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FEMA's Community Rating System: Worth the Effort?

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In response to growing threats of climate change, the US federal government is increasingly supporting community-level investments in resilience to natural hazards.^{2,3} As such federal programs become more widespread, evaluating their efficiency and effectiveness becomes essential. The Community Rating System (CRS), which is part of the National Flood Insurance Program (NFIP), is a promising example of a federal policy designed to incentivize community-level investment in climate adaptation. This analysis assesses the program, asking if it has been effective in reducing flood losses, how it can be improved, and what lessons it has for similar types of programs.

The NFIP is the primary means for US homeowners and small businesses to purchase insurance against flood damage. A fundamental goal of the NFIP is to promote flood resilience nationwide by engaging and incentivizing local communities to address their own risk. Since 2005, NFIP claims have far exceeded revenue collected from premiums.⁴ At the same time, there is growing concern about the affordability of NFIP premiums, particularly following price changes under FEMA's new Risk Rating 2.0 ([as discussed in this post from September, 2021](#)). With increasing flood risk due to climate change and continued housing development on US floodplains, these challenges to the NFIP are likely to continue.

KEY FINDINGS

- Participation in the CRS is associated with reduced flood damage claims.
- On average, the percent reduction in claims for each CRS class roughly aligns with the premium discount for that class.
- CRS activities related to "Flood Damage Reduction" are associated with the greatest reduction in NFIP claims.
- In all but five years since 1998, the annual program costs outweighed the annual benefits.
- Between 1998 and 2020, the total benefits of flood damage reductions and the total costs of NFIP premium discounts both equaled approximately \$10 billion.

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² Executive Order 14008, (2021) Executive Order on Tackling the Climate Crisis at Home and Abroad.

³ Lempert, R., Arnold, J., Pulwarty, R., Lempert, R., Gordon, K., Greig, K., Hoffman, C.H., Sands, D., Werrell, C., Lazarus, M.A., (2018) Chapter 28: Reducing Risks Through Adaptation Actions, in: Reidmiller, D.R., Avery, C.W., Easterling, D.R., Kunkel, K.E., Lewis, K.L.M., Maycock, T.K., Stewart, B.C. (Eds.), Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II. U.S. Global Change Research Program, Washington, DC, USA, pp. 1309–1345.

⁴ Horn, D., Webel, B., (2021) Introduction to the National Flood Insurance Program (NFIP), Congressional Research Service.

FEMA introduced the CRS in 1994, in part to address solvency and affordability issues. The CRS provides discounts on NFIP premiums within communities that invest in a range of risk communication and risk reduction activities. The goal of the CRS is to reduce damages by encouraging proactive behavior at the community level. The CRS was also designed to be revenue-neutral. In order to offset the lost revenue from CRS premium discounts, the NFIP cross-subsidizes the CRS.⁵ This means that all policyholders pay 15.3% more in premiums, totaling approximately \$400 million annually.

CRS awards points to communities that exceed minimum NFIP floodplain management requirements. Points are awarded for actions that span categories of public information, mapping and regulations, flood-damage reduction, and warning and response. These points give participating communities a “CRS Class” ranging from 1 to 9 (Table 1), with Class 1 being the highest. Depending on the awarded class, NFIP policyholders within the community receive 5% to 45% discounts on their premiums. Discounts differ depending on whether the policyholder is located within FEMA’s Special Flood Hazard Area (SFHA), similar to the 100-year floodplain, or outside the SFHA.

| Credit Points | CRS Class | SFHA Discount | Non-SFHA Discount |
|---------------|-----------|---------------|-------------------|
| 4,500+ | 1 | 45% | 10% |
| 4,000 – 4,499 | 2 | 40% | 10% |
| 3,500 – 3,999 | 3 | 35% | 10% |
| 3,000 – 3,499 | 4 | 30% | 10% |
| 2,500 – 2,999 | 5 | 25% | 10% |
| 2,000 – 2,499 | 6 | 20% | 10% |
| 1,500 – 1,999 | 7 | 15% | 5% |
| 1,000 – 1,499 | 8 | 10% | 5% |
| 500 – 999 | 9 | 5% | 5% |
| 0 – 499 | 10 | 0 | 0 |

Table 1: CRS points, classes, and corresponding premium discounts. Communities in CRS Class 1 receive the greatest discounts. Class 10 denotes non-participating communities or that do not possess the minimum number of credit points to enter the program.

Since its start, CRS has had supporters and critics. Several recent studies have found that risk reduction interventions implemented through CRS do in fact reduce flood losses.⁶ In Mississippi and Alabama, Frimpong et al.⁷ showed that participation in CRS reduced flood damages by ~6% in Class 5 communities, but had no effect for Class 6 – 9 communities. Highfield and Brody⁸ found CRS drove even larger damage reductions, exceeding 40%. In contrast, critics

⁵ Ibid.

⁶ Sadiq, A.A., Tyler, J., Noonan, D.S., Norton, R.K., Cuniff, S.E., Czajkowski, J. (2020b) Review of the federal emergency management agency’s community rating system program. *Natural Hazards Review* 21, 03119001.

⁷ Frimpong, E., Petrolia, D.R., Harri, A., Cartwright, J.H. (2020) Flood insurance and claims: The impact of the Community Rating System. *Applied Economic Perspectives and Policy* 42, 245-262.

⁸ Highfield, W.E., Brody, S.D. (2017) Determining the effects of the FEMA Community Rating System program on flood losses in the United States. *International Journal of Disaster Risk Reduction* 21, 396-404.

argue that NFIP policyholders in communities not enrolled in CRS are effectively penalized via the cross-subsidization of premium discounts.

Our analysis evaluated 23 years of data that included CRS classes and actions as well as NFIP flood losses for every NFIP community in the US. First, we used linear regression panel models to relate community participation in CRS to the value of NFIP claims after subsequent flood events. Second, we assessed each community's specific CRS activities with subsequent damage claims to quantify the effectiveness of activities.

Characteristics of Communities Participating in CRS

Communities across the US participate in CRS, including many small communities with few policyholders across the Midwest and West Coast. The largest number of CRS communities and NFIP policyholders receiving CRS discounts are along the Mid-Atlantic and Southeast coasts (Figure 1). Florida has the most policyholders who receive discounts from CRS. Interestingly, the highest CRS scores are in communities with relatively few NFIP policyholders, such as Roseville, CA and Tulsa, OK.

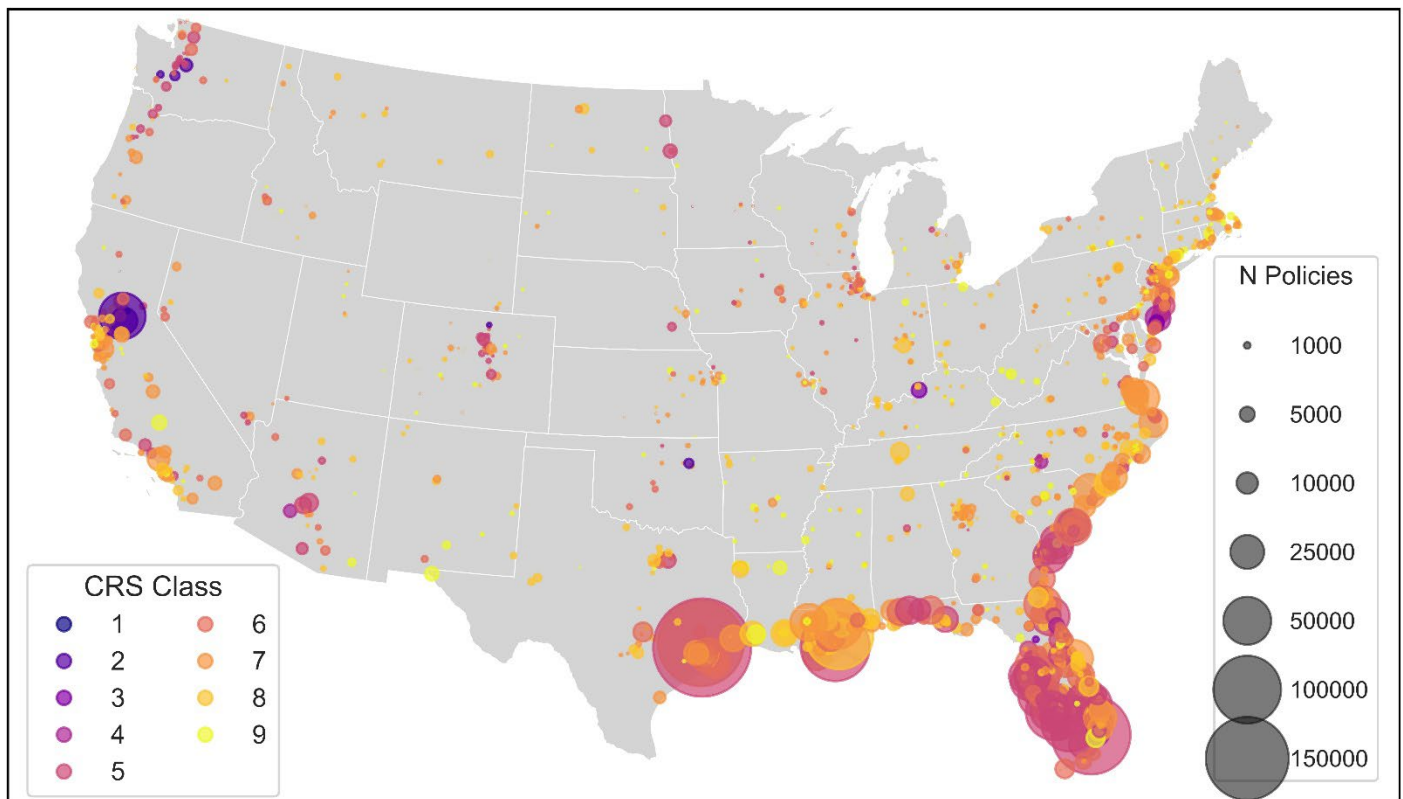


Figure 1: Communities currently participating in the CRS. Each circle represents a unique community. Circle size represents the number of NFIP policies in the community. Circle color represents the community's CRS class in 2020.

On average, communities participating in the CRS are more populous, less white, wealthier, and more highly educated than non-participating NFIP communities (Figure 2). These trends track with the general characteristics of large coastal communities on the Atlantic and Gulf coasts. This raises the question of whether the benefits provided by CRS participation are equitably distributed among demographic and socioeconomic groups.

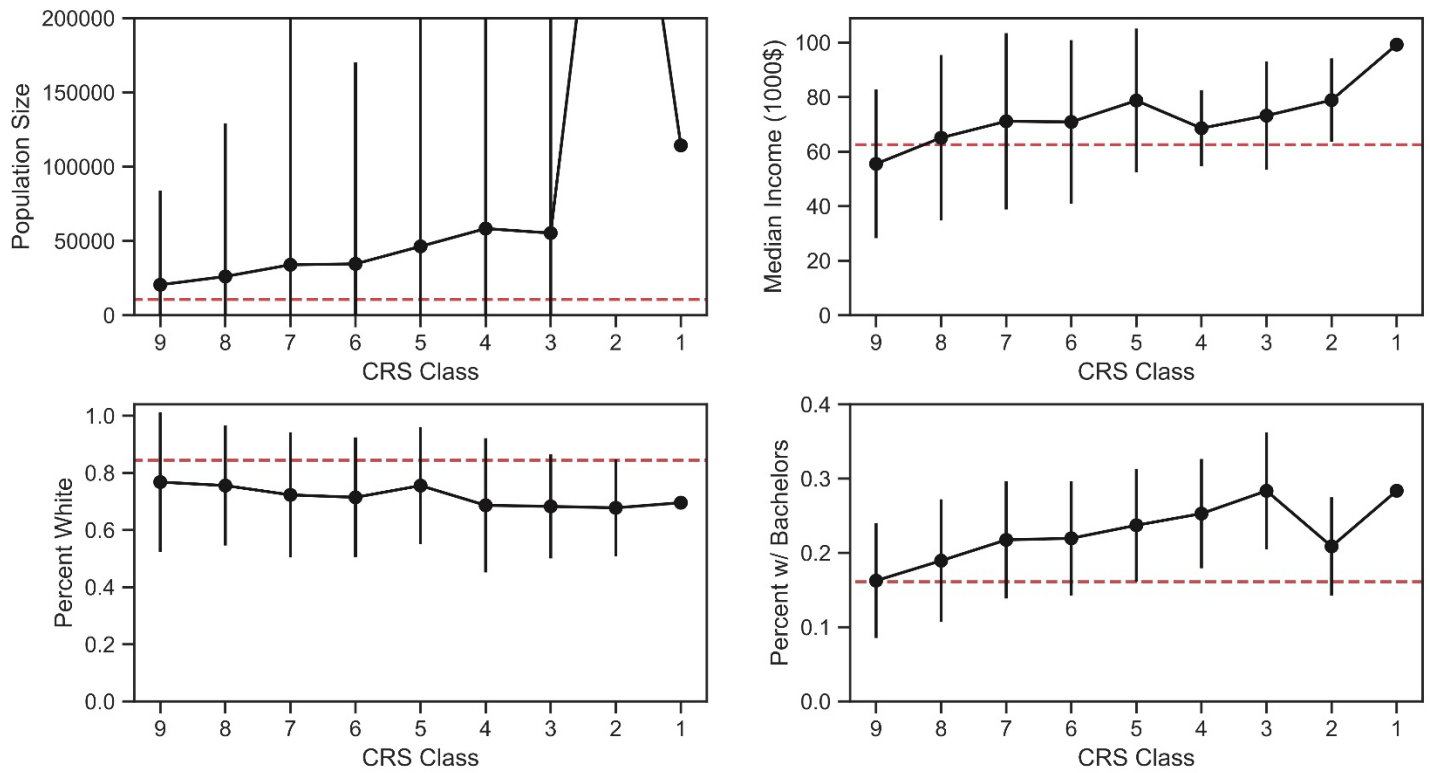


Figure 2: Population characteristics of communities participating in CRS. Each point represents the median value for all communities within a given CRS class, with error bars. The horizontal red line represents the median value of NFIP communities that do not participate in CRS.

Evaluating Program Effectiveness

Based on our statistical analysis, we find that CRS participation is associated with reduced flood damage claims. On average, the percent reduction in claims for each CRS score is roughly the same as the premium discount for that class. For instance, Class 7 communities incur 18% lower flood damages than non-CRS communities; those same communities receive a 15% discount on their NFIP premiums. These results show the CRS program is working as intended, as far as reducing flood damages. In addition, FEMA seems to effectively price CRS discounts, at least for SFHA policies, assuming their objective is to balance costs of incentives and damage reduction benefits.

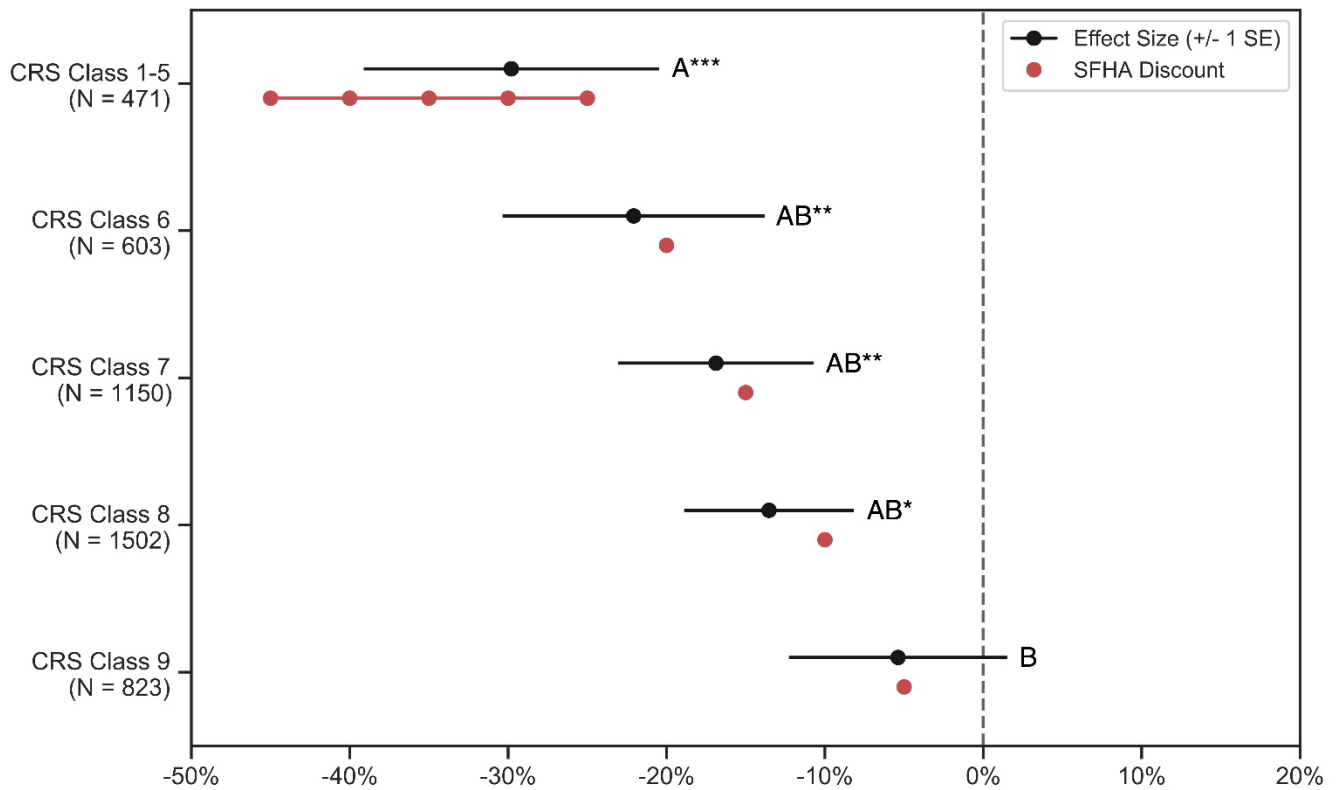


Figure 3: Estimated effect of CRS participation on the value of NFIP claims. Mean estimates for each CRS class are represented using black points. Red dots show the premium discounts for NFIP policies in the SFHA in that CRS class.

We also evaluated the effectiveness of specific CRS activities that communities implement under the program (Figure 4). The greatest reduction in claims were associated with activities that FEMA classifies as “Flood Damage Reduction” (Figure 4). These activities include buyouts and relocation of floodplain buildings and protection of buildings by floodproofing, elevation, or other structural projects. Communities implementing these two activities reported 25-30% less in damage claims than communities without such activities.

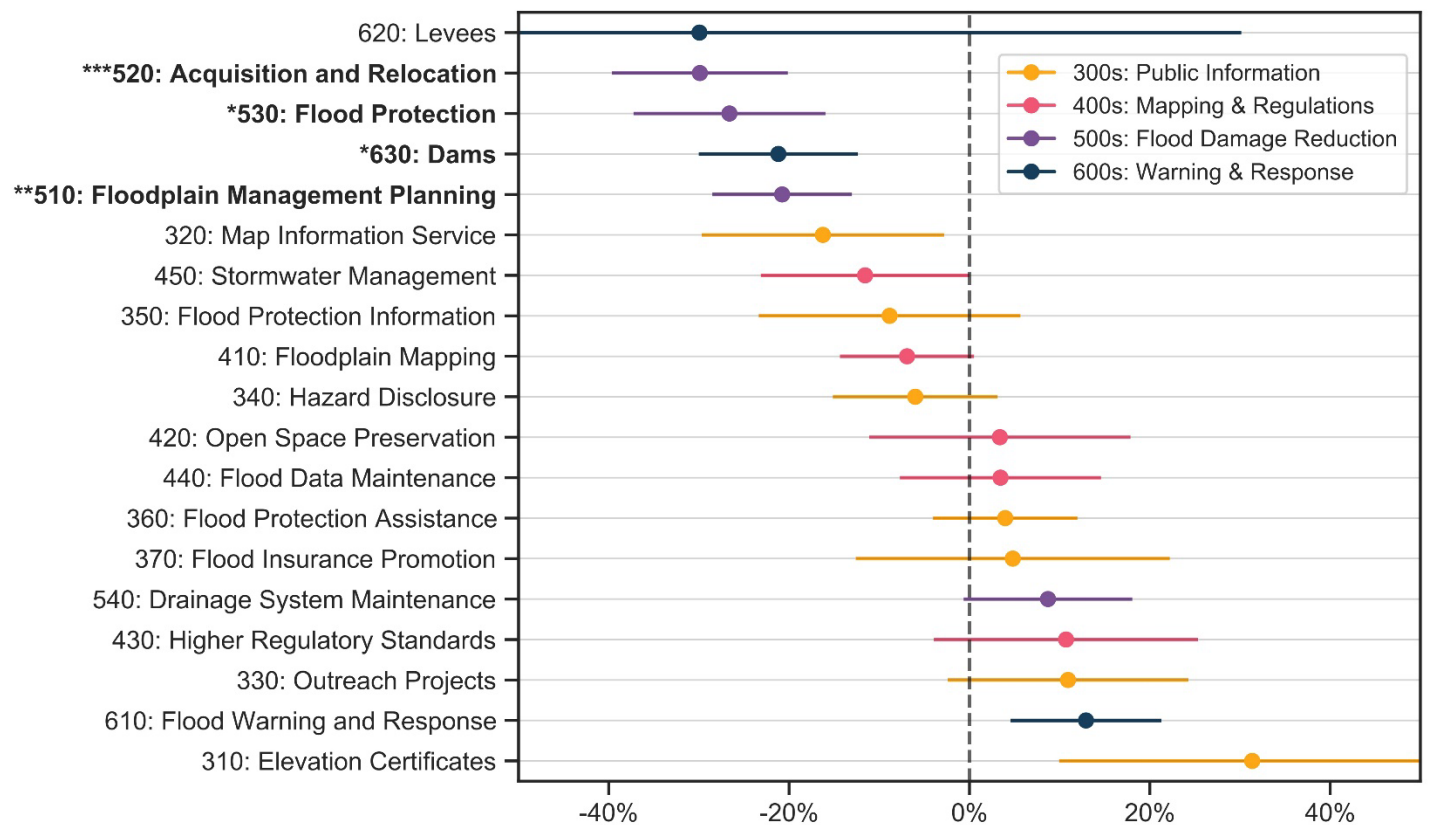


Figure 4 Estimated effect of CRS activities on the value of NFIP claims. Mean estimates for each CRS activity are represented using colored points. Statistically significant estimates are indicated by “*” next to the activity label.

In contrast, many other activities on the CRS menu either had no discernable effect on flood losses or seemed to increase damages. However, these activities require closer examination before they are criticized as ineffective or even detrimental. For example, activities to promote flood insurance take-up are not intended to reduce damages. Rather, increased insurance uptake likely increases insurance claims, yet also improves financial resilience within communities by increasing the proportion of insured damages.

Based on the effects of participation in CRS by class, we estimate the benefits of the program annually, in terms of the reduction in flood claims. In all but five years since 1998, the costs of CRS (total premium discounts) were greater than its benefits (Figure 5B). However, those five years included 2005 (Hurricane Katrina), 2012 (Hurricane Sandy), and 2017 (Hurricanes Harvey and Irma), when the US had its greatest flood damages. These non-linear trends indicate that the economics of flood damages, as well as flood risk management generally, are primarily driven by relatively low frequency, high severity events.

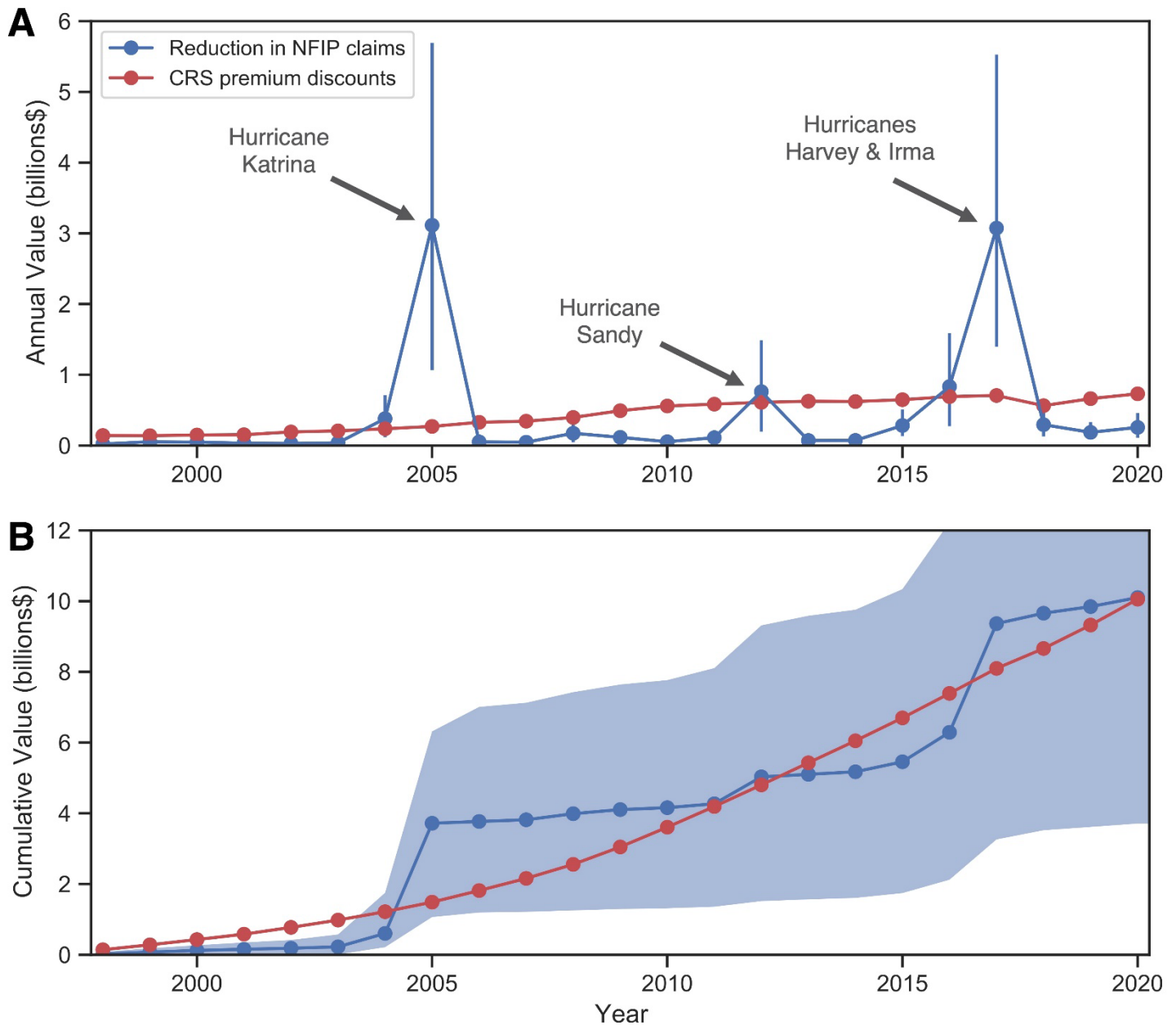


Figure 5: Comparing the benefits and costs of the CRS. The benefits are estimated in terms of reduced flood damages from CRS participation (blue points). Costs are estimated in terms of the value of CRS discounts (red points). The top plot shows cumulative values over time and the bottom plot shows annual values.

The cumulative flood damage reductions from CRS between 1998 and 2020 were approximately \$10.1 billion (Figure 5A). Over the same period of time, the cumulative costs of NFIP premium discounts were \$10.0 billion.

Conclusions & Policy Recommendations

The historical 1:1 match between the cost of CRS and its estimated benefits is an endorsement of CRS and supports its continuation. As climate change increases the frequency and severity of major flood events, such as those in 2005, 2012, and 2017, we expect the CRS will become crucial in mitigating damages and will yield greater net benefits to the NFIP.

At the same time, it remains uncertain if the CRS is the most cost effective strategy for reducing flood losses, as compared with other types of policy and management interventions. For instance, previous research estimates that FEMA hazard mitigation grants yield benefit-cost ratios of more than 5:1.⁹

In addition, our results raise concerns regarding programmatic equity and efficiency. The NFIP pays the costs of CRS premium discounts, but receives benefits twice: once by covering premium discounts through the cross-subsidy surcharge on policyholders in non-CRS communities, and again from reductions in claims paid out of NFIP.

Like any policy mechanism, the CRS should be revised to build on its strengths and address its challenges. In fact, FEMA is currently updating the program in response to ongoing feedback from NFIP administrators and external stakeholders nationwide – a process called "CRS Next." The stated mission of CRS Next is:

"To align the Community Rating System with the improved understanding of flood risk and flood risk reduction approaches gained since initiation of the program, and better incentivize communities and policyholders to become more resilient and lower their vulnerability to flood risk, thereby supporting the sound financial framework of the NFIP."

Based on our analyses, we offer several recommendations for improving the CRS to support these goals.

1. Expand community participation in the CRS. We show that participation in the CRS reduces flood damage claims. As flood risks continue to increase, investments in natural hazard mitigation need to become more widespread. Participating in CRS can be administratively burdensome though, particularly for small communities.¹⁰ FEMA could streamline administrative requirements for the program and/or allocate resources to support under-resourced communities.
2. Critically examine cross-subsidization of premium discounts. The results here suggest that CRS pays for itself through reduced flood damages and NFIP claims. While removing the cross-subsidy will not help resolve the NFIP's solvency issues, the penalization of communities that do not participate in CRS raises questions about equity.
3. Revise the allocation of CRS points to favor the most effective activities. CRS activities such as buyouts, structure elevations, and floodproofing are the most effective for reducing flood damage claims. Other activities may generate other social benefits not necessarily reflected by claims data. Given more than two decades of data, the incentive structure for allocating points could be revised based on empirical assessment of what has worked most effectively.
4. Consider alternative incentive structures, such as transferring CRS credits directly to government entities. The benefits of CRS participation are accrued by individual policyholders in the form of premium discounts. As a result, CRS creates a perverse incentive for increased development in the floodplain by reducing the costs of exposure to flood risk. In an alternative model, CRS benefits could be directed to local governments with a mandate to proactively invest these funds in flood mitigation.
5. Increase local incentives for community-level investment in climate adaptation. CRS provides a broadly successful model for incentivizing community-level investment in climate resilience. With climate change and continued development driving increasing losses due to flooding, coastal storms, wildfire, and other natural hazards, both top-down and bottom-up actions are needed to mitigate these threats. Financial incentives by federal agencies, such as those provided by the CRS, can generate public and political support for local investment in mitigation interventions as well as directly fund these projects.

⁹ Rose, A., Porter, K., Dash, N., Bouabid, J., Huyck, C., Whitehead, J., Shaw, D., Eguchi, R., Taylor, C., McLane, T. (2007) Benefit-cost analysis of FEMA hazard mitigation grants. *Natural Hazards Review* 8, 97-111.

¹⁰ Sadiq, A.A., Tyler, J., Noonan, D. (2020a) Participation and non-participation in FEMA's Community Rating System (CRS) program: Insights from CRS coordinators and floodplain managers. *International Journal of Disaster Risk Reduction* 48, 101574.

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