



**NATIONAL FLOOD INSURANCE
PROGRAM:
IMPACT OF THE BIGGERT-WATERS FLOOD
INSURANCE REFORM ACT OF 2012**

December 9, 2013

Produced for and Funded by:
Coastal Protection and Restoration Authority of Louisiana



**THE WATER INSTITUTE
OF THE GULF**

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ACKNOWLEDGEMENTS

This document was prepared by Craig Colten, Taylor Marshall, and Ann Hijuelos as a product of the Human Dimensions Program. We would like to acknowledge The Water Institute of the Gulf (Water Institute) staff Denise Reed, Jeff Heaton, Clint Willson and Ryan Clark for their review and comments. We would also like to acknowledge Greater New Orleans (GNO) Inc. which helped initiate this project. Special acknowledgements go to the homeowners, local and state floodplain managers, local insurance agents, and the FEMA and USGS personnel who provided foundational information upon which we built this report.

This project that was funded by the Louisiana Coastal Protection and Restoration Authority (CPRA) under Cooperative Endeavor Agreement Number 2503-12-58, Task Order No. 23, and overseen by Andrea Galinski and Natalie Peyronnin of the CPRA Liaison Team. We would like to acknowledge CPRA staff for providing integral comments and support which helped shape the quality of this report.

REPORT CITATION

Marshall, T. A., Colten, C. E., and Hijuelos, A.C. 2013. National Flood Insurance Program: Impact of the Biggert-Waters Flood Insurance Reform Act of 2012. The Water Institute of the Gulf. Funded by the Coastal Protection and Restoration Authority under Task Order 23 Contract No. 2503-12-58. Baton Rouge, LA



1. INTRODUCTION

Concern over the changes to the National Flood Insurance Program (NFIP) imposed by the Biggert-Waters Reform Act of 2012 (BW-12) that likely will impose major increases in insurance premiums has inspired a nationwide effort to assess the impacts in both riparian and coastal flood-prone areas. The National Flood Insurance Program was initially created by the U.S. Congress through the passage of the National Flood Insurance Act of 1968 in order to provide affordable flood insurance unavailable through the private insurance market. The Federal Emergency Management Authority (FEMA) implements and manages the program by mapping flood hazard areas, determining flood zones, calculating insurance rate tables, and offering incentives to reduce risk. The recent revisions were a response by Congress to address structural weaknesses in the system's funding and to alleviate the heavy demands placed on the system in recent years due to Hurricanes Katrina/Rita and Hurricane Sandy which have left the program \$24 billion debt. The Biggert-Waters Reform Act of 2012 reauthorized the program for another five years and made changes to address the program's fiscal instability including raising flood insurance premiums to reflect true risk, creating a catastrophic reserve fund, establishing more accurate mapping procedures, and improving administrative efficiency.

Although BW-2012 has begun to go into effect, there are many uncertainties about how the changes will impact flood insurance policyholders. Many public officials and citizens are concerned about: how big the premium increase will be, who will be impacted as policy changes unfold, and what areas will be reclassified by revised floodplain designations. Given the uncertainty facing flood insurance policy holders and both state and local floodplain managers, The Water Institute of the Gulf (The Water Institute) was asked to investigate the implications of the insurance rate changes to coastal and riverside communities. This report summarizes our research methodology and findings.

Greater New Orleans, Inc. (GNO, Inc.), a public-private group promoting regional economic development, requested that The Water Institute investigate the impending increases in the cost of flood insurance under BW-12 to determine the impact on a national scale, and the Coastal Protection and Restoration Authority (CRPA) funded the investigation. The Water Institute researched current flood insurance rates in selected locations along the Gulf Coast, the Eastern Seaboard, and the West Coast, including inland river locations to assess possible rate increases and to develop a series of tables and graphs that demonstrate the impact of these possible changes. Water Institute staff delivered a PowerPoint slide show and supporting text on August 7, 2013. These items appear in Appendix B.

This report and the slide show were updated for GNO Inc.'s presentation to a hearing of the House Committee on Financial Services on November 13, 2013 by Michael Hecht, President and CEO of GNO, Inc. These updates reflect the use of the most recent and accurate actuarial premium increases, as provided by FEMA in its "National Flood Insurance Program: Specific Rating Guidelines" document that was released on October 1, 2013. Additionally, this updated report contains explicit permission from each property owner as requested by the Congressional Committee. The updated report and companion slides contain three different properties from the original report in order to comply with the request to secure the property owners' permissions.

In order to illustrate the potential national impact of BW-12, in coordination with GNO Inc., we identified representative urban areas from different regions of the country that face either riparian or coastal flood risk. The selected cities include Sacramento, California; Fargo, North Dakota; Keansburg, New Jersey; Houston, Texas; Norfolk, Virginia; Pittsburgh, Pennsylvania; and Tampa, Florida. Five of these eight cities are discussed in more detail in this report. In order to include a Louisiana example,



CPRA added the Belle Chasse residence which was identified by GNO, Inc. In addition to the potential impacts on individual homeowners, estimates were made for the city-wide impact of BW-2012 in the case of Fargo, North Dakota.

Also, we reviewed literature on both the shortcomings of and promising reforms for the National Flood Insurance Program, and investigated the academic literature on flood hazards, government regulatory guidance, and insurance trade publications. Existing literature, fact sheets, and educational materials produced by FEMA provided the foundation for documenting the history and effectiveness of the NFIP, and the potential financial impact of ending subsidized flood insurance rates. Information providing the rationale for BW-12 and detailing the transition to actuarial premiums was also reviewed to better understand the need for increased insurance premiums to resolve the fiscal crisis facing FEMA and the NFIP. Auxiliary sources were reviewed to provide commentary, recommendations, and in some cases, alternatives to the proposals outlined in BW-12. This literature included Government Accountability Office reports, academic articles, and professional publications (ASFPM 2013). These potential solutions will be discussed in the section titled Future of the Floodplain.

2. METHODOLOGY

2.1 PROPERTY SELECTION

Currently, FEMA is upgrading its national Flood Insurance Rate Maps (FIRMs) from the original paper maps to Digital Flood Insurance Rate Maps (DFIRMs) to more accurately represent current flood risks across the country and to convert the maps into a more readily updatable format. The DFIRMs are used to calculate the cost of flood insurance premiums by identifying flood zones and base flood elevations (BFEs). The NFIP requires the owners of properties located in high-risk areas or Special Flood Hazard Areas (SFHAs) to purchase flood insurance to qualify for federally backed loans. Preliminary DFIRMs have been released for a number of cities across the country.

Using online resources and contacting professional experts and local stakeholders, we identified areas where pending changes in the mapping of the 100-year floodplain would modify the position of flood-zone boundaries and the corresponding requirements for property owners to purchase flood insurance. We included five of the eight cities (Belle Chasse, Sacramento, Fargo, Keansburg, and Houston) for a more detailed comparison of the estimated insurance premium costs before and after the pending adjustments expected from BW-12. For Belle Chasse, Keansburg and Houston, digital flood maps (DFIRMs) are available and enabled a direct comparison of the older (effective) and newer (preliminary) flood zones. Fargo and Sacramento did not have either older or newer maps in a digital form, but had ample locally generated information that made it possible to analyze changes in their respective flood hazard areas. These four cities also represented different environmental settings and sources of flood risk: Houston and Keansburg locations primarily face coastal flooding, while Fargo and Sacramento are exposed to riverine flooding. Belle Chasse faces both riparian and hurricane-induced flooding.

Our selection of individual properties within the cities followed these criteria:

- Matched median house price of respective municipal area
- Located in areas with existing flood risk, or would be placed in a Special Flood Hazard Area (SFHA) with the updated DFIRMs, or anticipated to have elevated flood risk
- Received homeowner permission to include the property in this report



Subsequently we consulted the effective flood maps or preliminary DFIRMs (in Louisiana, Texas and New Jersey), and identified a number of potentially applicable neighborhoods within each city. In an effort to determine whether a specific property within the neighborhood met the criteria, we called local floodplain managers, floodplain administrators, or city planners/engineers to verify areas of flood risk and historical flooding events. After confirming that the prospective properties met the flood -risk criteria, we consulted the owners to garner additional information related to the property's structure and its current flood insurance standing as well as to secure permission to use their information in this report. In the case of Fargo, contacts at the Fargo-Moorhead Homebuilder's Association helped to identify a specific residential property which was being mapped within the SFHA on FEMA's new flood maps. In the case of Sacramento, residents were contacted based on their location in the floodplain.

2.2 SECURING FLOOD INSURANCE QUOTES

Once specific residential addresses were determined, current flood insurance premiums were needed to estimate the actuarial premium under BW-12. We requested effective flood insurance premiums and the level of insurance coverage for both building and contents from the homeowners, which were provided either through verbal estimates or copies of their insurance policies sent via email. In addition, we requested structural information for each residence to determine the new insurance premiums. Using the information provided, the anticipated actuarial premium for each property was calculated using FEMA's "National Flood Insurance Program: Specific Rating Guidelines" (FEMA 2013f), with the exception of the Fargo property which is located in an X zone, which was not addressed in FEMA's newly released Guidelines.

2.3 ESTIMATING THE IMPACT OF BW-12

We relied on FEMA for the most geographically consistent and readily available information on current subsidized insurance rates and estimated actuarial rates for the study locations. Before October 1, 2013, the only credible data that had been widely cited to estimate the differential premium rate between subsidized and actuarial was FEMA's estimate of an average 40-45 percent increase. Alicia Puente Cackley, Director of Financial Markets and Community Investment with the U.S. Government Accountability Office (USGAO) and an authority on Flood Insurance, authored the USGAO report released July 2013, entitled: "Flood Insurance: More Information Needed on Subsidized Properties," which confirmed that the subsidized rates were not based on true flood risk, and represented about 40-45 percent of full flood risk according to FEMA (USGAO 2013).

On October 1, 2013, FEMA released the "National Flood Insurance Program: Specific Rating Guidelines" to allow homeowners in certain flood zones to calculate their actuarial premiums, and this document was utilized to derive the estimated actuarial premiums used in this report (FEMA 2013f). While this information is typically issued to insurance agents on an annual basis, FEMA made it available to all interested parties due to heightened public concern over the BW-12 reforms. Although these Specific Rating Guidelines are only relevant to properties located in flood zones A1-A30, AE, AO, AH, D, V1-V20 and VE, they provide anxious stakeholders with an opportunity to calculate the true financial implications of BW-12 themselves.

The current premium and estimated actuarial premium comparison tables (Section 3) created for each property and each city rely on the insurance coverage and property information provided by the homeowners. This information was inserted into the formula guidelines provided in the



“National Flood Insurance Program: Specific Rating Guidelines” document (FEMA 2013f) to determine actuarial rates for each property. If the insurance coverage amounts were unavailable, as was the case with the Keansburg, New Jersey property, coverage was assumed to be \$250,000 for building coverage and \$100,000 for content coverage. We prepared separate calculations for the Sacramento property since the rating guidelines do not specify calculations for properties located in X rated flood zones. In the case of Sacramento, the actuarial premium followed the FEMA estimated average of 40-45 percent more than the current flood insurance premium.

In a further effort to examine the potential impact of BW-12 on the local level, additional data were collected from the City of Fargo and used to produce estimates for proposed insurance increases for property owners across the municipality. City planners created a table outlining the number of parcels in the current and the proposed (DFIRM) floodplains. In an effort to demonstrate the financial impact of the enlarged preliminary floodplain in Fargo, we added estimates for the value of properties in the floodplain, and the subsequent increase in insurance premium costs. To estimate the value of houses in the current and proposed floodplain in Fargo, the number of parcels was multiplied by \$153,900, the median house price listed for the city of Fargo by real estate website Zillow.com. While we could not locate current data for the average cost of flood insurance premiums in Fargo, the cost of insurance was estimated using the national average for flood insurance provided by FEMA which is calculated to be \$625/annually per household (FEMA 2013i).

We created Tables 3 and 4 using FEMA website data for Policy and Claim Statistics for Flood Insurance, from January 1, 1978 to May 31, 2013 (FEMA 2013g & FEMA 2013h).

3. IMPACTS IN SELECTED CITIES

3.1 BELLE CHASSE, LOUISIANA

Belle Chase is part of the New Orleans metropolitan area on the west bank of the Mississippi River in Plaquemines Parish. The population in this parish is concentrated in a narrow swath of land on the natural levee of the river. With 94 percent of the parish within the 100-year floodplain, the parish is particularly vulnerable to flooding and it experienced significant damage during Hurricane Katrina (2005) and more recently during Hurricane Isaac (2012). This property is located near the town of Belle Chasse and is bounded by levees that are part of the Mississippi Rivers and Tributary levee system and also back levees that are part of the West Bank and Vicinity project of the New Orleans District Hurricane and Storm Damage Risk Reduction System (HSDRRS). This particular neighborhood received no significant flooding in 2005 or 2012.

Plaquemines Parish received approval of its effective flood map in 1985 (FEMA 2013b), however the parish is currently undergoing significant updates to this map. FEMA initially released a preliminary Digital Flood Insurance Rate Map (DFIRM) in 2008, and then released a revised map in November of 2012 which updated areas in the vicinity of the HSDRRS. The newer map incorporates the HSDRRS improvements completed by the US Army Corps of Engineers (USACE) as well as improvements to the local drainage system which will assist in the conveyance of flood water. (FEMA 2013k)

14272 Highway 23, Belle Chasse, LA

Note: insurance quote based on \$250,000 building coverage and \$50,000 content coverage with a \$1,000 deductible



Flood Zone	Current Premium	Estimated Actuarial Premium (BW-12)
AE	\$633	\$17,723

The older FIRM places the property in “Zone B” which indicates a 500-year flood event risk, while the updated FIRM places the property in the “Zone AE” which indicates a 100-year flood event risk. The Advisory Base Flood Elevation is 8 feet.

With the implementation of the updated floodplain map, the property is now assessed at 6 feet below the base flood elevation (or -6 BFE). In addition, the revised flood insurance rate calculations mandated by BW-2012 potentially increase the premium from \$633 to \$17,734 per year, an increase of almost 2,700 percent.

3.2 SACRAMENTO, CALIFORNIA

Sacramento exemplifies a city exposed to riverine flooding, specifically in the Natomas Basin (Fig. 1). It has an extensive levee system, protecting communities from the confluence of the Sacramento and the American rivers (Fig. 1). Approximately 75 percent of the city is dependent on levees for flood protection. Approximately 42 miles of the Sacramento River levee protect 53,000 acres of land (City of Sacramento 2012).

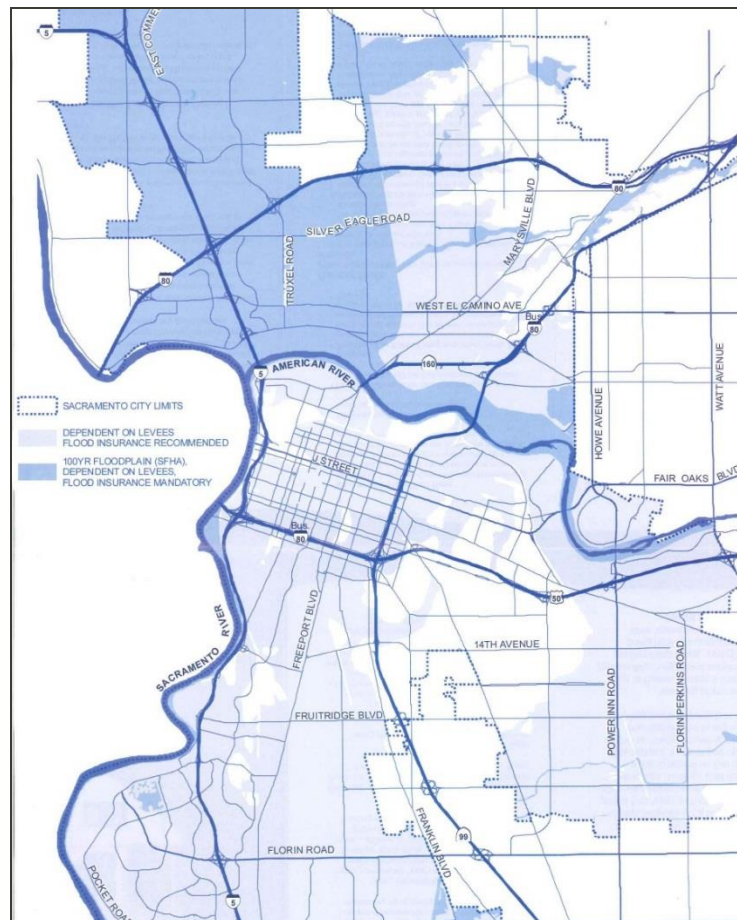


Figure 1. Sacramento Areas Dependent on Levees

Source: City of Sacramento 2012

In 2006, the U.S. Army Corps of Engineers upgraded the criteria for its levee system resulting in the decertification of the Sacramento Levee. This decertification reclassified 27,000 additional homes into the 100-year flood zone. Despite having the risk upgraded to an AE zone in most of the Natomas Basin (see Appendix A for designations), the NFIP currently exempts these property owners from paying traditionally higher AE flood zone insurance premiums who are instead eligible to pay preferred risk policies (PRP) while work is done to bring the Sacramento Levee up to code. Even with the potential 10-20 foot depths of the floodplain in the Natomas Basin (Fig. 2), property owners are paying rates between \$412 and \$860 a year with the two-year preferred risk policy (PRP) extension, which allows the majority of the homeowners in the Natomas community to purchase a flood insurance policy with the majority of policyholders paying \$412/year (City of Sacramento 2012 & FEMA 2013i).¹

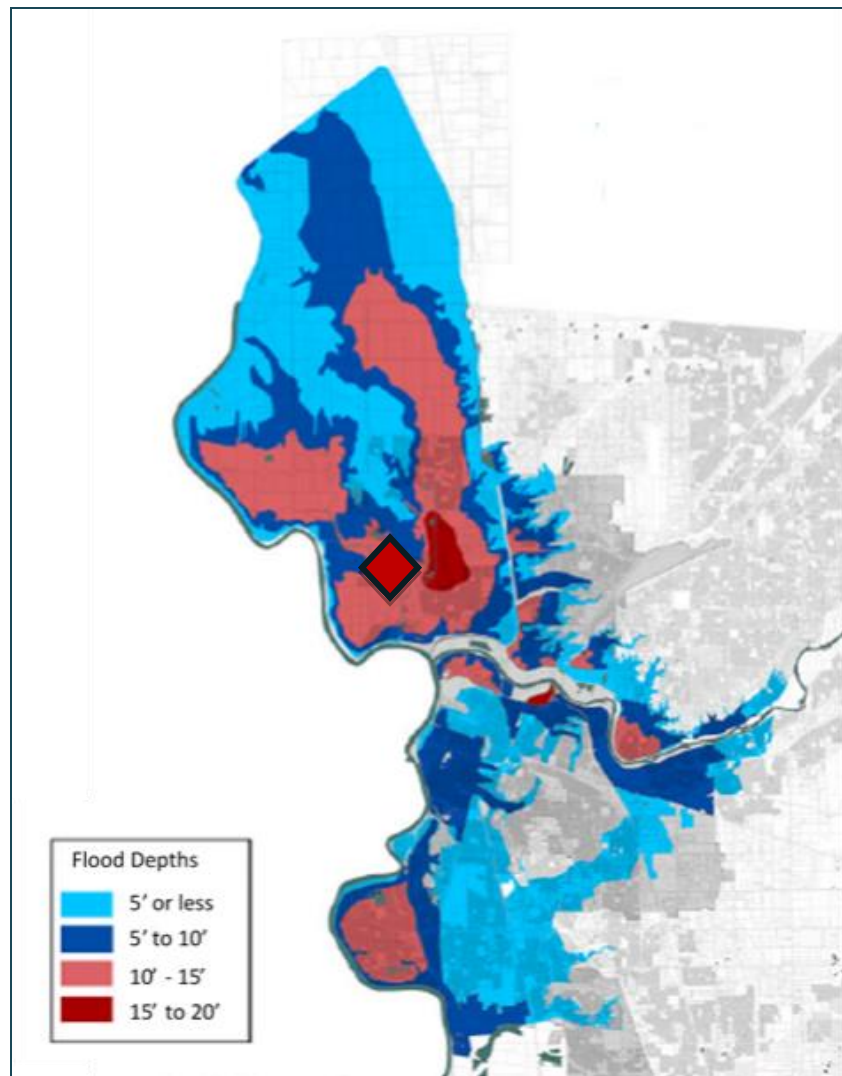


Figure 2. **Flood Depths with No Levees or in the Event of Levee Failure in Sacramento**
Source: City of Sacramento 2012

9 Elijah Place, Sacramento, CA 95835 (property indicated by red marker above)

Note: insurance quote based on \$200,000 building coverage and \$80,000 content coverage with a \$1,000 deductible

Flood Zone	Current Premium (PRP)	Estimated Actuarial Premium (BW-12)
A	\$353	\$20,967

As mentioned above, properties such as this one in the Natomas Basin receive a PRP rate despite being located in an A or AE flood zone with estimated potential flood depths between 10 to 15 feet. The Sacramento Insurance Company reported that without the preferred rating all policy holders in the Natomas Basin would currently be paying approximately \$1,600/year, and without the PRP under BW-12 their rates would climb to approximately \$20,000/year.

3.3 FARGO, NORTH DAKOTA

Fargo is a riparian city on the banks of the Red River, protected by U.S. Army Corps of Engineers levees, and subject to frequent river flooding. Major flooding events in 2009, 2010, 2011 and 2013 were the result of a heavy spring snow melts and downriver ice jams. These recent flood events prompted NFIP to modify the city's floodplain ordinance, and this adjustment enlarged the area where property owners face the requirement for flood insurance (Fig. 3) (City of Fargo 2012). With the preliminary DFIRM maps, the number of structures in the SFHA will increase from 226 to 2,035, resulting in 1,183 new structures with a value of over \$1 billion being designated within the SFHA based on local median house prices (City of Fargo 2012).

5116 Rose Creek Parkway South, Fargo, ND 58104

Note: insurance quote was based on \$250,000 building coverage and \$100,000 content coverage with a \$1,000 deductible

Current Flood Zone	Current Premium	Estimated Actuarial Premium (BW-12)
X	\$458	\$1,018-1,145

The property selected on Rose Creek Parkway is in a suburban neighborhood located in the Red River floodplain. This neighborhood is subject to flooding when levees overtop, but since its construction in 1998, the house has never flooded. Because this property is located in an X rated flood zone, the actuarial rate could not be calculated using FEMA's Specific Rating Guidelines as done with the other four properties. Based on the premium quoted by the property's insurance provider, the actuarial premium was estimated using FEMA's estimated average of 40-45 percent premium increase. With this calculation, the owners in Fargo are still estimated to pay more than double for flood insurance as BW-12 takes effect. While only a portion of this property is located in an AE floodplain, lenders require insurance based on the higher risk floodplain, not the sections of the property located in lower risk areas, even if that is where the house is located. This property in Fargo provides an example of a higher rate applying to a property that straddles two risk zones.



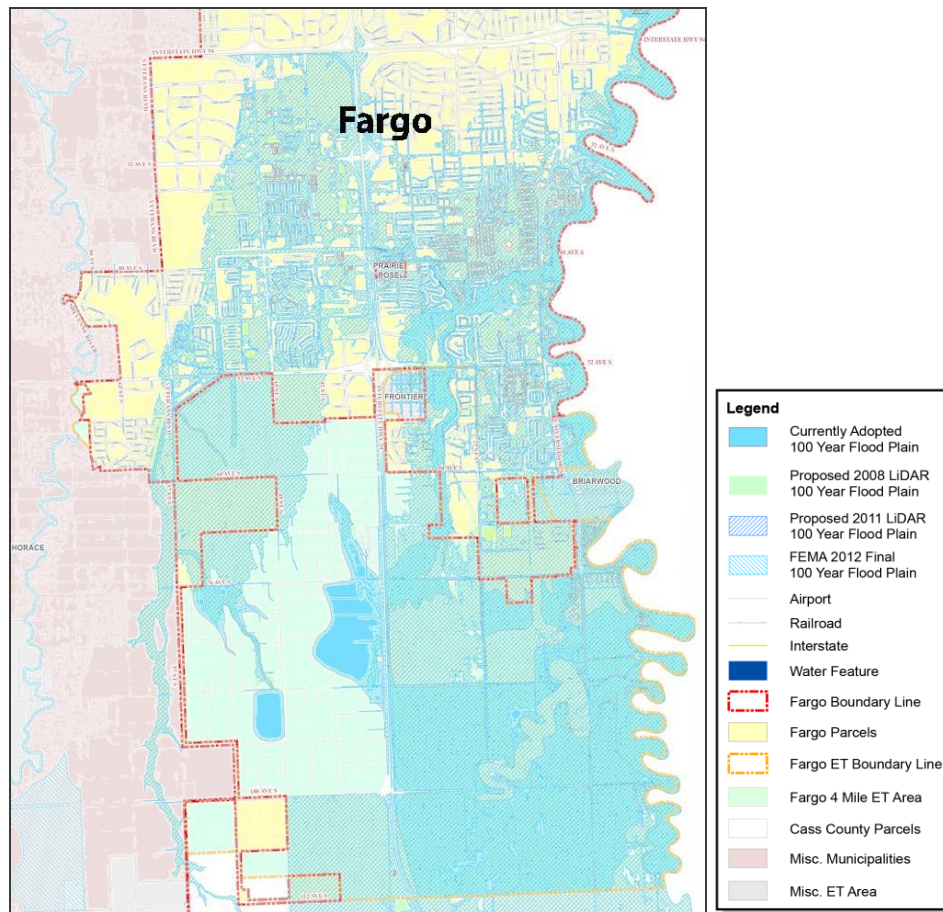


Figure 3. **Fargo: Current and Proposed 100 Year Floodplain**
 Source: City of Fargo 2012

3.4 KEANSBURG, NEW JERSEY

Keansburg, in Monmouth County New Jersey, represents a coastal location that experienced the effects from Hurricane Sandy, and now has recently updated DFIRMs. The majority of the State of New Jersey is a coastal plain with approximately 1/3 of the state in a 100-year floodplain. In part due to Hurricane Sandy, the State of New Jersey is currently ranked third in the nation for flood insurance claims, policies, and payouts (behind Florida and Louisiana).

20 Manning Place, Keansburg, NJ 07734

Note: insurance quote was based on \$250,000 building coverage and \$100,000 content coverage with a \$1,000 deductible

Current Flood Zone	Current Premium	Estimated Actuarial Premium (BW-12)
AE	\$458	\$8,814

This New Jersey community experienced significant damage and flooding driven by Hurricane Sandy in 2012 as the area is in a low-lying coastal plain with no structural levee protection. This property is located in a mixed-use neighborhood (commercial and residential). While there are only modest differences between the effective and preliminary flood zones (see Appendix B) and, therefore, no substantial change in designated flood risk, this property is still expected to experience an estimated



doubling of property flood insurance rates due to the move towards actuarial premiums resulting from BW-12. Based on FEMA's preliminary floodplain maps, there has been no reclassification of the flood zone for this property.

3.5 HOUSTON, TEXAS METROPOLITAN AREA

The Houston area has experienced coastal flooding associated with tropical storms rather than riverine inundation. In 2008, Hurricane Ike and its aftermath highlighted serious weaknesses in the storm surge model and the flood zone mapping for the Houston/Harris County area (Johnson 2013). In an effort to develop more accurate floodplain maps, the preliminary DFIRMs for Houston alone place an additional 3,000 houses in the 100-year floodplain, approximately a 5 percent increase. According to the preliminary DFIRMs, the City of Houston can anticipate an additional 100,000 properties to be located into the SFHA. Surrounding towns such as League City, Dickinson, and La Porte will also experience an 80-90 percent increase in residential properties added to the SFHA. The property selected in La Porte, just outside of Houston, faces Galveston Bay which is partly protected by barrier islands but has no levee protection (see Appendix B).

3914 Marlin Lane, La Porte, TX 77571

Note: insurance quote based on \$133,400 building coverage and \$32,200, content coverage with a \$1,000 deductible

Current Flood Zone	Current Premium	Estimated Actuarial Premium (BW-12)
AE	\$1,327	\$17,148

Built in 1962, this property is in a high risk area, despite only flooding once during Hurricane Ike in 2008. While there is no anticipated upgrade in the flood zone classification on the preliminary maps (see Appendix B), owners of this property can expect a significant increase in their current insurance premium without a change in their designated flood zone.

4. NATIONAL AND LOCAL IMPACT OF BW-12

4.1 IMPACT OF BIGGERT-WATERS ON NATIONAL AND LOCAL SCALES

In an effort to demonstrate the broader impacts of BW-12, beyond the financial impact of actuarial insurance rates on individual residential homeowners, we consulted additional resources to obtain city and state-based examples which would be impacted by the proposed insurance premium increases. At the national level, FEMA estimates that of the 5.5 million policy holders, some 1.1 million will be affected by the rate increase (FEMA 2012m).

The City of Fargo information enabled the documentation of the differences between current and potential insurance rates for property owners (Table 1). By comparing the current number of houses in Fargo located in the 100-year floodplain with the number of houses in the proposed FEMA preliminary floodplain, an estimated 7,683 additional properties will be incorporated into the newly designated 100-year floodplain (City of Fargo 2012).

Table 1. Fargo House Values and Annual Insurance Costs for 100-Year Floodplain

	CURRENT			PROPOSED			Increased Insurance Costs (in \$ 1000s)
	Number of Parcels	Value of Houses (in \$ 1000s)	Cost of Insurance (in \$ 1000s)	Number of Parcels	Value of Houses (in \$ 1000s)	Cost of Insurance (in \$ 1000s)	
Fargo Parcels	1,275	196,223	800	8,711	1,340,622	5,400	4,600
Fargo ET Parcels**	764	117,579	480	1,011	155,592	630	150
Total	2,039	313,802	1300	9,722	1,496,215	6,030	4,750

** ET: Extra Territorial Parcels

This change could result in cumulative annual insurance premium costs to residential property owners of nearly \$5 million. This example dramatically illustrates the potential impact of BW-12 for one city (City of Fargo 2013). However, it should be noted that this estimate does not yet capture the full scope of the potential financial impact on the community, as the cost of insurance rate increases for business and commercial properties is not included.

One argument for the passage of BW-12 was the exhaustion of funds in the system due to recent massive floods. It is important to note, when comparing the total payments in Fargo (\$7.9 million, Table 2) with the cost of insurance there (\$5.4 million, Table 1), it is apparent that payments to claimants exceed premiums paid by over \$2 million. Nonetheless, we hasten to add that the NFIP was established as a national program. It was able to cover most of its claims with the premiums paid by policy holders until 2004. However, the program was not designed to insure losses from catastrophic events and after the 2005 hurricane season and again after Hurricane Sandy, the program had to borrow from the U.S. Treasury to cover its claims (FEMA 2013).

Table 2. Insurance In-Force and Payments for Study Cities (1/1/1978-5/31/13)

City	Total Policies	Insurance In-Force (in \$ 1000s)	Total Policies with Losses	Total Claims Paid (in \$ 1000s)
Fargo, ND	3,783	1,053,606	1,248	7,906
Houston, TX	132,947	33,234,127	45,149	1,046,780
Keansburg, NJ	2,050	459,765	1,285	39,564
Norfolk, VA	12,434	3,133,630	5,379	61,375
Pittsburg, PA	479	157,738	538	8,334
Sacramento, CA	46,568	14,536,297	1,790	9,871
Tampa, FL	28,039	7,037,145	2,273	30,338
Total	226,300	59,612,308	57,662	1,204,168



Table 2 uses FEMA data from for the period January 1, 1978 through May 31, 2013 for Fargo and the other cities. It reveals the wide range in losses and payments in these different locations and highlights the impact of tropical weather systems in a location like Houston. Similar patterns appear at the state level (Table 3) (FEMA 2013m).

Table 3. **Insurance In-Force and Payments for Study States (1/1/1978-5/31/13)**

City	Total Policies	Insurance In-Force (in \$ 1000s)	Total Losses	Total Payments (in \$ 1000s)
North Dakota	14,142	67,051	13,027	256,426
Texas	641,653	1,622,137	239,974	5,532,685
New Jersey	245,501	5,680,298	186,632	5,203,557
Virginia	116,553	2,844,239	43,330	621,196
Pennsylvania	74,641	1,365,864	67,339	1,130,047
California	245,532	6,705,108	44,833	499,065
Florida	2,053,208	4,773,470	239,230	3,702,321
Total	3,391,230	23,058,167	834,365	16,945,297

5. FUTURE OF THE FLOODPLAIN

The impending increase in flood insurance premiums stemming from the passage of BW-12 is an attempt to address issues that have been discussed for over a decade and many argue were long overdue (Burby 2001). Increasing flood insurance payments, particularly in the last eight years with the extraordinary series of storms in 2005 and the impact of Hurricane Sandy in the New York metropolitan area in 2012, have raised concern over the NFIP's financial reserves (USGAO 2013). In addition, population growth and increasing urbanization have continued to concentrate development in flood-susceptible coastal and riparian areas. While the claim that the reserves have been depleted is undergoing scrutiny by policy makers and concerned citizens, the risk of future strain on the flood insurance system continues to be a concern (USGOA 2013). Yet, property owners and local policy makers fear that the impending increase in insurance rates may render some properties un-marketable in the future and constitute a serious threat to the long-term value of property, the real estate market, local businesses, lending institutions, and entire communities. At the same time, there are many advocates for options that would enable a more holistic long-term solution to reduce flood risk and lower the cost of flood insurance, and not just a delay to the proposed premium increases.

Burby noted in 2001 that the NFIP had not accomplished one of its original intents to diminish the amount of development in flood-hazard zones, but, rather, likely contributed to stimulating development by mitigating flood risk. Of 6.6 million buildings identified in the 100-year floodplain in 1999, 2.3 million were constructed after the preparation of the NFIP flood maps (Burby 2001). Using surveyed land-cover data, National Oceanic and Atmospheric Administration (NOAA) reports that 53 percent of new development across the country occurred in the hurricane belt between North Carolina and Texas from 1996 to 2001 (NOAA 2008).



Population increase in coastal areas, which also contain sizable areas of riparian floodplain, is driving the noted land-use changes. According to NOAA, in 2010, about 39 percent of the country's population lived in shoreline counties (NOAA 2013). About 8 percent of the country's population lived in counties facing the ocean or that contain some land area within the 100-year floodplain (1 percent annual risk of flooding). The eastern and southern seaboard, which contain much of this population, face the dual threats of riparian flooding and storm-based inundation, yet have also benefitted from extensive investments in flood protection levees – most notably in Florida and Louisiana. The Houston metropolitan area stands out as an area of particularly rapid growth with more than 640 square miles of land converted to low-density urban land uses between 1970 and 1990. This development has converted wetlands and expanded impervious surfaces making the Galveston-Houston area one of the largest contiguous areas of impervious surfaces in the country. Impervious surfaces can contribute to increased run off and property damage during floods (Brody et al. 2011). Development patterns, as much as premiums, need to be part of the conversation in revamping the NFIP. Imprudent development expands the number of properties at risk and increases flooding potential.

The Gulf Coast and Atlantic Seaboard present prime examples of practices which Burby refers to as paradoxes in terms of flood protection. He refers to the common pattern of increasing development behind flood-protection levees as the “safe-development paradox.” This pattern compounds the “levee effect” -- which is an increase in damages in areas protected by levees when a flood exceeds the design height of the barrier. Following Hurricane Betsy in 1965, Congress committed federal funds to fortify the New Orleans area from hurricane floods. During the next decade, the two principal urban parishes (Orleans and Jefferson) added 72,000 housing units within the perimeter of the emerging levee system (Burby 2006). Burby's second paradox is the “local government paradox” – where local government inadequately addresses flood issues. He cites examples of local authorities lobbying for a lower standard of levee protection to reduce the local cost share. Additionally, many of the post– Hurricane Betsy subdivisions approved by the City of New Orleans were within the footprint of areas that had flooded within memory (Fig. 4; Colten and Giancarlo 2011). The urge to rebuild in areas that have been impacted by previous floods is not restricted to New Orleans and is a common dilemma in many flood-prone areas (Kousky and Kunreuther 2010).

Property owners in the southeastern US, a region which has experienced rapid growth in recent decades, will face acute impacts from the pending rate increases. Within this region, Texas, Louisiana, and Florida have some of the highest percentages of subsidized flood insurance policies, and the elimination of subsidized coverage will have a profound impact on property resale potential (USGAO 2013). Louisiana and Florida, have some of the most extensive investments in flood protection levees – hence they also face the levee effect. Communities can assist property owners by taking advantage of [FEMA's Community Rating System](#) (CRS) which enables communities to implement a wide range of risk education and mitigation practices to earn policyholders flood insurance rate discounts between 5 and 45 percent.



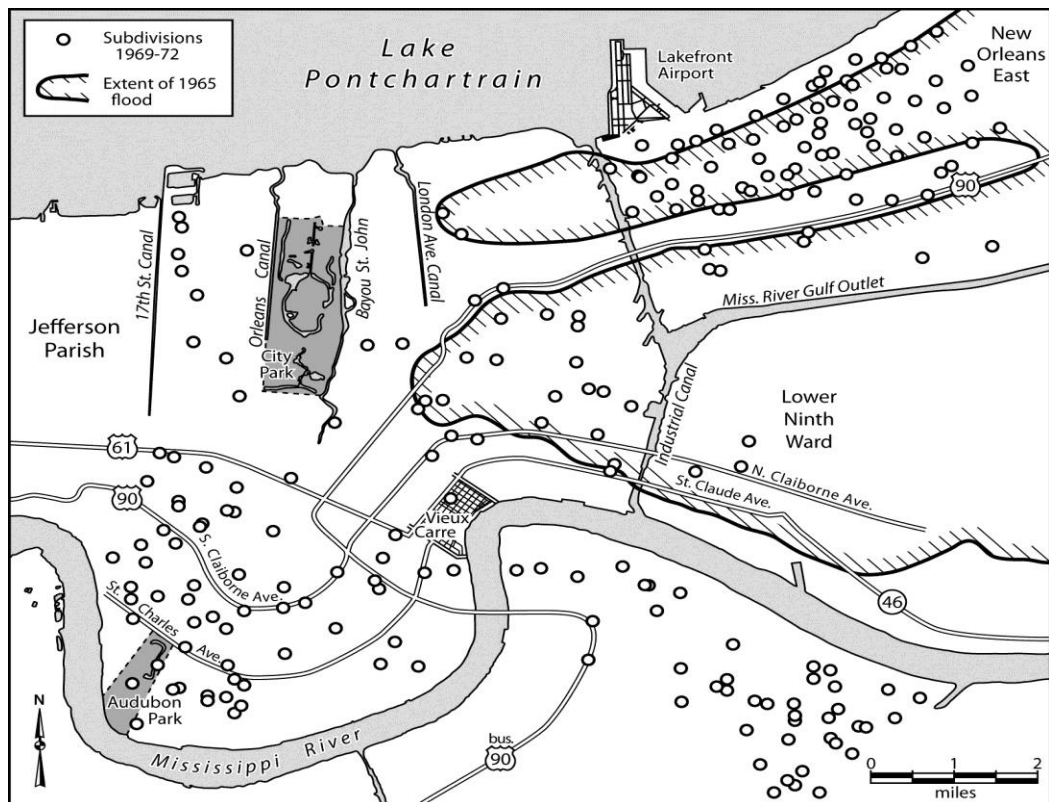


Figure 4. Subdivisions Approved in New Orleans after Hurricane Betsy in 1965

Source: Colten and Giancarlo, 2011.

Currently undergoing updating, the Flood Insurance Rating Maps (FIRMs) have received ample criticism over the years and commonly face challenges at the local level when released. Prior to the launch of the on-going map updating process, a common criticism was that the maps were not updated frequently enough. As development in drainage basins altered the local hydrology and runoff characteristics, the original flood zones became obsolete. Other critiques point out that those properties that straddle risk zones may be under- or overrated based on the proportion of the property within a particular zone (GenRe 2013). Incomplete or inaccurate hydrologic/flood records can also weaken the reliability of FIRMs when they do not accurately reflect risk. These critiques have been part of local push back when FIRMs are released, and in many instances these issues deserve to be addressed. The goal of nationally compatible and up-to-date floodplain maps is a costly undertaking that requires on-going support and is not a one-time procedure. It also demands adequate support for hydrologic data collection to maintain accurate flood risk calculations. Despite recent floods on the upper Red River, cuts to the USGS budget threaten stream gauging. This problem is not isolated to North Dakota and federal budget cuts reduce the ability of government scientists to provide adequate information for hydrologic predictions and floodplain mapping (USGS 2013).

FEMA is also evolving the procedures used to update floodplain maps in order to assess flood risk more accurately and to factor local levees and other flood protection structures into rate calculations through the “Risk Mapping, Assessment, and Planning” (RiskMAP) and “Levee Analysis and Mapping Approach” (LAMP) initiatives. The RiskMAP program “addresses gaps in flood hazard data to form a solid foundation for risk assessment, floodplain management, and actuarial soundness of the National Flood Insurance Program” (FEMA 2013). Through the development of LAMP guidelines, FEMA is modifying its

mapping procedures to recognize “that levee systems that do not fully meet the [federal] requirements... may still provide a measure of flood risk reduction” (FEMA 2013I). In the long run, the updated maps should address some of the concerns with astronomical rate increases, as properties may have reduced base flood elevations (BFEs) than currently calculated (FEMA 2013I). There have been numerous suggestions advanced to reform the NFIP that go beyond addressing challenges associated with floodplain mapping and with implementing actuarial insurance-rates. Professionals in hazard and floodplain management have advocated for phased-in rate increases along with community-based insurance in order to minimize the shock of rapid increases coupled with actuarial rates. Some localities are working to devise local subsidies to offset the cost of flood insurance for their residents. Enlarging the “residual risk” territory is an option that would bring more properties into the Special Flood Hazard Areas where flood insurance is required and thus reduce individual policyholder’s costs (King 2010). The introduction of longer-term insurance to reduce the number of short-term policy holders and sustain the risk pool by tying the policy to the property and not the owner is another option. This process would enable new buyers to be assured of a pre-purchase insurance rate. Another proposed alternative is to provide policy holders with an option to secure reduced insurance rates when they invest in mitigation practices on their properties (Huber 2012). Equally as important are steps to reverse the tendency for development to encroach on flood-prone locations to promote mitigation of high-risk homes through elevation or other measures, and to encourage outreach strategies for effective risk communication to local land use planners and property buyers (Huber 2012).

A prudent way forward will seek to improve safety for those in flood hazard zones along with diminishing the cost of both insurance and disaster relief. Advocates of risk reduction deserve a prominent place in the discussions about flood insurance reform since the NFIP is one of the most important arenas for discouraging inappropriate development in flood zones.

6. CONCLUSION

In assessing the potential impact of BW-12 and its proposed transition from subsidized flood insurance to actuarial premiums, which are considered more reflective of existing flood risk), it is clear that a number of coastal and riverine states and cities will be impacted. The updated floodplain maps will reassign many properties into the 100-year floodplain, requiring borrowers to participate in the NFIP and bear the costs of higher insurance premiums. As illustrated in this report, properties located in areas without changes in floodplain designations are anticipated to see their insurance costs increase substantially (in most cases more than double) with the introduction of actuarial rates.

While local communities have made efforts to address their flood risk through various means including property buyouts, home elevations, land-use restrictions, and building codes, experts make compelling arguments that significant changes are needed to create a sustainable and equitable national flood insurance policy. Adjustments to local policies that redirect inappropriate development to low risk locations and reward flood-proofing efforts taken by property owners can complement the NFIP. Supporting a sound flood insurance program with sufficient financial reserves to withstand extreme storm events while offering affordable, risk-based insurance are both critical to homeowners, businesses, local real estate markets, and communities across the nation.



ENDNOTES

¹Some communities protected by recently decertified levees (as is the case in the Natomas Basin in Sacramento), received preferred risk policies (PRP) by the federal government during upgrades to structural protection in anticipation of recertification. The PRP is a lower-cost Standard Flood Insurance Policy (SFIP) provided by NFIP, offering building and contents coverage for properties located in moderate risk zones (B, C, or X) (see Appendix A). PRP eligibility extensions are available if properties meet specific eligibility criteria as defined by FEMA. To be eligible for PRP Eligibility Extension coverage, structures must be located in B, C, or X zones on the effective date of the policy, with the exception of structures newly mapped within an SFHA due to map revisions effective on or after October 1, 2008. PRP Eligibility Extensions are also provided to structures previously located in D zones that have been newly mapped into an SFHA (FEMA 2013g). Certain property owners in Sacramento have received PRP extensions. These extensions offer a temporary rate as the federal and state government work to fortify and then recertify the Sacramento River Levee system.



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8. GLOSSARY OF TERMS

100 Year Floodplain	The flooding event that has a 1 percent chance of being equaled or exceeded in a particular location in any given year.
A-ZONE	The Special Flood Hazard Area shown on a community's Flood Insurance Rate Map where no base flood elevation is provided.
Base Flood Elevation (BFE)	The height at which there is a 1 percent chance or greater of flooding in a given year. The BFE is used for flood insurance policy rating.
Base Flood	The flood having a 1 percent chance of being equaled or exceeded in any given year. It is also known as the 1 percent chance or 100-year flood. The Base Flood has been adopted by the National Flood Insurance Program as the basis for mapping, insurance rating, and regulating new construction.
Decertified Levee	Levees are decertified when a community is restudied and it is determined that the levee does not meet the levee standards (as defined by the FEMA), or no available documentation demonstrates that the levee meets those criteria (FEMA 2006).
Digital Flood Insurance Rate Map	Digital map which displays areas in the community that are subject to flooding (see Flood Insurance Rate Map).
Extra Territorial Parcels (ET Parcels)	Parcels located beyond local territorial jurisdiction.
Flood Insurance Rate Map (FIRM)	Map used by nearly all 20,000 flood-prone communities in the nation, which displays shaded areas in the community that are subject to flooding. Flood insurance rates are based on risk of the various areas shown on the map. In addition, most community's regulations are tied to the different risk zones shown on that map.
Flood Zones	Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk. These zones are depicted on a community's Flood Insurance Rate Map (FIRM) or Flood Hazard Boundary Map. Each zone reflects the severity or type of flooding in the area (for Flood Zone Designations see Appendix A).
Preliminary FIRM or DFIRM	The NFIP map that reflects that initial results of a flood risk project that is performed by or for FEMA. The Preliminary FIRM is provided to CEOs and FPAs of all affected communities before



the 90-day appeal period (when required) is initiated or an LFD is issued.

Preferred Risk Policy (PRP)

Lower-cost flood insurance rates for homes and apartments in areas of low to moderate flood risk. These areas outside of known floodplains are shown as B, C, or X zones on a Flood Insurance Rate Map (see Appendix A).

Special Flood Hazard Area (SFHA)

An area of land that would be inundated by a flood having a 1 percent chance of occurring in any given year (also referred to as the base flood or 100-year flood).

Sources: Sea Grant Law & Policy Program 2009, Interagency Levee Policy Review Committee 2006 and FEMA 2013







Appendix A: High Risk Flood Designations

APPENDIX A – HIGH RISK FLOOD DESIGNATIONS

ZONE	DESCRIPTION
A	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.
AE	The base floodplain where base flood elevations are provided. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.
AR	Areas with a temporarily increased flood risk due to the building or restoration of a flood control system (such as a levee or a dam). Mandatory flood insurance purchase requirements will apply, but rates will not exceed the rates for unnumbered A zones if the structure is built or restored in compliance with Zone AR floodplain management regulations.
A99	Areas with a 1% annual chance of flooding that will be protected by a Federal flood control system where construction has reached specified legal requirements. No depths or base flood elevations are shown within these zones.
B and X (shaded)	Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. Are also used to designate base floodplains of lesser hazards, such as areas protected by levees from 100-year flood, or shallow flooding areas with average depths of less than one foot or drainage areas less than 1 square mile.
C and X (unshaded)	Area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level.
V	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. No base flood elevations are shown within these zones.
VE	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.

Source: FEMA 2013



A vertical bar on the left side of the page, filled with a repeating pattern of teal water droplets.

Appendix B:
PowerPoint & Presentation Notes
National Implications of Biggert-Waters Act



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**NATIONAL FLOOD INSURANCE
PROGRAM:
IMPACT OF THE BIGGERT-WATERS FLOOD
INSURANCE REFORM ACT OF 2012**

December 9, 2013



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LOUISIANA



BELLE CHASSE



~ 6 feet below BFE

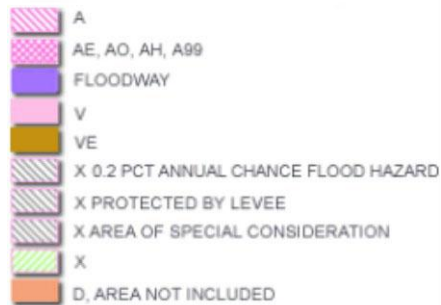
Address	14272 Highway 23 Belle Chasse, LA
Flood Zone	AE
Building and Content Coverage (\$1,000 deductible)	\$250,000 (building) \$50,000 (content)
Current Premium	\$633
Estimated Actuarial Premium (BW12)	\$17,723

FLOOD HAZARD ZONES OF PLAQUEMINES PARISH, LA

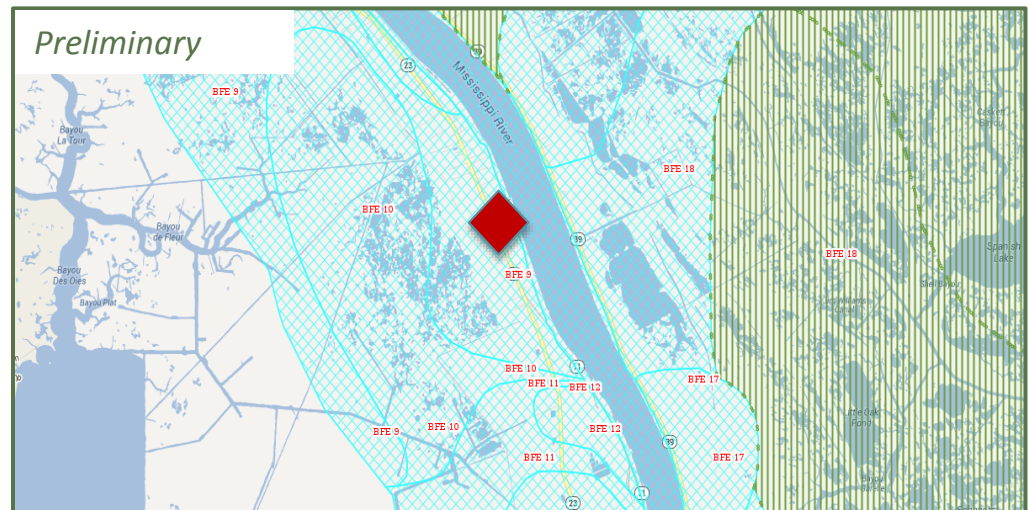
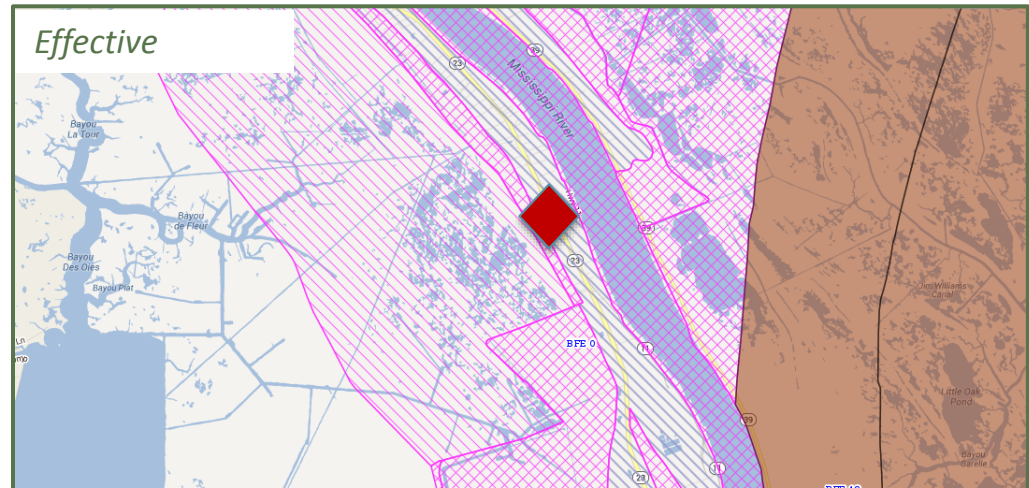
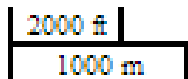
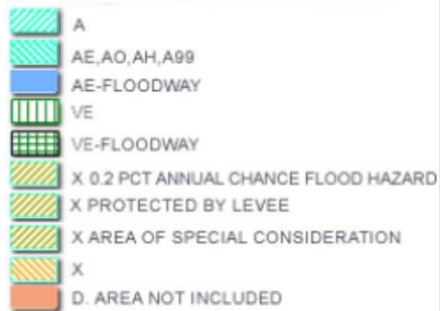


Legend

Effective Flood Hazard Zones



Preliminary Flood Hazard Zones



Disclaimer: This map has been captured from FEMA.gov for communication purposes only. The Water Institute does not produce or maintain FEMA Flood Insurance Rate Maps and therefore does not accept any liability for the accuracy, completeness, or correctness of FEMA flood hazard data or maps. Official flood hazard maps can be obtained from FEMA Map Service Center. Data Sources: Federal Emergency Management Agency.



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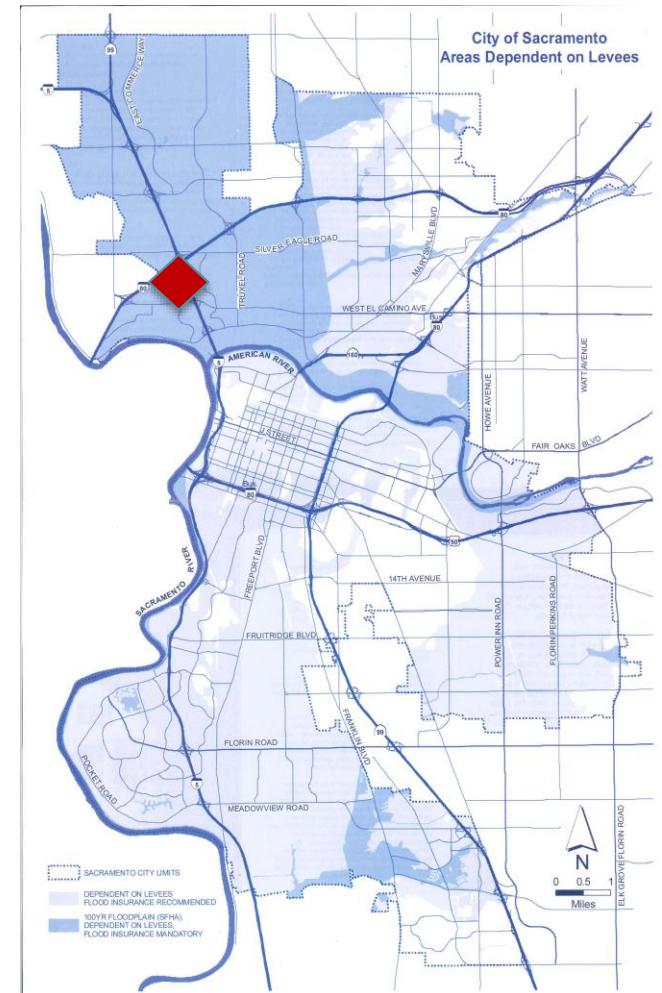


CALIFORNIA



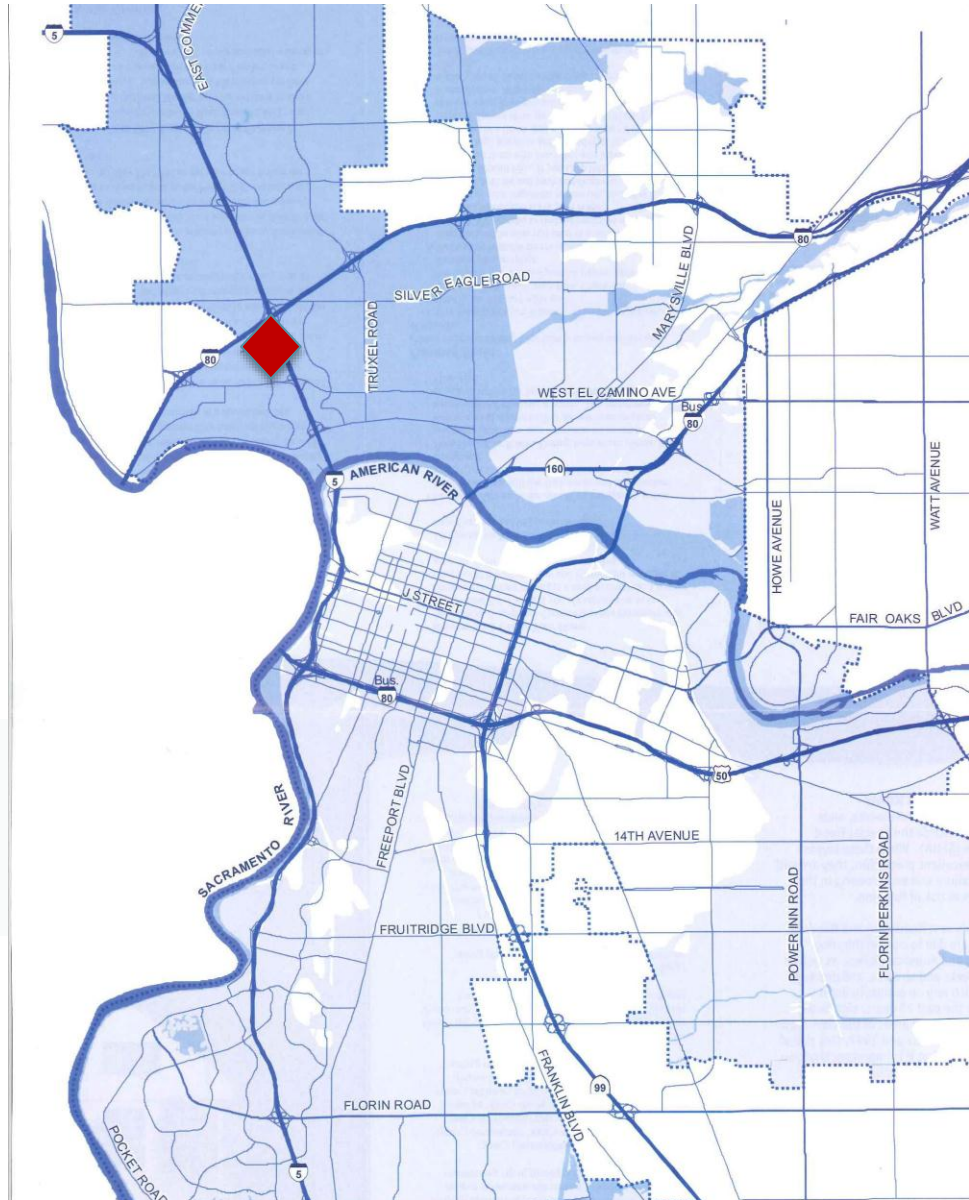
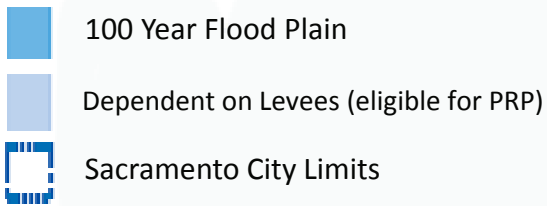
SACRAMENTO

- ◆ Area of high risk: Natomas Canal Basin
 - Where the American and Sacramento rivers converge
- ◆ 42 miles of the Sacramento River levee protect 53,000 acres of land
- ◆ Current population of Natomas Canal Basin ~100,000
- ◆ Sacramento River Levee decertified by U.S. Army Corps of Engineers in 2006
- ◆ Potential flooding depth up to 20 feet

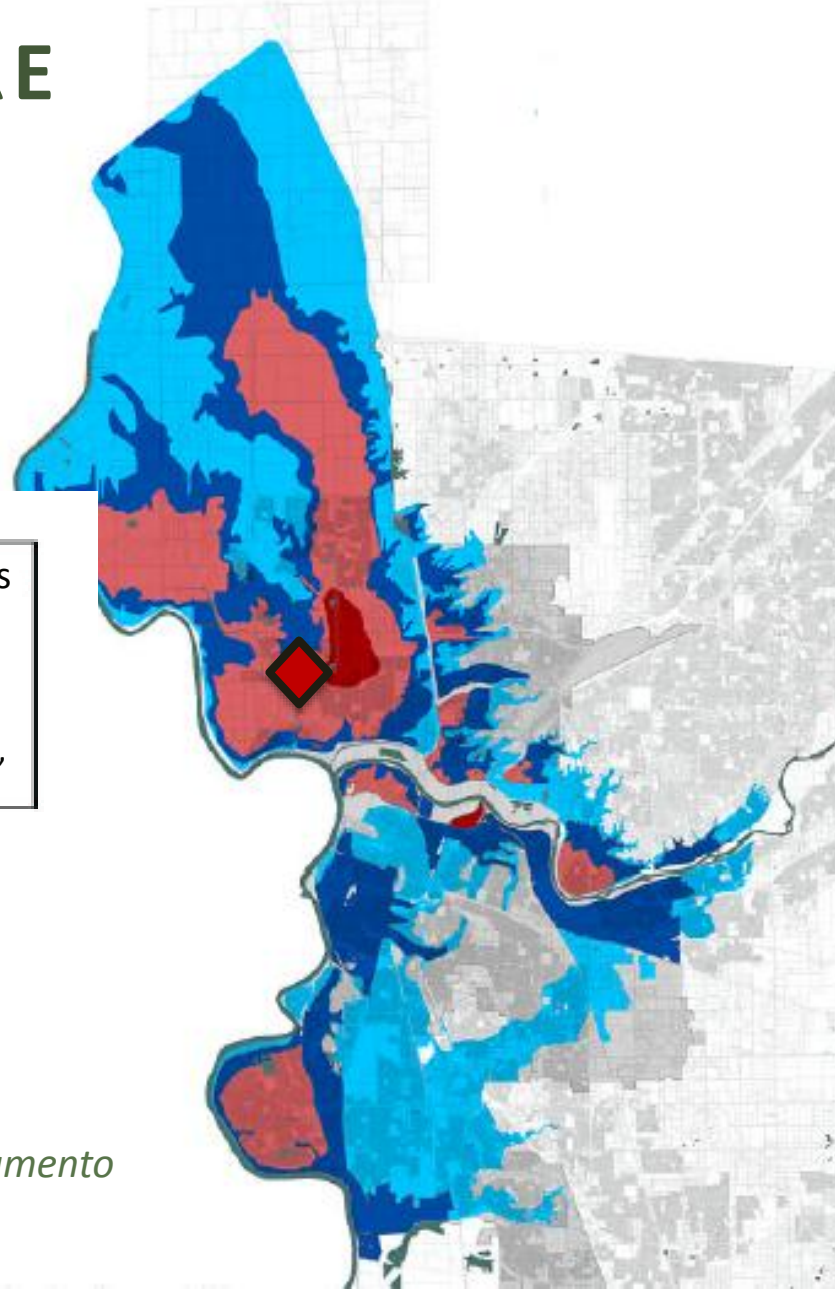
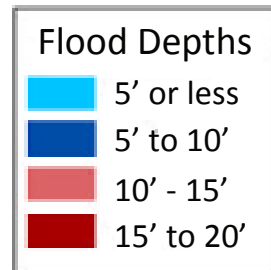


Source: City of Sacramento

SACRAMENTO AREAS DEPENDENT ON LEVEES



FLOOD DEPTHS WITH NO LEVEES OR LEVEE FAILURE

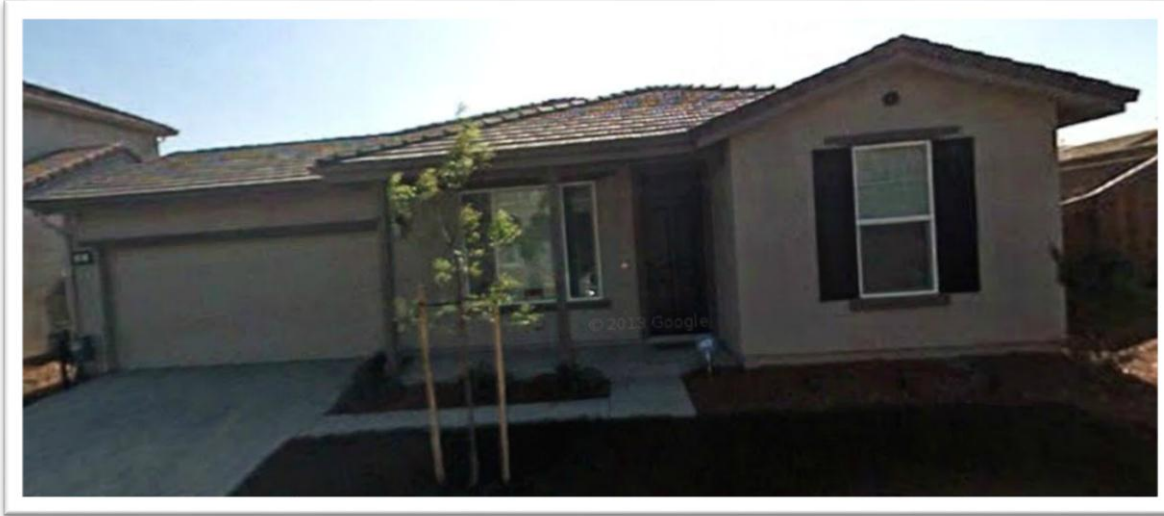


Source: City of Sacramento





SACRAMENTO



~ 10 feet below BFE

Address	9 Elijah Place, Sacramento, CA
Flood Zone	A
Building and Content Coverage (\$1,000 deductible)	\$200,000 (building) \$80,000 (content)
Current Premium	\$353
Estimated Actuarial Premium (BW12)	\$20,967



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NEW JERSEY

FLOOD HAZARD ZONES OF MONMOUTH COUNTY, NJ



Legend

- VE
- AO
- AE
- A
- X (Unshaded)
- X (Shaded)

0 1.5 miles



Disclaimer: The map has been produced for communication purposes only. The Water Institute does not produce or maintain FEMA Flood Insurance Rate Maps and therefore does not accept any liability for the accuracy, completeness, or currentness of FEMA flood hazard data or maps. Official flood hazard maps can be obtained from FEMA Map Service Center. Data Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013; Federal Emergency Management Agency



FLOOD HAZARD ZONES OF MONMOUTH COUNTY, NJ



Legend

- AE
- X (Shaded)

0 0.2 miles



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NEW JERSEY



Address	20 Manning Place, Keansburg, NJ
Flood Zone	AE
Building and Content Coverage (\$1,000 deductible)	\$250,000 (building) \$100,000 (content)
Current Premium	\$458
Estimated Actuarial Premium (BW12)	\$8,814



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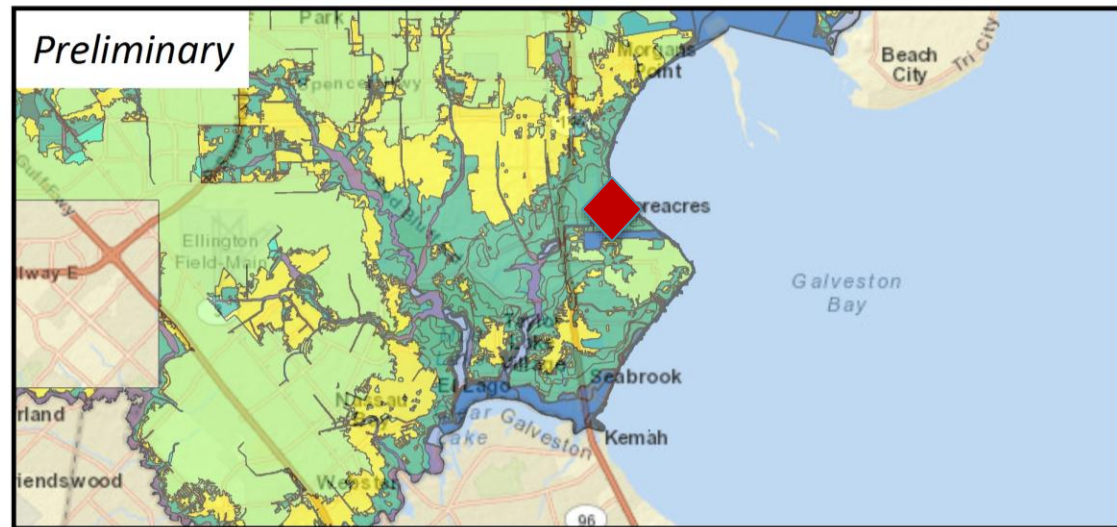
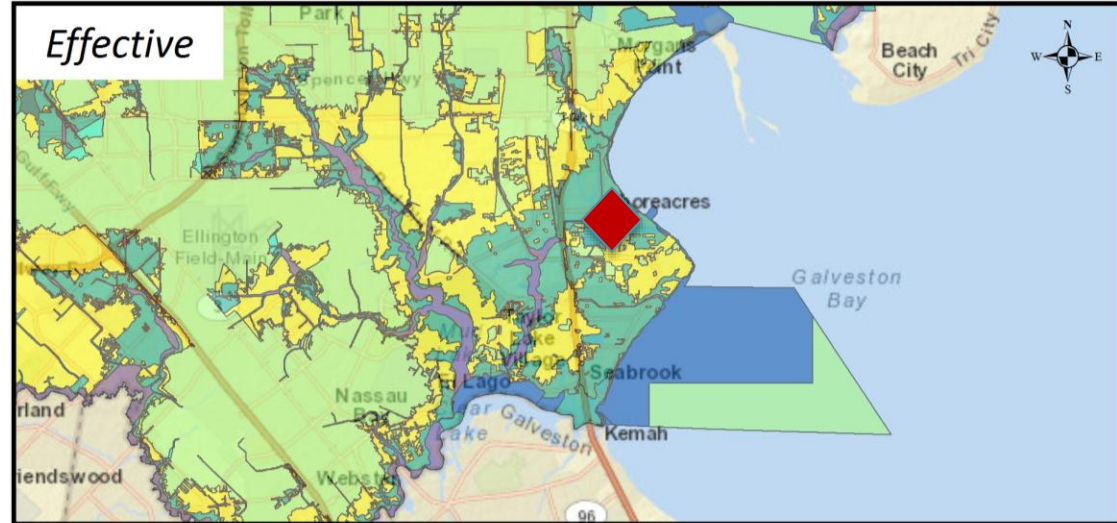
TEXAS

FLOOD HAZARD ZONES OF HARRIS COUNTY, TX



Legend

- VE
- VE Floodway
- AO
- AE Floodway
- AE
- A
- X (Unshaded)
- X (Shaded)



Disclaimer: The map has been produced for communication purposes only. The Water Institute does not produce or maintain FEMA Flood Insurance Rate Maps and therefore does not accept any liability for the accuracy, completeness, or currentness of FEMA flood hazard data or maps. Official flood hazard maps can be obtained from FEMA Map Service Center. Data Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013; Federal Emergency Management Agency



FLOOD HAZARD ZONES OF HARRIS COUNTY, TX



Legend

- VE
- AE Floodway
- AE
- X (Unshaded)
- X (Shaded)

0 0.7 miles



Disclaimer: The map has been produced for communication purposes only. The Water Institute does not produce or maintain FEMA Flood Insurance Rate Maps and therefore does not accept any liability for the accuracy, completeness, or currentness of FEMA flood hazard data or maps. Official flood hazard maps can be obtained from FEMA Map Service Center. Data Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community; Federal Emergency Management Agency



HOUSTON



~ 17 feet below BFE

Address	3914 Marlin Lane, La Porte, TX
Flood Zone	AE
Building and Content Coverage (\$1,000 deductible)	\$133,400 (building) \$32,200 (content)
Current Premium	\$1,327
Estimated Actuarial Premium (BW12)	\$17,148

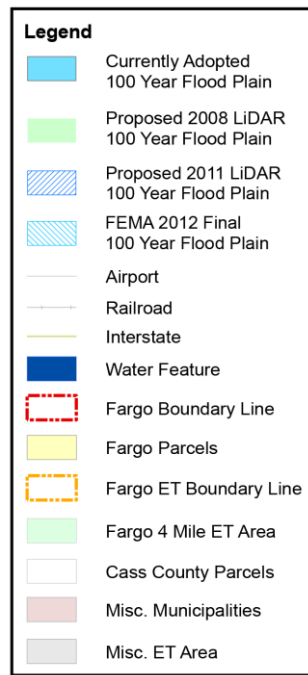


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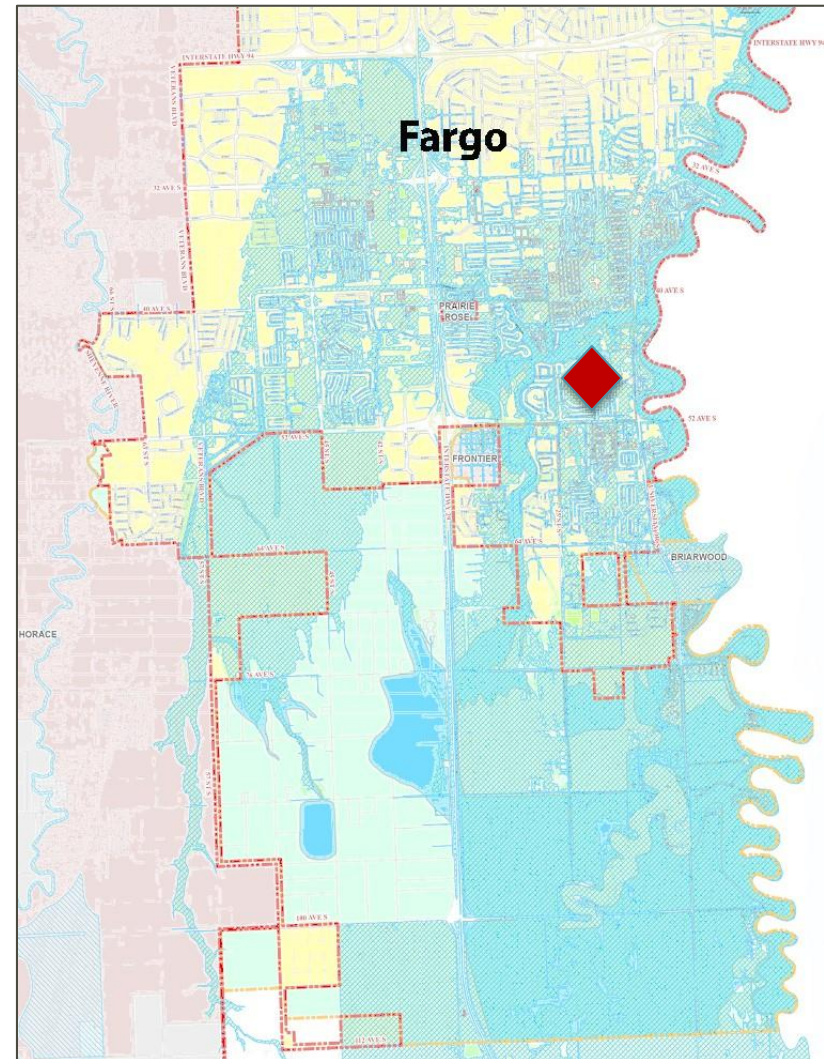


NORTH DAKOTA

FARGO: CURRENT AND PROPOSED 100 YEAR FLOODPLAIN



Source: City of Fargo





FARGO: NUMBER OF STRUCTURES IN SPECIAL FLOOD HAZARD AREA (SFHA)

- ◆ Structures currently in the SFHA
 - **Total Structures = 226**
 - Assessed value = \$267,402,100

- ◆ Structures that will be mapped in the SFHA with the preliminary FIRM released for Fargo
 - **Total Structures = 2,035**
 - Assessed value = \$1,689,460,800

- ◆ Structures at risk of being mapped in the SFHA due to decertification of 4th Street Levee
 - Total Structures = 188
 - Assessed value = \$137,500,600

Source: City of Fargo



FARGO



Address	5116 Rose Creek Parkway South, Fargo, ND
Flood Zone	X
Building and Content Coverage (\$1,000 deductible)	\$250,000 (building) \$100,000 (content)
Current Premium	\$458
Estimated Actuarial Premium (BW12)	\$1,018-1,145

Note: This property is located in an X Flood Zone, and the estimated actuarial premium was calculated using FEMA's 40-45% estimated rate change.



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IMPACT OF BIGGERT-WATERS ON NATIONAL AND LOCAL SCALES



FARGO HOUSE VALUES AND ANNUAL INSURANCE COSTS FOR 100-YEAR FLOOD PLAIN

	CURRENT MAP			FEMA 2012 (Proposed Map)			Increased Annual Insurance Costs (in \$ 1000s)
	Number of Parcels	Value of Houses (in \$ 1000s)	Cost of Annual Insurance (in \$1000s)	Number of Parcels	Value of Houses (in \$ 1000s)	Cost of Annual Insurance (in \$1000s)	
Fargo Parcels	1,275	196,223	800	8,711	1,340,622	5,400	4,600
Fargo ET Parcels*	764	117,579	480	1,011	155,592	630	150
Total	2,039	313,801	1,300	9,722	1,496,214	6,030	4,750

Source: City of Fargo

*ET: Extra-Territorial Parcels



INSURANCE COVERAGE AND PAYMENTS BY CITY

City	Total Policies	Insurance In-Force (in \$ thousands)	Total Losses	Total Payments (in \$ thousands)
Fargo, ND	3,783	1,053,606	1,248	7,906
Houston, TX	132,947	33,234,127	45,149	1,046,780
Keansburg, NJ	2,050	459,765	1,285	39,564
Norfolk, VA	12,434	3,133,630	5,379	61,375
Pittsburg, PA	479	157,738	538	8,334
Sacramento, CA	46,568	14,536,297	1,790	9,871
Tampa, FL	28,039	7,037,145	2,273	30,338
Total	226,300	59,612,308	57,662	1,204,168

Source: FEMA.gov "Policy and Claim Statistics for Flood Insurance." From 1/1/1978-5/31/13



INSURANCE COVERAGE AND PAYMENTS BY STATE

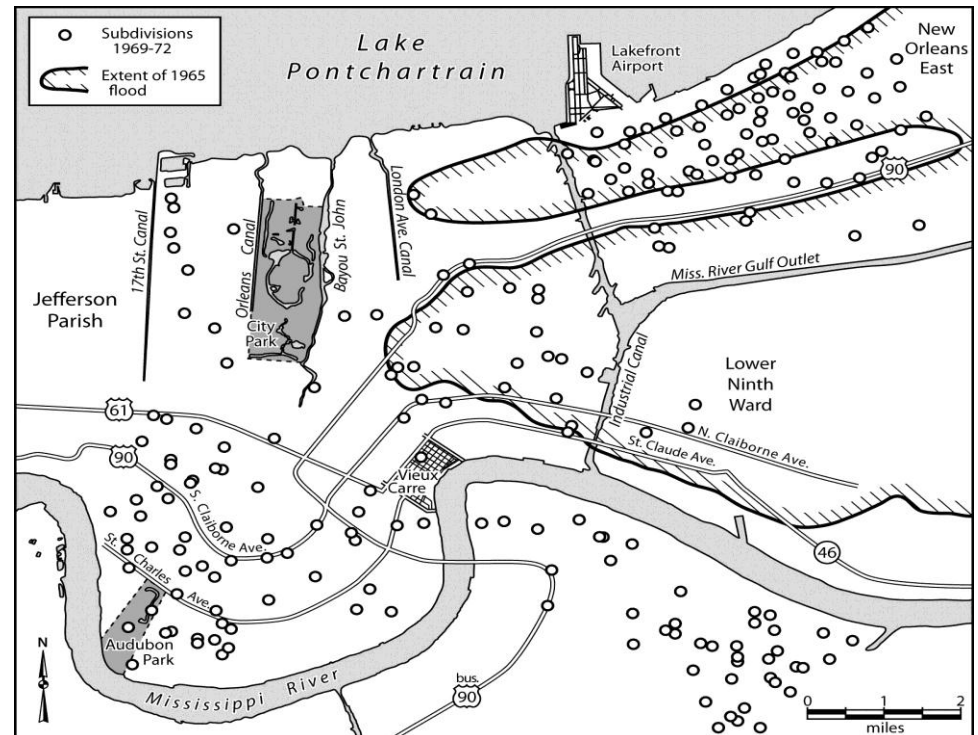
City	Total Policies	Insurance In-Force (in \$ thousands)	Total Losses	Total Payments (in \$ thousands)
North Dakota	14,142	67,051	13,027	256,426
Texas	641,653	1,622,137	239,974	5,532,685
New Jersey	245,501	5,680,298	186,632	5,203,557
Virginia	116,553	2,844,239	43,330	621,196
Pennsylvania	74,641	1,365,864	67,339	1,130,047
California	245,532	6,705,108	44,833	499,065
Florida	2,053,208	4,773,470	239,230	3,702,321
Total	3,391,230	23,058,167	834,365	16,945,297

Source: FEMA.gov "Policy and Claim Statistics for Flood Insurance." From 1/1/1978-5/31/13



LOCAL PARTICIPATION IN FLOOD RISK MITIGATION

- Local governments can reduce risk by restricting unsafe development and promoting safe building practices
- Flood insurance policies should provide incentives for mitigation



Subdivisions approved after Hurricane Besty, 1965



KEY TAKE AWAY POINTS

- ◆ Updated floodplain maps will bring additional households under provisions of NFIP and higher insurance rates
- ◆ In areas without change in floodplain designation, actuarial rates will increase costs substantially
- ◆ In some areas, homeowners face rate increase even with improved levee protection
- ◆ Insurance coverage in place for many locations exceeds long-term payouts
- ◆ Local communities have addressed floodplain safety through property buyouts, land-use restrictions, and building codes
- ◆ Insurance rates should be adjusted to reflect flood-proofing measures taken by property owners



ACKNOWLEDGMENTS

- ◆ Water Institute of the Gulf Staff
 - Taylor Marshall
 - Ann Hijuelos
 - Craig Colten
- ◆ Local and State Floodplain Managers
- ◆ Local Insurance Agents
- ◆ FEMA and USGS