



# Measuring, Mapping, & Managing Flood Risk

A Pilot Program in Southeast Texas

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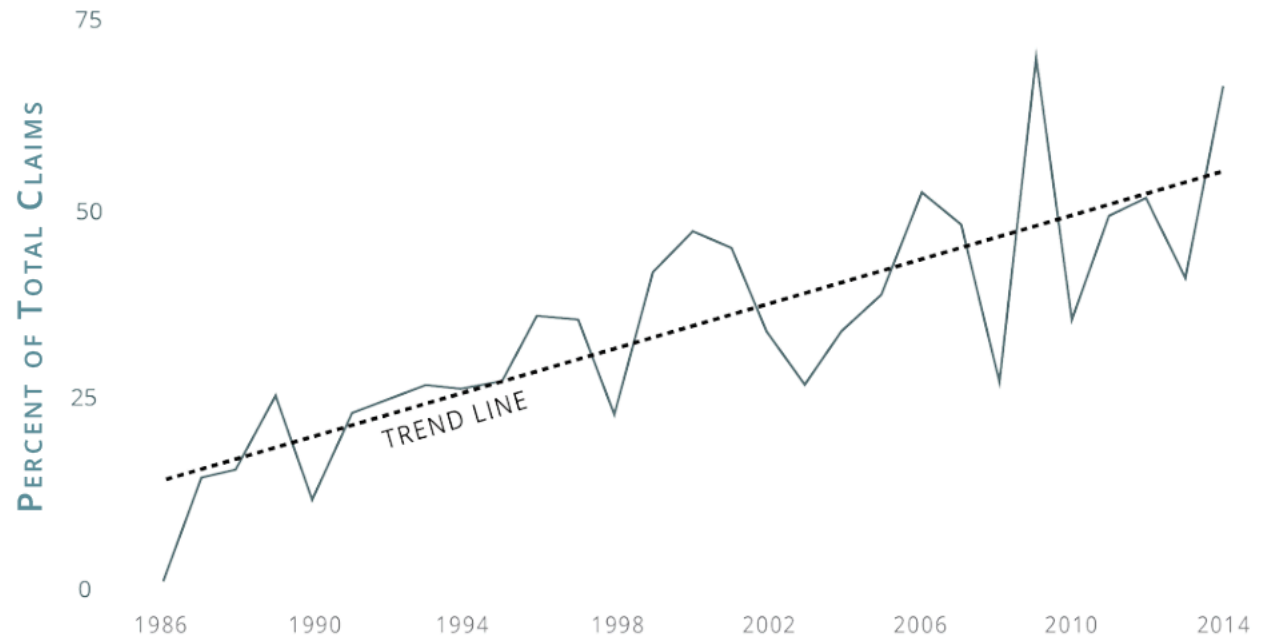
Texas A&M University at Galveston

# CHALLENGES

Inadequate risk communication undermines preparedness.

- The 100-year floodplain has become the primary instrument to communicate risk.
- However, the floodplain was only designed to set insurance rates.
- False sense of security, particularly for those just outside the floodplain boundary

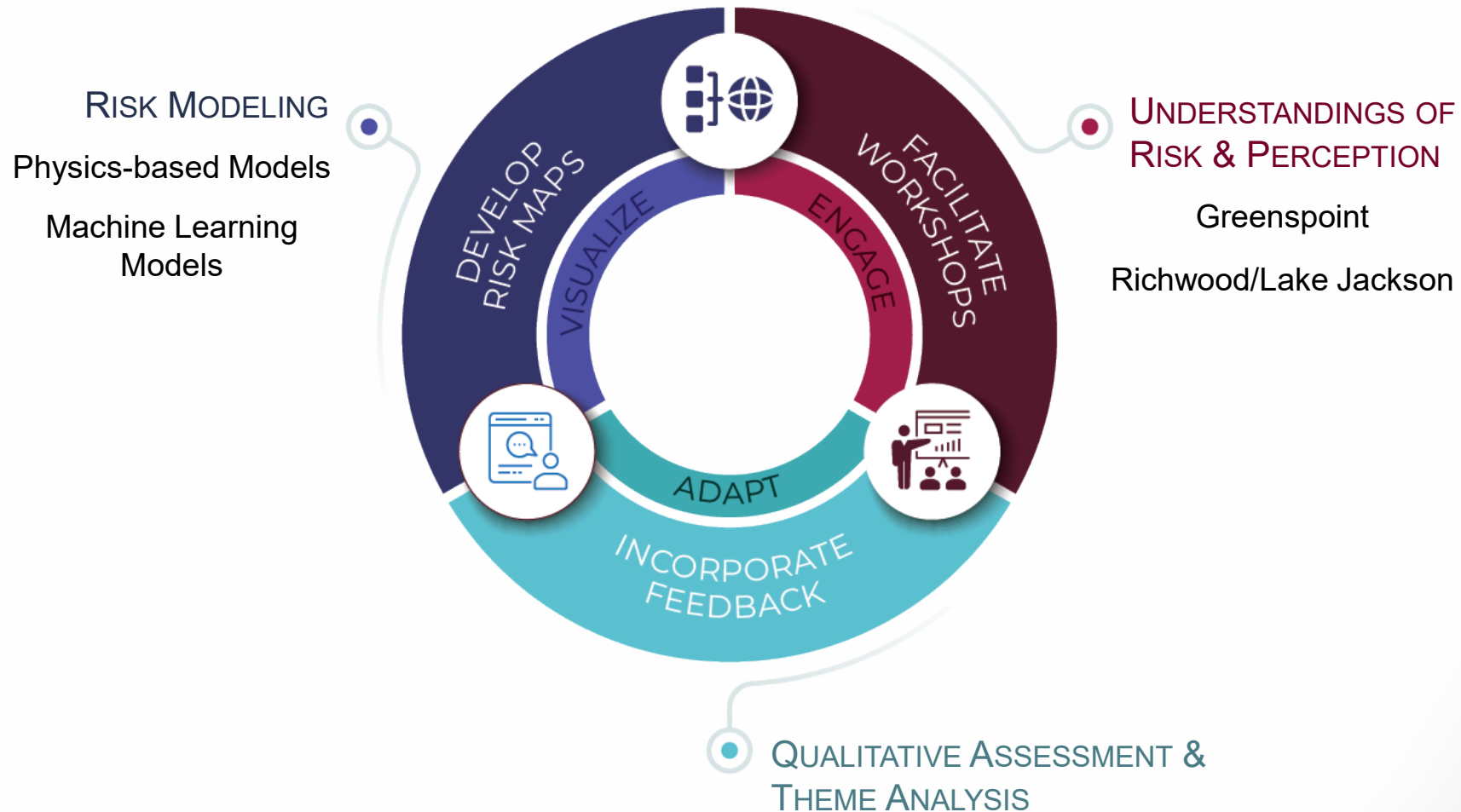
PERCENT INSURED FLOOD LOSS CLAIMS FROM OUTSIDE OF THE 100-YEAR FLOODPLAIN, TEXAS 1986 - 2014



Sources: University of Maryland, and Texas A&M University, Galveston. 2019. Eye of the Storm: Report of the Governor's Commission to Rebuild Texas. 2018.

# PROJECT IMPACT STATEMENT

*This project integrates advanced risk modeling and community engagement to create new mapping tools that expand decision-maker's capacity to mitigate flood risk.*



# PROJECT GOALS & OBJECTIVES

## Connecting Goals to Operations

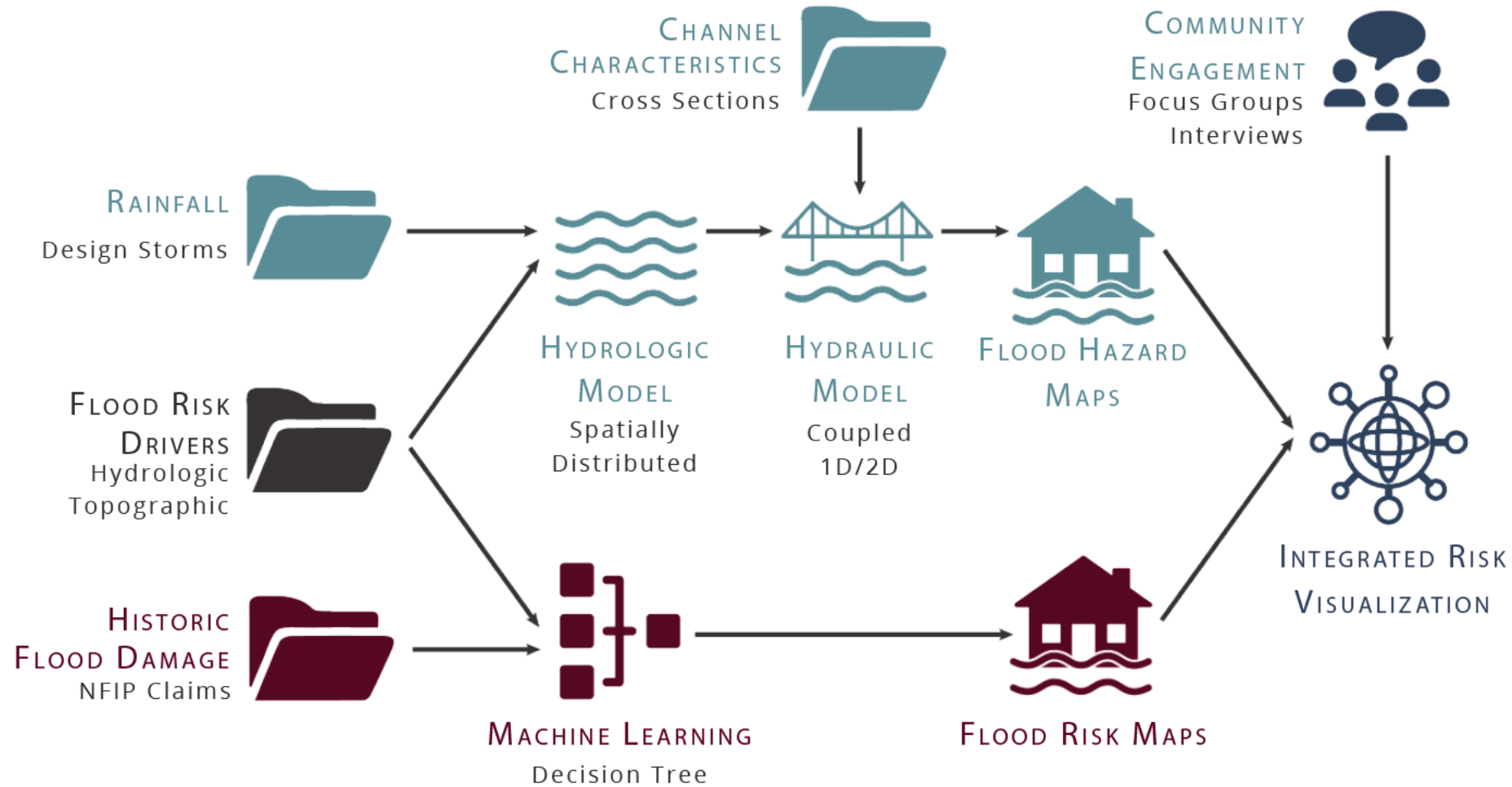
### GOAL

Identify and develop visual tools to measure, map, and articulate flood impacts to help communities to prepare for and reduce the adverse effects of future storm events.

### OBJECTIVES

- 1 Improve existing models and develop new methods for predicting flood risk in the built environment.
- 2 Develop web-based tools individuals can engage with flood risk information.
- 3 Hold iterative, facilitated workshops focusing on stakeholder perceptions of risk in the creation of interactive flood risk visualizations.
- 4 Engage a multi-stakeholder community (federal, state, and local).

# PROCESS INTEGRATION OF MULTIDISCIPLINARY APPROACHES

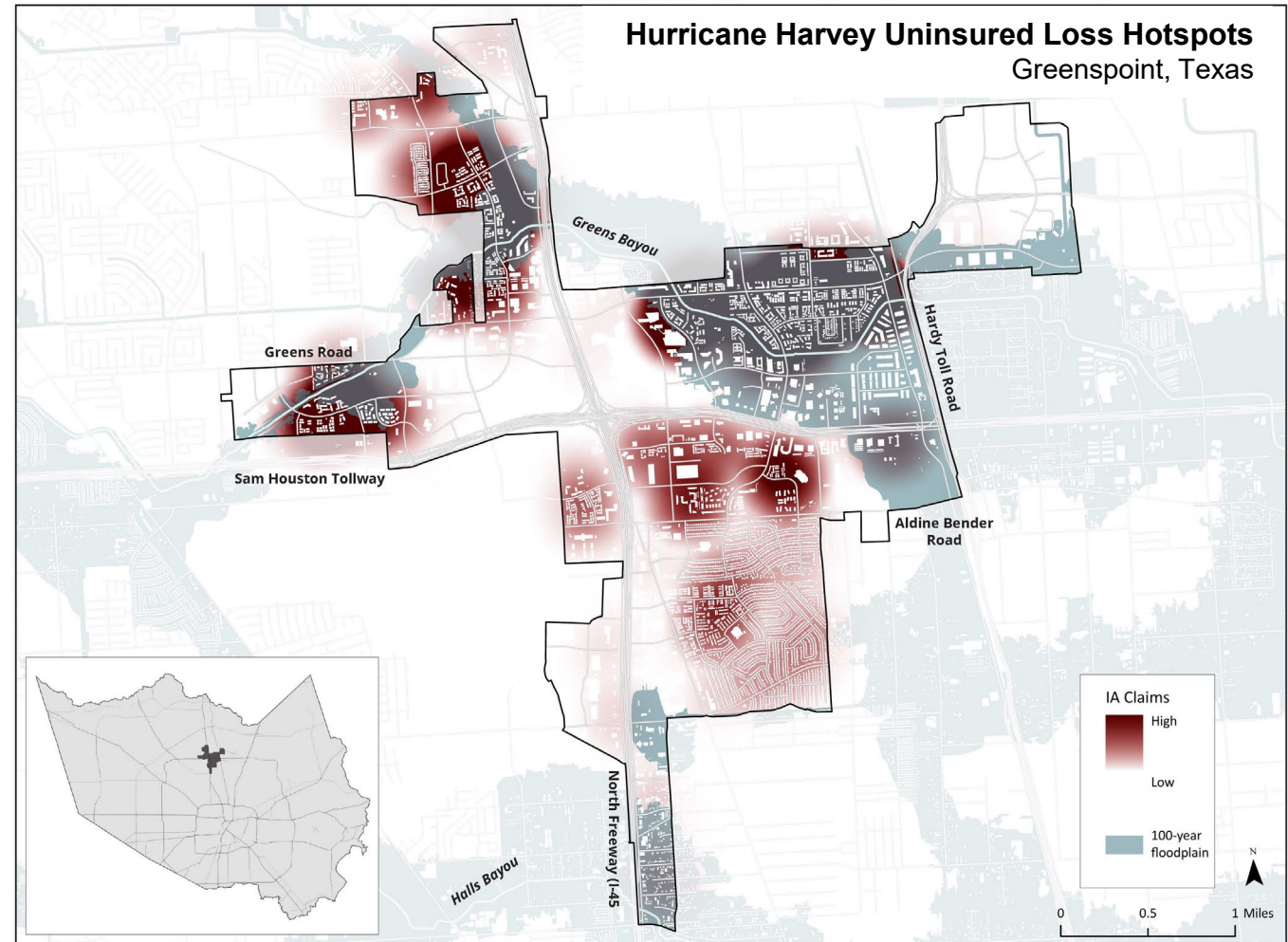


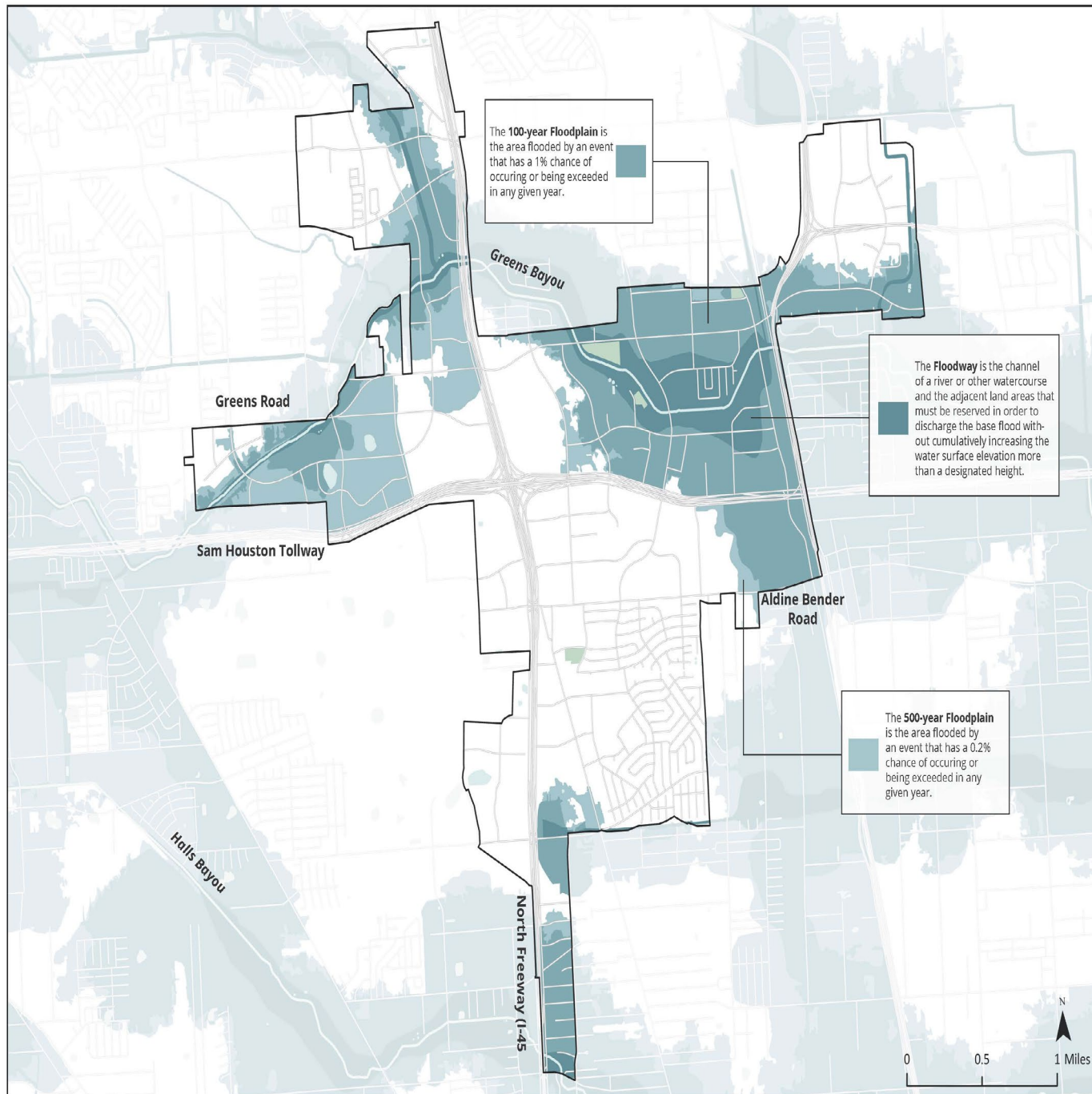


# ILLUSTRATIVE EXAMPLE

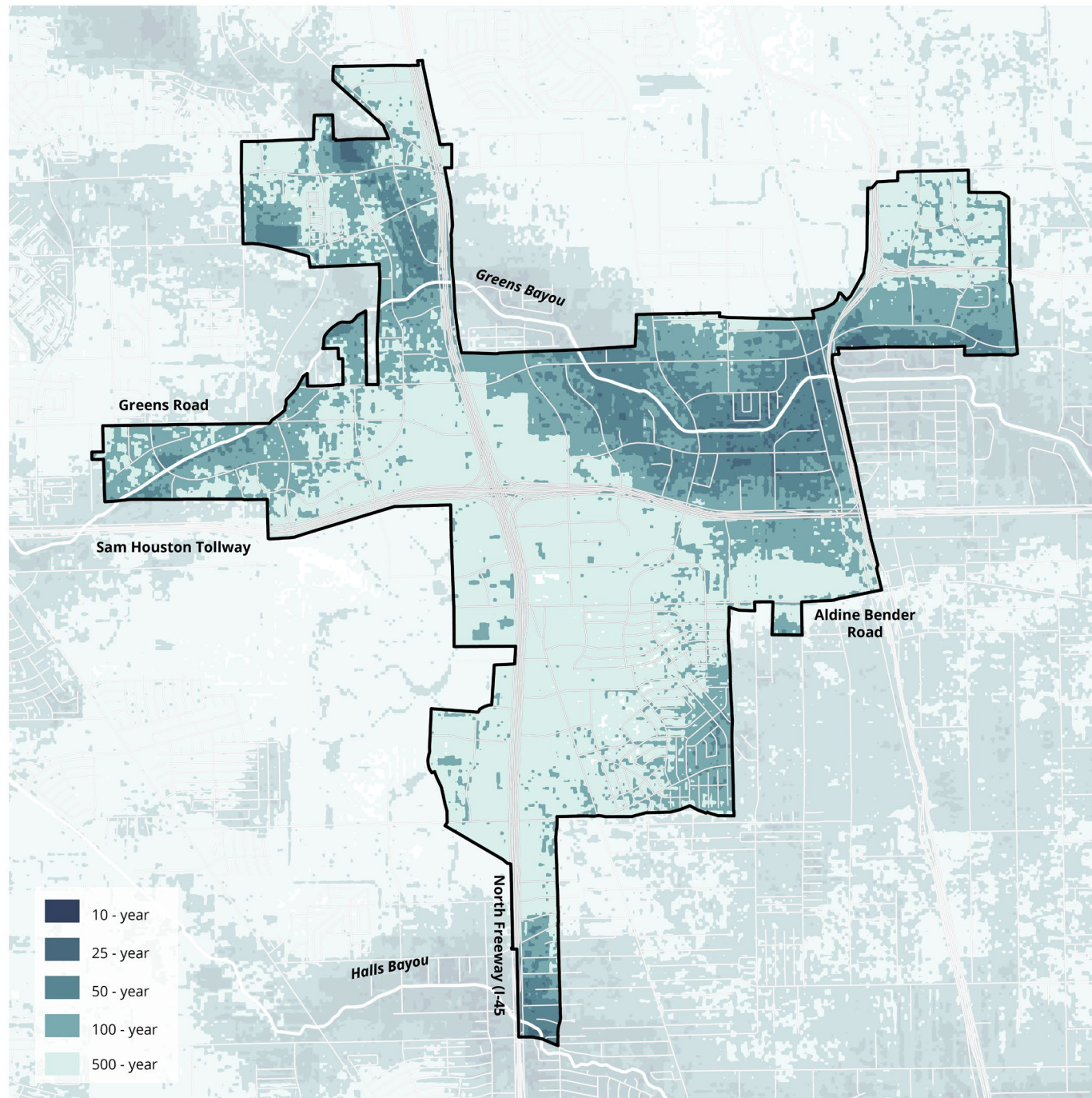
Greenspoint was impacted by both 2016 floods and Harvey.

- Located in North Houston on Greens Bayou
- One third of the population is below the poverty line
- High concentration of multi-family housing in the floodplain
- 18% of parcels outside the floodplain had an IA claim during Harvey

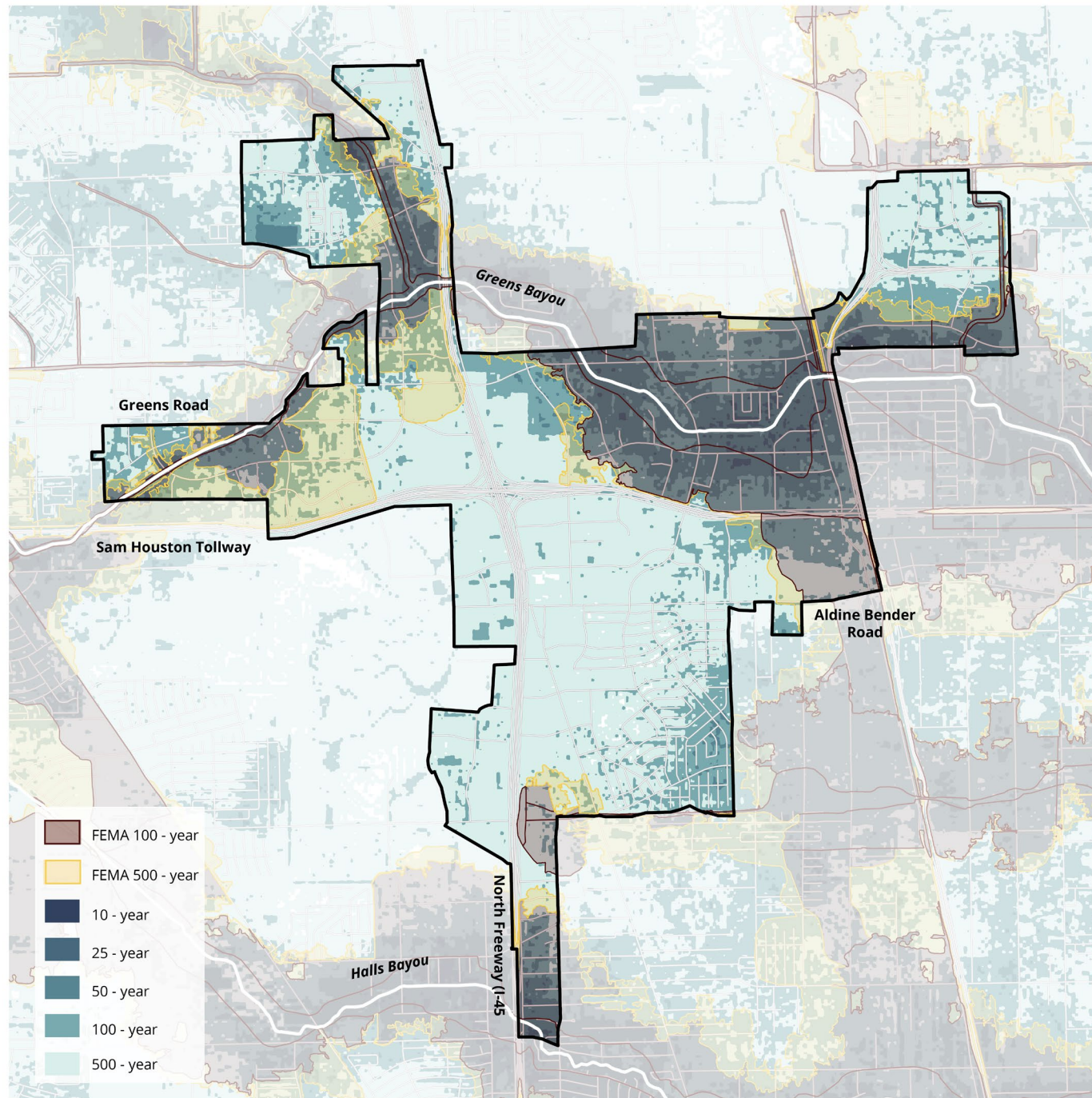


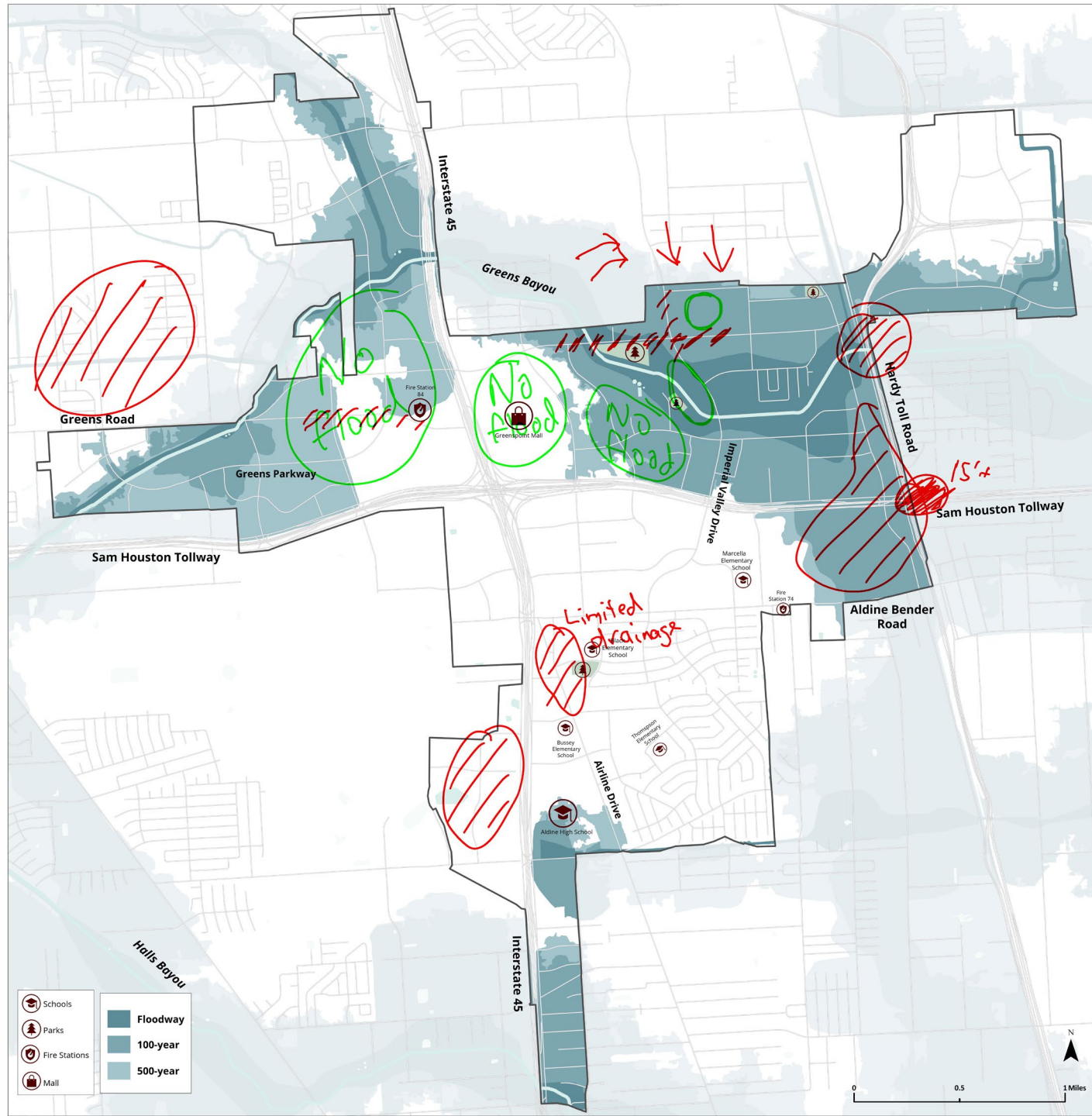
















This web-based spatial decision support system for Texas coastal communities is developed and maintained by Center for Texas Beaches and Shores in support for implementing the Rebuild Texas Framework. This spatial visualization, risk communication, and information-sharing mapping interface provides details on major Hurricane Harvey Impacts. The interface also provides general information about local flood risks in the region.

In order to provide a customized user experience, please identify yourself from one of the options below:

- Homeowner/ Resident / Concerned Citizen
- Local Business Owner
- Local Government Official
- Researcher

Continue >

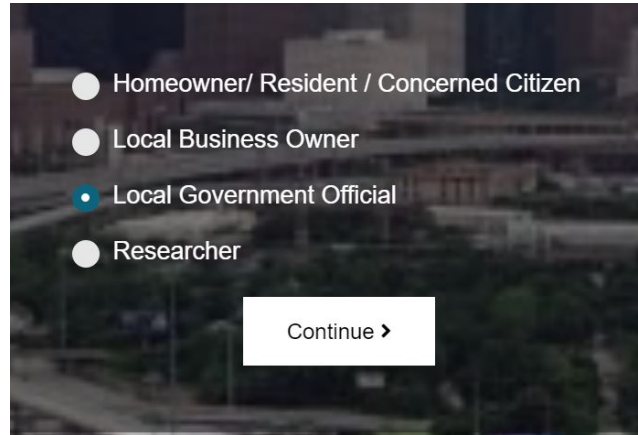
# Dashboard 1

[Resilient-Texas.com](https://Resilient-Texas.com)

- Developed in support of the Governor's Commission to Rebuild Texas following Hurricane Harvey
- Highlights key impacts of Hurricane Harvey, as well as general information on local flood risks
- Customized experience based on the user's role within the community

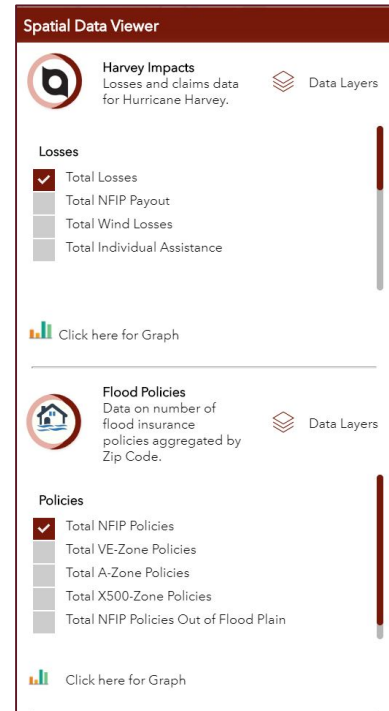


# How it Works



- Homeowner/ Resident / Concerned Citizen
- Local Business Owner
- Local Government Official
- Researcher

[Continue >](#)



**Spatial Data Viewer**

**Harvey Impacts**  
Losses and claims data for Hurricane Harvey.

**Losses**

- Total Losses
- Total NFIP Payout
- Total Wind Losses
- Total Individual Assistance

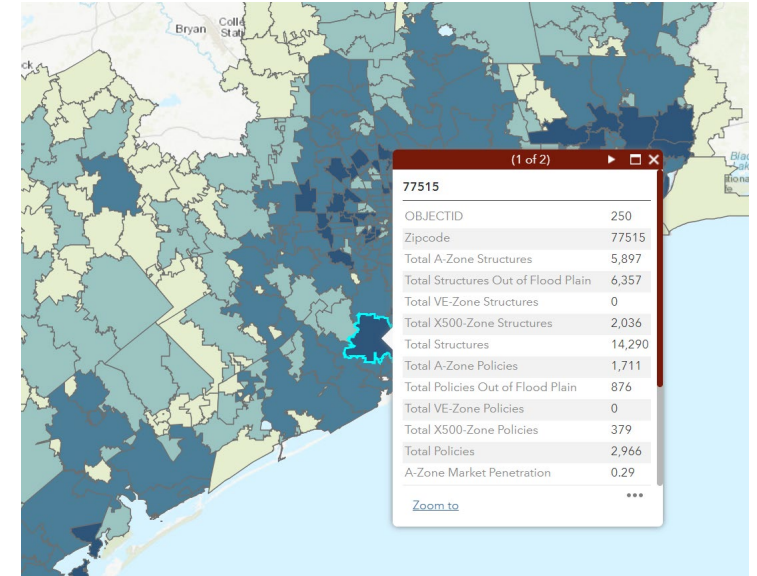
[Click here for Graph](#)

**Flood Policies**  
Data on number of flood insurance policies aggregated by Zip Code.

**Policies**

- Total NFIP Policies
- Total VE-Zone Policies
- Total A-Zone Policies
- Total X500-Zone Policies
- Total NFIP Policies Out of Flood Plain

[Click here for Graph](#)



Select Role

Choose Layers

Explore Data

Cost/Benefit for Flood Deduction & Mitigation Structures

Flood Type  
 Inland Flood Storm Surge


Display  
 COST SAVINGS

Mitigation Type  
 ELEVATION BUYOUTS


### Tutorial

This dashboard explores the benefits of buying out or elevating residential homes in reducing major flood damages as well repetitive flood loss. Click on the buttons at the left side of the dashboard to change between costs/savings or elevation and buyouts of residential properties. You can change the budget using the drop down above the map.

**BUYOUTS**



**ELEVATION**



The analysis in this dashboard apply four major methodological steps in estimating costs and savings from inland and storm surge flooding in Harris and Galveston Counties: (1) hydrologic modelling of Hurricane Harvey and Hurricane Ike, (2) computation of average annualized flood losses and historic flood claims from previous flood events, (3) flood damage estimation to residential properties for selected storm events, and (4) a benefit-cost analysis which compares cost of flood mitigation to savings accrued from the flood damages prevented.

The analysis is at the parcel level and results are aggregated to show estimated costs and benefits at the block group level. Parcels were chosen based on the Benefit/Cost Ratio. Those with the highest benefit/cost are purchased first. Parcels must at least have a 1 Benefit to Cost.

Users should interpret the results with caution and treat the values only as estimates. Decision makers should perform additional analysis to enable them to select the appropriate flood mitigation measures, in addition to a suite of other non-structural flood risk reduction methods that cross jurisdictional boundaries. You may find additional recommendations for flood risk reduction from the [Commission to Rebuild Texas Report](#).

Close

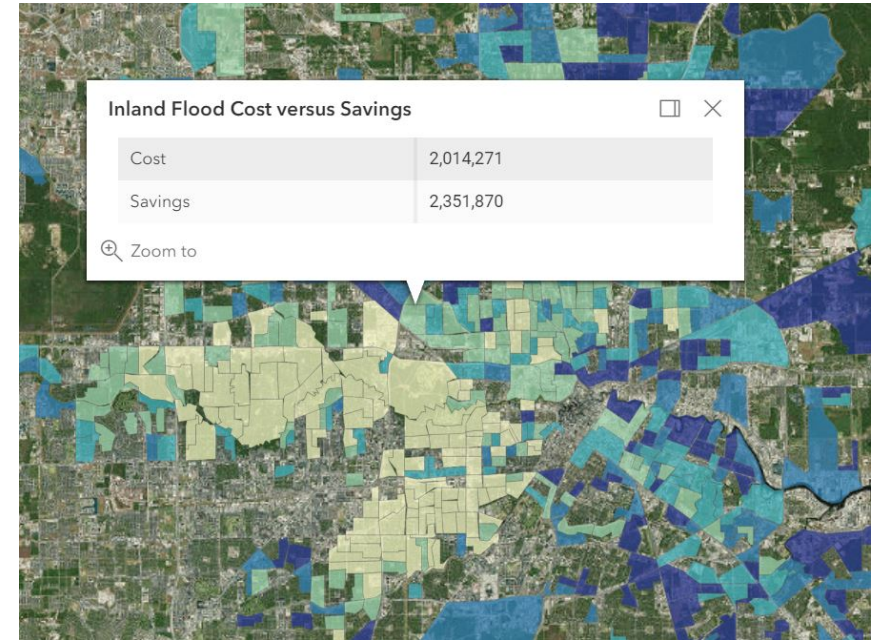
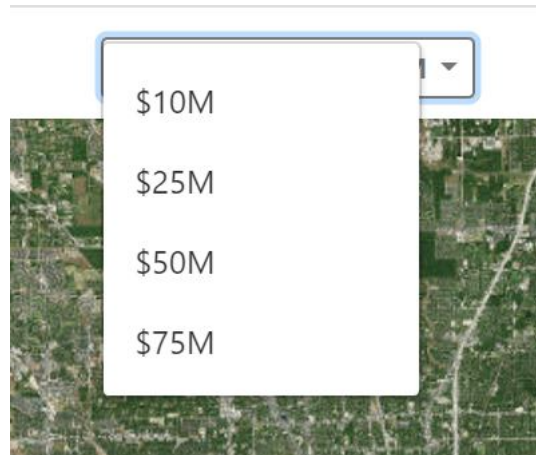
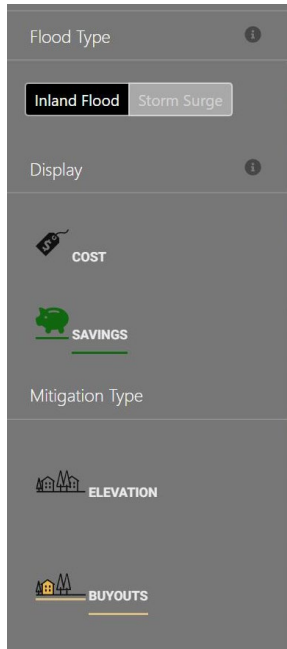
Earthstar Geographics Powered by Esri

# Dashboard 2

[TexasCoastalAtlas.com/dashboard2](https://TexasCoastalAtlas.com/dashboard2)

- Developed following the Governor's Commission to Rebuild Texas following Hurricane Harvey
- Explores benefits of mitigation efforts compared to flood losses
- Customize analysis based on type of flooding, mitigation method, and budget

# How it Works



Choose Mitigation

Change Budget

Compare Cost vs. Savings





Buyer Be-Where is an on-line system to help prospective home buyers and sellers understand their risk relative to other properties in the area. Anyone with an Internet connection can enter a street address and receive a graphic and statistical risk assessment for a specific property. Comprehensive, easy to understand information delivered on-the-fly will provide a critical resource for existing and future property owners interested in making sound and safe investment decisions.

## Buyers BeWhere

Go To Harris, Texas ▶

Go To Galveston, Texas ▶

Go To Miami-Dade, Florida ▶

Go To Dallas City, Texas ▶

Go To New Orleans, Louisiana ▶

Go To Seattle, Washington ▶

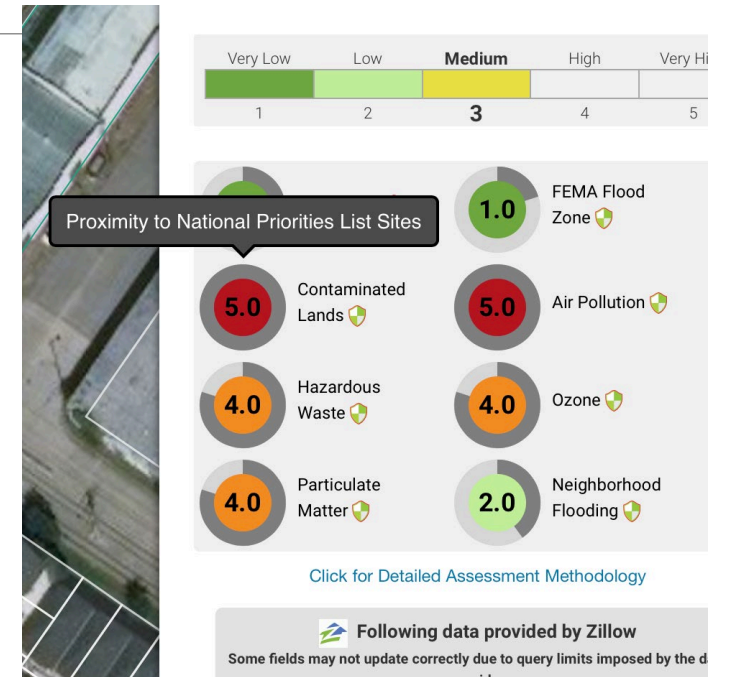
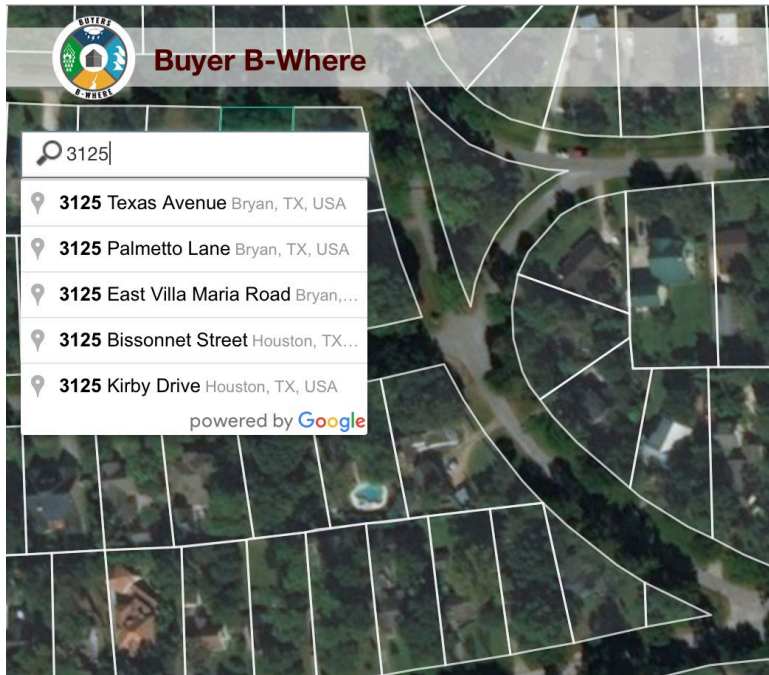
Go To Los Angeles County, California ▶

# Buyers Be-Where

[Buyers-BeWhere.com](http://Buyers-BeWhere.com)

- Offers on-demand and easy to understand information on a range of hazards
- Allows for customizable risk score for individual parcels relative to surround properties
- Provides solutions to mitigate risks and increase potential long-term value

# How it Works



Search an Address

Select the Hazards

Understand the Indicators



# Flooding



<https://www.ready.gov/floods>

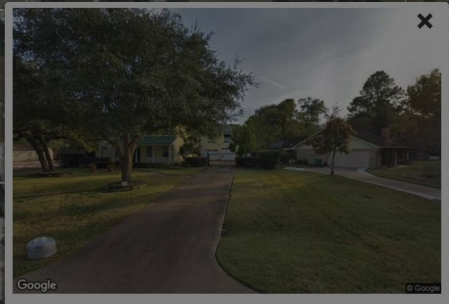
[https://www.fema.gov/media-library-data/1443014398612-a4dfc0f86711bc72434b82c4b100a677/revFEMA\\_HMA\\_Grants\\_4pg\\_2015\\_508.pdf](https://www.fema.gov/media-library-data/1443014398612-a4dfc0f86711bc72434b82c4b100a677/revFEMA_HMA_Grants_4pg_2015_508.pdf)

### Structural:

- Elevate structures
- Wet proof by installing flood openings or using flood proof materials in foundation or ground level floor
- Dry proof by installing sewer backflow valves, using flood impervious coating on exterior walls, and placing floodgates or shields at all openings
- Install french drains and on site retention

### Behavioral:

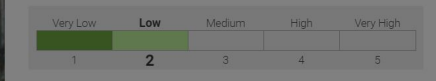
- Clean and maintain gutters and drains
- Move valuables to higher level
- Be aware where neighbors' properties drain
- Purchase flood insurance
- Check whether there is a high risk classified dam nearby



Houston, Texas, 77018

Overall Hazard Risk Score 1

The Risk Score is the Arithmetic Mean of the Individual Hazard Risk Score of the Hazards Selected. 7 selected



[Click for Detailed Assessment Methodology](#)

Following data provided by Zillow

Some fields may not update correctly due to query limits imposed by the data provider

<b>Zestimate</b>	<b>Facts</b>
Data not available	Data not available
<b>Features</b>	<b>Description</b>
Data not available	Data not available.



# Texas Disaster Information System

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An interactive, web-based spatial data system designed to support Preparedness, Response, Recovery and Mitigation for the State of Texas.

- Statewide system will employ cutting-edge data analytics and mapping technologies.
- Provide residents, policy makers, local jurisdictions, and other stakeholders with the most current and accurate information available to assess related disaster risks, impacts, and mitigation strategies.

The logo for the Center for Texas Beaches and Shores (CTBS) features the letters 'CTBS' in a large, white, bold, sans-serif font. The letter 'C' is stylized to resemble a blue wave curling to the right. The background is a dark maroon color at the top, transitioning into a blue wave pattern that flows behind the letters, and finally into a sandy beach texture at the bottom.

# CTBS

**The Center for Texas Beaches and Shores**

*Dedicated to the protection of the Texas coastal regions and its communities*

[www.tamug.edu/CTBS](http://www.tamug.edu/CTBS)