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Hearing on Reauthorization of the National Flood Insurance Program: Protecting Communities
from Flood Risk
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Reducing Increasing Flood Losses through the NFIP Reauthorization

Chairman Brown, Ranking Member Toomey, distinguished members of the Committee: it is a distinct privilege to participate in this timely hearing on the reauthorization of the National Flood Insurance Program (NFIP) and flood risk reduction in general. I want to thank the Committee for the opportunity to testify today and share my expertise.

I am a Regents Professor and holder of the George P. Mitchell '40 Chair in Sustainable Coasts in the Department of Marine and Coastal Environmental Science at Texas A&M University at Galveston. I serve as director of the Institute for a Disaster Resilient Texas (IDRT) and was the Lead Technical Expert for the Governor's Commission to Rebuild Texas as part of the state's response to Hurricane Harvey. I have been teaching, researching, advising, and leading initiatives on flood risk reduction for over 20 years. I have published numerous scientific articles on this topic, as well as the books *Rising Waters: The Causes and Consequences of Flooding in the United States* and most recently, *Coastal Flood Risk Reduction: The Netherlands and the U.S. Upper Texas Coast*.

I would like to focus my comments today the broader role the NFIP can play towards more effectively reducing flood losses in the United States (U.S.).

Growing Impact of Flooding

Floods continue to be the most deadly, disruptive, and costly natural hazard in the U.S., from chronic deluges of rainfall to catastrophic storm surge events, the toll of persistent inundation, especially in low-lying coastal areas, continues to spiral upward. Increasing physical risk combined with rapid land use change and development in flood-prone areas has amplified the adverse economic and human impacts in recent years. Never before have the repercussions from storm events driven by both coastal surge as well as rainfall been so damaging to local communities to the point where curbing their impacts has become state and national priorities.

Since 1970, the NFIP has received approximately 2.4 million insurance claims and paid out almost \$70 billion. Based on Federal Emergency Management Agency (FEMA) data, insured losses increased, on average by \$109 million per year (adjusted to 2018 dollars) from 1978 to 2018 (Brody et al., 2022). Moreover, average annual property damage due to flooding has multiplied roughly 54-fold over the past four decades (Brody et al., 2011). For many households,

such as in my hometown of Houston, TX, flood waters in residents' homes have been an annual occurrence leading up to Hurricane Harvey in 2017, which inundated over 150,000 residential structures and inflicted approximately \$125 billion in overall damages. The rising costs of floods in the U.S. help to solidify the notion that floods pose a major risk to property, and with expanding development in low-lying coastal areas the problem appears to be getting worse.

We also know that the increasing economic impact of floods are driven not solely by rainfall, sea-level rise, or wind-driven coastal surge. Rather, these mounting losses are often exacerbated, or entirely created by conditions set by the human-built environment. Parking lots, roadways, rooftops, and other impervious surfaces are fragmenting natural drainage patterns and compromising the ability of these systems to store and slowly release water (UMD/TAMUG, 2018). The result is more water pushed downstream and into people's homes. This trend is especially problematic in low-lying urban areas, where storm-water infrastructure deterioration, population growth, and development have accelerated over the last several decades (Bertilsson et al., 2019). Much of this flooding occurs in more densely occupied urban areas where infrastructure is aging and lacks adequate capacity to handle storm-water runoff. In the past, this type of flooding, known as 'urban flooding,' was considered to have relatively minor impacts, but has become increasingly more severe in recent years (Rainey et al., 2021). In this newer category of flooding, risk and impacts are no longer tied to the FEMA-defined floodplains derived by analyzing stream channels or bayous. Instead, significant flood losses can also occur miles from a delineated floodplain where they are embedded in a highly developed landscape (Highfield and Brody 2013; Blessing, Sebastian, and Brody, 2017). In Houston, TX, for example, over half of NFIP claims filed since the program's inception have occurred outside of the 100-year floodplain boundary, which is considered the primary marker of risk in the U.S. In fact, during Hurricane Harvey in 2017 almost 46 percent of the losses were outside even the FEMA 500-year floodplain (GCRT, 2018).

Overemphasis on a Recovery-based Approach to Flood Management

The NFIP has had several successes in managing floods, including more widespread identification of flood hazards and increased development standards in floodplain areas (U.S. Interagency Floodplain Management Review Committee, 1994). The program was initially established to reduce the financial burden on the federal government to pay for the cost of flood events across the country. The program focuses on economic recovery post-flood events more so than proactive mitigation to reduce the risk in the first place (Brody et al., 2022). In fact, the vast amount of funding for coastal flood-related issues is provided by the federal government only after a disaster occurs, through emergency supplemental appropriations. A recovery-based approach predicated upon insurance payments and other forms of post disaster payments is at its essence an acceptance of failure when it comes to avoiding adverse impacts from floods (Brody et al., 2019). This strategy continually strains the federal fiscal coffers (something the program was supposed to avoid).

Need for a More Proactive and Protective Approach to Flood Risk Reduction

While the NFIP provides important recovery resources to homeowners, a protection-based strategy focuses on mitigating flood risk before an event even takes place or eliminating it

altogether. This more proactive approach to risk reduction assumes that residents should never bear the burden of inundation and associated loss, regardless of where they are located within coastal landscapes. Such an approach favors both systems-based structural interventions and land use planning techniques that seek to remove or avoid structures from areas most at risk.

Under this notion, damage to property or other adverse impacts are considered failures in the system rather than expected consequences. Structural and non-structural flood mitigation techniques are implemented to eliminate vulnerability to flood impacts as much as possible, as well as incorporate contingencies if a disaster were to occur. This approach lends itself more towards the implementation of avoidance strategies that can reduce the constant repetitive loss and disaster-recovery cycle, thereby stemming the impacts of flood loss over the long term.

The Promise of the FEMA Community Rating System (CRS)

Fortunately, there is no need to establish a new federal policy or initiative within the NFIP to pursue proactive flood mitigation. FEMA's Community Rating System (CRS) is an established program focusing on a mitigation-based approach to flood risk reduction, that, if expanded, would make a significant impact on reducing losses and provide a pathway for flood resiliency in the U.S.

The CRS was established in 1990 to encourage communities to exceed the NFIP's minimum standards for floodplain management. Communities participating in the CRS adopt various flood mitigation measures in exchange for federal flood insurance premium discounts for policy holders, ranging from 5 to 45 percent. The non-structural orientation of the CRS program categorizes planning and management activities into the following four "series" containing 18 mitigation "activities":

1. Public information (Series 300) activities informing residents about flood hazards, the availability of insurance, and household protection measures.
2. Mapping and regulation activities (Series 400) containing both critical data needs and regulations that exceed NFIP minimum standards.
3. Damage reduction (Series 500) activities focusing on reducing flood damage to existing buildings, and may entail acquiring, relocating, or retrofitting existing structures.
4. Flood preparedness (Series 600) activities implementing strategies associated with warning and response to minimize the adverse effects of floods.

Credit points are assigned to participating CRS communities based on the degree to which different flood mitigation activities are implemented, but not all activities carry the same amount of points (FEMA, 2013). While the participating jurisdiction takes responsibility for adopting and implementing each mitigation activity, the individual homeowner receives the discount on their national flood insurance premium. The CRS program incentivizes local communities to focus on avoiding flood risk at the outset, increasing public awareness of this risk to encourage protective household behaviors, and preparing for the impact before a flood event occurs.

CRS program communities not only pay lower insurance premiums, they also significantly reduce their flood losses. A comprehensive national study conducted by IDRT at Texas A&M

University found that participating CRS communities experienced significantly less overall flood losses than communities that do not participate (Highfield and Brody, 2013). On average, CRS communities experienced 50% reduced losses per year than non-CRS communities. This reduction translated to, on average, approximately \$500,000 in savings per community, per year across the U.S.

Why is the CRS so effective in reducing losses and fostering flood resiliency at the local level?

First, the program incentivizes flood avoidance practices versus recovery from storm events. Two avoidance-based mitigation activities incorporated into the CRS program were found to be most effective in reducing observed flood losses: **freeboard**, the distance between the estimated 100-year level of inundation (we call this ‘vertical avoidance’) and **open space protection** (we call this strategy ‘horizontal avoidance’) that keeps structures out of harm’s way and maintains the natural absorptive capacity of natural systems, such as wetlands and riparian areas. Considering the average amount of credit points CRS participating communities received, freeboard requirements (listed as Higher Standards) led to the highest overall reduction in flood damages among all mitigation activities with an estimated average avoided losses of \$800,000 per year. Similarly, the average savings per year for each CRS community in the U.S. pursuing open space protection through buyouts, development restrictions, structural removal, and other means was approximately \$591,436.

Second, mitigation activities adopted at the community level translate into significant savings for households located in flood-prone areas. One of our studies in the Houston region where NASA is located found that jurisdictions implementing higher regulatory standards (activity 430), such as freeboard requirements and the prohibition of fill in the floodplain passed on approximately \$21,000 in avoided losses per household in the study area (Highfield, Brody, and Blessing, 2014). We showed that homeowners can benefit greatly in communities that engage in practices beyond the NFIP and that the minimum regulatory requirements of the NFIP may be too low given the substantial gains that can be made.

Third, the CRS program also emphasizes activities that provide the public with information on the location of flood risks, how to protect their homes from flood impacts, and requirements for real estate professionals to disclose risks during the property transaction process (series 300). We found that just providing residents with flood protection information (activity 350) can avoid over \$18,000 in flood losses per household. Communicating critical information about flood hazards often stimulates behavioral changes among homeowners, ranging from moving contents to a second floor to flood proofing bottom floors and basements. Risk disclosure also helps inform the homebuying or renting process. Flood risk communication and hazard disclosure are powerful tools to reduced flood losses experienced by residents because they do not require adopting costly regulations that are difficult to implement (Highfield and Brody, 2013). In response to this issue, IDRT created an online tool called Buyersbewhere.com where users can look up a property’s flood risk using the most advanced models and technology. Subsequently, the Governor’s Commission to Rebuild Texas proposed and helped pass the most ambitious state-level real-estate flood risk disclosure requirement in the U.S. Both these actions are facilitating more transparent, interpretable, and actionable communication of flood risk to those needing it the most.

Fourth, the CRS participating communities not only help residents avoid potential flood losses, but they also make it less expensive to live in flood-prone areas even in the absence of a storm event. In fact, communities that expend a lot of effort in the CRS program can offset increases in insurance premiums paid by homeowners while at the same time reducing the majority of expected losses through sound mitigation tactics (Blessing et al., 2019).

Finally, it is important to note that the CRS is an incentive-based program. Participation is voluntary and communities that implement a greater number of mitigation strategies reap the greatest economic rewards in terms of lower insurance premiums and significantly less flood losses. In this way, FEMA can influence local flood mitigation efforts without imposing strict regulations that infringe upon a locality's local economic development opportunities.

Conclusions

Without a continued investment in proactive mitigation strategies, we will continue to experience upwardly spiraling flood losses and continued drain on local and national economies. Incorporating into the current program a more proactive and protective strategy for flood risk reduction is imperative if the nation is to address its growing flood loss problem driven by development, changing rainfall patterns, sea level rise, and other issues. Fortunately, the existing FEMA-CRS program can meet this challenge without additional legislation, mandates, or regulatory requirements at the federal level. A CRS-styled program provides an opportunity to increase mitigation activities focusing on avoidance, planning, and risk communication that can effectively reduce losses while at the same time make insurance more affordable to homeowners. While flood insurance policies and mapping programs should remain critical components of the NFIP, they will not by themselves reverse the increasing trend of flood losses nor set the nation on a course for developing more flood resilient communities in the future.

Recommendations

Given my testimony above, there are several actions Congress and/or relevant agencies could consider to reform and reauthorize the NFIP so that it is more effective at reducing flood impacts:

1. Recognize that our federal system focused on recovering from flood disasters needs to take a **more protection-based approach** when dealing with economic impacts, and support existing as well as future initiatives that seek to prevent flood losses from occurring in the first place.
2. Recognize that the human-built environment is exacerbating and at times entirely creating flood impacts, and that urban flooding is a major problem that needs to be addressed by the CRS and other existing programs. To this end, the Congress and the administration, in coordination with state governors, and regional, local, and tribal officials, should develop appropriate mechanisms to **fund necessary repairs, operations, and upgrades of current stormwater and urban flood-related infrastructure**.
3. Expand participation in the FEMA-CRS by removing barriers to entry and better promoting the effectiveness of the program. Currently, there are about 1,500 CRS communities out of over 22,000 eligible to join the program. One of the major issues facing interested communities is the

lack of resources needed to hire a local coordinator and monitor the implementation of mitigation activities. Congress should **allocate financial and technical resources to localities** as a further incentive to join and successfully manage a CRS program to proactively reduce flood impacts over the long term. The goal should be that all NFIP communities become CRS communities and that what are now considered “higher standards” should become the baseline for localities managing flood risk across the U.S.

4. Promote and encourage increased effort for communities currently participating in the CRS. Effort matters when it comes to realizing the benefits of the CRS, both in terms of lower insurance premium rates and reduced flood losses over time. CRS communities already cover more than 65 percent of existing NFIP policies. However, most jurisdictions make minimal effort and tackle only the “low hanging fruit” of mitigation activities (Brody et al., 2009). Incentivizing added effort within the CRS **by increasing the weight of points earned for more robust and effective strategies** is one approach. For example, additional points could be assigned to adopting higher freeboard standards or open-space protection activities that most effectively avoid future flood losses. Another approach could be to subdivide activities into **smaller, more incremental steps, with points attached to each step** to make mitigation effort a less daunting proposition at the local level.
5. Emphasize flood risk communication, outreach, and disclosure either through the CRS or ongoing programs for riverine, urban, and coastal flooding. Localities should receive **additional resources and incentives for integrating flood risk communication, mapping, and risk disclosure** into the real estate transactions process in a way that is accessible, interpretable, and actionable.

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