USACE Water Resources Missions and Initiatives

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Audience: SAME Infrastructure Conference, UTA

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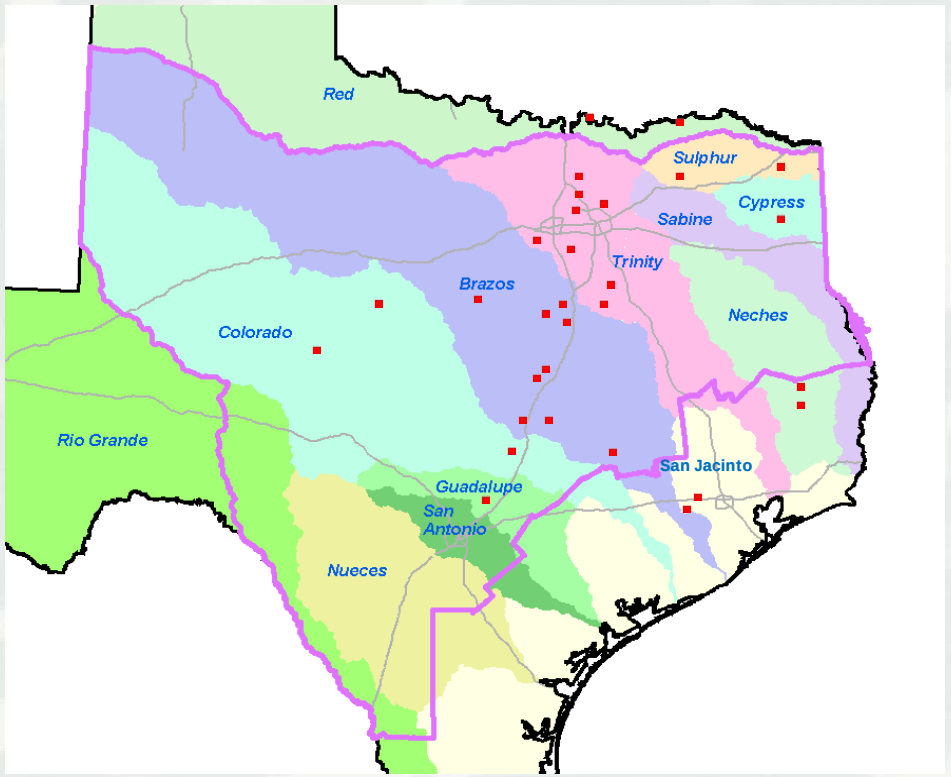
Statewide Reservoir Development Background

- Planned/constructed dams 111/32
  - 1st - Marshall Ford Dam (Lake Travis) 1942
  - Last – Cooper (Jim Chapman Reservoir) 1991
- Multi-purpose
  - Flood control, water supply, hydropower, environmental, recreation, ~~navigation~~
- Critical to the early development of Texas
- Significant federal economic contribution
- 8.8 M ac-ft conservation storage
  - 20% - 25% surface water supply
- 15.9 M ac-ft flood storage in 31 federal dams
- Costs (2013)
  - Construction - $8.2 billion
  - Benefits - $76 billion (flood only)
  - B/C ratio – 9.3
- Annual recreation visits – 22 M

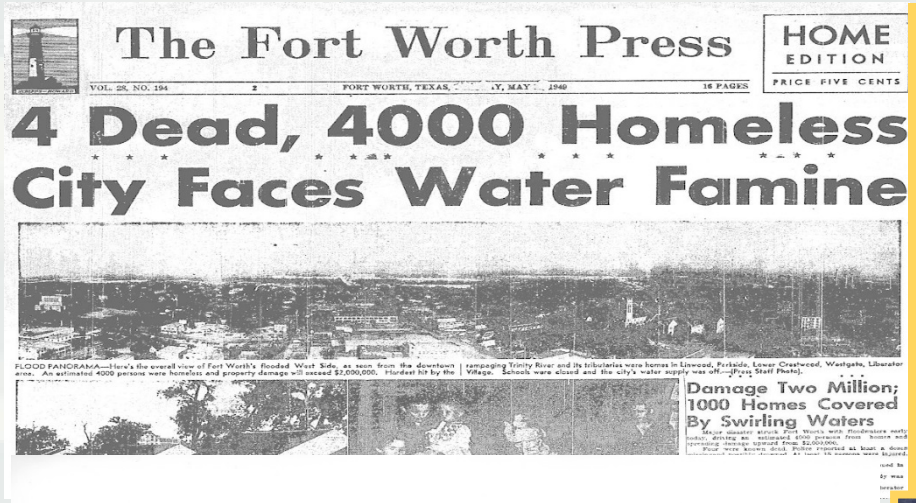


Reservoir Development

Dallas and Waco Floods

Reservoir Development

1949 Fort Worth Flood



The Fort Worth Press

HOME EDITION

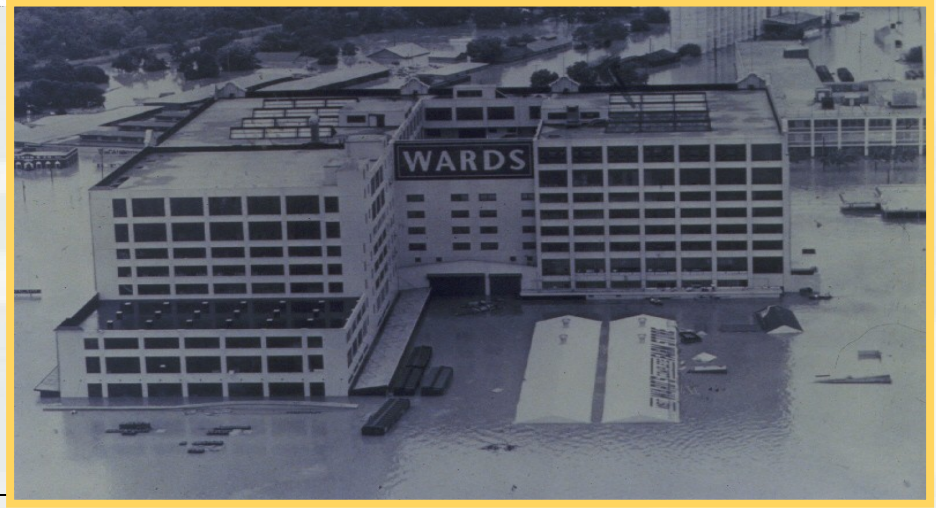
PRICE FIVE CENTS

4 Dead, 4000 Homeless

City Faces Water Famine

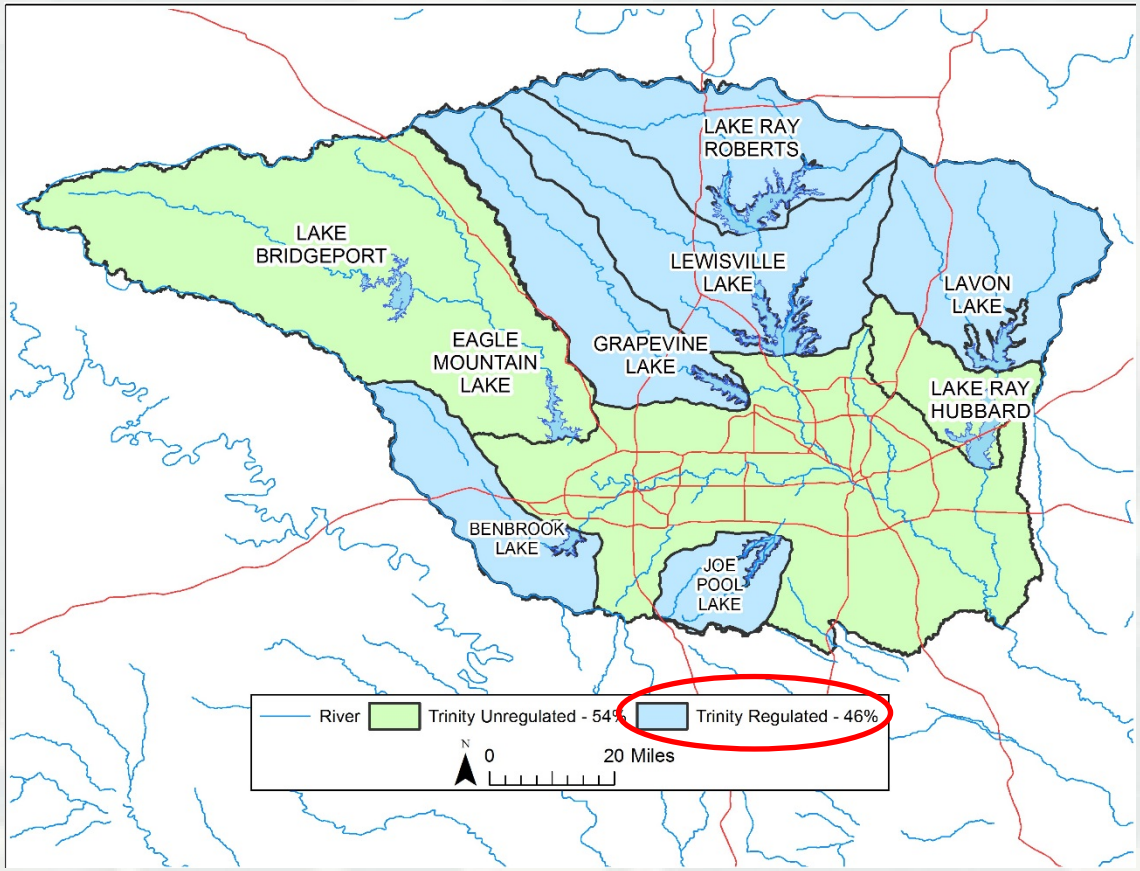
FLOOD PANORAMA—Here's the overall view of Fort Worth's flooded West Side, as seen from the downtown area. An estimated 4000 persons were homeless and property damage will exceed $2,000,000. Hardest hit by the rampaging Trinity River and its tributaries were homes in Linwood, Parkside, Lower Crestwood, Westgate, Liberator Village. Schools were closed and the city's water supply was off.—[Press Staff Photo].

Damage Two Million; 1000 Homes Covered By Swirling Waters

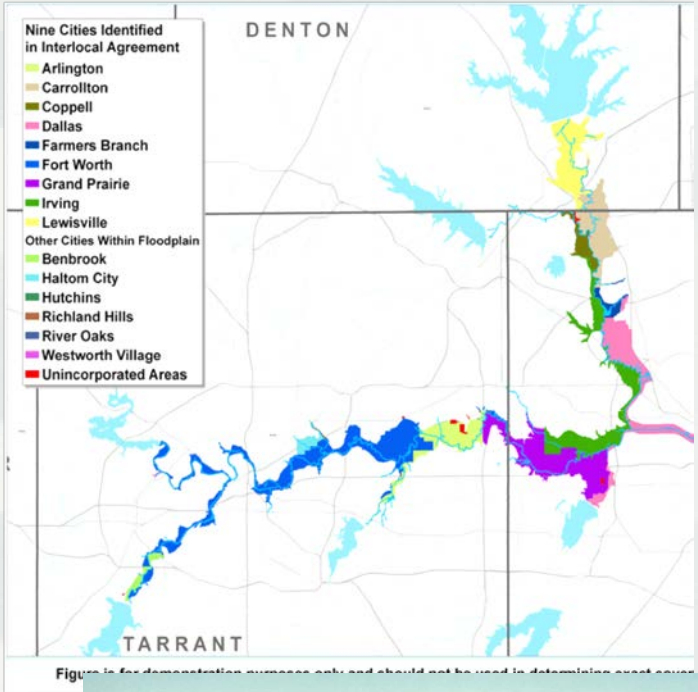


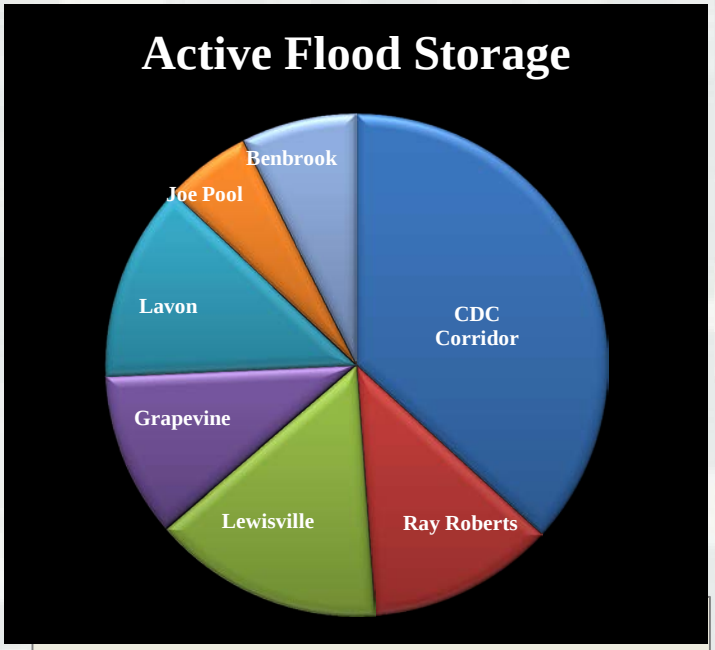
Dallas-Fort Worth - Flood Control and Water Supply System

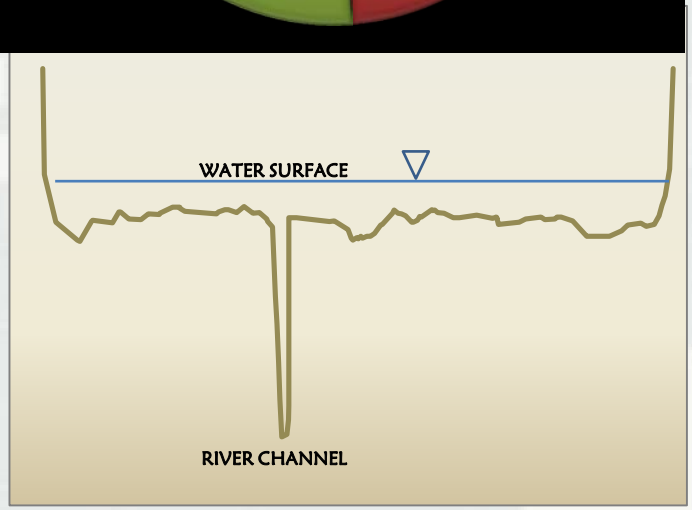
- Devastating floods, 1908, 1942, 1949
- 6 multi-purpose reservoirs
- 2 federal levee systems
- DFW Flood Control System
  - ► $79 billion in damages prevented
  - ► $2 - $3 billion annually
- Water supply system
  - ► 7 million served
- Total cost $2.5 billion



Seventh Flood Control Reservoir – CDC Regulatory Program







Full floodplain conveyance and storage

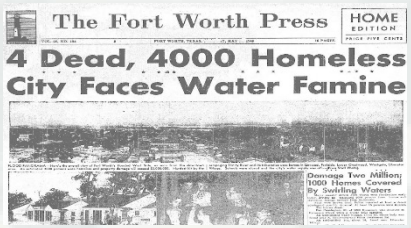
Background on Flooding

- Nationally
  - Flooding is leading cause of natural disasters
  - $8 billion per year
  - 82 deaths per year

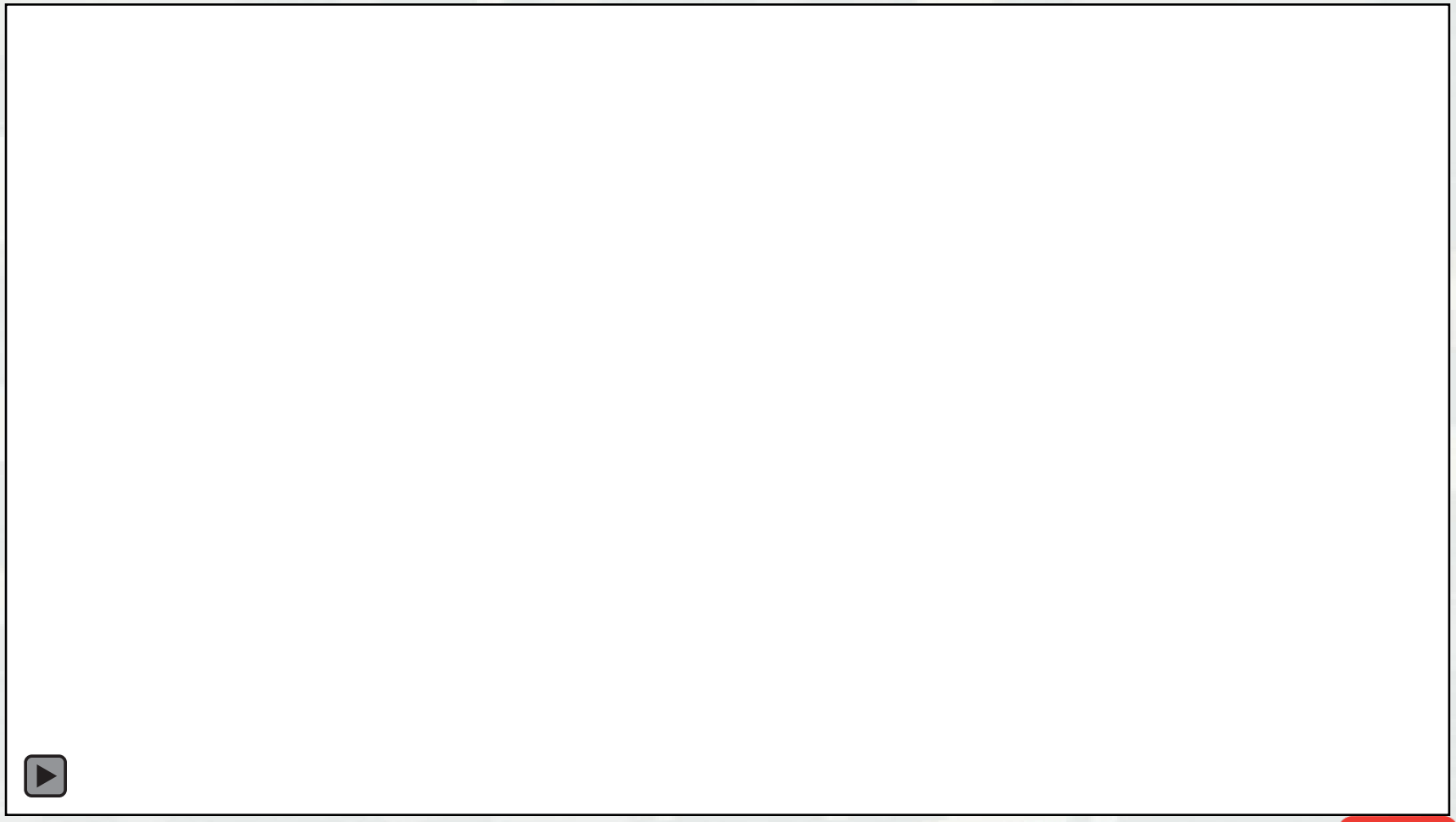
- Texas
  - $850 million in 2015
  - 48 deaths in 2015
  - 29 deaths 2nd quarter 2016
  - $190 B, Hurricane Harvey

Flooding Impacts

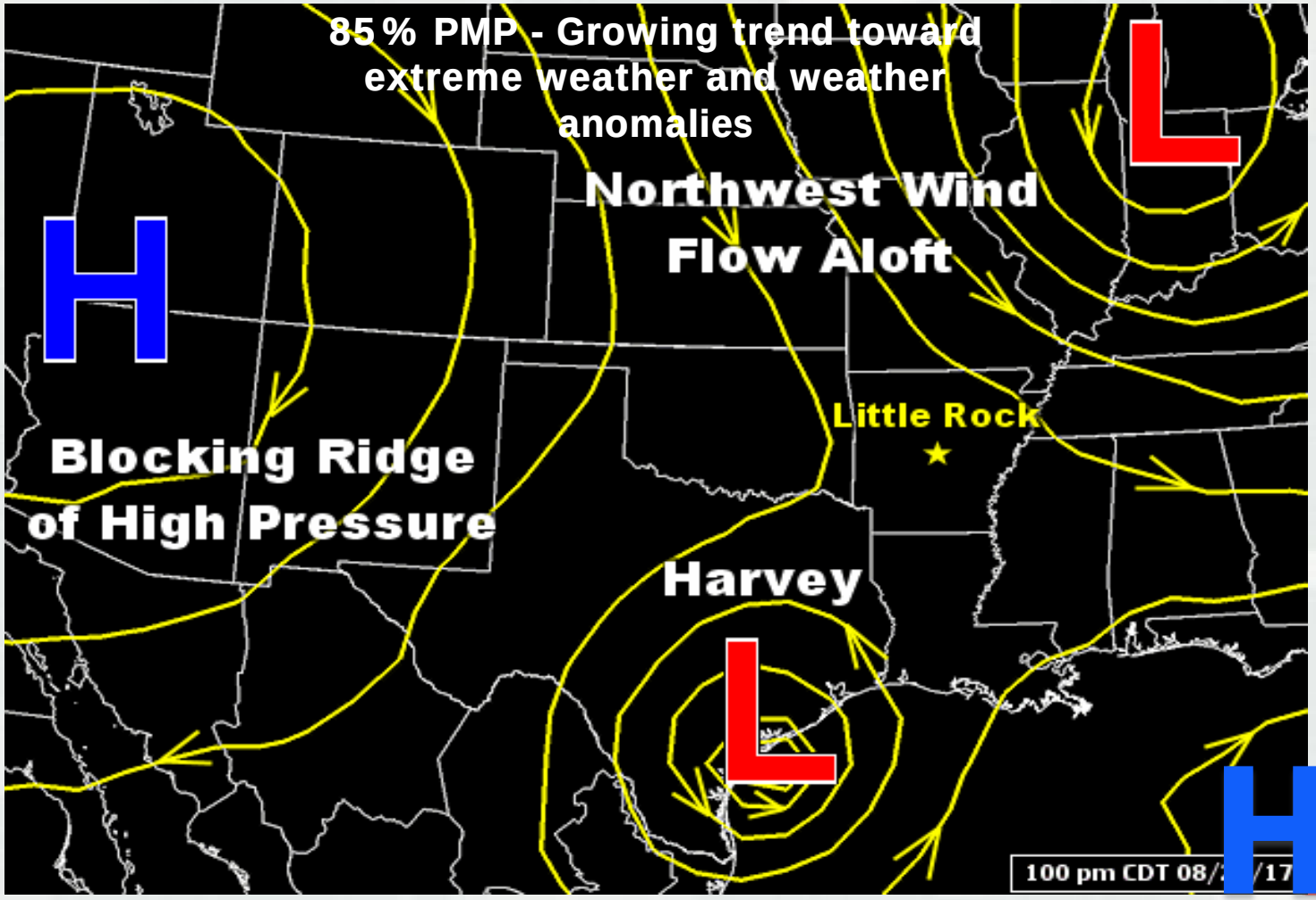
- Lives
- Transportation
- Water systems
- Sanitary sewer systems



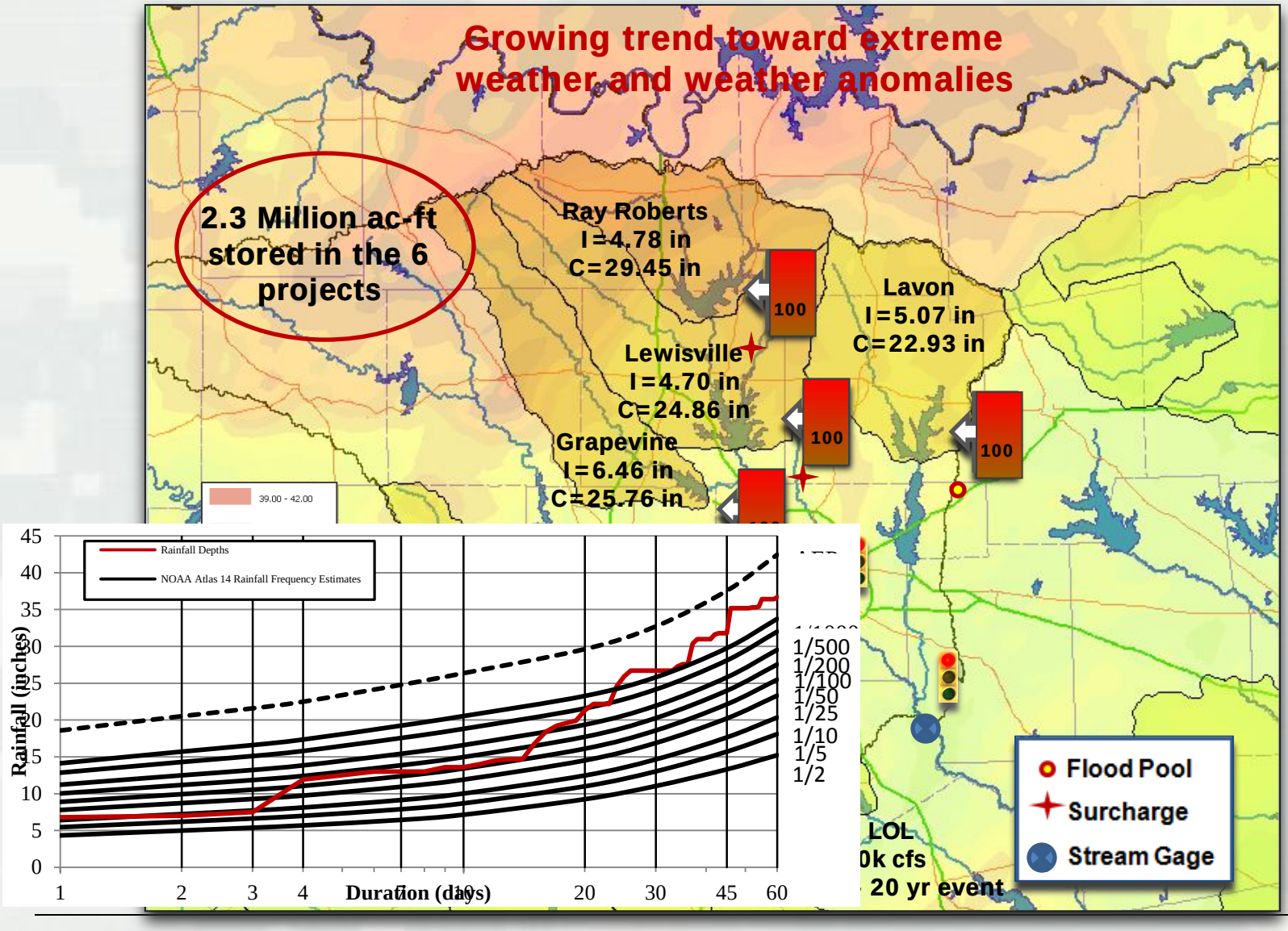
Hurricane Harvey



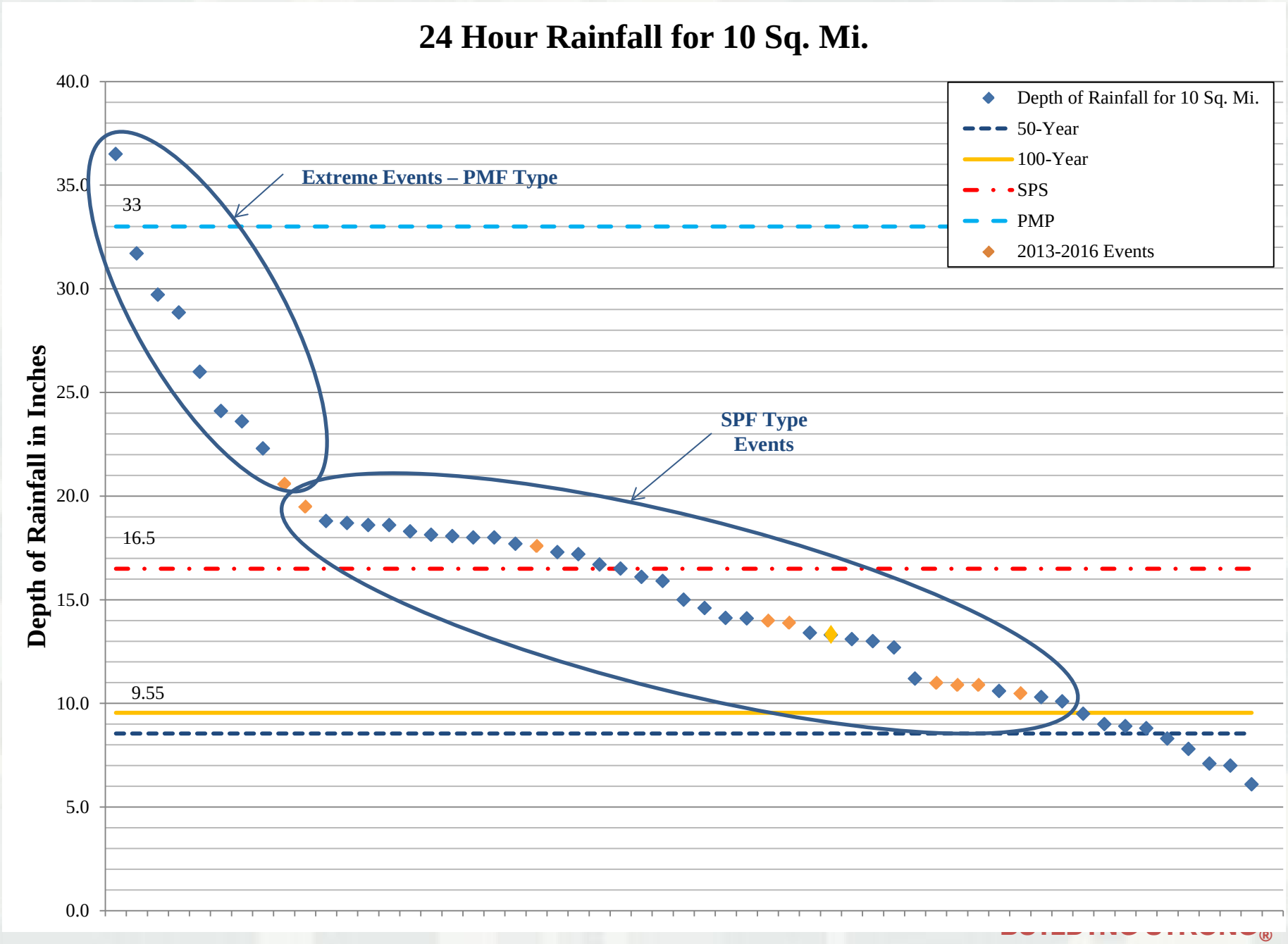
Harvey Weather Patterns



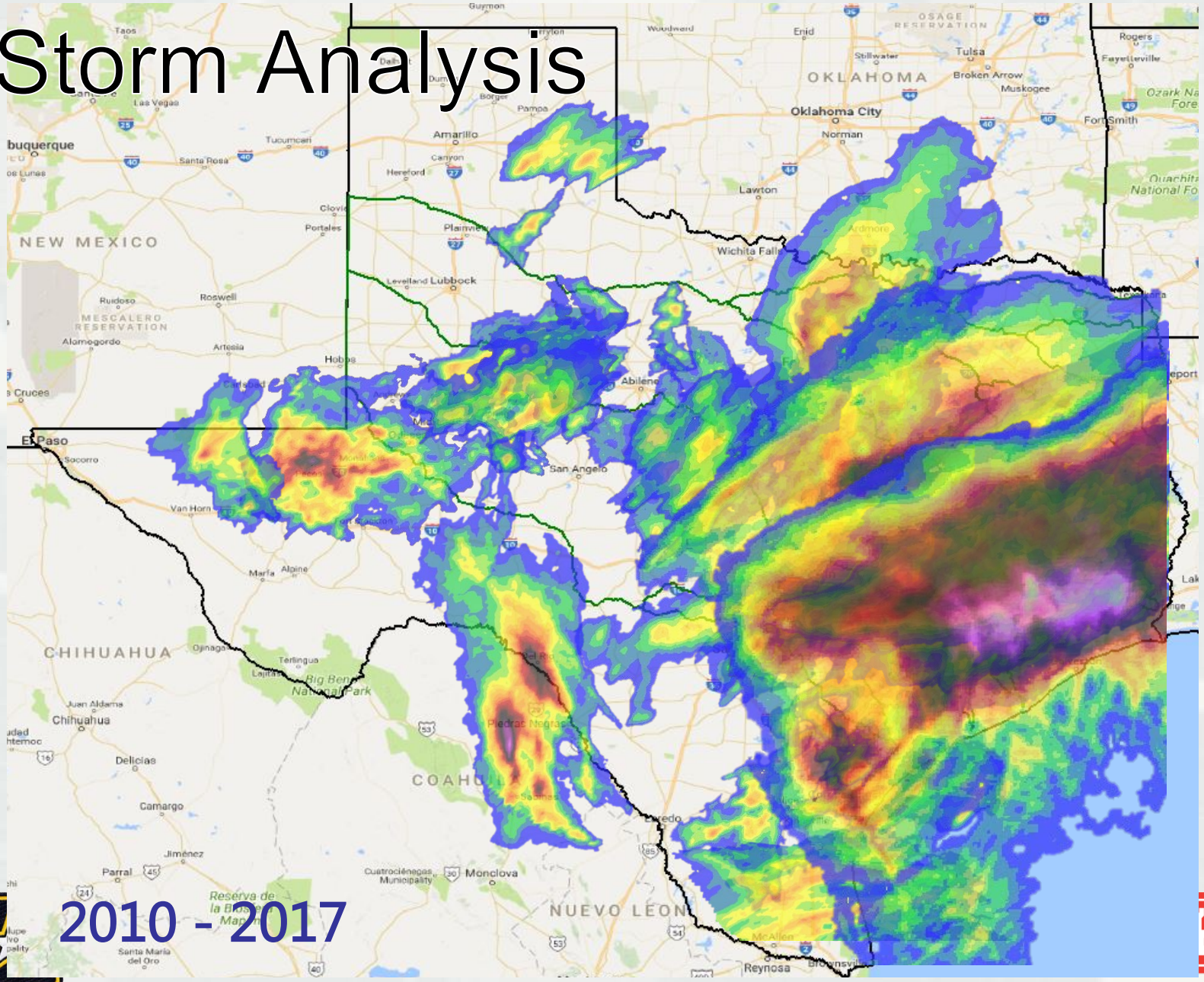
May-June 2015 Flooding



*Pool percent taken on the last day


24 Hour Rainfall for 10 Sq. Mi.
Depth of Rainfall in Inches
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
33
16.5
9.55
Extreme Events – PMF Type
SPF Type Events
Depth of Rainfall for 10 Sq. Mi.
50-Year
100-Year
SPS
PMP
2013-2016 Events

Storm Analysis



2010 - 2017

U.S.ARMY

BUILDING STRONG®

Interagency Flood Risk Management (InFRM)

FEMA

Support our citizens and first responders to ensure that as a nation we work together to build, sustain and improve our capability to prepare for, protect against, respond to, recover from and mitigate all hazards

USGS science for a changing world

To provide reliable, impartial, timely information that is needed to understand the Nation's water resources.

Provide the best weather, water, and climate forecasts through international cooperation on hydro-meteorological observations, data exchange, modeling, research, and technology development; and to provide global leadership in setting meteorological standards and building partnerships to save lives and protect property.

Deliver vital public and military engineering services; partnering in peace and war to strengthen our Nation's security, energize the economy and reduce risks from disasters.

Components of Flood Impact Determinations

Meteorology
- How much rain

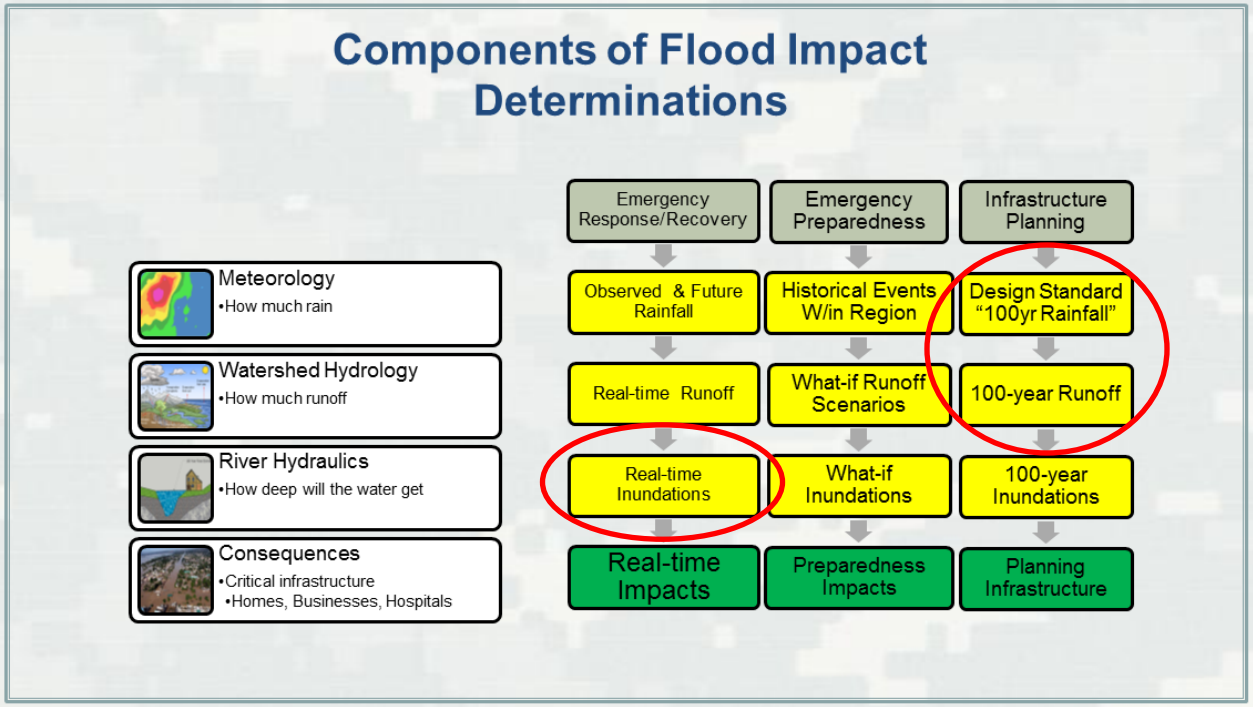
Watershed Hydrology
- How much runoff

River Hydraulics
- How deep will the water get

Consequences
- Critical infrastructure
  - Homes, Businesses, Hospitals

Emergency Response/Recovery	Emergency Preparedness	Infrastructure Planning
Observed & Future Rainfall	Historical Events W/in Region	Design Standard "100yr Rainfall"
Real-time Runoff	What-if Runoff Scenarios	100-year Runoff
Real-time Inundations	What-if Inundations	100-year Inundations
Real-time Impacts	Preparedness Impacts	Planning Infrastructure

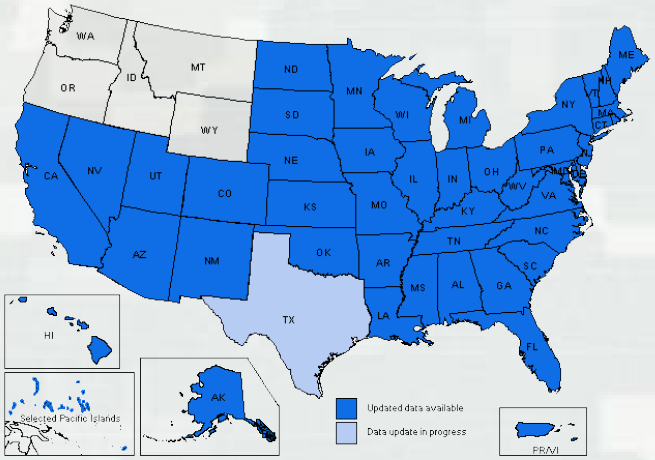
InFRM Initiatives



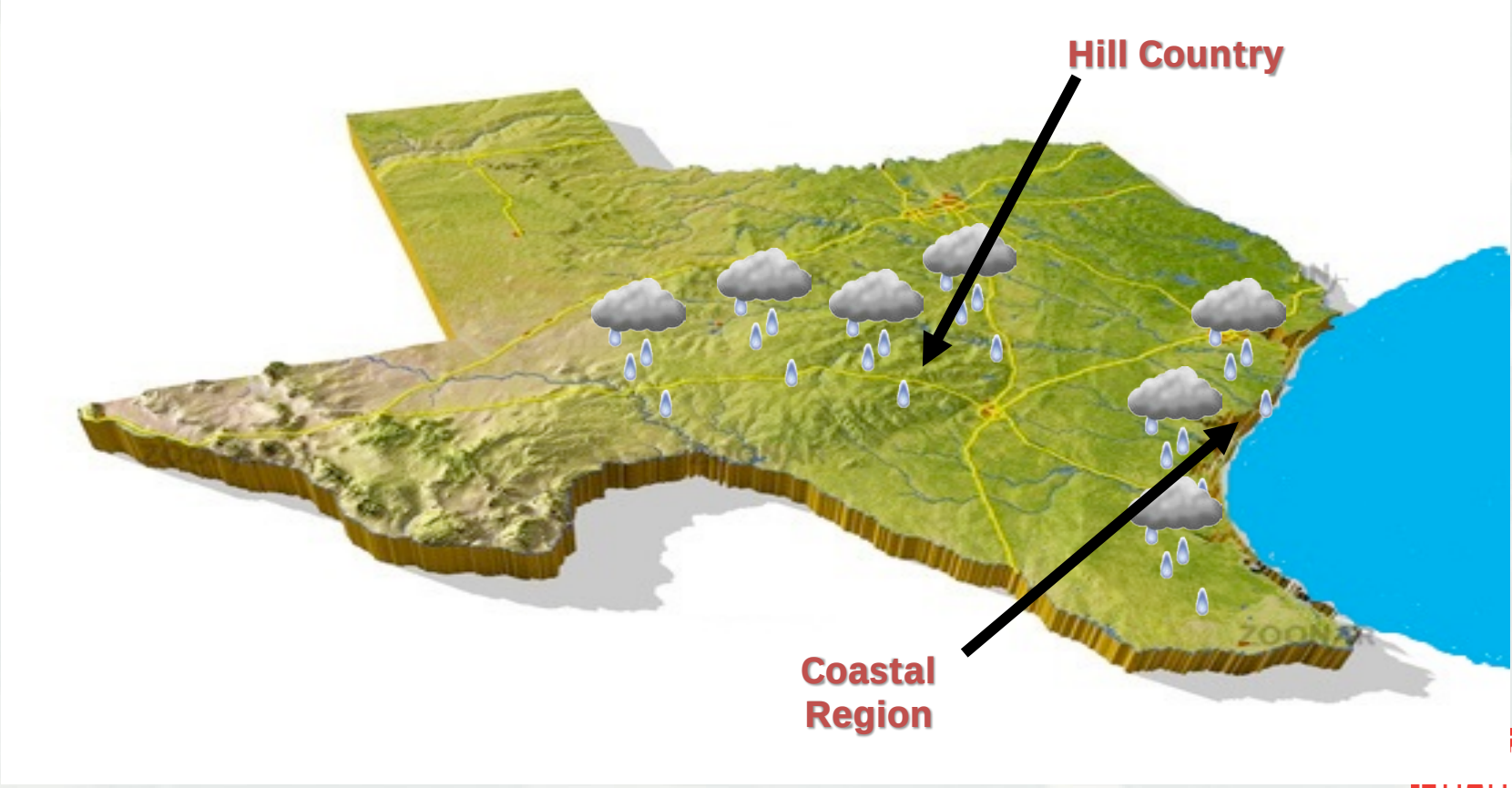
- NOAA Atlas 14
- Watershed Hydrology Assessments (WHA)
- Inundation Mapping

NOAA Atlas 14 for Texas

- What is it:
  - Precipitation frequency estimates
- What is it used for:
  - Better understanding of the risk from extreme precipitation events
  - Infrastructure design
  - Floodplain mapping (NFIP)
- Cost:
  - $1.5 M
- Follow-on studies
  - $3 M
  - Another method
  - Trends
  - Design storms

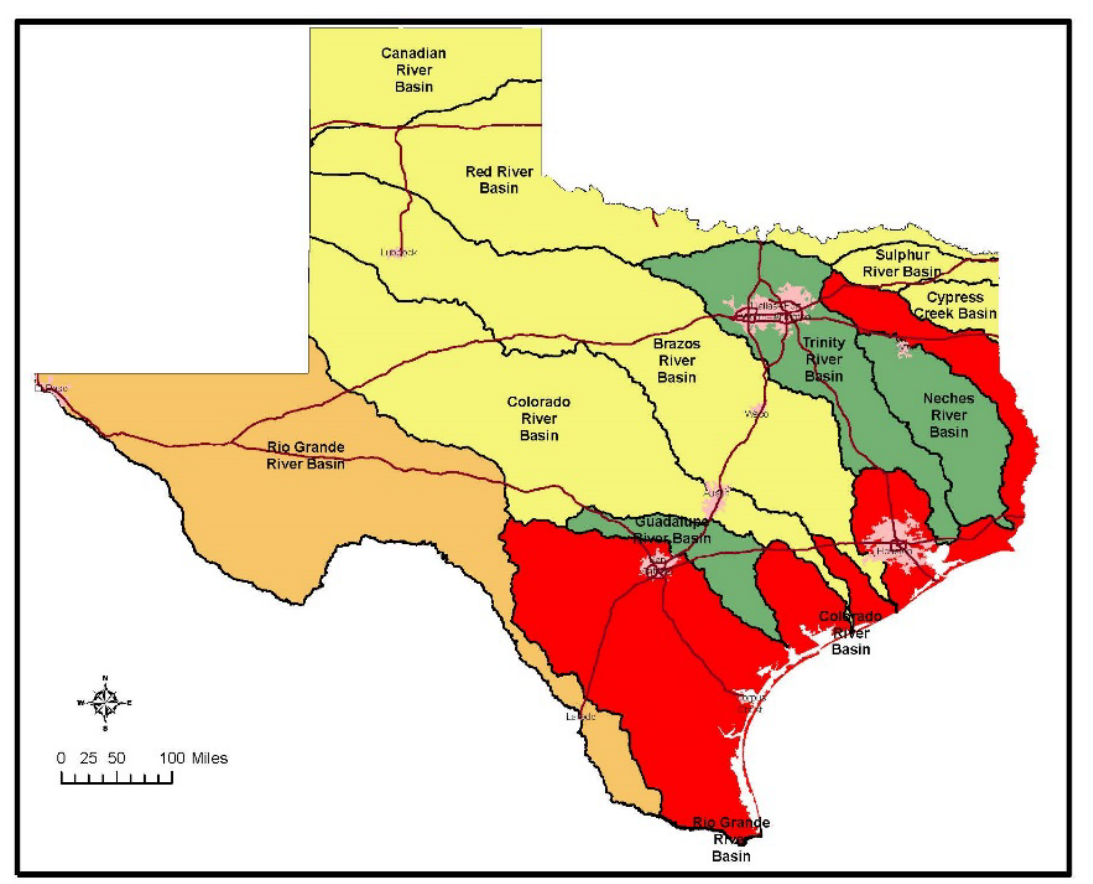


NOAA Atlas 14 Precipitation Changes



InFRM Watershed Hydrology Assessments

sponsored by FEMA Region 6



Basins Underway:

- Guadalupe
- Trinity
- Neches

Frequency Flows for Design & NFIP

- 2-yr, 5-yr, 10-yr, 25-yr, 50-yr, 100-yr, 250-yr, 500-yr

$2.4 Million Investment

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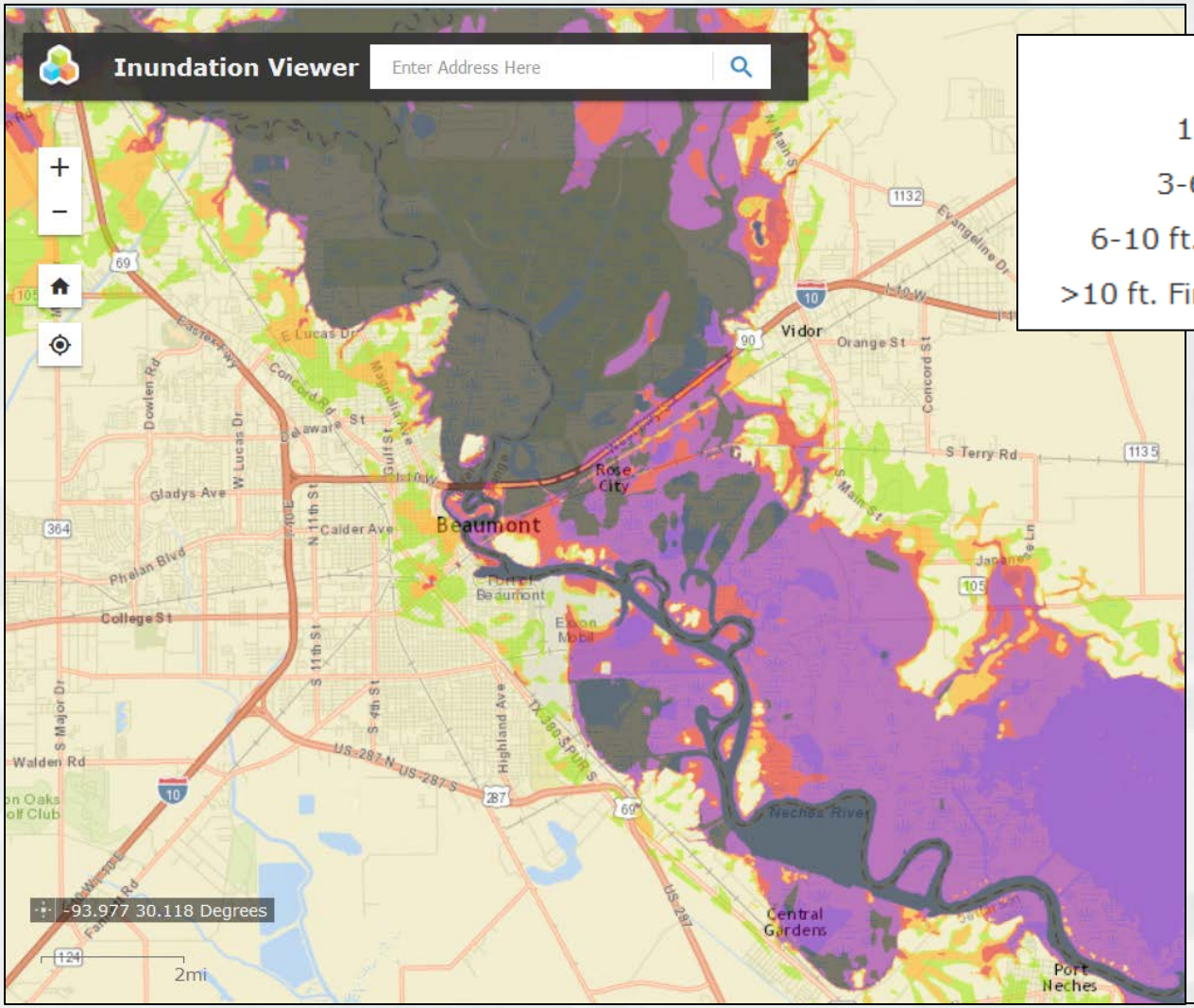
Inundation Mapping - Beaumont, TX



BUILDING STRONG®

What Can You Do?

- Better understand what is happening
- Higher standards - Freeboard
  - ►2', 3' or more above the 1% exceedance or 100-year level
  - ►At or above the .2% exceedance or 500-year level
- NCTCOG, TFMA and USACE
  - ►Promoting higher standards
  - ►Promoting consistent stormwater, ordinances, court orders and management across DFW, across state?
- Why
  - ►Decrease risk
  - ►Decrease future losses and costs
  - ►Lower insurance premiums

Questions?

US Army Corps of Engineers

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