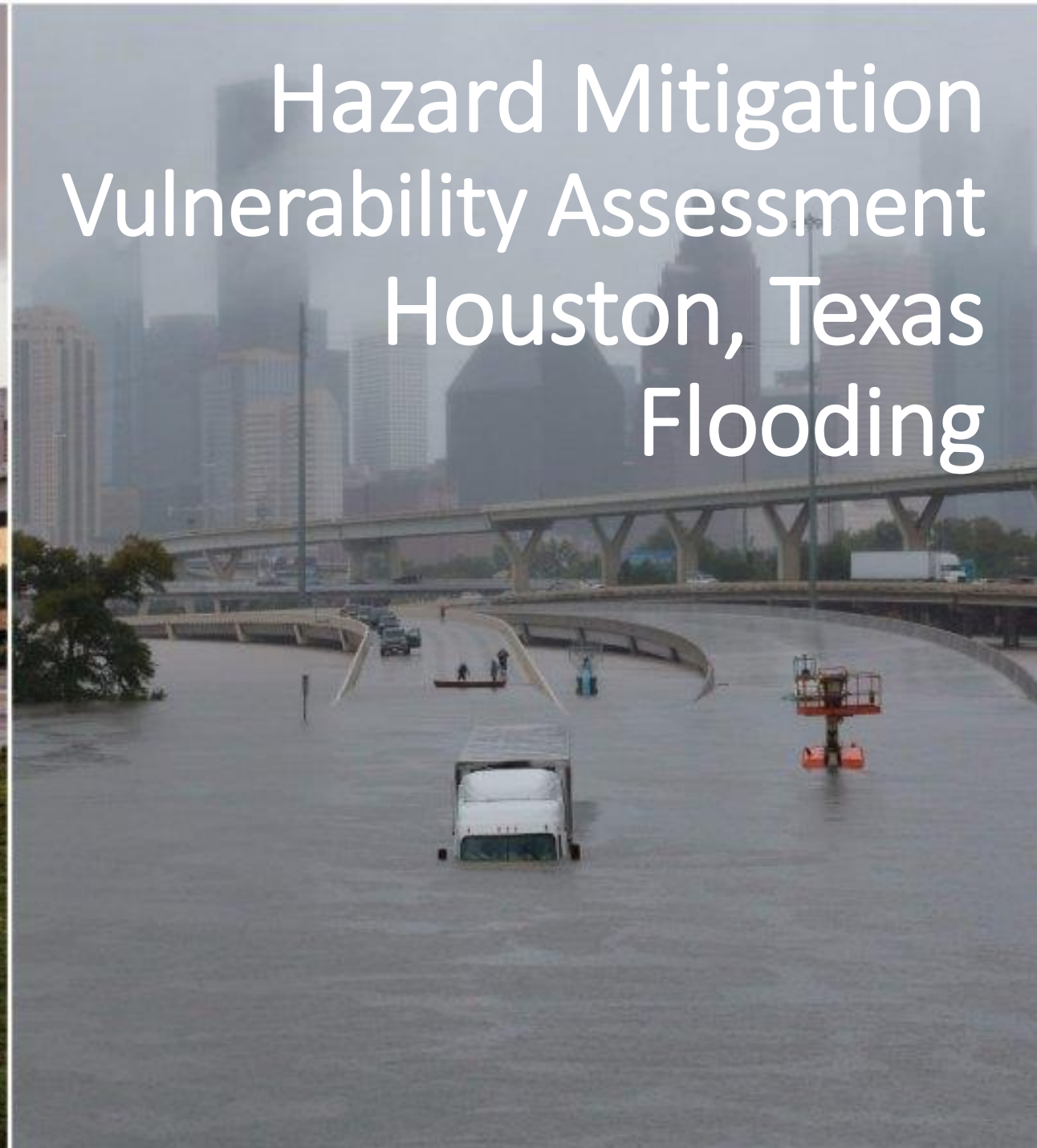


By: Elaine Hunt

# Hazard Mitigation Vulnerability Assessment Houston, Texas Flooding





# THE DEADLY FACTS ABOUT WATER

## **FACT!**

WATER CAN BE CHEMICALLY SYNTHESIZED BY BURNING ROCKET FUEL

## **FACT!**

OVER CONSUMPTION CAN CAUSE TEMPORARY DEAFNESS, HAIR LOSS AND EVEN DEATH

## **FACT!**

100% OF ALL SERIAL KILLERS AND DRUG DEALERS HAVE ADMITTED TO DRINKING WATER



## **FACT!**

WATER IS ONE OF THE PRIMARY INGREDIENTS IN HERBICIDES AND PESTICIDES

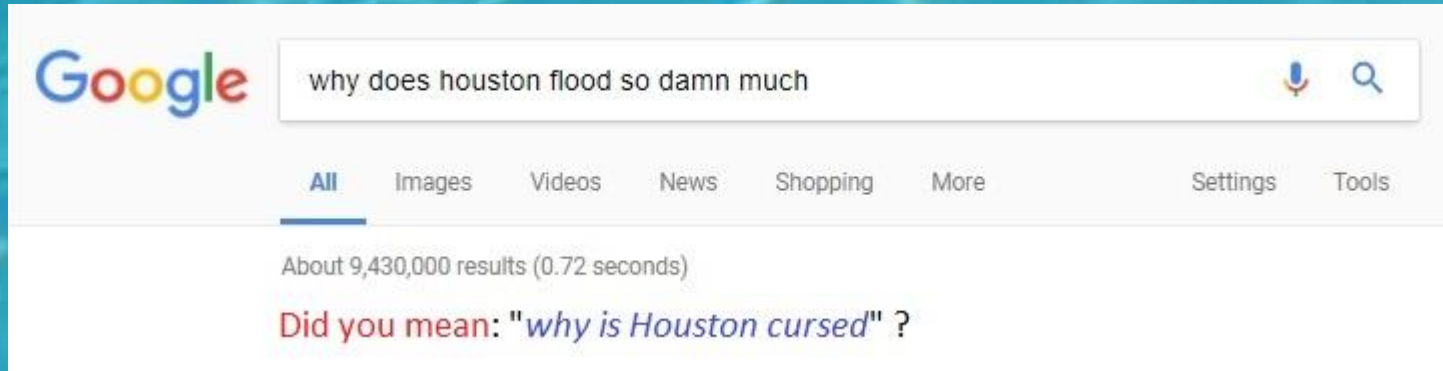
## **FACT!**

100% OF PEOPLE EXPOSED TO WATER WILL DIE

## **FACT!**

WATER IS THE LEADING CAUSE OF DROWNING





- Topography: bayous, creeks, streams, reservoirs, lakes, elevation (or lack thereof)
- Terrain: Swamp City!
- Climate: humid and rainy
- Location: "The armpit of America" Gulf of Mexico, prime midlatitude cyclone territory
- Modern Infrastructure: roadways, parking lots, sidewalks, cement, pavements, asphalt, concrete, buildings
- Other: Rapid population growth



Image source:  
<https://i.pinimg.com/736x/fb/2e/36/fb2e362ab1c19e4597ac01c294e84648--galveston-houston-texas.jpg>



# Mitigation Attempts

- Practical?
- Cost benefit analysis
- Long term prospects
- Too many people?
- Topography
- History – have we learned anything?

## Disasters

- December 6–9, 1935 - A massive flood inundates Houston, killing eight people; the Harris County Flood Control District is created in the aftermath.
- September 11, 1961 - Hurricane Carla struck the Texas Coast to the east of Port Lavaca, Texas, bringing heavy rainfall and wind damage to the Houston area.
- August 18, 1983 - Hurricane Alicia hits Houston and Galveston.
- October 15-19, 1994 - The Great Flood of '94 Hurricane Rosa leaves a stalled tropical depression over north Houston for a week. With over 30 inches of rain recorded in some places of Harris County, 20 inches in a number of hours, and maximum recorded stream flow volume at all recorded stations in the history of the San Jacinto River. The result was the highest flood levels of the San Jacinto basin to the present day, devastating the north side of Houston and killing 22 people in Texas. Petroleum lines bursting and setting aflame injured another 540 people.
- June 5 – June 9, 2001 - Tropical Storm Allison devastates the Houston area flooding much of the city including the Central Business District, several cultural institutions and major hospitals and research facilities in the Texas Medical Center. The storm is called a 500-year event.
- June 19, 2006 - Major flooding in Southeast Houston causes homes and roads to fill up with water. This was the most rain since Tropical Storm Allison in 2001.
- September 13, 2008 - Hurricane Ike passes through city causing flooding, wind damage and widespread power failures.
- May 25 - May 26, 2015 - **Historic Houston Flood** Devastating storms floods most of the city.
- April 18, 2016 - The 2016 Houston floods took place in nine counties near the city.<sup>[17]</sup>
- August 2017 - Hurricane Harvey devastates the city, flooding homes and roads.

Image Source: [https://en.wikipedia.org/wiki/Timeline\\_of\\_Houston](https://en.wikipedia.org/wiki/Timeline_of_Houston)



**John Dodge** ✓  
@dodgerman

 Follow

When finished, the McCook reservoir will hold 10 billion gallons of rain. #HurricaneHarvey would fill it 1,500 times. So far ...

3:22 PM - Aug 29, 2017



Image source: <http://chicago.cbslocal.com/2017/08/30/hurricane-harvey-by-the-numbers/>

# Allison

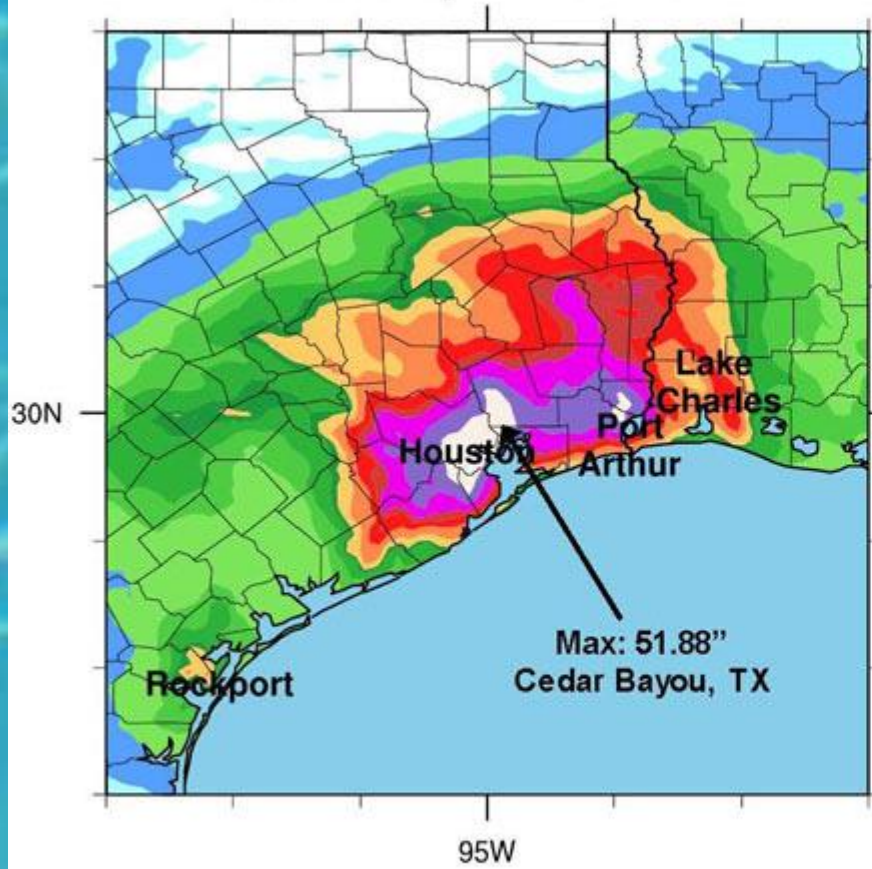
- June 4-20, 2001
- Tropical storm  
("Extratropical" from June 18-20)
- \$9 billion in damage
- 41 deaths
- 35 inches of rain in Houston
- 60mph winds
- Lowest pressure: 1000mbar

# Harvey

- August 17-September 3, 2017
- Category 4 Hurricane
- ~\$70 billion in damage
- 90 deaths
- ~52 inches of rainfall\*
- 130mph winds
- Lowest Pressure: 938mbar



Harvey – 2017



Allison – 2001

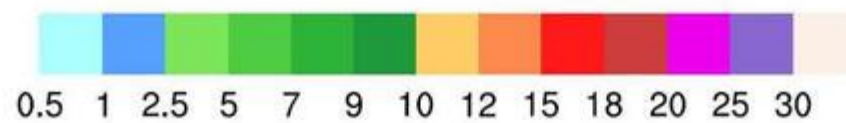
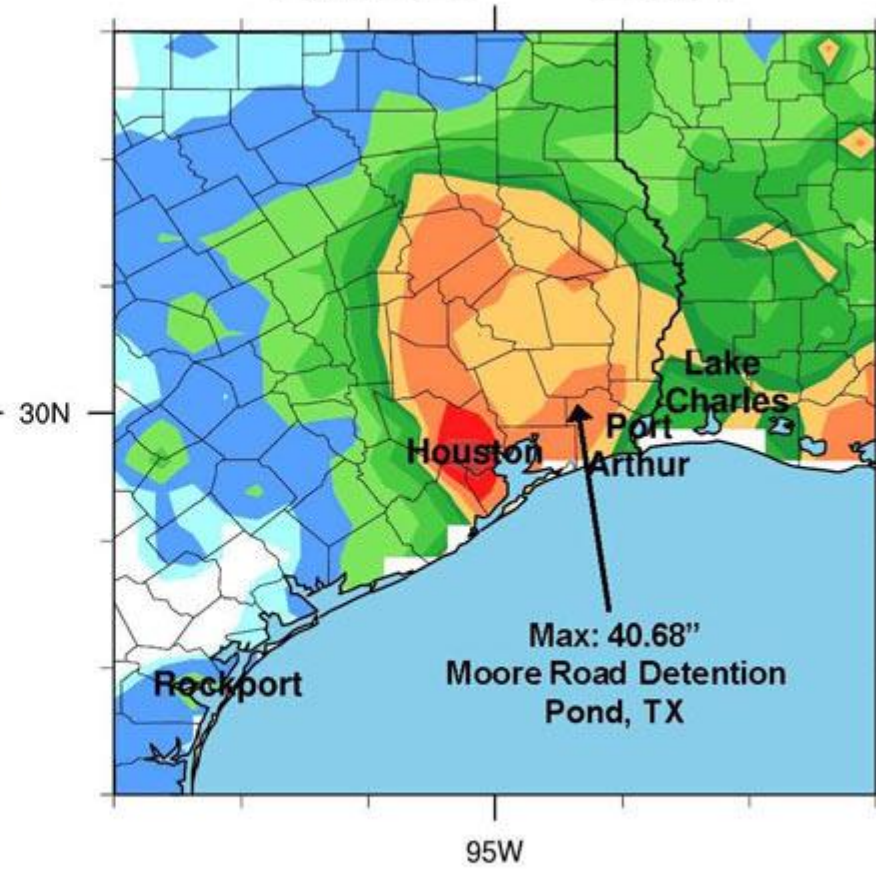


Image source: [http://www.air-worldwide.com/uploadedImages/Blog/harvey\\_historic\\_fig1.jpg](http://www.air-worldwide.com/uploadedImages/Blog/harvey_historic_fig1.jpg)

Assessment: High Risk





# References

Bogost, I. (2017, August 28). Houston's Flood is a Design Problem. The Atlantic. Retrieved from: <https://www.theatlantic.com/technology/archive/2017/08/why-cities-flood/538251/>

Garfield, L., et al. (2017, August 31). Hurricane Harvey is the Worst Rainfall Disaster in US History. Business Insider. Retrieved from: <http://www.businessinsider.com/hurricane-harvey-2017-rainfall-map-2017-8>

Photo References:

Title page photo: <http://static1.businessinsider.com/image/59a426a46eac401b008b5814-1190-625/tracking-harvey-before-and-after-images-show-the-catastrophic-flooding-in-houston.jpg>

Slide 7: Image source: <https://2ndchanceautoinsurance.ca/ver2/wp-content/uploads/2015/04/high-risk-auto-insurance-meter-ontario.png>