



RFF REPORT

A Proposed Design for Community Flood Insurance

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Community resilience can be enhanced by the widespread purchase of flood insurance. This realization has motivated interest in communities purchasing flood insurance on behalf of residents. The concept of community-purchased insurance has been suggested in the academic literature as well as in reports from the US Government Accountability Office and Federal Emergency Management Agency. To date, however, there has been no in-depth evaluation of how to design a community policy that would be of interest to both communities and to insurers, whether the insurer is the National Flood Insurance Program or a private firm.

A study was needed to explore alternatives and make policy design recommendations that could increase insurance coverage and support community resilience. The New York Community Trust provided the support for this study and we thank the Trust and program officer Arturo Garcia-Costas for the support.

We also thank all the persons interviewed in preparation of this report. These individuals are listed by name in the appendix; all helped improve the authors' understanding of the challenges and benefits of community insurance.

The findings and recommendations in this report are those of the authors and not the New York Community Trust or those interviewed.

A PROPOSED DESIGN FOR COMMUNITY FLOOD INSURANCE

Carolyn Kousky and Leonard Shabman*

Summary

Federal flood risk management programs increasingly are focused on promoting household and community resilience to flood events. Insurance is essential to resilience because, unlike federal disaster aid payments, it provides rapid and adequate funds for rebuilding. When property owners receive premium reductions for hazard mitigation activities, insurance can also help promote investment in cost-effective loss reduction measures. However, in many areas at risk of flooding, the purchase of flood insurance remains low, limiting its effectiveness as a tool for enhancing resilience.

Community purchase of flood insurance has been suggested by academics and policymakers as way to secure more widespread insurance coverage for those at risk. Community flood insurance is a single policy, purchased by a local governmental or quasi-governmental body, which covers a group of designated properties. Although the idea has been discussed over the years, it has never been examined in sufficient detail to allow an evaluation of its potential for improving resilience or its administrative and political feasibility.

This report proposes a design for a community flood insurance policy that would be attractive to communities and feasible for the National Flood Insurance Program or a private (re)insurer to offer. The specific features of the policy reflect the concerns and insights raised in interviews with staff from local governments, federal agencies, Congress, nonprofits focused on flood risk, and private (re)-insurers, as well as academics. In addition, insights were gained from a comprehensive review of the literature and from a partnership with the National Academy of Sciences Committee on Community-Based Flood Insurance Options.

The community policy proposed here adopts principles from parametric insurance. That is, it

would pay a fixed claim amount, with the maximum claim capped at a relatively modest level, when a predefined “triggering event” occurs—in this case, flood stage reaching a certain height on a river or tidal gage. The advantage of a parametric policy is that it simplifies the process of setting the premium and greatly reduces the cost of settling claims. These administrative savings can be passed on to the insured. The claims payments and premiums would be “risk based” and would be estimated using standard hydrologic and hydraulic models with readily available data. Since the maximum claim is capped, the community premium would be low. A property owner could eliminate the “basis risk,” or risk that the capped payment would not fully cover damages, by purchasing complementary coverage. In fact, the proposed design envisions the community policy as the first increment of a layered approach to full flood coverage, with the next layer being a supplemental policy purchased from the traditional NFIP or a private insurance company.

The community policy could be offered by the Federal Emergency Management Agency, by private (re)insurance companies, or possibly even by municipal insurance pools. It could be purchased by any entity with the ability to raise revenues to pay the premium. The approach to raising revenue could vary by community and could include risk-based fees or additions to the local property tax. If Congress believes community flood insurance should be encouraged, it may choose to provide funds directly to an insurer to offer a discounted premium, especially for places with a high proportion of low-income residents who may not be able to afford coverage. Because the purpose is to promote resilience, the policy would offer coverage for all properties in the 500-year floodplain, although the community may choose to limit coverage to a more limited area in order to lower the community premium. The design also includes an opt-out option for individual property owners to reduce local political opposition.

* Kousky is a fellow and Shabman a resident scholar at Resources for the Future. No senior authorship assigned.

1. Introduction

Promoting household and community resilience to flood risk is increasingly defined as a goal of federal flood risk management programs. Encouraging widespread take-up of flood insurance, rather than relying on disaster aid or self-insurance (especially in low-income communities or among those unaware of the risk), can contribute toward that goal. Flood insurance can provide faster, more certain, and larger payouts to households and businesses after a disaster, speeding recovery and rebuilding. In addition, the opportunity to reduce insurance premiums can create an incentive for making investments in flood hazard mitigation.

Currently, the National Flood Insurance Program (NFIP), housed in the Federal Emergency Management Agency (FEMA), is the main provider of flood insurance nationally. In many areas at risk of flooding, however, take-up of NFIP policies remains low: many property owners in floodplains¹ do not purchase flood insurance. This report explores a possible alternative: the NFIP, or another entity, such as a private (re)insurance company or a municipal pool, would offer a community-level insurance policy in which a community would purchase insurance on behalf of floodplain residents. This would increase take-up rates and improve resilience.

Over the years, the general concept of community insurance policies has been discussed by a range of experts, including academics and the General Accountability Office (GAO) (Burby 2006; Shabman 2009; GAO 2013). In a 2011 report, FEMA summarized assessments from an expert panel, which concluded that community flood insurance would, among the reforms they considered, be the most likely to minimize exposure to flood hazards but would face challenges of administrative feasibility and local political acceptability (FEMA 2011). In spring 2013, following the congressional NFIP reform legislation of 2012, Representative Gwen Moore advocated for community insurance, suggesting it could provide cost savings, empower communities, expand take-up rates, and incentivize

mitigation.² Representative Blaine Luetkemeyer supported Moore, stating on the floor of the House on March 12, 2013, that community insurance was an “innovative tool” that “may represent a new and better way for some communities at risk of flooding to take the necessary steps to protect their citizens.”³ Section 23 of the Homeowner Flood Insurance Affordability Act (HFIAA) of 2014 called on FEMA to study this policy option and report to Congress.⁴

Despite suggestions that the NFIP offer a community policy, design features have never been described or evaluated in detail. For example, in FEMA’s (2011) review of the concept, many features of the policy were left unspecified, and the details that were given, such as an assumption that nonparticipating communities would be denied any federal disaster aid, could have influenced participant’s perceptions of the idea, yet are not necessary features of a community insurance product. A recent National Research Council report similarly left many details unspecified (NAS 2015b). To fill the gap, we propose a detailed design for community insurance that can address the concerns of administrative feasibility yet be a product communities would be willing and able to pay for.

A community flood insurance policy would be a single policy, between a governmental or quasi-governmental body and an insurer, which would provide coverage for a group of designated properties.

The policy design presented here was developed based on interviews with a wide range of stakeholders who offered their perspectives on both the benefits and the challenges of creating a community insurance product that would attract community interest. The interviews, conducted in the latter half of 2014 and the summer of 2015, included members of national

¹ In this report, the term floodplain, unless otherwise specified, refers to the area that would be inundated by a 500-year flood event (0.2 percent annual probability of inundation).

² <http://www.youtube.com/watch?v=LuBeGLhQk8>.

³ <http://votesmart.org/public-statement/773569/#.VT-KWyFViko>.

⁴ This report on community insurance, supported by a grant from the New York Community Trust, was initiated prior to the 2014 legislation and is independent of that required FEMA study.

associations focused on flood risk management, local officials in several communities around the country, congressional staff, FEMA agency staff, staff from the Department of Housing and Urban Development, academic flood risk management experts, and (re)-insurance industry experts (see Appendix).⁵ A parallel review of relevant literature was also undertaken. Finally, after the work on this report was initiated, FEMA contracted with the National Academy of Sciences (NAS) to prepare a report on community insurance to support FEMA's compliance with Section 23 of HFIAA 2014. NAS in turn subcontracted with this report's authors to provide technical support to the NAS committee. The authors helped design and participated in the NAS meetings and a workshop and provided technical review for some parts of the NAS report. These activities provided additional insights for the proposed design.

The initial discussion in this report assumes that the community policy would be offered by the NFIP, given the concept's experimental nature and the ability of FEMA to oversee a pilot program to test it. This choice also responds to the concern of several interviewees that adverse selection and correlated loss problems would be exaggerated by community purchase, making a private offering unprofitable. However, other interviewees stated that private reinsurance firms could offer a community policy and that a private offering would have certain benefits, such as overcoming some federal political hurdles and providing a non-federal option to local governments. Still other interviewees suggested that a community policy could be developed and offered by municipal or state insurance pools. No matter the provider, the design proposed here envisions a continued role for the NFIP and private firms in providing individual-level policies as complements to the community policy. These policies could provide coverage beyond the community coverage limits and eliminate basis risk for households. Multiple individuals also suggested that increased investments in hazard mitigation could encourage a role for the private sector in writing flood risk. The possibility of a private firm or a municipal pool offering a community policy is discussed Section 4.10.

⁵ Interviewees' comments are described and discussed throughout the report, but comments are not ascribed to any individual.

A common set of concerns regarding the feasibility and acceptability of a community policy emerged from the interviews, the NAS workshop and meetings, and the literature review. Among the most frequent was that a community policy that placed significant administrative responsibilities and costs on communities would have limited appeal. A related concern was that it would be difficult to build local political support in communities where residents were not choosing to insure individually. Finally, several interviewees noted that the cost of a community policy must be less than that of the sum of individual policies—or communities would have no interest in securing this coverage. These expressed concerns were the design challenges that became the focus of this report.

This report presents a detailed policy design that could increase the administrative feasibility of offering community insurance and create a product for which communities might be willing and able to pay.

The initial interviews were conducted without reference to any particular design features for a community policy. The result was that most stakeholders began from the assumption that a community policy was simply the aggregation of many individual policies, with minimal change to NFIP pricing, coverage, or claims processing. With this assumption in the background, they then described the challenges they saw to making community purchase a viable alternative to individual purchase. Nevertheless, because of a broad acceptance of the argument that higher take-up rates for flood insurance would greatly improve household and community resilience, stakeholders were interested in designs that might make community insurance feasible.

This report proposes a design for community insurance based on two elements. First, the community policy would be modeled on parametric insurance (see Section 4), something not envisioned in previous reports. The parametric approach permits innovations in rating and claims settlement that can reduce administrative costs and enhance demand by communities. Second, the community

insurance product would be limited in coverage and intentionally linked to existing individual NFIP and private insurance options; it is not proposed as a replacement for either. Linking of the two policy types—community and individual purchase—can enhance resilience by increasing the number of flood-prone properties with insurance coverage.

The report is organized as follows. The next section describes the basic features of current NFIP policies, to elucidate the differences with community insurance. Section 3 discusses how the widespread take-up of flood insurance can advance the public policy goal of resilience. Section 4 is an overview of community insurance as a parametric product. This section is intentionally conceptual so that the basic logic for and requirements of a parametric product can be easily understood. Section 5 adds specificity and detail about aspects of implementation of the parametric offering, presented in the form of answers to questions that reflect the concerns identified during the interviews.

Before a community policy could actually be offered, however, further inquiry will be needed, particularly among communities, to assess demand. The interviewees suggested that community insurance would not be appropriate or attractive to all communities. More detailed investigation at the local level could help elucidate which types of communities would find it useful for enhancing resilience. The conclusion of this report, Section 6, describes the next steps for refining the concept and further assessing its feasibility.⁶

2. NFIP Basics and the Role of Communities

Since the establishment of the NFIP in 1968, communities have had a partnership role in the program. When communities agree to participate, they implement land-use management actions that can reduce claims over time; in exchange, FEMA makes flood insurance available to residents. Over the years, almost all communities at risk of flooding

have joined the program. Nationwide, more 22,000 communities now participate.

The NFIP defines a community as any local jurisdiction with authority to regulate floodplain land use. When a community chooses to join the NFIP, it must adopt minimum floodplain management regulations for the Special Flood Hazard Area (SFHA), defined as the area inundated by the 100-year (1 percent annual chance) flood event (FEMA 1998). These regulations include (1) requiring that all new development in the SFHA obtain a permit; (2) prohibiting new development in floodways (the central portion of a floodplain that carries deep flows) if it increases flood heights; and (3) elevating all new construction or substantially improved or damaged properties in SFHAs so the lowest floor is at or above base flood elevation (BFE), which is the estimated height of floodwaters in a 100-year flood (nonresidential structures can also be flood proofed). In coastal special flood hazard areas, where storm surge is possible, additional building requirements apply. FEMA regional offices provide model ordinances for adoption.

Community policies can be a resilience-building tool for some communities.

FEMA produces flood insurance rate maps (FIRMs), which depict zones of varying flood risk, to guide community planning and land regulations, as well as to use for rate setting. These maps divide SFHAs into A zones and V zones. A zones are inland high-risk areas, and V zones are subject to breaking waves of three feet or more (storm surge areas). FEMA also maps the 500-year floodplain (Zone B) and areas outside both SFHAs and 500-year floodplains (Zone X). Some communities agree to be Cooperating Technical Partners with FEMA, aiding, to various extents, with floodplain mapping. These communities receive some federal funding for their activities and receive credit in the NFIP's Community Rating System (discussed below). To date, more than 240 communities have taken on this role.

Participating communities are quite heterogeneous. Some are large counties and others are small incorporated areas. Some are deeply engaged in producing FIRMs and some are not. In

⁶ This concept is not presented as a means of handling the current NFIP debt. That requires its own analysis separate from the idea of community insurance. We do assume that all aspects of the 2012 and 2014 reform legislation are in effect when we discuss community policies.

some only a small part of the land area is subject to flood risk, and in others the majority of the community is at risk. Flood hazard varies from inland to coastal, from flash flooding to coastal storm surge, and from overbank flows along major rivers to shallow ponding. As of April 2014, more than 5.4 million policies-in-force nationwide represented slightly less than \$1.28 trillion in coverage. However, some communities have only a few policies-in-force, whereas the largest have tens of thousands. In 2012, some communities had only a few thousand dollars of coverage, from one or a handful of policies, and others had more than \$1 billion in coverage from many policies.

2.1. Pricing and Claims Processing

Once a community joins the NFIP, individuals can purchase flood insurance policies through the program. Residential property owners can purchase up to \$250,000 in flood coverage for a structure and up to \$100,000 for its contents. Businesses can purchase up to \$500,000 each for structure and contents coverage. Minimum deductibles for NFIP risk-based rated properties are generally \$1,000, with higher ones available.⁷

Rates (cost per \$100 of coverage) are based on flood risk. NFIP risk-based rates vary across flood zones and for different types of properties (such as single-family versus commercial). Rates within an SFHA⁸ may be differentiated by elevation of the first floor in relation to the BFE, the type of basement, and the location of contents. The NFIP risk-based rate also includes a loading for administrative expenses (discussed further in Sections 4.7 and 5.1). NFIP rates are more expensive for the first \$60,000 of residential building coverage purchased, since lower claims are more likely. All rates are charged a federal policy fee, a reserve fund assessment, and a surcharge mandated by HFIAA 2014. If a higher deductible is chosen, the rate is also lower. The NFIP, however, sets the risk-based rate somewhat

differently from a private company; hence we refer to “NFIP risk-based” rates (see Kousky and Shabman 2014; NAS 2015a).

There are two general classes of rates outside the SFHA, neither of which is elevation rated. Zone X rates vary simply by type of basement. These rates are much lower than for properties that are at or below the BFE in the SFHA, but they are higher than for homes elevated above the BFE in the A zones. For properties outside the SFHA with a favorable loss history, FEMA offers a preferred risk policy (PRP). To be eligible for a PRP rate, the property (regardless of owner) cannot have had any of the following in a 10-year period: two or more claims exceeding \$1,000, two or more separate claims regardless of amount, two federal disaster aid payments exceeding \$1,000, three disaster aid payments of any amount, or one claim and one aid payment for separate events each more than \$1,000. PRP rates cannot be grandfathered. PRP rates have a \$1,000 deductible. As an example, for a single-family residential building with a basement, \$150,000 of building coverage, and \$20,000 of contents coverage (and a \$1,000 deductible for each), the annual premium for an X zone rate is \$1,101 and the annual premium for a PRP rate is \$326.⁹

Several classes of policyholders in the program do not pay NFIP risk-based rates. The largest two groups are pre-FIRM policies and grandfathered policies. Pre-FIRM properties were built before FEMA had mapped the flood risk for a community and thus were built without full knowledge of the flood risk. The NFIP provides a discounted rate for these policies, although this discount is slowly being eliminated over time under the reform legislation passed in 2012 and 2014. Grandfathered policies also pay less than NFIP risk-based rates. When FEMA updates flood insurance rate maps in an area to reflect changing conditions or new data and flood risk assessment methods, some policyholders will be mapped into the SFHA or into a higher-risk zone, or the zone they are in will have a higher BFE. Such policyholders can keep the rate of the previous

⁷ Currently, the NFIP does offer a group policy in which insurance coverage is purchased at a fixed price for recipients of federal disaster aid for a period of 36 months (see <https://www.law.cornell.edu/cfr/text/44/61.17>).

⁸ There is a separate rating table for zones AE and A1-A30; unnumbered A zones; V'75-'81, V1-V30, and VE; and 1981 V1-V30 and VE.

⁹ Depending on how communities choose to assess fees and the nature of the flood risk, the availability of PRP rates may make the community policy financially unattractive for property owners outside the SFHA and thus dampen interest of communities in purchasing a community policy. This possibility is discussed further in Section 5.4.3.

lower-risk zone or BFE as long as they had built in accordance with the map that was current at the time of construction. This means that their premium is “grandfathered” and is thus less than an NFIP risk-based rate. Grandfathered policyholders are rated based on the previous map.

FEMA has contracts with private companies, referred to as write-your-own (WYO) companies, to write policies with individual property owners and process claims. The companies are compensated for this effort but bear none of the underwriting risk, which is held by FEMA. GAO (2009) has found that the NFIP pays one-third to two-thirds of annual premium revenue to WYO companies. The WYO allowance, as a percentage of written premiums, is roughly 15 percent agent commissions, 2.3 percent voluntary payment of state premium taxes, and 12.5 to 13.5 percent company expenses. The company expense percentage is based on a five-year industry average of the expense ratio for multiple property insurance lines, with an additional 1 percent for costs of a federal program.

The NFIP does not collect any data to compare these payments with the actual expenses of the companies. Companies also receive compensation for processing claims, which varies with the size of the claim. In 2008, FEMA did use actual expense data to modify the way it handles payments for claims processing because of very large payments to WYO companies in 2004 and 2005 (GAO 2009). WYO companies also get a bonus for expanding the policy base of the NFIP (of up to 2 percent of written premiums). The payments made to the WYOs are included as an administrative charge that adds to the cost of an NFIP policy.

2.2. Community Rating System Discounts

Communities can take actions that will reduce rates for their citizens. In 1990, the NFIP began the Community Rating System (CRS) program to encourage communities to engage in more extensive flood risk management. Communities that participate in the CRS undertake various flood risk reduction measures and receive points for doing so. As the community accumulates points, it moves up through the levels of the program. With each new level, SFHA residents of the community receive an

additional 5 percent discount on premiums, up to 45 percent. Four kinds of activities make communities eligible to receive points: public information, mapping and regulations, flood damage reduction, and flood preparedness. As of spring 2014, 1,296 communities were participating, accounting for only 5 percent of communities in the NFIP but more than 67 percent of all policies-in-force. Only one community has made it to the highest level (Roseville, California), and only three have made it to the second-highest level (Tulsa, and King and Pierce counties, Washington) (FEMA 2014). CRS discounts are not believed to reflect true reductions in claims and are thus accounted for by adjusting all premiums upward such that aggregate revenue is enough to cover the CRS discounts. The expected discount for the April 1, 2014, rate changes was 11.8 percent, translating into a 13.4 percent load on other premiums.

2.3. Take-Up Rate

Congress has made purchase of an NFIP policy mandatory for any SFHA property with a federally backed mortgage. Other property owners in the floodplain can choose whether to purchase an NFIP policy. From the program’s inception, Congress has always had a goal of having most floodplain property owners purchase flood insurance, but in practice this has been difficult to achieve.¹⁰ Several changes in pricing were aimed at increasing take-up rates, and recently, FEMA has implemented aggressive marketing campaigns to encourage the purchase of insurance.

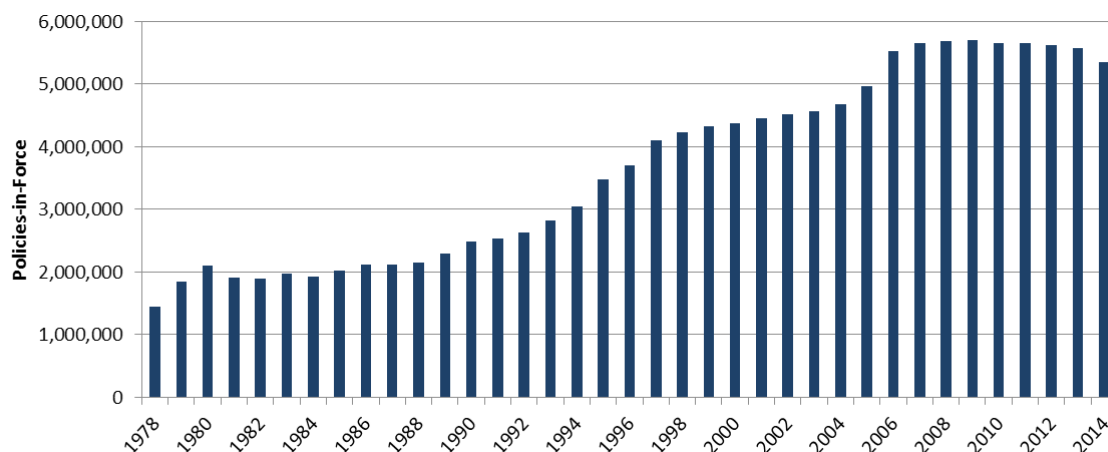
¹⁰ Early in the program’s history, very few people chose to purchase flood insurance. When Tropical Storm Agnes hit the mid-Atlantic region in June 1972, less than 1 percent of the damage was insured (American Institutes for Research 2005). In 1973, Congress passed the Flood Disaster Protection Act, amending the 1968 act and establishing the mandatory purchase requirement. Flood insurance is now mandatory for a homeowner in an SFHA with a loan from a federally backed or regulated lender. Further, to be eligible for federal disaster aid post flood, communities must participate in the NFIP. Both provisions increased participation at the community and individual levels. The Housing and Community Development Act of 1974 added a notification requirement that federally regulated lenders must inform a borrower if their property is located in an SFHA. The pre-FIRM rates, discussed above, were another effort to increase program participation.

Take-up has been low in areas where purchase is voluntary, but some who are required to purchase coverage apparently do not.¹¹ Calculating take-up rates and compliance with the mandatory purchase requirement is difficult because of a lack of nationwide data on the number of properties in SHFAs and those with federally backed mortgages. An estimate of take-up rates from a random sample of homes across the United States by the RAND Corporation suggests that about half of single-family homes in 100-year floodplains have flood insurance. This average masks high regional variation, however, with the Midwest having the lowest take-up rates—20 to 30 percent—and the South and West having take-up rates closer to 60 percent (Dixon et al. 2006). For coastal properties, the estimated take-up rate is 50 percent (Kriesel and Landry 2004). Finally, a calculation of take-up rates in census tracts (not just in the floodplain) along the New Jersey and New York coasts immediately preceding Hurricane Sandy suggests market penetration ranged from 5 to 50 percent, with a few tracts along the coast having rates up to 75 percent (Kousky and Michel-Kerjan 2012).

A range of explanations have been put forward concerning low take-up rates (Kunreuther et al. 2013). For example, scholars have documented the “mental shortcuts” people employ when evaluating risks that could lead them to dismiss or underappreciate flood risk (e.g., Kahneman et al. 1982; Kousky and Shabman 2015). In addition, price could play a role. Since enactment of the NFIP reforms in 2012 and 2014, which are increasing rates for many policyholders, the NFIP has been losing policies around the country. For instance, between October 1, 2013, and September 30, 2014, policies-in-force dropped in all but four states nationwide.¹² The reasons could be multiple, but higher premiums are a leading possibility. Supporting this, FEMA actuaries (pers. commun.) have observed that most of the discontinued policies were on pre-FIRM properties whose rates had risen.

Figure 1 shows the generally upward trend in policies-in-force over time, as well as the slight drop since the reform legislation of 2012. This figure masks the fact, however, that the program is highly

Figure 1. NFIP Policies in Force, by Year



¹¹ Many interviewees noted that the mandatory purchase requirement may not be well enforced. The reasons for that failure to enforce are varied. However, even if effectively enforced, mandatory purchase would not apply to the approximately one-third of residences in the mapped 100-year floodplain that do not have mortgages (HUD, pers. comm.), or those outside the 100-year floodplain.

¹² See: http://www.fema.gov/media-library-data/1424800450990-d52da1d57d820705665d5c46d8bc375e/policy_growth_percent_change_fy2014.pdf.

concentrated geographically. Florida has close to 40 percent of policies-in-force and dollars-in-force, and just five states (Florida, Texas, Louisiana, California, and New Jersey) account for around 70 percent of all policies nationwide (Michel-Kerjan and Kousky 2010).

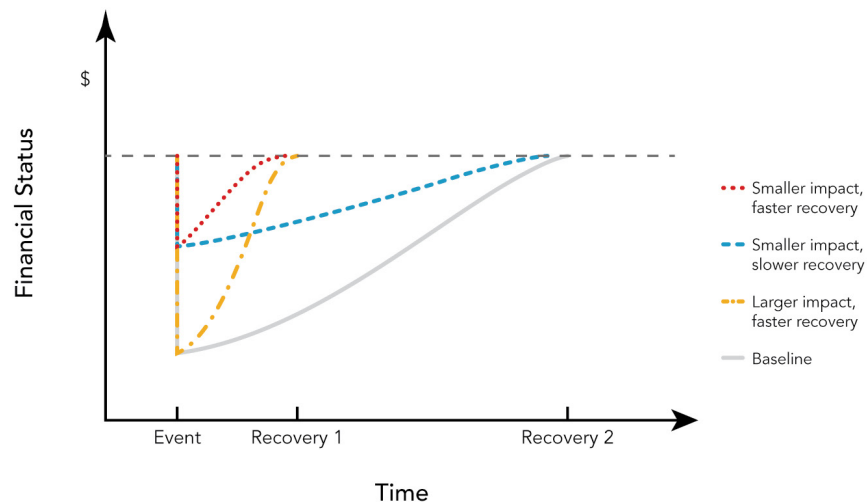
3. Community Insurance to Further Resilience

A National Research Council report defines resilience as “the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events” (NRC 2012, 1). The concept can be applied at the level of the individual, household, neighborhood, community, or nation. Papers on resilience have been published in fields as diverse as economics, engineering, biology, and psychology (e.g., Rodin 2014). Among federal activities, the Obama administration issued an executive order in 2013 to enhance national resilience to extreme weather events, the NFIP has updated its program to encourage communities to engage in hazard mitigation to further resilience objectives,¹³ the National Oceanic and Atmospheric Administration has partnered with the NFIP to help build resilience

in coastal communities,¹⁴ and the Environmental Protection Agency offers education on flood resilience for water and wastewater utilities.¹⁵ Local governments are also focusing on resilience: the City of New York’s Planning Department, for example, made flood resilience a priority after Hurricane Sandy (Department of City Planning 2013).

As an operational concept, resilience to flooding can be achieved by reducing the initial damage from a flood and also by reducing the time to recovery after the event. In Figure 2, the y-axis represents the financial condition of a household or community, and the x-axis represents time. A flood event occurs, leading to a decline in financial condition, and then postflood recovery takes place. Rose and Krausmann (2013, 74) call these two aspects *static resilience*, the “ability of a system to maintain function when shocked,” and *dynamic resilience*, “hastening the speed of recovery from a shock.” This two-part definition is echoed by Hallegate (2014, 3–4), who uses *instantaneous resilience* to mean “the ability to limit the magnitude of the immediate loss of income for a given amount of capital losses” and defines *dynamic resilience* as “the ability to reconstruct and recover quickly.”

Figure 2. Conceptual Representation of Resilience for a Particular Disaster Event



¹³ See: http://www.fema.gov/media-library-data/20130726-1907-25045-6528/changes_to_crs_system_2013.pdf.

¹⁴ See: http://crsresources.org/files/100/newsletters/december_2013_nfip_crs_update.pdf.

¹⁵ See: <http://water.epa.gov/infrastructure/watersecurity/emergencyplan/upload/epa817b14006.pdf>.

Risk management could influence either of these two dimensions: the size of the initial shock or the time to recovery after the event. This is shown for a single event by the curves in Figure 2. All three colored curves represent an improvement in resilience over the baseline case, shown by the solid gray line.

The red dotted curve conceptualizes what could be achieved by widespread take-up of flood insurance, which increases the resilience of individuals and communities by both speeding recovery and lessening the magnitude of the shock. Insurance speeds recovery by making available funds for rebuilding in the immediate aftermath of a flood. This of course helps the individual household recover, but as more households and businesses have insurance, the community as a whole also recovers more quickly. In addition, the insurance premium provides information about flood risk and could also offer an incentive to invest in hazard mitigation whenever the investment would lessen the premium. Offering policyholders premium discounts for investing in hazard mitigation that reflect the lower claims could encourage property owners to seek out the mitigation measures that are most cost-effective for their circumstances and potentially increase adoption.¹⁶

Other measures may alter just one dimension of resilience. For example, programs to quickly provide liquidity to local governments or households, such as through a loan program, could improve recovery times but would not encourage mitigation. This effect is represented by the yellow line. Similarly, elevating a property could reduce damage initially but would not address recovery time; this is represented by the blue dashed line.

It is important to say more on the role of disaster aid. To the extent aid is used to quickly provide liquidity or invest in hazard mitigation measures, it can improve resilience. That said, despite widespread perceptions to the contrary, federal disaster aid

provided directly to households is uncertain, limited, and often delayed (Kousky and Shabman 2012) and therefore does not enhance resilience as much as insurance. Federal disaster aid is available only when the president issues a disaster declaration. Aid is usually not available for small-scale flooding, which may be devastating at a very local level. Federal grants to repair and replace damaged property are usually not more than a few thousand dollars, and they are not the first line of assistance to homeowners (McCarthy 2010; Kousky and Shabman 2012).

A federal official noted during our interviews that homeowners fail to realize that if they lose their homes in a flood, even if they get all the aid they can, they will not be satisfied. Federal disaster aid is also disbursed quite slowly, often taking months or years to reach households, whereas insurance provides more funds more quickly. It is thus not surprising that a report examining rebuilding post-Katrina found that residences that had been insured before the storm were 37 percent more likely to have been rebuilt (Turnham et al. 2011). Insurance can also be preferable to self-insurance, particularly for low- and moderate-income families that may not have sufficient reserves to cover substantial damage, and whose failure to insure can impose costs on their community.

Community insurance would promote resilience because rapid payments give property owners funds to make structures habitable after a flood, and because the pricing structure would incentivize investments in mitigation.

The contribution of flood insurance to speeding postflood recovery was recognized in 1968 when the NFIP was established (although the term resilience was not used). For the greatest benefit, however, take-up of insurance must be widespread in the community. This, as many interviewees suggested, is the primary justification for community insurance: it would overcome all the barriers to higher take-up noted above—people’s failure to self-insure because they lack information, misunderstand the risk, or cannot afford the premiums. This is the same logic that makes automobile insurance and

¹⁶ Figure 2 is a conceptual representation for a particular disaster event. If these were empirically derived responses, different graphics would be produced for different possible events. Each event would have its own likelihood of occurrence. A resilience analysis to determine the cost-effective combination of pre-event mitigation spending and insurance purchase would need to take into account the likelihood of each event as well as the premiums paid and the savings on premiums from pre-event mitigation.

health insurance mandatory and that drives lenders to require homeowners insurance as a condition of mortgages.

The remainder of this report presents a design to make the product more acceptable to communities and thereby further the goal of resilience (Section 4) and answers specific questions about implementation, feasibility, and acceptability (Section 5).

4. A Concept for Community Insurance

In this section, we provide conceptual details on our design of a parametric community insurance product. We begin with an overview of parametric insurance and then discuss specific features of the proposed policy: coverage levels, complementary products, the process of establishing and settling claims, premium setting, data needs, and insurance contract length.

4.1. Parametric Design: An Overview

Parametric insurance has been developing over the last few decades and has increasingly been used in developing economies and for public sector risks (Robertson 2011). With a parametric policy, claims are based on the occurrence of a predefined triggering event, as well as some basic evidence of loss.¹⁷ The claims payment itself is a set amount for the triggering event instead of being based on an assessment of damage at each specific property. For an earthquake, for example, the triggering event could be its size as measured on the moment magnitude scale: when the scale registers a certain level, funds would be disbursed. For a flood, the trigger for payment would be the flood stage as measured by water reaching a specific height on a flood gage. Different gage heights would trigger different payment amounts. This precludes the need for an assessor to visit each property but it

¹⁷ Parametric insurance products have grown in popularity over the past decade as a way to provide affordable coverage for catastrophe risks. They have been used in developing countries where the transaction costs of traditional indemnity-based insurance are prohibitive. They have also been purchased by governments; for example, the Caribbean Catastrophe Risk Insurance Facility uses parametric policies to provide liquidity for Caribbean governments after a devastating hurricane or earthquake.

introduces “basis risk,” the risk that the payment could be lower or higher than the actual damages. The premium paid for the policy is determined by modeling the expected loss when an event occurs and the payout this would trigger, weighted by the likelihood of its occurrence. Swiss Re describes the approach as follows:

Parametric insurance uses measured or modelled parametric data to determine payouts. The payout model aims to closely mirror the actual damage on the ground and is usually based on the physical parameters of a catastrophic event or an index of such parameters, such as wind speed, geographic location of a hurricane or earthquake magnitude. Parametric insurance enables a more rapid payment than indemnity insurance because it requires no loss adjustments to assess the actual damage after an event (Swiss Re 2011, 11).

A community policy would expedite claims payments and minimize administrative costs—both to the property owner making a claim and to the insurer honoring a claim.

A parametric design for a community insurance policy, when coupled with the option for individual property owners to have additional coverage from the NFIP or a private insurer (which could manage basis risk, as discussed in Section 4.3), can increase the number of property owners having insurance coverage and lower the cost of insurance for a given level of coverage. Importantly, this design only minimally increases the administrative burden on communities, making purchase of the product potentially attractive. For example, a community that works with FEMA in producing FIRMs or has enrolled in the CRS will already be collecting and analyzing much of the data necessary to apply for a community policy. In fact, CRS communities may be well poised to explore community insurance for this reason, along with their demonstrated interest in promoting resilience to floods.

The proposed policy would cover the same types of properties in the 500-year floodplain that are currently eligible to purchase NFIP policies—

residences, commercial structures, and municipal buildings.¹⁸ River or surge height at specified gages would determine which properties were covered and how much they would receive in claims payments. The claims payments would be based on damages as predicted by modeling, which also would be the basis for setting the community-wide premium. The community would pay the premium, raising the revenue by its preferred method, and the seller of the insurance would administer the program and make claims payments.

Sections 4.2 through 4.9 describe the design of a parametric community product in greater detail. Of course, this type of product has its own challenges, many stemming from ensuring that households and communities understand clearly how such a policy would operate. These challenges are identified and discussed in section 5 of this report. One of the challenges is the basis risk. Complementary products could manage this for individuals, but several interviewees raised the concern that the GAO and Congress would be quite opposed to a federal program paying claims that were not indemnity based. This could be one of the key benefits to a private firm offering a community policy, as discussed in Section 4.10.

4.2. Capped Coverage Levels

Properties covered by parametric insurance would receive predefined claims payments when a qualifying flood event occurs. The payouts would be only for floods that register on the gages and that affect more than a few properties. For example, the policy would not pay for burst pipes or poor drainage that flooded just a few homes. This limitation is not unusual: the NFIP currently defines a flood as “inundation of two or more acres of normally dry land area or of two or more properties.” The community policy could maintain or modify such a definition, or set the trigger such that payouts would be only for large riverine or coastal surge events.

Since buildings and contents vary enormously in value and hence damages incurred, this payment

would not be the same absolute amount for each property. Instead, the payout would be a percentage of the property’s appraised value, and it would be capped as a maximum dollar amount per property per flood event. There would be a similar cap for contents coverage.

Like other parametric insurance products, the realized payout to a covered property would vary with the intensity of the event, as determined by how the trigger relates to the cap: as flood levels increased, more properties would receive payouts and see larger payouts, but only up to the defined cap. For instance, the cap may be 25 percent of the assessed value not to exceed \$25,000 per property per event.

For perspective, consider residential claims paid by the NFIP between 1978 and 2012 for which FEMA has data on building value (see Kousky and Michel-Kerjan 2015). Over these years, only 15 percent of claims exceeded 50 percent of the building’s value and 7 percent exceeded 75 percent. When data for 2005 (the year of Hurricane Katrina) are excluded, the percentages are 10 percent and just over 3 percent, respectively. For all years, the *mean* claim payment in inflation-adjusted terms was \$33,764; it ranged from \$11,738 in 1988 to \$91,911 in 2005. The *median* ranged from \$4,594 in 1981 to \$72,887 in 2005. The median claim between 2000 and 2009 was \$21,740, but excluding 2005, the median was \$12,600. These statistics suggest that a majority of damaging flood events can be covered under the proposed parametric policy, but also that catastrophic damage would not be fully covered.¹⁹ A community policy, then, is only one part of comprehensive flood coverage, discussed next.

¹⁸ The NFIP today offers coverage to residential, commercial, and municipal buildings but not community infrastructure, such as water treatment plants, roads, or transit stops. The proposed community policy would not be a departure from the existing program.

¹⁹ In standard insurance contracts, the insured can choose the level of coverage. When a household or business purchases an NFIP policy, for example, the buyer can choose a coverage level up to the residential building cap of \$250,000 or the commercial building cap of \$500,000. At least one interviewee suggested to us that this choice should be preserved in a community policy, with each covered entity in the community able to choose his or her own coverage level. The opportunity to select higher coverage, above the community policy base, remains available to the property owner. Also, the program design will offer any property owner the opportunity to opt out of community coverage (see Section 5.6). Allowing varied coverage levels within the community policy, however, would potentially prohibitively increase transaction costs.

4.3. Complementary Products: A Layered Approach

Recognizing that claims paid under the community policy would be capped, some property owners may seek additional coverage. An individual property owner could purchase supplemental coverage on the private market or through the NFIP up to that program's maximum coverage limits. The premium for such supplemental coverage would be quite affordable, since the community policy coverage would provide the first level of claims payment, in effect acting as a large deductible for the supplemental policy. There have always been private companies willing to write coverage, largely for high-value properties, in excess of the NFIP caps, and private providers that lenders can turn to when they need to force-place coverage on a property (Dixon et al. 2007).²⁰

A community policy would provide a base level of coverage, and property owners could purchase additional coverage. The total cost of these "layers" could be less than the premium for an individual policy for the same coverage level.

This additional coverage could also be easily written to eliminate the basis risk in the community policy. Representatives from the private (re)-insurance sector, as well as FEMA staff, informed us that such "wraparound" coverage, which would start paying where the community policy stopped, or pay when the community policy was not triggered, would be straightforward to provide. It should also be fairly inexpensive, since the community policy would cover the more frequent damage layers.

²⁰ A private company could offer coverage for all claims above the community insurance cap. In recent years, some companies have begun to write private flood coverage even within NFIP limits. For example, after rate hikes in the NFIP, a few private companies, many underwritten by Lloyds of London, began to enter the Florida market (e.g., Boatwright 2014).

4.4. Establishing a Claim

As with other parametric insurance products, the community insurance policy would have a dual trigger for establishing a claim. First would be the physical trigger, either flood stage or surge height as read at a specified gage(s). This type of trigger was recently used in the catastrophe bond purchased by New York's Metropolitan Transportation Authority after Hurricane Sandy. That bond pays if the tide gages surrounding the city exceed certain heights. The gages and reporting from them are managed by the US Geological Survey and the National Oceanic and Atmospheric Administration. Amtrak also recently purchased a catastrophe bond with physical triggers for storm surge, wind, and earthquake. The physical trigger provides two benefits: there is no ambiguity about whether the trigger is reached, and the gages can be run by independent agencies and thus cannot be manipulated.²¹

The second trigger would be establishment that flooding in fact occurred at the covered property. Verification that floodwaters were higher than the elevation of the first floor of the property's living area could be as simple as a photograph, submitted online, or a satellite image showing the flooded area. The important point is that loss adjusters need not visit every property—a huge expense to the current program. The cost savings would be passed on in the form of a lower premium to the community and in turn to the property owners.

If the event tripped both triggers, then the claims payment would be made based on the payout structure (discussed in Sections 4.5 and 4.6.)²²

²¹ It would also be possible to use other triggers, such as total damages from the storm event. To preserve independence, this could not be based on FEMA's assessment of the damage (if FEMA writes the policy) but would need to be based on independent damage estimates, such as those provided by Property Claim Services or a catastrophe modeling company (but not one paid by FEMA for such a purpose). It is important to prevent accusations that the triggering event was manipulated for payout purposes.

²² These simple and clear triggers lower transaction costs but, as is the case with all parametric policies, also introduce some basis risk—the risk that the payout amount differs from actual losses. This could raise challenges if the community policy was written by the NFIP and not the private sector and also has implications for the incentives created for hazard mitigation; both are discussed further in Section 5.

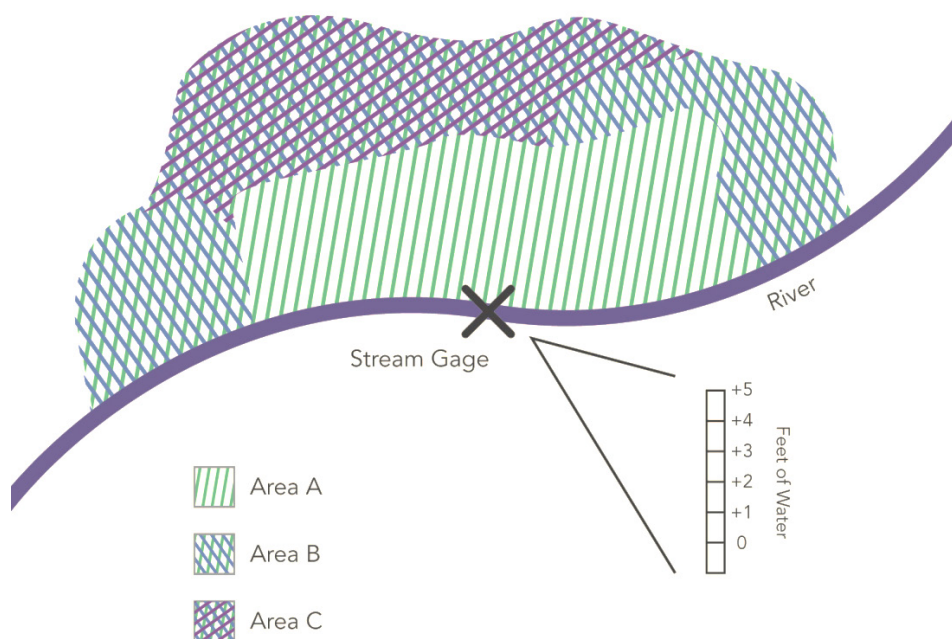
4.5. Relating the Extent and Magnitude of Claims Paid to the Trigger

Consider a community policy linked to a stream gage (in practice, multiple gages might be needed, depending on topography and source of the flood hazard). Standard hydrologic and hydraulic models can predict flood depths in the community for various flood stages on the gage. In Figure 3, the X marks the gage and the blue line is the river. The letters indicate areas of the community that are expected to flood to similar depths at each flood stage. The community policy would be structured to pay out for events greater than some return frequency; in this illustration, payouts begin with any flood stage having a return frequency greater than the 25-year event.

Consider this the baseline “zero” on the gage. Whatever flood event is chosen as the baseline, the policy pays out only for events greater than that (see Section 5.4.4 on other baselines).²³ According to the modeling, at one foot above the baseline, Area A is predicted to begin to flood. At two feet above, Areas A and B flood, with the flooding in area A now being deeper. At three feet or more, Areas A, B, and C are all predicted to flood, with A having the deepest flooding and C the shallowest. The areas are chosen to minimize heterogeneity in flood depths within each area.

The predicted average depth of flooding in each area for each point on the gage is then linked to depth-damage curves to estimate the amount of damage to a property of a given elevation at each

Figure 3. Community Areas Expected to Flood



²³ Different base flood events could be chosen for this policy; we suggest the 25-year event here so that the community policy offers coverage to currently pre-FIRM and grandfathered properties below what the NFIP defines as the BFE for the 100-year event. The community could choose a different BFE; this would affect the premium. For example, if the policy covered events with a return frequency greater than 100 years, the premiums would be lower than for a policy that covered more frequent events.

flood depth. Depth-damage curves are frequently used in flood loss analysis to relate the depth of flooding to the percentage of a building's replacement value that is damaged. They are generally a stair-step function of water depth in relation to the first floor of the building, measured in feet. Figure 4 shows an example based on a curve from the US Army Corps of Engineers for a residential structure without a basement. The variations across depth-damage curves for the same building type can be substantial, but a community that lacked an empirically grounded relationship could use the generic curves from the Army Corps of Engineers.

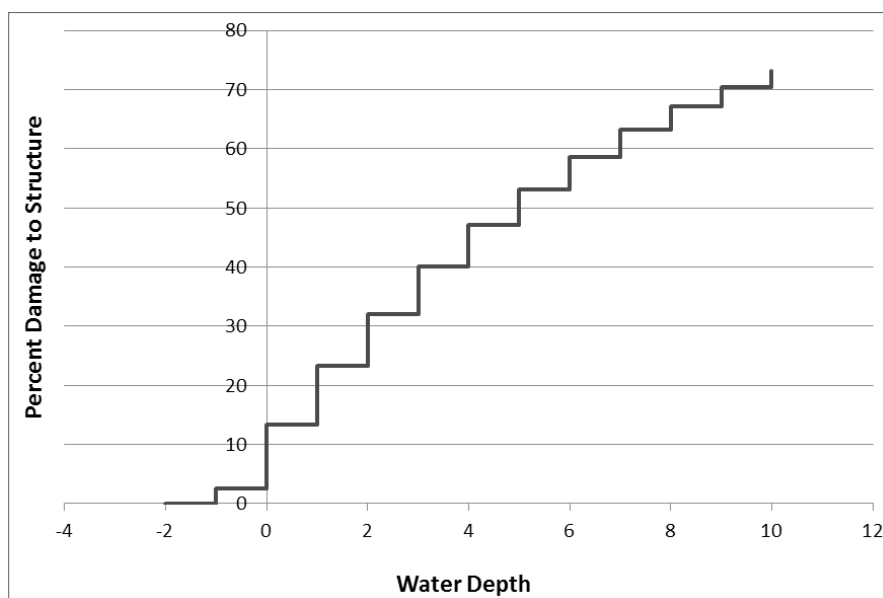
Even though structures with different first-floor elevations will have different amounts of damage for a given gage reading and depth of flooding, the parametric approach means that all properties in the same area receive the same claims payment. It may be possible to differentiate community areas not only by estimated flood depth but also by similar house elevations, and then base the payout on the median elevation of the first floor. Different elevations besides the median could be chosen, with an effect on premiums. Basing payments on the actual elevations of every house would add substantial administrative costs.

If the median elevation is used, owners of houses above the median elevation will benefit—they will receive the same payment but have less damage—while those with elevations below the median will get the same payment but have more damage. This disparity could be an incentive for owners to elevate their structures, although such a mitigation measure is costly.

Table 1 shows the results of using a hypothetical stage-damage curve to predict the percentage of a structure's value that is estimated to be damaged at the average flood depth and median elevation in each area of our example riverine community for flood events above the baseline 25-year flood.

The estimates of property damage (for the modeled flood depth and median elevation) are then used to determine payments for each covered property. Different areas receive different payouts (each a percentage of property value up to a cap) for each flood stage. Table 2 shows an example payout structure for Areas A and B, along with the amounts that houses of different value would receive. Note that even if flood depth exceeds 5 feet and estimated damages are greater, payments are capped at \$25,000.

Figure 4. Example Depth-Damage Curve



Source: Created by the authors with data from the US Army Corps of Engineers Economic Guidance Memorandum 04-01.

Table 1. Example Modeled Damage for Median Property Elevation for Given Gage Readings, by Area

Gage reading	Percent damage		
	Area A	Area B	Area C
0 (25-year flood)	0	0	0
+1.01 to 2 feet	3%	0	0
+2.01 to 3.0 feet	5%	4%	0
+3.01 to 4.0 feet	10%	8%	5%
+4.01 to 5.0 feet	25%	15%	10%
+5.01 to 6.0 feet	30%	25%	20%

Table 2. Example Payouts under Parametric Policy, by Area

Gage reading	Area A			Area B		
	Payment as a percent of assessed value	Payment for house value = \$100,000	Payment for house value = \$250,000	Payment as a percent of assessed value	Payment for house value = \$100,000	Payment for house value = \$250,000
0 (25-year flood)	0	0	0	0	0	0
+1.01 to 2.0 feet	3%	\$3,000	\$7,500	0	0	0
+2.01 to 3.0 feet	5%	\$5,000	\$12,500	4%	\$4,000	\$10,000
+3.01 to 4.0 feet	10%	\$10,000	\$25,000	8%	\$8,000	\$20,000
+4.01 to 5.0 feet	25%	\$25,000	\$25,000	15%	\$15,000	\$25,000
+5.01 feet	25%	\$25,000	\$25,000	25%	\$25,000	\$25,000

4.6. Claims Settlement

Once payout on the policy is triggered, the predetermined payout amounts are disbursed to each household by the insurer.²⁴ Adjusters do not visit each property. This not only saves costs, which could be passed on in the form of a reduced premium, but also promotes resilience because claims payments are made rapidly. It also reduces adjudication, since the predefined trigger is an

objective measure of a property owner's eligibility and amount of payment.²⁵

Claims settlement would be a responsibility of the NFIP or other insurer.

²⁴ Several interviewees had assumed that a community policy meant that claims payments would be made in a lump sum to the community, and it would be the community's responsibility to disburse funds to damaged buildings. They said that the practical and political difficulties of taking on this role would discourage communities from purchasing such policies.

²⁵ Following allegations of fraud and underpayment after Hurricane Sandy, FEMA reopened and reviewed claims. This is costly to the agency and frustrating to the insured. The parametric product would avoid these problems, since there are no loss adjusters and the payments are for predetermined amounts.

4.7. Community Premium

The premium-setting process would not use the rating tables that the NFIP currently applies to individual properties. Instead, hydrologic and hydraulic modeling would identify which properties receive payment when the flood stage reaches a particular level, and the depth-damage curves would define the payout for each property. Using data on the number of structures covered and their assessed values, the insurer's actuaries could then estimate the expected claims from issuing the community policy.

The premium for the community would be this expected payout amount plus any additional loadings.²⁶ Loadings would include some charge for administrative costs, although much less than the current amount received by WYO companies (see Section 2.1). These savings in administrative costs would help lower the overall costs of the community policy. Since FEMA (or a single agent) would be writing the policy directly to the community, the 15 percent of individual premiums currently paid to agents would be eliminated.²⁷ A loading for operating expenses would still be required but could likely be less than the current charges. The community policy would also eliminate the 3 percent of premiums that goes to adjusters and claims overhead. The federal policy fee and a fixed expenses loading, which are used to cover costs of mapping, mitigation grants, salaries, the NFIP servicing agent, the NFIP FloodSmart campaign, and a few other costs would remain.

The community policy premium would be risk-based in the sense that it would be priced to recover expected future claims as well as administrative costs.²⁸ The NFIP currently does not price for any

tail risk in its overall portfolio, and we envision the community policy would also not contain this load. The reality, however, is that flood risk is correlated spatially: one severe event, such as Hurricane Katrina, or Sandy, can generate a very large total amount of claims. Pricing for this concentration of risk is one reason that private insurance is often more expensive in the highest-risk areas than NFIP policies. Although a community policy would help diversify risk in one respect, by enrolling policyholders beyond the 1 percent line, it would also generate additional concentration, if the entire SFHA of one community became enrolled. In conjunction with a community policy, the NFIP may choose to purchase reinsurance even if there is no charge to the community premium; or the NFIP may secure a commitment that the Treasury will act as a reinsurer to the program—and not simply a lender—by covering claims in any year that that exceed a defined amount. This issue, which also pertains to the NFIP as currently designed, is beyond the scope of this report.

4.8. Instrumentation, Model, and Data

Implementation of a parametric community policy would require gages along the river, stream, or coast to identify when claims payments are triggered. Depending on the topography and land area, more than one gage may be needed. The US Geological Survey maintains many gages, as might other agencies or institutions, which could be used. If a community required additional gages, installation and maintenance would be a responsibility of the insurer, and the costs would be part of the administrative costs recovered through the community premium.²⁹

A parametric community policy also requires risk mapping and modeling, with an input of topographic data to identify areas of the floodplain having common depths at a given river stage. Topographic data for the nation are publicly available in the National Elevation Dataset. Some communities have higher-resolution data, such as LiDAR. The Army

²⁶ The community would choose how to apportion the cost of the premium to property owners covered by the policy, including whether and how to include any discounts to certain properties to make the coverage more affordable (see Section 5.4.2 and 5.1.2).

²⁷ One of the interviewees expressed a concern that this would cause agents to lose business. Since many policyholders may wish to add supplemental coverage to the community policy (see Section 4.3) and some covered under the community policy will not have previously had coverage, this need not be the case. In addition, although flood policies are a substantial portion of the business for some agents, this is far from universal; many agents write very few flood policies.

²⁸ There would be no pre-FIRM subsidized rates or grandfathered price discounts. Pre-FIRM discounts are being

eliminated by the Biggert-Waters 2012 reform legislation, but grandfathered rates were reinstated by the HFIAA 2014.

²⁹ Since at times gages could potentially fail, the policy would need redundant gages or a documented process for handling claims when a gage fails.

Corps of Engineers has models that could be used for determining flood risk.³⁰ Hazus, a product of FEMA, could also be used, although its hydrologic and hydraulic modeling is less sophisticated. The services of a specialized catastrophe modeling firm could also be employed. Some of the private companies now offer inland flood models for private insurers that could potentially be used for this purpose, although the costs would need to be considered. The insurer would need to evaluate the choices and select a model.

Parametric community policies would require data and models that are already available or not onerous to develop.

Finally, the community would need to provide an inventory of covered buildings and their location, occupancy type, and appraised improved value. This information is usually kept by assessor's offices and should be readily available.

The policy also requires knowing the median (or other central tendency) elevation of the first floor of living area of structures in each area, referenced to the datum used for stage depth. The median elevation is used both for setting premiums and for determining claims payments. Elevation certificates are now required for NFIP-insured properties in SFHAs, and these could be used to impute a median elevation for all properties in an area. However, there are no such data for properties outside SFHAs even if they are NFIP insured, as those policies are not elevation rated (see Section 2.1). One approach to filling the elevation data gap is to sample within each area and then calculate a median elevation. Another approach is to use ground elevation coupled to known building characteristics from the assessments, such as presence of basements, to create a proxy estimate for first-floor elevation. Most cost effective could be to rely on emerging technology, such as truck-mounted mobile LiDAR, to find first-floor elevations. This technology will likely not be cost-effective for rural areas, but will be best in denser environments.

³⁰ See the Corps' Hydrologic Engineering Center website (<http://www.hec.usace.army.mil/about/>).

4.9. Multiyear Community Policy

The contract that defines the terms of the policy would be between the insurance provider and a community, with the community having the obligation to pay the premium required for the chosen coverage. The premium and coverage would be set for a five-year contract period³¹ and at the end of the period could be renewed or revised to reflect any changes in flood risk, number and characteristics of properties covered, area covered, and mitigation actions taken in previous years. From the perspective of the community, a multiyear policy justifies the required upfront investment of time and resources necessary to build community support and enter the contract. Since the multiyear policy would guarantee a fixed price for several years, community budget planning would be easier, particularly if the community needs to spread out revenue collection over time (see Section 5.4.2). A multiyear policy would also reassure both parties that neither would drop coverage immediately after a storm or in response to some other occurrence.³²

The multiyear process would proceed as follows. When first considering a multiyear policy, and then at each renewal date, the community would provide building first-floor elevations, if available, and assessed values for all properties in the 500-year floodplain. Using this information and modeling tools (described above), the insurer would prepare an estimate of the cost for the policy. The insurer would explain the determinants of the community premium, show how the premium is affected by the areas covered and the property types, and help the community identify those areas and properties with the most significant effect on the premium.

The community, as the purchaser of the policy, then tells the NFIP what properties will be covered. The community could choose, for example, to exclude properties with first floors below a certain elevation if their inclusion causes a large increase in

³¹ Five years is offered here for purposes of illustration, but this could be varied.

³² Multiyear policies have been proposed for the current NFIP structure of individual policies as well. The argument is that multiyear policies tied to the property (as opposed to the individual) could overcome myopic consumer behavior that results in low take-up rates (Michel-Kerjan and Kunreuther 2011).

the community premium. A community's decision to exclude certain properties from the community policy leaves those property owners with the option of purchasing standard NFIP individual policies or policies from a private insurer. The community also develops a cost recovery plan for paying the premium, based on fees, taxes, or a combination (see Section 5.4.2), and offers individual property owners a chance to opt out of coverage (see Section 5.4.3).

The insurer estimates the final premium and the community enters into a five-year contract with the insurer for the specified coverage. The community also agrees to other conditions, such as gage maintenance, annual reporting on levee conditions (if applicable), and other matters specified in the contract.³³

During the contract period, the community and its residents undertake mitigation actions that can reduce risk at individual or groups of properties (see Section 5.2). When the policy is renewed, the premium calculation will reflect these risk-reducing actions. At renewal, any new properties must be considered for addition to the policy. It may be prudent to follow current NFIP regulations and exclude any new construction built below the current BFE. An even more stringent regulation could require that all new construction be at or above the 200-year flood level to be included in the community policy. New coverage and a new premium are then fixed for the next five-year period.

4.10. Alternative Insurance Providers

Whether flood insurance can be successfully written by the private sector is a question as old as the NFIP itself. Floods violate some of the ideal conditions of insurability (e.g., American Insurance Association 2013; Swiss Re 2005; Charpentier 2008; Kousky 2013). In particular, flood insurance can be subject to adverse selection, with only the riskiest properties insuring. Losses are also correlated—when a large flood occurs, many properties are damaged simultaneously—and can be catastrophic.

³³ For example, communities behind a levee might be required to affirm that the levee is structurally sound. The Corps of Engineers currently assesses levees under its jurisdiction. Passing these inspections could be the precondition for levee-protected areas to purchase a community policy.

These aspects of flood losses can make the line unattractive to the private sector, and when private coverage is available, it can be expensive, perhaps more than insureds are willing or able to pay.

Several interviewees expressed concern that a community insurance policy would exacerbate these problems and were thus skeptical that any private insurance companies would write such a policy. Whereas enrolling properties beyond an SFHA would add some diversification, fully covering the SFHA, particularly of a large metropolitan area, was thought to be beyond the interest or ability of many primary insurance companies. Many interviewees were also concerned that communities at risk of flooding would also be those at high risk of hurricane winds, something already covered by the private sector, and so a community flood insurance policy would be highly correlated with the company's existing portfolio—another reason not to write such coverage. If inland communities enrolled, however, that might offer diversification for a company's current coastal exposure. When it comes to flood risk, insurers remain concerned about adverse selection (e.g., American Insurance Association 2013), which with community policies could operate not just at an individual but also a community level.

That said, interest by the private sector in flood coverage is growing. For example, after rate hikes in the NFIP, a few private companies, many underwritten by Lloyds of London, began to enter the Florida market (e.g., Boatwright 2014). A study of two counties in Texas found that while undercharging for the risk in many locations, in some places the NFIP was actually overcharging, creating an opportunity for the private sector to compete on price (Czajkowski et al. 2012). In another indication of private interest, several catastrophe modeling companies are developing flood models for the United States for use by the private sector in rating. Private interest could perhaps be further extended if more hazard mitigation was undertaken. A Swiss Re report discusses how floods can be insured by the private sector when, among other things, governments work in partnership by reducing flood risks through building codes, land-use regulation, and hazard reduction measures (Menzinger and Brauner 2002).

The insurance and reinsurance sectors appear to have different perspectives on community policies.

Several reinsurance representatives said their sector could write them, and one company said it was now willing to do so if there was demand. This may be particularly true for well-defined smaller areas, such as behind levees or outside SFHAs. One outstanding question private sector representatives raised, however, was the role of state insurance commissioners in setting community policy rates and whether that would present a hurdle to policy development. This issue needs to be explored in more detail.

A community policy offered by a private reinsurance firm provides one political benefit over a federal policy. Some interviewees expressed concern that Congress and GAO would balk at the idea of a parametric policy because payouts do not exactly match losses. This political opposition would be eliminated if communities purchased the product from a private firm.

Another option is for community insurance policies to be written by pools administered at the state level. Municipal pools are cooperative, nonprofit insurance entities owned and controlled by local governments. In general, participating local governments pay a premium into the pool and receive a coverage document, similar to an insurance policy. In event of a covered loss, the pool pays claims to the local government. Municipal pools often cover liability, property damage to city buildings, and workers compensation for employees. Many have a consulting relationship with an actuarial firm to help them price their coverage. If funds exceed claims in a given year, the pool may retain the earnings in reserve or may return them as a dividend.

Such pools offer several benefits. They are member owned and operated, and that increases most municipalities' interest in adopting hazard mitigation measures that could lower claims, thereby delivering a direct benefit. Investments in mitigation could help make coverage for the floodplain of an entire community more feasible. At least one community representative told us that a pool would be much more politically palatable in his community than participation in a federal program.

One challenge to using such pools for community policies involves diversification at the state level. A devastating flood in a single large community could send the pool deeply into debt.

The municipal pools would thus likely need to purchase private reinsurance or have the authority to issue post event bonds to cover high-loss years. This would be similar to financing of state residual market mechanisms (Kousky 2011).

5. Implementation Considerations

In the interviews and at the NAS meetings and workshop, stakeholders raised questions and concerns. Households and communities must understand clearly how a community parametric policy operates, for example. The following subsections answer questions about the parametric design and supplementary products presented in Section 4.

5.1. How Could a Community Policy Reduce Premiums?

The goal of the community policy is to improve community resilience, not necessarily to lower premiums, but a cost-saving design would help secure political and landowner interest. When deciding whether to purchase a policy, a community will want to know whether property owners will pay less for the same coverage than if they purchase individual policies. This section discusses how a community insurance policy, even when combined with complementary coverage, could cost the property owner less than an individual NFIP risk-based policy. However, not all NFIP premiums are risk based. The consequences of the NFIP premium-setting practices for the cost of individual versus community purchase with supplemental coverage are discussed in Section 5.3.

5.1.1. Administrative Cost Savings

Currently, the NFIP tasks are shared by FEMA, FEMA contractors, private insurance companies, and independent agents. The costs for this structure are recovered through an administrative fee of roughly 30 percent of the premium, loaded onto each policy (see Section 2.1). The parametric community insurance policy reduces these costs and passes on the savings to the community. For instance, the current loss adjustment factor covers the costs of loss adjusters and special claims investigations.

These activities and costs would be eliminated by a parametric community insurance policy. In current rates, there is also a load for agent commissions; WYO commissions, for example, are 14 percent of NFIP premiums (GAO 2014). These could also be eliminated because agents would no longer write separate policies for individual properties. However, the community policy may boost demand for complementary coverage, so agents' services will still be required. The net result could be slightly lower premiums for a community policy.

However, some administrative costs would still be incurred, including costs for gage installation and maintenance, potentially costs to secure first-floor elevation data for estimation of premiums, and any costs for applying and calibrating the modeling tools. Other remaining costs include the federal policy fee and a fixed expenses loading, used to cover costs of mapping, mitigation grants, salaries, the NFIP servicing agent, the NFIP FloodSmart campaign, and a few other costs. Currently accounting for about 9 percent of an individual policy premium (Hayes and Neal 2011), most of these costs would likely be included in a community policy premium. Or, as discussed next, the federal Treasury could pay some costs, such as mitigation grants or mapping, instead of loading them into the premium.

5.1.2. Premium Discounts

The community policy premium will be the expected costs of payouts plus any administrative charges and contingency loads. However, because community insurance is proposed as a means to increase resilience and is not a pure insurance program, there may be reason to discount the price through annual payments from the Treasury (not through cross-subsidization, as is often currently done). The logic for a discount would be the same as for any other federal program that Congress creates when it sees a public interest in encouraging individuals' to make a particular choice (such as tax deductions for college tuition to support college attendance or mortgage interest deductions to support home ownership).

One justification for offering a discount is that if insurance take-up rates were higher, demand for postflood disaster aid and thus spending would perhaps fall. A RAND report, however, found no

relationship between take-up of flood insurance and the frequency of federal aid given and a very small—economically insignificant—effect on the amount of aid (Dixon et al. 2006). Still, if nearly full take-up reduced aid more than the RAND data, estimating the amount of any such savings for the particular community would require calculating the likelihood of aid for different flood events and predicting the amount of aid to property owners who did not purchase individual policies but do have capped coverage from the community policy. Any calculation made to justify a specific discount and request for reimbursement to the insurer would be highly uncertain. As an alternative, a general argument for potential savings on disaster aid might be used to propose some fixed percentage reduction in the community policy premium.

A second justification for a premium discount relates to ability-to-pay. The community will distribute the cost of the premium among those covered by the community policy, but some property owners may have very low incomes and be forced to opt out because they cannot afford the expenditure. A discount could be available for communities where some or all of the properties are owned by people less able to self-insure or "cost burdened" by individual premiums. The Biggert-Waters Flood Insurance Reform Act of 2012 and the HFIAA 2014 suggest that affordability of flood insurance is a congressional concern. However, determining when premiums are not affordable and when and how to assist individuals might be complicated (see NAS 2015a). Congress may choose to extend assistance to a community based on the number of low-income residents in the floodplain and require the community to report how the discount was used to make the community policy affordable to low-income property owners.

5.1.3. Complementary Coverage

As discussed in Section 4.3, the community insurance policy can be one piece of a layered approach to flood coverage for individuals. It could be treated as a large deductible when property owners purchase additional coverage through a private firm or the NFIP. The supplemental policies, as mentioned, could also be written to eliminate the basis risk in the community policy: the community insurance policy pays first and the supplemental

policy covers damage above the community payout, or the supplemental insurance pays when the community policy is not triggered and yet some flood damage is still sustained. Given the rare occurrence of high levels of loss, these additional products would likely be very inexpensive. The NFIP policies would require modifications to allow for much higher deductibles, or the program could create an entirely new wraparound product to complement community policies.

5.2. What Are the Incentives for Mitigation?

A parametric product would provide incentives for multiple mitigation measures by both communities and households. A parametric community insurance policy can create incentives for investment in household-level mitigation through the nature of the payout and incentives for investments in community-level mitigation through the premium. We discuss both mechanisms here.

5.2.1. Incentives for Individual Property Mitigation

The parametric approach to community flood insurance creates a unique incentive for household-level investments in mitigation. Since those whose properties are flooded will get the same payout regardless of the level of damage that the buildings and contents sustain, they have incentive to invest in measures that will reduce losses, such as flood-proofing their structures, improving localized drainage, and moving contents to higher ground before a storm. In the current NFIP, premium reductions are not given for many mitigation measures beyond home elevation that could be implemented at individual properties because of high transaction costs or a lack of data.

It is the case that some mitigation measures have high up-front costs, even if they produce savings over time in the form less damage or a reduced combined cost for the community payment plus the premium for supplemental coverage. One way to help defray the costs of implementation would be for FEMA to prioritize mitigation grants to communities that purchase a community policy. Another approach

is a mitigation loan program, with priority given to residents of communities that have purchased community policies. For more on the design of such programs, see National Academy of Sciences (2015a).

5.2.2. Incentives for Community-Level Mitigation

The current NFIP structure, according to the interviewees, creates very little incentive for community-level investments in hazard mitigation. The Community Rating System does offer premium reductions to SFHA residents when the community undertakes mitigation measures, but several interviewees raised concerns about the program's efficacy. They described the CRS as cumbersome and complex for small communities to navigate and found it not well suited for large cities, either. Community leaders might be rewarded by voters for participating in the CRS, but the community has no direct financial incentive to adopt risk reduction measures.

Multiple studies have found that participation in the CRS reduces flood claims and property damage, although some find that significant reductions come only to communities higher up in the program or only for certain actions (such as open space protection, higher elevation requirements, and small flood-control projects) (Brody et al. 2007; Michel-Kerjan and Kousky 2010; Highfield and Brody 2013). Research in Florida suggests that most communities undertake easier activities, such as mapping and providing public information, and do much less in terms of damage reduction and flood preparedness (Brody et al. 2009).

Several of those interviewed argued that if the community was paying the premium and could receive premium discounts for a wide range of community-level mitigation measures, then community insurance policies could spur greater investments in mitigation—for example, land-use measures, structural investments,³⁴ and/or aid to

³⁴ Regulations would likely need to be adopted to control hydrologic trespass. Structural measures such as levees or channels can push floodwaters into neighboring communities. If these approaches to flood risk management are rewarded in the community policy, they will need to be permitted, even if not federally funded, to ensure they do not increase flood risk for others.

individual property owners to finance mitigation measures. Premiums could be reduced for risk-reducing measures, and thus the premiums would convey the necessary information for the community to invest in cost-effective risk reduction.³⁵ The premiums would be updated every five years following verification of any new mitigation measures adopted since the previous renewal date. Pricing of the premium at the time of the 5 year renewal would either be a determination that certain actions received a stated discount, or would require modeling sophisticated enough to include the expected reduction in claims as a result of these measures.

As an additional incentive, priority for mitigation grants might be given to communities that purchase community policies, especially if the coverage extends to providing payment relief to low-income residents.³⁶ Programs other than FEMA's might link mitigation with community purchase as well. For example, flood hazard funding priorities might favor communities that have purchased a group policy.

5.3. Will All Property Owners Have to Accept and Pay for Community Policy Coverage?

This question was raised in all the interviews and at the NAS workshops. One benefit of community

policies would be greater take-up of flood insurance, and as more individuals are insured, the community recovers more quickly after an event. For this reason, a community policy should begin with the commitment to offer coverage for the entire 500-year floodplain, including areas behind accredited levees.

That said, many individuals choose not to purchase insurance, even when it is available, and might resist having coverage placed on them involuntarily. This led several interviewees to question whether any local government would be willing to assess charges on residents to pay for insurance coverage they were not already purchasing for themselves. This reality makes it less likely that a community leader could gain the political support for purchasing a policy and levy an associated fee or tax to help pay the community premium.

Landowners who do not wish to be covered by the community policy could opt out.

One possible way to secure community support would be to propose universal coverage in the 500-year floodplain but allow property owners to opt out before the final policy is written. Two comments about opting out were raised in the interviews and need to be addressed. First, opting out of community coverage would not exempt property owners from complying with the mandatory purchase requirement if they are in an SFHA and have federally backed mortgages. And as a corollary point, FEMA would need to affirm that the community policy coverage, combined with a supplemental policy, satisfies the mandatory purchase requirement. Second, although an opt-out provision would make the community policy more politically feasible, if many choose to opt out, the number of property owners who do want community coverage may not justify the associated administrative effort to offer the policy. This is why the process described in Section 4.9 begins with an assessment of property owner interest and why the outreach efforts to assess that interest (Section 5.4.3) should be a cost borne in part by the insurer and not just the community.

³⁵ In addition to spurring more mitigation, community insurance could also help prevent investment in mitigation that is not cost-effective. One interviewee told us that community insurance could be a deterrent to investments in hazard mitigation measures that are expensive but help only a few households and thus do not benefit the community broadly. It would be less expensive for the community to provide insurance coverage. There thus exists the potential for community insurance to lead to more financially rational mitigation investments.

³⁶ Some repetitive loss properties (usually defined as having two or more losses of at least \$1,000 over a 10-year period) have seen much higher and/or more frequent claims than others. Some of these are the same properties that pay pre-FIRM rates, which are lower than NFIP risk-based rates. To reduce the net financial loss associated with these properties, the NFIP encourages investments in hazard mitigation. The Flood Mitigation Assistance Program provides grants for mitigation that can be shown to be in the NFIP's financial interest. It was established in 1994 to reduce or eliminate NFIP claims and has been used to mitigate the repetitive loss properties. Note that previously there had been separate programs for these properties, but the 2012 reform legislation consolidated them. In FY 2014, \$89 million was available in this program.

The logic for an opt-out provision (and not an opt-in) comes from behavioral economics, popularized recently through books such as *Nudge* and *Thinking Fast, Thinking Slow*. These books mention studies that have shown that individuals disproportionately stick with the status quo or a default option (Samuelson and Zeckhauser 1988). For example, in some countries people are considered to be organ donors at death unless they have explicitly stated otherwise. In other countries, the opposite is true—people are assumed not to be donors unless they have explicitly given their prior consent. Under both situations, most individuals stay with the default option, and thus rates of organ donation are dramatically higher in countries where the default is to donate (Johnson and Goldstein 2003). Similarly, when car insurers offer an option that limits drivers' rights to sue in exchange for lower premiums, sticking with the default choice is much more likely (Johnson et al. 1993). We use this literature as a basis for anticipating that if an opt-out option is offered, the majority of homeowners may choose to stick with coverage.³⁷

An opt-out decision, however, should be well informed. The community, in cooperation with the insurer, would offer outreach programs to increase the likelihood that the property owner has read a plain-language explanation of the community policy and how it would work with individual supplemental coverage. Ideally, the information products and/or sessions would explain flood likelihoods, expected damages, expected payouts under the community policy, premiums for supplemental coverage, and the limits and uncertainty of receiving post flood aid (see Section 5.4.3).

Although some residents may opt out of flood coverage entirely, others may find coverage for less than the cost of the community policy plus any supplemental coverage. Indeed, property owners who are subject to the mandatory purchase requirement or want insurance coverage would compare the premium for a private or NFIP individual policy with their cost for the community policy plus the premium paid for supplemental coverage. If the individual policy is less expensive, the property owner would be expected to opt out of the community coverage. Helping property owners compare the combined cost

of community plus supplemental coverage with the premium for an individual policy could be part of the information sessions.

5.4. What Are the Administrative Responsibilities and Costs for the Community?

A frequently expressed concern was that purchasing a community policy would require expertise, resources, and staffing that many communities do not have. The design proposed here minimizes the burden on communities to the greatest extent possible, as the following subsections explain.

The administrative responsibilities of the community would include providing data for premium estimation, conducting outreach programs, and choosing coverage levels. In addition, communities will continue to take responsibility for community-level mitigation.

5.4.1. Community Eligibility for Purchase

NFIP participating communities must currently adopt floodplain regulations covering the SFHA; those requirements would remain in place for the community to be eligible to purchase a community insurance policy. Although some interviewees advocated stricter flood mitigation requirements as a condition of purchasing a community policy, for many local governments this would create a disincentive, dampen purchase, and work against the goal of fostering greater resilience through widespread take-up of insurance. However, the community insurance policy could include incentives for implementing flood mitigation measures at both household and community levels (see Section 5.2).

In addition to having land-use regulations, the community also must have authority to raise the necessary funds to pay the insurance premium, through taxation or assessments. These two

³⁷ Some interviewees, however, were wary of any opt-out option.

authorities can reside in a city or a county government that has control of property, sales, or income tax authority, and authority to charge fees for services.

A special-purpose funding district, such as a levee district, that has been granted taxing authority to fund its projects might be the purchaser of the community policy. This could be similar to, say, tax increment financing (TIF) districts. For example, in St. Louis County, Missouri, a portion of the municipality of Chesterfield was designated a TIF district so that properties in the area could be taxed to cover the costs of improving a levee. Special districts might be created to obtain the necessary financial authority for the sole purpose of purchasing a community insurance policy. For example, several interviewees raised the possibility that a group of property owners in an area could get together and choose to purchase a community policy. The neighborhood association would need to have the authority to raise funds to pay the premium. In fact, one person interviewed suggested that this neighborhood association approach might be more feasible, since a large jurisdiction is unlikely to find the political support to purchase community insurance for an entire floodplain.

A community that has revenue raising authority and meets current requirements for participation in the NFIP would be eligible to purchase a community policy.

5.4.2. Collecting Revenues to Pay the Community Premium

The question of how the community might recover costs was a topic of frequent discussion in the interviews and the perspectives offered were quite varied. There are multiple ways in which a community could raise funds to pay for the community level premium and each community could choose the mechanism that is best suited for them. Two approaches—a fee and a property tax—were discussed most often, and a combination of both was also mentioned. Some interviewees said that calling the payment a “fee for a service” might be more acceptable than a tax. Proponents of a

property tax assessment observed that it would be administratively simple. A surcharge on the property tax of those who have coverage from the policy was often suggested as a possibility, although the burden might also be spread more widely through a local sales tax or by a surcharge on all property taxpayers.

A concern with both a fee and a property tax was the extent to which rates could be risk based. Many interviewees stressed that property-level assessments should be made on a sliding scale according to the risk level, both to preserve the risk information that is conveyed by the price of insurance and to create incentives to mitigate that risk. For example, many communities charge different stormwater fees based on the pervious surface area on a property, under the logic that the community’s cost to control stormwater can be limited if there is less runoff from any given property. This could serve as a model for insurance assessments. Whether by fee or tax, payments can be a signal to be aware of flood risk in decision making and allow property owners to bear some of the cost of selecting a high-risk location and create incentives for mitigation. Because the parametric policy premium is linked to assessed property value, a community fee that is a fixed percentage charge (ad valorem) will vary by the assessed value of the property. This would mean that those who are likely to incur higher damages from a given event in a given area would pay more. If the ad valorem rate in turn could vary by the risk in an area, then the payment to the community by each property owner would be aligned with the risk at the property. For this effect to be realized, the charge for the community insurance coverage must stand out on any bill paid by the property owner.

A related concern was differentiating rates according to low- and middle-income households’ ability to pay. The community could offer “lifeline” charges to those who are less well off, as is done by some utility companies. The revenue forgone from offering such discounts might be made up by charging higher rates on others, but a higher charge might encourage those property owners to opt out. If the goal is resilience, any subsidy should perhaps come from state or federal funds, not through cross-subsidies among households.

We also heard, however, that differentiating rates, whether according to risk or ability-to-pay, may not be realistic: asking the community to establish

how taxes or fees would vary across property owners could be too contentious for local government decision making. Local officials may also not have the expertise to differentiate by risk and would need guidance from FEMA. Finally, a community's ability to differentiate rates, even if it wanted to, may be limited. The manager of a levee district, for example, informed us that the district can set a tax rate only on the value of the property; it could not, therefore, assess properties differently depending on their risk level. For a flat area behind a levee, risk may be fairly uniform, but for some communities, risk could be highly uneven across properties, making even assessments politically unpalatable, with those at lower risk objecting to the charge.

Collection of revenues to pay the premium can be part of existing revenue-raising practices but will vary with the local authorities and the local objectives.

5.4.3. Conducting Outreach and Education

The community, in cooperation with the insurer, would sponsor outreach and education meetings as the policy is initially being considered (a) to inform residents about community coverage, options for collecting revenues, and supplemental insurance, and (b) for those who may consider opting out, to provide information about terms and limitations of self-insurance and disaster aid. Such information would always be publicly available on a website as well. Ideally, outreach would be repeated annually, to remind participating property owners of the coverage provided, the claims process, the limitations of the coverage, and opportunities to purchase supplemental coverage. The cost for outreach may already be budgeted in some communities if they are in the Community Rating System. However, the emphasis on resilience as the goal for community insurance suggests that outreach programs could possibly be supported by grants from FEMA.

An outreach program could be organized around two basic questions. First, assuming they are not subject to the mandatory purchase requirement, do

property owners want to have any flood insurance coverage at all? Without insurance, they would be relying on self-insurance (their own readily available financial assets) and disaster aid. Inundation maps could help them visualize the effects at their property when water reaches different heights on the gage. Owners also need to understand the likelihood that flooding would reach each height. Communication of likelihood is difficult and may need to be explained in several ways (Kousky and Shabman 2015). The program could also include a simple calculation that property owners might use to estimate repair and replacement costs at each flood stage, to help them consider the limits of self-insurance. Equally important, the owners must recognize the limits of disaster aid and should receive a plain-English description of federal aid programs, web links for further information, and estimates of the amounts available and the time it takes to receive aid (Kousky and Shabman 2012.)

Assuming property owners decide that they are interested in insurance, then the second question they need to answer is how much coverage to buy and whether they would be willing to be covered by a community policy. For the reasons discussed in 5.1.1 and 5.1.2, the payment to the community could be less than the payment for individual coverage up to the community policy cap. In addition, the sum of the payment to the community plus the premium for supplemental coverage would likely be less than the premium for individual purchase for that same coverage. This is especially the case if the NFIP (or private) individual purchase alternative was “risk-based”. However, in the NFIP as currently structured, some property owners pay grandfathered rates or, if the properties are outside the SFHA and have a favorable loss history, Preferred Risk Policy rates—both of which are less than NFIP risk-based rates. It remains to be determined whether a community policy plus supplemental coverage would be less expensive than the discounted NFIP premiums.

Once in the program, property owners need to understand the community policy process. This is an ongoing requirement for an outreach program. The administration of claims would follow the procedure discussed in Section 4.6. The NFIP would make claims payments directly to the insured property owners. Expedited payouts may be important to interest and acceptance. Even though the contract

is between the community and the NFIP, each insured property needs information on its flood coverage. Thus, in lieu of actual insurance contracts, the insurer and the community would provide, for every covered property, documents that clearly state what coverage the property has under what triggers. Such informational notices would be sent annually and should include what kind and size of events are not covered and what other coverages are available through NFIP and private offerings.

5.4.4. Selecting Properties to be Covered

Although enrollment through the 500-year floodplain is the best option for promoting greater community resilience to flood events, other spatial areas for inclusion in the community policy could be considered. For example, the policy could only cover areas of residual risk outside the SFHA, leaving the current NFIP program design for the SFHA itself. Providing coverage only to properties behind accredited levees or only to areas between the 100-year and 500-year lines would make the policy much more affordable and promote insurance for properties that are the least likely to voluntarily insure and yet still be at risk from a catastrophic flood event. It would be less expensive since the risk in these areas is lower. This “beyond the SFHA” alternative could contribute to community resilience.

However, if only properties outside the SFHA are covered, the incentive for the community to mitigate the risk at the properties most likely to flood—such as pre-FIRM buildings in the current program—is dampened. The challenge is to encourage communities to include these properties in their coverage and thus serve the broader resilience goals. For this reason the NFIP might require coverage for properties in, say, the 25-year floodplain in exchange for prioritizing the community for mitigation assistance.

5.4.5. Providing Data for Setting the Community Premium

The community will choose whether to purchase a policy and, if so, who will be covered, based in part on the cost of the premium. As described in Section

4.7, the calculation of the premium will use data provided by the community. First, the community needs to provide street addresses and assessed values of properties in the 500-year floodplain at the time of the initial policy contract and at each renewal, so that the premium can be estimated as if all properties were covered. The final premium is calculated for the subset of properties that actually enroll. The required property information is readily available in jurisdictions that have property taxes. Even if properties are not assessed at 100 percent of market value, appraisals are usually maintained by local governments; if not, adjustments will need to be made for the modeling process used to estimate the premium.

The community must also determine median elevation of the first habitable floor in each area, referenced to the same vertical datum used for determining flood stages. In many places, this information may not be available.³⁸ Therefore, securing median elevations for each area is a cost that may need to be initially incurred by the insurer and perhaps recovered through an administrative fee loaded onto the premium. One cost-effective alternative is to analyze the elevation certificates of SFHA properties covered under current NFIP individual policies and then impute the median to all properties in the area. For areas outside the SFHA, it may be necessary to pay for obtaining elevation certificates for a sample of properties, and then extrapolate. The costs of these approaches can be compared with the cost of LiDAR.

6. Future Steps toward a Community Policy

This report has presented one design for a community insurance policy that could enhance resilience to flood events by increasing the number of properties having insurance coverage. Moving from concept to implementation will require additional work. In fact, the major challenge noted by all those

³⁸ The costs per property can be greatly reduced if LiDAR is employed. As another benefit the community then has data to help individual property owners determine risk and choose a mitigation approach. One possibility is to have FEMA provide a grant for LIDAR mapping if the community agrees to proceed through the initial steps required when considering purchase of a community policy.

interviewed would be gaining local political support, particularly if not all residents are interested and community resources are required.

This report clarifies how a community policy might be structured to increase residents' interest and limit communities' administrative costs. This does not mean that the proposed design will make the concept universally attractive. However, the specifics presented here can motivate further exploration and refinement.³⁹

If interest remains, we suggest that FEMA seek an extension for preparation of the final report to Congress in compliance with Section 23 of HFIAA 2014 so that the agency can provide a definitive finding on the feasibility of the concept and, if feasible, propose terms and possible conditions for the NFIP or the private sector to offer such insurance. With additional authority, the NFIP could organize an internal development team to work with a small number of communities.⁴⁰ Together, they would collect the necessary data and, building on the design presented in this report, develop a specific offering that communities would be willing and able to pay for.⁴¹ From there, FEMA and potential

private sector (re)insurers could develop a pilot insurance policy that aligned with the interests of the communities. Ideally, this process would be iterative and ultimately a joint, cooperative design activity that engaged both the communities and the potential (re)insurers. Funding for such work could be secured from FEMA, private (re)insurers, and/or foundations.

³⁹ In fact, topics not covered in this report will emerge and will need to be addressed through a modified design. Identifying those questions and providing answers will be one of the necessary tasks if the community insurance policy concept is refined. One interviewee provided an example of an unexamined issue: a community was considering a community insurance policy with a private company, which would provide standard NFIP-like coverage for properties, as well as lost tax revenues in the event of a flood. Ultimately, however, the community became concerned about the liability implications of having its name on a primary insurance policy and abandoned further consideration of community purchase.

⁴⁰ Communities that may have interest in this effort might already be cooperating technical partners or CRS-enrolled communities; these communities are already fulfilling some of the required administrative obligations. Many interviewees thought a community policy might be of particular interest to levee districts, which may already be familiar with assessing taxes or fees on themselves for flood protection and might be open to an additional assessment to insure against events that exceed the design of the levee. A community policy may also be of interest where map updates have increased mandatory coverage, or where recent floods have caused damage.

⁴¹ To compare the cost of a community policy with that of standard NFIP or private sector policies, a community would need results from modeling. Because of variations in flood risk, estimates cannot be done in the abstract, and modeling flood risk for a specific community was beyond the scope of this report. It would be a necessary and feasible part of a pilot, however.

Appendix. Interviewees

The following individuals all participated in some form of communication with us in preparation of this report. The majority of individuals were interviewed once or twice in person or by phone. A subset of individuals provided targeted feedback on specific topic areas or provided suggestions in response to viewing a draft of the report. We also benefited from comments from members of the NAS Committee on Community-Based Flood Insurance Options and speakers at their workshop; those names are not included here, instead the reader should reference their report (NAS 2015b) and website.

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