

Hurricane Harvey Damage Assessment for the Houston-Galveston Area

*Texas Demographic Conference 2018
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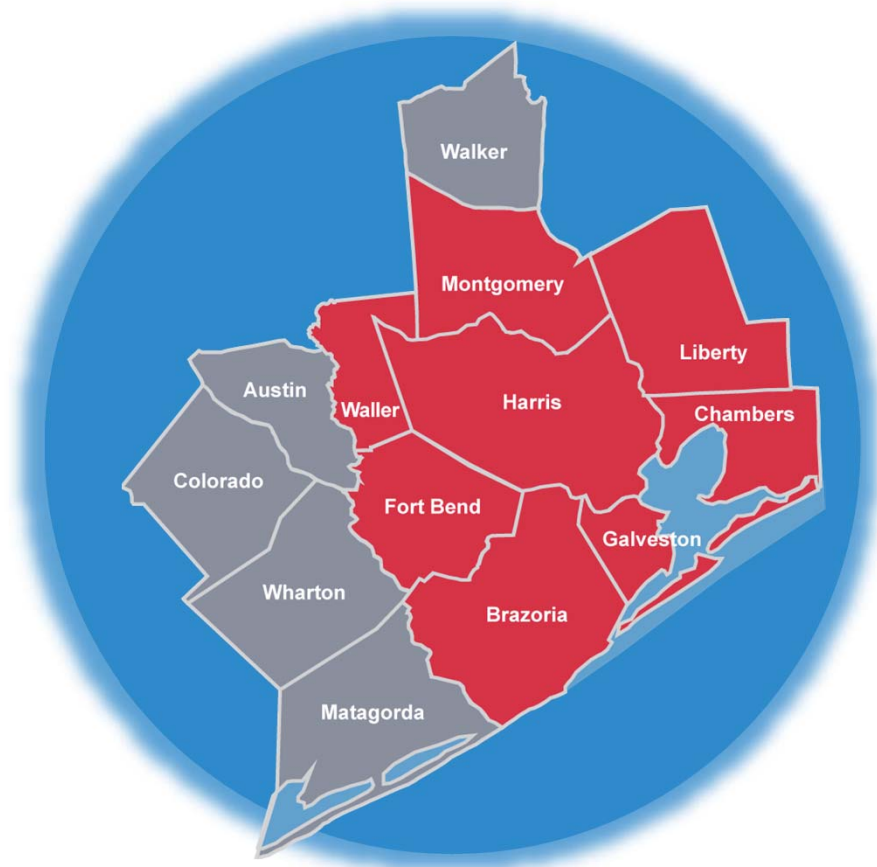
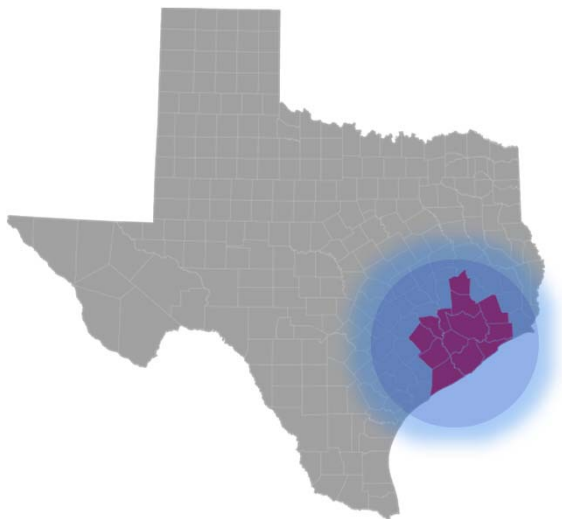
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Houston-Galveston Area Council (H-GAC)

H-GAC Serves:

- 13 counties
- 134 cities
- 8 MPOs
- 6.5 million people
- 3 million jobs



Houston-Galveston Area Council (H-GAC)

Forecast Group

- Manage regional databases (census, economic, and real estate)
- Perform regional growth forecast on regional population, employments and commute patterns
- Develop interactive tools and online applications

Hurricane Harvey

- Struck coastal Texas in August 2017
- Dumped 50 inches of rain in the Houston-Galveston Area
- Up to 30% of Harris County were flooded
- More than 203,300 homes were damaged

Hurricane Harvey



Photo Sources: The New York Times; Houston Chronicle

H-GAC post-Harvey efforts

- Interactive mapping & data visualization
- Damage assessment
- Vulnerable population identification

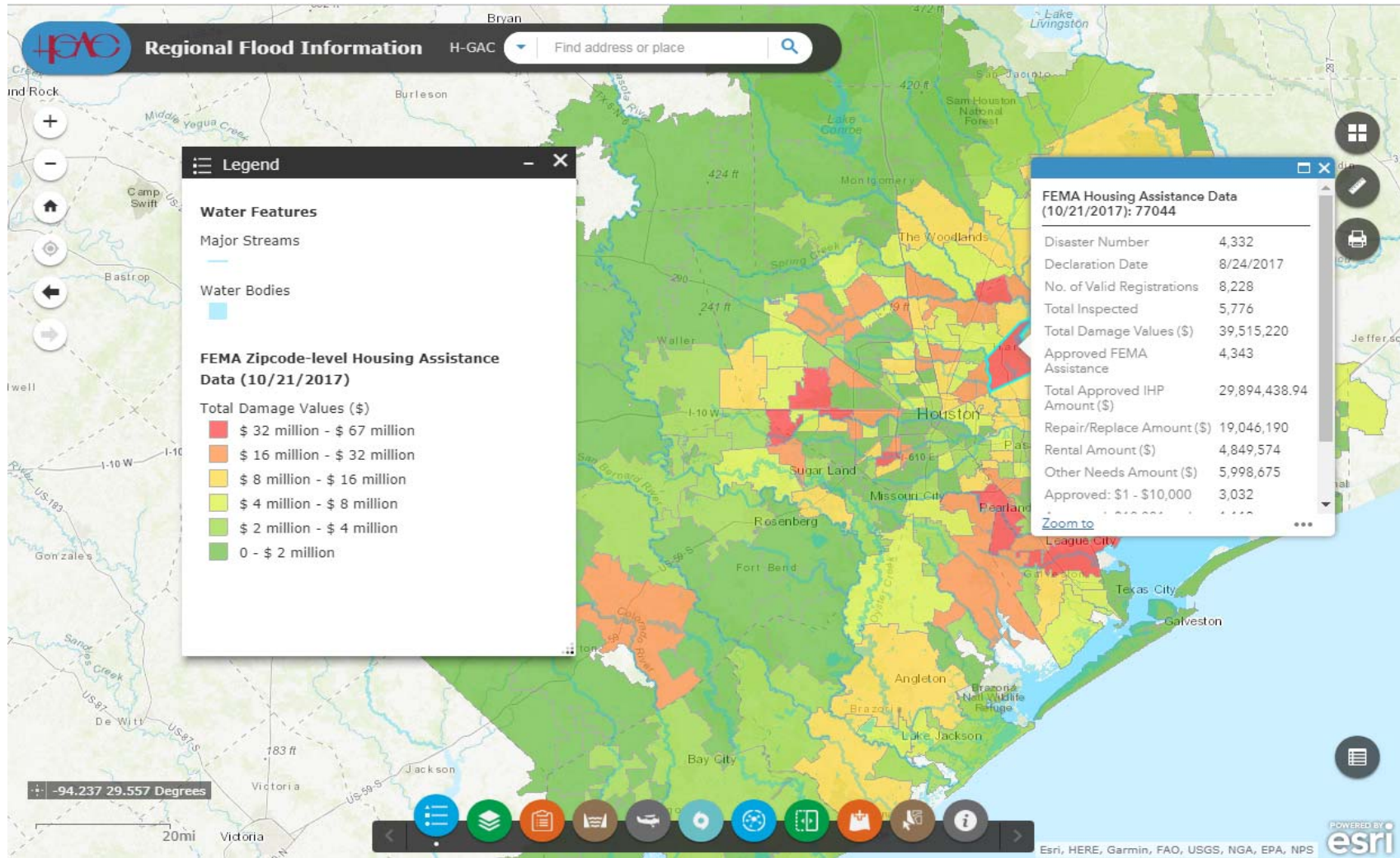
Interactive Application:

The Regional Flood Information Tool

<http://www.h-gac.com/community/interactive-web-applications/default.aspx>

<http://arcgis02.h-gac.com/flood>

Hurricane Harvey: Regional Flood Information



Regional Flood Information

- Development
 - Based on ESRI web GIS
 - JavaScript, portable-device-friendly
 - Up to date database
- Functions
 - Input
 - Display
 - Analyze
 - Share

Damage Assessment

- FEMA Housing Assistance Data:
 - Total claims
 - Total population in claimed household
 - Real property damage
 - Personal property damage
 - Insurance status

(Available at the census block level)

Damage Assessment

- FEMA Individual Assistance Data:
 - Total number of valid registrations
 - Total number of home damages
 - Total number of utilities-out
 - Total number of auto damages
 - Total number of emergencies
 - Food/Shelter assistance requirements
- (Available at the zip code level)

Damage Assessment

- City of Houston Building Damage Data:
 - Total number of damaged
 - all structures
 - single-family residentials
 - multi-family residentials
 - commercial buildings
 - industry buildings
- (Available at the census block level)

Vulnerable Population Index (VPI)

- Identify minority or low-income populations that are prone to disproportionately high and adverse health or environmental effects
- Used for better and more effective resource allocation and hazard mitigation
- Contain the following eight populations:
 - Poverty
 - Non-Hispanic, Non-White minority
 - Hispanic minority
 - Limited English proficiency
 - Disability in household
 - Single female householder with child/children in the household
 - Car-less
 - Elderly

Vulnerable Population Index (VPI)

- Step 1: Extract the demographic and socio-economic data from 2016 ACS and calculate the proportion of each vulnerable population group for each block group and the H-GAC region.

$$BG_Var\% = BG_Population_Var / BG_Total_Population$$

$$Region_Var\% = Region_Population_Var / Region_Total_Population$$

- Step 2: Calculate the vulnerability quotient for each vulnerable population category.

$$Quotient_Var = (BG_Var\%) / (Region_Var\%)$$

Vulnerable Population Index (VPI)

- Step 3: Sum up all vulnerability quotients of all vulnerability categories for each block group.
Quotient_Sum = sum(Quotient_vars) (for all categories in a block group)
- Step 4: Rank all block groups in ascending order of quotient summary and then calculate the cumulative percentage. The vulnerable population index (VPI) is the cumulative percentage divided by the total quotients of all block groups in the region.
Quotient_Total = sum(Quotient_Sum) (for all block groups)
VPI = (Cumulative % of Quotient_Sum) / Quotient_Total

Post-Harvey Actions

- House elevation
 - Increase to 2 feet above the floodplain
 - Extend to 500-year floodplain
- Buyouts
- Zoning debate
- Flood detention
 - Require both new developments and redevelopments to provide detention

THANK YOU!

Acknowledgements

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Forecast Group at H-GAC (www.h-gac.com)

Regional Growth Forecast 2040:

<http://www.h-gac.com/community/socioeconomic/2040-regional-growth-forecast/default.aspx>

More online applications:

<http://www.h-gac.com/community/interactive-web-applications/default.aspx>

For any questions feel free to contact

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