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## DO NO HARM: MANAGING RETREAT BY ENDING NEW SUBSIDIES

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### INTRODUCTION

The twin threats of climate change and sea-level rise have prompted an ongoing discussion of the concept of “managed retreat”—that is, whether to explicitly encourage the relocation of coastal communities and others facing unsustainable risks toward relatively safer locations by way of public policy.<sup>1</sup> The 20th century saw mean global sea levels rise by between 11 and 16 centimeters, while most projections for the 21st century anticipate a sea-level rise between 50 centimeters (assuming immediate sharp cuts to global carbon emissions)<sup>2</sup> and more than two meters (assuming breakup of the Antarctic ice sheet).<sup>3</sup> More extreme projections place the increase at levels that would

1. Orrin H. Pilkey, “We Need to Retreat From the Beach,” *The New York Times*, Nov. 14, 2012. <https://www.nytimes.com/2012/11/15/opinion/a-beachfront-retreat.html>.

2. Carling C. Hay et al., “Probabilistic reanalysis of twentieth-century sea-level rise,” *Nature* 517 (Jan. 14, 2015), pp. 481–84. <https://www.nature.com/articles/nature14093>.

3. Robert E. Kopp et al., “Evolving Understanding of Antarctic Ice-Sheet Physics and Ambiguity in Probabilistic Sea-Level Projections,” *Earth’s Future* 5 (Dec. 13, 2017), pp. 1217–33. <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2017EF000663>.

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put 630 million people around the globe at risk of annual flooding by the year 2100.<sup>4</sup>

Despite these projections, Americans continue to build extensively in severely flood-prone regions. A 2019 research brief produced by ClimateCentral in partnership with the real-estate website Zillow found that in eight coastal states there have been more homes constructed since 2010 in areas projected by 2050 to face an annual 10 percent risk of serious coastal flooding (a 10-year floodplain) than in all other zones combined.<sup>5</sup> In Delaware, Mississippi, New Jersey and Rhode Island, these high-risk coastal zones have seen twice as much development over the past decade as relatively safer zones, while new construction in the 10-year coastal floodplain in Connecticut has been three times as fast. Nationwide, ClimateCentral projects that 17,800 homes built since 2010 will face at least 10 percent annual risk of severe coastal flooding by 2050, and 60,500 of them will face such risk by 2100.

Such trends threaten the mission of the National Flood Insurance Program (NFIP), the federal program that has served as Americans’ primary source of flood insurance coverage since its creation in 1968. Historically, the NFIP has been a primary facilitator of building in flood-prone areas. It insures many properties that the private market would not and, in many cases, at rates that do not meet basic actuarial guidelines for sufficiency. Driven in part by the NFIP’s newly available flood coverage, in the 40 years after the program’s creation, from 1970 to 2010, the population of U.S. coastal counties grew by 50.9 million, a 45 percent increase. That

4. See, e.g., Scott A. Kulp and Benjamin H. Strauss, “New elevation data triple estimates of global vulnerability to sea-level rise and coastal flooding,” *Nature Communications* 10 (Oct. 29, 2019). <https://www.nature.com/articles/s41467-019-12808-z>.

5. “Ocean at the Door: New Homes and the Rising Sea,” *ClimateCentral*, July 31, 2019. [https://centralassets.s3.amazonaws.com/pdfs/2019Zillow\\_report.pdf](https://centralassets.s3.amazonaws.com/pdfs/2019Zillow_report.pdf).

period ended with coastal counties representing 52 percent of the nation's total population.<sup>6</sup>

The NFIP has also proven fiscally unsustainable as currently structured. The 1966 Presidential Task Force on Federal Flood Control Policy warned Congress that creating a federal program to provide “insurance in which premiums are not proportionate to risk would be to invite economic waste of great magnitude.”<sup>7</sup> That warning has proved prescient. Over the dozen years from 2002 to 2013, the nonpartisan Government Accountability Office estimates the program collected \$11 billion to \$17 billion less in premiums than was actuarially prudent.<sup>8</sup>

Reforms passed in 2012 were intended to place the program on a path toward long-term fiscal sustainability by phasing out explicit premium subsidies and shifting more risk to the private insurance, reinsurance and capital markets. Nonetheless, catastrophic claims from storms like Hurricanes Katrina, Rita, Wilma, Ike, Sandy, Harvey and Irma have forced the NFIP to borrow nearly \$40 billion from the U.S. Treasury since 2005. Despite having \$16 billion of its debt erased by Congress in 2017, the NFIP remained \$20.5 billion in debt to U.S. taxpayers as of the fourth quarter of Fiscal Year 2019.<sup>9</sup>

It is broadly understood that full repayment of that debt is infeasible, and the program's debts are only projected to grow if the current structure remains in place. In a September 2017 report, the Congressional Budget Office estimated the NFIP's average expected annual costs exceed its expected revenues by \$1.4 billion.<sup>10</sup>

In recent sessions of Congress, lawmakers have entertained a variety of proposed reforms to make the NFIP more fiscally sustainable, including raising the program's rates, forgiving the remainder of its debt and making investments in mitigation and updated mapping. Each of these proposals has, in turn, faced political objections, including concerns about the budgetary impact of mitigation projects and debt cancellation, that higher rates could prove unaffordable and that

updated maps could have adverse impacts on the economies of flood-prone regions.

In light of continued high levels of development in flood-prone areas, even as sea-level rise and other effects of climate change are expected to make future flood risk even worse, this paper proposes two reforms that Congress should consider as it crafts a long-term extension of the National Flood Insurance Program:

1. Rather than the current policy of extending coverage to any property in a participating community, the NFIP should cease writing insurance for new construction in 100-year floodplains.
2. Going forward, the program also should end the practice of “grandfathering”—that is, failing to update flood insurance rates to reflect changes in projected flood risk—for any new structures that join the program.

## DEVELOPMENT IN 100-YEAR FLOODPLAINS

There are currently 22,403 communities that participate in the NFIP, which writes 5.1 million policies with \$1.3 trillion of insurance in force.<sup>11</sup> To qualify for the program, a community must agree to comply with floodplain management rules spelled out in Title 44, Section 60.3 of the Code of Federal Regulations.<sup>12</sup> Those rules specify that communities must require permits for all proposed development, survey potentially flood-prone areas and ensure that any new construction or substantial improvements to existing structures be “reasonably safe from flooding.”

The Federal Emergency Management Agency (FEMA), which administers the NFIP, is responsible for preparing Flood Insurance Rate Maps (FIRMs) for participating communities, using information gathered through local flood hazard studies that define various risk-rating zones.<sup>13</sup> Special Flood Hazard Areas (SFHA) are those defined by FEMA as areas with a 1 percent or greater risk of flooding every year, also known as the 100-year floodplain. These areas are classified either as Zone V (coastal high-hazard areas exposed to potential tidal surge) or Zone A (high-hazard areas that do not face storm-surge risk). Zones B, C and X are areas of moderate or minimal flood risk, while Zone D is an area of unknown flood risk.

Properties in participating communities are eligible for standard NFIP policies that offer up to \$250,000 of building

6. Ross Toro, “Half of US Population Lives in Coastal Areas (Infographic),” *LiveScience*, March 12, 2012. <https://www.livescience.com/18997-population-coastal-areas-infographic.html>.

7. Gary William Boulware, “Public Policy Evaluation of the National Flood Insurance Program (NFIP),” doctoral dissertation, University of Florida, December 2009, p. 14. <https://ufdc.ufl.edu/UFE0041081/00001>.

8. “Forgone Premiums Cannot Be Measured and FEMA Should Validate and Monitor Data System Changes,” Government Accountability Office, GAO-15-111, Dec. 11, 2014. <https://www.gao.gov/products/GAO-15-111>.

9. “The Watermark Fiscal Year 2019, Fourth Quarter, Volume 8,” Federal Emergency Management Agency, Feb. 4, 2020, p. 2. [https://www.fema.gov/media-library-data/1580835852884-cf006eabf4a79ae7e85d3e67302d6b44/FIMA\\_Watermark\\_Fourth\\_Quarter2019.pdf](https://www.fema.gov/media-library-data/1580835852884-cf006eabf4a79ae7e85d3e67302d6b44/FIMA_Watermark_Fourth_Quarter2019.pdf).

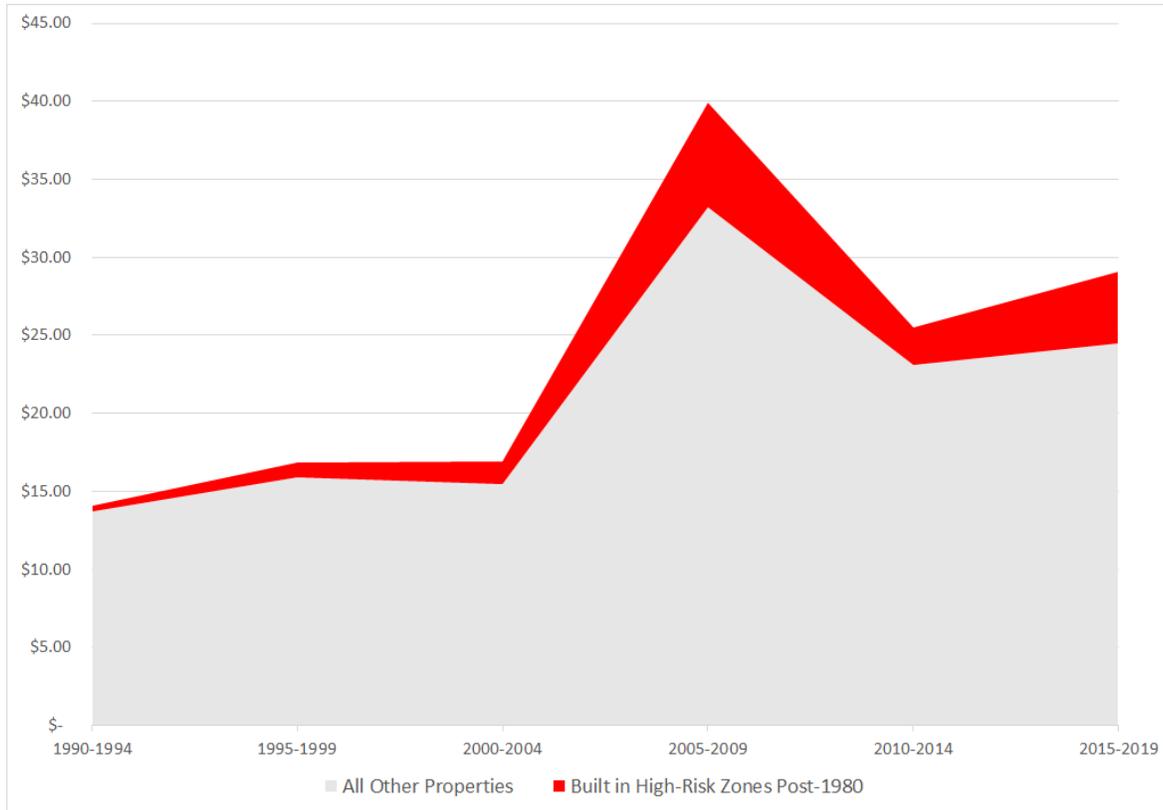
10. “The National Flood Insurance Program: Financial Soundness and Affordability,” Congressional Budget Office, Sept. 1, 2017, p. 1. <https://www.cbo.gov/publication/53028>.

11. “The Watermark Fiscal Year 2019, Fourth Quarter, Volume 8,” p. 1. [https://www.fema.gov/media-library-data/1580835852884-cf006eabf4a79ae7e85d3e67302d6b44/FIMA\\_Watermark\\_Fourth\\_Quarter2019.pdf](https://www.fema.gov/media-library-data/1580835852884-cf006eabf4a79ae7e85d3e67302d6b44/FIMA_Watermark_Fourth_Quarter2019.pdf).

12. 44 CFR § 60.3. <https://www.law.cornell.edu/cfr/text/44/60.3#a>.

13. 44 CFR § 64.3. <https://www.law.cornell.edu/cfr/text/44/64.3>.

FIGURE I: INFLATION-ADJUSTED NFIP CLAIMS, 1990-2019 (\$B)



SOURCE: R Street analysis of Federal Insurance and Mitigation Administration NFIP Redacted Claims Data Set.

NOTES: Data set drew from 1.9 million NFIP claims files between 1990 and 2019. All claims totals adjusted to 2019 dollars using the U.S. Bureau of Labor Statistics' Consumer Price Index calculator. Claims for insured properties built in high-risk zones post-1980 were defined as Zone A and Zone V properties with an original date of construction of Jan. 1, 1980 or later. For the 0.9 percent of claims files in this set in which no date of construction was reported, date of NFIP coverage initiation was used as a proxy.

coverage and \$100,000 of contents coverage for residential properties, and up to \$500,000 each of both building coverage and contents coverage for business properties. The program may not decline to insure or end coverage in participating communities.

Under both statute and regulation, federally related mortgages on properties located within SFHAs are required to be insured for the risk of flooding. While the definition of “federally related” does not cover every mortgage loan, it includes any issued by a bank insured by the Federal Deposit Insurance Corporation (FDIC); any issued by a credit union with deposit share insurance from National Credit Union Share Insurance Fund (NCUSIF); any from lenders regulated by the Farm Credit Administration (FCA); any mortgages acquired, secured or insured by the government-sponsored enterprises Fannie Mae and Freddie Mac; and any insured or guaranteed by the Small Business Administration (SBA), the

Federal Housing Administration (FHA) or the Department of Veterans Affairs (VA).<sup>14</sup>

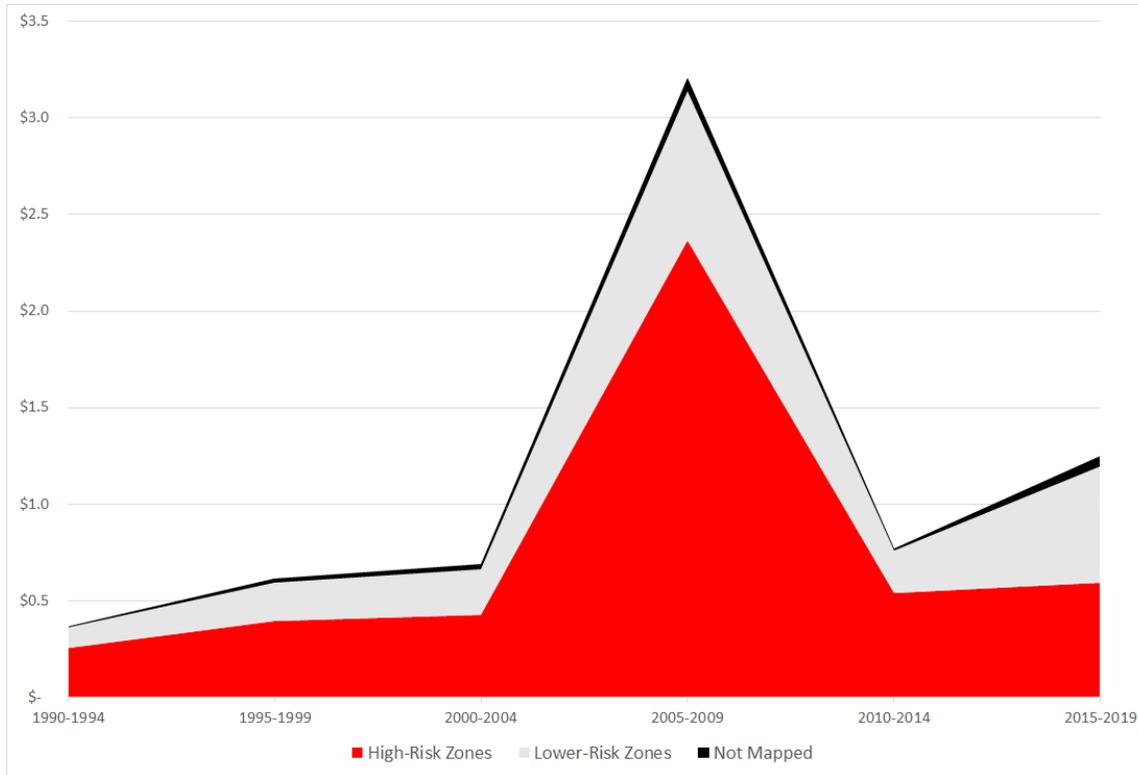
Despite extensive rules intended to discourage development in flood-prone areas, evidence demonstrates that building in such areas continues unabated. A 2018 report by *Governing* magazine analyzed FEMA records obtained under the Freedom of Information Act and found that 15 million Americans were living in 100-year floodplains as of 2016, a 14 percent increase from population estimates of those same U.S. Census tracts in 2000.<sup>15</sup> In contrast, population growth in all other zones over that same period was just 13 percent.

Evidence from private property insurance markets amplify similar trends. A report from catastrophe modeling firm AIR

14. “FDIC Consumer Compliance Examination Manual – September 2019,” Federal Deposit Insurance Corporation, September 2019, V-6.1. <https://www.fdic.gov/regulations/compliance/manual/5/v-6.1.pdf>.

15. Mike Maciag, “Analysis: Areas of the U.S. With Most Floodplain Population Growth,” *Governing*, August 2018. <https://www.governing.com/gov-data/census/flood-plains-zone-local-population-growth-data.html>.

**FIGURE 2: NFIP CLAIMS BY NEW CONSTRUCTION, 1990-2019 (\$B)**



SOURCE: R Street analysis of Federal Insurance and Mitigation Administration NFIP Redacted Claims Data Set.

NOTES: Data set drew from 1.9 million NFIP claims filed between 1990 and 2019. All claims totals adjusted to 2019 dollars using the U.S. Bureau of Labor Statistics' Consumer Price Index calculator. High-risk zones are defined as claims by Zone A and Zone V properties, while lower-risk zones were defined as properties in B, C, D and X zones. New construction was defined as properties with an original date of construction 10 years or less before reported date of loss. For the 0.9 percent of claims files in this set in which no date of construction was reported, date of NFIP coverage initiation was used as a proxy.

Worldwide found that the total insured value of property in the coastal counties of 18 coastal states stood at \$13.541 trillion in 2018, a 27.2 percent increase from 2012.<sup>16</sup> Over those six years, coastal county exposure was up 24.4 percent to \$888 billion in New Jersey, up 27.3 percent to \$1.082 trillion in Massachusetts, up 34.9 percent to \$1.585 trillion in Texas, up 25.6 percent to \$3.595 trillion in Florida and up 28.3 percent to \$3.751 trillion in New York.

It's important to note that when it comes to flood risk, these trends are cumulative. Figure 1 illustrates our analysis of a trove of NFIP claims data published by FEMA in June 2019.<sup>17</sup> Adjusting for inflation, we find the NFIP paid out \$125.98 billion in claims between 1990 and 2019, expressed in constant 2019 dollars. Had the program ceased writing coverage for any new construction in A or V zones built in 1980 or later, its claims totals over the past 30 years would have been 13.1

percent lower, with savings growing from 4.4 percent in the 1990s to 14.4 percent in the 2000s and 12.7 percent in the 2010s.

### FAILURES TO MAP FLOOD RISK

The demonstrated growth of development in areas designated as flood-prone nonetheless understates the problem significantly. In many cases, the FIRMs used by FEMA are badly out-of-date and fail to acknowledge the ways changing climactic and development patterns (such as the capacities of local drainage systems or the amount of impermeable ground cover) have shifted the risk of flooding. Existing rules also mean that where updated maps reveal heightened flood risks in certain regions, those risks are not reflected in the rates charged to NFIP policyholders in the remapped zones. Moreover, updated maps only reflect past flood experience. They do not reflect the degree to which climate change and sea-level rise are expected to heighten the risk of flooding and expand the areas that will be subject to flooding in the future.

16. Gloria Gonzalez, "Insured value of coastal exposures on the rise: AIR," *Business Insurance*, July 31, 2019. <https://www.businessinsurance.com/article/20190731/NEWS06/912329921/Insured-value-of-coastal-exposures-on-the-rise-AIR>.

17. "FIMA NFIP Redacted Claims Data Set," Federal Emergency Management Agency, data set accessed between Feb. 1 and Feb. 10, 2020. <https://www.fema.gov/media-library/assets/documents/180374>.

FEMA is required by statute to revise and update all its maps at least once every five years, but it falls woefully short of that goal. Though the agency set a goal in 2009 of assessing at least 80 percent of mapped areas as new, valid or updated by the end of 2014, when that deadline came, it had done so for only 49 percent of program miles.<sup>18</sup> By the end of 2016, the total had fallen to 42 percent. These failures were cited in a 2017 report from the U.S. Department of Homeland Security Office of the Inspector-General, which concluded that “FEMA is unable to assess flood hazard miles to meet its program goal and is not ensuring mapping partner quality reviews are completed in accordance with applicable guidance.”

And some of FEMA’s most obsolete maps are found in some of the nation’s most flood-prone communities. A 2017 survey by the Congressional Budget Office looked at the 166 counties nationwide that are projected to produce annual flood claims in excess of \$2 million, and found that half of them—representing a combined 55 percent of the program’s risk—used maps that were more than five years old.<sup>19</sup> The CBO also identified 42 high-risk counties with maps that were more than 10 years old, representing 26 percent of the program’s risk; and 17 high-risk counties with maps that were more than 15 years old, accounting for 14 percent of the program’s risk.

In addition to frequently out-of-date maps, some researchers have raised methodological concerns about how FEMA assesses flood risk. A 2018 study published in the journal *Environmental Research Letters* reported the results of advanced modeling that found nearly 41 million Americans currently live within 100-year riverine floodplains—more than three times FEMA’s calculation of just 13 million.<sup>20</sup>

Inaccurate maps may contribute to another trend our analysis of the FEMA claims data set finds. A growing portion of claims made by new construction actually fall within the lower-risk B, C, D and X zones. Figure 2 illustrates, adjusted for inflation, NFIP claims made from 1990 to 2019 by properties with reported original dates of construction less than 10 years before their reported dates of loss. While structures mapped into lower-risk zones fell from 30.9 percent of claims by new construction in the 1990s to 26.0 percent in the 2000s—likely due to the outsized impact of 2005’s Hur-

ricane Katrina—they subsequently grew to 40.4 percent of such claims in the 2010s.

Even where maps are updated and reasonably accurate, many NFIP policyholders do not pay premiums reflective of their actual risk. About one in five NFIP policies are what the program deems “subsidized”; these are policies for structures located in Zone A or Zone V that were built before the community joined the NFIP. To encourage participation from flood-prone communities, such policies historically have been assessed rates that were only 45 percent of their true actuarial liability.<sup>21</sup>

The NFIP has also allowed properties built after a community joined the program to retain whatever insurance rates were associated with the designated zone at the time the structure was built. While a property can appeal to pay lower rates if a mapping update shows it to be in a less-risky zone, it generally is not required to pay higher rates when an update shows it lies in a riskier zone. This practice is called “grandfathering.”

FEMA has not, to date, offered any public estimate of how many of the NFIP’s 5.1 million policies are grandfathered. A 2017 report from the CBO found that, among Zone V properties exposed to tidal surge, 69 percent were grandfathered.<sup>22</sup> Separately, 29 percent of Zone V properties were subsidized, including 13 percent that were both grandfathered and subsidized.

In 2012, Congress passed the Biggert-Waters Flood Insurance Reform Act, which proposed to set both subsidized and grandfathered properties on a path to move gradually toward risk-based rates. For subsidized properties that are second homes, business properties or properties that have suffered several repetitive losses (defined by FEMA as having experienced four or more claims of more than \$5,000 or at least two claims that cumulatively exceed the building’s value), the law required rates to increase 25 percent every year until actuarial rates are achieved.<sup>23</sup>

The law originally would have increased rates 20 percent annually for all other subsidized properties and all grandfathered properties until they reached actuarial soundness. However, backlash to Biggert-Waters over real or perceived impacts of the law on flood-prone communities prompted Congress to pass the Homeowner Flood Insurance Afford-

18. “FEMA Needs to Improve Management of Its Flood Mapping Programs,” U.S. Department of Homeland Security Office of the Inspector-General, Sept. 27, 2017, p. 3. <https://www.oig.dhs.gov/sites/default/files/assets/2017/OIG-17-110-Sept17.pdf>.

19. “Age of Flood Maps in Selected Counties That Account for Most of the Expected Claims in the National Flood Insurance Program: Supplemental Material for The National Flood Insurance Program: Financial Soundness and Affordability,” Congressional Budget Office, November 2017, p. 3. <https://www.cbo.gov/system/files?file=115th-congress-2017-2018/reports/53028-supplementalmaterial.pdf>.

20. See, e.g., Oliver E. J. Wing et al., “Estimates of present and future flood risk in the conterminous United States,” *Environmental Research Letters* 13:3 (Feb. 28, 2018). <https://iopscience.iop.org/article/10.1088/1748-9326/aaac65>.

21. Bill Jones, “Biggert-Waters Flood Insurance Reform Act of 2012 Summary,” Nebraska Dept. of Natural Resources, February 2013. [https://agriculture.ks.gov/docs/default-source/dwr-floodplains/summary-of-the-biggert-waters-act.pdf?sfvrsn=ce3ffe1\\_0](https://agriculture.ks.gov/docs/default-source/dwr-floodplains/summary-of-the-biggert-waters-act.pdf?sfvrsn=ce3ffe1_0).

22. “The National Flood Insurance Program: Financial Soundness and Affordability,” p. 16. <https://www.cbo.gov/publication/53028>.

23. P.L. 112-141, *112th Congress* (July 6, 2012). <https://www.congress.gov/bill/112th-congress/house-bill/4348/text?overview=closed&r=1>.

**TABLE I: HOUSING BUILT SINCE 2010 AT RISK OF ANNUAL COASTAL FLOODING**

COUNTY	STATE	ANNUAL FLOODING BY 2050		ANNUAL FLOODING BY 2100	
		New Housing Units	Value (\$M)	New Housing Units	Value (\$M)
Atlantic	NJ	363	236.8	827	796.8
Beaufort	SC	120	120.7	752	659.5
Broward	FL	17	36.1	750	971.3
Cape May	NJ	893	1,295.5	2,003	3,411.7
Charleston	SC	523	638.2	2,601	2,231.9
Collier	FL	24	22.1	2,268	2,459.5
Fairfield	CT	208	481.4	385	903.0
Galveston	TX	437	176.5	2,143	805.6
Lee	FL	41	77.0	1,513	1,300.3
Manatee	FL	120	164.0	1,018	787.4
Miami-Dade	FL	23	189.0	1,059	2,827.3
Monmouth	NJ	190	184.7	532	479.6
Ocean	NJ	1,467	1,135.0	2,790	2,175.4
Palm Beach	FL	18	93.3	362	1,599.9
Pinellas	FL	85	68.3	586	577.0
San Mateo	CA	87	112.3	372	566.3
St. Johns	FL	124	120.9	762	526.6
Suffolk	NY	62	210.0	226	1,171.6
Sussex	DE	804	561.2	2,378	1,518.5
Virginia Beach	VA	84	62.9	947	575.2

SOURCE: Zillow and ClimateCentral data.

ability Act of 2014, which repealed those scheduled increases. Instead, the bill capped premium increases for grandfathered properties at 15 percent annually.<sup>24</sup>

Should future flood risk increase at the pace anticipated by many climate models, the chasm between the rates charged by the NFIP and the claims volumes those premiums must support is likely to grow wider. According to a 2019 Princeton University study published in *Nature Communications*, the combined effect of sea-level rise and coastal flooding from tropical storms means that, by the end of the 21st century, what historically had been considered 100-year flooding events are expected to occur every 1 to 30 years in the Southeast and Gulf Coast regions and every single year in New England and the mid-Atlantic.<sup>25</sup>

24. P.L. 113-89, 113th Congress (March 21, 2014). <https://www.congress.gov/bill/113th-congress/house-bill/3370/text?overview=closed>.

25. See, e.g., Reza Marsooli et al., "Climate change exacerbates hurricane flood hazards along US Atlantic and Gulf Coasts in spatially varying patterns," *Nature Communications* 10:3785 (Aug. 22, 2019). <https://www.nature.com/articles/s41467-019-11755-z>.

The ClimateCentral/Zillow study referenced earlier also looked at development patterns in areas projected to experience annual coastal flooding. According to the report's data, \$137.13 billion of existing development is expected to face annual coastal flooding by 2050, including \$9.34 billion of development built since 2010. By 2100, total development exposed to annual coastal flooding would rise to \$695.69 billion, with \$45.12 billion of that total built since 2010.<sup>26</sup> Table 1 highlights the projected risks to new construction in 20 high-risk counties.

## MANAGING MANAGED RETREAT

The original focus of the NFIP was to encourage mitigation and offer financial protection for properties facing flood risk, particularly high-risk properties with a greater than 1 percent annual risk of flooding. The 10 percent and 100 percent risks of annual flooding under consideration in the ClimateCentral/Zillow report obviously are orders of magnitude greater than what we currently consider "high risk." But sea-level rise suggests an even more alarming prospect than intermittent annual flooding: complete and permanent inundation.

The problem of inundation is neither new nor uniquely associated with climate change. Since the 1930s, coastal Louisiana famously has lost 2,000 square miles of land, including a quarter of its wetlands, according to the U.S. Geological Survey.<sup>27</sup> Still, the long-term threats of land loss are sobering. A 2016 study in the journal *Nature Climate Change* estimated that, when projected population growth in coastal areas is taken into account, sea-level rise of 0.9 meters (roughly three feet) would threaten to displace 4.2 million Americans as a result of inundation, while a rise of 1.8 meters (six feet) would affect 13.1 million people, more than twice the number who currently live in the areas projected to be inundated.<sup>28</sup> Such effects, the authors note, "could lead to U.S. population movements of a magnitude similar to the 20th century Great Migration of southern African-Americans."

To the extent that "managed retreat" strategies look to guide public policy in anticipation of such drastic scenarios, existing programs are woefully inadequate. To date, the most significant programs have involved buying out flood-prone properties, which are then either demolished or physically relocated, with the vacated land dedicated in perpetuity to open space use. The overwhelming majority of such buy-

26. "More Than 386,000 Homes at Risk of Coastal Flooding by 2050," Zillow, Nov. 13, 2018. <https://www.zillow.com/research/ocean-at-the-door-21931>.

27. "USGS: Louisiana's Rate of Coastal Wetland Loss Continues to Slow," U.S. Geological Survey, July 12, 2017. <https://www.usgs.gov/news/usgs-louisiana-s-rate-coastal-wetland-loss-continues-slow>.

28. Mathew E. Hauer et al., "Millions projected to be at risk from sea-level rise in the continental United States," *Nature Climate Change* 6 (March 14, 2016), pp. 691-95. <https://www.nature.com/articles/nclimate2961>.

outs have been funded by one of two FEMA programs: the Hazard Mitigation Grant Program (HMGP), which uses 15 percent of funds targeted for federal assistance following presidential disaster declarations to help communities implement long-term risk mitigation projects; and the Flood Mitigation Assistance (FMA) Program, which is appropriated funds by Congress to reduce or eliminate flood risk to buildings insured by the NFIP.<sup>29</sup>

Between 1989 and 2019, FEMA purchased and demolished more than 43,000 flood-prone properties,<sup>30</sup> a pace that would permit it to execute about 115,000 more buyouts by the end of the 21st century. In a review of 30 years of buyout data, researchers from the Natural Resources Defense Council found that it took, on average, five years after a flood until a FEMA-funded buyout project was completed.<sup>31</sup> With millions of potential climate refugees in need of relocation by the end of the century, existing programs are not nearly big enough and do not act fast enough to handle a load that size.

Some also have raised concerns that existing buyout programs may not equitably serve disadvantaged populations. In particular, an October 2019 study in *Science Advances* caused a stir with findings that many outlets reported as demonstrating that buyouts disproportionately benefit the wealthy, with such media headlines as “Wealthy counties benefited most from a flood relief program”<sup>32</sup> and “Equity concerns raised in federal flood property buyouts.”<sup>33</sup> In truth, the researchers’ findings were significantly more nuanced. They did find those counties that administered buyout projects were larger and more densely populated, and had higher income and education, than those that did not, but the authors anticipated that finding. They explicitly designed their test under the assumption that local governments with greater capacities would be more likely to execute buyouts, using population and income as proxies for local government capacity. However, they also found that residents of the ZIP Code Tabulation Areas (ZCTAs) that received buyouts had lower income, lower education levels, lower English language proficiency

and greater racial diversity than other residents of the same counties.<sup>34</sup>

Of course, even if existing buyout programs were both sufficiently funded and functional, the question would remain: Where will these bought-out climate refugees go? It’s a question Caleb Robinson, Bistra Dilkina and Juan Moreno-Cruz examined recently in the pages of *PLoS ONE*.<sup>35</sup> Their spatial migration algorithm found that climate migrants’ primary destinations are likely to be counties just inland of where they started, explaining the population boosts expected in locations like Tallahassee, Florida and Jackson, Mississippi. But the model also finds some migrants will move toward larger inland cities that offer economic opportunity, such as Dallas, Texas; Atlanta, Georgia; and Raleigh and Durham, North Carolina. Cities that become destinations for climate migrants should expect to face new challenges of their own, such as increased demand for housing and increased costs for local infrastructure.

## FIRST, DO NO HARM

The challenges associated with managed retreat strategies, already manifest, also must be considered within the context of what have proven to be intractable political divisions over issues like NFIP reform. Before passage of the Biggert-Waters Act, the NFIP was extended 17 times between 2008 and 2012 and lapsed four times. Since its most recent statutory expiration in September 2017, it has been extended 15 times and currently is scheduled to expire again in September 2020.<sup>36</sup>

The reason for these long strings of short-term extensions is that Congress repeatedly has found itself unable or unwilling to come to resolution on a number of thorny issues surrounding the future of the program, including rate increases, what to do about repetitive-loss properties, how much to invest in mapping and mitigation and how to settle the program’s outstanding debt.

Even issues ostensibly settled by the Homeowner Flood Insurance Affordability Act of 2014, like the long-term goal of phasing out premium subsidies, remain hotly debated. Expressing support for a proposal to roll back all rate increases to a cap of just 9 percent annually, U.S. Rep. Debbie Mucarsel-Powell (D-Fla.) underscored the lingering

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29. “Hazard Mitigation Assistance,” Federal Emergency Management Agency, Sept. 18, 2019. <https://www.fema.gov/hazard-mitigation-assistance>.

30. Christopher Flavelle, “Rich Counties Get More Help to Escape Climate Risk, New Data Show,” *New York Times*, Oct. 9, 2019. <https://www.nytimes.com/2019/10/09/climate/disaster-flood-buyouts-climate-change.html>.

31. Anna Weber and Rob Moore, “Going Under: Long Wait Times for Post-Flood Buyouts Leave Homeowners Underwater,” Natural Resources Defense Council, Sept. 12, 2019. <https://www.nrdc.org/resources/going-under-long-wait-times-post-flood-buyouts-leave-homeowners-underwater>.

32. Eric Miller, “Wealthy counties benefited most from a flood relief program,” *Wired*, Oct. 9, 2019. <https://www.wired.com/story/wealthy-counties-benefited-most-from-a-flood-relief-program>.

33. Kimberly 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>.

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34. See, e.g., Katharine J. Mach et al., “Managed retreat through voluntary buyouts of flood-prone properties,” *Science Advances* 5:10 (Oct. 9, 2019). <https://advances.sciencemag.org/content/5/10/eaax8995>.

35. See, e.g., Caleb Robinson et al., “Modeling migration patterns in the USA under sea level rise,” *PLoS ONE* 15:1 (Jan. 22, 2020). <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0227436>.

36. Richard J. Andreano, Jr., “Congress Agrees to Extend NFIP Through September 2020,” Ballard Spahn LLP, Dec. 20, 2019. <https://www.consumerfinancemonitor.com/2019/12/20/congress-agrees-to-extend-nfip-through-september-2020>.

divide between those who advocate managed retreat and what remains a common sentiment: “If they won’t be able to afford an insurance program because the caps are raised up to 18 percent then people are going to start leaving their homes, and that is the last thing we want.”<sup>37</sup>

Given the firm stance representatives of flood-prone regions have taken in defense of their constituents’ reliance interests, many of the most contentious parts of the NFIP debate are likely to remain at an impasse. But there are other approaches reformers could take that do not threaten those interests. By pursuing policies that discourage future development in flood-prone regions or ensure no new subsidies will be extended, lawmakers could avoid creating those reliance interests in the first place. To paraphrase the ancient Greek physician Hippocrates: “First, do no harm.”

The reforms we recommend in this paper are modeled on the success of the Coastal Barrier Resources System (CBRS). Created in 1982, the system comprises 3.5 million acres of beaches, wetlands, barrier islands and estuaries along the Atlantic Ocean, the Gulf of Mexico and the Great Lakes that are deemed completely ineligible for federal subsidies for development. The law does not prohibit development within the zone, but it does require that any development that occurs must be financed entirely with private funds. As a result, more than 80 percent of potentially developable system units remain undeveloped.<sup>38</sup>

In addition to its environmental benefits for fragile coastal ecosystems, the CBRS has had salutary fiscal effects. A 2019 study published in the *Journal of Coastal Research* found that by discouraging development that otherwise would have drawn on federal disaster assistance, housing, transportation and other subsidies, the CBRS was responsible for \$9.5 billion of avoided federal spending between 1989 and 2013.<sup>39</sup> The researchers also project that it will save as much as \$108 billion in federal expenditures over the next 50 years.

Similar approaches have been implemented elsewhere, particularly in connection with government-sponsored insurance programs like the NFIP. As part of the 2014 Farm Bill, Congress added subsidized crop insurance premiums to the list of U.S. Department of Agriculture benefits farmers could

lose if they fail to comply with regulations to conserve wetlands and highly erodible prairie land.<sup>40</sup> In Florida, the state-sponsored Citizens Property Insurance Corp. has, since 2015, been prohibited from writing coverage for new construction located seaward of the state’s Coastal Construction Control Line.<sup>41</sup> That Florida law, which was based on a 2013 R Street proposal,<sup>42</sup> serves as the basis of our first recommendation:

- Rather than the current policy of extending coverage to any property in a participating community, the NFIP should ceasing writing insurance for new construction in 100-year floodplains.

As a first step toward managed retreat, Congress must reverse any federal policy that actively encourages Americans to move into harm’s way. Unlike private insurers, which employ underwriting criteria to screen out unacceptable risks, the NFIP offers coverage on a take-all-comers basis to existing structures in participating communities, as well as any new structures that pass conforming permitting processes. Amending that policy to deny coverage to new and substantially improved structures—defined as those that have undergone repairs, reconstruction, rehabilitation or improvement that costs 50 percent or more of the structure’s market value—would remove financial incentives to development and place the program on a more sustainable fiscal path. As noted earlier, had such a rule been adopted for new construction starting in 1980, the NFIP’s claims total from 1990 through 2019 would have been 13.1 percent lower.

The application of FEMA floodplain-management requirements has, no doubt, helped many participating NFIP communities mitigate flood risk. But as demonstrated in this paper, there continues to be more development in high-risk Zone A and Zone V regions that outside those regions, with entire states seeing more development (in some cases, multiple times more) in what are projected to be 10-year floodplains than outside those extreme floodplains.

Existing FEMA regulations already require participating NFIP communities to establish permitting rules for new and substantially improved structures. It would therefore add no new administrative complexity to apply a screening rule denying NFIP coverage to new and substantially improved structures in Zone A and Zone V floodplains. If anything, complexity would be reduced.

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37. James Jarvis, “Congress extends flood insurance program for 14th time since 2017,” *The Hill*, Nov. 21, 2019. <https://thehill.com/blogs/blog-briefing-room/471522-congress-extends-flood-insurance-program-for-14th-time-since-2017>.

38. “John H. Chafee Coastal Barrier Resources System; Hurricane Sandy Remapping Project for Delaware, Massachusetts, New Hampshire, and New Jersey,” U.S. Fish and Wildlife Service, March 18, 2018. <https://www.federalregister.gov/documents/2018/03/12/2018-04889/john-h-chafee-coastal-barrier-resources-system-hurricane-sandy-remapping-project-for-delaware>.

39. Andrew S. Coburn and John C. Whitehead, “An Analysis of Federal Expenditures Related to the Coastal Barrier Resources Act (CBRA) of 1982,” *Journal of Coastal Research* 35:6 (March 15, 2019), pp. 1358-61. <https://www.icronline.org/doi/abs/10.2112/JCOASTRES-D-18-00114.1>.

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40. Megan Stubbs, *Conservation Provisions in the 2014 Farm Bill* (P.L. 113-79), Congressional Research Service, April 24, 2014. <http://www.nationalaglawcenter.org/wp-content/uploads/assets/crs/R43504.pdf>.

41. Jane Smith and Michelle Quigley, “Along the Coast...A line in the sand,” *The Coastal Star*, Aug. 30, 2017. <https://thecoastalstar.com/profiles/blogs/along-the-coast-a-line-in-the-sand>.

42. Christian Cámara, “Coastal Preservation Through Citizens Reform,” *R Street Policy Study* No. 8, January 2013. <https://www.rstreet.org/wp-content/uploads/2013/01/RSTREET81.pdf>.

As with the example of the CBRS, denying NFIP coverage to new 100-year floodplain development would not mean barring all such development outright. In some cases, property owners may turn to the emerging private market for flood insurance. The Biggert-Waters Act clarified that private flood insurance can be used to satisfy federal lending regulators' mandatory purchase requirements. Moreover, in the years since Biggert-Waters' passage, federal regulators and several states have promulgated rules to encourage private flood insurance. According to data from S&P Global Market Intelligence, private flood insurance premiums nationwide grew 70.1 percent from \$412.6 million in 2016 to \$701.8 million in 2018.<sup>43</sup> But unlike the NFIP, profit-driven private insurers would be certain to apply risk-based underwriting and rating criteria to any structures they insure for flood.

Ending NFIP coverage to new Zone A and Zone V construction would be expected to slow development in regions currently acknowledged to be high-risk, but it would not address another trend noted in this paper: the growing number of claims made by new construction in what are ostensibly lower-risk zones. As FEMA works to improve the NFIP's maps, and as the underlying risks that define those maps change, existing policies like grandfathering will lead to the creation of new subsidized reliance interests who will add to the constituency of voices lobbying against removal of those subsidies in the future. That prompts our second recommendation:

- Going forward, the program also should end the practice of grandfathering for any new structures that join the National Flood Insurance Program.

Phasing out existing premium subsidies has proven deeply contentious, prompting some members of Congress to seek legislative provisions to guarantee that premiums are affordable for lower-income policyholders. But few would affirmatively make the case for creating new subsidies for flood-prone structures that do not currently exist. Yet that is what current grandfathering policy calls for. While reforms passed in 2012 and 2014 endeavor to place all NFIP policies on the gradual path to actuarial adequacy, the current caps on rate increases cannot keep up with the rates of sea-level rise and new floodplain development.

We propose that Congress pass legislation setting some future date, so as not to unfairly burden projects already under development, after which grandfathering of NFIP rates will no longer be extended to any new or substantially improved property. In the future, when a structure's risk designation changes, it would be required immediately to begin paying rates commensurate with the new designation.

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43. "P&C Market Share Application," *S&P Global Market Intelligence*, 2019.

## CONCLUSION

This paper's two recommendations are intended to supplement, not replace, the kinds of comprehensive reform proposals that Congress has entertained in recent years. In fact, for these recommendations to be effective, some other changes are essential.

For example, neither of the proposals will have much force unless Congress appropriates the funds that would allow FEMA to meet its target goals for mapping updates. It would be particularly helpful for mapping standards to shift toward the use of more accurate and comprehensive property-level Light Detection and Ranging (LIDAR) surveys. Proposed investments in mitigation, including drastic expansion of FEMA's buyout programs, will also be essential.

Withdrawing from insuring new construction will not have the desired outcome of reducing flood risk on the federal government's balance sheet unless lending regulators aggressively police requirements that federally related mortgages are insured, either by the NFIP or by private insurers. This is of particular concern given that the NFIP's current policy count of 5.1 million is down from a peak of 5.7 million policies in 2009.<sup>44</sup>

Without insurance protection, the likelihood of default on mortgages rises, with at least some of that risk absorbed by federal agencies like the FHA and the GSEs. For example, data analytics firm CoreLogic found that serious delinquency rates on home mortgages tripled in the Houston, Texas and Cape Coral, Florida metro areas following the landfalls of Hurricanes Harvey and Irma, respectively.<sup>45</sup>

In a recent National Bureau of Economic Research working paper, researchers Amine Ouazad and Matthew Kahn theorize that Fannie Mae and Freddie Mac may increasingly play the role of insurer-of-last-resort for mortgages that are uninsured or underinsured for flood risk. They find evidence that banks and other mortgage originators' sales of mortgages just below conforming-loan limits spike in the wake of \$1 billion natural disasters, and that such sales are most common in areas without a long history of hurricanes.<sup>46</sup> Ouazad and Kahn estimate mortgages sold to the GSEs in the year following a major hurricane have a 3.6 percentage point higher rate of foreclosure, growing to 4.9 percentage points

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44. Christopher Flavelle, "Even as Floods Worsen with Climate Change, Fewer People Insure Against Disaster," *New York Times*, June 8, 2019. <https://www.nytimes.com/2019/06/08/climate/climate-flood-insurance.html>.

45. CoreLogic, "CoreLogic Natural Hazard Report Reveals Serious Delinquency Rates Tripled in Recent Disaster-affected Regions," Press Release, Jan. 29, 2020. <https://finance.yahoo.com/news/corelogic-natural-hazard-report-reveals-130000372.html>.

46. See, e.g., Amine Ouazad and Matthew E. Kahn, "Mortgage Finance in the Face of Rising Climate Risk," *NBER Working Paper No. 26322*, Sept. 30, 2019. [http://www.ouazad.com/resources/paper\\_kahn\\_ouazad.pdf](http://www.ouazad.com/resources/paper_kahn_ouazad.pdf).

in the third year following the storm.<sup>47</sup> All of these factors indicate the need for regulators to be much more stringent in policing the mandatory purchase requirement.

We do nonetheless believe these two recommendations offer an important step in what will be an evolving discussion of how to respond to climate change and sea-level rise. Where we can discourage flood-prone land from being developed without laying any new burden on current residents, we simply must take that opportunity.

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47. Ibid., p. 20.