Andrew Reeves found that presidents reject at their peril a governor’s request for a disaster declaration and that governors score political points simply by seeking such a declaration.⁷⁰ Broadly confirming the retrospective voting hypothesis, Gasper and Reeves found that voters were attentive to actors at different levels of government and rewarded politicians for attempting to take action as to a disaster, even if their actions were not successful.⁷¹ The study did not, however, seek to rank the relative political paybacks for *ex ante* disaster preparation versus *ex post* disaster relief.⁷²

An earlier study, however, sought to explore precisely that question. In a 2009 study focusing on the sixteen-year period between 1988 to 2004, political economists Andrew Healy and Neil Malhotra found a stronger relationship between an incumbent’s vote share when supporting *ex post* relief spending as opposed to a politician’s vote share when supporting *ex ante* spending on preparedness spending.⁷³ From these data, Healy and Malhotra characterized voters’ preferences as “myopic,” not serving their true self-interest given the greater payback ratio from *ex ante* disaster preparedness, and thereby suggesting

by tornadoes, which are [viewed as] more stochastic and beyond government response.” Healy & Malhotra, *supra* note 60, at 296.

67. Healy & Malhotra, *supra* note 60, at 286–87.

68. See, e.g., Thomas A. Garrett et al., *Political Allocation of US Agricultural Disaster Payments in the 1990s*, 26 INT’L REV. L. & ECON. 143, 159 (2006) (claiming that agricultural disaster payments are about \$44 million higher to states with congressional representatives sitting on the House Appropriations subcommittee, with “almost 12-30% of all direct agricultural disaster relief [being] due to political influence rather than actual crop and feed losses.”); Thomas A. Garrett & Russell S. Sobel, *The Political Economy of FEMA Disaster Payments*, 41 ECON. INQUIRY 496 (2003) (claiming that federal aid is authorized disproportionately to states with members of Congress on committees with oversight of FEMA).

69. See John T. Gasper & Andrew Reeves, *Make It Rain? Retrospection and the Attentive Electorate in the Context of Natural Disasters*, 55 AM. J. POL. SCI. 340, 350 (2011).

70. See *id.* (“[V]oters punish presidents for turn downs.”).

71. *Id.*

72. The authors at one point did speculate, however, that “[b]ecause politicians can offset the cost of severe weather damage with a disaster declaration, there are potentially incentives to underinvest in disaster mitigation. *Id.* at 354.

73. See generally Healy & Malhotra, *supra* note 56.

that the voter-retrospection hypothesis as to disasters might be “imperfect.”⁷⁴ That said, Healy and Malhotra were quick to add that “government almost certainly does not underinvest in all kinds of preparedness,” giving the example of widespread precautionary measures instituted at all American airports in the aftermath of the World Trade Center attacks.⁷⁵ Even as to catastrophic weather, Healy and Malhotra noted that major events “such as Hurricane Katrina can heighten” at least the short-term political value of natural disaster preparedness⁷⁶ and that there was evidence “that governments may be able to take action to make preparedness salient to voters in a more permanent fashion.”⁷⁷

2. *The Political Commons Claim That Politicians Will Prefer Ex Post Disaster Relief over Ex Ante Disaster Preparation*

The most significant contribution in the legal literature to the debate over *ex ante* disaster resilience is an oft-cited article by Professor Ben Depoorter that appeared in a 2006 Duke Law Journal Symposium.⁷⁸ Professor Depoorter, a leading law-and-economics scholar, offered an intriguing hypothesis as to why politics will disproportionately favor *ex post* disaster relief over more cost-effective investments in *ex ante* resiliency. At its core, the Depoorter hypothesis draws its conclusion from the American tradition of shared responsibility for disasters among federal, state, and local governments.⁷⁹ With no one person in charge, and thus, no simple mechanism by which blame or praise can be attributed, disaster politics is seen as a common-pool problem that results in suboptimal and inefficient outcomes.⁸⁰ This claim has been repeatedly cited in the legal literature for the proposition that disaster policy in the United States will tend toward inefficient outcomes eschewing investments in *ex ante* resiliency even when there are cost-benefit bargains.⁸¹ At bottom, the claim

74. *Id.* at 402.

75. *Id.*

76. *Id.* at 402–03.

77. *Id.* at 403. Healy and Malhotra added that “future scholarship could use surveys, as well as lab and field experiments, to determine the extent to which voter decisions can be influenced by government efforts at increasing the salience of issues and policies in areas such as disaster preparedness.” *Id.*

78. See Depoorter, *supra* note 12.

79. *Id.* at 101 (“Because multiple levels of government share political accountability in national scale disasters, disaster management is subject to a collective action problem.”).

80. *Id.* at 103 (“My analysis of the supply and demand of disaster management predicts that disaster preparation will be undersupplied and ex post relief will be oversupplied.”).

81. See, e.g., Haley Palfreyman Jankowski, *Legal Barriers and Disincentives to Self-Sufficient Disaster Preparation in the United States*, 46 HOFSTRA L. REV. 563, 568 n.34 (2017) (citing Depoorter, *supra* note 12); Qihao He & Michael Faure, *Regulation by Catastrophe Insurance: A Comparative Study*, 24 CONN. INS. L.J. 189, 234 n.197 (2018) (citing Depoorter, *supra* note 12); Lisa Grow Sun & Brigham Daniels, *Mirrored Externalities*, 90 NOTRE DAME L. REV. 135, 136 n.1 (2014) (citing Depoorter, *supra* note 12, at 104); Pidot, *supra* note 51, at 243 n.145 (citing Depoorter, *supra* note 12, at 104); Jonathan Remy Nash, Essay, *Standing and the Precautionary Principle*, 108 COLUM. L. REV. 494, 520 n.118 (2008) (citing Depoorter, *supra* note 12, at 111); Matthew W. Wolfe, Note, *The Shadows of Future Generations*, 57 DUKE L.J. 1897, 1911 n.68 (2008) (citing Depoorter, *supra* note 12, at 111); Note, *Mechanisms of Secrecy*, 121 HARV. L. REV. 1556, 1575 n.85 (2008) (citing Depoorter, *supra* note 12, at 111).

asserts that positive and negative externalities arise when disaster federalism locates multiple political actors within a political ‘commons,’⁸² creating three collective-action problems.

First, local politicians question the value of selling expensive *ex ante* resiliency measures to voters when the federal government will inevitably step in later with *ex post* disaster relief.⁸³ To be sure, support for this argument can lie in the economic literature on the “Samaritan’s Dilemma,” which explores how after-the-fact assistance by good Samaritans as a general matter dampens incentives to take precautionary measures ahead of time.⁸⁴ However, the argument does not explain why the federal government, as the payor of last resort when it comes to disasters, would not itself eventually encourage (and pay the lion’s share of) cost-benefit justified investments in disaster reduction.⁸⁵

This leads to Depoorter’s second argument, that politicians will not cooperate in the creation of positive externalities—externalities which make others better off—lest they confer the benefits of this cooperation on others, including politicians belonging to other levels of government or those in a different political party.⁸⁶ This claim posits that the risks are low to politicians for engaging in this kind of noncooperative behavior, either because voters generally assign less blame overall when political decision making is shared or because politicians feel that they can deflect political accountability by playing “the blame game” and casting more criticism on others than will be attributed to themselves.⁸⁷

Depoorter’s third argument is that the public’s cognitive dissonance about rare events like natural disasters will also weaken voter support for *ex ante* disaster resilience projects.⁸⁸ Thus, on the one hand, the public *ex ante* will under-perceive the actual threat such events can pose (because they are rare) and, *ex post*, may believe the risks to be so much greater than they are (due to the

82. Depoorter, *supra* note 12, at 103.

83. *See id.* at 111 n.31.

84. To be sure, the economic literature on the “Samaritan’s Dilemma,” whereby after-the-fact assistance by good Samaritans dampens the interest in taking *ex ante* precautionary measures, supports Professor Depoorter’s argument, at least as a general matter. *See, e.g.*, Tatyana Deryugina & Barrett Kirwan, *Does the Samaritan’s Dilemma Matter? Evidence From U.S. Agriculture* (Nat’l. Bureau of Econ. Rsch., Working Paper No. 22845, 2016), <https://www.nber.org/papers/w22845> (finding empirical support for the expectation of government bailouts negatively to affect otherwise rational expenditures on farm inputs).

85. *See infra* notes 94–105 and accompanying text.

86. Depoorter, *supra* note 12, at 115 (“[A] Democratic governor may face pressure from his party to refrain from bipartisan policies that would confer benefits on a Republican mayor or a Republican White House.”).

87. *Id.* at 120–21 (“[F]inger-pointing is an attractive strategy for individual politicians and politicians as a group because it reduces the total political costs of government failings.”).

88. *Id.* at 121 (“[C]ognitive bias reduces [the] demand for disaster preparation and mitigation policies. . . . In the economic literature, voters are assumed to be myopic and they tend to discount future value in favor of immediate benefits.”).

“availability heuristic”⁸⁹) that any pre-disaster expenditures will seem to have been too small to garner significant political credit.⁹⁰ This part of the argument, therefore, touches on the ongoing debate over retrospective voting and whether voters can tell whether a politician has, or has not, made them better off as to disasters.

C. Critiquing the Political Commons Claim

Although the political commons analysis stands out in the legal literature, it echoes observations made by other public choice analysts about the greater political salience to voters of *ex post* disaster relief relative to *ex ante* investments in resiliency.⁹¹ And, to be fair to this literature, within the last twenty years, there has been a significant imbalance between expenditures by governments worldwide for *ex post* recovery than there has been for *ex ante* resiliency.⁹² Of course, this may also reflect the fact that the first two decades of the twenty-first century may have recorded the greatest span of natural disasters in U.S. history, thus triggering unusually high payouts from programs that were put in place when their historical costs had been lower.⁹³ However, this possibility aside, there are several additional reasons why one can expect the imbalance to change and, indeed, why one can already see signs of resiliency rising.

1. The Inevitable Attraction of Greater Federal Investments in Resiliency

Even granting the political commons claim its major premise, that local politicians will always favor the free lunch of federal post-disaster payouts over the local tax burden of *ex ante* investments in resiliency, it begs the question of whether federal largess will continue. Thus, one problem with the political commons argument is its assumption that the last twenty years of federal disaster budgeting accurately forecasts the next twenty years. Yet, there is already

89. The “availability heuristic” posits that people’s perception of risk increases, beyond what may be statistically accurate, in the aftermath of such highly visible events as a house fire or a violent storm—events that are more psychologically “available” as people experience them. As Professor Sunstein illustrates, “[i]f floods have not occurred in the immediate past, people who live on flood plains are far less likely to purchase insurance . . . [but] [i]n the aftermath of an earthquake, insurance for earthquakes rises sharply—but it declines steadily from that point, as vivid memories recede.” Cass R. Sunstein, *The Availability Heuristic, Intuitive Cost-Benefit Analysis, and Climate Change*, 77 CLIMATIC CHANGE 195, 198 (2006).

90. *Id.*

91. See, e.g., Jeroen Klomp, *Election or Disaster Support?*, 56 J. DEV. STUD. 205, 205–06 (2019) (“[V]oters sanction elected officials only when they fail to adequately address the negative consequences of disasters. . . . Since voters are myopic and evaluate only the recent past when casting their votes, this gives incumbents powerful incentives to affect voters’ behaviour in the aftermath of a natural catastrophe when elections are upcoming.”).

92. DIANE P. HORN, CONG. RSCH. SERV., IN11733, RECENT FUNDING INCREASES FOR FEMA HAZARD MITIGATION ASSISTANCE 2 (2022) (“Over the years, post-disaster mitigation has received significantly more funding than pre-disaster mitigation.”).

93. See *infra* nn.235–236, 239–240.

evidence that federal politicians may no longer be as amenable to hemorrhaging disaster-relief funds as the argument presumes.⁹⁴

In particular, mounting disaster-relief deficits are starting to register politically. One study of the long-term disaster-relief deficit from continuing business-as-usual estimated that there would be \$1.2–\$7 trillion in such federal expenditures by the latter half of this century, roughly the same amount of funding that will be needed during the same period to keep Social Security solvent.⁹⁵ Thus, it was not surprising when, in the immediate aftermath of both Superstorm Sandy in 2012 and Hurricane Harvey in 2017, there were signs within Congress of fracturing in the practice of open-ended supplemental appropriations for disaster aid,⁹⁶ with budget-minded legislators refusing to approve disaster relief unless it was “paid for” with offsets in other parts of the budget.⁹⁷ The same dynamic recurred in 2020 and 2021 when Hurricanes Laura, Delta, and Ida hit Louisiana hard, and supplemental disaster aid was delayed in some cases for two years while politicians sought to tie supplemental disaster aid to the broader debate over the federal debt ceiling.⁹⁸ And, lest these disagreements are thought to reflect merely budget posturing between blue state and red state congressional delegations, in 2012, a majority of Democrats joined with a majority of the congressional Freedom Caucus to enact the Biggert-Waters

94. To be sure, there is a two-part argument sometimes made that strong central governments will always prefer disaster-relief expenditures over disaster-prevention expenditures because (1) they can smooth the costs of borrowing for such disaster-relief expenditures over time and (2) such post-disaster relief avoids the risk of wasting money on pre-disaster resiliency in the event the disaster never comes. Professor Depoorter does not make this argument, nor does he argue that investments in pre-disaster precaution cannot bring their own political rewards. Instead, he argues that to the extent state and local politicians can expect a federal bailout without shouldering a significant local tax burden, the political payoff for championing local resiliency efforts loses much of its attraction.

95. See Cummins et al., *supra* note 10, at 63 (estimating that the net present value of the unfunded liability of next seventy-five years’ worth of federal extreme weather expenditures to be between \$1.2 trillion and \$7.1 trillion, in comparison to the net present value over the same time period of a projected Social Security shortfall of \$4.9 trillion).

96. See, e.g., James W. Fossett, *The Changing Face of Disaster Relief Politics*, ROCKEFELLER INST. OF GOV’T (Jan. 20, 2013), <https://rockinst.org/blog/changing-face-disaster-relief-politics/> (as to Superstorm Sandy) (“Recent events in Washington have cast doubt on the political sustainability of federal disaster policy . . .”); Todd J. Gillman, *Six Texas Republicans Oppose \$19B Disaster Bill that Pries Loose \$4B in Overdue Hurricane Harvey Aid*, DALLAS MORNING NEWS (June 4, 2019, 12:48 PM), <https://www.dallasnews.com/news/politics/2019/06/04/six-texas-republicans-oppose-19b-disaster-bill-that-pries-loose-4b-in-overdue-hurricane-harvey-aid/> (with one representative saying “he opposed the disaster relief package because he was ‘troubled’ that Congress would spend so much on disaster relief ‘when we are racking up approximately \$100 million an hour in national debt.’”).

97. Fosset, *supra* note 96 (“Large-scale disaster relief has become a major target for ‘Tea Party’ Republicans.”).

98. See Greg Hilburn, *Senator Bill Cassidy Politics Holding Federal Disaster Aid Hostage for Louisiana*, DAILY ADVERTISER (Sept. 21, 2021, 1:18 PM), <https://www.theadvertiser.com/story/news/2021/09/21/senator-bill-cassidy-politics-holding-federal-disaster-aid-hostage-louisiana/5801001001/> (“Cassidy said a stand-alone bill with disaster recovery “would pass,” but if it’s tied to raising the debt ceiling ‘I don’t think it can get 60 votes’ needed in the Senate to overcome a filibuster.”).

Act,⁹⁹ phasing out subsidized rates for federal flood insurance that had led to repeated deficits in the National Flood Insurance Program (NFIP).¹⁰⁰ Although Congress slowed the pace of the phase-out in 2014 in the Homeowner Flood Insurance Affordability Act,¹⁰¹ the Federal Emergency Management Agency (FEMA) began contemplating regulatory initiatives to reward states that invested in pre-disaster mitigation.¹⁰² In addition, under President Trump, FEMA announced, but postponed to 2021, “Risk Rating 2.0,” a program designed to reduce NFIP cross-subsidies and broaden the criteria by which it determines a property’s flood risk.¹⁰³ Under President Biden, Risk Rating 2.0 began taking effect in fall 2021, with some changes in flood-risk mapping being rolled out even earlier,¹⁰⁴ and all policies to be priced using Risk Rating 2.0 methodology by April 1, 2022.¹⁰⁵

Further, just as the federal government has begun to tap the brakes on *ex post* disaster aid, it has also begun to increase appropriations for *ex ante* resiliency projects—precisely the opposite of what the political commons argument would predict. Thus, as to the claim that extreme partisanship characterizes disaster politics, in 2018, Congress enacted the Disaster Recovery Reform Act (DRRA)¹⁰⁶ by overwhelmingly *bipartisan* majorities, creating the nation’s largest federal financing program specifically for investments in pre-

99. See Biggert-Waters Flood Insurance Reform Act of 2012, Pub. L. No. 112-141, 126 Stat. 916 (2012) (Subtitle A of Title II of the Moving Ahead for Progress in the 21st Century Act); Fox, *supra* note 52, at 227–32.

100. The pace of the phase-out was significantly slowed two years later in the Homeowner Flood Insurance Affordability Act of 2014, Pub. L. No. 113-89, 128 Stat. 1020 (2014).

101. *Id.*; see also Alexander Lemann, *Rolling Back the Tide Toward an Individual Mandate for Flood Insurance*, 26 FORDHAM ENV’T L. REV. 166 (2015).

102. Under President Obama, FEMA published an Advanced Notice of Proposed Rulemaking for a “disaster deductible,” which would have required states to spend their own funds on pre-disaster mitigation projects before becoming eligible for federal disaster aid. However, FEMA never proceeded further in the rulemaking process. See *Establishing a Deductible for FEMA’s Public Assistance Program*, 81 Fed. Reg. 3082 (proposed Jan. 20, 2016).

103. See *Risk Rating 2.0 Equity in Action*, FEMA, <https://www.fema.gov/flood-insurance/work-with-nfip/risk-rating> (last updated Mar. 25, 2022).

104. See DIANE P. HORN, CONG. RSCH. SERV., R45999, NATIONAL FLOOD INSURANCE PROGRAM: THE CURRENT RATING STRUCTURE AND RISK RATING 2.0, at 2 (2021); see also Tracey McManus, *Updated Federal Flood Maps Take Effect Aug. 24*, TAMPA BAY TIMES, <https://www.tampabay.com/weather/2021/07/23/updated-federal-flood-maps-take-effect-aug-24/> (July 30, 2021). *But cf.* Nick Martin, *Why Is Chuck Schumer Protecting the Rich from Flood Insurance Hikes?*, NEW REPUBLIC (Mar. 26, 2021), <https://newrepublic.com/article/161798/chuck-schumer-protecting-rich-flood-insurance-hikes> (noting possible objections to Risk Rating 2.0 articulated by U.S. Senate Majority Leader Senator Schumer).

105. See DIANE P. HORN, CONG. RSCH. SERV., NATIONAL FLOOD INSURANCE PROGRAM RISK RATING 2.0: FREQUENTLY ASKED QUESTIONS 1 (Oct. 15, 2021). *But see* *Senators from Gulf Coast States Seeking to Delay New Flood Insurance Rating System*, INS. J. (Sept. 29, 2021), <https://www.insurancejournal.com/news/southcentral/2021/09/29/634199.htm> (“U.S. Senators from Florida, Louisiana, Mississippi and Texas have introduced legislation to delay the roll out of new risk rating methodology from the National Flood Insurance Program . . .”).

106. Disaster Recovery Reform Act of 2018, Pub. L. No. 115-254, 132 Stat. 3438 (2018).

disaster resiliency.¹⁰⁷ Indeed, given that the same Congress would several weeks later be torn by such partisan bickering as to precipitate the longest federal government shutdown in U.S. history,¹⁰⁸ its bipartisan cooperation on federal-state resiliency projects in the DRRRA indicates that politicians actually welcomed the positive political externalities that the political commons model predicted they would forego.

To be sure, the relative size of federal *ex post* disaster aid still vastly exceeds the amount dedicated by the DRRRA to pre-disaster resiliency.¹⁰⁹ However, the recent adjustments away from the former and towards the latter offer evidence that the politics of disaster management may no longer be as asymmetrical as the political commons model predicts.¹¹⁰

2. *The Political Benefits of Ex Ante Resiliency May Exceed the Benefits of the Blame Game*

Similarly, there are limits to the argument that political candidates will find it in their self-interest to blame others for disasters rather than support measures that increase resiliency. First, there is the problem of public choice economics being at war with itself. Although the premise of the political commons argument is that politicians are responsive to voters' wishes, an enormous amount of public choice literature claims precisely the opposite—special interests, not the public interest, commandeer most politicians' loyalties.¹¹¹ And, if that is true, why

107. See Lucia Bragg, *2018 FAA Reauthorization Act and Disaster Recovery Reform Act Become Law*, NAT'L CONF. OF STATE LEGISLATURES: NCSL BLOG (Oct. 9, 2018), <https://www.ncsl.org/blog/2018/10/09/2018-faa-reauthorization-act-and-disaster-recovery-reform-act-become-law.aspx> (noting that the bill is most comprehensive disaster recovery legislation since Hurricane Katrina, that it increases federal investment in pre-disaster mitigation, that it passed the House with "overwhelming majority" and that it passed the Senate on a 96–3 vote).

108. See Mihir Zaveri et al., *The Government Shutdown Was the Longest Ever. Here's the History*, N.Y. TIMES, <https://www.nytimes.com/interactive/2019/01/09/us/politics/longest-government-shutdown.html> (Jan. 25, 2019).

109. See SADIE FRANK ET AL., BROOKINGS, INVITING DANGER: HOW FEDERAL DISASTER, INSURANCE AND INFRASTRUCTURE POLICIES ARE MAGNIFYING THE HARM OF CLIMATE CHANGE 4 (2021), <https://www.brookings.edu/research/inviting-danger-how-federal-disaster-insurance-and-infrastructure-policies-are-magnifying-the-harm-of-climate-change/> ("A central finding . . . is that there is currently a 7:1 ratio of disaster recovery to resilience funding across the federal government.").

110. *Id.* ("[A]fter Superstorm Sandy . . . Congressional appropriations allocated between one-third and one half of funding for smart rebuilding—a share much larger than normal disaster recovery programs.") The federal government's rise in pre-disaster funding is significant. Between 2013 and 2015, FEMA's Pre-Disaster Mitigation program received only \$25 million annually. See Ari Sillman, *A New Approach to Disaster Relief Funding? The Disaster Recovery Reform Act's Promise for Pre-Disaster Mitigation*, HARV. ENV'T & ENERGY L. PROGRAM (Jan. 28, 2021), <https://eelp.law.harvard.edu/2021/01/a-new-approach-to-disaster-relief-funding-the-disaster-recovery-reform-acts-promise-for-pre-disaster-mitigation/>. Yet, following the enactment of the DRRRA and President Biden's support for such funding, the federal government's commitment to pre-disaster resiliency projects is estimated to have grown to \$3.7 billion, with potentially as much as \$10 billion in new funding. See Flavelle, *supra* note 26.

111. See, e.g., JAMES M. BUCHANAN & GORDON TULLOCK, *THE CALCULUS OF CONSENT: LOGICAL FOUNDATIONS OF CONSTITUTIONAL DEMOCRACY* 286 (1962) (described as the classic statement of public choice theory in Michael A. Livingston, *Reinventing Tax Scholarship: Lawyers, Economists, and the Role*

would politicians not regularly support such special interests as major engineering and construction companies that stand to make significant profits from billion-dollar resiliency projects? Indeed, that is precisely one of the claims made recently in the public choice literature about why there can be a “bias” in political decision making “towards anticipatory and technical measures” promoting “adaptation infrastructure.”¹¹² Not only would support for such projects bring jobs and cash into a politician’s jurisdiction, but they could also attract significant campaign contributions.¹¹³ Indeed, this is why popular culture so often refers to such projects as “pork,” with the public choice literature underscoring how they deliver outsized local benefits while externalizing their costs nationally.¹¹⁴

Second, the political commons argument may underestimate the benefits of political cooperation in the face of disaster, especially once we grant the assumption that politicians care about public support. In fact, it is a no-lose proposition for a governor to ask for a presidential disaster declaration, regardless of what the president does. A recent analysis of this question found that the electorate credits both the governor and president when a disaster declaration is sought and granted¹¹⁵ and rewards the governor for asking even when the federal government denies their request.¹¹⁶ More broadly, there can be major political payoffs for politicians who cooperate, especially across party lines. This point was well illustrated in the aftermath of Superstorm Sandy when Chris Christie, the Republican governor of New Jersey, and Democratic

of the Legal Academy, 83 CORNELL L. REV. 365, 382 n.56 (1998)); Patricia Hureston Lee, *Shattering Blight’ and the Hidden Narratives That Condemn*, 42 SETON HALL LEGIS. J. 29, 63 (2017) (“Public choice assumes that politicians often act on their own behalf, not on behalf of others. To the extent that politicians are brokers, they interact with a variety of individual voters and special interest groups (corporations, non-profits, political organizations, lobbyists).”); Frank H. Easterbrook, *The State of Madison’s Vision of the State A Public Choice Perspective*, 107 HARV. L. REV. 1328, 1334 (1994) (“Private interest legislation is common today . . . and more common at the national level than among the states . . . This predictive failure can be explained as the result of a variety of factors well known to public choice theory: limits on representatives’ freedom from factions’ influence; increased specialization in production; free rider obstacles to political participation; the considerable advantages to interest groups of obtaining national legislation; and the failure of collective virtue.”).

112. See Erik Gawel et al., *A Public Choice Framework for Climate Adaptation Barriers to Efficient Adaptation and Lessons Learned from German Flood Disasters* 10–11 (Helmholtz Ctr. for Env’t Rsch., Discussion Paper No. 3/2016, 2016) (emphasis added), <https://www.econstor.eu/bitstream/10419/130616/1/857496700.pdf> (“[T]he providers of adaptation infrastructure and large firms from other sectors are likely to exert the strongest influence on the policy maker. . . . [such that] preferences for technical adaptation may dominate.”).

113. Moreover, these political benefits will accrue whether or not a disaster happens to strike before the next election.

114. See, e.g., ERIC MASKIN & JEAN TIROLE, *PANDERING AND PORK-BARREL POLITICS* 2 (2019), https://scholar.harvard.edu/files/maskin/files/pandering_and_pork-barrel_politics_maskin_tirole_01.2019.pdf (claiming that the general public loses more from pork-barrel politics than special interests gain from it).

115. See Gasper & Reeves, *supra* note 69, at 352 (“Governors receive an almost 4-point increase while presidents get a half-point increase for a declaration.”).

116. *Id.* (“For a turn down, governors are rewarded with over 2.5 points, while a president is punished by about a point for intent.”).

President Barack Obama famously cooperated in disaster recovery efforts. President Obama and Governor Christie displayed a level of bipartisanship that many credit as helping President Obama's re-election in 2012¹¹⁷ and Governor Christie's re-election in 2013.¹¹⁸ Bipartisan cooperation also has political advantages even outside the glare of a post-disaster media spotlight. Thus, in addition to wide bipartisan cooperation in the passage of the Biggert-Waters Act in 2012 and the DRRA in 2018,¹¹⁹ bipartisan committee support in 2019 and 2020 advanced the Natural Infrastructure and Resilience Act,¹²⁰ the Resilience Revolving Loan Fund Act of 2019,¹²¹ the Coastal State Climate Preparedness Act,¹²² and a surface transportation reauthorization bill that provided for billions of dollars for transportation resilience.¹²³

In summer 2021, the bipartisan political appeal of pre-disaster resiliency was again on full display in Congress's early action on President Biden's infrastructure bill.¹²⁴ Not only was its \$50 billion for climate resiliency described as "unmatched in United States history[.]"¹²⁵ but early analysis of the bill's success found that bipartisan political support for resiliency easily outpaced any evidence of political gamesmanship or the blame game. As one observer noted, "when it comes to addressing the consequences of a warming planet, no amount

117. See, e.g., *Hurricane Sandy A Political Storm*, HARV. POL. REV. (Nov. 12, 2012), <http://harvardpolitics.com/united-states/hurricane-sandy-a-political-storm/> (the storm recovery "gave President Obama not only a presidential image, but a *bipartisan* one as well. Indeed, the President saw his approval ratings receive a solid boost in the run-up to the election [with] his favorability rating [rising] by six percentage points.").

118. See, e.g., Celeste R. Aguzino, *Chris Christie's Use of Hurricane Sandy in New Jersey's Gubernatorial Elections*, INQUIRIES J. (2014), <http://www.inquiriesjournal.com/articles/948/examining-chris-christies-use-of-hurricane-sandy-in-new-jerseys-gubernatorial-elections> ("Hurricane Sandy gave Christie both the publicity and in turn, confidence to distinguish himself from the Republican Party. . . . Hurricane Sandy provided Christie the opportunity to portray himself as a Visionary Motivator.").

119. See Disaster Recovery Reform Act of 2018, Pub. L. No. 115-254, 132 Stat. 3438 (2018); Biggert-Waters Flood Insurance Reform Act of 2012, Pub. L. No. 112-141, 126 Stat. 916 (2012); Bragg, *supra* note 107.

120. See H.R. 5871, 116th Cong. (2020); Mark Rupp, *Congress Is Advancing Bipartisan Climate Resilience Policies in 3 Key Ways*, ENV. DEF. FUND: GROWING RETURNS BLOG (June 30, 2020), <http://blogs.edf.org/growingreturns/2020/06/30/congress-advancing-bipartisan-climate-resilience-policies/> (noting bipartisan support for bill).

121. See H.R. 3779, 116th Cong. (2019); Rupp, *supra* note 120 (noting bipartisan support for bill).

122. See H.R. 3541, 116th Cong. (2019); Rupp, *supra* note 120 (noting bipartisan support for bill).

123. America's Transportation Infrastructure Act, S. 2302, 116th Cong. (2019); Rupp, *supra* note 120 (noting bipartisan support for legislation); Laura Brush, *Select Committee Wisely Eyes Climate Resilience Investments*, CTR. FOR CLIMATE & ENERGY SOLS. (July 27, 2020), <https://www.c2es.org/2020/07/select-committee-wisely-eyes-climate-resilience-investments/>

("Resilience was one of the items highlighted by the Select Committee's Republican members as a potential area of bipartisan progress."); SENATE ENV'T & PUB. WORKS COMM., AMERICA'S TRANSPORTATION INFRASTRUCTURE ACT 3 (2019) ("The bill invests \$4.9 billion over 5 years in a new resiliency program to protect roads and bridges from natural disasters such as wild fires, and extreme weather events such as hurricanes, flooding, and mudslides.").

124. See generally Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, 135 Stat. 429 (2021).

125. Christopher Flavelle, *In the Infrastructure Bill, a Recognition Climate Change Is a Crisis*, N.Y. TIMES, <https://www.nytimes.com/2021/08/03/climate/infrastructure-bill-climate-preparation.html> (Nov. 6, 2021).

of money appears to be too much, and bipartisan consensus is easy to find.”¹²⁶ In economic terms, the politics of resiliency are free from at least one of the externality problems that complicate political support for global greenhouse gas reductions—resiliency provides benefits to a politician’s constituents that do not depend on the cooperation of other nations.¹²⁷ In game-theoretic terms, the political benefit of expenditures for resiliency cannot be watered down by free-riding abroad.¹²⁸ Thus, explaining the bipartisan appeal of the Biden climate resilience legislation, one political analyst concluded, “as [climate] threats become more frequent and widespread, ‘the constituency for climate resilience is now everybody.’”¹²⁹

Finally, to fully consider the politics of resilience, one has to account for the “republican moments” theory of public-regarding legislation.¹³⁰ This hypothesis notes that many political decisions are made in the glare of major, disruptive events when politicians cannot easily shirk voters’ sudden attentiveness.¹³¹ Disasters are such destructive, media-grabbing events. This has major implications for the political commons argument. In particular, it provides the context in which to evaluate two of its contentions: that politicians will not value their political records on resiliency because the benefits of *ex ante* investments will not accrue until long after their political tenure has ended,¹³² and that after a disaster occurs politicians correctly presume that constituents are focused on immediate relief efforts.¹³³ The problem with these claims is that a disaster can illuminate a politician’s support, or lack thereof, for *ex ante* resiliency as well as post-disaster relief. Indeed, even as to deeper issues of natural disasters’ disproportionate effects on racial minorities and the poor, such issues can become politically salient in the glare of a disaster’s immediate

126. *Id.*

127. See, e.g., Nives Dolšak & Aseem Prakash, *The Politics of Climate Change Adaptation*, 43 ANN. REV. ENV’T & RES. 317, 319 (2018) (“In contrast to mitigation, the benefits of climate adaptation tend to be local. Therefore, collective action issues rooted in free riding that impede mitigation are probably less pronounced for climate adaptation.”).

128. See Nives Dolšak & Aseem Prakash, *Confronting the “China Excuse” The Political Logic of Climate Change Adaptation*, 6 SOLUTIONS 27, 28 (2015), <https://faculty.washington.edu/nives/dolsak%20Prakash%20mitigation%20adaptation.pdf> (“In contrast to mitigation, the political logic of adaptation is compelling. . . . [A]daptation does not suffer from the free rider problem—those paying for it will also benefit from it.”).

129. Flavelle, *supra* note 125 (citing Shalini Vajjhala, a former Obama administration official).

130. See generally James Gray Pope, *Republican Moments The Role of Direct Popular Power in the American Constitutional Order*, 139 U. PA. L. REV. 287 (1990).

131. See, e.g., Michael E. Levine & Jennifer L. Forrence, *Regulatory Capture, Public Interest, and the Public Agenda Toward a Synthesis*, 6 J.L. ECON. & ORG. 167, 168–69 (1990) (politicians’ actions tend toward the public interest during periods of heightened public concern).

132. See Depoorter, *supra* note 12, at 111 (“Because politicians are concerned with getting reelected, they have limited time horizons, leading them to ‘prefer policies that yield tangible benefits for constituents in the near term.’” (quoting RICHARD POSNER, *CATASTROPHE: RISK AND RESPONSE* 137 (2004))).

133. See Depoorter, *supra* note 12, at 111 (“[P]olitical actors immediately capture the political rewards from ex post relief.”).

aftermath in a way that they were not beforehand.¹³⁴ To his credit, Professor Depoorter was careful to acknowledge this point and thus observed that “[a]lthough the public may not be concerned with preparation before a disaster, it will pay close attention once a natural disaster occurs.”¹³⁵ He underscores this point by acknowledging that, “[a]lthough voters’ disinterest in disaster preparation may not discipline politicians before a disaster, their exaggerated interest after a disaster may cause politicians to adopt sound disaster management policies as to future disasters.”¹³⁶

The disasters-as-republican-moments argument has only become more relevant since Professor Depoorter’s 2006 article. Indeed, the same year that his article appeared, an empirical evaluation of public reaction in Houston to Tropical Storm Alison found that voters were capable of distinguishing among federal, state, and local responsibility for flood preparation and that voters would punish politicians electorally if they felt that the responsible politician could have done more to lessen the damage.¹³⁷ Moreover, this heightened political awareness can translate into popular support for *ex ante* resiliency. Thus, after Hurricane Harvey struck Houston in 2017, one county revised its building code to require new construction be built two feet above the 500-year floodplain,¹³⁸ and congressional Republicans successfully proposed more than \$10 billion for major flood infrastructure projects in Houston,¹³⁹ in this case, a republican moment in both a lower-case “r” and capital “R” sense.

The same political phenomenon occurred in New Orleans after Hurricane Katrina, perhaps the most analyzed natural disaster in the world.¹⁴⁰ Immediately

134. See, e.g., Miranda Welbourne, *The Environmental Justice Movement’s Response to Hurricane Katrina, a Critique Problems Faced, Successes, Failures, and the State of the Movement One Year Later*, 32 T. MARSHALL. L. REV. 125, 140 (2006) (“Katrina brought attention back to the environment and to African-American communities, providing the perfect opportunity for the revitalization of the Environmental Justice Movement.”).

135. See Depoorter, *supra* note 12, at 123.

136. *Id.* at 124. Carefully acknowledging this possible weakness in the model, Professor Depoorter states that, “[a]n empirical verification of this proposition is beyond the scope of [the] Article.” *Id.*

137. See Arceneaux & Stein, *supra* note 66, at 48.

138. See *Harris County Approves New Building Regulations Post-Harvey*, ABC NEWS (Dec. 5, 2017), <http://abc13.com/harris-county-new-building-regulations-post-harvey-/2743685/>.

139. See Andrew Schneider, *Will \$81 Billion Be Enough to Defend Texas from the Next Harvey?*, HOUS. PUB. MEDIA, <https://www.houstonpublicmedia.org/articles/news/2017/12/19/257659/in-depth-will-81-billion-be-enough-to-defend-texas-from-the-next-harvey/> (Dec. 20, 2017, 11:54 AM). The possibility of the federal investment apparently drew a positive comment from Stanford political economist Neil Malhotra, whose academic writings had decried the asymmetrical expenditure on disaster relief over disaster prevention. See *id.*

140. See David D. Troutt, *Katrina’s Window Localism, Resegregation, and Equitable Regionalism*, 55 BUFF. L. REV. 1109, 1114–15 (2008) (suggesting that racial and social segregation in New Orleans supported in the twentieth century by localism can be successfully combatted post-Katrina by rebuilding efforts and governance built on the principle of equitable regionalism, which involves the formation of regional alliances for activities, such as the distribution of fair housing obligations and dispersion of tax revenues to improve conditions for both New Orleans’ poor and middle classes); Kevin R. Johnson, *Hurricane Katrina Lessons About Immigrants in the Administrative State*, 45 HOUS. L. REV. 11, 71 (2008) (calling for careful judicial review of agency decisions pertaining to immigrants “to ensure some modicum of a check of bureaucratic error and abuse in our system of checks and balances”); Robin West, *Katrina*,

after the storm, Congress enacted the Post-Katrina Emergency Reform Act of 2006, appropriating \$3.6 billion for levees and other flood control measures.¹⁴¹ And since that time the U.S. Army Corps of Engineers had completed its rehabilitation of the “100-year plus” levees that encircle much of the city¹⁴² as well as its construction of a floodgate across the notorious Mississippi River Gulf Outlet navigation channel,¹⁴³ projects which helped the city withstand Hurricane Isaac, a Category 1 storm that affected the New Orleans area in 2012.¹⁴⁴ Indeed, these engineering projects were questioned as insufficiently protective, with a serious discourse begun on whether the Corps should continue to follow the “100-year-flood” benchmark or reform its “Standard Project Flood” level to withstand a 500-year event.¹⁴⁵ By 2017, Louisiana had adopted a statewide Coastal Master Plan, a 50-year, \$50-billion program designed to fight coastal land loss preemptively,¹⁴⁶ and did so “in one of the reddest states in the

the Constitution, and the Legal Question Doctrine, 81 CHI.-KENT L. REV. 1127, 1129 (2006) (emphasizing the importance of a broader understanding of constitutional jurisprudence that guides, rather than constrains, the legislature); Brandon L. Garrett & Tania Tetlow, *Criminal Justice Collapse The Constitution After Hurricane Katrina*, 56 DUKE L.J. 127, 127–28 (2006) (detailing the collapse of the criminal justice system in New Orleans following Katrina and highlighting the overall unpreparedness of local systems for large-scale emergencies before proposing solutions to safeguard criminal justice in emergencies such as Hurricane Katrina); William P. Quigley, *Thirteen Ways of Looking at Katrina Human and Civil Rights Left Behind Again*, 81 TUL. L. REV. 955, 955–56 (2007) (highlighting inequities in education, housing, healthcare, employment, criminal justice, race, nationality, and class perpetuated by recovery priorities in New Orleans); Lolita Buckner Inniss, *A Domestic Right of Return? Race, Rights, and Residency in New Orleans in the Aftermath of Hurricane Katrina*, 27 B.C. THIRD WORLD L.J. 325, 370–71 (2007) (applying the international law concept of right of return to the city of New Orleans to give poor, black residents displaced by Katrina a claim to come home); Sandra Zellmer, *A Tale of Two Imperiled Rivers Reflections from a Post-Katrina World*, 59 FLA. L. REV. 599, 603 (2007) (discussing the need for and path to a comprehensive federal framework clearly establishing boundaries for management of the Mississippi and Missouri river systems by the Army Corps of Engineers).

141. See Healy & Malhotra, *supra* note 56, at 403.

142. See *In Honor of Hurricane Katrina’s 10th Anniversary, We Thought It Would Be a Great Idea to Pick the Brains of Some of the Leading Industry Experts on New Orleans.*, ASS’N OF STATE FLOODPLAIN MANAGERS NEWS & VIEWS, Aug. 2015, at 14, 14, https://asfpm-library.s3-us-west-2.amazonaws.com/NewsViews/News_Views_Aug2015.pdf [hereinafter *Leading Industry Experts on New Orleans*] (“Last year the Army Corps of Engineers completed its work on the rehabilitation and improvement of the 100-year plus levee that encircles most of New Orleans.”).

143. See Mark Fischetti, *Is New Orleans Safer Today than When Katrina Hit 10 Years Ago?*, SCI. AMERICAN (Aug. 27, 2015), <https://www.scientificamerican.com/article/is-new-orleans-safer-today-than-when-katrina-hit-10-years-ago/>.

144. *Id.*

145. See *Leading Industry Experts on New Orleans*, *supra* note 142, at 14 (quoting Gerald Galloway, author of the major federal Task Force Report on the 1993 Mississippi Flood and currently an engineering professor at the University of Maryland, as noting that California already “requires 200-year protection for urban areas” and that Dutch experts frequently build levees to guard against 1,000- and 5,000-year events).

146. See Faimon A. Roberts III, *Louisiana House Approves 50-Year Coastal Master Plan; Here’s What’s Included*, ADVOCATE (June 2, 2017, 11:35 AM), https://www.theadvocate.com/baton_rouge/news/environment/article_851d2128-47b1-11e7-8356-ff3de1873804.html; Mark Schleifstein, *\$50 Billion Plan to Save Louisiana Coast Approved by Legislature*, TIMES-PICAYUNE (July 7, 2021, 10:56 AM), https://www.nola.com/news/environment/article_e501f847-d265-577c-a67b-f0c7c177248c.html.

nation . . . [with] thunderous bipartisan support.”¹⁴⁷ Moreover, the effects of Hurricane Katrina’s impact on the politics of resilience were felt out of state. State politicians in California, for example, used the disaster to help pass Ballot Proposition 1E,¹⁴⁸ providing bond financing for \$4.1 billion in flood control projects, a political victory that became possible “only after Hurricane Katrina made the danger salient.”¹⁴⁹

Of course, the republican-moment explanation of disaster politics predates Hurricane Katrina. Perhaps the earliest modern example of disasters leading to risk-reduction measures is Hurricane Andrew, the Category 5 hurricane that struck Florida in 1992.¹⁵⁰ The scale of loss caused by Andrew, which included \$26 billion in insured losses,¹⁵¹ the bankruptcy of eleven insurers,¹⁵² and a population of 250,000 left homeless,¹⁵³ led the state of Florida to begin increased building-code enforcement and, by 2002, to adopt more protective building-code standards for new construction.¹⁵⁴ In 2004, when Hurricane Charley made landfall at the Punta Gorda/Port Charlotte area of Florida (with the strongest hurricane winds since Andrew), insurance-industry researchers found that the new building codes reduced loss frequency among homeowners by 60 percent and the severity of losses of those suffering damage by 42 percent.¹⁵⁵ By 2012, Florida had what insurance experts described as the “gold standard for codes,”¹⁵⁶ leading to indications that, when Hurricane Irma hit Florida in September 2017, newer code-compliant homes suffered measurably less damage than older homes.¹⁵⁷

147. See Nathaniel Rich, *Destroying a Way of Life to Save Louisiana*, N.Y. TIMES MAG. (July 21, 2020), <https://www.nytimes.com/interactive/2020/07/21/magazine/louisiana-coast-engineering.html> (“In one of the reddest states in the nation, the master plan enjoys thunderous bipartisan support; in 2017, when it last came up for a vote, a single state legislator opposed it.”).

148. See CALIFORNIA GENERAL ELECTION: TUESDAY NOVEMBER 6, 2006: OFFICIAL VOTER INFORMATION GUIDE 36, 40 (2006), http://repository.uchastings.edu/ca_ballot_props/1265 (providing information on the Disaster Preparedness and Flood Prevention Bond Act of 2006).

149. Healy & Malhotra, *supra* note 56, at 403.

150. See *20 Years After Hurricane Andrew Are We Building Stronger?*, 2 DISASTER SAFETY REV. 9 (2012), <https://issuu.com/ibhs/docs/2012-2-disaster-safety-review> (Andrew came ashore as a Category 5 hurricane).

151. *Id.* at 10.

152. *Id.*

153. *Id.*

154. *Id.* at 9.

155. *Id.* at 9–10.

156. *Id.* at 11.

157. See, e.g., Mary Catherine O’Connor, *Building Codes that Promote Resilient Design Still Get a Mixed Reception*, ARCHITECT (Oct. 30, 2017), http://www.architectmagazine.com/practice/building-codes-that-promote-resilient-design-still-get-a-mixed-reception_o (reporting of early anecdotal evidence that “in cities directly hit by this year’s Hurricane Irma, such as Naples, Florida, resiliency-focused building codes significantly mitigated potential damage”); Shannon Cunniff, *4 Smart Investments Helped These Communities Weather Extreme Storms*, ENV’T DEF. FUND: EDF VOICES BLOG (Nov. 15, 2017), <https://www.edf.org/blog/2017/11/15/4-smart-investments-helped-these-communities-weather-extreme-storms> (“These codes proved their worth during Hurricane Irma this September when buildings were better able to withstand the storm, likely saving[] millions in damages[.]”). It is, however, worth noting that ironically, in the months before Hurricane Irma, the Florida legislature weakened one of the stronger

In short, a broader look at the political economy of resilience suggests that the political benefits of resiliency can, and often do, exceed the benefits of the blame game.

3. *The Public's Cognitive Dissonance as to Disasters is Changing with the Increasing Frequency of Disasters, Making Ex Ante Resilience More Salient*

Professor Depoorter acknowledges that resiliency may attain political currency in the aftermath of disasters,¹⁵⁸ but suggests that the public's "heightened sensitivity to disaster preparedness after a disaster may be short-lived."¹⁵⁹ The political commons claim therefore emphasizes the conclusions of behavioral economists who find that people generally "[a]re assumed to be myopic and they tend to discount future value in favor of immediate benefits," and thus downplay the chances of future disasters below the level "experts regard as the statistically accurate risk."¹⁶⁰ Indeed, the argument continues, "[i]nhabitants of disaster-prone regions may discount remote risks *even more* than inhabitants of areas where disasters are infrequent" and thus eschew "loss mitigation strategies because they prefer not to think about the consequences of a natural disaster in the region—the 'it will not happen to me' effect."¹⁶¹

Although there is general support in the economic literature for the relevance of cognitive errors,¹⁶² for several reasons, this literature is not a closed book on resiliency's prospects. First, there are growing constituencies for resilient strategies that are not distorted by the cognitive dissonance to which the literature points. Consider, for example, public utilities. As a general proposition, utility companies are on the front lines of climate change.¹⁶³ New Orleans

features of Florida's building codes, which had required buildings to be updated every three years to reflect improvements in the International Building Code and the National Electrical Code. See Christopher Flavelle, *As Storms Get Stronger, Building Codes Are Getting Weaker*, BLOOMBERG NEWS (Mar. 19, 2018), <https://www.bloomberg.com/news/articles/2018-03-19/storm-prone-states-ease-off-building-codes-as-climate-risk-grows?sref=jruCbP7U>.

158. See Depoorter, *supra* note 12, at 124 ("Although voters' disinterest in disaster preparation may not discipline politicians before a disaster, their exaggerated interest after a disaster may cause politicians to adopt sound disaster management policies as to future disasters. An empirical verification of this proposition is beyond the scope of this Article.")

159. *Id.* ("As a result, the political accountability costs of inadequate preparation may be limited. In this regard, politicians may be able to disregard voters' heightened demand, unless a disaster precedes an election by a short enough time span so that the politicians will be held full accountable.")

160. *Id.* at 121.

161. *Id.* at 121–22 (emphasis added).

162. The classic treatment is Amos Tversky & Daniel Kahneman, *Judgment Under Uncertainty Heuristics and Biases*, 185 SCIENCE 1124 (1974). In the legal literature, see, for example, Cass R. Sunstein, *On the Divergent American Reaction to Terrorism and Climate Change*, 107 COLUM. L. REV. 503, 535, 536 & n.179 (2007); Donald T. Hornstein, *Reclaiming Environmental Law: A Normative Critique of Comparative Risk Analysis*, 97 COLUM. L. REV. 562, 604–10 (1992).

163. See, e.g., 2 IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES: FOURTH NATIONAL CLIMATE ASSESSMENT (David Reidmiller et al. eds., U.S. Global Change Rsch. Program 2018) (nation's energy system increasingly affected by extreme weather) (cited in Frank Stern et al., *Extreme Weather Alert: How Utilities Are Adapting to a Changing Climate*, UTILITY DIVE (Mar. 6, 2019),

Energy lost 95 out of 125 miles of transmission lines during Hurricane Katrina,¹⁶⁴ while in Florida, Hurricane Irma caused the fourth-largest blackout in U.S. history.¹⁶⁵ Armed with cost-benefit calculations showing that investments in *ex ante* resiliency cost less than future projected storm expenses, utilities are increasingly making those investments.¹⁶⁶ Thus, outside of any distortions held by the general public as to risk assessments, New Orleans Entergy invested over \$1 billion to improve system resilience,¹⁶⁷ ConEdison spent \$1 billion to strengthen its infrastructure after Superstorm Sandy,¹⁶⁸ and Florida Power & Light spent over \$3 billion in grid-hardening projects since Hurricane Wilma in 2005.¹⁶⁹ This is not to say that public utilities have been incentivized to take resilience as seriously as they should. A study of ConEdison's vulnerabilities in the aftermath of Hurricane Sandy revealed multiple additional measures that the utility needed to undertake,¹⁷⁰ including additional measures needed to address the disproportionate impact felt by the storm on New York's most vulnerable populations.¹⁷¹

Second, the threat of litigation operates as a separate feedback loop that can bypass whatever cognitive dissonance the public may harbor as to extreme weather. Thus, in California, the role played by high-voltage powerlines in the state's recent wildfires has opened Pacific Gas and Electric, the state's largest utility, to inverse condemnation lawsuits,¹⁷² not only leading the company into

<https://www.utilitydive.com/news/extreme-weather-alert-how-utilities-are-adapting-to-a-changing-climate/549297/>).

164. Sarah Brody et al., *Why, and How, Utilities Should Start to Manage Climate-Change Risk*, MCKINSEY & CO.: ELEC. POWER & NAT. GAS (Apr. 24, 2019), <https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/why-and-how-utilities-should-start-to-manage-climate-change-risk>.

165. *Id.*

166. *Id.* In general, such investments are subject only periodically to public review through regulatory base-rate proceedings, or to separate cost-recovery procedures outside of the normal ratemaking process. *See, e.g.,* Zayne Smith, *Beware 'Storm Hardening' Bills Will Raise Electric Rates for Millions of Floridians*, S. FLA. SUN SENTINEL (Apr. 15, 2019, 6:00 AM), <https://www.sun-sentinel.com/opinion/commentary/fl-op-com-elderly-electricity-20190410-story.html>.

167. Brody et al., *supra* note 164.

168. *Id.*

169. *Id.*

170. *See* CONEDISON, CLIMATE CHANGE VULNERABILITY STUDY 17–47 (2019), <https://www.coned.com/-/media/files/coned/documents/our-energy-future/our-energy-projects/climate-change-resiliency-plan/climate-change-vulnerability-study.pdf> (showing need for improved anti-flood measures, better flood maps, updated extreme weather protocols, and increased demand-side improvements such as distributed on-site generation and microgrids).

171. *See, e.g.,* Albert Huang, *Hurricane Sandy's Disproportionate Impact on NYC's Most Vulnerable Communities*, NRDC: EXPERT BOG (Nov. 15, 2012), <https://www.nrdc.org/experts/albert-huang/hurricane-sandys-disproportionate-impact-nycs-most-vulnerable-communities> (“With the prospect of more Sandy-like storms in the future, we are afforded the opportunity to learn from its impact on our vulnerable communities and to take affirmative steps to protect them.”).

172. *See, e.g.,* Sean L. Litteral, *After the Wildfires PG&E, Bankruptcy, and Corporate Sustainability*, 43 ENVIRONS: ENV'T L. & POL'Y J. 119, 121–22 (2019); Jeremy Gradwohl, Comment, *Electric Utility-Caused Wildfire Damages: Strict Liability Under Article 1, Section 19 of the California Constitution*, 12 TEMP. L. REV. 595, 595–96 (2020).

Chapter 11 bankruptcy but also, as a condition of its emergence from bankruptcy, the near-term investment of over \$7 billion to wildfire-mitigation efforts to reduce the risk of future wildfires.¹⁷³ And although governments are generally protected from legal action for their failure to take precautions against extreme weather,¹⁷⁴ the law in the area is evolving.¹⁷⁵

Of course, all of this sidesteps the question about whether the public still suffers from the cognitive dissonance as to extreme weather events that Professor Depoorter described in 2006.¹⁷⁶ The answer is mixed. Superficially, public opinion polls since 2006 increasingly reflect a public acceptance of climate change and, to that extent, growing acceptance that climate-related disasters will recur.¹⁷⁷ On the other hand, there is evidence that property values in many coastal areas have continued to grow¹⁷⁸ and that those living in coastal danger zones register less worry about coastal flooding than those living inland.¹⁷⁹

173. See Jeff St. John, *4 Things PG&E Must Do to Survive and Thrive as It Exits Bankruptcy*, GREENTECH MEDIA (July 2, 2019), <https://www.greentechmedia.com/articles/read/four-hurdles-pge-must-clear-to-survive-post-bankruptcy>.

174. See CONSERVATION L. FOUND., CLIMATE ADAPTATION AND LIABILITY: A LEGAL PRIMER AND WORKSHOP SUMMARY REPORT 18 (2018), https://www.clf.org/wp-content/uploads/2018/01/GRC_CLF_Report_R8.pdf. For evidence of wildfire resilience being taken seriously by another California utility, San Diego Gas and Electric, in the face of increased wildfire risk and litigation, see *SDG&E's 2019 Wildfire Mitigation Plan Builds on Past Successes to Further Strengthen Fire Preparedness & Safety*, SDG&E (Feb. 6, 2019), <https://www.sdgenews.com/article/sdges-2019-wildfire-mitigation-plan-builds-past-successes-further-strengthen-fire>.

175. See Peel & Osofsky, *supra* note 50 at 2197–98, 2209–11 (discussing adaptation lawsuits against municipalities). Relatedly, insurers paying damages to policyholders have subrogation rights against those who may have contributed to the losses, included governmental entities. Thus, after paying the claims of homeowners whose houses were destroyed, fire insurers in California sold their subrogation rights against those who played a role in causing these fires to a hedge fund which used its own cost-benefit calculations to place a value on disaster-prevention steps that should have been taken. See Michael McDonald & Mark Chediak, *Baupost Collects \$3 Billion Wagering on PG&E's Wildfire Claims*, BLOOMBERG NEWS (Aug. 21, 2020), <https://www.bloomberg.com/news/articles/2020-08-21/baupost-collects-3-billion-wagering-on-pg-e-s-wildfire-claims?sref=jruCbP7U>.

176. See Depoorter, *supra* note 12, at 122 (“Individuals may also be disinterested in *ex ante* disaster planning because the benefits of such planning are reduced disproportionately by the remote possibility of the benefits ever being realized.” (emphasis added)).

177. See, e.g., Moira Fagan & Christine Huang, *A Look at How People Around the World View Climate Change*, PEW RSCH. CTR. (Apr. 18, 2019), <https://www.pewresearch.org/fact-tank/2019/04/18/a-look-at-how-people-around-the-world-view-climate-change/> (“Majorities in most surveyed countries say global climate change is a major threat to their nation.”); Cary Funk & Meg Hefferon, *U.S. Public Views on Climate and Energy*, PEW RSCH. CTR. (Nov. 25, 2019), <https://www.pewresearch.org/science/2019/11/25/u-s-public-views-on-climate-and-energy/> (“Majorities of Americans say the federal government is doing too little for key aspects of the environment, from protecting water or air quality to reducing the effects of climate change.”).

178. See, e.g., Markus Baldauf et al., *Does Climate Change Affect Real Estate Prices? Only if You Believe in It*, 33 REV. FIN. STUDS. 1256, 1291 (2020) (heterogenous beliefs account for the fact that prices of homes projected to drop because of climate change in coming years continue to rise in neighborhoods populated by climate denialists).

179. See generally Laura A. Bakkensen & Lint Barrage, *Flood Risk Belief Heterogeneity and Coastal Home Price Dynamics: Going Under Water?* (Nat'l Bureau of Econ. Rsch., Working Paper No. 23854, 2021), <https://www.nber.org/papers/w23854>.

reflecting the sustained type of cognitive dissonance in which partisan deflection and the blame game may offer winning political strategies.

However, a closer look at the data suggests possible shifts in public attitudes away from this type of sustained, wholesale cognitive dissonance. Consider, for example, the effects of coastal flooding resulting from tropical storms and sea-level rise. As to storms, whatever might be the public's cognitive dissonance when extreme weather truly was a one-in-one-hundred or one-in-five-hundred-year event, Greenville, North Carolina experienced two one-in-one-hundred-year events within four years of one another, Hurricane Fran in 1996 and Hurricane Floyd in 1999.¹⁸⁰ In Houston, Hurricane Harvey was the third one-in-five-hundred-year flood in three years.¹⁸¹ Applying modeling techniques to communities that experience storms repetitively, one study found that the first flooding resulted in a 26 percent decrease in home resale value in the 100-year floodplain, whereas a second flood resulted in a 35 percent decrease.¹⁸²

A similar change in circumstances may arise in areas experiencing sea-level rise first-hand in the form of regular "sunny day" flooding, even in the absence of storms.¹⁸³ One recent study of Miami-Dade County, Florida, where such flooding occurs, measured higher increases in prices for properties located on higher ground within the county relative to price increases in properties in lower, more at-risk elevations.¹⁸⁴ In short, coastal real estate markets may be beginning to reflect homebuyers who are no longer as sanguine about flood risks as they may once have been.

Nor does the increased salience of flood risk depend on a community actually experiencing the physical effects of climate change. The NFIP is currently in the process of both accelerating its mapping of properties at increased risk of flooding and increasing the annual, risk-adjusted premiums it charges for flood insurance (albeit more slowly than reformers would like).¹⁸⁵ The result may be a tangible, year-by-year signal as to flood risk even on days when skies are clear.

180. Koen de Koning & Tatiana Filatova, *Repetitive Floods Intensify Outmigration and Climate Gentrification in Coastal Cities*, ENV'T RSCH. LETTERS, Feb. 18, 2020, at 1, 5 (2020).

181. *Id.*

182. *Id.* at 6.

183. See Ada Carr, *Miami Area Experiences Chronic Nuisance Flooding Due to Annual King Tides*, THE WEATHER CHANNEL (Oct. 21, 2015), <https://weather.com/news/news/miami-beach-flooding-high-king-tide>; Matthew Cappucci, *Sea Level Rise Is Combining with Other Factors to Regularly Flood Miami*, WASH. POST (Aug. 8, 2019), <https://www.washingtonpost.com/weather/2019/08/08/analysis-sea-level-rise-is-combining-with-other-factors-regularly-flood-miami/>; Tom Di Liberto, *King Tides Cause Flooding in Florida in Fall 2017*, NOAA, <https://www.climate.gov/news-features/event-tracker/king-tides-cause-flooding-florida-fall-2017> (June 13, 2021) ("These tidal floods are often called sunny-day or blue-sky floods, as they occur on an otherwise beautiful, calm day.").

184. See Jesse M. Keenan et al., *Climate Gentrification From Theory to Empiricism in Miami-Dade County, Florida*, ENV'T RSCH. LETTERS, Apr. 23, 2018, at 1, 3.

185. See Laura A. Bakkensen & Lala Ma, *Sorting Over Flood Risk and Implications for Policy Reform*, J. ENV'T ECON. & MGMT., Nov. 2020, at 1, 4.

To be sure, these developments do not mean that all at-risk communities will take proactive measures to improve resilience. Rather, communities process climate change and resilience's social and political implications differently. On the one hand, some communities at increased risk of disaster-related losses may adopt and finance *ex ante* resiliency measures to retain their populations and maintain their tax bases, especially in light of signals from bond-rating entities that investors are prepared to include climate-related effects into their evaluations of a state or local government's credit risk.¹⁸⁶ In 2017, for example, voters in the City of Miami voted in support of a \$400 million general obligation bond, with nearly half of the bond to be invested in reducing flood risk.¹⁸⁷ But on the other hand, not all communities are, or can afford to be, equally proactive. Climate-related effects on housing prices can change the demographics of those who remain at risk—with wealthier property owners moving to less risky areas, and poorer property owners, often from communities of color, concentrating more heavily in at-risk areas. This phenomenon may occur because lower-income buyers are attracted to discounted at-risk properties, or because existing low-income homeowners cannot afford to sell their at-risk properties at a lower price.¹⁸⁸ Either way, the political commons model of disaster politics, in which resiliency is destined to fail, may no longer be as true today as it may have been in 2006.

III. RECONCEPTUALIZING *EX ANTE* RESILIENCY: WHAT THE PUBLIC CHOICE CRITIQUE MISSES

Not only may there be theoretical weaknesses in the political commons model of disaster politics, but the model draws its principal empirical support from too-limited a historical time frame. In general, the political commons critique draws its strongest historical support from the mid-to-late twentieth century and early twenty-first century American experience with flood-related

186. See, e.g., Kristoffer Tigue, *Climate Change Becomes an Issue for Ratings Agencies*, INSIDE CLIMATE NEWS (Aug. 5, 2019), <https://insideclimatenews.org/news/05082019/climate-change-ratings-agencies-financial-risk-cities-companies/>.

187. See, e.g., *Financing Resilience: City of Miami Invests \$400 Million to Build a Stronger Future*, SE. FL. REG'L COMPACT CLIMATE CHANGE, <https://southeastfloridaclimatecompact.org/news/financing-resilience-city-miami-invests-400m-build-stronger-future/> (last visited Mar. 9, 2022).

188. See, e.g., de Koning & Filatova, *supra* note 180, at 14 (gradual increase in poverty in the years following major flooding events); Keenan et al., *supra* note 184, at 3 (“The second pathway for [climate gentrification] relates to the deterioration of environmental conditions such that the overall cost of living can only be feasibly borne by wealthier and wealthier households, as climate change impacts manifest in greater frequency and intensity.”); Bakkensen & Ma, *supra* note 185, at 14 (“While all groups dislike flood risk, low income and minority groups are more likely to sort into floodplains.”). There is also evidence that, in areas affected by severe natural disasters, there is a 3 to 5 percent decrease in home ownership and a corresponding increase in the number of renters in such areas. See Tamara L. Sheldon & Crystal Zhan, *The Impact of Natural Disasters on US Home Ownership*, 6 J. ASS'N ENV'T & RES. ECONOMISTS 1169, 1170 (2019) (“We find that natural disasters decrease home ownership levels of incoming migrants in the second year following the disaster. . . . This effect may also lead to gradual shifts in local population toward renting in vulnerable areas that frequently experience disasters as climate change progresses.”).

disasters. Against the backdrop of mounting post-disaster expenses during this period, public choice economists highlight the growing imbalance of post-disaster expenditures relative to spending on pre-disaster precautionary measures. They then project onto this imbalance their conclusions that politicians are overly motivated by a short-term self-interest in keeping voters assuaged with post-disaster assistance instead of keeping voters less prone to disaster ahead of time.

But apart from the weaknesses of this claim described earlier, the public choice model has historical and empirical weaknesses. In short, once one widens the time frame through which governmental disaster policy is examined, it quickly becomes clear that disaster politics throughout U.S. history has sustained periods of political support for disaster preparedness—precisely the opposite of what the political commons model predicts.

A. *Century of Federal Expenditures and Experiments in Ex Ante Flood Control*

1. *The Growth of Federal Flood Control Efforts*

Not long after the Supreme Court in 1824 first interpreted the Commerce Clause to authorize the federal government to improve the navigability of rivers,¹⁸⁹ there emerged a political fault line over the federalism of flood control: federal authority was to restrict itself to navigability, with flood-control measures to be solely the responsibility of the states.¹⁹⁰ However, flooding along the lower Mississippi River between 1828 and 1849 fed demands for an increased federal role in flood control.¹⁹¹ Although President James Polk vetoed the federal Rivers and Harbors Bill of 1846 because it reflected a “despicable scramble” for increased federal flood-control efforts,¹⁹² by the 1880s, the U.S. Army Corps of Engineers “had constructed miles of levees along the Mississippi River for navigational purposes.”¹⁹³

189. *Gibbons v. Ogden*, 22 U.S. (9 Wheat.) 1, 239–40 (1824).

190. See Christine A. Klein & Sandra B. Zellmer, *Mississippi River Stories: Lessons from a Century of Unnatural Disasters*, 60 SMU L. REV. 1471, 1478–79 (2007) (“Critics read *Gibbons* narrowly, believing that the central government had little authority beyond the sphere of navigation, and that it lacked the authority to shield private property from flooding.”); see also Ned Randolph, *River Activism, “Levees-Only” and the Great Mississippi Flood of 1927*, 6 MEDIA & COMM’NS 43, 44 (2018) (despite the Supreme Court’s decision in *Gibbons v. Ogden*, “flood control was officially relegated to local interests.”).

191. Randolph, *supra* note 190, at 44.

192. *Id.*; see also NATALIE KEEGAN ET AL., CONG. RSCH. SERV., R41752, *LOCALLY OPERATED LEVEES: ISSUES AND FEDERAL PROGRAMS 1–2* (2011) (local levee owners operate 13,000 miles of the levees constructed by the Corps).

193. See Klein & Zellmer, *supra* note 190, at 1479; JAMES M. WRIGHT, ASS’N OF STATE FLOODPLAIN MANAGERS, *THE NATION’S RESPONSES TO FLOOD DISASTERS: A HISTORICAL ACCOUNT 6* (Wendy L. Hessler ed., 2000) (“To some, 1879 marked the turning point in the long battle to garner federal support for flood control. From that time forward, Congress gradually increased federal government responsibility to develop flood control throughout the nation. Between 1879 and 1917, federal money funded some flood control work recommended by the Mississippi River Commission. But throughout this

A “devastating” Mississippi flood in 1912 led to platforms in all three major American political parties recognizing the “national” importance of flood control and the need for increased federal involvement and funding.¹⁹⁴ Congress, in the Flood Control Act of 1917, then responded with the country’s first explicit authorization for federal flood-control funding.¹⁹⁵ And later, the Great Mississippi Flood of 1927 galvanized political support for the Flood Control Act of 1928,¹⁹⁶ in which Congress acknowledged the federal government’s responsibility for the Mississippi River,¹⁹⁷ budgeting an amount “in fiscal terms [that] was more expensive than anything else the federal government had ever undertaken except World War I.”¹⁹⁸ Congress was finding the politics of precaution to be irresistible.¹⁹⁹

For the next fifteen years, the federal government expanded its financial commitment to flood prevention, even as its understanding evolved as to the best way to control flooding. The 1928 Flood Control Act itself abandoned the levees-only approach and embraced the idea of upstream floodwater-retention reservoirs that, by necessity, also required the Corps of Engineers to adopt a river-basin-wide vision of flood control.²⁰⁰ The Act budgeted \$325 million for Mississippi River flood prevention, an amount representing “a percentage of the

period, Congress insisted that the Commission focus on *navigation* with its incidental benefits of bank stabilization, surveys, and gaging assisting in flood control.”).

194. See Randolph, *supra* note 190, at 49 (“The presidential nominees [of all three national parties] specifically subscribed to [these political party] declarations.”).

195. Flood Control Act of 1917, Pub. L. No. 64-367, 39 Stat. 948; see also Klein & Zellmer, *supra* note 190, at 1480 (“Congress relented somewhat through the Flood Control Act of 1917, the first federal enactment that explicitly appropriated money for river improvements other than navigation.”); WRIGHT, *supra* note 193, at 7 (“The first break in the wall of congressional intransigence came in 1916 with the creation of the House Committee on Flood Control. Supported by congressmen from the lower Mississippi River and Ohio Valley states, the committee created a permanent forum for congressional flood control proponents. The most concrete result . . . was the passage of the Flood Control Act of 1917[.]”).

196. Flood Control Act of 1928, Pub. L. No. 70-391, 45 Stat. 534 (codified as amended at 33 U.S.C. §§ 702–704).

197. *Id.*

198. See Klein & Zellmer, *supra* note 190, at 1484; see also WRIGHT, *supra* note 193, at 10 (“During the previous 200 years, local governments had paid an estimated \$292 million in lower Mississippi flood protection works. Now in a single act [the 1928 Flood Control Act], the Congress authorized expenditures of \$325 million. . . . [P]robably no other water project involved as great a percentage of the federal budget at the time of its authorization as did Mississippi River flood control.” (quoting MARTIN RUESS, *DESIGNING THE BAYOUS: THE CONTROL OF WATER IN THE ATCHAFALAYA BASIN, 1800–1950*, at 121 (1998))).

199. Federal enthusiasm for flood control after the 1927 Mississippi Flood was unaffected by the confidence expressed only months earlier by the Mississippi River Commission that the system of levees on the Mississippi River were “now in [a] condition to prevent the disastrous effects of floods.” See WRIGHT, *supra* note 193, at 8.

200. See A. Dan Tarlock, *United States Flood Control Policy: The Incomplete Transition from the Illusion of Total Protection to Risk Management*, 23 DUKE ENV’T L. & POL’Y F. 151, 160 (2012) (“[T]he 1928 Act laid the foundation for the demise of the levees-only approach, with a transition to the construction of upstream reservoirs . . . [and] formally committed the Corps to the Progressive Conservation Era vision of a river-basin-wide approach to water management.”); WRIGHT, *supra* note 193, at 9 (“In passing [the 1928 Act] Congress adopted a flood control plan that abandoned the levees only approach.”).

federal budget” greater than any water project ever before funded.²⁰¹ In the Flood Control Acts of 1936,²⁰² of 1938,²⁰³ and of 1941,²⁰⁴ President Franklin Roosevelt became an incredibly enthusiastic supporter of flood-control projects in part because the projects also served as vehicles to provide jobs.²⁰⁵

Between 1936 and 1952, Congress spent more than \$11 billion on flood-control projects,²⁰⁶ even as evidence revealed that these projects had a mixed record of actually reducing flood losses.²⁰⁷ The problem, of course, was the moral hazard of the flood-control projects themselves, which encouraged development in the very floodplains where flood-control projects were built, thus exacerbating future losses from the inevitable, major floods that the projects could not prevent.²⁰⁸

This led to two significant developments in federal flood-control policy. First, the federal government in 1965 formed the Bureau of the Budget Task Force on Federal Flood Control Policy, which soon thereafter issued a report finding that physical flood control, without more, could be counterproductive.²⁰⁹ It urged a more integrated approach that emphasized knowledge of flood hazards, floodplain planning, and restrictions on floodplain development.²¹⁰ Second, in

201. See WRIGHT, *supra* note 193, at 10 (quoting RUESS, *supra* note 198, at 121).

202. Flood Control Act of 1936, Pub. L. No. 74-738, 49 Stat. 1570.

203. Flood Control Act of 1938, Pub. L. No. 75-761, 52 Stat. 1215.

204. Flood Control Act of 1941, Pub. L. No. 77-228, 55 Stat. 638.

205. See WRIGHT, *supra* note 193, at 10–11; see also Tarlock, *supra* note 200, at 162 (“During his four terms, President Franklin Roosevelt first embraced dams as engines of employment to combat skyrocketing joblessness during the Depression, and after the Allied victory became certain, saw them as sources of employment for returning veterans.”). During his presidency, the funding for 250 flood-control projects specifically used work-relief funds. *Id.* In addition to flood-control projects built by the Army Corps of Engineers, flood-control legislation authorized construction of floodwater-retention projects by the Tennessee Valley Authority, see Tarlock, *supra* note 200, at 162 (indeed, the TVA, “created under the Tennessee Valley Authority Act of 1933, was the first [agency] to put floodwater retention into large-scale practice”), and by the Department of Agriculture’s Soil Conservation Service, see the 1954 Watershed and Flood Prevention Act, Pub. L. No. 83-566, 68 Stat. 666 (1954), and Wright, *supra* note 193, at 12 (the 1954 legislation “authorized the . . . Soil Conservation Service . . . to participate in comprehensive watershed management projects in cooperation with states and their subdivisions.”).

206. WRIGHT, *supra* note 193, at 12.

207. Between 1900 and 1948, as the country committed to its major dam-building program, floods causing over \$50 million in damages occurred on average once every six years. *Id.* at 21. Between 1940 and 1968, this \$50 million benchmark was nonetheless breached regularly. *Id.* Indeed, by one count, despite a half century of major federal flood-control efforts, the \$50 million benchmark was breached almost “every two years.” *Id.*

208. Although levees and dams do prevent flood damage, they “encourage[] settlement, so that when a flood occurs, the damage often exceeds that which would have been expected prior to dam construction. This is a classic moral-hazard problem.” Tarlock, *supra* note 200, at 166; see also WRIGHT, *supra* note 193, at 29 (asserting that existing flood-control structures lead to “inadvertent encouragement of floodplain encroachments.”).

209. For more detailed information on the creation of the federal Task Force, see WRIGHT, *supra* note 193, at 29. For information on the Task Force Report itself, see TASK FORCE ON FEDERAL FLOOD CONTROL POLICY, A UNIFIED NATIONAL PROGRAM FOR MANAGING FLOOD LOSSES, H.R. DOC. NO. 89-465 (1966). The Task Force Report has been called the “Magna Carta of contemporary nonstructural floodplain management planning.” See WRIGHT, *supra* note 193, at 31 (quoting William Donovan, later Chief of the Corps of Engineers’ floodplain management services program).

210. See WRIGHT, *supra* note 193, at 29.

1968 Congress created the NFIP in part to implement the Task Force’s recommendations.²¹¹ Just as the NFIP’s requirement that insureds pre-fund at least some of their inevitable post-disaster payments can be understood as a rational political response,²¹² so too can its requirement that communities could qualify for NFIP coverage only by first adopting local floodplain management regulation. This understanding is what the 1966 report emphasized as the necessary antidote to the moral hazard of both NFIP insurance and on-the-ground flood control infrastructure.²¹³

2. *The Federal Commitment to Structural Flood Protection Begins to Slow*

However one accounts for the NFIP, at the time of its adoption, the federal politics of disaster prevention were at a turning point. Political support for dam-building was more uneven between 1952 and 1992 than in the twenty-five years previously,²¹⁴ partly because the best sites had already been developed, meaning that proposals for any remaining sites had far less economic potential.²¹⁵

211. National Flood Insurance Act of 1968, 42 U.S.C. §§ 4001–4027. Congress first expressed its interest in national flood insurance with passage of the Federal Flood Insurance Act of 1956, Pub. L. No. 84-1016, 70 Stat. 1078, but a program of federal flood insurance was never implemented under the earlier legislation. See WRIGHT, *supra* note 193, at 30.

212. See DIANE P. HORN & BAIRD WEBEL, CONG. RSCH. SERV., R44593, INTRODUCTION TO THE NATIONAL FLOOD INSURANCE PROGRAM (NFIP) 1–2 (2021) (suggesting that, given the rise in “post-disaster flood losses” and the “subsequent federal disaster relief assistance,” a national insurance program could be “a reasonable method of sharing the risk of flood losses”).

213. The congressional findings when establishing the NFIP included the following:

[A]s a matter of national policy, a reasonable method of sharing the risk of flood losses is through a program of flood insurance which can complement and encourage preventive and protective measures. . . . [A] program of flood insurance can promote the public interest by providing adequate protection against the perils of flood losses and encouraging sound land use by minimizing exposure of property to flood losses . . . the objectives of a flood insurance program should be integrally related to a unified national program for management

42 U.S.C. § 4001(a), (c). That the NFIP has since been criticized for creating its own moral hazard through non-actuarially fair pricing that itself encourages building in harms’ way is thus an especially relevant critique of its operation, given the impetus for its creation in 1968. I discuss *infra* at pages 245–47 the current status of NFIP enforcement of the Program’s requirement of local floodplain management regulation, as well as the current status of the NFIP’s non-actuarially based pricing.

214. See Tarlock, *supra* note 200, at 164 (“After the New Deal, federal support for large dam construction continued but only on a project-by-project basis. The Eisenhower Administration [] followed a ‘no-new starts’ water-resources-development policy, and stressed increased local responsibility for smaller projects. This policy was reversed in the Kennedy and Johnson administrations. . . . [Although t]he Water Resources Planning Act of 1965 created seven river-basin commissions coordinated by a federal Water Resources Council[, t]he attempted revival was too late. Congress was funding fewer dams, levees, and canals[.]”).

215. See WRIGHT, *supra* note 193, at 31 (“By the late 1960s, though, the pace of federal flood control projects began to slow mainly because of difficulties justifying the projects’ economic and environmental aspects . . . projects with the highest economic potential had already been built while rising interest rates added to new project costs. Executive branch actions and congressional legislation reduced development in floodprone areas.”).

Although investments in flood-prevention projects continued during this time²¹⁶ as they continue today,²¹⁷ two major events called into question the politics of disaster prevention through large-scale infrastructure alone.

First, despite billions of dollars of federal investment in flood-control dams and levees, the Great Flood of 1993 caused property damage even greater than the adjusted-dollar amount created by the Great Mississippi Flood of 1927—the event that first triggered the federal politics of disaster prevention.²¹⁸ In response, the federal Interagency Floodplain Management Review Committee issued a report in 1994 that questioned the dominant federal role in funding flood reduction in the absence of more effective state and local engagement in integrated land-use planning and floodplain management.²¹⁹ The report was “especially notable for its exploration of the role that undeveloped or restored riparian areas and wetlands could play in floodwater retention”—a significant shift in flood-prevention strategy.²²⁰

And second, the devastation from Hurricane Katrina would ultimately rival that of the Great Mississippi Flood of 1927²²¹ despite its flood-protection infrastructure,²²² also suggesting that a shift in disaster-resilience strategy was needed. A subsequent study of Hurricane Katrina by the National Research Council²²³ concluded that, although infrastructure improvements should be made, “the risks of inundation and flooding never can be fully eliminated by protective structures no matter how large or sturdy those structures may be.”²²⁴

216. See Tarlock, *supra* note 200, at 164 (“After the New Deal, federal support for large dam construction continued but only on a project-by-project basis.”).

217. See, e.g., Kyle Hagerty, *Work on Nation’s Largest Water Infrastructure Project Set to Begin*, BISNOW (May 15, 2017), <https://www.bisnow.com/houston/news/economy/work-on-nations-largest-water-infrastructure-project-set-to-begin-74447> (\$3.5 billion pipeline-and-canal project in Houston designed to counteract subsidence that would make the city more vulnerable to flooding in the future, financed largely with funding from the Texas State Water Implementation Fund to be borne by five regional water authorities in Harris & Fort Bend Counties); Jeff Daniels, *California Governor Plans to Spend Nearly \$450 Million on Flood Control But Says More Is Needed*, MSNBC, <https://www.cnbc.com/2017/02/24/california-plans-to-bolster-states-flood-control-efforts.html> (Feb. 24, 2017, 8:20 PM) (planning an expenditure from state water bond funds, but estimating that California’s flood management infrastructure could need \$50 billion).

218. The 1927 Mississippi Flood caused \$12.3 billion in property damage and flooded 12.8 million acres; the 1993 Mississippi Flood, despite over one-half century of federal investment in levees and flood-control dams and reservoirs, caused \$12.7 billion in property damage and flooded 20.1 million acres. See WRIGHT, *supra* note 193, at 75.

219. See *id.* at 80–81.

220. See Tarlock, *supra* note 200, at 171.

221. See *id.* at 171 (“Hurricane Katrina was the worst flood disaster since the 1927 Mississippi River Flood.”).

222. *Id.* (“Katrina’s storm surge damaged some 169 of the 350 miles of floodwalls and levees around New Orleans.”).

223. NAT’L ACAD. OF ENG’G & NAT’L RSCH. COUNCIL, *THE NEW ORLEANS HURRICANE PROTECTION SYSTEM: ASSESSING PRE-KATRINA VULNERABILITY AND IMPROVING MITIGATION AND PREPAREDNESS* (2009).

224. *Id.* at 4.

Instead, Katrina signaled renewed interest in more integrated approaches to disaster management.²²⁵

3. *The Re-Emergence of Federal and State Interest in Ex Ante Resilience*

The modern public-choice claim may misread the historical record. Not only have there been successful political coalitions formed in support of massive expenditures in *ex ante* disaster prevention, but the recent imbalance between *ex post* and *ex ante* expenditures may reflect factors other than a tragedy of the political commons. Specifically, the imbalance may reflect several decades of unprecedented climate disasters (requiring massive amounts of *ex post* aid) while expenditures for new disaster-prevention strategies are just starting to attract political support. Thus, it is especially relevant that, since 2015, federal expenditures for FEMA's pre-disaster grants have risen from \$25 million to \$3.4 billion, a 136-fold increase.²²⁶

Such an explanation finds support in a new wave of worldwide experimentation as to the prevention of flood losses. Consider, for example, the Netherlands, not only the world's most flood-prone country but also the country that had constructed the Deltaworks, perhaps the most ambitious and expensive flood-control structure in the world.²²⁷ Following a major flood in 1995 that the Deltaworks failed to prevent, the Netherlands began emphasizing a new policy of "making 'room for the river' rather than further raising dikes and hardening infrastructure."²²⁸ This marked a shift away from traditional flood-control structures and toward relocating at-risk properties out of floodplains. In the United States, a similar strategy was undertaken by the city of Des Moines, Iowa, which had also experienced years of recurring flood losses. The city used local revenue and funding from FEMA's flood-buyout program²²⁹ to move large swaths of low-lying development to higher ground, allowing the floodplains to "revert to wetlands that soak up overflow waters."²³⁰ Under the Obama administration, similar efforts to those in Iowa began in Illinois, Massachusetts, North Dakota, Minnesota, Oklahoma, and Wisconsin.²³¹ And early signs from

225. See also Tarlock, *supra* note 200, at 171 ("flood protection strategy in at-risk areas such as New Orleans must be based on an integrated risk-based system that expressly rejects the expectation that complete structural protection against all hydrological contingencies is possible").

226. See *supra* note 110.

227. See BENJAMIN K. SOVACOO & BJÖRN-OLA LINNÉR, *THE POLITICAL ECONOMY OF CLIMATE CHANGE ADAPTATION* 1–32 (2016).

228. *Id.* at 77.

229. See *infra* note 289 (reports on use of the NFIP flood buyout program).

230. See John Flesher, *Battered by Floods, US River Communities Try New Remedies*, CHI. TRIBUNE (Apr. 30, 2020, 3:11 PM), <https://www.chicagotribune.com/weather/weather-news/sns-river-communities-attempt-to-remedy-floods-20200430-e7wwkipmzrtdm7alzihqzre34-story.html>. But see Tarlock, *supra* note 200, at 182 (arguing that, despite the consensus of flood-control experts that new risk management strategies need to be used, "it will not be easy to translate this consensus into policy on the ground.").

231. See Renee Cho, *Making Room for Rivers: A Different Approach to Flood Control*, COLUM. CLIMATE SCH.: STATE OF THE PLANET (June 7, 2011), <https://blogs.ei.columbia.edu/2011/06/07/making->

the Biden administration also reflect increased support for moving at-risk properties out of floodplains, in addition to signaling support for other pre-disaster mitigation projects.²³²

The bottom line is that the politics of *ex ante* resiliency are more nuanced than the political commons model describes. Spending for pre-disaster flood control structures historically represented one of the largest domestic expenditures in the country's history. And, perhaps precisely because *ex post* disaster recovery budgets have ballooned in recent decades, policymakers are currently increasing expenditures once again for cost-effective resiliency projects.

B. Resiliency's Other Problems and Potential Solutions

But simply because the public choice claim can be overstated does not mean that it fails to illuminate some of the politics of disasters. For instance, during the first year of the COVID-19 pandemic, evidence suggests that President Trump sought refuge in the blame game, repeatedly chastising (largely) Democratic governors and mayors for what he claimed to be their mismanagement of the pandemic.²³³ This blame-shifting was regularly reciprocated by blue-state politicians.²³⁴ So too, in the aftermath of the February 2021 "extreme cold" disaster in Texas, the immediate reaction of some Republican politicians was to blame Democrats and promoters of renewable energy.²³⁵ Such political

room-for-rivers-a-different-approach-to-flood-control/; see also Tristan Buarick, *The Dutch Are Giving Rising Rivers More Room. Should We Follow Suit?*, NOLA.COM, https://www.nola.com/news/environment/water_ways/article_2dca0db4-5e56-11ea-9452-e3ac6e96c114.html (Mar. 10, 2020, 10:23 AM).

232. See Christopher Flavelle, *Biden Doubles FEMA Program to Prepare for Extreme Weather*, N.Y. TIMES, <https://www.nytimes.com/2021/05/24/climate/biden-fema-disasters.html> (Aug. 5, 2021) ("The change will double the current size of a Federal Emergency Management Agency program that gives money to state and local governments to reduce their vulnerability before a disaster happens — for example, building sea walls, elevating or relocating flood-prone homes."); see also Sophia Schmidt, *Eastwick Residents Want Biden's Infrastructure Plan to Fund Philly's First Climate Migration*, WHY? (Nov. 23, 2021), <https://why.org/articles/eastwick-residents-want-bidens-infrastructure-plan-to-fund-phillys-first-climate-migration/>.

233. See, e.g., Philip Bump, *Trump Blames Blue States for the Coronavirus Death Toll — But Most Recent Deaths Have Been in Red States*, WASH. POST (Sept. 16, 2020), <https://www.washingtonpost.com/politics/2020/09/16/trump-blames-blue-states-coronavirus-death-toll-but-most-recent-deaths-have-been-red-states/>; Mia Jankowicz, *Kushner's Coronavirus Team Shied Away from a National Strategy, Believing That the Virus Was Hitting Democratic States Hardest and That They Could Blame Governors, Report Says*, INSIDER (July 31, 2020, 4:25 AM), <https://www.businessinsider.com/kushner-covid-19-plan-maybe-axed-for-political-reasons-report-2020-7>.

234. See, e.g., Lee Drutman, *The COVID-19 Blame Game Is Going to Get Uglier*, FIVETHIRTYEIGHT (Apr. 13, 2020, 6:00 AM), <https://fivethirtyeight.com/features/the-covid-19-blame-game-is-going-to-get-uglier/> ("Democrats have done the obvious so far: Pin all the blame on Trump . . .").

235. See, e.g., Greg Sargent, *Opinion The Latest GOP Nonsense on Texas Shows Us the Future Republicans Want*, WASH. POST (Feb. 18, 2021), <https://www.washingtonpost.com/opinions/2021/02/18/texas-republicans-abbott-power-shortages/> ("It's a future in which the default response to large public problems will be to increasingly retreat from real policy debates into an alternate information

gamesmanship was seen in Hurricane Katrina's aftermath, when federal officials in the Bush administration exchanged accusations of political mismanagement with state and local Democratic officials in Louisiana. Perhaps these political tactics were foremost in Professor Depoorter's mind when he formalized the politics of the blame game.²³⁶

Still, the fact that political gamesmanship has room in disaster management does not mean that it must dominate climate resiliency efforts. The thrust of the public choice claim is that it can be in politicians' self-interest not to cooperate, even when optimal resilience strategies require inter-jurisdictional cooperation.²³⁷ The linchpin of the argument is that disasters are too infrequent to overlap with a politician's short-term focus on the next election, giving politicians room to bet that a community's subpar preparedness for disasters will not be held against them.²³⁸ Yet, the United States has suffered many extreme weather events since Professor Depoorter developed his model in the shadow of Hurricane Katrina.

In 2012, the country recorded climate-caused losses approaching those caused by Hurricane Katrina,²³⁹ and in 2017 experienced its costliest storm-loss year on record.²⁴⁰ In 2020, the country marked the most active Atlantic hurricane season in U.S. history, setting the national record for the number of billion-dollar weather-related disasters in a single year.²⁴¹ And in general, there is an

universe, while doubling down on scorched-earth distraction politics and counter-majoritarian tactics to insulate themselves from accountability.”).

236. See, e.g., Scott Shane et al., *After Failures, Government Officials Play Blame Game*, N.Y. TIMES (Sept. 5, 2005), <https://www.nytimes.com/2005/09/05/us/nationalspecial/after-failures-government-officials-play-blame-game.html> (“As the Bush administration tried to show a more forceful effort to help the victims of Hurricane Katrina, government officials on Sunday escalated their criticism and sniping over who was to blame for the problems plaguing the initial response.”).

237. See Depoorter, *supra* note 12, at 113 (“Shared political accountability in the disaster management context brings to mind a well-known proposition in social psychology regarding the debilitating effect of diffused responsibility in collective action settings. When members of a group perceive that their obligation to act is shared with other members of the group, individual responsibility is diluted.”).

238. *Id.* at 124 (“the public’s heightened sensitivity to disaster preparedness after a disaster may be short-lived[,]” in part because the focus is on disaster recovery).

239. See *NCDC Releases 2012 Billion-Dollar Weather and Climate Disasters Information*, NOAA: NAT’L CTRS. FOR ENV’T INFO., <https://www.ncdc.noaa.gov/news/ncdc-releases-2012-billion-dollar-weather-and-climate-disasters-information> (last visited Oct. 2, 2021) (reporting that total costs in 2012 from Superstorm Sandy and western drought and wildfire exceeded \$110 billion, making “[t]he 2012 total damages rank only behind 2005”).

240. See Rachel Cleetus, *New NOAA Report Shows 2017 Was the Costliest Year on Record for US Disasters*, UNION OF CONCERNED SCIENTISTS: THE EQUATION (Jan. 8, 2018, 2:09 PM), <https://blog.ucsusa.org/rachel-cleetus/new-noaa-report-shows-2017-was-the-costliest-year-on-record-for-us-disasters> (citing report from the National Climate Data Center that the costs of weather-related disasters in 2017 was \$306.2 billion).

241. Adam B. Smith, *2020 U.S. Billion-Dollar Weather and Climate Disasters in Historical Context*, CLIMATE.GOV, <https://www.climate.gov/disasters2020> (Sept. 27, 2021) (in 2020, there was “a record-breaking number of named tropical cyclones (30), eclipsing the record of 28 set in 2005 . . . [along with] a record-breaking U.S. wildfire season . . . 2020 [] stands head and shoulders above all other years in regard to the number of billion-dollar disasters.”).

unmistakable trend over the last four decades of costly climate-related disasters becoming more frequent: there were twenty-nine billion-dollar climate disasters in the United States in the 1980s, fifty-three in the 1990s, sixty-three in the 2000s, and 123 in the 2010s.²⁴² As disasters become more recurrent, repeated inaction and blame-gaming from officials become more politically fraught.

Accordingly, there has been a steady uptick in cross-jurisdictional cooperation among local officials concerned about climate adaptation. Between 2013 and 2015 in California, in addition to requiring municipalities to incorporate climate change into their general plans,²⁴³ state officials began encouraging regional adaptation collaboration among local and county governments.²⁴⁴ In turn, local officials in Los Angeles formed the Los Angeles Regional Collaborative to address climate change and help make the region “resilient to its impacts.”²⁴⁵ In 2016, Massachusetts Governor Charlie Baker issued Executive Order 569,²⁴⁶ requiring “state agencies to create a coordinating committee and state adaptation plan, and local governments to conduct municipal vulnerability assessments.”²⁴⁷ But Boston had already begun formalizing climate-related relationships with neighboring cities and regional agencies²⁴⁸ and by 2019, the city was conducting a feasibility study about, and advocating for, a regional harbor barrier for Boston Harbor.²⁴⁹ In Florida in 2009, four counties formed the Southeast Florida Regional Climate Change Compact, which by 2011 was encouraging local governments to plan and receive funding for climate adaptation priorities.²⁵⁰ That same year, in the aftermath of Hurricane Harvey, the Texas congressional delegation successfully appropriated \$10 billion in new flood-reduction infrastructure projects for the Houston metropolitan area.²⁵¹ This growing political appetite for *ex ante* disaster resilience drew praise from political scientist Neil Malhotra, whose writings had provided some of the strongest evidence at the time in support of the political commons hypothesis that *ex ante* climate adaptation lacked political salience.²⁵²

242. *Summary Stats*, NOAA: NAT'L CTRS. FOR ENV'T INFO., <https://www.ncdc.noaa.gov/billions/summary-stats> (last visited Mar. 11, 2022).

243. See Linda Shi, *Promise and Paradox of Metropolitan Regional Climate Adaptation*, 92 ENV'T SCI. & POL'Y 262, 266 (2019).

244. *Id.* (citing California Senate Bill 246, creating this initiative).

245. L.A. REG'L COLLABORATIVE FOR CLIMATE ACTION & SUSTAINABILITY, GOVERNANCE POLICY (2014) (cited in Shi, *supra* note 243, at 267). *But see id.*, at 269, 271 (referencing organizational struggles of LARC and the fact that the Southeast Florida Compact may not have “significantly impacted local land use planning”).

246. Mass. Exec. Order No. 569 (Sept. 16, 2016), <https://www.mass.gov/executive-orders/no-569-establishing-an-integrated-climate-change-strategy-for-the-commonwealth>.

247. Shi, *supra* note 243, at 267.

248. *Id.*

249. *Id.* at 268.

250. *Id.* at 248 (describing Southeast Regional Climate Compact, Regional Climate Action Plan).

251. See Schneider, *supra* note 139.

252. See *id.* More broadly, the possibility of inter-jurisdictional cooperation in support of climate resiliency has long been explored by the Ostrom Workshop at Indiana University whose co-founder, Elinor Ostrom, was awarded the Nobel Prize in Economics in 2009 for her work on political commons.

All this said, however, the difficulties facing the adoption of *ex ante* resiliency measures have hardly been overcome. Perhaps one of the principal problems with the public choice claim may be that, in light of the decades of climate-related disasters that lay ahead, it masks the attention we should be paying to other obstacles standing in the way of optimal resilience outcomes. Accordingly, this Article suggests three issues deserving fuller attention by policymakers and legal academics and invites suggestions for more.

1. *Three Problems, Even without Political Gamesmanship*

Even a vibrant political market for resiliency has other challenges. Perhaps chief among these is the mismatch between a locality's interest in resiliency and the pressures it faces as to public finance. To the extent that gains in resiliency will require major infrastructure investments, states and municipalities finance such expenditures largely through bond financing.²⁵³ Yet, municipalities face political and often legal constraints in issuing debt,²⁵⁴ not to mention the engineering and informational costs that can elude smaller municipalities altogether in raising the billions of dollars needed for a wide range of climate resiliency investments.²⁵⁵ As the U.S. Global Change Research Program found in its Fourth National Climate Assessment, "adaptation . . . presents challenges, including difficulties in obtaining the necessary funds [and] insufficient information and relevant expertise."²⁵⁶

See, e.g., EDALLA SCHLAGER, STATE-REINFORCED SELF-GOVERNANCE AND INSTITUTIONAL CHANGE: THE EVOLUTION OF THE NEW YORK CITY WATERSHEDS GOVERNING ARRANGEMENT (2019), <http://dlc.dlib.indiana.edu/dlc/handle/10535/10491> (finding that cooperative behavior among multiple jurisdictions was "crowded in" through institutional rewards for cooperation) (paper presented at Ostrom Workshop June 18–21, 2019); *see also* Daniel A. DeCaro et al., *Legal and Institutional Foundations of Adaptive Environmental Governance*, 22 *ECOLOGY & SOC'Y* 1, 21 (2017) (discussing inter-jurisdictional arrangements involving over-appropriation of rivers in Nebraska leading to local jurisdictions imposing well moratoria and adopting integrated water management plans); Jesse B. Abrams et al., *Re-Envisioning Community-Wildfire Relations in the U.S. West as Adaptive Governance*, 20 *ECOLOGY & SOC'Y*, no. 3, at 1 (2015) (contrasting improved fire and forest management practices adopted in one community with lack of such progress in another).

253. *See, e.g.,* Christine Sgarlata Chung, *Rising Tides and Rearranging Deckchairs How Climate Change Is Reshaping Infrastructure Finance and Threatening to Sink Municipal Budgets*, 32 *GEO. ENV'T L. REV.* 165, 182 (2020) ("[W]hile tax collections and intergovernmental transfers are important sources of funding for infrastructure, state and local governments 'rely principally upon the municipal securities markets to finance and fund public infrastructure projects.'"); *see also* JUSTIN MARLOWE, INT'L CITY/CNTY. MGMT. ASS'N & GOV. FIN. OFFICERS ASS'N, *MUNICIPAL BONDS AND INFRASTRUCTURE DEVELOPMENT – PAST, PRESENT, AND FUTURE 1* (2015), https://bernardisecurities.com/wp-content/uploads/2015/08/2015_GAPC_White_Paper_Municipal_Bonds_and_Infrastructure_Development.pdf ("[A]pproximately 90 percent of state and local capital spending is financed with debt.").

254. *See* Chung, *supra* note 253, at 192–93.

255. *Id.*

256. Jeffrey Arnold et al., *Reducing Risks Through Adaptation Actions*, in 2 *IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES: FOURTH NATIONAL CLIMATE ASSESSMENT*, *supra* note 163, at 1310, 1312; Carmin Chappell, *Climate Change in the US Will Hurt Poor People the Most, According to a Bombshell Federal Report*, CNBC (Nov. 26, 2018), <https://www.cnbc.com/2018/11/26/climate-change-will-hurt-poor-people-the-most-federal-report.html> ("Better-resourced communities have created climate offices and programs, while response has lagged in smaller or poorer communities[.]" (quoting Ellen L.

Although municipal-bond ratings agencies attempt to account for a bond issuer's (lack of) climate resiliency,²⁵⁷ to date, it is unclear whether these still-incipient efforts will have a positive effect on state and local governments' willingness and ability to finance the investments that greater resiliency requires. This constraint, however, highlights at least one obvious partial solution: greater federal direct or indirect investment in resiliency infrastructure. Such an approach is already visible in infrastructure initiatives begun by the Biden administration and in more longstanding approaches such as federal financial support for state revolving-loan funds that aid local resiliency-focused projects.²⁵⁸

In addition to the problem of infrastructure finance, another explanation for resiliency's adoption difficulties lies in its organizational and informational demands. Before COVID-19 put additional financial strain on state and local governments,²⁵⁹ they already exhibited a wide range of capabilities in mastering the informational demands required to evaluate potential investments in resiliency. Unsurprisingly, some larger jurisdictions began to marshal the information needed to develop resilience strategies.²⁶⁰ But generally speaking, state and local governments "[did] not have the financial resources or technical expertise needed,"²⁶¹ and even if they did, requiring each jurisdiction to independently resolve overlapping technical questions, such as those related to

Mecray et al., *Northeast*, in 2 IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES: FOURTH NATIONAL CLIMATE ASSESSMENT, *supra* note 163, at 670, 704)).

257. See, e.g., *Credit FAQ Understanding Climate Change Risks and U.S. Municipal Ratings*, S&P GLOB. RATINGS, (Oct. 17, 2017), <https://www.spglobal.com/ratings/en/research/articles/171017-credit-faq-understanding-climate-change-risk-and-u-s-municipal-ratings-10285887>; see generally EPA, EPA 817-S-14-001, RISK AND RESILIENCE: CONSIDERING THE INTEGRATION OF CLIMATE READINESS INTO FINANCIAL ANALYSES OF DRINKING WATER & WASTEWATER UTILITIES (2014); CERES, DISCLOSURE FRAMEWORK FOR WATER AND SEWER ENTERPRISES (2013), <https://www.ceres.org/resources/reports/disclosure-framework-water-and-sewer-enterprises>.

258. See, e.g., Valerie Volcovici & Jeff Mason, *Biden Takes Sweeping Measures to Curb Climate Change, Vows Job Creation*, REUTERS (Jan. 27, 2021), <https://www.reuters.com/article/us-usa-biden-climate/biden-takes-sweeping-measures-to-curb-climate-change-vows-job-creation-idUSKBN29W0YS> ("[President Biden] said building a modern and resilient climate-related infrastructure and a clean energy future for America would create millions of good-paying union jobs."); Maxine Joselow, *Infrastructure Is Key to Biden's Climate Dreams*, E&E NEWS: E&E DAILY (Nov. 10, 2020, 7:11 AM), <https://www.eenews.net/articles/infrastructure-is-key-to-bidens-climate-dreams/> ("[B]oth Democrats and Republicans voic[e] strong support for concepts like modernizing the nation's roads and increasing their resilience to extreme weather events.").

259. See, e.g., Louise Sheiner & Sophia Campbell, *How Much Is COVID-19 Hurting State and Local Revenues?*, BROOKINGS (Sept. 24, 2020), <https://www.brookings.edu/blog/up-front/2020/09/24/how-much-is-covid-19-hurting-state-and-local-revenues/> ("We project that state and local government revenues will decline \$155 billion in 2020, \$167 billion in 2021, and \$145 billion in 2022—about 5.5 percent, 5.7 percent, and 4.7 percent, respectively—excluding the declines in fees to hospitals and higher education.").

260. See, e.g., Oliver Milman et al., *The Fight Against Climate Change Four Cities Leading the Way in the Trump Era*, THE GUARDIAN (June 12, 2017), <https://www.theguardian.com/cities/2017/jun/12/climate-change-trump-new-york-city-san-francisco-houston-miami> (identifying New York, Houston, Miami, and San Francisco).

261. Chung, *supra* note 253, at 213.

common engineering matters, would be “massively inefficient.”²⁶² At the very least, this kind of baseline information could be much more efficiently developed through federal programs such as the U.S. Global Change Research Program,²⁶³ and then shared with states that can contribute more unique, localized knowledge.²⁶⁴ Moving the burden of such informational challenges “upstream,” moreover, is more likely to produce synergistic overlaps where adaptation projects can be developed that maximize regional advantages to multiple jurisdictions.²⁶⁵

Even as to single-purpose projects such as repairing transportation infrastructure, recent scholarship has highlighted why local jurisdictions often do not build back better, perhaps one of the more obvious opportunities to make gains in long-term resiliency. For example, one study found that post-disaster public assistance often finances only ad hoc transportation repairs rather than long-term resiliency improvements because local infrastructure managers have neither the time nor the matching funds needed to implement long-term resiliency measures.²⁶⁶ In short, even when politicians desire long-term resiliency, we may still be underinvesting in adaptation projects because of informational deficits and competing short-term priority-setting at the managerial level. The public choice claim thus can distract from focusing on the necessary corrective policies.

Finally, the public choice model fails to account for one of the principal causes of mounting disaster losses: more people moving into harm’s way.²⁶⁷ Thus, the growth of post-disaster aid might not reflect politicians’ beliefs that

262. *Id.*

263. See *About USGCRP*, U.S. GLOB. CHANGE RSCH. PROGRAM, <https://www.globalchange.gov/about> (last visited Mar. 28, 2022).

264. See Chung, *supra* note 253, at 212–14.

265. See, e.g., GLOB. CTR. ON ADAPTATION & ASIAN DEV. BANK, A SYSTEM-WIDE APPROACH FOR INFRASTRUCTURE RESILIENCY: TECHNICAL NOTE 20 (2021), <https://gca.org/wp-content/uploads/2021/01/A-System-wide-Approach-for-Infrastructure-Resilience.pdf> (“It is important that these projects are identified as part of the process of integrating climate risks into upstream planning. The country, sector, or regionwide assessments of climate risks undertaken in an upstream approach will help identify where adaptation projects can be most valuable, taking into account critical interdependencies and vulnerabilities.”).

266. Gina Tonn et al., *U.S. Transportation Infrastructure Resilience Influences of Insurance, Incentives, and Public Assistance*, 100 TRANSPORT POL’Y 108, 110 (2021) (“This dependence on federal assistance is potentially exacerbated when natural disasters fall below an infrastructure manager’s threshold level of concern amidst a range of other competing priorities.”).

267. See, e.g., *Confronting the Cost of Catastrophe*, SWISS RE (Dec. 3, 2019), <https://www.swissre.com/risk-knowledge/mitigating-climate-risk/natural-catastrophes-affecting-more-people-what-can-do-to-help.html> (“Although climate change is a factor behind this trend [of increasing disaster costs], it is by no means the only one. The fact that more people are living and working in areas prone to being affected by natural disasters is also significant. ‘[60 percent] of all the new homes built in recent years in the US are in what we call the wildland-urban interface — areas which are the first to be affected by wildfires[.]’”); see also Darryl Cohen, *94.7M Americans Live in Coastline Regions*, U.S. CENSUS BUREAU (July 15, 2019), <https://www.census.gov/library/stories/2019/07/millions-of-americans-live-coastline-regions.html> (“About 60.2 [million Americans] live in areas most vulnerable to hurricanes . . . [a] 15.3% growth since 2000.”).

such aid will help them get reelected, but instead may better reflect the incentives of local governments to allow, if not welcome, this development as a way to maintain their tax bases.²⁶⁸ Further accelerating floodplain development may also be real estate developers threatening lawsuits under the Takings Clause against municipalities that seek to control this type of growth.²⁶⁹

Although the grand bargain of the NFIP was to offer flood insurance to communities that agreed to regulate floodplain development, a recent U.S. Government Accountability Office report documented a decade's worth of lapses in FEMA's enforcement of this part of the bargain.²⁷⁰ Thus, as a descriptive matter, FEMA's failure to police the boundaries of the NFIP's bargain with localities may better explain the growth in post-disaster assistance than politicians' electoral strategizing. And, as a normative matter, a focus on this cause of the problem could lead to gains in resiliency that otherwise might go unexplored. Indeed, in light of FEMA's currently planned launch of flood-rate revisions in 2021–2022 that will increase some insurance rates,²⁷¹ a renewed focus on this aspect of the bargain could incentivize local communities to begin more aggressive land-use control measures to qualify for premium reductions.²⁷² The point is that there are other, perhaps better, explanations for the imbalance between *ex ante* and *ex post* disaster payments that the public choice hypothesis might otherwise obscure.

2. Resiliency Haves and Have Nots

The link between disasters and poverty is well documented²⁷³ and includes both the diminished resources that poorer households have on hand to withstand the immediate effects of an ongoing disaster²⁷⁴ and the disparities between rich and poor in accessing post-disaster aid.²⁷⁵ More broadly, there is a growing consensus that disasters, and especially the cumulative effects of repeated

268. See, e.g., Christine A. Klein, *The National Flood Insurance Program at Fifty: How the Fifth Amendment Takings Doctrine Skews Federal Flood Policy*, 31 GEO. ENV'T L. REV. 285, 312 (2019) (“Local governments are reluctant to regulate floodplain development. Many are concerned about maintaining a healthy tax base.”).

269. *Id.* at 308 (documenting the adoption in Houston and Harris County, Texas of a land-use ordinance restricting floodplain development after Tropical Storm Allison in 2001, that was later withdrawn and weakened following a Takings Clause lawsuit brought by landowners).

270. See, e.g., U.S. GOV'T ACCOUNTABILITY OFF., GAO-20-396, NATIONAL FLOOD INSURANCE PROGRAM: FEMA CAN IMPROVE COMMUNITY OVERSIGHT AND DATA SHARING (2020) (documenting FEMA's failure to meet minimum floodplain inspection requirements in Texas and Florida between 2008 and 2019).

271. See HORN, *supra* note 104, at 16 (detailing FEMA's plans to revise NFIP rates by October 1, 2021, in many cases leading to increased rates especially on more expensive homes).

272. See *id.* at 4 (explaining FEMA's Community Rating System program).

273. See, e.g., Stéphane Hallegatte et al., *From Poverty to Disaster and Back: A Review of the Literature*, 4 ECON. DISASTERS & CLIMATE CHANGE 223 (2020).

274. *Id.* at 223 (“Almost by definition, poor people are more vulnerable to shocks . . . : because they are poor . . . they have less resources to reduce risks or cope with the shock when it occurs.”).

275. *Id.* at 235 (“Post disaster support often fails to provide the poorest with enough resources because of their lack of voice and influence.”).

disasters, can themselves cause and accelerate the long-term impoverishment of entire communities,²⁷⁶ even entire countries.²⁷⁷

So it should come as no surprise that resiliency from disasters can fracture along economic lines. Consider, for example, evidence that home prices in neighborhoods in Florida that experience regular nuisance flooding have been listed for an average 7 percent discount,²⁷⁸ while homes at higher elevations in the region are expected to increase in price.²⁷⁹ The disparity can create a sorting mechanism for separating resilience haves and have-nots with more affluent populations residing in higher-ground areas, and poorer populations residing in lower-lying areas either because they move there to take advantage of lower prices or cannot afford to sell their properties at the market's flood-prone discounts.²⁸⁰ There are climate-gentrification variations on the same theme.²⁸¹ In South Florida, the Little Haiti neighborhood was settled largely by Brown and Black residents on higher-elevation land once viewed as less desirable than property nearer the ocean.²⁸² But now that higher-elevation property in Little Haiti has flood-resilient benefits, its average home values have increased by 19 percent, changing the area's demographics as more high-income households move in and "long-term residents of the community are priced out and forced to move elsewhere."²⁸³

A different dynamic on floodplains generally, with implications for resiliency haves and have-nots, may be unfolding in the implementation of the flood-buyout program operated by the NFIP. The NFIP, as the nation's primary

276. See, e.g., Eleanor Krause & Richard V. Reeves, *Hurricanes Hit the Poor the Hardest*, BROOKINGS (Sept. 18, 2017), <https://www.brookings.edu/blog/social-mobility-memos/2017/09/18/hurricanes-hit-the-poor-the-hardest/>.

277. See U.N. OFF. FOR DISASTER RISK REDUCTION, *HYOGO FRAMEWORK FOR ACTION 2005–2015: BUILDING THE RESILIENCE OF NATIONS AND COMMUNITIES TO DISASTERS I* (2007), https://www.preventionweb.net/files/1037_hyogoframeworkforactionenglish.pdf; Claude de Ville de Goyet & André Griekspoor, *Natural Disasters, The Best Friend of Poverty*, 14 GEO. J. ON POVERTY L. & POL'Y 61, 63 (2007) (reporting that losses in developing countries can be twenty times greater as a percentage of GDP than in industrialized countries).

278. See Alex Harris, *Sea Rise Won't Sink All of Florida's Real Estate Market, Experts Say. Just Parts of It*, WUSF PUB. MEDIA (May 4, 2020, 10:00 AM), <https://wusfnews.wusf.usf.edu/environment/2020-05-04/sea-rise-wont-sink-all-of-floridas-real-estate-market-experts-say-just-parts-of-it> (citing University of Colorado Study).

279. See, e.g., Aparna Nathan, *Climate Is the Newest Gentrifying Force, and Its Effects Are Already Reshaping Cities*, SCI. IN THE NEWS (July 15, 2019), <https://sitn.hms.harvard.edu/flash/2019/climate-newest-gentrifying-force-effects-already-re-shaping-cities/>.

280. See generally de Koning & Filatova, *supra* note 180.

281. See generally Marcel Apple, *Climate Gentrification: An Imminent Threat to Oceanfront Cities*, 20 SUSTAINABLE DEV. L. & POL'Y 20 (2020); Rakhia Bonjour, Note, *Flooding the Cities: How Land Use Policies Contribute to Climate Gentrification*, 44 SETON HALL. LEGIS. J. 91 (2020).

282. See Elizabeth Santiago, *Weathering the Storm: Climate Gentrification in Miami's Little Haiti*, UNIV. OF MICH. SCH. OF PUB. HEALTH (Feb. 10, 2020), <https://sph.umich.edu/pursuit/2020posts/weathering-the-storm-climate-gentrification-in-miami.html>. In part, the settlement pattern is attributed to discriminatory redlining by mortgage lenders that restricted financing for homeowners of color, preventing them from locating in the more expensive, coastal neighborhoods. *Id.*

283. *Id.*

flood insurance provider,²⁸⁴ can internalize the benefits of risk-reduction measures that reduce its expected payouts for flood losses. Accordingly, Congress in 1994 authorized a Flood Mitigation Assistance program that allows FEMA to offer buyouts of repetitive loss properties where simply buying the properties costs less than repeated insurance payouts to rebuild.²⁸⁵ A decade later, the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004²⁸⁶ doubled the program's budget authorization.²⁸⁷ Although in Gulf Coast states repetitive loss properties represented only 1 percent of the NFIP's book of business, they "account[ed] for 30 percent of all damage claims,"²⁸⁸ thus providing evidence that buyouts offer a return on investment of 245 percent to 300 percent, or \$2.45 to \$3.00 for every dollar spent.²⁸⁹ Unsurprisingly, therefore, both Congress and the executive branch have increased expenditures for the buyouts of repetitive loss properties,²⁹⁰ making flood buyouts an increasingly prominent resilience strategy.²⁹¹

That said, the buyout of flood-prone properties has led to two concerns over racial and economic equity. The first is whether low-wealth communities and communities of color are given the same access as wealthier and whiter communities to the potential benefits of this program.²⁹² The second is whether

284. See Amy Danise, *Guide to Flood Insurance*, FORBES ADVISOR, <https://www.forbes.com/advisor/homeowners-insurance/flood-insurance/> (Sept. 27, 2021, 11:56 AM) (private flood policies comprise only 3.5 percent to 4.5 percent of primary residential flood policies, with the lion's share of all flood policies instead written by the NFIP).

285. See RAWLE O. KING, CONG. RSCH. SERV., RL32972, FEDERAL FLOOD INSURANCE: THE REPETITIVE LOSS PROBLEM 30 (2005).

286. Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004, Pub. L. No. 108-264, 118 Stat. 712.

287. See KING, *supra* note 285, at 30.

288. See Letter from Association of State Floodplain Managers, Consumer Mortgage Coalition, et al., to the Honorable Mike Crapo, Chairman, Senate Committee on Banking, Housing and Urban Affairs (May 17, 2018), https://assets.nrdc.org/sites/default/files/media-uploads/s2862-hr5846_support_letter_0.pdf. An even smaller subset of "Severe Repetitive Loss Properties," representing only 0.6 percent of all NFIP policies, account for 9.6 percent of all paid claims. *Id.*

289. See, e.g., Esther White, *Establishing Long-Term Cost Effectiveness of FEMA Buyouts: A Loss Avoidance Study of the Acquisition/Demolition of 22 Properties in Shepherdsville, Kentucky* 14–15 (Mar. 2011) (capstone project, Univ. of Ky.), https://uknowledge.uky.edu/mpampp_etds/118/; FED. EMERGENCY MGMT. AGENCY, REPORT ON THE COSTS AND BENEFITS OF NATURAL HAZARD MITIGATION 27 (1997), https://www.wbdg.org/FFC/DHS/fema_cost_nat_haz_mit.pdf (FEMA acquired repetitively flooded properties for approximately 35 percent of what the NFIP payouts would be historically to those properties, representing an almost 300 percent return on investment).

290. Indeed, the Trump Administration proposed in Fall 2017 that FEMA stop offering insurance altogether to all repetitive-risk properties, something that has not yet been taken up by Congress. See Ruth Simon, *Trump Administration Calls for Fixes to Federal Flood Insurance*, WALL ST. J. (Oct. 5, 2017, 6:22 PM), <https://www.wsj.com/articles/trump-administration-calls-for-fixes-to-federal-flood-insurance-1507242127>.

291. See, e.g., *Flood Insurance Looks Like One Area of Bipartisan Agreement*, INS. J. (May 30, 2017), <https://www.insurancejournal.com/news/national/2017/05/30/452446.htm> ("Democrats and Republicans, who have agreed on little this year, have found common ground on plans . . . to offer more buyouts for homeowners in areas likely to be repeatedly submerged.")

292. There are a range of concerns. In one of the first comprehensive program reviews investigating the issue, researchers found that "[c]ounties that have had locally administered buyout projects have higher

the program, as applied to low-wealth communities and homeowners, negatively affects the local tax base and social cohesiveness of the communities homeowners will leave.²⁹³ This worry led at least one community of color to organize against FEMA home buyouts offered to properties in a historically Black community.²⁹⁴

These concerns point to broader issues about resiliency haves and have-nots. At bottom, and especially as applied to coastal flooding, a community's ability to finance proactive resiliency measures is directly tied to the strength of its tax base and indirectly to the administrative capabilities that a greater tax base can support. Thus, as to sea-level rise, a public policy rule of thumb is that more densely populated urban areas "should increasingly engineer their coastlines with higher and stronger defensive structures,"²⁹⁵ an option that is less available to more rural communities where buyouts and retreat is the more cost-effective option.²⁹⁶ Yet, the social justice implications of these possibilities have only just begun to be explored.²⁹⁷ Indeed, there are projections that as much as one-third of the country's shorelines will be armored with seawalls or bulkheads by the end of the century,²⁹⁸ with additional scores of localities cooperating with state and local politicians to fund beach renourishment projects that have, since 1995,

income, education, population, and population density compared to counties without buyouts," but others found that "[w]ithin counties with buyouts, . . . the bought-out properties are located in relatively poorer, less densely populated areas, also with relatively lower education levels, lower English language proficiency, and greater racial diversity." Katharine J. Mach et al., *Managed Retreat Through Voluntary Buyouts of Flood-Prone Properties*, SCI. ADVANCES, Oct. 2019, at 1, 3, 6. *But see* James R. Elliott et al., *Racial Inequities in the Federal Buyout of Flood-Prone Homes: A Nationwide Assessment of Environmental Adaptation*, 6 SOCIUS 1, 7 (2020) ("[T]he whiter a tract's racial composition relative to its surrounding county the higher its probability of participating in the federal buyout program, all else equal.").

293. See Andy Olin, *Study Reveals Effects of White Privilege in FEMA Flood Buyout Program*, RICE: KINDER INST. OF URB. RSCH. (Feb. 18, 2020), <https://kinder.rice.edu/urbanedge/2020/02/18/study-reveals-effects-white-privilege-fema-flood-buyout-program-Houston-hurricane-harvey>.

294. *Id.* (discussing organizing efforts of Kashmere Gardens neighborhood in Houston against FEMA buyout efforts in the aftermath of Hurricane Harvey); see also Kimberley M.S. Cartier, *Equity Concerns Raised in Federal Flood Property Buyouts*, EOS (Oct. 9, 2019), <https://eos.org/articles/equity-concerns-raised-in-federal-flood-property-buyouts> ("Cases have also shown that vulnerable populations have been pressured into buyouts, lied to about flood risk, and relocated to equally flood-prone areas.").

295. See Mach et al., *supra* note 292, at 5.

296. *Id.* ("In poorer and more rural areas, however, it is not economically optimal to invest in protection, and these populations are expected to eventually retreat to higher ground.").

297. See, e.g., Lisa Song & Al Shaw, "A Never-Ending Commitment" *The High Cost of Preserving Vulnerable Beaches*, PROPUBLICA (Sept. 27, 2018, 5:00 AM), <https://www.propublica.org/article/the-high-cost-of-preserving-vulnerable-beaches> ("A ProPublica analysis of 16 North Carolina communities directly behind beaches that have received federal funds shows they're 94 percent white on average; a quarter of owner-occupied housing in these areas is worth more than \$500,000 . . ."); see also *id.* ("[T]he Corps generally funds projects only when the expected benefit is 2.5 times as high as the project's cost. Poor communities can't meet that criteria . . .").

298. See Travis O. Brandon, *A Wall Impervious to Facts: Seawalls, Living Shorelines, and the U.S. Army Corps of Engineers' Continuing Authorization of Hard Coastal Armoring in the Face of Sea Level Rise*, 93 TUL. L. REV. 557, 558 (2019).

resulted in approximately \$11 billion in expenditures.²⁹⁹ One commenter, upon surveying projects such as these, “couldn’t think of a single project that primarily benefited people of color.”³⁰⁰

There is also the possibility of a different type of public choice problem—pressures from special interests that can result in federal, state, and local agreements benefitting some waterfront owners at the expense of larger economic costs being borne by the community at large.³⁰¹ Thus, as to coastal beach erosion, community-wide fees supporting beach-renourishment projects have drawn criticism from some for benefiting primarily the absentee owners of beachfront mansions.³⁰² Similar debates have emerged around the politics of highly localized support for protective measures like seawalls.³⁰³ Indeed, a recent economic study found that poorly placed coastal seawalls, while protective of some properties, can impose over \$700 million in damages per

299. The Office of Coastal Management within the National Oceanic and Atmospheric Administration uses data compiled by the Program for the Study of Developed Shorelines at Western Carolina University to track these expenditures. As of April 2021, the University’s Beach Nourishment Viewer records that \$10,834,114,963 have been spent on beach nourishment projects within the past twenty-five years. *See Beach Nourishment Viewer Program for the Study of Developed Shorelines at Western Carolina University*, BEACH NOURISHMENT, <http://beachnourishment.wcu.edu> (last visited Oct. 2, 2021).

300. *See Song & Shaw, supra* note 297. Obviously, this is not to say that local resiliency projects cannot be designed especially with vulnerable populations in mind. Resiliency projects can also reflect examples of community engagement, vision, and inclusiveness. Thus, New Orleans has committed to a much richer conception of resiliency than mere infrastructure improvements, a vision that considers employment and wage growth, K-12 educational success, and racial inclusiveness as crucial components of its resiliency index. *See* ENTER. CMTY. PARTNERS, INC., SAFER AND STRONGER CITIES: STRATEGIES FOR ADVOCATING FOR FEDERAL RESILIENCE POLICY 15 (2018), <https://rebuildbydesign.org/wp-content/uploads/2021/12/918.pdf> (referencing the City Resilience Framework developed by the Rockefeller Foundation); *see also* Allison Plyer et al., *The New Orleans Index at Ten Measuring Greater New Orleans’ Progress Toward Prosperity*, THE DATA CTR. 7 (July 31, 2015), https://www.datacenterresearch.org/reports_analysis/new-orleans-index-at-ten/ (“But beyond infrastructure, a number of economic and social factors impact the ability of a metro area to respond to, and bounce back from, and adapt positively to any negative shock. These resiliency factors include: a strong and diverse economy; [relatively small gaps in wage disparities]; large shares of skilled and educated workers; . . . strong leadership; and trust in government.”).

301. *See* Brandon, *supra* note 298, at 576.

302. *See, e.g.,* Joy Crist, *The Debate over Avon Beach Nourishment*, ISLAND FREE PRESS (Apr. 2, 2021), <https://islandfreepress.org/blog/editors-blog-the-debate-over-avon-beach-nourishment/> (counting objections to year-round residents of Avon Beach, North Carolina paying the same as nonresidents for a beach renourishment project because the majority of homes most in danger of erosion are second homes owned by nonresidents); Sammy Fretwell, *Wealthy Coastal Residents Remove Illegal Seawalls. But Dispute Rages as Seas Rise*, THE STATE (Nov. 21, 2020), <https://www.thestate.com/news/local/environment/article247226404.html> (objections to beach renourishment costs because they are allegedly propounded by wealthy landowners who want to sell their beachfront homes and leave residents with the project’s costs).

303. *See, e.g.,* Rebecca Beitsch, *Living With Water’ Facing Climate Change, Cities Trade Sea Walls for Parks*, PEW: STATELINE (Nov. 2, 2018), <https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2018/11/02/living-with-water-facing-climate-change-cities-trade-sea-walls-for-parks> (reporting that localities are considering “soft” structural solutions such as parks with floodwater-retention benefits in lieu of, or in addition to, seawalls which can amplify harm to some members of the population even as they protect others).

flood event on other properties and residents.³⁰⁴ Thus, simply because public choice models do not accurately capture all of the politics of resiliency, it does not mean that more limited special interest problems cannot emerge.

CONCLUSION

The legal academy owes a debt to Professor Depoorter and other public choice scholars who identified possible pathologies in the politics of resiliency. This Article hopes to have made the case that those insights, although predictive in some respects, are unlikely to be conclusive as to the politics of resiliency more broadly. Rather, resiliency's prospects are both more hopeful and more complex than is captured by the political commons model alone. The many billions of dollars already being marshalled in resiliency investments, and the hundreds of billions that will need to be made in the decades ahead, will face challenges on which the legal academy has only recently begun to focus. It is not too late to make up for lost time.

304. See Michelle A. Hummel et al., *Economic Evaluation of Sea-Level Rise Adaptation Strongly Influenced by Hydrodynamic Feedbacks*, PROC. NAT'L ACAD. OF SCI., July 20, 2021, at 1 (modeling potential levees and seawalls in San Francisco Bay, "[w]e find that protection of individual shoreline segments . . . can increase flooding in other areas by as much as 36 million [cubic meters] and damages by \$723 million for a single flood event and in some cases can even cause regional flood damages that exceed the local damages prevented from protection.").

We welcome responses to this Article. If you are interested in submitting a response for our online journal, Ecology Law Currents, please contact cse.elq@law.berkeley.edu. Responses to articles may be viewed at our website, <http://www.ecologylawquarterly.org>.