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Journal of Policy History, Volume 26, Number 3, 2014, pp. 327-353 (Article)

Published by Cambridge University Press
DOI: 10.1353/jph.2014.0017

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Troubled Waters: The National Flood Insurance Program in Historical Perspective

The National Flood Insurance Program (NFIP)—an effort to provide government-backed insurance protection to Americans living in flood-prone areas—was championed by Lyndon B. Johnson and established by Congress through the passage of the National Flood Insurance Act of 1968.[1] Private flood insurers had retreated from the market following the great 1927 Mississippi River flood; serious attempts to create a flood insurance program only began again in the 1950s, with actions by both the Truman and Eisenhower administrations that eventually stalled.[2] The impetus to pass the NFIP finally came in reaction to the escalating costs of ad hoc post-disaster relief legislation, triggered initially by the Alaska earthquake of 1964, and followed by severe flooding and damage from Hurricane Betsy in 1965, America's first billion-dollar hurricane.[3]

The NFIP was implemented in the midst of a remarkable population shift to hurricane-vulnerable states and coastal counties. For example, since 1950 Florida's astounding 579 percent growth rate was the highest in the nation, raising it from twentieth to fourth in population. Texas grew at a rate of 226 percent, moving its population rank to second in the nation. Other hurricane-hazard states like Delaware, Georgia, Maryland, New Hampshire, and Virginia were among the fastest-growing states in the nation.[4] As of 2010, 39 percent of Americans lived in coastal shoreline counties, a remarkable increase of almost 40 percent since 1970—with population densities six times greater in shoreline counties than inland counties.[5]

THE JOURNAL OF POLICY HISTORY, Vol. 26, No. 3, 2014.

doi:10.1017/S0898030614000153

While the concentration of population in coastal regions has created wealth, it has also placed vastly more people and more property in previously undeveloped floodplains and hurricane zones and into harm's way. This trend in development is a clue toward understanding why the United States has moved into a "new normal" of frequent, billion-dollar hurricanes. Eight of the ten costliest hurricanes in United States history have hit since 2004, at a cost of over $200 billion. An additional $100 billion has been lost to riverine and flash flooding since 2003.[6] Insured flood losses in the United States in 2012 reached $58 billion.[7] Climate change and sea-level rise today portend longer and more destructive hurricane seasons in the years to come, an ominous forecast given that the number of shoreline residents in the United States is expected to rise another 8 percent by 2020.[8]

The NFIP has grown rapidly in the past forty years; as of December 2012 it had sold more than 5.5 million policies in twenty thousand communities and provided more than $1.28 trillion in coverage. Insurance tends to be concentrated in coastal states, with Florida and Texas alone comprising nearly 40 percent of the entire program (in number of policies, premiums, and coverage). Looking ahead, a 2013 study for the Federal Emergency Management Agency (FEMA) predicts 80 percent growth in NFIP policies written by the year 2100; the study speculates that "30% of the estimated increase in policies is due to population growth and approximately 70% is due to climate change."[9]

NFIP found itself $18 billion in debt in the aftermath of Hurricane Katrina. To meet its obligations, the NFIP's borrowing authority had to be increased from $1.5 to $20.775 billion, where it stood pre–Hurricane Sandy in 2012. After Hurricane Sandy, Congress increased NFIP's borrowing authority again, to over $30 billion. To date, the program has borrowed nearly $27 billion from the U.S. Treasury to meet its claims obligations in the aftermath of the 2004, 2005, 2008, and 2012 hurricane seasons.[10]

Since 2002, FEMA (the agency overseeing the NFIP) has taken on new and complex roles within the enormous infrastructure of the Department of Homeland Security. FEMA faced further reforms after Hurricane Katrina, while the NFIP suffered the political uncertainty of stopgap reauthorizations. Saddled with "repetitive loss properties," struggling to modernize its floodplain maps, and still unable to enforce comprehensive building code and floodplain management reforms that were central to the original bill, the program has seen flood losses increase significantly in recent years.

In July 2012, Congress passed the Biggert-Waters Flood Insurance Reform Act (BW12) reauthorizing and overhauling the NFIP.[11] The NFIP has seen

multiple reauthorizations over the years, but BW12 outlined a thorough reform of the program, addressing policy inadequacies that have plagued it since its inception. The necessity for the BW12 reforms were prompted, at the broadest level, by a long-term structural failure in applying the findings of disaster science, such as accurate floodplain maps and risk calculations, to the process of enacting and maintaining the public policy of flood protection. BW12 marked a decisive step by Congress toward applying the tools of risk management to the real and increasingly frequent threat of flooding. Among its many provisions, the legislation required that the NFIP produce updated floodplain maps, beef up local building-code enforcement, remove insurance subsidies for certain properties, and move toward charging premiums that realistically reflect calculated flood risk.[12]

The goal of moving away from government-subsidized insurance to insurance premiums that reflect risk has proven extremely difficult to attain. And this trend continues today. Soon after becoming law, BW12 faced significant challenges from some homeowners who had reason to complain that the new FEMA maps overestimated their risk. These residents and other homeowners in flood-prone areas felt that their proposed premium increases were unjustified and that they could not afford the increased premiums that they would face. In March 2014, Congress passed the Menendez-Grimm Homeowner Insurance Affordability Act (henceforth MG14), rolling back the strongest provisions of BW12.

The 2012 Biggert-Waters Act, and the innovative risk-reduction tools it proposed were adopted amid the costliest era of flood disasters in American history. And yet, only two years later, the BW12 reforms were abruptly repealed by Congress. Today, the future of the NFIP is more uncertain than ever before. This article charts the history of disaster preparedness in America leading to the NFIP. The article then provides a close look at the political and technical obstacles the program has faced over time in attempting to fulfill its mandate to bring Americans under insurance protection while reducing flood risk through sensible land use and flood mitigation techniques. This history provides the context for understanding the contradictory impulses of American disaster politics we observe in action today.

TRADITIONS OF AMERICAN DISASTER POLICY AND DISASTER RESEARCH

Recent scholarship by historian Michele Landis Dauber traces the history of public disaster relief in the United States back almost to the founding of the

nation. Throughout the nineteenth century, Congress provided relief funds on a regular basis, though in a disaster-by-disaster fashion. This tradition provided institutional precedent and a Constitutional basis rooted in the "general welfare clause" for the creation of New Deal programs that defined environmental calamities like the Dust Bowl as a disaster. Moreover, poverty itself might be considered a disaster—a perhaps surprising historical connection between disaster relief and welfare policy at the federal level.[13] At the same time, New Deal programs that focused on land and water conservation enabled some of the first federal studies of hazards. In the 1930s, what would come to be called welfare policy and environmental policy were taking shape, provoked by the decade-long combined disasters of the Great Depression and the Dust Bowl.

World War II signaled a change in the nation's disaster policies by way of wartime civil defense preparedness. With the opening of hostilities in Korea, Congress acted swiftly to create a large-scale civil defense bureaucracy—the Federal Civil Defense Act was signed by President Truman in 1951. Ostensibly these preparations were for nuclear attack, though they morphed into natural disaster preparations over time, based in part on the need for civil defense officials to find a use for their activities and given the frequency of earthquakes, floods, hurricanes, and tornadoes. Though used in a very limited way, first in the case of wildfires by President Eisenhower, civil defense policy gave the president the ability to declare a disaster so that the federal government could provide relief to stricken communities rapidly.[14]

Civil defense officials commissioned studies on an exceedingly wide range of topics, spanning the physical, natural, and social sciences. Everything from blast effects to mass fire, psychological effects of fall-out shelter confinement, to postattack economic recovery fell within the purview of civil defense. This very broad agenda triggered the emergence of new subdisciplines in disaster research in response to the funding. Civil defense officials long maintained that their preparations for nuclear Armageddon were also appropriate for natural disasters. This "dual use" philosophy went unchallenged until 1964, when a massive earthquake shook Alaska. The 9.2 magnitude quake was followed by a tsunami that swept down the West Coast taking 131 lives; property losses totaled $311 million. The most forceful earthquake recorded in United States history before or since, the Alaska Earthquake simultaneously illustrated the fallacy of "dual use" while also sending a chill down the spine of the tens of millions of Americans living in earthquake-prone areas. Ironically, federal civil defense officials saw an earthquake as the closest proxy to a nuclear attack that they were likely to find, and they funded extensive study of the disaster.[15]

The National Academy of Sciences and National Research Council also launched a major effort, resulting in an eight-volume study of the geophysical, economic, and social impacts of the earthquake. Scientists and social scientists who had been working with little funding and in small research communities, with no earthquakes of such horrifying force in recent memory, were now suddenly well funded with government patrons hungry for their findings. Seismologists, earthquake engineers, and social science disaster researchers found themselves working side by side in the aftermath of the 1964 Alaska Earthquake.

At the same time, increasing costs from natural disasters had given rise to a field of "hazards research"—an amalgam of geography, land-use planning, economics, and engineering. Geographer Gilbert White emerged as the key figure in this field. After earning a Ph.D. from the University of Chicago, White worked for the New Deal–era Mississippi Valley Committee, and following World War II he became the youngest-ever president of Haverford College. In 1955, White returned to Chicago to chair the geography department. In works like *Human Adjustment to Floods: A Geographical Approach to the Flood Problem in the United States* (1945) and *Changes in Urban Occupancy of Flood Plains in the United States* (1958), White developed models through which to understand the relationship between land development and flood hazard, and he suggested remedies ranging from structural mitigation to land-use restrictions and flood insurance.[16]

To disaster researchers, both in the natural hazards realms and in the social sciences, the array of costly and deadly disasters in the 1950s and 1960s signaled an opportunity to reframe disaster preparedness. Rather than focus on the single apocalyptic threat of atomic attack—for which no real preparation was realistic anyway—why not begin to theorize ways to prepare for, react to, and rebuild from "all hazards"? The Disaster Research Center (DRC) at Ohio State University, founded by Henry Quarantelli, Russell Dynes, and Eugene Haas in 1963, focused on the human dimensions of disasters. The DRC published numerous studies of individual disasters, looking closely at the ways that communities reacted to stress. By the late 1960s the DRC's findings were sufficient to undermine the core claims of civil defense planners, namely, that people and communities do not fall to pieces under stress, looting is rare in disasters, and outside "experts" often cause as much harm as good as they converge on the disaster scene.[17] This was an ironic twist, given that a great deal of DRC's early research was funded with federal civil defense dollars. A study on the economics of natural disasters was undertaken as part of this research activity and strategies for disaster prevention and recovery

were advocated with particular interest focused on disaster insurance given the prospect of a national flood insurance program.[18] By the late 1960s a consensus had been reached across the social and physical sciences: nuclear war was not the only, or even the most realistic, threat facing the nation.

FOUNDING THE NFIP

Flood insurance was offered by private insurers between 1895 and 1927,[19] but as pointed out above, after the devastating 1927 Mississippi floods and additional losses in 1928, insurers withdrew from the market. In 1951, 1952, and 1953, President Truman called for a national system of flood insurance, with no result.[20] In 1956, President Eisenhower called for a $100 million appropriation for a flood insurance program, leading to the Federal Flood Insurance Act of 1956. The Eisenhower administration created the Federal Flood Indemnity Association to implement the program, but without adequate technical studies Congress voted down funding for the program in 1957.[21]

In 1965, Hurricane Betsy inundated New Orleans. Following fast on the Alaska Earthquake, and in the context of the more activist approach of federal science policy established by the Kennedy administration, a consensus was building around the need for federal intervention to address American disasters. Following Betsy, Congress passed the Southeast Hurricane Disaster Relief Act. On signing the bill, President Johnson pointed out that it was the "sixth law passed in 18 months for the specific purpose of broadening Federal aids for the victims of the unusually severe succession of disasters experienced since the spring of 1964." In addition to relief, the bill called for the "immediate initiation of a study . . . of alternative permanent programs which could be established to help provide financial assistance in the future to those suffering property losses in floods and other natural disasters, including but not limited to disaster insurance or reinsurance."[22]

A Bureau of Budget *Task Force on Federal Flood Policy*, chaired by Gilbert White, was created to study the issue and make recommendations. The report that followed in the summer of 1966 focused on multiple areas: improving knowledge about flood hazards, coordination and planning for new development in floodplains, technical services to floodplain managers, adjustment of flood-control policy on "sound criteria," and development of a "practical national program for flood insurance."[23] Of particular concern was the need for data with which to more fully understand the nation's flood problems, and to enable floodplain policy. The report recommended that the U.S. Army Corps of Engineers (USACE) compile a detailed accounting of the thousands

of towns and streams with flood problems; while the United States Geological Survey (USGS) would be tasked with providing floodplain maps based on aerial photography, historical flood information, and gauge measurements (at an estimated cost of $3 million!).

The Water Resources Council (created under the Water Resources Planning Act in 1962) was suggested to take on the problem of determining an appropriate methodology for determining flood frequency. The Water Resources Council would then have an "unprecedented opportunity to guide river basin commissions and State planning agencies to consider all reasonable alternatives in water resource development. This includes identification of floodplain areas, preparation of data on local flood hazards, and arrangements for the participation of State and local governments in flood loss reduction plans through land use regulation and other nonstructural alternatives."[24] With the geographical data on flooding, the maps to detail the hazard, and analytical tools to model the risk, *then* the real work could begin: rational floodplain management.

On the issue of flood insurance, White's report stressed its dual purpose: not only to offer financial relief but also to take some initiative in directing land use and development—or restriction of development—in the nation's floodplains. The report offered optimism that with a dedicated effort at studying floodplain management, a flood insurance program could succeed. But success was far from guaranteed. The task force warned:

> A flood insurance program is a tool that should be used expertly or not at all. Correctly applied, it could promote wise use of floodplains. Incorrectly applied, it could exacerbate the whole problem of flood losses.
>
> For the Federal Government to subsidize low premium disaster insurance or provide insurance in which premiums are not proportionate to risk would be to invite economic development in floodplain areas. Further, insurance coverage is necessarily restricted to tangible property; no matter how great a subsidy might be made, it could never be sufficient to offset the tragic personal consequences which would follow enticement of the population into hazard areas.[25]

As Gilbert White's biographer Robert Hinshaw notes, White was deeply concerned that "such attention given nationally to federally subsidized flood insurance would divert attention from the broader goal of his task force recommendations: a 'unified national program' for managing not only flood loss/flood control but also floodplains as ecosystems."[26]

A second and related task force was working simultaneously, convened by the Department of Housing and Urban Development, and chaired by former Bureau of Land Management director, Marion Clawson. The 1966 Clawson HUD report, "Insurance and Other Programs for Financial Assistance to Flood Victims," was unlike White's report in that it was not engaged in a broader assessment of floodplain use, and was, from White's perspective, "less cautious advocacy for moving ahead with flood insurance." Still, White found areas of agreement, particularly on the need for a subsidized program (a compromise between a fully private or fully public approach) for homeowners currently in flood-prone areas, and an incremental rollout for the program.[27]

From here, developments leading toward a flood insurance program moved swiftly. President Johnson issued an executive order in 1966 directing federal agencies to evaluate and take action on flood hazards related to properties they oversaw. Specifically, it directed such agencies to "require conspicuous delineation of past and probable flood heights so as to assist in creating public awareness of and knowledge about flood hazards." Whenever "practical and economically feasible . . . flood proofing measures" were to be applied. Additionally, the order directed agencies involved in federally backed loans and mortgages for "construction of buildings, structures, roads, or other facilities" to bring down the need for federal flood relief payments. Agencies engaged in land-use planning were also instructed to "take flood hazards into account when evaluating plans" and "shall encourage land use appropriate to the degree of hazard involved to evaluate flood hazards."[28]

In 1967, the Corps of Engineers released its *Guidelines for Reducing Flood Damages*, and in 1968 followed up with its estimate that there were approximately five thousand flood-prone communities in the United States. The USGS in 1967 released a nineteen-volume flood study detailing the magnitude and frequency of floods in the United States. Finally, in that same year, twenty-six federal agencies adopted a preliminary report by the Water Resources Council outlining "methodologies and standards to be used in developing information about flood hazards, including delineation of the floodplain, elevations that floods of various magnitudes would reach, flood velocities, and the probability of floods of various magnitudes." It was this report that first established the "100-year flood" (a flood with a 1 percent chance of occurring in any given year) as the base standard for federal agencies as they assessed flood risk.[29]

By this time, floodplain management legislation was moving forward in states across the country. The insurance industry had signaled its willingness to participate in a subsidized program, especially one that included establishment

of an industry pool and federal assistance in the form of a congressionally appropriated fund that would be used to pay losses during the early years of operation."[30] In Washington, D.C., support for a federal flood insurance program was gaining traction across party and geographic lines. Louisiana congressman Hale Boggs, the Democratic majority whip, steered the bill through the House and in August 1968 Congress passed the National Flood Insurance Act. The law created the Federal Insurance Administration (FIA) with oversight over the NFIP, all housed under the Department of Housing and Urban Development; the NFIP went into effect at the start of 1969.

It is worth asking why the NFIP came into being in 1968 after previous attempts at such a program failed. By the late 1960s, the nation had grown weary of Cold War civil defense measures. Public participation in civil defense activities by this time was at a very low ebb. In this context it is possible to see how the real threats of flooding (and the many other disasters of the era) demanded public and political attention in ways that had been difficult to muster earlier in the "hot" days of the Cold War. Additionally, the Johnson administration's Great Society ambitiousness on issues having to do with environmental protection and poverty reduction (and disaster relief) were far more aggressive than those seen in previous postwar presidencies. Finally, there were a series of floods at the end of 1964 and in 1965 (in the Pacific Northwest, the Upper Mississippi, and Colorado/Kansas) as well as water damage from Hurricane Betsy that stimulated generous disaster relief since victims did not have any insurance protection.[31]

Beyond the politics, the expertise around flood hazard had grown over the previous generation into a remarkably sophisticated, interdisciplinary project, with Gilbert White as a clear intellectual leader. White and the hazards researchers with whom he worked were busily trying to understand what may be called the emergence of the "second environmental crisis." The first crisis was that of pollution, and from Rachel Carson (1962) forward, the nation was increasingly aware of the environmental legacies of urban industrialization.[32] White's floodplain hazard research was describing something different, a process that we see today much more clearly than he could then: the impact of unbridled suburbanization and land development in hazardous terrains would lead to vast increases in disaster losses, particularly from floods. Earthquake, fire, and flood protection legislation of this era marks the first policy responses to the second environmental crisis. It should be noted as well that Gilbert White serves as a paradigmatic case of a disaster expert who also succeeded as a public policy entrepreneur—he could speak

with equal facility to academics and to public officials. All of these factors taken together help explain why the program finally got its moment in the waning days of the Johnson administration.

THE NFIP: EARLY YEARS, 1969–1978

Gilbert White had favored establishing the NFIP on an "experimental pilot basis," considering the massive work remaining to be done in gathering flood data and advising communities on floodplain management. George K. Bernstein, first FIA director, instead charged ahead with the intention of establishing a national program right away.[33] When the NFIP began in January 1969, coverage was entirely voluntary. Premiums on existing homes were highly subsidized, with no penalty for previous flooding history—new homes were charged actuarially fair rates. The insurance industry assembled a group called the National Flood Insurers Association, composed of eighty-nine companies pledging $42 million in capital to back the industry's side of the collaboration.[34]

Through the NFIP, the federal government offered highly subsidized premiums to homeowners currently residing in flood-prone communities that were willing to institute building codes and land-use regulation; those moving into these areas were required to pay risk-based rates to discourage them from locating in high-hazard areas.

To be eligible to participate in the NFIP, a community's flood exposures and probabilities were to be assessed by the Corps of Engineers in order to create "flood insurance rate maps" (FIRMs) and "flood hazard boundary maps" (FHBMs), and HUD then needed to calculate actuarial rates. When these tasks were completed, a community could be certified and insurance policies could be sold. A clause in the law also required that if a community was certified eligible, and a homeowner did not purchase flood insurance within one year, then his ability to receive post-disaster relief would be reduced by the amount of insurance he could have purchased.

It was assumed that once communities in flood-prone areas learned of the highly subsidized premiums they would pass the legislation necessary to enable residents to purchase coverage under the NFIP. Homeowners and small businesses located in the eligible communities were expected to be eager to buy. Neither assumption held true. Communities were slow to participate in the program and few individuals in those communities that did join the NFIP purchased coverage. One analyst noted that the NFIP "appeared to make the best use of the federal government, the private industry, and loss

control techniques. In the short run, property owners would be able to obtain insurance for losses due to flood. In the long run, local and state programs of floodplain management, built primarily on the adoption of land use and control measures, should be able to significantly reduce overall flood losses. But what appeared to be strong on paper proved to be weak in actual implementation."[35]

Pressure also came directly from real estate and construction interests—as well as municipalities looking to sustain tax revenues through development. As the Corps of Engineers went about its work of assessing and mapping hazards, it might find a community to have a greater than 1 percent chance in any given year of a serious flood. Communities in these risky zones were termed "special flood hazard areas" (SFHAs), and this designation placed the community under pressure to pass ordinances restricting floodplain development or lose NFIP eligibility. Faced with restricting development or taking chances on a hurricane and hoping for disaster-relief payments, it is clear that many communities in the early NFIP years chose to take their chances.

When category 5 Hurricane Camille slammed into the Gulf Coast in August 1969 (259 killed, $1.4 billion in losses), only two communities (Fairbanks, Alaska, and Metairie, Louisiana) were participating in the NFIP. Only two more communities would be deemed eligible by the end of 1969. This dismal state led Congress to amend the program and allow communities that had not yet been mapped for flood hazard or had actuarial rates computed to join on an "emergency" basis as long they accepted floodplain development controls on new construction.[36] This so-called St. Germain Amendment lowered the time from application to certification from nine-to-twelve months to three weeks, and brought 154 new communities (5,500 policies) by mid-1970.[37]

Tropical Storm Agnes swept up from the Gulf of Mexico and battered the east coast in June 1972. With 128 lives lost and almost $12 billion in damage, Agnes provided a second major test of the NFIP. The results were grim. Fewer than 1,200 communities were participating in the program (out of a projected 13,600 eligible), 95,000 policies were in effect, and less than 1 percent of the insurable damages from Agnes were covered.[38] In the hard-hit state of Pennsylvania, only 683 policies were in effect—overall the NFIP paid $3 million in claims on a $3 billion disaster.[39]

This slow start led to the passage of the Flood Protection Act (FDPA) of 1973. This bill made major changes to the NFIP, by requiring all properties receiving federally backed mortgages to purchase flood insurance. FDPA also directed that a survey be made of communities with serious flood hazards,

and that these communities should be covered by NFIP or risk ineligibility for different types of federal disaster assistance. FDPA added much-needed strength to the powers of NFIP. These requirements paved the way for parts of the 1974 Disaster Relief Act (used to establish the presidential disaster declaration process) in which applicants for post-disaster reconstruction aid were required to seek flood insurance, and communities receiving aid were expected to assess and mitigate natural hazards.[40] Importantly, though, the FDPA provided a grandfather clause for properties in a special flood hazard area that was built before new, more stringent building codes went into effect. Still, by the end of 1973, fewer than 3,000 out of the 21,000 flood-prone communities in the United States had entered the program and only 274,000 policies had been sold to homeowners residing in these areas.[41]

With the lure of subsidized insurance amid the seemingly never-ending hurricanes and storms of the era, and the requirement of purchase for federally backed mortgages, the NFIP started to gain ground in the mid-1970s. However, growth raised serious challenges, and these challenges have remained with the program to the present day: (1) keeping up with new mapping requests and updating old maps, and (2) compelling and enforcing land-use restrictions in flood-prone communities. Early on it was clear that the FIA was not staffed sufficiently to keep up with the demands of producing maps fast enough to enroll communities efficiently—and inefficient enrollment meant bringing communities in under the less desirable "emergency" program. To meet these mapping needs, the FIA continued to rely on the Corps of Engineers, but it also began to turn to the Tennessee Valley Authority (TVA), the Soil Conservation Service (SCS), the National Weather Service, the USGS, and to private engineering firms as well.

A 1976 Government Accountability Office (GAO) evaluation of the NFIP found that considerable progress had been made "identifying flood-prone communities and in providing them with flood hazard boundary maps." However, significant delays were noted in moving communities out of the emergency program and into the regular program. Specifically, the GAO report noted delays as a result of: "ineffective planning and scheduling of studies," "changes in study guidelines," and "delays in reviewing completed studies," among other challenges. The GAO charged the FIA to complete studies on all flood-prone communities nationwide by 1983, with the ominous observation that to "meet this deadline, it will have to increase its completion rate from about 91 studies a year to about 2,600."[42]

The GAO report also found that the FIA lacked an "effective system" to monitor community adoption of floodplain restriction and zoning requirements.

GAO reviewed nine communities covered by the NFIP and found that "some had been permitted to remain in the program for several years even though they had not adopted acceptable floodplain management regulations and some communities were not enforcing compliance with approved regulations. As a result, the Federal Government had no assurance that the communities' flood-prone lands were being developed wisely."[43]

FIA responded that it would be possible to at least start all of the required flood-hazard studies by 1983 (with reasonable resources appropriated). FIA also accepted GAO's findings on community noncompliance and sketched out proposed remedies, including on-site monitoring, required annual reports from NFIP communities, and making better information available on standards for floodplain management.[44] By 1978—ten years into the NFIP's life—the work of identifying flood-prone communities was done, and 19,000 flood hazard boundary maps had been produced. However, with the extremely rapid rate of coastal and suburban/exurban development under way in the 1970s, it was clear that being "done" assessing flood-prone communities was a fantasy. And still by 1978, only 2,818 of a total 16,116 participating communities had moved from the emergency program into the regular program.[45]

THE NFIP: REACHING FOR SUSTAINABILITY, 1979–2005

In 1979, President Carter signed an order creating the Federal Emergency Management Agency (FEMA). FEMA was in part a reaction to strong pressure from the National Governors' Association to streamline the acquisition of disaster relief and to assist states with hazard mitigation efforts. FEMA represents as well the final rejection of civil defense as the dominant paradigm of the postwar United States—FEMA inherited the civil defense mission, but the agency was also thoroughly steeped in an "all hazards" disaster preparedness methodology. The FIA and the NFIP were moved from Housing and Urban Development right away and placed under the aegis of FEMA. Certainly the new agency's mission was more closely aligned than HUD's with the floodplain management goals of the NFIP, and almost at once FEMA took action to provide technical floodplain management assistance in the many communities across the nation that had no state or local offices equipped for such work. "From around 3,000 communities in 1980 to around 8,000 communities in 1984 had received flood insurance studies from the FIA and had entered the flood insurance program's Regular Program phase. . . . More than 8,000 communities still participated in the Emergency program."[46]

Despite hopes for FEMA as an aggressive, expert agency focused on hazards reduction, the agency under the Reagan administration made a sharp turn back to Cold War civil defense modes of disaster preparedness. Mitigation programs were curtailed and "fantasy" postattack scenario planning soaked up agency attention.[47] A major innovation of the 1980s emerged with the switch to a "Write Your Own" (WYO) approach. The WYO program allowed insurance companies to sell and manage flood insurance policies in their own names. The shift was significant, as Erwann O. Michel-Kerjan explains: "The NFIP benefits from the private insurance industry's marketing channels and the presence of many insurers in flood-prone areas. In return, the private insurers participating . . . receive an 'expense allowance.' . . . Over time, insurers came to see this partnership as an opportunity: they could now add flood risk to the menu of insurance coverage they sell to their clients. In doing so, they played an important role in providing many more people throughout the country access to coverage."[48] The number of communities enrolled and policies sold was now on a continuous upward trend, and on the eve of its twentieth year in effect, the NFIP "broke even," requiring no taxpayer funds to meet its expenses.

The Disaster Relief Act of 1974 was broadly revised in 1988 with the Robert T. Stafford Disaster Relief and Emergency Assistance Act. The Stafford Act further enabled FEMA to pursue mitigation efforts in support of the NFIP, allowing the program to buy out destroyed properties and offer funds to discourage reconstruction in special flood hazard areas (SFHAs). FEMA's response to major flood events including Hurricane Hugo (1989), Andrew (1992), and the Midwest Floods (1993) led to intense criticism, including calls to dismantle the agency. For the NFIP the results of these disasters were mixed. On the one hand, post-disaster analysis revealed a low insurance take-up rate, even in flood-prone areas—the NFIP had still not reached its desired customers. At the same time, the magnitude of the three events in such rapid succession led to an increase in the demand for flood insurance. The 1990s in general were a time of growing effectiveness and reputation for FEMA.[49] Under the leadership of former (Clinton era) Arkansas emergency management director James Lee Witt, FEMA again turned away from Cold War civil defense and thoroughly embraced all hazards methods, including especially mitigation efforts. The agency was elevated to cabinet-level status in 1996. Project Impact (begun in 1997) stands out as Witt's signature achievement, a program that put FEMA funds directly into the hands of communities in order to allow local-level disaster planning. Project Impact was in some ways a continuation of the NFIP's "Community Rating System"

(begun in 1990), an initiative aimed at incentivizing local communities to voluntarily take on flood-reduction and floodplain management efforts.

September 11, 2001 provided a shock to the national disaster system the likes of which the nation had not seen since the early days of the Cold War. The creation of the Department of Homeland Security in 2002 saw the removal of FEMA from cabinet status and the arrival of counterterrorism as the most critical area for federal disaster preparedness. The first test of FEMA's fitness as an all hazards agency under in the "homeland security era" came with Hurricanes Katrina, Rita, and Wilma in 2005. FEMA's dysfunction at every level again raised the specter of liquidation for the agency—but what would take its place? Certainly by 2005, coastal population rise and property development made it impossible to abandon the idea of federal disaster relief, and also foolish to expect disaster relief to replace the slow and cautious work of hazard mitigation. The ferocity of these storms demonstrated without a doubt that neither structural mitigation (levees and pumps) nor stringent floodplain restrictions (scantily developed or enforced on the Gulf Coast) had been developed sufficiently to keep coastal residents out of harm's way. For the first time, the NFIP found itself significantly in debt, necessitating a $19 billion loan from the Treasury Department. The dream of subsidized flood insurance driving a safety-minded land-use revolution was, if not dead, seriously injured. The NFIP was in crisis.

EXPLAINING DISASTER POLICY CHALLENGES

The policymaking influence of the flood-control task force, chaired by Gilbert White in 1966, fits within a larger historical context: the move for land-use planning and controls was steadily picking up legislative steam across the nation at just this time. Traceable back to Lewis Mumford and the regional planning efforts of the 1930s, planners like Ian McHarg, Edmund Bacon, and geographers in Gilbert White's circle were articulating the need for coordinating urban planning with "open space" planning and controls on vulnerable environments like wetlands, hillsides, and floodplains. Historian Adam Rome has argued that this movement came to its peak with the Clean Air Act and the Clean Water Act; a National Land Use Policy Act was proposed (not enacted) in 1970.[50]

The NFIP's rapid growth and evolution from 1973 onward took place against the backdrop of a remarkably active era for environmental protection. Researchers and government were waking up to the second environmental crisis—a crisis of development in hazard-prone areas borne out of the postwar

successes of the American economy: suburbanization, exurbanization, coastal development, and geographical mobility. The 1970s were also the heyday for federally funded disaster research and extraordinary ferment in disaster policy: from fire to environmental pollution to emergency management. Disaster policy was now best exemplified by the myriad conservation and flood-control measures discussed above, as well as the creation of the Environmental Protection Agency in 1970, the Earthquake Hazard Reduction Act in 1977, and the founding of FEMA in 1979. Hazard and disaster research centers also emerged rapidly in this period, driven by National Science Foundation funding, perhaps most significantly Gilbert White's Natural Hazards Center at the University of Colorado (1975). And from the public's perspective, by the 1970s disaster relief in the United States had emerged as "implicit public insurance," according to historian David A. Moss. "Although private property-and-casualty insurance continued to play a critical role . . . the federal government was increasingly emerging as an insurer of last resort."[51]

It is critical to note that in policy terms (and despite its early home at HUD) the NFIP was never a welfare program. Moss notes that although "disaster relief looked very much like an entitlement, it did not technically qualify as one. Unlike mandated AFDC or Medicaid programs, federal disaster assistance depended almost entirely on discretionary year-to-year and emergency congressional appropriations."[52] The NFIP has been described as a "quid pro quo" program, wherein "relief from the impacts of flood damages in the form of federally-backed flood insurance became available to participating communities contingent on flood loss reduction measures embodied in state and local floodplain management regulations."[53] Moss, again, points out that "policymakers emphasized the self-financing nature of such programs and their potential to curb expensive supplemental relief allocations each time a disaster struck."[54] In effect, the NFIP promised coverage to homeowners who would otherwise be entirely out of luck or reliant on public assistance if they suffered flood-related damage. In exchange for this peace of mind and financial security, the NFIP also aspired to bring a measure of sanity to coastal development, only allowing policies to be written where risks could be rationally assessed through floodplain mapping and managed by land-use regulations and building codes in flood-prone areas. However, the history shows that state legislatures and planning authorities, and county/municipal land-use regulators, struggled to place the principles of flood mitigation above the politically vital ethos of development.[55] Reflecting on the NFIP in 1997, Gilbert White lamented that "we do not have a sense of what has happened on the land, locally, as a result of this program."[56]

A key critique that has plagued the NFIP (and public disaster-relief and mitigation spending more generally) over the years is the "moral hazard" argument—a view that federal disaster-relief programs do not promote risk-averse behavior, but instead entice people to take risks they should not (like living on a flood-prone coastline)—and reward them when their luck (inevitably) runs out. Tempting as it may be to buy into the moral hazard view, close review of trends in NFIP policy holding reveals something much more complex and startling. Coastal New Jersey residents by 2010, for example, were not universally covered. Despite the regularity of severe weather, some coastal New Jersey ZIP codes had less than 15 percent of their property owners purchasing insurance, while others averaged between 50 percent to 75 percent. Coastal Long Island, New York, displayed a similarly variable pattern in its rates of flood coverage, but much lower than New Jersey overall, tending toward 5 percent to 15 percent coverage.[57] Low take-up rates, as we have seen, have been a constant with the NFIP. Explanations range from inadequacies in NFIP mapping and floodplain management advising, to limited interest by private insurers in marketing flood policies, lack of enforcement of community floodplain policies, and local political pressure from cost-fearful homeowners and the construction industry against adopting NFIP land-use guidelines.

To take this a step further we might ask: Why would home and business owners take the risk of being washed out by a flood when highly subsidized flood insurance was available to them? The principal reason for their lack of interest in buying coverage is that they treat the flood risk as below their threshold level of concern. Support for this view comes from a laboratory experiment on purchasing insurance where many individuals bid zero for insurance coverage against low-probability events, apparently viewing the probability of a loss as so small that they were not interested in protecting themselves against it.[58] Furthermore, homeowners allow their policies to lapse even when they are required to purchase coverage as a condition for a federally insured mortgage. An in-depth analysis of the NFIP revealed that the median tenure of flood insurance from 2001–2009 was between two and four years, while the average length of time in a residence was seven years.[59] Some banks and financial institutions have not enforced this regulation because they are unlikely to be fined, and/or the mortgages are transferred to financial institutions in non-flood-prone regions of the country that have not focused on either the flood-hazard risk or the requirement that homeowners may have to purchase this coverage.[60]

The knowledge base required to enact and maintain the NFIP is formidable—and to keep the program going with such needs puts it in the

same difficult position as other disaster-reduction efforts in modern American history. Building and maintaining interdisciplinary disaster science research takes time and a steady commitment from the private sector and public funding for agencies to develop the requisite mapping and enforcement of risk-reduction measures. A commitment to coastal and riverine flooding research is central to the NFIP. In fact, the continuous updating of flood-hazard maps provides the technical underpinning of everything the program strives to do. Without accurate flood-hazard maps, it is impossible to sustain the knowledge required to set insurance premiums that reflect risk, or to establish floodplain development rules, building codes, and other tools of flood mitigation. The result has been a history of haphazard technical updates and a mismatch between the ambitions of the policy and the knowledge needed to carry it to success.

The costly floodplain mapping, so critical to risk calculations, has been badly underfunded and deferred over the years. According to the National Association of Floodplain Managers, "from the beginning, inadequate funding, limited capabilities of federal agencies that traditionally mapped floodplains, and the sheer enormity of trying to identify the nation's floodplains on a sound scientific and credible basis greatly hindered . . . [the] ability to carry out studies and keep pace with community enrollment."[61] In 1999, FEMA issued a report calling for "map modernization" at a cost of $750 million over a seven-year period. This ambitious plan proceeded in fits and starts as the homeland security era unfolded. And as much as the NFIP might have desired more accurate maps, the technology of mapping was itself changing throughout the 2000s—making heavy investments in "old-fashioned" updating questionable in the midst of the development of new methodologies.

Bringing the findings of risk research into policy has itself proven to be a consistently difficult process in American history—we might describe it as a *disaster science-policy action gap*. The history of fire hazard provides a context within which risk knowledge could be moved successfully into protective programs that were implemented. Even facing city-leveling blazes, municipal and state authorities in the late nineteenth and early twentieth centuries were reluctant to exercise control over the built environment—the threat of fire was of course tied directly to the rapidity of construction and the crowding of the industrializing metropolis. Eventually, the fire insurance industry nurtured risk research and standard-setting bodies like Underwriters Laboratories and the National Fire Protection Association. These nonprofit organizations were seen as objective and authoritative representatives for fire safety, and over a period of half a century they enabled municipal and state fire service, building,

and planning officials to legislate fire protection into the built environment—in the case of urban fire, the disaster science-policy action gap was bridged and urban conflagrations ended by the 1920s.[62]

The clustering of disasters in the short time interval of 1964 and 1965 led to the passage of NFIP legislation in 1968 and ensured public support. But the need for severe disasters to spur legislation has made it difficult to sustain policy implementation when nature is not creating havoc. Effective mitigation—taking steps to lower risk and lessen the impact of a disaster—must happen well before rather than after a disaster. But the political appetite for funding mitigation in the absence of a crisis is often weak—reflecting a persistent *relief mind-set* among elected officials. This proved true with the NFIP in a number of ways, from minimal funding for mapping to lack of effective tools for monitoring homeowner and municipal compliance with NFIP guidelines. Recent scholarship demonstrates that elected officials are largely unwilling to support disaster mitigation, while they are quite eager to champion post-disaster relief and recovery spending.[63]

The relief mind-set helps us understand why so many policies aimed at mitigating hazards have been passed in the immediate aftermath of disasters, fallen into quasi-funded status, and then again receive attention in the midst of a crisis. Successful disaster preparedness, over the long term, generally involves risk-management tools like insurance, as well as infrastructure and antipoverty spending. As the recent history of NFIP demonstrates, the political will to remove subsidies for risky "grandfathered" properties or to allow premiums to reflect risk is shaky at best. These are the necessary steps, though, toward fostering land use in line with NFIP standards and achieving the larger goal of flood-loss reduction and sustainable coastal development.

THE END OF DISASTER RELIEF CONSENSUS?

Just three months after Biggert-Waters became law, Hurricane Sandy struck the eastern seaboard, taking 148 lives and causing economic losses estimated at $68 billion. Coastal flooding from Sandy inundated communities from Florida to New England, cut off power to millions, and displaced hundreds of thousands of residents for months, some permanently. New protective infrastructures along the Atlantic seaboard were clearly necessary, especially considering the scientific consensus around climate change and sea-level rise. If there were going to be more storms like Sandy, then now was the time to start thinking ahead, to take seriously the opportunity in the midst of the disaster.

All of these initiatives were critical, but ultimately they had to get in line behind FEMA's primary post-Sandy obligation: NFIP payments. As the cleanup progressed, cost assessments from the storm rose higher by the day, and it became clear that FEMA's disaster-relief fund was not going to be deep enough to fund the recovery. Public debate over FEMA's role as a flood insurer got particularly heated as Congress took up a bill to expand NFIP's borrowing authority in advance of policyholder claims. Authorized to borrow $1.5 billion in 2005, NFIP's ability to borrow post-Katrina jumped to $20 billion, and was now potentially moving to $30 billion.[64]

Freshman Florida representative Ron DeSantis expressed sympathy for Sandy victims, agreeing that "those who purchased flood insurance should have their claims paid." But DeSantis and other Republicans argued for FEMA and congressional Democrats to offset the NFIP costs with cuts to other programs in the federal budget. Ultimately, DeSantis voted against the measure, objecting that "allowing the program to increase its debt by another $9.7 billion with no plan to offset the spending with cuts elsewhere is not fiscally responsible."[65] The Hurricane Sandy relief bill passed the House 354–67, moved through the Senate on a voice vote, and was signed by President Obama on January 6, 2013.

Even more divisive was the Disaster Relief Appropriations Act of 2013, providing $50.7 billion for individuals and communities impacted by Sandy. Speaker John Boehner found himself with a caucus divided over the scope of the relief package, but he brought the measure to a vote in mid-January under intense pressure from northeastern legislators. Ultimately FEMA found itself able to provide solvency for NFIP and a well-funded response and recovery effort. However, it was impossible not to notice the difference in the political atmosphere since 2005, when Hurricane Katrina's NFIP extension passed unanimously and a $51.8 billion relief package passed in less than two weeks after the storm with only eleven votes against it in the House. In contrast, Sandy aid took three months to arrive. Clearly, federal disaster relief in the United States today is no longer a consensus issue; the failures of the National Flood Insurance Program must be seen as playing a role in the dissolution of this consensus.

STIRRING UP THE WATERS?[66]

Three months prior to Hurricane Sandy, the U.S. Congress took a significant step in addressing the need for NFIP reform: it approved a major five-year reauthorization of the National Flood Insurance Program by enacting BW12.[67]

Hurricane Sandy highlighted the importance of investing in protective measures and insurance prior to a disaster to reduce future damage and facilitate the recovery process for those experiencing severe losses. But Sandy was not the cause of reforms at the NFIP—it merely underlined the need for the reforms to be enacted. As we have seen, the program had gone through waves of reform before. The crisis of debt for the program caused by Hurricane Katrina showed policymakers that piecemeal fixes and reauthorizations would not stand up to the increasing urgency of hurricanes and sea-level rise resulting from climate change.

How was BW12 different from previous reforms? The answers are striking. For properties that are not primary residences or those that have suffered severe or repetitive losses or those under new ownership, premiums were to be risk-based within the next five years. Establishing these rates required FEMA to update its maps so they more accurately reflect flood risk; the legislation established a Technical Mapping Advisory Council for providing guidance to FEMA in this regard. BW12 authorized $400 million per year to develop more accurate flood maps over fiscal years 2013–17. FEMA had been restudying areas of the New Jersey and New York coastlines in order to update flood insurance rate maps (FIRMs) prior to Hurricane Sandy. Because existing FIRMs for these areas were developed more than twenty-five years ago, and updated FIRMs are not finalized, FEMA determined that it was vital to provide interim maps with advisory base flood elevations (ABFEs) to support reconstruction efforts. Under BW12, home and business owners suffering damage from Hurricane Sandy in communities adopting these ABFEs would be required to build elevated and safer structures. Doing so would result in lower flood insurance premiums due to the reduced risk of water damage from future hurricanes.[68]

An underlying principle of BW12 was that flood insurance premiums should be risk-based to reduce taxpayer subsidies and fixed for a prespecified time period (i.e., five years) based on updated flood maps. The act also authorized FEMA and the National Academy of Sciences to undertake a study to design an affordability program and consider means-tested insurance vouchers for those currently residing in hazard-prone areas. A program could be designed around risk-based insurance rates with vouchers not only covering a portion of the insurance premium, but also mitigation loan costs for structural changes to reduce future flood damage to the residence. As a condition for receiving a voucher, homeowners would be *required* to invest in loss-reduction measures.[69]

Even before BW12 passed, Louisiana Senator Mary Landrieu fought to "repeal it, radically amend it, or delay" the law.[70] She implored her colleagues to consider the impact the bill would have on the affordability of insurance premiums. In the fall of 2013, congressional hearings brought forward experts from the home-building and real estate industries to support Landrieu's core argument and chastise FEMA for not conducting an effective assessment of the impact the law would have on flood insurance consumers.[71] Even Maxine Waters, the co-sponsor and namesake of the law stated that had she known the impact it would have she never would have drafted it in the first place. Indeed, for a small but vocal contingent of NFIP policyholders, the insurance rates were going up dramatically. A 2013 GAO study, though, indicated that only about 8 percent of policyholders would see immediate rate increases with BW12 in effect, and among these were the most heavily subsidized policies.[72] However, the slowness and complexity of settling flood claims post-Sandy gave opponents another way to scuttle the bill and criticize FEMA.[73] MG14, passed in March 2014, rolls back the expiration of policies with subsidized premiums and institutes a more gradual path for discounted premiums on second homes and those with repetitive flooding to reflect risk.[74] This new legislation has now stirred up the waters again with respect to the future of the NFIP.

Flood disaster policy going forward must also take into account the impact that changing climate patterns might have on future damage from flooding due to sea-level rise and more intense hurricanes. There is evidence that federal agencies and other bodies have underestimated the risks of damage from extreme weather events due to climate change.[75] Enforcing building codes for all residences in Florida could reduce by nearly half the expected price of insurance under climate-change projections.[76]

The challenge facing the country today is how to take advantage of the awareness raised by Hurricane Sandy to take positive steps in the future, rather than regretting our inaction after the next hurricane or flood wreaks havoc. The problems we face in protecting the nation's people, property, and infrastructure from disasters are rarely due to a lack of expert knowledge. The challenge is—and has been for over four decades now—in crafting public policy that encourages individuals and communities in harm's way to undertake cost-effective loss-reduction measures, to encourage them to purchase insurance and to take longer-term steps to slow or restrict development in dangerous coastal locations. This is even more critical today given the federal debt, projections of sea-level

rise and the need for those currently residing in flood-prone areas to have safe homes in which to live.

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NOTES

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