

# Lessons Learned from Hurricane Harvey

2018 ASFPM Conference:  
Julie Grauer & David Hiegel



## Local Floodplain Managers & State NFIP Coordinator – What are the Workload Challenges in a Catastrophic Disaster



**FEMA**

# WHAT WILL BE ASKED OF YOU IN A DISASTER:

## STATE COORDINATOR

1. Coordination of response efforts, JFO, DRC, AFO:
  - Providing participation status of communities
  - Any mapping issues – will ABFE's be done ?
  - Substantial Damage
  - Temporary Housing
  - ICC

## LOCAL FLOODPLAIN MANAGER

1. Providing needed support to residents:
  - Safe access to home
  - Complete Substantial Damage Assessments
  - Issue Substantial Damage Determinations
  - Issue Permits for re-construction
  - Issue Permits for temporary housing



# What are tips for workload:

## STATE COORDINATOR

- Stay in close communication with SHMO
- Coordinate Substantial Damage efforts with FEMA
- Any new Regulations or Processes you have wanted to advance for floodplain management – now is the time advance it politically
- Coordinate Insurance efforts with Insurance Commissioner
- Coordinate with Building Commissioner
- Coordinate with State Assessor

## LOCAL FLOODPLAIN MANAGER

- What structures in community are Pre-FIRM/ have LF below BFE?
- How will you communicate with Residents?
- Issue Substantial Damage Determinations
- Issue Permits for re-construction
- Issue Permits for temporary housing

# Needed information to Determine What Structures are at Risk?

- Obtain this data for State/Communities in non-disaster time:
- Pre-FIRM Structures- Report in CIS
- Repetitive Loss/Severe Repetitive Loss
- Lowest floor below BFE
- Insurance Policies in SFHA
- Insurance Policies in X Zone
- ICC Claims

What does this data look like?

Where do you get the data?

# Policies by Zone from CIS

## Insurance Zone

As of 03/31/2018

Community: HAVERHILL, CITY OF  
County: ESSEX COUNTY

State: MASSACHUSETTS  
CID: 250085

Overview	Occupancy	Zone	Pre/Post FIRM			
	Policies in Force	Premium	Insurance in Force	Number of Closed Paid Losses	\$ of Closed Paid Losses	Adjustment Expense
A01-30 & AE Zones	352	\$415,776	\$61,859,800	34	\$1,278,041.44	\$45,045.70
A Zones	5	\$10,524	\$823,800	13	\$205,763.51	\$9,535.79
AO Zones	0	\$0	\$0	0	\$0.00	\$0.00
AH Zones	0	\$0	\$0	0	\$0.00	\$0.00
AR Zones	0	\$0	\$0	0	\$0.00	\$0.00
A99 Zones	0	\$0	\$0	0	\$0.00	\$0.00
V01-30 & VE Zones	0	\$0	\$0	0	\$0.00	\$0.00
V Zones	0	\$0	\$0	0	\$0.00	\$0.00
D Zones	0	\$0	\$0	0	\$0.00	\$0.00
B, C & X Zone						
Standard	28	\$22,123	\$8,243,200	20	\$558,437.45	\$18,822.31
Preferred	46	\$30,240	\$16,990,000	5	\$158,046.11	\$5,725.00
Total	431	\$478,663	\$87,916,800	72	\$2,200,287.00	\$79,127.00



# CIS Report on Pre/Post FIRM Structures

## Pre-FIRM

	Policies in Force	Premium	Insurance in Force	Number of Closed Paid Losses	\$ of Closed Paid Losses	Adjustment Expense
A01-30 & AE Zones	221	\$327,953	\$31,429,700	27	\$982,935.44	\$34,434.25
A Zones	4	\$8,659	\$733,800	13	\$205,763.51	\$9,535.79
AO Zones	0	\$0	\$0	0	\$0.00	\$0.00
AH Zones	0	\$0	\$0	0	\$0.00	\$0.00
AR Zones	0	\$0	\$0	0	\$0.00	\$0.00
A99 Zones	0	\$0	\$0	0	\$0.00	\$0.00
V01-30 & VE Zones	0	\$0	\$0	0	\$0.00	\$0.00
V Zones	0	\$0	\$0	0	\$0.00	\$0.00
D Zones	0	\$0	\$0	0	\$0.00	\$0.00
B, C & X Zone	30	\$28,492	\$10,254,000	17	\$613,466.56	\$19,372.31
Standard	10	\$10,655	\$3,071,000	14	\$472,191.76	\$14,697.31
Preferred	20	\$17,837	\$7,183,000	3	\$141,274.80	\$4,675.00
Grand Total	255	\$365,104	\$42,417,500	57	\$1,802,164.00	\$63,341.00

## Post-FIRM

	Policies in Force	Premium	Insurance in Force	Number of Closed Paid Losses	\$ of Closed Paid Losses	Adjustment Expense
A01-30 & AE Zones	131	\$87,823	\$30,430,100	7	\$295,106.00	\$10,611.45
A Zones	1	\$1,865	\$90,000	0	\$0.00	\$0.00
AO Zones	0	\$0	\$0	0	\$0.00	\$0.00
AH Zones	0	\$0	\$0	0	\$0.00	\$0.00
AR Zones	0	\$0	\$0	0	\$0.00	\$0.00
A99 Zones	0	\$0	\$0	0	\$0.00	\$0.00
V01-30 & VE Zones	0	\$0	\$0	0	\$0.00	\$0.00
V Zones	0	\$0	\$0	0	\$0.00	\$0.00
D Zones	0	\$0	\$0	0	\$0.00	\$0.00
B, C & X Zone	44	\$23,871	\$14,979,200	8	\$103,017.00	\$5,175.00
Standard	18	\$11,468	\$5,172,200	6	\$86,245.69	\$4,125.00
Preferred	26	\$12,403	\$9,807,000	2	\$16,771.31	\$1,050.00
Grand Total	176	\$113,559	\$45,499,300	15	\$398,123.00	\$15,786.00



# Repetitive Loss Report from CIS

## Community Repetitive Loss

COMMUNITY : HAVERHILL, CITY OF

Com munity	State	Regional	National	
	AE, A1-30, AO, AH, A	VE, V1-30, V	B, C, X	TOTAL
RL Buildings (Total)	9	0	5	14
RL Buildings (Insured)	8	0	2	10
RL Losses (Total)	18	0	13	31
RL Losses (Insured)	16	0		22
RL Payments (Total)	\$757,692.08	\$0.00	\$259,802.31	\$1,017,494.39
Building	\$750,646.27	\$0.00	\$251,721.28	\$1,002,367.55
Contents	\$7,045.81	\$0.00	\$8,081.03	\$15,126.84
RL Payments (Insured)	\$666,138.70	\$0.00	\$143,401.55	\$809,540.25
Building	\$659,092.89	\$0.00	\$142,145.59	\$801,238.48
Contents	\$7,045.81	\$0.00	\$1,255.96	\$8,301.77

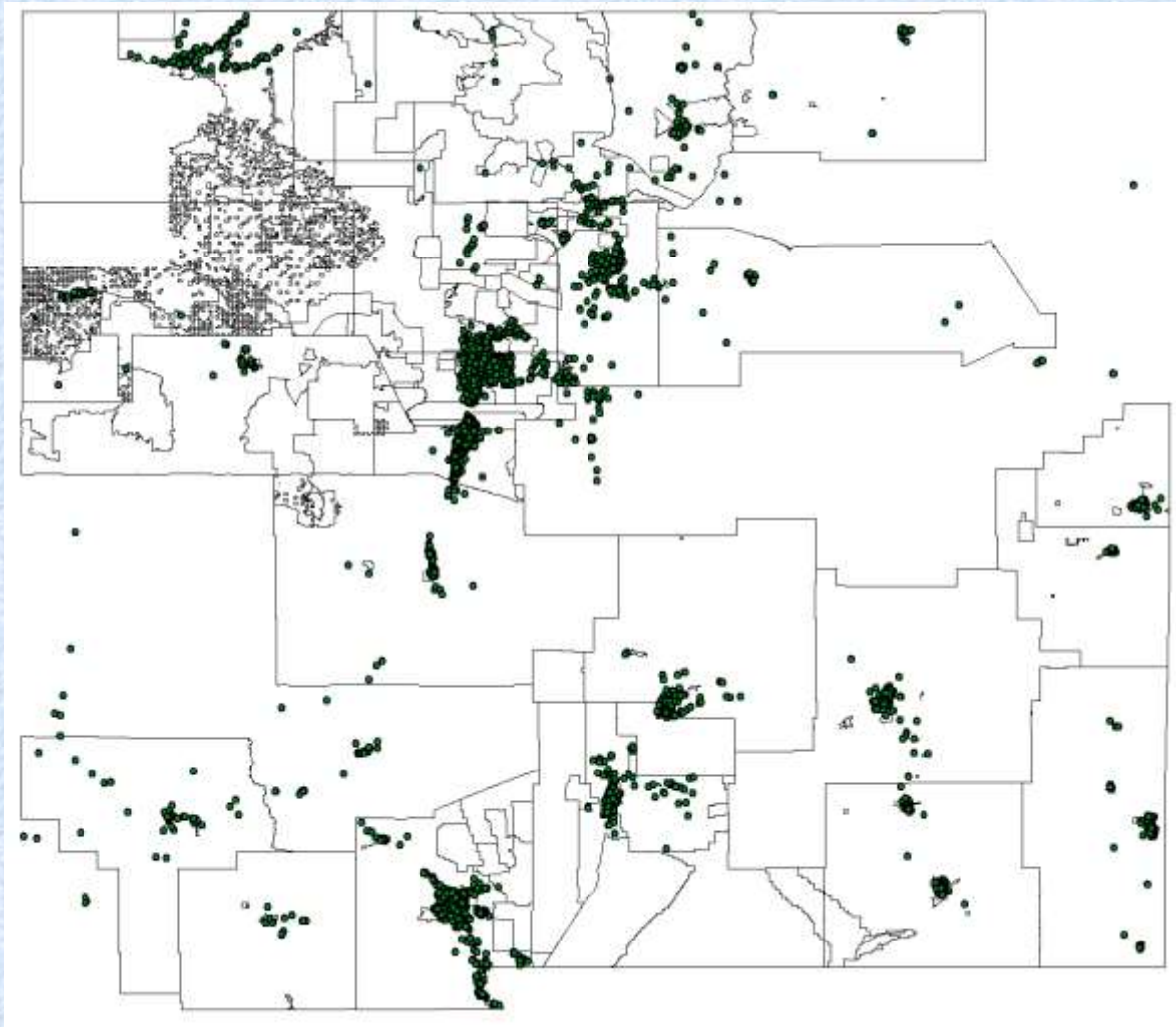
Post - FIRM SFHA RL Buildings: 2

Insured Buildings with 4 or More Losses: 0

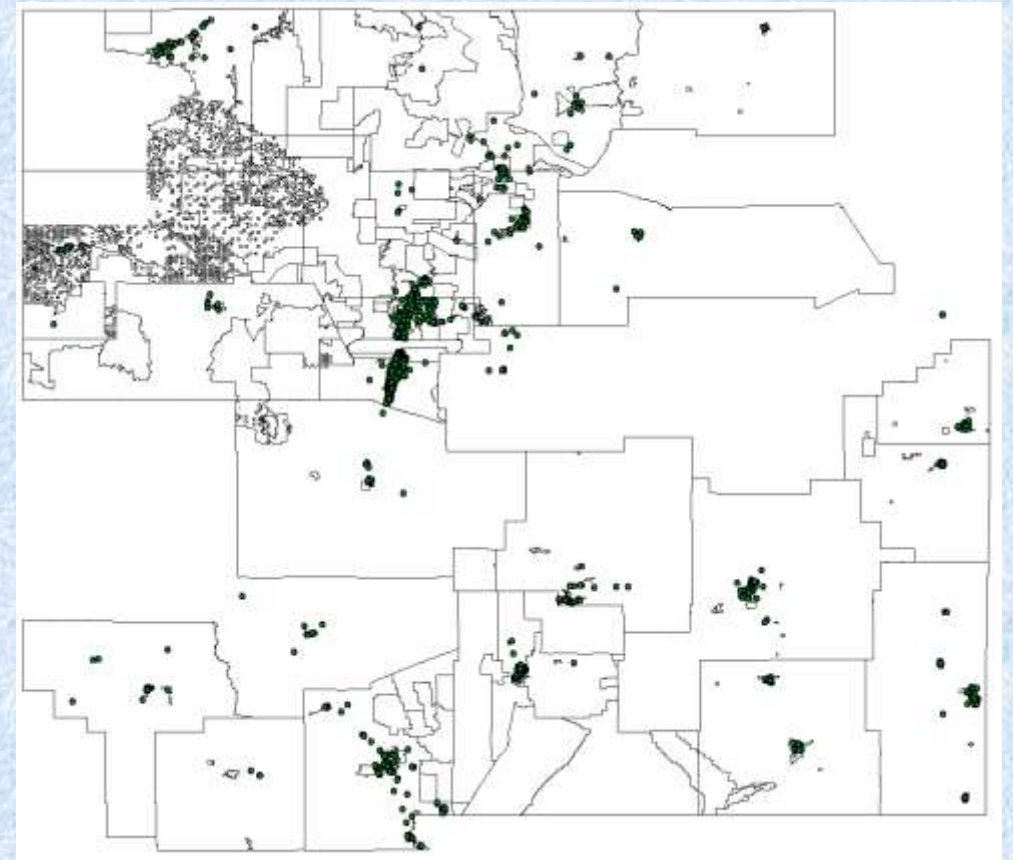
Insured Buildings with 2-3 Losses > Building Value: 0

Total Target RL Buildings: 0

13,263 policies



4,404 with elevation info



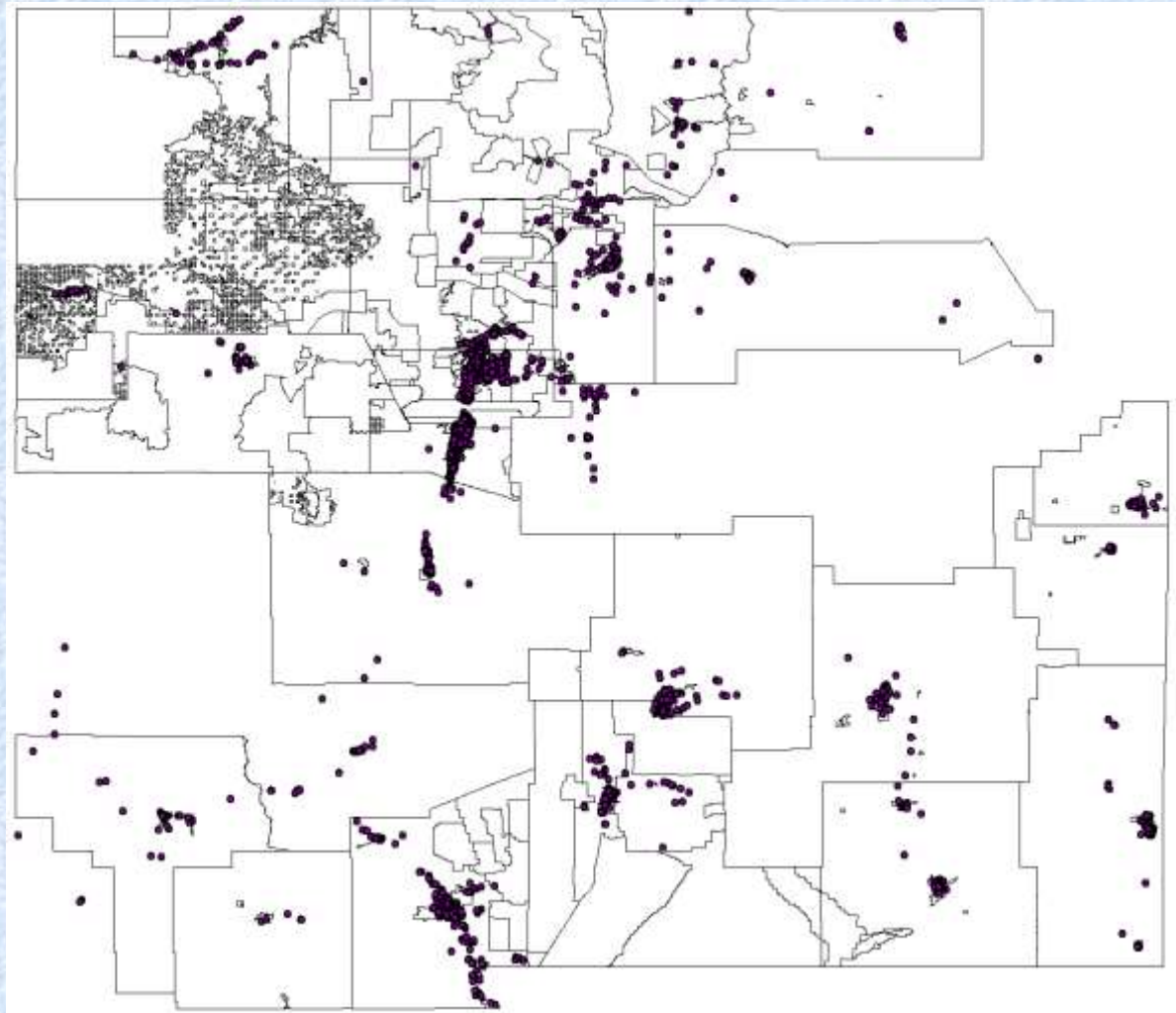
2,536 above BFE

1,341 at BFE

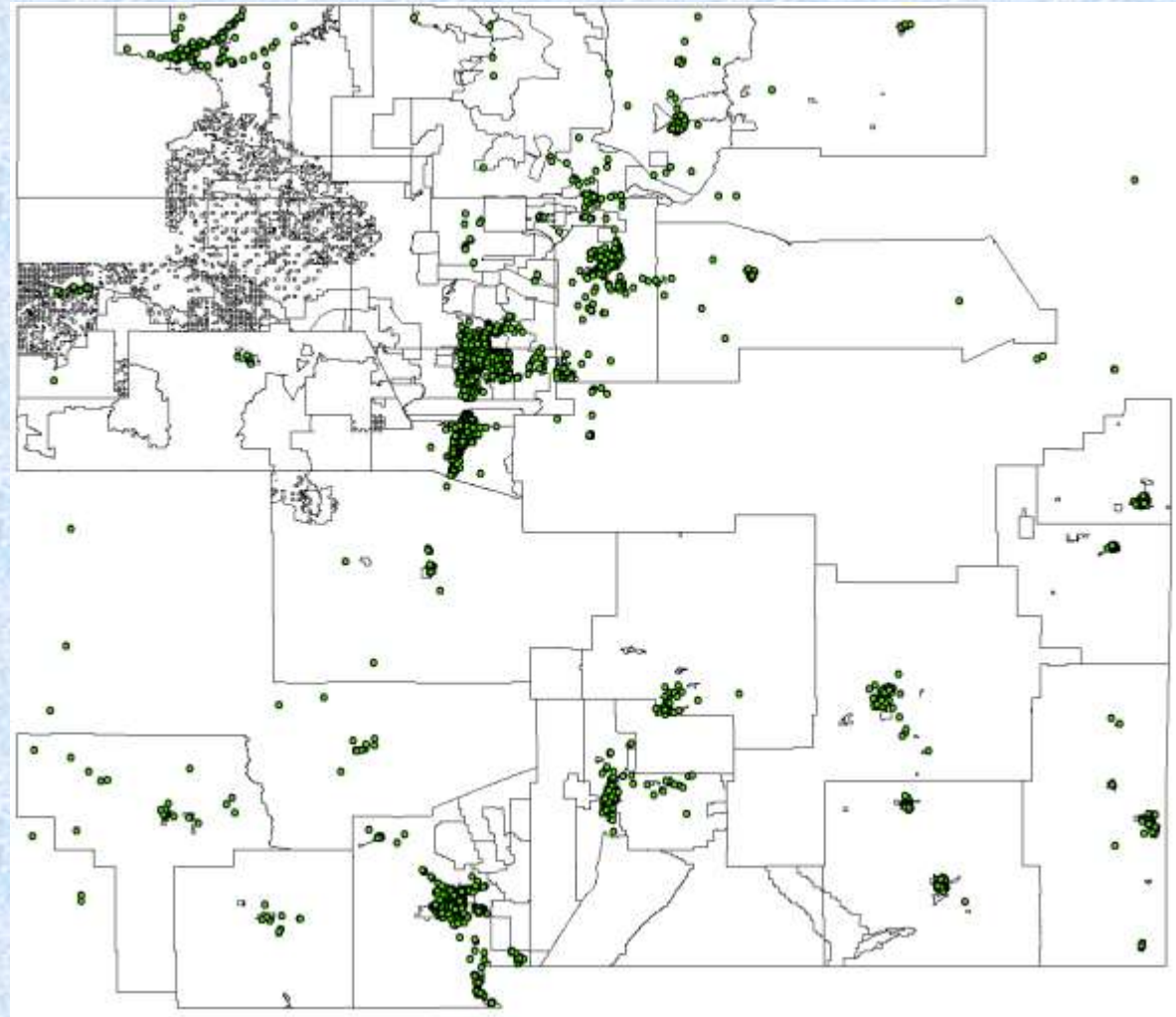
474 below BFE



7,737 Pre-FIRM



5,521 Post-FIRM





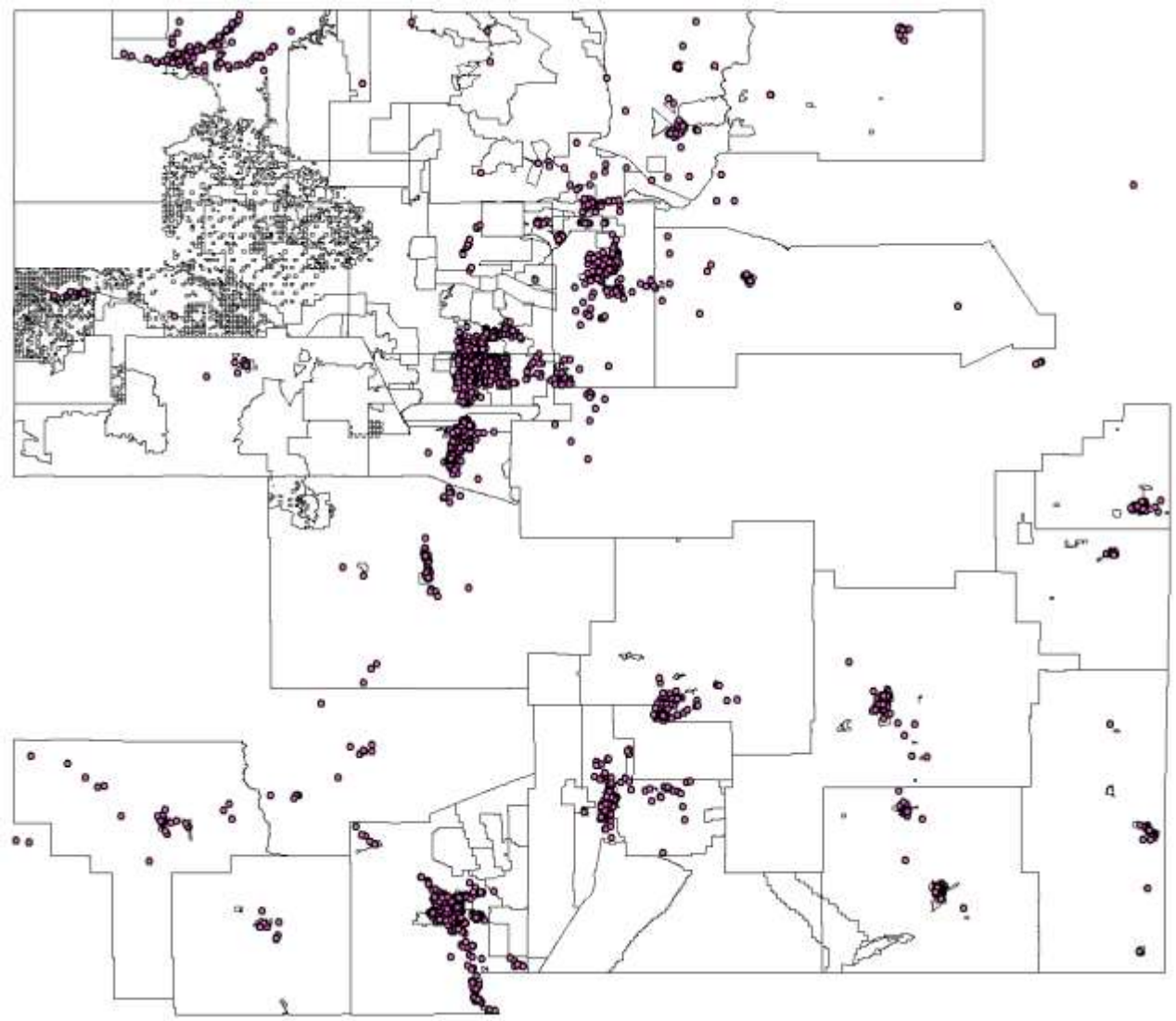
4,529 (34%) in Zones B-C-X-D

What do these folks know?

Do they know:

The FIRM truth?

What Houstonians learned  
the hard way?



# Survivor Reality

- Home is unlivable
- Life must continue- School, Work, etc.
- Mortgage?
- Where do you live?
- *How far does \$6,935 from IA go?*





# What Does Flood Damage Cost?

2,500 sqft, one-story home with possessions worth \$50,000

Interior Water Depth (Inches)	Cost to Home	Cost to Personal Property	Combined Loss Potential
1"	\$23,635	\$3,172	\$26,807
2"	\$23,720	\$3,172	\$26,892
3"	\$24,370	\$4,917	\$29,287
4"	\$31,345	\$7,207	\$38,552
5"	\$31,425	\$13,914	\$45,339
6"	\$37,260	\$14,777	\$52,037
7"	\$37,691	\$17,700	\$55,391
8"	\$38,122	\$20,624	\$58,746
9"	\$38,553	\$23,547	\$62,100
10"	\$38,983	\$26,470	\$65,453
11"	\$39,414	\$29,394	\$68,808
12"	\$39,845	\$32,317	\$72,162
24"	\$44,325	\$43,001	\$87,326
36"	\$47,905	\$46,633	\$94,538
48"	\$53,355	\$50,000	\$103,355

Does a generic 2 feet AGL requirement in Zone A protect homeowner's investment ?

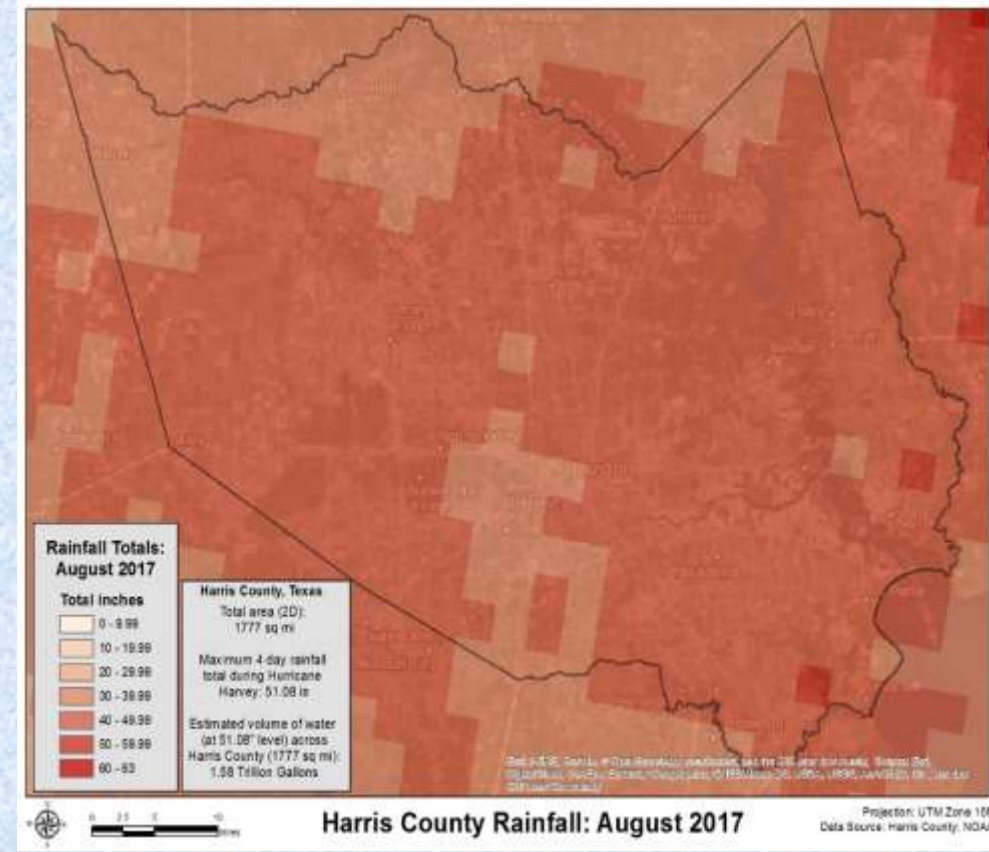


# Lessons from Hurricane Harvey



# Hurricane Harvey

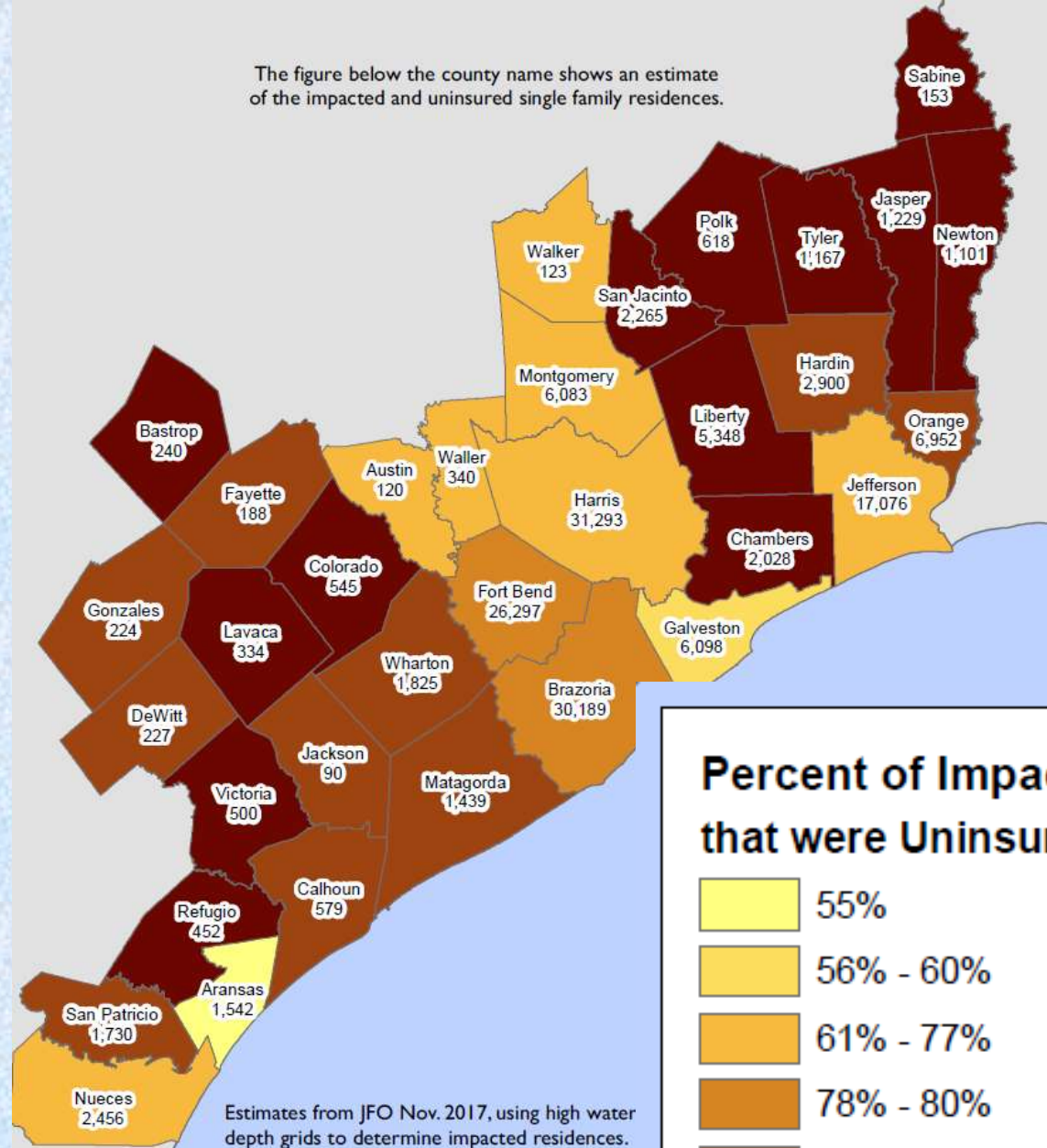
- 500 Year flood in many locales
- Houston has experienced 500-year storms in each of the last three years
  - NOAA is revising the Atlas 14
- Roughly 65% of flooding was in Zone X
- Roughly 55% of damage was in Zone X
- Received 46-52 inches of rain throughout the area
  - FIRMS's are mapped to the **1% annual chance flood- 13 inches of rain in 24 hrs**
- Roughly a third of structures were built to 1 ft. above BFE
- Current law requires 1 ft. freeboard above BFE
- 84% of homes are below 2 ft. freeboard



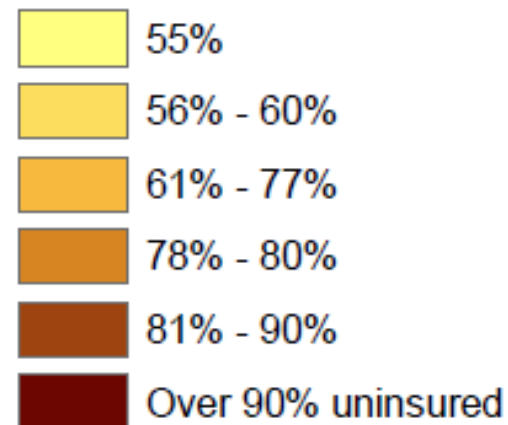


The figure below the county name shows an estimate of the impacted and uninsured single family residences.

# Harvey Experience



## Percent of Impacted SFRs that were Uninsured, by County







# WHY WERE SO MANY HOMES OUTSIDE THE FLOOD PLAIN DAMAGED DURING HARVEY?

Residents who are one inch out of the flood plain face different risks than residents 1,000 miles away.



*Jorge Sanhueza-Lyon/KUT News*

Rescue boats in northeast Houston.

## Report: Houston region must take fresh approach on flooding

By [Mike Morris](#) Updated 8:01 am, Thursday, April 5, 2018



Photo: Karen Warren, Staff Photographer



### IMAGE 1 OF 28

Overhead view of the floods from Buffalo Bayou on Memorial Drive and Allen Parkway, as heavy rains continued falling from Hurricane Harvey, Monday, Aug. 28, 2017, in Houston. ( Karen Warren / Houston ... [more](#)

A coalition of local researchers focusing on flooding in the aftermath of Hurricane Harvey have released **a detailed report** calling for the region to rethink what flood mitigation means and how to tackle these efforts.



## Houston council approves changes to floodplain regulations in effort to reduce flood damage

"To do nothing is not an option," said Mayor Sylvester Turner, who pushed the new rules requiring new homes within the city's 500-year floodplain to be built 2 feet above the floodplain.

BY CAT CARDENAS AND BRANDON FORMBY APRIL 4, 2018 16 HOURS AGO



The Houston home of Mami Axelrad and her family being elevated and repaired on Feb. 21, 2018, after sustaining flood damage during Hurricane Harvey. Loren Elliott for The Texas Tribune



# Houston City Council adopts stricter building codes for future floodplain construction

POSTED 6:47 PM, APRIL 4, 2018, BY [MIKE H.](#)

FACEBOOK

TWITTER

PINTEREST

REDDIT

LINKEDIN



**Got a Tip?**

Let us know! Click here to email us

**WHAT DO YOU THINK?**

Do you think your home  
you outsourced the cho  
despise?

☐ Yes

☐ No

## City Council adopts stricter development rules for Houston's floodplains

By [Rebecca Elliott](#) Updated 8:18 am, Thursday, April 5, 2018



Photo: Brett Coomer, Staff / Houston Chronicle



IMAGE 1 OF 17

Floodwaters from the Addicks Reservoir inundate a neighborhood off N. Eldridge Parkway in the aftermath of Tropical Storm Harvey on Wednesday, Aug. 30, 2017, in Houston. ( Brett Coomer / Houston Chronicle )



## Houston Approves New Post-Harvey Flood Construction Rule

[Associated Press](#), April 4, 2018

Houston officials on Wednesday approved a rule for new homes and other buildings in the city's flood plains that will require them to be elevated higher off the ground to avoid floodwaters. The regulation comes more than seven months after Hurricane Harvey flooded thousands of homes in the nation's fourth-largest city, which has long had a culture that's resistant to regulation and remains the only major U.S. city without zoning. The City Council approved the rule 9-7 during a sometimes contentious meeting. City officials say that of the homes in Houston's flood plains that were damaged by Harvey, more than 80 percent could have been protected had they been built at the height required in the new regulation. Such homes would typically be built on pier and beam foundations that put them above ground. Mayor Sylvester Turner, who championed the effort, called changing the rule a "defining moment" for the city, parts of which got nearly 50 inches (127 centimeters) during Harvey last August. "Can we undo what was done with Harvey? No. Can we build looking forward? Yes," Turner said. "If it has the probability of letting people know in our city and those who are looking to come that we are taking measures to be stronger, to be more resilient, then that's positive for the city of Houston." Critics of the regulation, including several council members and many home builders, argued it will drive up home prices and stifle economic development. "It will hurt the city as a whole," said Councilman Greg Travis. "We have not taken the time to find out what the ramifications will be."

Under the rule, new structures in the 100-year and 500-year flood plains must be constructed 2 feet (0.61 meter) above the ground or above the projected water level in a 500-year flood, an event in which 17 to 19 inches (32 to 48 centimeters) of rain falls in 24 hours. There's a 0.2 percent chance of such an event happening in any given year. The city's previous rule required buildings to be constructed 1 foot (0.3 meter) above the water level in a 100-year flood, an event in which 13 to 14 inches (33 to 36 centimeters) of rain falls in a 24 hour period. It also applied only to property in the 100-year flood plain.



BTW... New Orleans now requires  
3' above grade in Zone X



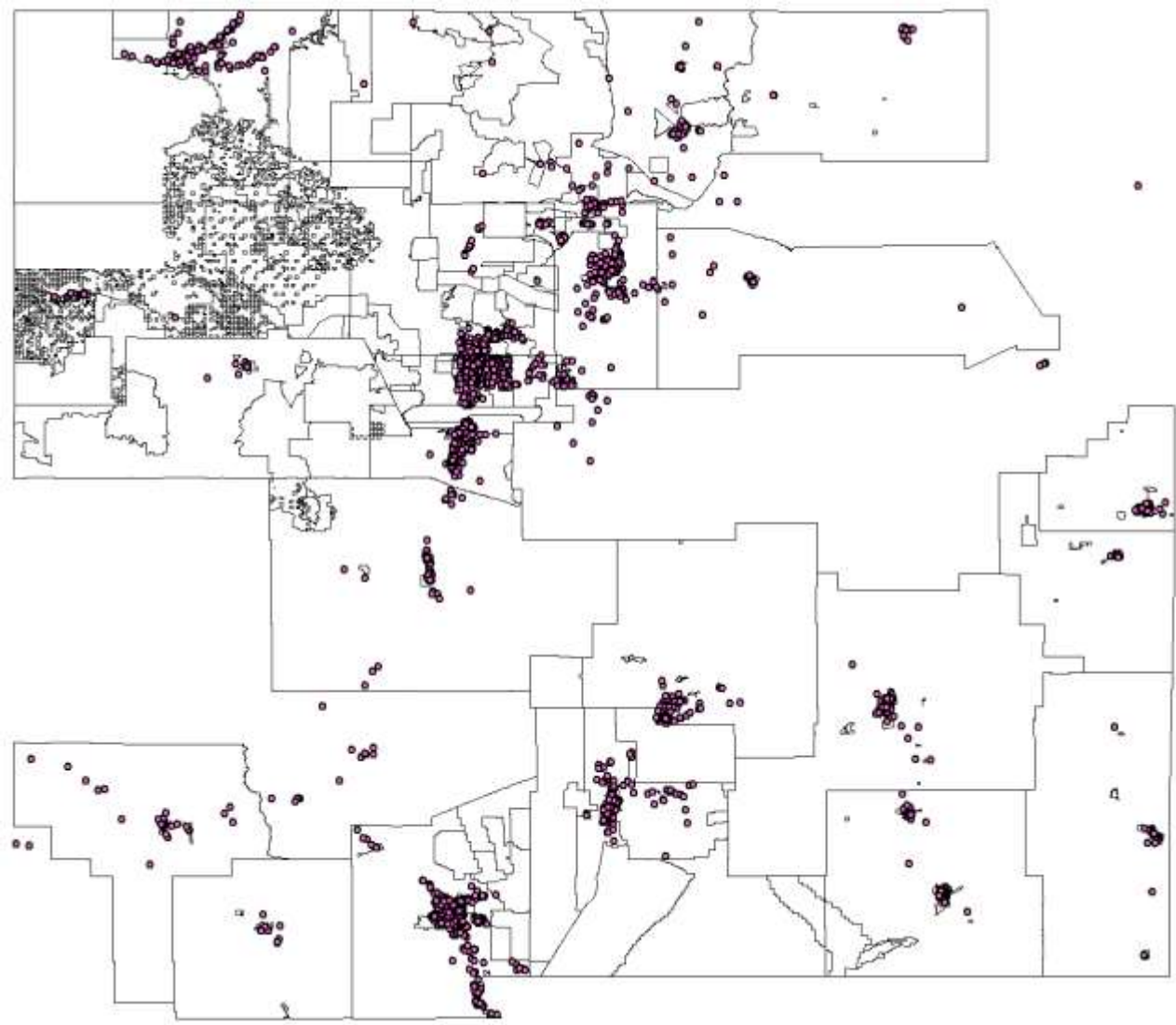
4,529 policies in Zones B-C-X-D

What do these folks know?

Do they know:

The FIRM truth?

What Houstonians learned  
the hard way?



How many structures in YOUR  
town are below two-feet-above  
the 500 year flood elevation?



**Outsmart Your Risks –  
It's Just Good Business Sense**