Before the Deluge: Federal Policy and Flood Resiliency

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ABSTRACT

Discourse on addressing climate change and its effects often focuses on climate mitigation—chiefly, reducing greenhouse gas emissions. However, policymakers and communities must also devote considerable attention to climate adaptation—actions that enable communities to better live with or move away from climate risks. As the events of the past year make clear, this issue is particularly urgent regarding flooding, which will increasingly threaten coastal and inland communities. This article evaluates the current federal policy landscape as it pertains to flood risk. The article examines three policies that, though not conceived as a response to climate change, may nonetheless be potential tools for promoting adaptation and resiliency. For each program—the Army Corps of Engineers' Flood Risk Management program, the National Flood Insurance Program, and a tapestry of federal grant programs—the article evaluates its efficacy and proffers reforms to better equip that program for the challenges ahead.

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INTRODUCTION

The summer and autumn of 2021 was a stark illustration of risks the United States faces from intense flooding. The headlines denoting the number of lives lost, from Alabama to New York, were accompanied by photographs of destroyed residential blocks and submerged infrastructure.[1] These were soon followed by less visceral but nonetheless dire accounts of the economic and emotional hardship that awaited those who lost their homes and faced uncertainty over insurance reimbursements or disaster relief.[2] Meanwhile, comparatively prosaic journalism continued to sound the drumbeat on more quotidian but increasingly troublesome nuisance flooding, its implications for city planning, and the imminent rise in insurance premiums for many homeowners.[3] These episodes also highlight the

1. Carol Robinson, *Alabama flooding: 4 dead in Marshall County and Hoover, Woman Revived in Birmingham*, BIRMINGHAM NEWS, (Oct. 7, 2021, 7:52 AM), https://perma.cc/QCJ4-KET2; Anne Barnard et al., *At least 43 are Dead After Ida Causes Flooding in Four States*, N.Y. TIMES, (Sep. 2, 2021), https://perma.cc/BX94-Z7UG; Natalie Allison et al., *Tennessee Flooding Sunday Updates: Death Toll Climbs Past 20 as Decimated Towns Begin Recovery*, THE TENNESSEAN (Nashville), (Aug. 22, 2021, 6:01 AM), https://perma.cc/JZC9-SXLB.

2. Chelsia Rose Marcius & Benjamin Norman, *They Put Everything into Their Homes. Not One Was Spared in the Flood*, N.Y. TIMES, (Sep. 6, 2021), https://perma.cc/A5UT-7QNQ; Ann Carrns, *Flood Damage From Ida? Your Homeowner's Policy Probably Won't Cover That*, N.Y. TIMES, (Sep. 10, 2021), https://perma.cc/7LHH-DSLR; Swapna Venugopal Ramaswamy, *'I am Living in a Nightmare Everyday': What Homeowners Need to Know as Climate Change Threatens Properties*, USA TODAY (Oct. 8, 2021, 5:02 AM), https://perma.cc/3QHT-NVRH.

3. Andrew S. Lewis, *The Long, Slow Drowning of the New Jersey Shore*, N.Y. TIMES MAG. (Aug. 15, 2021), available at https://perma.cc/2777-Y2DX; Darryl Fears & Lori Rozsa, *The Price of Living near the Shore is Already High. It's About to go Through the Roof*, WASH. POST (Oct. 1, 2021, 6:00 AM), https://perma.cc/6A4M-H5HF.

increasing urgency of a comprehensive approach to bolstering flood resiliency for communities throughout the nation.

This article will examine the current federal policy landscape as it pertains to flood risk. While none of the policies discussed were originally conceived as a response to rising sea levels, each is nonetheless a potential tool for promoting adaptation, actions that enable communities to lessen or move away from flood risks. Part I details the growing flood risk across the country and the urgent need to adapt, alongside any efforts to mitigate greenhouse gas emissions. Part II scrutinizes the US Army Corps of Engineers, which takes a hands-on approach to implementing flood control projects throughout the country. Part III examines the numerous and sometimes competing aims of the National Flood Insurance Program, the primary entity through which property owners insure against flood risk. Part IV evaluates a tapestry of federal grant programs. It focuses on the Federal Emergency Management Agency's hazard mitigation assistance, grant programs meant to address communities' risks before disasters like flooding occur. This article concludes with an overarching vision for the federal government moving forward as a nationwide adaptation catalyst.

I. AMERICA'S RISING FLOOD RISKS

Flood risk in its various forms is growing for communities across the country. Some manifestations of this risk pose a threat to health and safety, others a threat to economic security. The stakes require urgent adaptation actions, which will be necessary regardless of the trajectory of global greenhouse gas emissions. The federal government must assume a significant role if these challenges are to be effectively addressed.

Climate change figures to multiply America's exposure to flood risks in several ways. As the level of greenhouse gasses in the atmosphere increases, global temperatures will continue to rise.[4] Warming oceans will accelerate the rate of ice melt in Greenland, Antarctica, and elsewhere, causing sea levels to rise steadily.[5] Depending on the volume of greenhouse gas emissions in the coming years and decades, global sea levels could, under moderate scenarios, rise by four feet by the end of the century,[6] or up to eight feet under more pessimistic scenarios.[7] Rising temperatures will also lead to more intense and frequent severe weather

4. DONALD J. WUEBBLES, ET AL., CLIMATE SCIENCE SPECIAL REPORT: FOURTH NATIONAL CLIMATE ASSESSMENT, Volume I at 134 (Linda O. Mearns et al. eds., U.S. Global Change Research Program 2017); INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2021: THE PHYSICAL SCIENCE BASIS: SUMMARY FOR POLICYMAKERS 14-15 (Valérie Masson-Delmotte et al. eds., 2021).

5. WUEBBLES, *supra* note 4, at 336; INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, TECHNICAL SUMMARY, CLIMATE CHANGE 2021: THE PHYSICAL SCIENCE BASIS 97 (Gregory M. Flato et al. eds., 2021).

6. WUEBBLES, *supra* note 4, at 342.

7. *Id*. at 344.

events. Warmer oceans will increase the frequency of intense tropical storms and hurricanes.[8] And because warmer air can hold more moisture in the atmosphere, many more places, including those hundreds or thousands of miles inland, will experience more intense rainfall events.[9] These heavy rainfall events can produce deadly flash floods that can overwhelm local infrastructure ill-equipped to handle the unprecedented amount of precipitation.[10]

While only one of numerous climate change risks facing America, flooding may have the widest reach. Many coastal communities are already experiencing the effects of the sea-level rise occurring over recent decades. Those closest to or below sea level have seen multifold increases in the frequency of nuisance flooding,[11] where tidal flooding in the absence of an extreme weather event will nonetheless submerge roads or saturate lawns.[12] Additional sea-level rise will saddle many more communities with these issues.[13] These communities will also experience greater vulnerability to storm surges, increasing the risk of property damage and loss of life.[14]

Meanwhile, those lowest lying localities already experiencing frequent nuisance flooding face a much more daunting prospect. Climate models warn that many communities risk becoming permanently inundated by the end of the century, uprooting residents, and wiping out billions in home equity.[15] Even under more optimistic scenarios, the rising sea levels encroaching on these communities threaten to render properties unsellable.[16] This could cascade into a downward

8. *Id*. at 258-60; Thomas Knutson et al., *Tropical Cyclones and Climate Change Assessment: Part II: Projected Response to Anthropogenic Warming*, 101 BULL. OF THE AM. METEOROLOGICAL SOC'Y 303, 310-11 (2020).

9. WUEBBLES, *supra* note 4, at 218-21.

10. Gabrielle Hays, *As 'Flash Floods are Getting Flashier,' Communities Worry About Aging Infrastructure*, PUB. BROAD. SERV., (Aug. 10, 2022, 4:56 PM), https://www.pbs.org/newshour/nation/as-flash-floods-are-getting-flashier-communities-worry-about-aging-infrastructure.

11. WILLIAM SWEET ET AL., NAT'L OCEANIC AND ATMOSPHERIC ADMIN., SEA LEVEL RISE AND NUISANCE FLOOD FREQUENCY CHANGES AROUND THE UNITED STATES 9-10 (2014).

12. WUEBBLES, *supra* note 4, at 347.

13. *Id*. at 347-48 (listing some of the more than 25 coastal cities experiencing accelerating rates of tidal flooding); WILLIAM SWEET ET AL., NAT'L OCEANIC AND ATMOSPHERIC ADMIN., DEP'T OF COM., 2021 STATE OF HIGH TIDE FLOODING AND ANNUAL OUTLOOK 9-10 (2021) (noting the increasing frequency of high tide flooding along U.S. coastlines and the number of locations experiencing record levels of high tide flooding); U.S. GLOBAL CHANGE RSCH. PROGRAM, IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES: FOURTH NATIONAL CLIMATE ASSESSMENT, VOLUME II 326, 329-330 (David Reidmiller et al. eds., 2018) (estimating a national average increase of the regulatory Special Flood Hazard Area of 40% to 45% by 2100).

14. WUEBBLES, *supra* note 4, at 349.

15. U.S. GLOBAL CHANGE RSCH. PROGRAM, *supra* note 12, at 327, 330; Scott A. Kulp et al., *Unprecedented Threats to Cities from Multi-Century Sea Level Rise*, 16 ENV'T. RSCH. LETTERS 1 at 10 (2021), https://perma.cc/3FLY-YR5D.

16. CAROLYN KOUSKY ET AL., *Flood Risk and the U.S. Housing Market*, 29 J. OF HOUS. RSCH. 3, 18 (2020).

spiral, where the loss of property values and exodus of residents hollows out municipal coffers, further hamstringing the community's ability to adapt.[17]

Unsurprisingly, these risks are most acute for socioeconomically vulnerable communities. While many of the nation's most affluent communities reside along the coastline, climate change threatens many other low-income communities, both along the coast and inland, that have often been steered by circumstance into some of the most flood-prone areas.[18] Without adequate resources to prepare for increasing flood risk, it is these communities that stand to lose the most and sink into precarity.[19]

Discourse on addressing climate change and its effects, like greater flood risk, often focuses on climate mitigation–chiefly, reducing greenhouse gas emissions to avert the most severe consequences of climate change in the coming decades. However, as has become increasingly obvious, policymakers and communities must also devote considerable attention to climate *adaptation*. The frustratingly slow pace of meaningful, global climate mitigation action suggests a slim to nil chance of avoiding at least the moderately significant effects warned of by "lower-bound" climate models.[20] And even if the world, by way of a magic wand, achieved net-zero greenhouse gas emissions by yesterday, the necessity of climate adaptation would remain. Because there is a delayed effect between the concentration of greenhouse gasses in the atmosphere and rising oceanic temperatures, a stabilization of emissions levels today would still entail decades of not insignificant temperature and sea-level rise.[21]

Adaptation to more frequent and intense flooding can entail a range of actions.[22] Structural adaptation entails the construction of infrastructure like sea walls and levees to physically repel encroaching floodwaters.[23] Non-structural measures include smaller-scale projects like elevating homes or other property above base flood level, or otherwise modifying buildings to "floodproof" them.[24] Non-structural adaptation also encompasses changing land-use regulations to

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17. RACHEL CLEETUS ET AL., UNION OF CONCERNED SCIENTISTS, UNDERWATER: RISING SEAS, CHRONIC FLOODS, AND THE IMPLICATIONS FOR US COASTAL REAL ESTATE 13 (2018); Kousky et al., *supra* note 15, at 18; U.S. GLOBAL CHANGE RSCH. PROGRAM, *supra* note 12, at 330-31.

18. Christopher T. Emrich et al., *Flood Exposure and Social Vulnerability in the United States*, 106 NAT'L. HAZARDS 435, 438 (2021).

19. Lily Katz, *A Racist Past, a Flooded Future: Formerly Redlined Areas Have $107 Billion Worth of Homes Facing High Flood Risk—25% More Than Non-Redlined Areas*, REDFIN (Mar. 14, 2021), https://perma.cc/M99Y-E747.

20. *See Out of reach? After COP26*, ECONOMIST, Nov. 20, 2021, at 57-58.

21. WUEBBLES, *supra* note 4, at 134; INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 4, at 21.

22. The debate about the efficacy of different adaptation actions is beyond the scope of this paper. In a vacuum, such a debate may itself be of limited efficacy, as each community's adaptation needs and preferences are unique.

23. *Terminology,* U.S. ARMY CORPS OF ENG'RS, https://perma.cc/RP8N-A6YD (last visited Jan. 17, 2022).

24. *Id.*

discourage development in floodplains and buying out owners of acutely at-risk properties. Nature-based features, like restored wetlands or oyster reefs, can also be utilized for their natural militating qualities.[25]

The challenge of effectively preparing the country for greater flood risk in the face of climate change is immense. With its long and densely populated coastlines, America's exposure necessitates a huge investment of financial resources.[26] Institutional learning and knowledge sharing across jurisdictions will also be essential if these complex issues are to be addressed effectively across the country.

On these counts, the federal government has a large role to play. Adaptation is, at its core, a local enterprise, with various community stakeholders determining its needs and implementing chosen actions. However, the federal government's ability to marshal and mobilize resources is unmatched. Federal policy will also be a determining factor in whether resources accrue to different localities according to longstanding inequities, with high-income communities benefitting disproportionately from their higher property values and tax base, or more justly ensures that those communities most in need of assistance receive it.[27] The federal government is also well-positioned to provide meaningful technical assistance or otherwise facilitate knowledge sharing.

II. US ARMY CORPS OF ENGINEERS

The US Army Corps of Engineers' ("the Corps") Flood Risk Management ("FRM") program plays a significant role in funding and implementing large-scale adaptation projects around the country.[28] Staffed by 37,000 technical specialists,[29] the Corps is a federal agency that conducts engineering work on projects with a national interest. As its name suggests, a large part of the Corps' work is construction for use by the military. However, the Corps also has an extensive Civil Works program, growing from its historical focus on managing the navigable waters of the US. Under this Civil Works remit, the FRM works with non-federal entities, principally state or local governments, to identify and implement projects to address a community's flood risks.[30] The Corps uses a hands-on approach, serving as principal during the planning and construction phases, and typically footing between 50 and 65% of the bill during that time.[31] This Part will

25. TODD S. BRIDGES ET AL., U.S. ARMY ENG'R RSCH. AND DEV. CTR., INTERNATIONAL GUIDELINES ON NATURAL AND NATURE-BASED FEATURES FOR FLOOD RISK MANAGEMENT 4 (2021).

26. Jim Morrison, *Who Will Pay for the Huge Costs of Holding Back Rising Seas?*, YALE ENV'T 360 (Aug. 5, 2019) https://perma.cc/G2EL-7WDX.

27. Emrich et al., *supra* note 17, at 452.

28. *See Flood Risk Management Program: About the Program*, U.S. ARMY CORPS OF ENG'RS, (last visited Jan. 18, 2022), https://perma.cc/BH4S-SRYS.

29. *About Us,* U.S. ARMY CORPS OF ENG'RS, https://www.usace.army.mil/about/, (last visited Jan. 29, 2023).

30. 33 U.S.C. § 701b (2018).

31. *Id.* §§ 2213(a)(2), 2215(a)(1).

first detail the Corps process for implementing flood management projects, then evaluate the FRM's effectiveness, and finally recommend reforms for better addressing the country's growing flood risks.

A. THE 7001 PROCESS

The Corps' flood management projects generally go through the 7001 process, so named after the numbered section in the Water Resources Reform and Development Act of 2014.[32] The 7001 process is an attempt to make the Corps' work more deliberative, following scrutiny of "earmarking"–where Members of Congress direct funding towards projects that are in their district or otherwise politically beneficial–in federal legislation.[33] Whereas before Corps projects and priorities were openly subject to political haggling, under the 7001 process the Corps dictates which projects will be considered.[34]

The Corps solicits proposals from non-federal entities like state or local governments.[35] These proposals are for feasibility studies to be conducted on potential flood management projects.[36] For a typical Corps project, its life cycle begins here. The Corps then evaluates all proposals for alignment with the Corps' mission and other eligibility criteria.[37] Eligible proposals are included in an annual 7001 report to Congress.[38] For each proposal, the Corps includes preliminary information about the project's expected costs and benefits,[39] as well as documentation of non-federal support for the project.[40] The 7001 report also includes projects purposed during previous cycles for which feasibility studies have been or are near completion, to be considered by Congress for construction authorization.[41]

Congress then authorizes specific projects from this report, typically in a bi-annual Water Resources and Development Act ("WRDA").[42] But authorization for these projects is often a less meaningful milestone than it first appears, as the authorizing WRDAs generally do not include corresponding appropriations of

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32. Pub. L. No. 113-121, tit. VII, § 7001, 128 Stat. 1360-64 (2014) (codified at 33 U.S.C. § 2282d (2018)).

33. NICOLE T. CARTER & ANNA E. NORMAND, CONG. RSCH. SERV., ARMY CORPS OF ENGINEERS: WATER RESOURCE AUTHORIZATION AND PROJECT DELIVERY PROCESSES 2, 4 (2019).

34. NICOLE T. CARTER & ANNA E. NORMAND, CONG. RSCH. SERV., WATER RESOURCES DEVELOPMENT ACTS: PRIMER (2021).

35. 33 U.S.C. § 2282d(b) (2018).

36. *Id.* Non-federal entities can also propose modifications to previously authorized feasibility studies or projects that have received construction authorization.

37. § 2282d(c)(1)(A) (2018).

38. *I*§ 2282d(a)(2). Proposals found ineligible are included in an appendix to the report. § 2282d(c)(4).

39. §§ 2282d(c)(1)(B), 2282d(c)(2)(D)-(E).

40. §§ 2282d(c)(1)(C), 2282d(c)(2)(B).

41. § 2282d(a)(1).

42. CARTER & NORMAND, *supra* note 31, at 2-3; *see Water Resource Development Acts and other Key Laws,* U.S. ARMY CORPS OF ENG'RS, https://perma.cc/59VC-2WNT (last visited Jan. 6, 2022).

funding.[43] Instead, appropriations for the FRM are typically included in annual Energy and Water Development appropriations acts.[44] Unlike the authorizations, these appropriations are not project-specific but rather are for the entire program.[45] The Corps has ample discretion in determining its yearly work plan for use of these funds,[46] prioritizing projects based on expected economic, environmental, and safety returns.[47] Appropriations are often put to projects authorized in previous years and, for the majority of projects, work is only funded and begun years after authorization.[48]

When an authorized feasibility study is eventually included in a Corps work plan, the Corps will more thoroughly evaluate the costs and benefits of the project, including any alternative plans.[49] Conducting the feasibility study often takes up to three years, on top of the time the project spent authorized but excluded from yearly work plans.[50]

The Corps' findings are documented in a feasibility report that is submitted to Congress.[51] At this point, the process repeats, as construction authorization is sought for the project. Projects that are confirmed eligible and clear a benefit-to-cost ratio threshold are included in a subsequent 7001 report.[52] As with the feasibility studies, construction authorization is not tied to a specific appropriation, and the Corps generally allots the program-wide appropriation for construction activities to projects authorized in previous years.[53]

Once construction is underway, again typically after a delay of a few years following authorization, the Corps functions as the project manager responsible for implementing construction.[54] Following the completion of an FRM project, its operation is generally turned over to the non-federal entity, which is responsible for operation and maintenance costs going forward.[55]

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43. CARTER & NORMAND, *supra* note 31, at 3.

44. *Id.* Confusingly, as a result of the increasing consolidation of legislation in larger and larger omnibus bills, a single bill can contain both the authorizing WDRA and the appropriating Energy and Water Development act. *See*, *e.g.*, Pub. L. No. 116-260, div. D, tit. I, 134 Stat. 1352 (2020); *id.* at div. AA, 134 Stat. 2615.

45. *E.g.*, *id.* at div. D, tit. I, 134 Stat. 1353 (2020) (appropriating $153 million to the Corps for feasibility studies and nearly $2.7 billion for construction activities).

46. Though Congress can specify how many new projects the Corps is to take. *E.g.*, *id.* at 134 Stat. 1353, 1359 (instructing the Corps to "initiate nine new study starts" and "seven new construction starts" during fiscal year 2021).

47. U.S. ARMY CORPS OF ENG'RS, FISCAL YEAR 2022: CIVIL WORKS BUDGET OF THE U.S. ARMY CORPS OF ENGINEERS 2, 58 (2021).

48. CARTER & NORMAND, *supra* note 31, at 7.

49. 33 U.S.C. § 2282(a)(2) (2018).

50. § 2282c(a)(1).

51. § 2282b.

52. § 2282d(a)(1).

53. CARTER & NORMAND, *supra* note 31, at 8, 10.

54. *Id.* at 15.

55. *Id.* at 14-15.

B. EFFECTIVENESS

FRM should ideally be evaluated based on its progress towards addressing the country's systemic flood risk, as well as how its projects perform as flooding events occur over time. Currently, however, such information is not readily available. This Article therefore performs a partial evaluation that instead examines other metrics. Project delivery timeframes evince the Corps' struggles to provide timely assistance, while budget shortfalls give a sense of unmet demand. The equitability of the Corps' operations should also be scrutinized.

1. Flood Risk Management

While the significant financial and technical resources of the Corps could conceivably be an effective tool for systematically addressing the country's flood risk, the degree to which the FRM accomplishes this is difficult to discern. A more comprehensive and holistic accounting of risk has only been provided sporadically. The Corps has undertaken rigorous analysis of flood risk at a regional level, most notably with its North Atlantic Coast Comprehensive Study.[56] This study examines flood risk across the region, documents ongoing resiliency efforts, and provides a framework for the North Atlantic states to use in addressing their exposure.[57] These analyses were specifically commissioned by Congressional legislation, typically in response to large-scale disasters like Hurricane Sandy.[58] The Corps currently has no mandate for conducting regional, let alone nationwide, studies on an ongoing basis.[59] Without one, it will remain difficult to holistically evaluate the country's flood risk exposure and effectively triage.

Evaluating the effectiveness of the FRM's activities to date is also challenging. While it thoroughly evaluates proposed projects, the Corps is decidedly less rigorous in empirically analyzing the effectiveness of completed projects. The Corps submits yearly reports to Congress that document the flood damage reduction attributable to Corps projects.[60] However, there are concerns about the Corps' methodology for calculating these figures, which are the result of an

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56. *See* U.S. ARMY CORPS OF ENG'RS, NORTH ATLANTIC COAST COMPREHENSIVE STUDY: RESILIENT ADAPTATION TO INCREASING RISK (2015).

57. *Id*. at 1, 3; see, e.g., U.S. ARMY CORPS OF ENG'RS, NORTH ATLANTIC COAST COMPREHENSIVE STUDY – APPENDIX D-10: COMMONWEALTH OF VIRGINIA (2015).

58. Disaster Relief Appropriations Act, 2013, Pub. L. No. 113-2, tit. X, 127 Stat. 23-24.

59. RAY WIMBROUGH ET AL., LARGE SCALE STUDIES: SCOPING, DEVELOPMENT, AND IMPLEMENTATION, 2015 NATIONAL PLANNING COMMUNITY OF PRACTICE TRAINING, (2015), https://perma.cc/45B3-8END.

60. *Value to the Nation: Flood Risk Management Fast Facts,* U.S. ARMY CORPS OF ENG'RS, https://perma.cc/X9ML-CKYM, (last visited Sept. 10, 2020); H.R. Rep. No. 98-217, at 4 (1983); PAUL SCODARI, INST. FOR WATER RES., U.S. ARMY CORPS OF ENG'RS, U.S. ARMY CORPS OF ENGINEERS FLOOD RISK MANAGEMENT PROGRAMS, APPENDIX D, 11 (2014).

inherently complex undertaking.[61] The Corps readily cautions that the findings of this report should be treated as preliminary and not relied on for additional research.[62] This evaluation process also suffers from a poorly articulated purpose.[63] There is little indication of how, if at all, the findings in these reports are used for learning and improvement.

2. Project Delivery and Budget

The Corps' protracted timeframe for project delivery raises questions about how effectively it is helping localities address their flood risk. Under optimal conditions, flood control projects can take many years, with feasibility studies and pre-construction engineering activities typically taking five years and construction several years more.[64] In some cases, the project delivery timeframe has spanned multiple decades.[65]

This prolonged timeframe is attributable to several factors. Even with Congress rubber-stamping most project recommendations, the bifurcated 7001 process, with individual projects requiring the enactment of multiple WRDAs, can create a delayed and lurching project cycle. The time it takes for the Corps to complete a feasibility study is another source of inefficiency.[66] The most glaring reason for delay, though, is the time during which a project sits, during both the feasibility study and construction phases, on the Corps' back-burner, authorized but not yet allotted funding by the Corps' work plan. The backlog has become so severe that Congress has at times qualified new study and construction authorizations by requiring automatic deauthorization if they remain unfunded after seven or ten years, respectively.[67]

This phenomenon is mainly attributable, not to bureaucratic inefficiency, but to Congressional underfunding. A perennial budget shortfall for the Corps has created a significant backlog of projects, causing the gap in time between

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61. James J. Comiskey, *Overview of Flood Damages Prevented by U.S. Army Corps of Engineers Flood Control Reduction Programs and Activities*, 130 J. of Contemp. Water Res. & Ed. 13, 16-18 (2005).

62. SCODARI, *supra* note 58, at 11; Comiskey, *supra* note 59, at 14.

63. Comiskey, *supra* note 59, at 14.

64. *Water Resources Project Delivery: Feasibility*, U.S. ARMY CORPS OF ENG'RS, https://perma.cc/KPG9-YVWJ (last visited Oct. 15, 2022); *Water Resources Project Delivery: Pre-Construction Engineering and Design (PED)*, U.S. ARMY CORPS OF ENG'RS, https://perma.cc/6VTH-XWGW (last visited Oct. 15, 2022).

65. MELISSA SAMET, AM. RIVERS & NAT'L WILDLIFE FED'N, A CITIZEN'S GUIDE TO THE CORPS OF ENGINEERS 43 (2009); U.S. GOV'T ACCOUNTABILITY OFF., ARMY CORPS OF ENGINEERS: COST INCREASES IN FLOOD CONTROL PROJECTS AND IMPROVING COMMUNICATION WITH NONFEDERAL SPONSORS 14 (2013).

66. U.S. GOV'T ACCOUNTABILITY OFF., WATER RESOURCES PROJECTS: ARMY CORPS OF ENGINEERS CAN FURTHER ENHANCE ACCELERATION OF FEASIBILITY STUDIES 13 (2019).

67. Water Resources Reform and Development Act of 2014, Pub. L. No. 113-121, § 1001(d)(4) 128 Stat. 1196; America's Water Infrastructure Act of 2018, Pub. L. No. 115-270, § 1302(a)(1), 132 Stat. 3817.

authorization and implementation.[68] The estimated $98 billion construction backlog dwarfs the around $2 billion that is typically appropriated for construction each year.[69] The backlog and attendant project delays are a problem for communities whose vulnerability to flooding goes unaddressed.[70]

3. Equity

Given its budget constraints, the socioeconomic distribution of the Corps' flood management resources warrants particular scrutiny. Historically, the Civil Works' focus on the bottom-line economic impact of proposed projects has steered funding away from low-income communities in favor of wealthier ones.[71] For all FMP projects, the Corps conducts a benefit-cost analysis (BCA).[72] This BCA figure is often used as a determinant for the selection of which projects are allotted funds.[73] The data that traditionally weigh heavily in the BCA calculation, namely the value of property that stands to be protected, favors proposed projects that would protect affluent areas.[74] Though social factors can be included, the Corps has struggled to quantify these factors and make them reconcilable with others in the BCA calculation.[75] The Corps has attempted to address these gaps and give social factors more weight.[76] However, their BCA methodology remains heavily influenced by property values, to the detriment of low-income communities.[77]

C. RECOMMENDATIONS

Several reforms are necessary to better equip the Corps with the tools to help address the nation's flood risk. The FRM would benefit from a significant infusion of appropriations, though employing alternative funding mechanisms could enable the Corps to better leverage its existing resources. Similarly, adjustments to the current project delivery process could reduce delays and facilitate more timely assistance to communities. To promote a systematic approach to addressing the nation's flood risk, Congress should give the Corps a mandate to regularly conduct

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68. CARTER & NORMAND, *supra* note 31, at 1.

69. *Id*. at 3, 7.

70. *Id*. at 18.

71. ANNE N. JUNOD ET AL., URBAN INST., EQUITABLE INVESTMENTS IN RESILIENCE: A REVIEW OF BENEFIT-COST ANALYSIS IN FEDERAL FLOOD MITIGATION INFRASTRUCTURE 4-6 (2021).

72. *See* 33 U.S.C. § 2282(a)(2) (2018).

73. U.S. ARMY CORPS OF ENG'RS, *supra* note 45, at 2, 58; CARTER & NORMAND, *supra* note 31, at 12.

74. JUNOD ET AL., *supra* note 69, at 4-6 (noting the historical centrality of property values in BCA calculations and the halting efforts to incorporate a wider array of criteria).

75. GERARD WALTER, OTHER SOCIAL EFFECTS: A TIME-SERIES ANALYSIS COMPARING SOCIAL VULNERABILITY CHANGES BETWEEN LOWER AND HIGHER INCOME COMMUNITIES FROM FLOOD CONTROL PROJECTS 4 (2021).

76. SCODARI, *supra* note 58, at 9; *see* ROBERT GRAMLING & SHIRLEY LASKA, EXPANDING THE IDENTIFICATION AND MEASUREMENT OF THE HUMAN CONSEQUENCES OF DISASTROUS FLOODING: TOWARD THE REFINEMENT OF THE "OTHER SOCIAL EFFECTS" ACCOUNT (2008).

77. WALTER, *supra* note 72, at 3.

comprehensive studies of regional risk profiles and project effectiveness. Lastly, the FRM should take pains to promote equity in its outcomes by incorporating social factors into its BCAs.

1. Budget and Leveraging Resources

Several changes would better equip the Corps to address the country's rising flood risk in the coming years. Chief among the Corps' needs is a significant infusion of funding for FRM activities. The seminal Infrastructure Investment and Jobs Act enacted in November 2021 is a step in the right direction. The Act includes $17 billion for the Corps, $5 billion of which is earmarked for flood resiliency work.[78] This significant infusion of funding should enable the Corps to begin tackling its backlog. Whether future Corps appropriation levels anchor to this new spending benchmark, or revert to the significantly lower previous level, will be crucial in determining the Corps' ability to meet the increasing demand, because of climate change, for flood risk management projects.

Alternative funding models could also alleviate the financial shortfall. The White House, Congress, and think tanks have mooted several ideas for leveraging the Corps' existing funding. For example, utilizing public-private partnerships could crowd in private funding at multiple times the level of Corps funding alone.[79] Under another proposed reform, at least some of the federal government's financial contribution to a project would be converted into the form of a loan, as part of a revolving fund. This would increase the long-term financial burden on a project's non-federal entity, but, by increasing the Corps' operating budget without ballooning its bottom-line expenditures, would also allow the Corps to provide some measure of support to more projects.[80] The Corps has begun piloting some of these alternative paradigms.[81] The results of these pilots could provide valuable insight on how best to deploy Corps resources in the future.

2. Project Delivery

While the backlog of projects caused by budget shortfalls is the most significant impediment to timely project delivery, there are other impediments that can be addressed with distinct reforms. The process of conducting feasibility studies is one component that could be expedited without sacrificing the ultimate

78. Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, div. J, tit. III, 135 Stat. 1358 (2021); *Army Civil Works Studies, Projects and Programs to Be Accomplished with Bipartisan Infrastructure Law Funding*, U.S. ARMY CORPS OF ENG'RS, https://perma.cc/6BAY-5KKW (Jan. 19, 2022).

79. CARTER & NORMAND, *supra* note 31, at 19.

80. *Id.* at 20-21 (discussing various "small projects" under the USACE Continuing Authorities Program).

81. Water Resources Reform and Development Act of 2014, Pub. L. No. 113-121, § 5014, 128 Stat. 1329 (2014); *id.* § 5021., 128 Stat. 1332.

effectiveness of the Corps' flood management activities. Congress has sought to improve the efficiency of the feasibility study process, by not only placing time-bound parameters on the process but also instructing the Corps to examine the issue further.[82] However, such an analysis has yet to be done.[83] By following through on this mandate, the Corps could identify additional means of eliminating undue delays in the process.

Congress should also examine whether its own process – with each project requiring separate authorizations for a feasibility study and construction, and separate authorizing and appropriating bills – can be made more efficient. A more streamlined paradigm already exists within the FRM. The Continuing Authorities Program (CAP) allows the Corps to undertake smaller flood management projects – those that cost under $10 million – without Congressional approval.[84] On average, CAP projects are completed around three years after their feasibility studies are initiated.[85] While the much smaller scale of these projects contributes significantly to this timelier project delivery, it undoubtedly also benefits from the absence of legislative hurdles.

The difference in scale and the appropriate level of Congressional oversight between regular and CAP projects is not insignificant. Given the vast sums of money expended on large projects, Congress would be loath to abandon its role in authorizing specific projects. However, while a wholesale shift to the CAP paradigm for project delivery is unlikely, there is potential middle-ground. For instance, statutory reforms could empower the Corps to conduct feasibility studies, which require significantly less resources than construction, without first seeking Congressional authorization. This would eliminate one legislative bottleneck while still maintaining an involved oversight role for Congress.

3. Comprehensive Studies and Effectiveness Evaluations

To make the most of its resources and expertise, the Corps should routinize its activities evaluating the nation's flood risks. Permanent statutory authority to conduct comprehensive analyses at the regional and national levels could have several important consequences. Such studies could provide a basis for more deliberative planning. A thorough accounting of the nation's adaptation needs could serve as a much more germane, and likely much higher, benchmark to guide Congressional appropriations than the present status quo. Conversely, while funding constraints remain, these studies could enable more effective triaging by identifying those areas where adaptation is most urgent.

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82. 33 U.S.C. § 2282c (2018).

83. U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 64, at 19-22.

84. 33 U.S.C. § 701s (2018).

85. ANNA E. NORMAND, CONG. RSCH SERV., IF11106, ARMY CORPS OF ENGINEERS: CONTINUING AUTHORITIES PROGRAMS (2022).

Ongoing analysis of the nation's flood risk could dovetail with more rigorous evaluation of the Corps' effectiveness, suggesting over time the extent to which the FRM is mitigating that risk. As flood risk increases, a process for bolstering FRM's effectiveness and catalyzing knowledge sharing will become all the more crucial. A new mandate for conducting evaluations should be coupled with a commitment to institutional learning and improvement.

4. Equity Metrics

Lastly, the Corps should build on efforts to ensure an equitable distribution of the benefits from FRM by ensuring due consideration of social factors. Encouragingly, the Corps has evinced a new focus on this issue. A recently issued policy directive instructs staff to "consider[], in a comprehensive manner, the total benefits of project alternatives, including equal consideration of economic, environmental and social categories," in their evaluations, including in BCAs.[86] To effectuate this directive, the Corps should leverage existing scholarship suggesting ways to modify BCAs and incorporate well-designed metrics.[87] There are numerous social vulnerability indices to draw from when seeking to quantify social factors to allow for easier integration into the BCA calculation.[88] The Corps could also adjust economic metrics to encompass distributional considerations, such as how many people stand to suffer economic harm from flooding, instead of relying on sum totals.[89]

III. NATIONAL FLOOD INSURANCE PROGRAM

The National Flood Insurance Program (NFIP), administered by the Federal Emergency Management Agency (FEMA),[90] issues flood insurance to residential and commercial property owners. Like any other insurer, NFIP sets its rates based on certain risk factors, collects premiums, and pays out to policyholders when their properties are damaged by flooding. NFIP was created to fill a vacuum left by private insurers, which were reluctant to offer flood insurance widely.[91] Among the program's stated goals are facilitating wide flood insurance coverage for at-risk properties;[92] promoting adequate floodplain management standards;[93] and establishing actuarial rates,[94] thereby achieving program solvency. NFIP also

86. Memorandum, Assistant Sec'y of the Army (Civil Works), Policy Directive – Comprehensive Documentation of Benefits in Decision Document (Jan. 5, 2021), https://perma.cc/CJ6P-AD6H.

87. *See*, *e.g.*, JUNOD ET AL., *supra* note 69.

88. WALTER, *supra* note 72, at 4-5; *see also* GRAMLING & LASKA, *supra* note 73.

89. JUNOD ET AL., *supra* note 69, at 61-63.

90. 42 U.S.C. § 4011(a) (2018).

91. § 4001(b).

92. §§ 4001(d), 4002(a)(6).

93. §§ 4001(c), 4002(b)(3).

94. § 4014(a)(1).

has the makings of an equity mandate, albeit a vague one scattered about its enabling statute.[95]

This Part will first explore the interplay between NFIP insurance and resiliency. It then evaluates NFIP's effectiveness according to its own stated goals. Finally, it parses the challenge of meeting these sometimes conflicting goals and urges NFIP to place a greater emphasis on promoting equity.

A. FLOOD INSURANCE AND RESILIENCY

NFIP promotes resiliency in multiple ways. Flood insurance bolsters the financial resiliency of individual policyholders. When a policyholder suffers property damage because of flooding, they are indemnified for the losses and thus able to rebuild or otherwise respond on a firmer financial footing.

Flood insurance could also play an important role in signaling risk and encouraging adaptation. The premiums paid by policyholders, if they are actuarially sound, are among the clearest indications of a property's flood risk. As flood risk increases, policyholders troubled by their rising premiums may consider taking steps to reduce their flood risk—if they are assured it will be reflected in lower premiums—or relocating to areas with less flood risk.[96]

NFIP's most important signaling tool is the mandatory purchase requirement. Any property in a designated Special Flood Hazard Area (SFHA) that is subject to a federally-backed mortgage is required to carry flood insurance.[97] The mandatory purchase requirement applies broadly, with 75% of single-family mortgages backed by a federal entity.[98] The requirement promotes awareness of the risks associated with these SFHAs and deters unsuitable development in those areas.

NFIP also uses mandates to promote resiliency at the community level. A property must be within a participating municipality to be eligible for NFIP insurance.[99] To participate in NFIP, a municipality must meet a set of minimum floodplain management standards or take steps to enact such ordinances.[100]

NFIP's Community Rating System (CRS) builds on this approach. CRS is a voluntary program under which participating communities can choose to adopt even stricter floodplain management standards in exchange for premium discounts for all policyholders in that community.[101] CRS uses a points-based

95. *Cf.* §§ 4001(a), 4001(b), 4001(d), 4014(a)(2).

96. Omri Ben-Shahar & Kyle D. Logue, *The Perverse Effects of Subsidized Weather Insurance*, 68 STAN. L. REV. 571, 575-76, 580-83 (2016).

97. 42 U.S.C. § 4012a(b) (2018).

98. U.S. GOV'T ACCOUNTABILITY OFF., GAO-21-554, COVID-19 HOUSING PROTECTIONS: MORTGAGE FORBEARANCE AND OTHER FEDERAL EFFORTS HAVE REDUCED DEFAULT AND FORECLOSURE RISKS 3 (2021).

99. § 4022(a)(1).

100. *Id.*

101. § 4022(b)(1)-(2) (2018).

system for taking certain actions, with corresponding discount rates that can reach as high as 45%.[102]

B. EFFECTIVENESS

Evaluating NFIP in terms of its stated goals—wide coverage of at-risk properties, encouraging better floodplain management, solvency, and equitability—paints a complicated picture and illustrates the discordance among some of those goals.

1. Coverage

Despite NFIP's mandatory purchase requirement, there is currently a yawning gap in flood insurance coverage. Only around 40% of properties in SFHAs have flood insurance.[103] The extent to which various factors, including under-inclusivity[104] or under-enforcement of the federal insurance mandate,[105] contribute to this insurance gap is not well researched. What is clear is that a majority of properties in those areas deemed most susceptible to flooding are actually uninsured.

The coverage rate for properties outside of SFHAs, which are not required to hold policies, is nonetheless relevant. The often outdated flood maps used to determine SFHAs fail to capture the true flood risk to many properties in the face of accelerating climate impacts.[106] NFIP's own claim data demonstrates the significant share of flood risk that falls outside SFHAs, with 20% of claims coming from such properties.[107] Because these properties are less likely to be insured, the true share of the nation's flood risk borne by non-SFHA properties could be much higher. For instance, large flooding events in 2015 and 2016 that saw significant inland flooding impacted areas that, on average, had NFIP coverage of only 5 to 17%.[108]

The insurance gap resulting from this confluence of factors has been laid bare by recent extreme storms. Though the coastal communities impacted might be expected to have extensive coverage, less than 25% of properties flooded by Hurricanes Harvey, Sandy, and Irma were found to have insurance.[109] The failure to achieve wider coverage means that many property owners bear the full

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102. *Community Rating System,* FED. EMERGENCY MGMT. AGENCY (last visited Jan. 24, 2022), https://perma.cc/6RHQ-MNDG.

103. Before, During & After, *Episode 10: Closing The Insurance Gap*, FED. EMERGENCY MGMT. AGENCY (July 22, 2020), https://perma.cc/E73X-5V4W (search "Episode 10").

104. FED. EMERGENCY MGMT. AGENCY, U.S. DEP'T OF HOMELAND SEC., AN AFFORDABILITY FRAMEWORK FOR THE NATIONAL FLOOD INSURANCE PROGRAM 13 (2018).

105. U.S. GOV'T ACCOUNTABILITY OFF., GAO-21-578, NATIONAL FLOOD INSURANCE PROGRAM: CONGRESS SHOULD CONSIDER UPDATING THE MANDATORY PURCHASE REQUIREMENT 22 (2021).

106. *Id*. at 36-38.

107. DIANE P. HORN, CONG. RSCH. SERV., IN10890, CLOSING THE FLOOD INSURANCE GAP 1 (2019).

108. *Id*. at 1, 3.

109. CAROLYN KOUSKY ET AL., WHARTON RISK MGMT. AND DECISION PROCESSES CTR., UNIV. OF PA., MOVING THE NEEDLE ON CLOSING THE FLOOD INSURANCE GAP 1 (2019).

financial risk of flooding and, in the event of a severe flooding event, will either be reliant on other forms of relief or else suffer significant financial loss.

2. Floodplain management

NFIP has been successful in effecting the wide adoption of its minimum floodplain management standards. Over 22,000 communities participate in NFIP and previous studies have found a high rate of compliance with NFIP's standards among these communities.[110] Over 1,500 of these communities have further opted to participate in CRS and implement even more stringent floodplain management practices.[111] These CRS communities, which include many of the most populous, encompass more than 70% of policyholders.[112]

However, debate remains about whether NFIP has had the ultimate effect of reducing the nation's flood risk or actually promoting unsustainable development in flood-prone areas. By diluting the financial risk to property owners, especially through subsidies and undervalued policies, some argue that NFIP has *encouraged* such development.[113] This perverse incentive may be particularly acute in coastal or other water-adjacent areas because, flood risk aside, these areas tend to be more desirable and lucrative. As evidence, these critics point to the significant growth since NFIP began in the number of policies and more generally of the population of high-risk areas.[114]

It is hard to determine NFIP's causal contribution, if any, to this growth. There is plenty of reason to believe that the proliferation of people living on the coasts is driven by other, more determinative factors. Nonetheless, it is fair to wonder whether NFIP, conceived decades before climate change percolated to the top of the nation's consciousness, has at least failed to forestall the overdevelopment of flood-prone areas and prepare property owners for the impacts of climate change.

3. Solvency

NFIP was intended to be financially self-sustaining. Premium rates are supposed to be based on sound actuarial principles to ensure that the revenue NFIP generates can cover its costs.[115] However, NFIP's inability to achieve solvency is perhaps its most visible failing. NFIP has frequently had to borrow money to

110. DIANE P. HORN & BAIRD WEBEL, CONG. RSCH. SERV., R44593, INTRODUCTION TO THE NATIONAL FLOOD INSURANCE PROGRAM (NFIP) 1, 7 (2021).

111. *Community Rating System Overview and Participation,* FED. EMERGENCY MGMT. AGENCY (June 30, 2021), https://perma.cc/8AHJ-BS9D.

112. *Id.*

113. Ben-Shahar & Logue, *supra* note 92, at 577, 613-16; WALTER A. ROSENBAUM & GARY W. BOULWARE, AM. INST. FOR RESEARCH, THE DEVELOPMENT AND ENVIRONMENTAL IMPACT OF THE NATIONAL FLOOD INSURANCE PROGRAM, 3-4 (2006).

114. Ben-Shahar & Logue, *supra* note 92, at 577, 613-16.

115. 42 U.S.C. § 4014(a)(1) (2018).

meet its obligations and currently owes a debt of just over $20 billion.[116] While NFIP revenues exceeded expenditures in many years, the financial losses incurred by the program from a handful of extreme storms plunged NFIP's bottom line into the red.[117]

A 2017 analysis by the Congressional Budget Office found that NFIP's average yearly shortfall of $1.4 billion was mainly attributable to NFIP underestimating expected claims and thus setting premium rates too low.[118] Using a methodology less reliant on historical data, which, in light of accelerating climate change, is becoming a less reliable predictor of future outcomes,[119] CBO estimated that the value of NFIP's expected annual claims exceeded FEMA's estimate by $1 billion.[120] The other significant contributor was the discounted rates, mainly for grandfathered properties. Though a policy surcharge is supposed to subsidize these discounts, the amount collected from this surcharge undershoots the discounts by about $300 million.[121]

This systemic shortfall belies any notion of solvency for NFIP. In 2017, with its debt even higher and approaching its congressionally mandated debt ceiling of around $30 billion, NFIP had to turn to Congress to cancel over $16 billion of its debt.[122] This eye-popping debt total and accompanying "bailout" has made NFIP an easy object of derision.

4. Equitability

Though NFIP purports to make insurance available to those who might not otherwise be able to afford it,[123] NFIP has hardly been a redistributive program. As a general matter, NFIP policyholders are likely better off socioeconomically compared to the general public.[124] A 2007 study by the Congressional Budget Office found that the median value of properties insured by NFIP was higher than that of uninsured properties.[125] And FEMA has found that the income of policyholders is on average higher than those without NFIP insurance.[126]

These population comparisons necessarily gloss over differences, which, for affected communities, can be stark. The socioeconomic profile of high flood risk

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116. DIANE P. HORN, CONG. RSCH. SERV., IN10784, NATIONAL FLOOD INSURANCE PROGRAM BORROWING AUTHORITY 3 (2021).

117. PERRY BEIDER ET AL., CONG. BUDGET OFF., THE NATIONAL FLOOD INSURANCE PROGRAM: FINANCIAL SOUNDNESS AND AFFORDABILITY 4 (2017).

118. *Id.*

119. *Id.* at 10.

120. *Id.*

121. *Id.*

122. HORN, *supra* note 111, at 3.

123. Ben-Shahar & Logue, *supra* note 92, at 585.

124. *Id.* at 579.

125. PERRY BEIDER, CONG. BUDGET OFF., VALUE OF PROPERTIES IN THE NATIONAL FLOOD INSURANCE PROGRAM 6 (2007).

126. FED. EMERGENCY MGMT. AGENCY, *supra* note 99, at 6, 11.

communities runs the gamut from affluent coastal communities to low-income ones redlined into flood-prone areas.[127] And while NFIP would benefit from more granular research on the socioeconomic profile of policyholders and other stakeholders, what evidence there is points to inequitable outcomes within the population of policyholders. Within SFHAs, where flood risk is most acute, the average income for non-policyholders is lower than for policyholders,[128] suggesting a failure to make insurance sufficiently affordable. NFIP's subsidies are primarily aimed not at promoting affordability, but at creating favorable grandfather rates for older construction built before the enactment of certain NFIP mandates.[129] Unsurprisingly then, these subsidies have in practice been regressive, disproportionately benefitting more well-off policyholders with valuable, historic homes.[130]

5. Risk Rating 2.0

While all of NFIP's aims – sufficient flood insurance coverage, promotion of good floodplain management practice, solvency, and equitability – may be laudable, its ability to achieve all of them simultaneously is dubious.[131] Many possible reforms to accomplish one could be counterproductive to others. For instance, phasing out distorting subsidies, which would improve solvency and better signal flood risk, has the general effect of increasing premiums.[132] This could create financial hardship for low-income policyholders and, more broadly, discourage people from maintaining a flood insurance policy.[133]

NFIP's recent actions suggest that resolving the solvency issue is their top priority. Under the Risk Rating 2.0 initiative, NFIP is overhauling its process for setting premium rates,[134] which has thus far resulted in a systematic underestimation of policyholders' flood risks.[135] By changing its methodology and continuing the phase-out of subsidies, NFIP aims to set premiums at a level that more accurately reflects the policyholders' risk.[136] More actuarially sound premiums will in turn staunch NFIP's operating deficits.[137]

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127. *Id*. at 12-13.

128. *Id*. at 11.

129. DIANE P. HORN, CONG. RSCH. SERV., R45999, NATIONAL FLOOD INSURANCE PROGRAM: THE CURRENT RATING STRUCTURE AND RISK RATING 2.0 3-6 (2021).

130. BEIDER, *supra* note 120, at 8-9; Ben-Shahar & Logue, *supra* note 92, at 595, 610.

131. U.S. GOV'T ACCOUNTABILITY OFF., GAO-17-425, FLOOD INSURANCE: COMPREHENSIVE REFORM COULD IMPROVE SOLVENCY AND ENHANCE RESILIENCE 42 (2017).

132. *Id*. at 9.

133. *Id*. at 23; FED. EMERGENCY MGMT. AGENCY, *supra* note 99, at 2, n.8.

134. HORN, *supra* note 124, at 7-10.

135. *See supra* Section III.B.3.

136. HORN, *supra* note 124, at 7.

137. FED. EMERGENCY MGMT. AGENCY, RISK RATING 2.0 IS EQUITY IN ACTION 1 (2021), https://perma.cc/VZG6-5QXW.

Risk Rating 2.0 went into effect for new policies on October 1, 2021, and will be reflected in existing policies renewed after April 1, 2022.[138] Based on preliminary estimates, premium rates are expected to increase for around 77% of policyholders.[139] The majority of these increases will be moderate, less than $240 per year.[140] However, some will see the cost of insuring their homes balloon, with yearly rate increases in the thousands of dollars.[141]

Assuming Risk Rating 2.0 is successful at setting more accurate premium rates and addressing solvency issues, its full impact on the other effectiveness criteria will only be clear once the dust settles. NFIP's stated goal to double its coverage rate by 2023[142] will likely be complicated by premiums going up for many properties, discouraging potential policyholders from obtaining coverage.[143]

The implications of Risk Rating 2.0 for equity are uncertain, as the extent to which low-income policyholders will bear the burden of rates increases requires further research. Reforms to make NFIP more affordable for low-income property owners, through means-tested assistance to lower premium rates, have been well-discussed.[144] However, the implementation of Risk Rating 2.0 would seem to foreclose these mooted reforms, because such assistance would undermine the solvency gains made by phasing out existing subsidies.

C. RECOMMENDATIONS

Following the implementation of Risk Rating 2.0, NFIP should focus on leveraging its authoritative role in regulating flood insurance to promote adaptation. Squarely aligned with NFIP's goal of promoting good floodplain management, encouraging adaptation can also contribute to, or at least not undermine, achieving NFIP's other programmatic goals.

The more nuanced methodology of Risk Rating 2.0 itself should provide a nudge towards adaptation. With more granular factors such as an individual property's elevation or the presence of structural flood openings included in the calculation of premium rates,[145] the value of taking adaptation actions should now be captured in a more tangible economic benefit: lower premiums.[146] To capitalize on this, NFIP must implement a comprehensive risk communication strategy. NFIP should communicate not only the risk factors contributing to the premium rates of prospective and current policyholders, but also estimates of how certain

138. *Id.* at 5.

139. FED. EMERGENCY MGMT. AGENCY, RISK RATING 2.0 – NATIONAL RATE ANALYSIS (2021), https://perma.cc/V2ED-RVUT.

140. *Id.*

141. Christopher Flavelle, *The Cost of Insuring Expensive Waterfront Homes Is About to Skyrocket*, N.Y. TIMES (Sep. 24, 2021), https://perma.cc/H4LQ-S3FQ.

142. HORN, *supra* note 102, at 5.

143. FED. EMERGENCY MGMT. AGENCY, *supra* note 99, at 2, n.8.

144. *Id.* at 20.

145. HORN, *supra* note 124, at 9-10.

146. U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 100, at 39.

adaptation actions could lower those rates. NFIP should seek to convey such individualized information to all property owners facing at least moderate flood risk, not only those required to hold insurance.[147] Providing information on the potential savings derived from adaptation could soften the effect of rising rates on coverage.[148] NFIP could also build online interactive tools to let anyone input the attributes of a home and explore how certain adaptation actions affect estimated premium rates.

While awareness of how premium rates respond to adaptation may spur many property owners to take action, many low-income individuals may not have the upfront capital to do so, forcing them to forego the benefits of lower flood risk and more affordable premium rates.[149] NFIP should assist its low-income policyholders out of this resiliency trap. Targeted assistance, in the form of technical support and financial resources, could be utilized at both the individual level and at the community level,[150] facilitating greater participation by disadvantaged communities in NFIP and CRS.

Unlike means-tested discounts that artificially restrain premium rates while leaving the underlying flood risk unaddressed, targeted assistance for adaptation is a more direct and sustainable equity fix.[151] However, the question of paying for affordability assistance remains. NFIP could seek to use surcharges on other policyholders to generate corresponding revenue, as it tries, albeit with limited success, to do with existing subsidies. These surcharges though, could be significant, unpopular, and reintroduce solvency issues.

Ultimately, this conundrum points to the limitations of a strictly actuarial insurance program as a tool for equitably addressing the climate crisis. A fixation on NFIP's nominal solvency undermines efforts to assist the countless low-income communities to bolster their resiliency, which will require significant expenditures, even if debited from somewhere else in the federal ledger.[152] The Flood Mitigation Assistance program, discussed along with other federal grant programs in the following Part, is a policy sleight of hand that encapsulates this reality. Administered by FEMA closely alongside NFIP, the program is nonetheless generally excluded from discussions of NFIP's solvency, giving it a freer hand to address equity.

IV. FEDERAL GRANT PROGRAMS

Several federal grant programs seek to bolster resiliency by funneling resources towards communities faced with flood risk and other hazards. The objectives,

147. U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 126, at 33.
148. U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 100, at 39.
149. FED. EMERGENCY MGMT. AGENCY, *supra* note 99, at 32.
150. *Id*. at 32-33.
151. *Id*. at 32; U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 126, at 25.
152. U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 126, at 27.

scope, and eligible activities of this tapestry of programs overlap or diverge to varying degrees. For instance, while the Flood Mitigation Assistance program is focused squarely on flood risk, other programs have a broader scope, of which addressing flood risk is a component. However, the programs tend to follow the same general process: a community applies, often through its relevant state agency,[153] for funding for a specific project to analyze or address its flood risk. The federal agency receives these proposals during designated application periods, applies eligibility and effectiveness criteria, and determines which projects receive funding.[154]

The Flood Mitigation Assistance (FMA) program is, as the name suggests, squarely focused on funding activities that address flood risk.[155] Administered by FEMA, FMA is linked to NFIP, the federal flood insurance program discussed in the previous Part. To be eligible for an FMA grant, a community must be an active NFIP participant.[156] Furthermore, projects are evaluated in part on the degree to which they will mitigate risks to NFIP-insured properties.[157] FMA grants can be used to fund a range of activities, including strategic planning and technical assistance, community-wide adaptation projects, and adaptation measures by individual property owners.[158]

Also administered by FEMA, the Building Resilient Infrastructure and Communities (BRIC) program has a broader scope than FMA, funding projects to address numerous additional disaster risks, including earthquakes, mudslides, and wildfires.[159] However, a substantial portion of the grants sought through BRIC has been for addressing flood risk. During the 2020 grant cycle, applications for "flood control" projects were the most common; of the $3.6 billion sought in federal assistance, $1.3 billion was for flood control.[160]

Whereas FMA is funded through the ordinary appropriations process,[161] BRIC is funded by a set-aside of disaster relief expenditures. When a disaster is declared and relief appropriated, the President has the authority to direct up to 6% of the amount appropriated to BRIC.[162] Conceived as a means of mitigating the risks of disasters, BRIC and its operation are also ostensibly tied to these disaster declarations; BRIC grants are only available to states or territories that have suffered a federally declared major disaster in the past 7 years.[163] However, this

153. *E.g.* 42 U.S.C. § 5133(d) (2018).
154. *E.g.* § 5133(f)-(g).
155. § 4104c(a).
156. § 4104c(b).
157. § 4104c(c)(2)(A)(ii).
158. § 4104c(c)(3).
159. § 5133(b).
160. FED. EMERGENCY MGMT. AGENCY, HAZARD MITIGATION ASSISTANCE (HMA) ANNUAL GRANT CYCLE SUBMISSIONS SUMMARY (2021), https://perma.cc/WG8Y-XZPJ.
161. *E.g.*, Pub. L. No. 116-260, tit. III, 134 Stat. 1182, 1463 (2020).
162. 42 U.S.C. § 5133(i)(1) (2018).
163. § 5133(g).

nexus is so loose that it has, in practice, had little limiting effect. The COVID disaster declarations issued for all fifty states in March 2020[164] ensures that all states will be eligible for FMA grants for years to come.

Although this Part focuses on the FEMA grant programs given their pertinent aims, there are also a number of other federal grant programs that address flood risk to varying degrees.[165] Perhaps most notable of these is the mitigation grants component of Housing and Urban Development's Community Development Block Grant program (CDBG-MIT).[166] Presently without permanent authorization, this grant program provides $16 billion for adaptation activities for communities impacted by specified disasters from 2015 to 2017.[167] Administered by a different agency, CDBG-MIT nonetheless piggybacks off of FEMA's grant programs, replicating some of FMA's and BRIC's processes and planning requirements.[168] As part of the flagship CDBG program, however, CDBG-MIT has a more central focus on low- and moderate-income communities.[169]

Other federal grant programs of note include the National Coastal Resilience Fund, administered by the National Fish and Wildlife Foundation with assistance from the National Oceanic and Atmospheric Administration and other agencies. Grants from this program seek to bolster the ecological health of the coasts to achieve a range of objectives, including climate resiliency.[170] The Department of Agriculture's Watershed and Flood Prevention Operations has more of an inland focus, funding riparian flood control projects.[171]

A. EFFECTIVENESS

Comparing the total amount of funds requested against the amount actually available provides one means of evaluating the effectiveness of grant programs. For the most recent BRIC cycle, $500 million in grants was available but FEMA received applicants requesting a total of more than seven times that amount.[172] The gap was less stark for the most recent FMA cycle, with the $393 million in federal support sought from applicants a little less than double the $200 million available.[173] Nonetheless, it is clear that the demand for federal grants to fund

164. *COVID-19 Disaster Declarations,* FED. EMERGENCY MGMT. AGENCY (last visited Jan. 25, 2022), https://perma.cc/Q9DB-747N.

165. *See generally* EUGENE BOYD ET AL., CONG. RSCH. SERV., R45017, FLOOD RESILIENCE AND RISK REDUCTION: FEDERAL ASSISTANCE AND PROGRAMS (2019).

166. Bipartisan Budget Act of 2018, Pub. L. No. 115-123, div. B, tit. XI, 132 Stat. 103.

167. *CDBG-MIT Overview,* DEPT. OF HOUS. & URB. DEV. (last visited Jan. 25, 2022), https://perma.cc/Z4WQ-UC97.

168. Allocations, Common Application, Waivers, and Alternative Requirements for Community Development Block Grant Mitigation Grantees, 84 Fed. Reg. 45,838, 45,838 (Aug. 30, 2019).

169. *Id.*

170. 16 U.S.C. § 7501-7507 (2018).

171. § 1001-1012a.

172. FED. EMERGENCY MGMT. AGENCY, *supra* note 155.

173. *Id.*

climate resiliency projects far exceeds the supply, before even taking into account whether capacity constraints for many small or impoverished communities depress the amount of funding requested.

Funding levels themselves are a heuristic for effectiveness. Unfortunately, more direct effectiveness metrics are not readily available for FEMA's grant programs. Though FEMA publishes information on the geographic distribution of grants and the amount of resources devoted to different types of projects,[174] more granular data on grant awards is not available. The lack of information on outcomes is particularly inhibiting, as there is little information on whether projects are implemented on time, let alone how they perform over time in the face of rising seas or weather events. FEMA does collect such information on some projects, for instance by commissioning a loss avoidance study after a disaster.[175] However, the extent of evaluation activities appears limited. Most glaringly, and likely as a result of the sporadic nature of these studies, FEMA has not published any comprehensive evaluations that could, for instance, inform communities in the future deciding between different resiliency measures. Moreover, FEMA does not routinely share these studies publicly, foreclosing the utility of public analysis.[176] Until FEMA regularly and rigorously conducts and publishes such studies, evaluating the effectiveness of their grant programs will remain difficult.

B. EQUITY

For BRIC, FEMA tracks the number of applications received from, and the amount of funds awarded to "small and impoverished communities."[177] For the most recent grants cycle, small and impoverished communities accounted for 9.3% of applicants by volume of funding requested. FEMA notes this figure is up from a previous average of around 6%.[178] Still, the proportion of applications from small and impoverished communities may significantly understate the true resiliency needs of such communities, which are presumably more reliant on federal assistance. A 2021 report by GAO found many possible barriers to participation in FEMA's grant processes.[179] These barriers are likely to be felt more acutely by low-income communities with less capacity to engage. The demanding application process requires resources that are taxing for many communities.

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174. *Id.*

175. U.S. GOV'T ACCOUNTABILITY OFF., GAO-21-140, DISASTER RESILIENCE: FEMA SHOULD TAKE ADDITIONAL STEPS TO STREAMLINE HAZARD MITIGATION GRANTS AND ASSESS PROGRAM EFFECTS 27-31 (2021).

176. *Id.* at 35-37.

177. "Small impoverished community" is defined as a community with a population of or less than 3,000 and a per capita income that is 80% or less of the national per capita income. U.S. DEP'T OF HOMELAND SEC., NOTICE OF FUNDING OPPORTUNITY (NOFO): FY 2020 BUILDING RESILIENT INFRASTRUCTURE AND COMMUNITIES 9 (2020), https://perma.cc/8HR3-8RRB.

178. *Building Resilient Infrastructure and Communities FY 2020 Subapplication Status,* FED. EMERGENCY MGMT. AGENCY, (last visited Jan. 28, 2022), https://perma.cc/6FDB-8NKJ.

179. U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 170, at 18-25.

Few small communities retain all the professional competencies needed to compile all the necessary application materials. Instead, these communities must either forego applying or contract for these services, to the detriment of their small municipal budgets.[180]

The proportion of BRIC funds ultimately awarded to small and impoverished communities trails even the low application rate. These communities received grants for projects totaling $39.2 million in cost, about 7% of the funding that was available.[181] This low share of awarded funding is perhaps unsurprising given the criteria FEMA uses to score applications. The amount of technical evaluation points awarded for applications from small and impoverished communities is only five out of a possible one hundred.[182] The scoring framework for the most recent FMA cycle, in which grant recipients were found to have on average "a low to moderate level of vulnerability,"[183] is devoid of any equity criteria.[184]

C. RECOMMENDATIONS

As flooding and other climate risks grow, more resilience funding should be made available through federal grant programs. While the political will to adequately fund adaptation lags behind the demand, these programs should continue to draw funding from a variety of sources. Grant programs like those administered by FEMA, which fund a wide variety of projects, should also establish a process for evaluating projects across their portfolio and sharing insights. Finally, grant programs that solicit applications from local governments must ensure that their application processes do not exclude meaningful participation by small and low-income communities. These programs should also give due consideration to socioeconomic criteria when selecting grant recipients.

1. Funding

Examining just a handful of these grant programs illustrates a variety of funding paradigms, as well as their corresponding advantages and pitfalls. The disaster relief set aside that funds BRIC provides a germane link to its mission. If, as a result of climate change or otherwise, the frequency or severity of disasters increases, so too will funding for resiliency. However, linking the amount of resiliency funds to backward-looking disaster relief, instead of an appraisal of future needs, could prove insufficient for addressing the risks of accelerating

180. *Id.* at 25.

181. FED. EMERGENCY MGMT. AGENCY, *supra* note 172.

182. U.S. DEP'T OF HOMELAND SEC., *supra* note 176, at 20.

183. *Flood Mitigation Assistance FY 2020 Subapplication Status,* FED. EMERGENCY MGMT. AGENCY (last visited Jan. 28, 2022), https://perma.cc/JF5S-RR77.

184. U.S. DEP'T OF HOMELAND SEC., NOTICE OF FUNDING OPPORTUNITY (NOFO): FY 2020 FLOOD MITIGATION ASSISTANCE 20 (2020), https://perma.cc/S459-NEZF.

sea-level rise and storm intensity.[185] Appropriations like those for FMA have the flexibility to potentially be more forward-looking, though they are also subject to political inertia, often resulting in static funding levels inapt for a worsening crisis. Others rely, at least in part, on a more permanent funding source. For instance, in addition to typical appropriations, the Watershed and Flood Prevention Operations receives $50 million each year from the government-owned Commodity Credit Corporation.[186]

As with the Corps, the amount of funding for these grant programs should ideally correspond to a best estimate of the resources required to comprehensively address the nation's flood risk. Considering, though, that such a degree of deliberativeness is rare in federal policymaking, the present tapestry of funding sources is a serviceable compromise. While each source may be subject to its own fluctuations or stagnation, a diversified mix at least mitigates the risk of overall funding levels drying up. Congress should look for additional sources of revenue to inject into resiliency grant programs. Though a federal cap and trade policy remains mired in political purgatory,[187] should one ever be enacted, the federal government could follow the lead of Virginia, which uses any proceeds from its operation to fund its Community Flood Preparedness Fund.[188]

2. Evaluation and Knowledge Sharing

FEMA is well-positioned to advance the field of climate resiliency through institutional learning and knowledge sharing. Through its grant programs, FEMA funds a wide variety of resiliency projects in diverse locations. Much could be learned from examining how well these different projects fare in the coming years.[189]

To fulfill this important role, FEMA must implement a more thorough process for monitoring the projects it funds and evaluating their effectiveness.[190] Because of the dynamic character of flood risk in the face of climate change, monitoring should, to the extent possible, be ongoing for all projects. Adding a temporal dimension to FEMA's already expansive portfolio of funded projects will necessitate a well-designed monitoring process that efficiently utilizes the continued engagement of grantees.

Based on this routine monitoring, FEMA should undertake broader analyses of, for instance, the outcomes for certain types of projects or locations with certain ecological features. These analyses should aim to create actionable guidance

185. DIANE P. HORN, CONG. RSCH. SERV., IN11515, FEMA PRE-DISASTER MITIGATION: THE BUILDING RESILIENT INFRASTRUCTURE AND COMMUNITIES (BRIC) PROGRAM 2 (2021).

186. 16 U.S.C. § 1012a (2018).

187. Jeffrey Pierre, *How Decades of Disinformation About Fossil Fuels Halted U.S. Climate Policy*, NAT'L PUB. RADIO (Oct. 27, 2021) https://perma.cc/YW3X-AE5K.

188. VA. CODE ANN. § 10.1-1330 (2022).

189. U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 170, at 27, 34-35.

190. *Id.* at 38.

to improve the effectiveness of future projects. FEMA should seek to leverage the expertise in the academic, private, and non-profit sectors by collaborating on analyses. At the very least, FEMA should enable their participation by making effectiveness data and evaluations publicly accessible.

3. Accessibility and Socioeconomic Criteria

FEMA should take steps to continue increasing the participation of small and impoverished communities. Though a rigorous application process can be important for ensuring funds are used effectively, FEMA should scrutinize its processes and modify any unduly burdensome requirements that may hinder accessibility for disadvantaged communities.[191] To ease the burden of the more intractable red tape, FEMA should ensure its guidance is readily available and responsive to the needs of small communities.[192]

Striving to ensure a proportionate share of *applications* come from small and impoverished communities is an important step. FEMA's ultimate goal, though, should be an equitable share of *grants* going to disadvantaged communities. For competitive grant programs, this necessitates attention to the methodology for scoring grant applicants. Encouragingly, the current cycle for the FEMA grant programs features a scoring framework that places greater emphasis on socioeconomic factors than in previous years. For BRIC, the amount of technical evaluation points awarded for small and impoverished communities has tripled to fifteen.[193] FMA has not only added but assigned significant weight to social vulnerability criteria.[194] To what extent these changes increase disadvantaged communities' share of the grants, and whether more criteria tinkering is needed, remains to be seen. That FEMA is now scrutinizing the equitability of its grant programs, though, is undoubtedly an important development.

CONCLUSION

The federal government already has tools to address the country's flood risk. However, none of these existing policies and programs were conceived as a response to the accelerating growth of flood risk as a consequence of climate change. Recalibrations are needed to tackle this incipient crisis and do so in an equitable way.

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191. *Id.* at 21, 25.

192. *Id.* at 26-27.

193. U.S. DEP'T OF HOMELAND SEC., NOTICE OF FUNDING OPPORTUNITY (NOFO): FISCAL YEAR 2021 BUILDING RESILIENT INFRASTRUCTURE AND COMMUNITIES 27 (2021), https://perma.cc/3S4W-3ZM5.

194. U.S. DEP'T OF HOMELAND SEC., NOTICE OF FUNDING OPPORTUNITY (NOFO): FISCAL YEAR 2021 FLOOD MITIGATION ASSISTANCE 26, 28-29 (2021), https://perma.cc/MHW8-D35V.

In addition to program-specific reforms, the federal executive branch can also assume an important convening role. With so many and varied policies intersecting, there is a risk of working at cross-purposes. In one instance, the Corps was planning on building a levee to protect a community that was already in the process of relocating using FEMA and Housing and Urban Development resources.[195] While many programs already make efforts at interagency communication, the breadth of the challenge may also necessitate a presiding body to coordinate responses.[196]

The Biden administration was quick to establish a Climate Policy Office and an interagency National Climate Task Force.[197] However, with an expansive mandate that includes reducing pollution, conserving biodiversity, and spurring well-paying union jobs,[198] it is unclear whether they can effectively coordinate resiliency efforts. A more squarely adaptation-focused initiative was mooted by the Obama administration but was scrapped by the Trump administration before it ever got going.[199] Renewing such an initiative could not only synergize federal policy but also serve as an important clearinghouse for information pertinent to vulnerable communities.

Notably, the Biden administration has already sought to prioritize equity across climate-related programs. One of the administration's first actions was launching the Justice40 initiative in January 2021. Justice40 aims to ensure that, as the federal government attempts to step up its actions in response to the climate crisis, at least 40% of the resulting benefits accrue to disadvantaged communities.[200] While much attention has been paid to this initiative in relation to issues like clean energy investments, Justice40 also expressly includes FEMA's grant programs and potentially covers the Corps as well.[201]

Achieving this lofty goal will require carefully designed policies. Previous presidential efforts to mainstream environmental justice into federal policy[202] have had mixed success.[203] Luckily, a presidential memorandum mandating a broad review of federal regulations provides a path forward. Issued around the same time as the launch of Justice40, the memorandum instructs the Office of Management and Budget to work with other federal agencies to, among other

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195. Christopher Flavelle, *Climate Change Is Bankrupting America's Small Towns*, N.Y. TIMES, (Sep. 15, 2021), https://perma.cc/WDN9-PM7A.

196. U.S. GOV'T ACCOUNTABILITY OFF., GAO-20-127, CLIMATE RESILIENCE: A STRATEGIC INVESTMENT APPROACH FOR HIGH-PRIORITY PROJECTS COULD HELP TARGET FEDERAL RESOURCES 6, 30, 33, 63, 67 (2019).

197. Exec. Order No. 14,008, 86 Fed. Reg. 7619, 7622-23 (Feb. 1, 2021).

198. *Id.* at 7623.

199. Flavelle, *supra* note 189.

200. Exec. Order No. 14,008, § 223, 86 Fed. Reg. 7619, 7631-32 (Feb. 1, 2021).

201. OFF. OF MGMT. & BUDGET, EXEC. OFF. OF THE PRESIDENT, M-21-28, INTERIM IMPLEMENTATION GUIDANCE FOR THE JUSTICE40 INITIATIVE 12-13 (July 20, 2021).

202. Exec. Order No. 12,898, 3 C.F.R., 1994 Comp., p. 859.

203. Albert Huang, *The 20th Anniversary of President Clinton's Executive Order 12898 on Environmental Justice,* NAT'L RES. DEF. COUNCIL (Feb. 10, 2014), https://perma.cc/V64R-STU3.

things, identify procedures that could "take into account the distributional consequences of regulations, including as part of any quantitative or qualitative analysis of the costs and benefits of regulations, to ensure that regulatory initiatives appropriately benefit and do not inappropriately burden disadvantaged, vulnerable, or marginalized communities."[204] As with the Corps, these agencies could leverage a wealth of existing scholarship on how to achieve this.[205]

With global action on curbing emissions wanting and at least some of the effects of rising temperatures already locked in, the threat of flooding to economic security and human health is unlikely to abate for the foreseeable future. By refining existing policies and leading a coordinated effort, the federal government can prepare the nation to rise with the tide, rather than slip below it.

204. Memorandum of January 20, 2021, Modernizing Regulatory Review, 86 Fed. Reg. 7223 (Jan. 26, 2021).

205. *See supra* Section II.C.4.