

Working Draft White Paper  
on Community Based Flood  
Insurance Opportunities in  
California

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# Table of Contents

1	Implementation of the National Flood Insurance Program is problematic for the Delta Legacy Communities .....	1
1.1	What is Community Based Flood Insurance? .....	3
1.2	What is a GHAD? .....	4
1.3	Why is a GHAD an attractive partner for insurers? .....	5
1.4	How might a GHAD based flood insurance program work? .....	5
1.5	How might a GHAD based flood insurance program work? .....	5
	1.5.1 Tier 1 - The Good Samaritan Tier .....	6
	1.5.2 Tier 3 - High Risk Tier .....	7
1.6	How would claims be handled? .....	8
	1.6.1 What are the characteristics of parametric insurance? .....	8
	1.6.2 What are the benefits of parametric insurance? .....	9
	1.6.3 What would be the typical annual insurance premium(s) for a three-tiered CBI policy for single-family residences in a Delta Legacy Community? .....	9
	References .....	12

# 1 Implementation of the National Flood Insurance Program is problematic for the Delta Legacy Communities

*The Delta Legacy Communities are under-insured, both individually and collectively.* The levees protecting the Legacy Communities are considered fragile relative to current FEMA 100-yr accreditation standards. If a levee were to fail, it could easily inundate whole communities to depths as high as 15 feet. Yet, less than half of the Delta Legacy Community residences have flood insurance. If they do have a National Flood Insurance Program (NFIP) insurance policy, it does not cover such things as the full replacement value, living expenses while the home is being rebuilt, or septic system repair. The existing NFIP policies for single-family residential structures are typically limited to a total loss value of \$350,000, with a maximum of \$250,000 for structure damage/replacement and a maximum of \$100,000 for structure contents.

*The insurance gap is widening.* The first Flood Insurance Rate Map (FIRM) for Sacramento County was issued in March 1979. Owners of single-family residences built before 1979 have enjoyed a subsidized flood insurance rate, known as a pre-FIRM rate. In 2012, NFIP reforms removed this subsidy for many homeowners and set into motion significant rate increases. In 2014, after a backlash from homeowners who saw rates increase by as much as 25%, Congress passed the Homeowner’s Flood Insurance Affordability Act of 2014 (HFIAA). Under HFIAA, rates will continue to increase but at a slower rate. The **Error! Reference source not found.** below, created from FEMA open-source data, shows that as the price of insurance increases, the number of policyholders decrease — widening the insurance gap.

*The current NFIP pricing structure results in some homeowners paying too much and others paying too little.* In 2019, the lowest annual flood insurance premium for residential structures in the Delta Legacy Communities was \$237, the largest premium was \$6,447. Thus, homes with similar risks pay drastically different amounts. Risk Rating 2.0 dubbed “Equity in Acton” seeks to fix this inequity. Unfortunately, the weight of the national bureaucracy, the inability of FEMA to modify existing regulations, and the inability of Congress to enact meaningful reform prevents Risk Rating 2.0 from living up to its full potential. The NFIP will always be hard to change due in part to the sheer magnitude of the program. With more than \$5.1 million NFIP policies in force, providing \$1.25 trillion of content and building coverage, the NFIP is the largest single line insurance carrier in the world (Maurstad, 2027). Virtually every community in the U.S. has adopted some form of NFIP regulation.

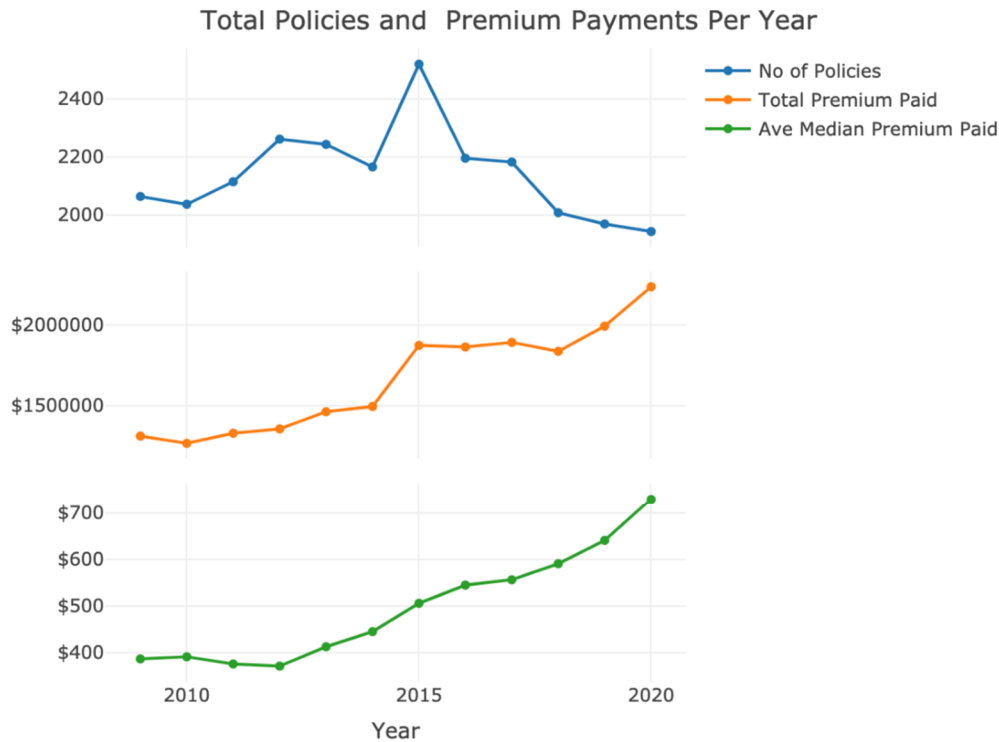


Figure 1: NFIP Number Policy and Premium Rates. Source: NFIP Open Source Data.

The NFIP pricing structure also adversely impacts low-income rental properties that are not owner-occupied. Roughly half of all policies written within the Delta Legacy Communities are for rental properties. When these policyholders renewed their policies in 2020, they saw an average premium increase of about 24 percent, which is inevitably passed along to the renter occupants. Conversely, many rental properties in the Delta Legacy Communities do not have a mortgage and do not have NFIP coverage. NFIP does provide coverage for renters’ contents, but it is not strongly promoted and few renters choose to purchase it.

For 50 years, the NFIP has been the primary provider of flood insurance. However, due to a number of recent regulatory changes, this is changing. In 2018, it was estimated that about 3.5 to 4.5% of all primary residential flood policies issued nationwide were private flood insurance policies (Kousky et al., 2018). In 2016, data reported by Wholesale & Specialty Insurance Association (WSIA) estimated there were 4,265 private flood policies issued in California (WSIA, 2017). In 2017, that number had almost doubled, increasing to 7,411. By 2019, WSIA reported that there were 10,651 policies and \$7,962,163 in premiums (WSIA, 2019). A 2019 white paper by Milliman (Rollins, 2019), suggests that the private market for flood insurance in California is between \$1 billion and \$5 billion. A 2019 market survey by WSIA found that the average 2018 private insurance premium per primary residential policy in the state of California was \$748 (WSIA, 2019).

In addition to the regulatory changes, there are a number of reasons for the increase in private flood insurance programs. Significantly, global re-insurers are gaining familiarity with flood catastrophe models (Kousky et al., 2018). Their interest is fueled by the NFIP’s relatively recent purchases of reinsurance. In 2021, the NFIP transferred \$1.153 billion in risk to 32

private reinsurance companies. Combined with the three capital markets reinsurance placements from 2018 to 2020, FEMA has transferred \$2.35 billion of the NFIP's flood risk to the private sector.

FEMA's new rating program, Risk Rating 2.0, which will be introduced in October 2021, builds on the experience gained from contracting with the reinsurance markets. Risk Rating 2.0 fundamentally changes the way that FEMA prices NFIP policies. It is the first major change in how it prices policies since the program was enacted in 1968. NFIP policies will no longer be priced based on the "in-out" Flood Insurance Rate Maps (FIRMs). Additionally, the pre- and post-FIRM subsidies will be phased out. Policies will instead be priced based on the location specific estimated flood risk. The location-specific flood risk will be determined by an ensemble of catastrophe models along with other factors such as the location near the potential flooding source, a river, stream, lake, and/or coastal proximity. For the first time, this will provide private firms with a benchmark to which they can measure their risk pricing. Solution: Community Based Flood Insurance

## **1.1 What is Community Based Flood Insurance?**

Community Based Insurance has the potential to serve the community better than either the NFIP or private flood insurance. Community based flood insurance (CBI) is a single policy, purchased by a local governmental or quasi-governmental body, which covers a group of designated properties (Kousky and Shabman, 2015). It simplifies the process of setting the premium, which greatly reduces the cost of settling claims and provides administrative savings that can then be shared with property owners and/or used to fund flood risk reduction mitigation measures. It provides an opportunity to manage the flood risk collaboratively, which reduces uncertainty. Uncertainty pricing is one of the biggest components of premium pricing.

The increase in interest in private flood insurance brings with it an increased interest in CBI. The idea of CBI has been around for a long time, but until now technological, regulatory, governmental and administrative challenges have prevented it from being implemented. As noted, many of these potential obstacles have been overcome or changed, and today there is growing interest. The concept of CBI is a building block in *The Congressional Action Platform for a Clean Energy Economy and a Healthy, Resilient, and Just America* (Castor, 2020). Support for community based flood insurance is included within the draft language for the reauthorization of the National Flood Insurance Program. The legislation, if passed, would call for FEMA to initiate a pilot within 180 days of passage of the bill.

CBI is part of a broader Community Based Disaster Risk Management (CBDRM) approach to disaster risk management. CBDRM is an approach that supports local grassroots community disaster risk management. It is an approach strived for in FEMA's Whole Community philosophy (Agency, 2011). It is widely promoted by countries that share the same low-income challenges as residents within the Delta Legacy Communities (Paripurno and Jannah, 2011) (Mysiak et al., 2016).

In this approach, the community plays an active role in the self-interpretation of hazards and disaster risk, and in the reduction, monitoring, and evaluation of their own performance in disaster risk reduction. Key to the successful implementation of a CBDRM program is the optimal mobilization of resources that the community has and has control over (Paripurno and

Jannah, 2011). Which is why the idea of CBI is attractive. It gives the community ownership of their flood risk; and, importantly, the assets that come with it. The community ceases to be viewed as hapless victims and are instead viewed as empowered citizens.

A CBI program presents an opportunity to align public agency staff, engineers, and private insurance around a unified goal of managing flood risk—providing the opportunity to both reduce flood insurance and fund mitigation measures (Kousky and Shabman, 2015). CBI is a risk transfer program developed in collaboration between engineers, insurance professionals, investors, and media professionals. It has the potential to:

- Allow insurance companies to take advantage of the detailed flood risk information developed by engineers, thus reducing costs;
- Compile detailed risk information for the graduated pricing of risk;
- Provide the specific form of coverage desired by the citizens;
- Implement quantifiable mitigation measures;
- Permit the community to accept some degree of risk, passing the savings on to their citizens;
- Roll program savings into mitigation measures or provide the local cash match for grant funding;
- Support an open and informed decision-making process;
- Reduce uncertainties associated with risk, which is one of the largest components of the risk premium; and
- Reduce longstanding environmental justice inequities.

## **1.2 What is a GHAD?**

California has a unique government entity called Geologic Hazard Abatement Districts (GHAD), which are uniquely poised to fill the role of a CBI provider. A GHAD is a public agency formed by a community to provide a management structure and funding source to protect the community from landslides, erosion, liquefaction, flooding and other similar geologic hazards. GHADs are state-level agencies with powers to provide prevention, rapid response, and funding to address hazardous geologic conditions. Although formed by a local agency, a GHAD is a political subdivision of the State and is not an agent or instrument of a local agency. They were established by the California Legislature to allow local communities to develop a self-funding mechanism to mitigate the damaging effects of large-scale hazards such as landslides, earth movement, erosion and other similar hazards.

GHADs were created in California in 1979 by the Beverly Act to enable local residents to collectively mitigate geological hazards which pose a threat to their properties and their associated improvements. Statutes pertaining to GHADs are presented in California Public Resources Code Division 17. GHADs are designed to handle long-term abatement and maintenance of real property potentially threatened by geologic hazards.

GHADs have been granted similar authority as other local agencies, including:

- Taxing and/or assessment ability;
- Bonding ability;

- Certain legal immunity;
- Can sue and/or be sued;
- May exercise eminent domain.

A GHAD is intended to address the prevention, mitigation, abatement, and control of geologic hazards on designated land within its boundaries. Further, as a prudent landowner, a GHAD is able to acquire, construct, operate, manage, or maintain improvements on any land it specifically owns. There are no limits or requirements pertaining to size, number of units, or contiguous boundaries (i.e., a GHAD may contain numerous non-contiguous parcels, and may be developed for one or a handful of separate Delta Legacy Communities).

### **1.3 Why is a GHAD an attractive partner for insurers?**

There are several features of a GHAD that makes it an attractive partner for insurers. First, unlike other government entities, such as city councils or flood control districts, the single focus of the GHAD is to mitigate the damaging effects of natural hazards. The GHAD boundaries are flexible and do not need to be contiguous. Depending on the desire of the community, the boundaries can be drawn to spread the risk widely, in such a way that only those property owners most concerned about their flood risk participate or in such a way as to exclude economically uninsurable risk areas. The board of the GHAD can be comprised of property owners who are concerned about their risk and seek to take proactive measures as opposed to city council members who may have other priorities. From the insurers perspective, it provides a single point of contact for the purchase of policies and administration of claims. The aggregation of the risk reduces the uncertainty associated with individual policies. Uncertainty is a key component in insurance pricing. Lastly, it provides a government structure that supports a partnership between the insurer and the community around a common goal of reducing flood risk.

Significantly, GHAD implementation may reduce the volatility associated with types of policies. The premium would be paid from property tax revenue guaranteed by the county in which the GHAD was formed. Because the premiums would come from ongoing tax revenue, the aggregated risk would be spread across time. Thus, a large loss early in the program would be recouped over time. Additionally, GHAD could self-insure certain layers of risk, minimizing both the moral hazard and the volatility associated with an aggregated loss. The GHAD could also receive state and federal grant funding to support ongoing, community-specific, structural-based flood management actions (including but not limited to levee repairs/improvements) and non-structural measures that could include flood-fight berms, ring levee systems, and enhanced community-specific flood emergency response programs.

### **1.4 How might a GHAD based flood insurance program work?**

### **1.5 How might a GHAD based flood insurance program work?**

It is envisioned that flood insurance would be provided by the GHAD in a three tiered program. Tier one - the Good Samaritan Tier would provide of a modest amount of recovery cash immediately after the disaster to everyone in the community. Tier 2 — the Insurance Tier would



provide a base level of insurance to everyone who sought to purchase it. Tier 3 — the Concierge Tier would consist of a policy providing other coverages as the community requested.

The GHAD would purchase a single policy and distribute it to the community.

The GHAD would be the policy holder and issue certificates to individual parcels.

### **1.5.1 Tier 1 - The Good Samaritan Tier**

Tier 1 is intended to provide a small amount of immediate *ex ante* funds (as much as \$10,000) to everpolicy holder who experiences a flood loss. The reason for this tier is four-fold.

This tier recognizes that low income households become even more vulnerable during and after disasters. A 2018 study conducted by FEMA’s Individual and Community Preparedness Division found most respondents said they would not have enough money to cover a \$500 emergency expense (NAC, 2019). When families lack savings or property insurance, there is no mechanism to fill the financial gap after a flood. A U.S. Department of Housing and Urban Development (HUD) study found that households with flood insurance were 37% more likely to have rebuilt after Hurricane Katrina. For this reason, flood insurance plays an important role in post flood disaster recovery. The immediate *ex ante* flood recovery funds could be utilized by the policy holders to cover temporary re-location living expenses or pay for immediate remediation repairs over and above the structure damage or content damage claims that are paid with a conventional NFIP policy.

This tier also recognizes that people have different perceptions of risk and different resources to purchase flood insurance. Many people are risk seeking and will not purchase flood insurance for any reason. Many people may not know that they have a flood risk, and if they do, they may be overwhelmed by other activities that drive them to “back burner” the purchase of flood insurance.

The NFIP currently provides a 40?

Lastly, this tier provides an incentive for the community to manage the more frequent smaller flood events.

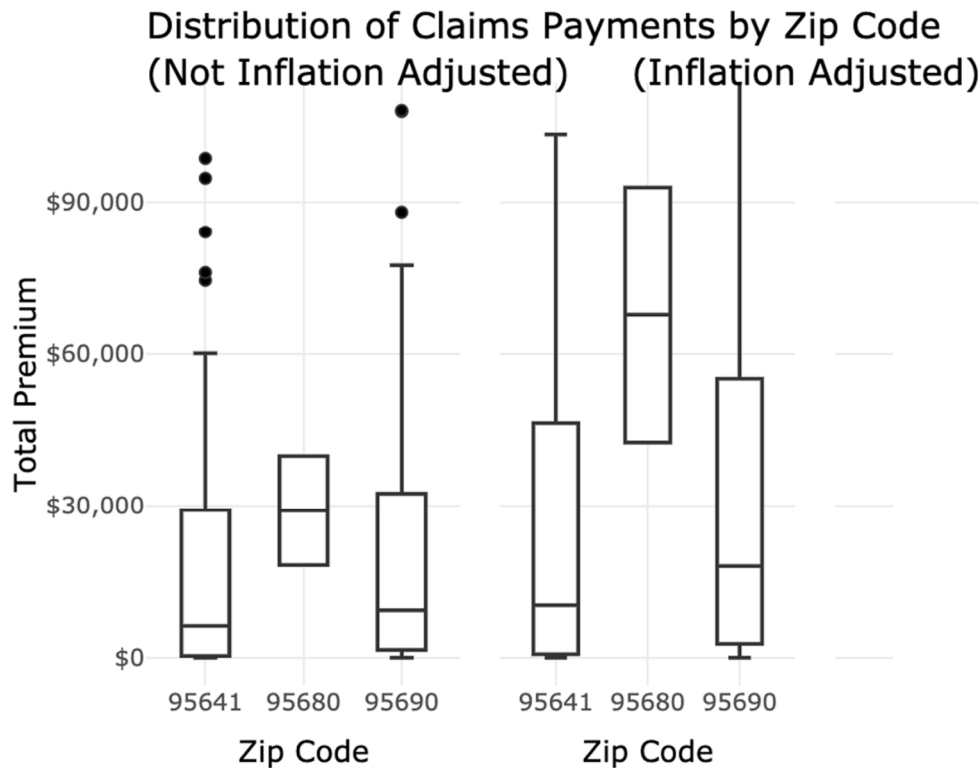
### **Tier 2 - The Insurance Tier**

A study examining flood insurance claims in the US by Kousky and Michel-Kerjan

(Kousky and Michel-Kerjan, 2017) finds that there are a number of factors that go into a household’s decision to purchase flood insurance. They find that most homeowners want to see some return on their premium payment and they want to collect as much as possible on their policy should they suffer a loss. In other words, they do not want to pay for a \$250,000 policy if the most they will ever collect is \$100,000. Research also suggests that most people disregard the possibility of a catastrophe. They suggest that a policy low deductible low-loss level policy would be attractive.

The global insurance firm has expressed interest in providing a flood insurance policy that would provide \$100,000 in building coverage and \$20,000 in contents coverage with a \$10,000

deductible for around \$500. As shown in the figure below, this amount of coverage would pay 85% of all claims paid within the Delta Legacy Communities by the NFIP since 1977.



### 1.5.2 Tier 3 - High Risk Tier

The same study of claims in the US mentioned earlier by Kousky, and Michel-Kerjan

(Kousky and Michel-Kerjan, 2017) suggests that coverage for the rare or insurance terms --tail losses only would be attractive. Some individuals might prefer to self-insurance for the more frequent and modest losses but purchase a policy to cover catastrophic damage. Such a “tail insurance policy” would be cheaper than a more comprehensive coverage and thus, it is likely to be much more affordable.

Another reason for breaking out the policies into low, medium, and high tiers is that it allows the high tier to be managed separately. Rare, large events are simultaneously more difficult to evaluate statistically and may result in aggregated claims that threaten the solvency of any program. We see this with Hurricane Katrina. The sum of all insurance claims paid out by the NFIP was more significant than the same of all payments made by the program before 2005 (Kousky and Michel-Kerjan, 2017). The issue of how to pay off this debt is an issue of contention almost twenty years later.

This level of loss might be financed with a security such as a catastrophe bond. However, unlike the federal government, private reinsurers pay a cost for this capital. Alternatively, a state or local entity would need to pay a cost for capital, however, they enjoy the benefits of a tax-

exempt status that makes lending more attractive. Thus, they may be in a better position to accept this layer of risk.

## **1.6 How would claims be handled?**

It is envisioned that the Tier 1 payments and potentially the Tier 2 would be handled as a parametric insurance policy. Traditional insurance is indemnity based. Coverage is based on the policy terms and conditions such as deductibles, exclusions, limits and sub-limits. Claims are paid when losses exceed the retention held by the insured. In contrast, parametric insurance losses are covered by predefined payments made when a predefined trigger is established. Parametric insurance is increasingly viewed as a viable alternative to traditional claims-based insurance. Many industries such as manufacturing, hotel/hospitality, real estate, construction projects, public entities, energy, and utilities purchase parametric insurance. After the 2017 hurricane season industry reported a massive rise in parametric hurricane inquiries (<https://riskandinsurance.com/8-questions-for-robert-nusslein/>). There is interest in parametric insurance for things beyond weather such as reduced tax revenue for a municipality operating a port that has reduced cargo traffic.

### **1.6.1 What are the characteristics of parametric insurance?**

Unlike a traditional NFIP flood insurance program, parametric insurance pays a predetermined amount when an event exceeds a pre-determined index (trigger). An index is a objective measure (e.g. rainfall, river gage height, wind speed) that is highly correlated to the variable of interest (e.g. flood depth, flood loss). In the case of the Delta Legacy Communities, the triggering event could be a levee failure, the water surface elevation in the Lower Sacramento River at specific locations exceeding a predetermined Flood Warning or Flood Stage height, or an Atmospheric River event of a certain magnitude. An index must have the following properties:

- observable and easily measured.
- objective
- independently verifiable
- transparent
- reported in a timely manner
- consistent over time
- experienced over a wide area.

Challenges with implementing a parametric insurance program center around agreeing on the payout and on the triggering event and addressing basis risk. Basis risk is the difference between an insured's policies and the parametric insurance recovery. Basis risk is present in traditional insurance policies as well in the form of deductibles or retentions, exclusions, sub-limits and unresponsive cover, such as business interruption losses must result from physical damage to insured assets not just from the event. Third generation parametric structures allows for more flexibility by creating "either/or" triggers - a design driven by the convergence of multiple factors.

### **1.6.2 What are the benefits of parametric insurance?**

The most significant and impactful benefit is the speed of the payment. With a parametric insurance program, payments can be made almost immediately. Increasingly advances in technologies such as a block chain hold the potential to provide an almost instantaneous transfer of funds. The financial liquidity available from a parametric insurance policy can reduce some of the indirect effects of damage, such as human suffering, loss of livelihoods. Prompt payouts facilitate more rapid reconstruction. Actions that help communities and households recover more quickly, reduce the long-term consequences that accompany disasters.

Parametric insurance can also be used to fill in coverage gaps left by traditional policies. For example, parametric insurance can provide business interruption insurance even though the business is not directly impacted by the event. Further, payouts can be applied however the insured chooses, covering direct and indirect loss and any expenses associated with the event. In the case of the Delta Legacy Communities, a parametric policy could be purchased to cover flood fight activities.

Another benefit is that payments are known in advance.

The standard NFIP policy excludes coverage for mold damage due to the policy holder's failure to inspect and maintain property after flood waters recede. Because a parametric policy does not require damage inspectors, the prompt payments provide funding for the immediate mitigation of mold.

While the NFIP provides coverage for the clean up of pollutants, it does not provide coverage for testing or monitoring. This is something that could be economically conducted by the community or GHAD.

### **1.6.3 What would be the typical annual insurance premium(s) for a three-tiered CBI policy for single-family residences in a Delta Legacy Community?**

Acknowledging that the Tier 1 and Tier 2 premiums and payments would likely be handled as a parametric insurance policy, and the High-Risk Tier 3 would be more optional to provide for additional catastrophic losses the following range of premiums are anticipated for each of the three Tiers.

#### **Tier 1 – The Good Samaritan Tier**

Tier 1 would be the minimum coverage that would be provided to all homeowners/renters living within the GHAD, preferably the entire populated center of the Delta Legacy Community. The policy holders of this tier would be entitled to a claim of up to \$10,000 to use at their own discretion anytime the Sacramento River (and/or other distributary sloughs) reached flood stage at a pre-determination level; and/or there were evacuation measures or flood-fight activities occurring within the larger Reclamation District(s) where the Delta Legacy Community resides.

This premium amount would not include an added benefit assessment amount that is envisioned to accrue local cost-share amounts and long-term financing for flood community-specific risk

reduction structural-based management actions coupled with non-structural measures that may be identified in the Delta Legacy Community SCFRRP feasibility studies completed in 2021.

This tier would likely need to be funded from sources outside of the Legacy Communities. It would recognize that the low-income residents within the Legacy Communities are already overburdened by other costs. The payment for this tier might come from the State or County General Fund. It might also come from FEMA. This payment is similar to that provided by the FEMA Individual Assistance program. Unfortunately, payments from the FEMA IA program are seldom asked for in California and often take months to receive. The FEMA IA program could be a source of funding, but it would require a change to the Safford Act. This tier would also recognize that over the years the County has invested in 100-year protection for other parts of the County. Providing a parametric payment would compensate for the County's inability to provide 100-year protection to the residents within the Legacy Communities. Because it is unlikely that more than one community will fail at a time, the largest sum that the County would likely have to pay is about \$2,500,000.

### **Tier 2 – The Insurance Tier**

This Tier recognizes that households are unable or unwilling to spend much more than 1 percent of their income on flood insurance. This means that for flood insurance to be attractive, it must be offered in the \$500 to \$800 range. Conversations with international insurance firms suggest that a policy providing \$100,000 building and \$20,000 in contents coverage with a \$10,000 deductible could be provided for \$400 to \$700. In this scenario, an additional \$100 to \$200 could be charged to each policy. This extra amount could be accumulated and would be a fungible source of funding to help pursue other larger grants.

In this scenario, everyone might be required to purchase flood insurance. Alternatively, those who chose not to buy flood insurance might be assessed a fee of \$100 to \$500. All fees would be subject to a Proposition 218 vote. Thus, an arrangement acceptable to a majority of the voters would need to be determined. Teasing out an arrangement that is not only acceptable, but that is supported by a majority of the voting residents will take a concerted effort. As finding an alternative to the NFIP is a goal specifically called for in both the 2020 Governor's Water Portfolio and in the 2017 Central Valley Flood Protection Plan, the County or the State might consider investing in outreach and surveys to determine the wishes of the community.

### **Tier 3 – High Risk Tier**

Individuals who participate in a Health Maintenance Organization insurance plan are often provided the opportunity to pay extra to receive more specialized treatment. The term used to describe this extra insurance is "concierge insurance". Similarly, this tier would be a concierge insurance that would provide extra insurance above the basic plan. This level of insurance might provide for coverages that meet the \$250,000 as might be required by lenders. It might also cover items not covered by NFIP policies such as housing relocation during reconstruction or debris removal. The cost of this additional tier would vary widely given the type of coverage provided. However, given the fact that the lower more frequent losses are covered in other tiers, it would not be unreasonable to assume that insurance in this tier might be obtained for around \$1.50 per hundred dollars of insured value.

This tier might also be viewed as a catastrophe tier. In the past, through the Stafford Act, FEMA has provided Individual Assistance to homeowners and Public Assistance to communities. Recent increases in the minimum loss thresholds make it unlikely that FEMA assistance under the Stafford Act will be available to the Legacy Communities. Recognizing the impact of this change, the State may choose to fill the gap by purchasing Catastrophe Insurance. This is an increasingly attractive option and is used by cities like New Orleans and New York City.

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