An aerial photograph showing a large area of flooding. The water is a murky brown color, covering most of the ground. There are many green trees scattered throughout the flooded area, some standing in the water. In the background, there are some white buildings and a road. The sky is not visible.

# Mitigation Assessment for the City of Houston's Flooding Hazard

By: Elaine Hunt

# Background



Image Source: <http://mitigationguide.org/wp-content/uploads/2013/05/TXHarris.pdf>

- Greater Houston Area: nine counties
  - Harris, Fort Bend, Montgomery, Brazoria, Galveston, Liberty, Waller, Chambers and Austin
- Coastal flooding: a result of storm surge, wind-driven waves, and heavy rainfall produced by hurricanes, tropical storms, nor'easters, and other large coastal storms. (Riverine flooding – NA, but dams)
- Urban cities most at risk: low % of groundcover that can absorb water
- Houston's lack of zoning codes and development policies\*
- Harris County has received 32 presidential declarations of disaster since 1975
- Total estimated asset value: \$168,970,908,227

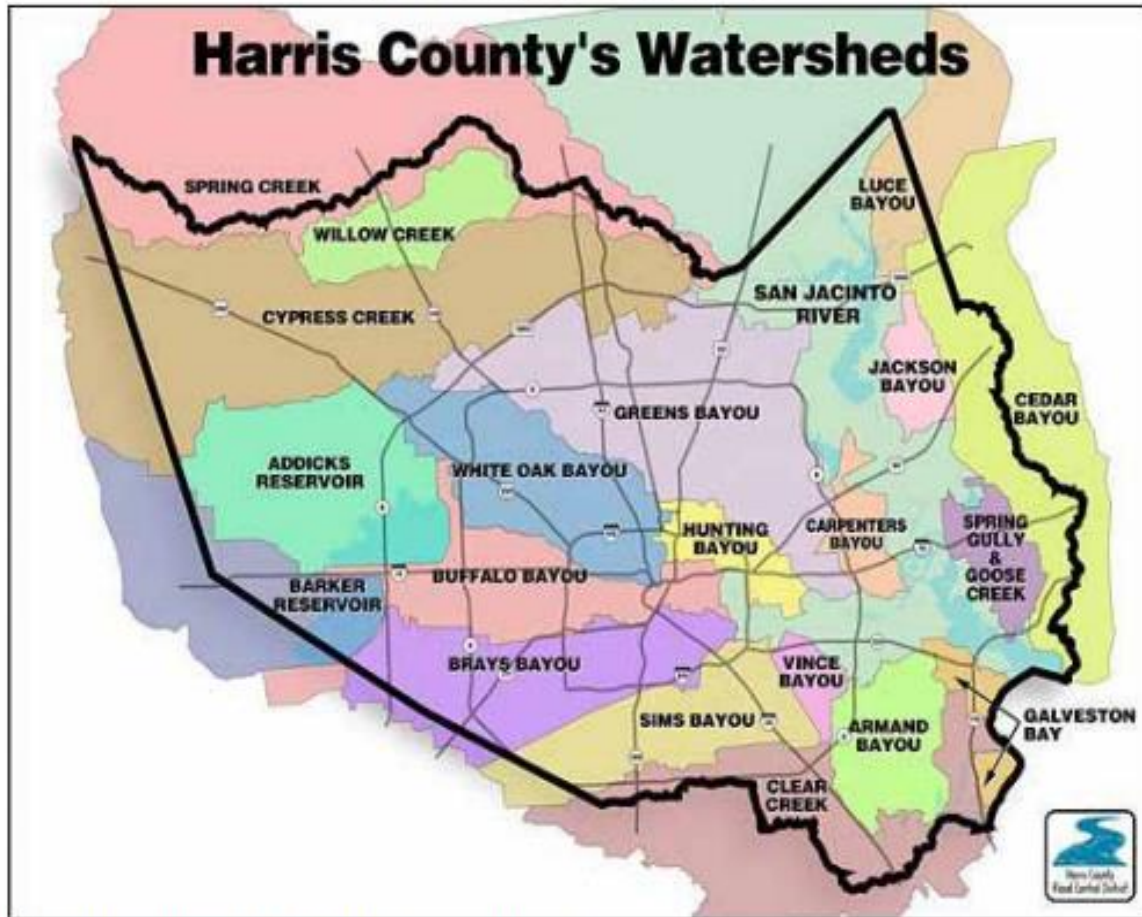


**YOU MAY ALL  
GO TO HELL,**

**AND I WILL  
GO TO  
TEXAS**

# Current & Past Mitigation Efforts

Figure 2-1  
Harris County Watersheds



Harris County is drained by twenty-two watersheds.  
Photo courtesy of Harris County Flood Control District.

- Barker and Addicks Reservoir built by Army Corp of Engineers in 1947
- Combined maximum capacity 510 GL (1GL = 1 billion liters)
- Estimated total cumulative savings: \$4,643,104,000
- Disaster Mitigation Act of 2000
  - Mandates state/local govt to adopt mitigation plan in order to qualify for FEMA aid

# Addicks and Barker Reservoirs

- Built in 1948 & 1951 by the Army Corps of Engineers
- Previous land use included cattle ranching and rice farming
- “The threat of flooding in the areas below the dams continued to rise with the increase of urban development,” (US ACE, 2009).

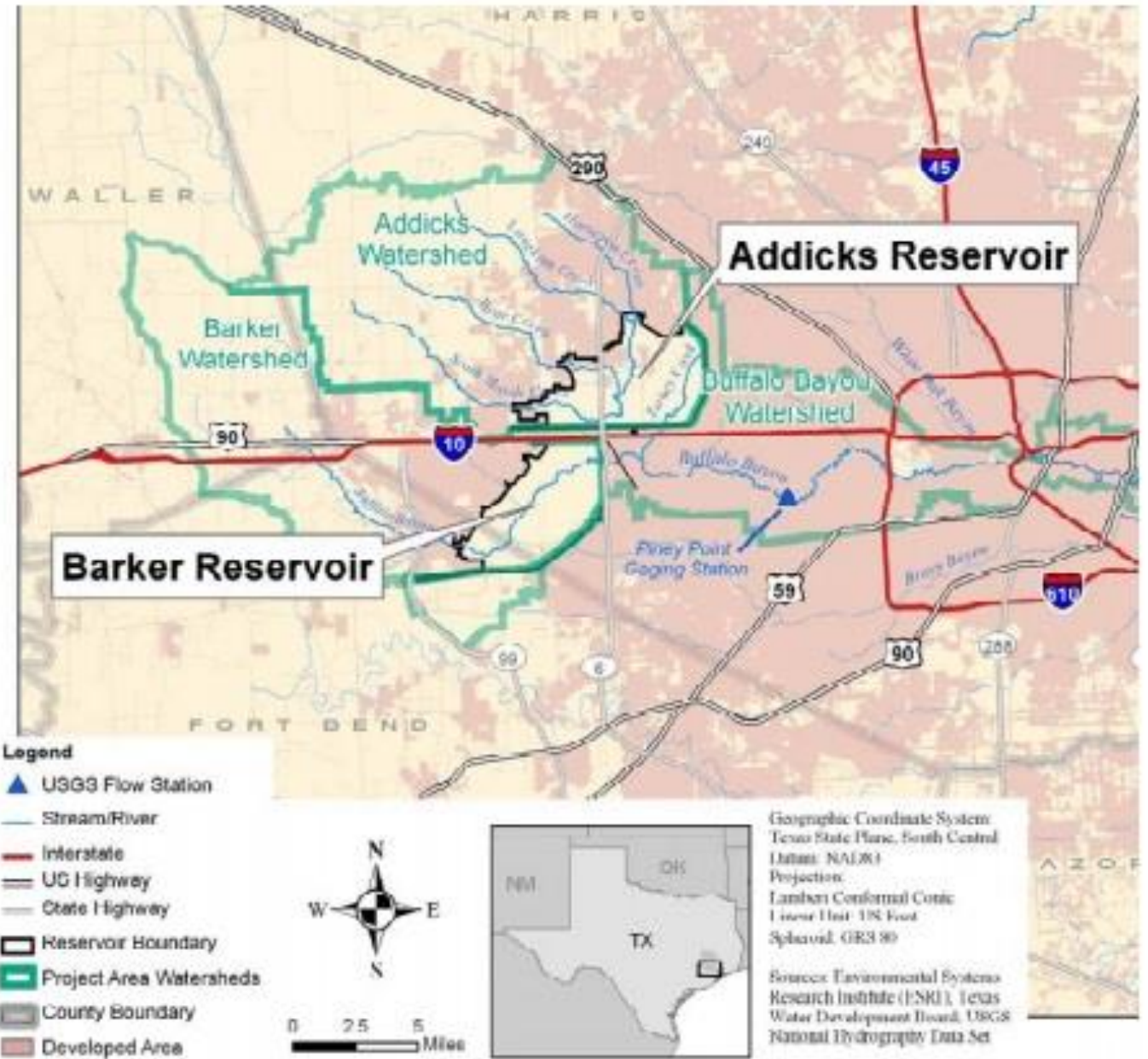


Image Source:

<http://www.swg.usace.army.mil/Portals/26/docs/2009%20Addicks%20and%20Barker%20MP.pdf>

# Hazard Mitigation Plans and Programs within Harris County

**Table 5.1**  
**Relevant Plans and Programs in Place**

Jurisdiction	HMP	DRP	CLUP	FMP	SMP	EOP	COOP	REP	SARA	TRANS	CIP	REG-PL	HPP	ZO	SO	NFIP	BC	CRS	FDPO
Harris County	x	x		x	x	x	x	x	x	x		x	x		x	x			x

**HMP – Hazard Mitigation Plan**  
**DRP – Disaster Recovery Plan**  
**CLUP – Comprehensive Land Use Plan**  
**FMP – Floodplain Management Plan**  
**SMP – Stormwater Management Plan**  
**EOP – Emergency Operations Plan**  
**COOP – Continuity of Operations Plan**  
**REP – Radiological Emergency Plan**  
**SARA – SARA Title III Emergency Response Plan**

**TRANS – Transportation Plan**  
**CIP – Capital Improvements Plan (that regulates infrastructure in hazard areas)**  
**REG-PL – Regional Planning**  
**HPP – Historic Preservation Plan**  
**ZO – Zoning Ordinance**  
**SO – Subdivision Ordinance**  
**FDPO – Flood Damage Prevention Ordinance**  
**NFIP – National Flood Insurance Program**



# CITY OF HOUSTON

Planning and Development

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To: Whom It May Concern

From: Patrick Walsh, P.E., Director  
Planning and Development Department

Effective Date: January 1, 2017

The City of Houston does not have a zoning ordinance. This is the city of Houston's no zoning letter applicable to any property inside the city of Houston. This does not address any separately filed restrictions that may be applicable to the property. You may use this letter to present to your lender. This letter will be updated on January 1, 2018.

All applicable development regulations and subdivisions laws can be obtained through a review of the City Code of Ordinances, which is located on the City of Houston internet site accessed through [www.houstonplanning.com](http://www.houstonplanning.com) or [www.houstontx.gov/planning](http://www.houstontx.gov/planning).

# Proposed Mitigation Plan

## Part I - Zoning

- Zoning Codes for future development
- Includes redefining 'floodplain risk' boundaries
- Houses must be raised 2 feet above original height in order to receive funding from FEMA
- Is it enough?
- Models need to be readjusted for current averages

## Part II – 3<sup>rd</sup> Dam

- Hundreds of thousands currently live in high risk areas
- Residents currently hold responsibility to obtain flood insurance
- A third dam would alleviate pressure on current dams
- Location will affect housing prices
- Building during reconstruction = where will the funds come from?



Mitigation Approach	Structural / nonstructural	Rate on Cost	Rate on Benefit	Rate on Ease	Scale
Zoning Policies	Nonstructural	High	High	Low	Local/Community
3 <sup>rd</sup> Dam	Structural	High	High	Medium	Local implementation (Fed. Funding)

# References

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Title Slide Image Background: <http://www.swg.usace.army.mil/Portals/26/docs/2009%20Addicks%20and%20Barker%20MP.pdf>

Background Image: <http://www.rususa.com/city/citymap.asp-city-houston+tx>

Slide 3 Image: <https://i.pinimg.com/originals/84/74/d6/8474d6db28fb9bc2c3642e2f057d7bf7.jpg>