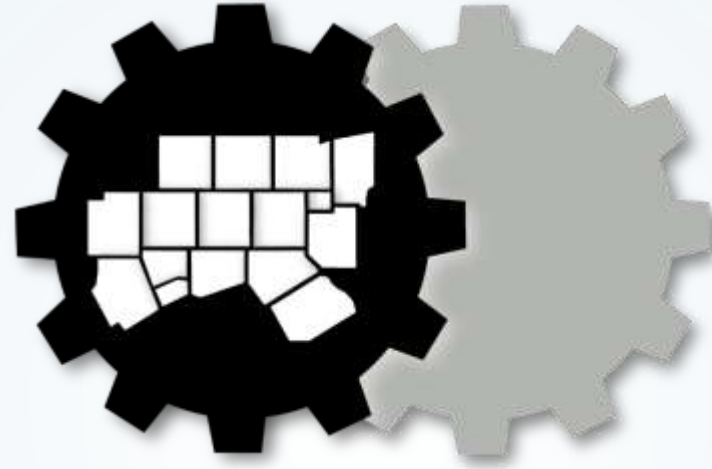


# Trinity Common Vision Steering Committee

September 12, 2019

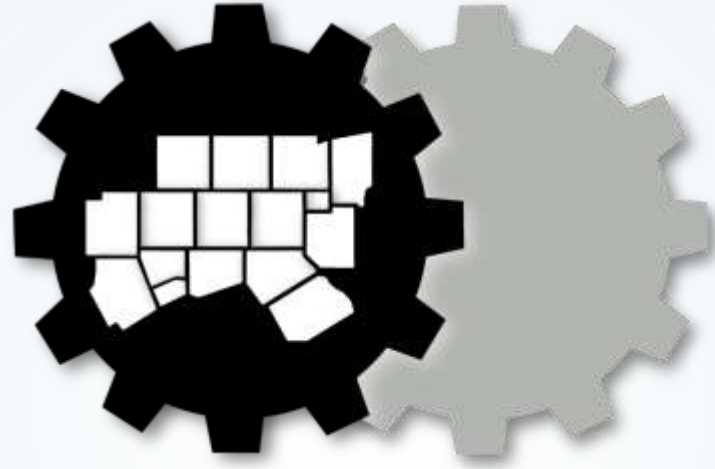




# WELCOME & INTRODUCTIONS

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# DISCUSSION ITEMS

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# Trinity Common Vision

Trinity River Corridor Interlocal Agreement - 1989

## NINE CITIES

Arlington	Farmers Branch
Carrollton	Fort Worth
Coppell	Grand Prairie
Dallas	Irving
	Lewisville



## THREE COUNTIES

Dallas County  
Denton County  
Tarrant County

## PROGRAMMATIC PARTNERS

NCTCOG Environment & Development  
U.S. Army Corps of Engineers  
Federal Emergency Management Agency  
Texas Water Development Board

## TWO SPECIAL DISTRICTS

Tarrant Regional Water District  
Trinity River Authority

# Trinity River Common Vision Program

## Timeline & Background

### 1990 Upper Trinity River Basin Reconnaissance Report

Interlocal Agreements signed by member cities & Congress authorizes the Upper Trinity River Feasibility Study (UTRFS). These studies by the Corps of Engineers simulated the cumulative impacts of flooding in the Dallas-Fort Worth area based on different levels of floodplain development.

### 1990 Flood Management Task Force

Flood Management Task Force formed and CDC criteria developed based on ROD

**\$11B**

### Record of Decision

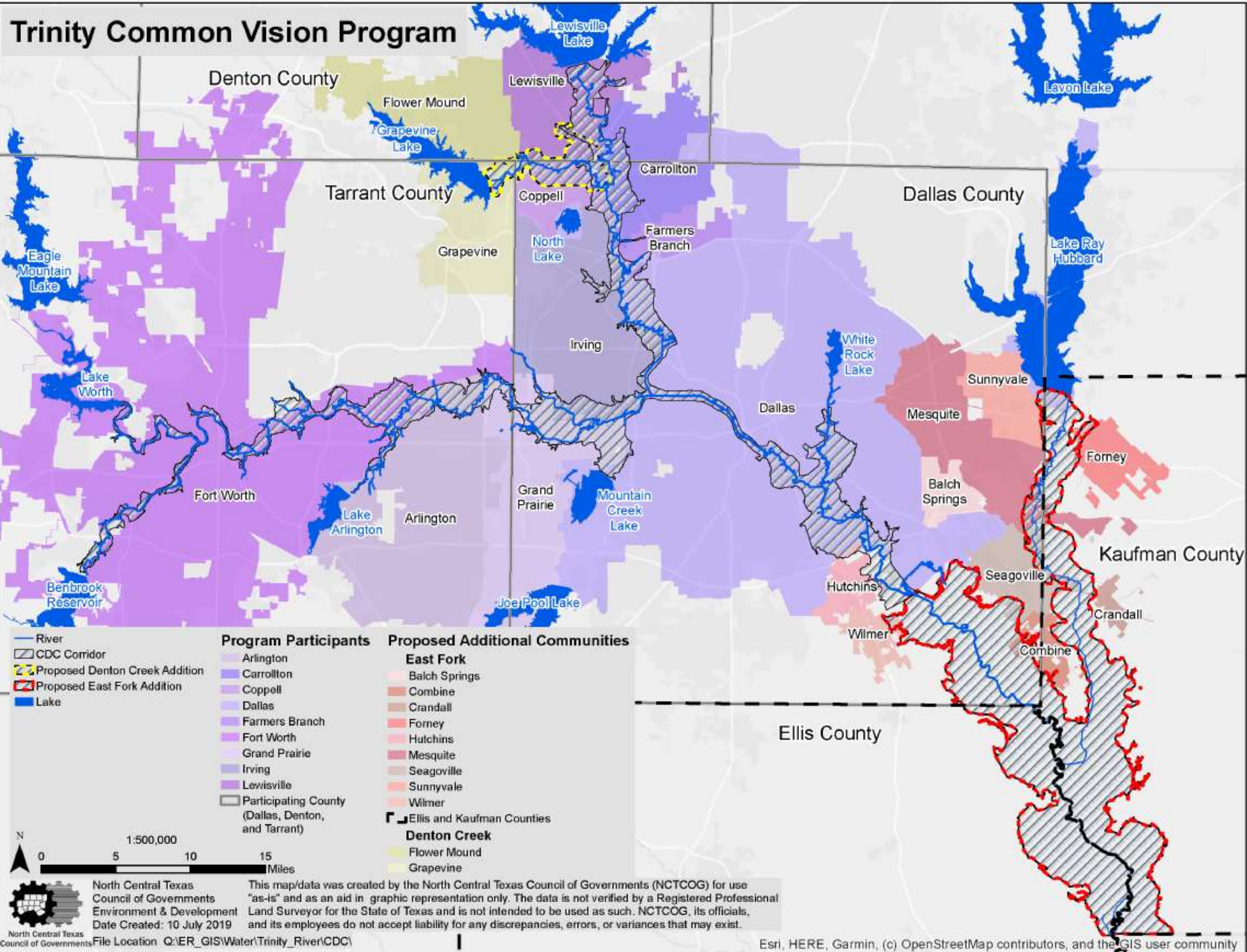
Results suggest that damages from a major flood could total more than \$11 billion if floodplain development is unregulated. A comprehensive floodplain management program could cut losses to \$4 billion.

### Corridor Development Certificate (CDC) Manual

1st Edition of the Corridor Development Certificate (CDC) Manual was produced in **1991**. We are currently on the 4<sup>th</sup> edition

Over 200 projects have been permitted along the Trinity River in the Dallas/Fort Worth Metroplex using the CDC process. Models are continuously being refined and updated to reflect new construction and redevelopment.





# CDC Program Goals

## Corridor Development Certificate Program



### Limits Impact

Limits (but does not eliminate) the impact of floodplain encroachments for regulated streams on downstream areas



### Review Process

Establishes a consistent regional criteria and review process



### Funding Stream

Provides a funding stream for updates and state-of-the-art models and modeling tools



# CDC Program Goals

## Corridor Development Certificate Program



### Provides Oversight

Provides oversight for projects constructed in the 100 year floodplain

### Allows Development

Allows development in the floodplain

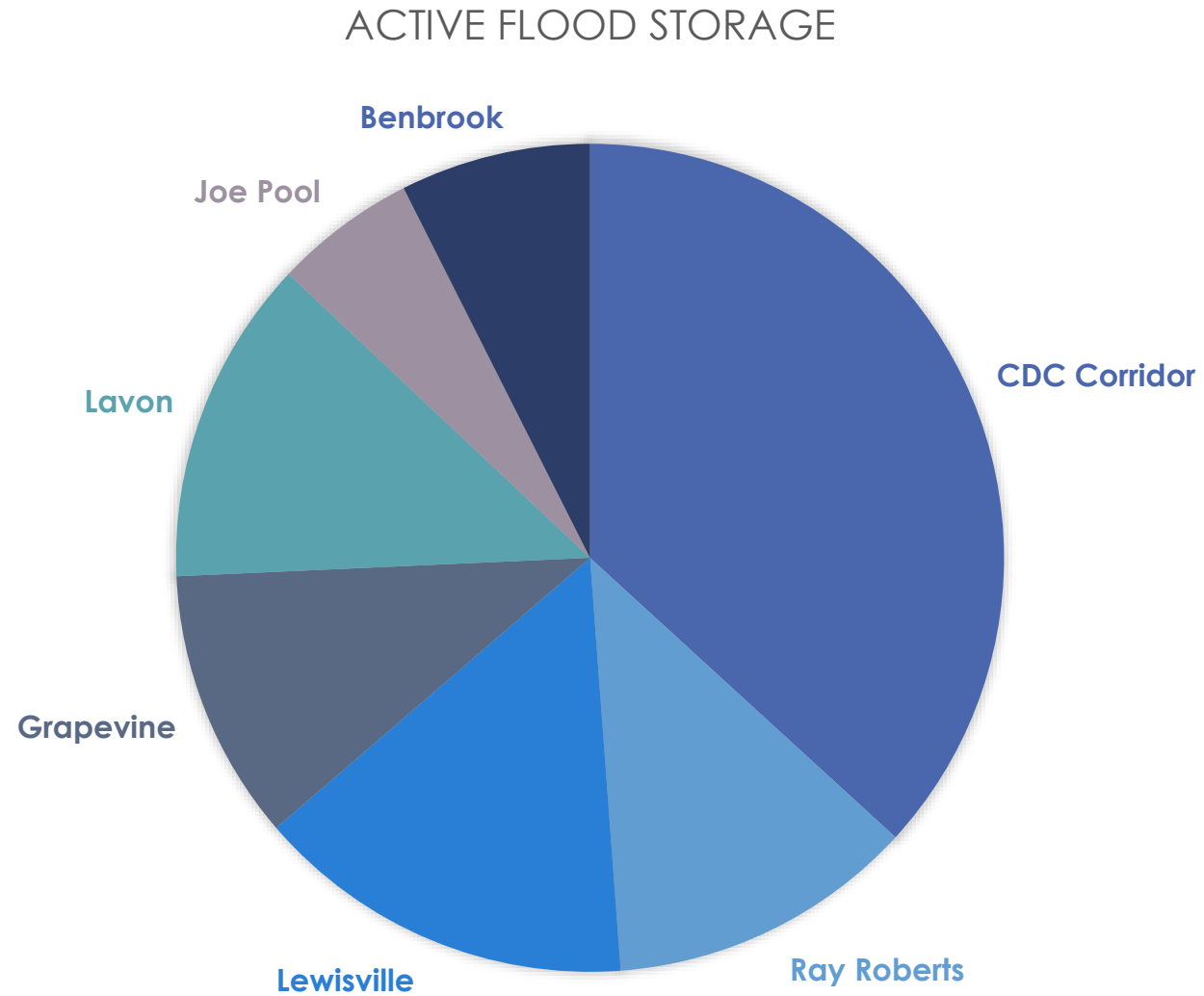
### Project Review

Allows all Flood Management Task Force (FMTF) members to review projects for the entire regulatory footprint





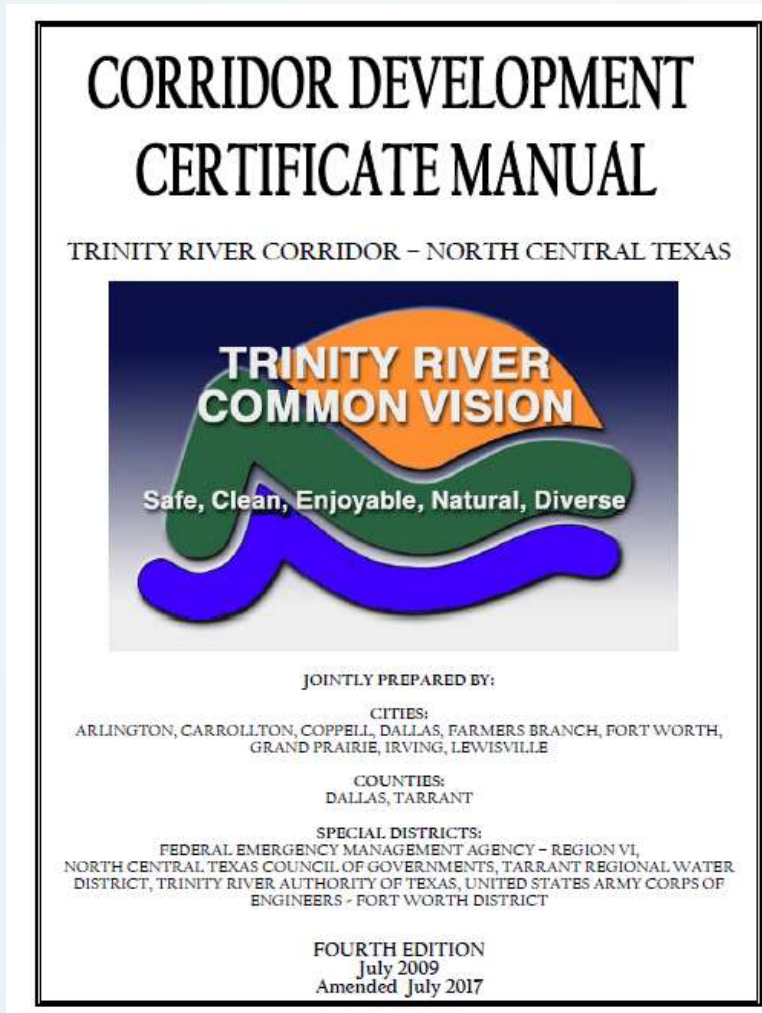
# Why is the Trinity River Corridor So Important to Flood Prevention?



# Common Vision Work Program and Activities Update

- CDC Permitting
- FEMA L-273 Four Day Course
- Elected Officials Seminar
- FY19 Work Program – Additional Technical Item Outcomes

# CDC Permits in Fiscal Year 2019



- 10 Applications Received This Fiscal Year
- 216 Total Applications Since CDC Inception

# L-273 FEMA NFIP Course and the Elected Officials Seminar

## Floodplain Management through the NFIP

23rd annual Class held November 2018 – Class was full with a wait list!

24th Annual Class to be held November 18-21. Registration opened last week.

## Annual Combined Elected Officials Seminar/CRS Users Group

Held July 18, 2019.

Guest speakers from Texas A&M Agrilife and TFMA



# FY 19 Work Additional Work Program Items: NFIP-CDC Model Consolidation Update

CDC/NFIP Model Consolidation Team Update –  
Stephanie Griffin, City of Grand Prairie and Team Chair

- Background
- Goals and Objectives
- Team Membership
- Scope of Work
- Deliverables

# Background

- ▶ Only applies to FEMA LOMCs within CDC corridor
- ▶ CDC model looks at current and future conditions
- ▶ NFIP looks at current conditions only
- ▶ FEMA, NCTCOG and USACE partnership to combine and geo-reference the CDC and NFIP HEC-RAS models
  - ▶ Dual purpose models to administer both programs
  - ▶ Maintain current models

# Team Members

- ▶ Stephanie Griffin, Team Chair - City of Grand Prairie
- ▶ Jim Keith - Freese and Nichols
- ▶ Amy Cannon - City of Arlington
- ▶ Kim Dewailly - City of Dallas
- ▶ Lisa Biggs - City of Fort Worth
- ▶ Craig Ottman - TRWD
- ▶ Mike Danella - USACE
- ▶ Landon Erickson - USACE
- ▶ Alan Johnson – FEMA
- ▶ Jacob LeSue - Dewberry
- ▶ Mia Brown - NCTCOG

# Advisory Group

- ▶ Edith Marvin, NCTCOG
- ▶ Ron Wanhanen, FEMA
- ▶ Jerry Cotter, USACE



# Team Goals and Objectives

- ▶ Establish policies and procedures to keep both models simplified and in sync with permit actions for each program
- ▶ Incorporate policies and procedures into the CDC Manual and the NFIP LOMC instructions
- ▶ Identify resources and funding needs

# Scope of Work

- ▶ Includes 20 tasks
  - ▶ 18 have been completed
  - ▶ 2 are in progress
- ▶ Team has met 12 times since *May 21, 2018*
- ▶ Current activities
  - ▶ Preparing memo summarizing activities accomplished and proposed updates to CDC-NFIP programs and permitting processes
  - ▶ Developing one page summary of updates/changes and new features

# Schedule

- ▶ Oct 2019: Meet with Advisory Group to review draft memo
- ▶ Nov 2019: Present memo to Floodplain Management Task Force for review and comment
- ▶ Jan 202: Seek approval of memo from Floodplain Management Task Force

# Deliverables

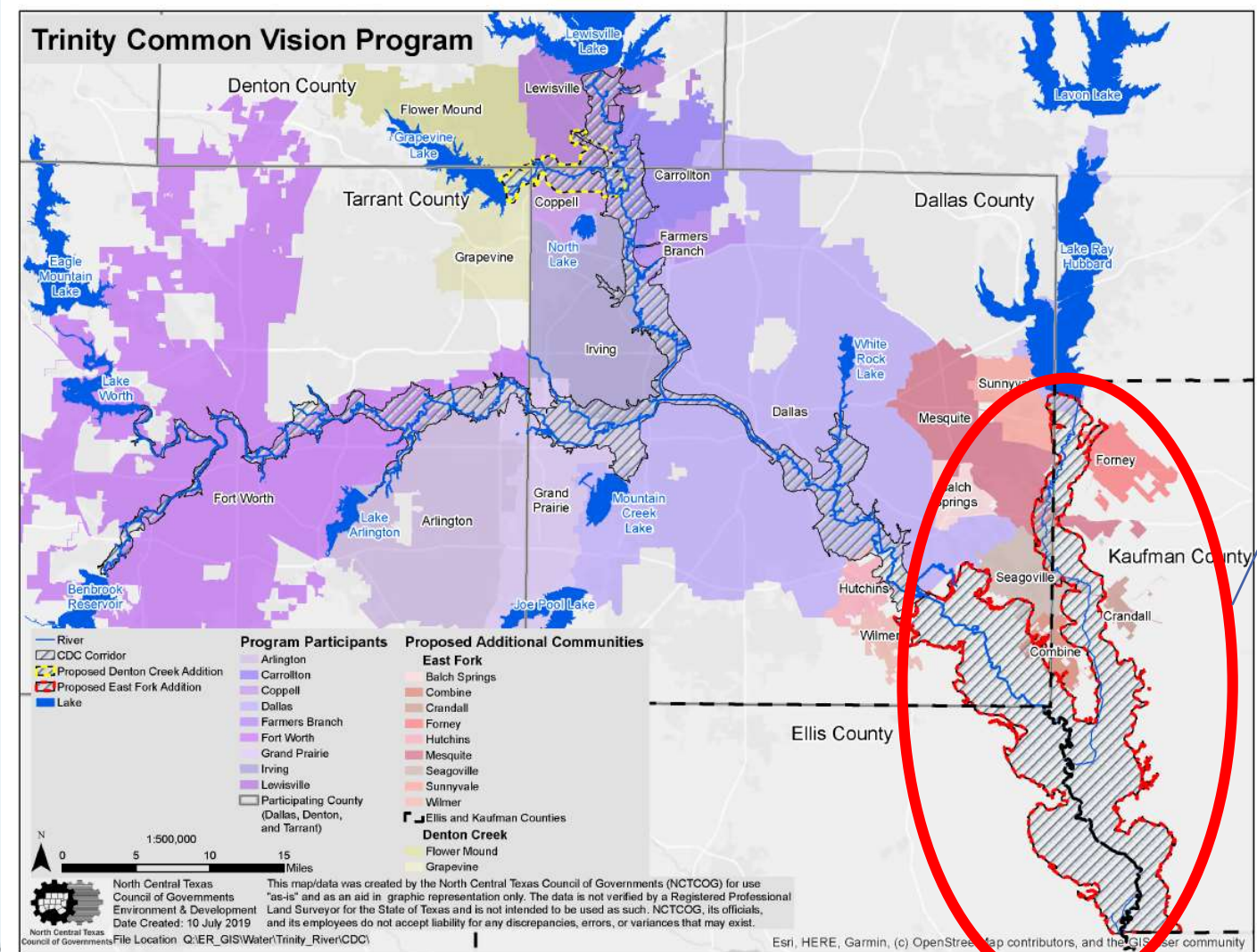
- ▶ Final recommendation memo
- ▶ Documentation to be incorporated into NFIP and CDC program documents



# NFIP-CDC Model Consolidation Update: Future Efforts

- ▶ With the Steering Committee's approval of the FY20 Work Program, NCTCOG staff will set up a website to provide access to the CDC model and eventually streamline CDC application submission, as guided by the Consolidation Team's process flow chart.
- ▶ The flow chart and updated submission process will necessitate an update to a 5<sup>th</sup> edition CDC Manual, anticipated to be made during FY21.
  - ▶ This will also coincide with the addition of the East Fork Trinity communities to the Common Vision Program.

# FY 19 Work Additional Work Program Items: East Fork Integration



- Mesquite
- Sunnyvale
- Crandall
- Combine
- Forney
- Hutchins
- Wilmer
- Seagoville (joined Aug. 2019)
- Balch Springs
- Kaufman County
- Ellis County

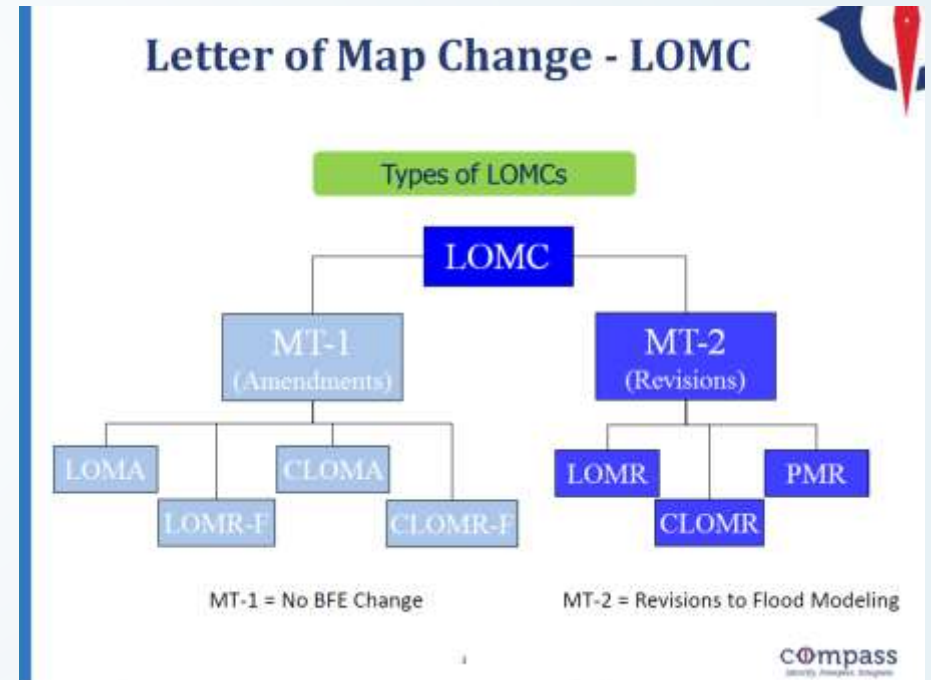
# FY 19 Work Additional Work Program Items: East Fork Integration

- **April 2016-January 2017:** Four interest meetings held.
- **September 14, 2017:** TCV Steering Committee votes to approve the continued pursuit of the East Fork Addition.
- **June 22, 2018:** Meeting in Kaufman County to review the program and collect comments on a draft resolution.
- **September 19, 2018:** CDC Manual/Application training held in Mesquite at the communities' request.
- **May 1, 2019:** Dallas County hosts a meeting in Wilmer for East Fork community staff.
- **August 7, 2019:** Balch Springs and Dallas County host a meeting for East Fork elected officials.

# FY 19 Work Additional Work Program Items

## LOMR Process Improvements

- ▶ FEMA Region 6 staff and contractors have visited with FMTF to address concerns regarding LOMR processing times and communication regarding current models.





# FY 19 Work Additional Work Program Items

## Regional Flood Warning Software



### OneRain Price List

System (Annual Fees)	Pricing
StormData Services	\$ 4,950.00
GARR (Gauge-Adjusted Radar Rainfall) Includes: <ul style="list-style-type: none"> <li>OneRain's real-time rainfall estimates;</li> <li>Calibrates Radar rainfall estimates to gauges</li> <li>Produces rainfall custom overlays within maps</li> <li>1km x 1km, 5-minute resolution</li> <li>5-minute update of estimates</li> </ul>	Included
Customer Contrail Administrative Support NCTCOG Managed Services/Support Model (Annual Cost)* Includes: <ul style="list-style-type: none"> <li>Website administrative support</li> <li>Managed Homepage and Dashboards</li> <li>Assistance with Member Entity</li> </ul>	Included
<b>Implementation/Technical/Learning Services (One-Time Fees)</b>	
Implementation Services – Client Setup and Configuration	\$ 1,500.00
Implementation Services - Hardware: OneRain Custom Serial to IP Connection Kit <ul style="list-style-type: none"> <li>Digi 4-PortServer custom configured</li> <li>Customized serial cable assembly</li> </ul>	\$ 1,500.00
Implementation Services - Custom Dashboards and Control Widget Configuration <ul style="list-style-type: none"> <li>Enable control for external devices such as warning lights, automated barricades, sirens, etc.</li> <li>Manual test dashboard</li> </ul>	\$ 1,000.00
Technical Services - Historical Data Load	OneRain to quote
Technical Services - Custom Data Feed	OneRain to quote
Technical Services - DataSight Data Analysis Software License <ul style="list-style-type: none"> <li>Supports offline data analysis</li> </ul>	OneRain to quote
Learning Services - Contrail ALERT2 TDMA Manager Training	OneRain to quote

- ▶ Communities can see each other's gauge readings and better prepare for storms
- ▶ The cooperative contract with OneRain for Contrail software launched on North Texas SHARE in August 2018.
  - ▶ Early adopters get a \$500 discount off the annual subscription fee.
  - ▶ McKinney and TRWD have subscribed, and Frisco is working with SHARE on subscribing.





The Regional Flood Warning Software Platform provides a comprehensive look at rainfall and water levels across the North Texas region through a connected network of flood gauges made possible through partnerships with local municipalities and agencies.



### Rainfall Map

View live data of rainfall across the region.

[View Maps](#)



### Current Stage Level Map

View live data of the current stage level of flood gauges across North Texas.

[View Map](#)



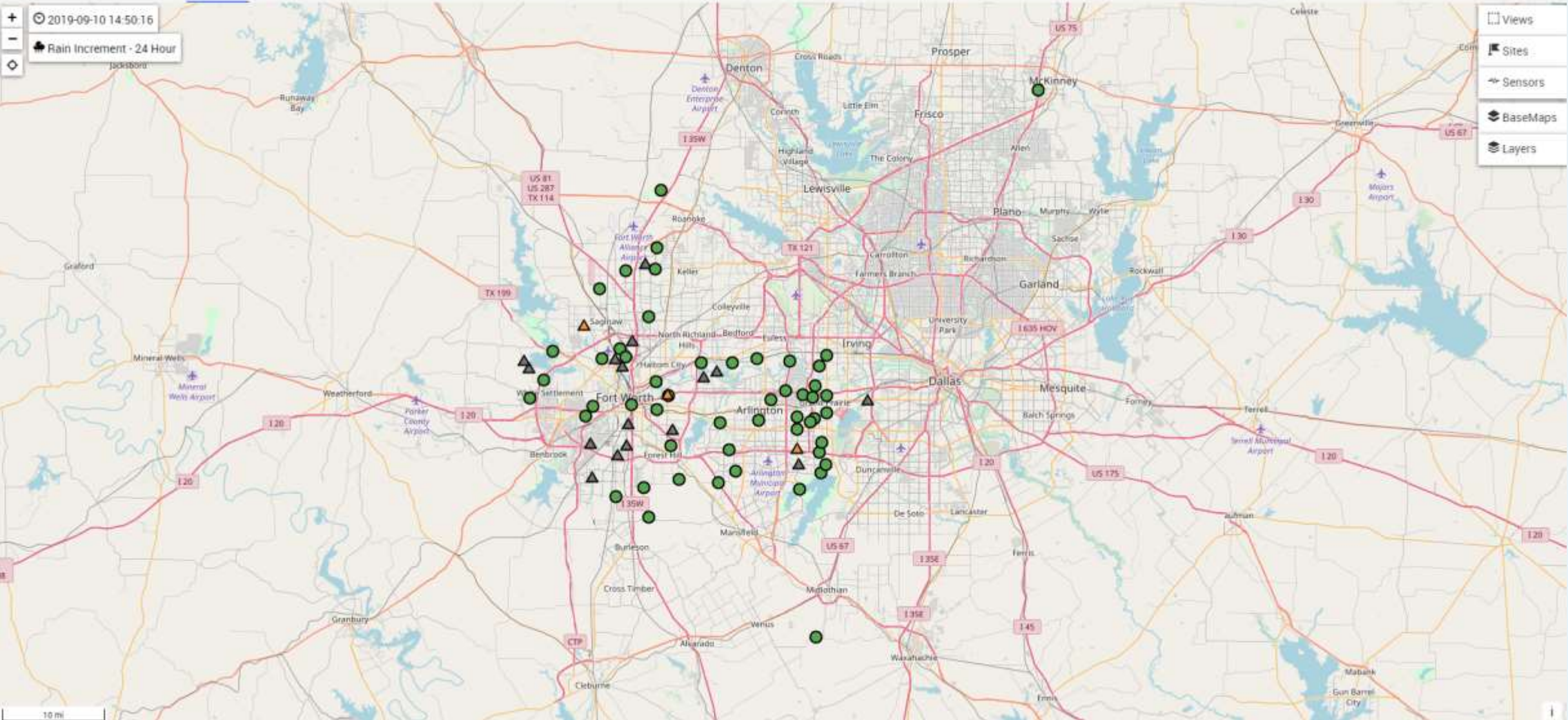
### How to Join

Communities of North Texas can join the program for a cost savings on flood warning hardware and software. Communities can view and integrate all other communities' data for a comprehensive look at the region as a storm moves across.

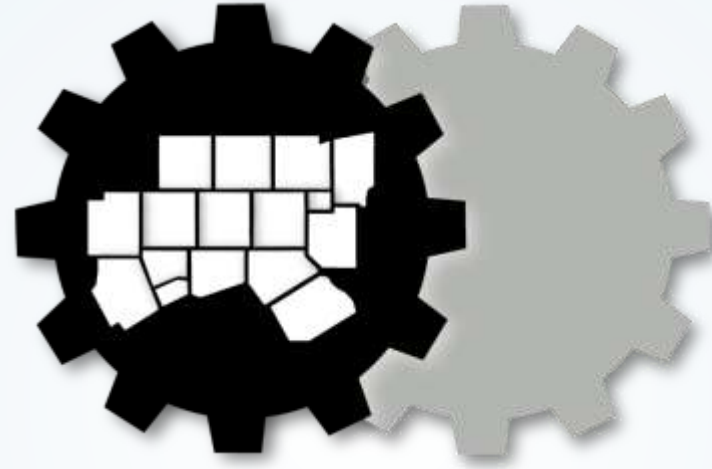
[Visit North Texas Share](#)

**Disclaimer:** FloodDataNTX is an interactive mapping application developed by the North Central Texas Council of Governments through a cooperative contract with OneRain, Inc. The data and information presented may not be presented in real-time and should not be assumed to be exact conditions in the indicated area on the map. Neither FloodDataNTX nor the sponsoring agencies including the North Central Texas Council of Governments and member municipalities participating in this program assume any legal liability or responsibility, or make any guarantees or warranties as to the accuracy, completeness, or suitability of the information for any specific purpose. The public is urged to closely monitor information provided by local emergency management organizations during emergency situations.

2019-09-10 14:50:16  
Rain Increment - 24 Hour








# Action Items

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# 2018 Trinity Common Vision Steering Committee Meeting Summary

- ▶ NCTCOG staff are seeking approval of the 2018 Trinity Common Vision Steering Committee Meeting Summary.



North Central Texas Council of Governments

## SUMMARY

Trinity River COMMON VISION Steering Committee  
Thursday, September 13, 2018  
9:30 AM, Pitstick Executive Board Room  
NCTCOG Offices, CPII  
616 Six Flags Drive, Arlington, TX 76011

1. **Welcome and introductions (Mia Brown)**  
The meeting began with introductions of all present.

**DISCUSSION ITEMS**

2. **Presentation on COMMON VISION**
  - a. **Overview of COMMON VISION and the Corridor Development Certificate (CDC) Program (Mia Brown)**  
Mia Brown presented an overview of the Trinity COMMON VISION program history and the goals of the program.
3. **COMMON VISION Work Program Overview and Activities Update.** NCTCOG staff will provide an overview and update of the listed activities of the Trinity River COMMON VISION Program:
  - a. **CDC Permitting Update (Mia Brown)**  
Mia Brown told the committee that 11 CDC applications were received during the fiscal year. This brings the total applications since the beginning of the program to 206.
  - b. **NCTCOG hosting of the 23<sup>rd</sup> annual FEMA 4-day National Flood Insurance Program (NFIP) course (Mia Brown)**  
Mia Brown let the Committee know that this year NCTCOG would host the FEMA 4-day National Flood Insurance Program (NFIP) course for the 23<sup>rd</sup> year in a row, and that registration for COMMON VISION communities opened last week.
  - c. **Elected Officials Seminar and Community Rating System (CRS) Meeting (Mia Brown)**  
Mia Brown gave the Committee a recap of the Combined Elected Officials Floodplain Seminar/CRS Users Group that was held July 18, 2018. The topics were new NCTCOG regional floodplain efforts, a NOAA Atlas 14 update from the USACE, and a presentation from FEMA's Resilience Action Partners on flood economics and their IMMERSSED virtual reality tool.

616 Six Flags Drive, Centerpoint Two  
P.O. Box 5888, Arlington, Texas 76005-5888  
(817) 640-3309 FAX: 817-608-2372  
[www.nctcog.org](http://www.nctcog.org)

# FY 2020 Trinity Common Vision Work Program

- ▶ **NCTCOG staff are seeking approval of the FY 2020 Trinity Common Vision Work Program.**
- ▶ Additional Technical Activities for 2020 (page 2):
  - ▶ Continued Participation in the Model Consolidation Committee
  - ▶ Website for CDC application process.
  - ▶ Continued support of the East Fork Integration, as well as Denton Creek and a long-term vision of expansion.
- ▶ No change to the cost shares.

Fiscal Year 2020  
NCTCOG REGIONAL WORK PROGRAM  
The Trinity River COMMON VISION Program

**INTRODUCTION:** The Trinity River COMMON VISION Program continues to focus on the goals outlined in the Regional Policy Position on Trinity River Corridor – 1989 and the commitment expressed in Interlocal Agreements among the participating communities. Toward the continued goal of maintaining this important cooperative program among the COMMON VISION communities, NCTCOG is proposing a work program of the following ongoing support and technical components.

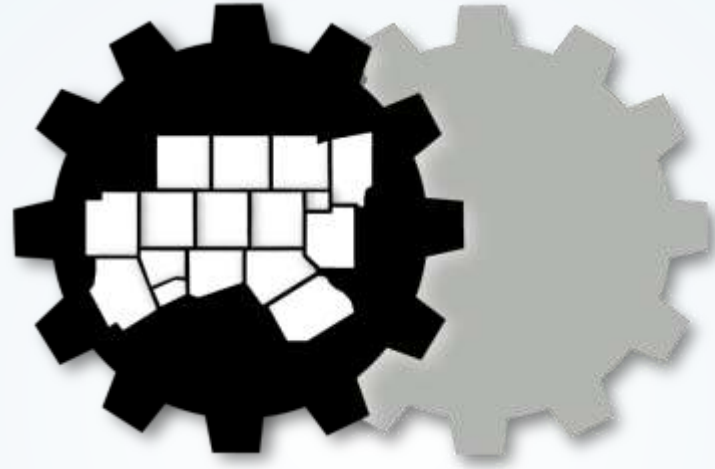
We propose to maintain the program at a \$100,000 level of support, continuing the cost breakout among the participants as per the previous traditional method based on SPF 1995 Baseline.

**SUMMARY OF FY 2020 PROGRAM ELEMENTS**

Ongoing support activities:

- **Ongoing Trinity River COMMON VISION Information and Task Force Committee Support:** Continued service and support of the Trinity River Program committees (Common Vision Steering Committee and Flood Management Task Force), as well as distribution of important general Corridor information to the public and to regional delegates at the State and Federal levels.
- **Ongoing Corridor Development Certificate (CDC) Process and mapping support:** Administrative support of the CDC process, technical/procedural assistance to local government participants, coordination with US Army Corps of Engineers (USACE) staff and addressing inquiries from interested individuals.
- **Continued sponsorship of FEMA's NFIP training courses:** Continuation of the long-running partnership with the Federal Emergency Management Agency (FEMA) Region 6 and the Texas Water Development Board for important training opportunities to be offered in the region for the benefit of the FMTF and other floodplain management officials. The very popular "Managing Floodplain Development through the National Flood Insurance Program (NFIP)" course will be offered, marking the 23<sup>rd</sup> year that this four-day class will be offered at NCTCOG. NCTCOG staff will work with FEMA to offer additional courses. NCTCOG will also continue partnering with Texas Floodplain Management Association (TFMA) to host CFM Exams throughout the year.
- **Ongoing effort to explore partnership and outreach opportunities:** Continued efforts to partner with agencies including the US Army Corps of Engineers Fort Worth District (USACE-FWD), FEMA, TWDB, TCEQ, USGS, NRCS, and TFMA for traditional projects or educational opportunities.
- **Continued exploration of regional cooperative detention/retention strategies:** Discussion and investigation of potential strategies will continue on key critical watersheds and segments throughout the Trinity Basin. Continue to research and collect information on existing management approaches in those areas.
- **Administrative Coordination for the OneRain – Regional Flood Warning Software Program Contract:** NCTCOG staff will distribute information and market the North Texas SHARE regional master contract for common early flood warning detection software.





# Presentation Items

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# Related Activities Update



# Trinity River National Recreation Trail



- ▶ Trinity Nature Conservancy has worked with NPS on designation for the Trinity River.
- ▶ Designation is anticipated in June 2020.
- ▶ This effort was awarded the Conservation Wrangler designation by Texan By Nature.
- ▶ TNC is working with communities on signage and possible additional launches.
- ▶ Thank you to the Trinity River communities for your efforts and support!

# Cooperating Technical Partners Grant - FEMA

2004

- Joined CTP
- Created Master Plan

2009

- NCTCOG Participates in Map Mod

2012

- West Fork Trinity and Elm Fork Trinity Discovery

2013

- Village Creek Flood Risk Project

2014

- Bear Creek Flood Risk Project

2015

- Cedar and Denton Watershed Discovery
- Lynchburg and Irving Creek Flood Risk Studies

2016

- East Fork Trinity Discovery
- Silver Creek and McAnear Creek Flood Risk Studies

2017

- Richland-Chambers Watershed Discovery
- Town Creek and Clear Fork Tributary Flood Risk Studies

2018

- Marys Creek Flood Risk Study

2019

- Waxahachie Creek and Harriet Creek Flood Risk Studies pending award



# Integrated Stormwater Management - iSWM



## Why iSWM?

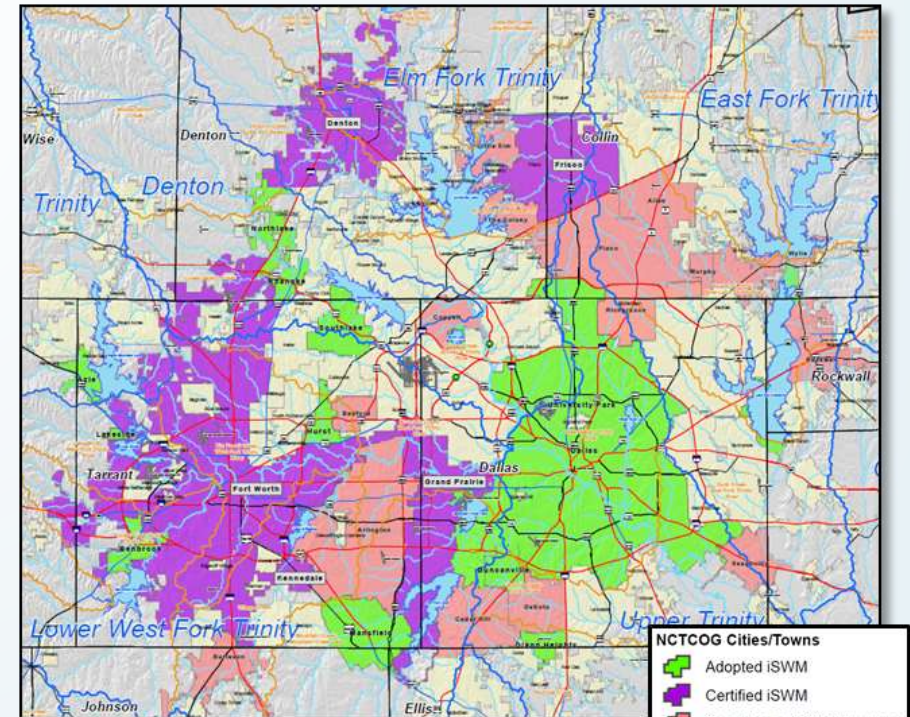
- Flooding and streambank erosion due to increased runoff
- Water quality concerns / stormwater regulations
- Loss of natural features
- Interest in green infrastructure
- Comprehensive approach needed
- Regional consistency and equity

## Certified Communities:

- Denton (Silver)
- Grand Prairie (Silver)
- Kennedale (Silver)
- Frisco (Silver)
- Fort Worth (Silver)
- Irving (Silver)

## iSWM Resources

- Technical Manual
- Criteria Manual





# NOAA Atlas 14

## ➤ What is it?

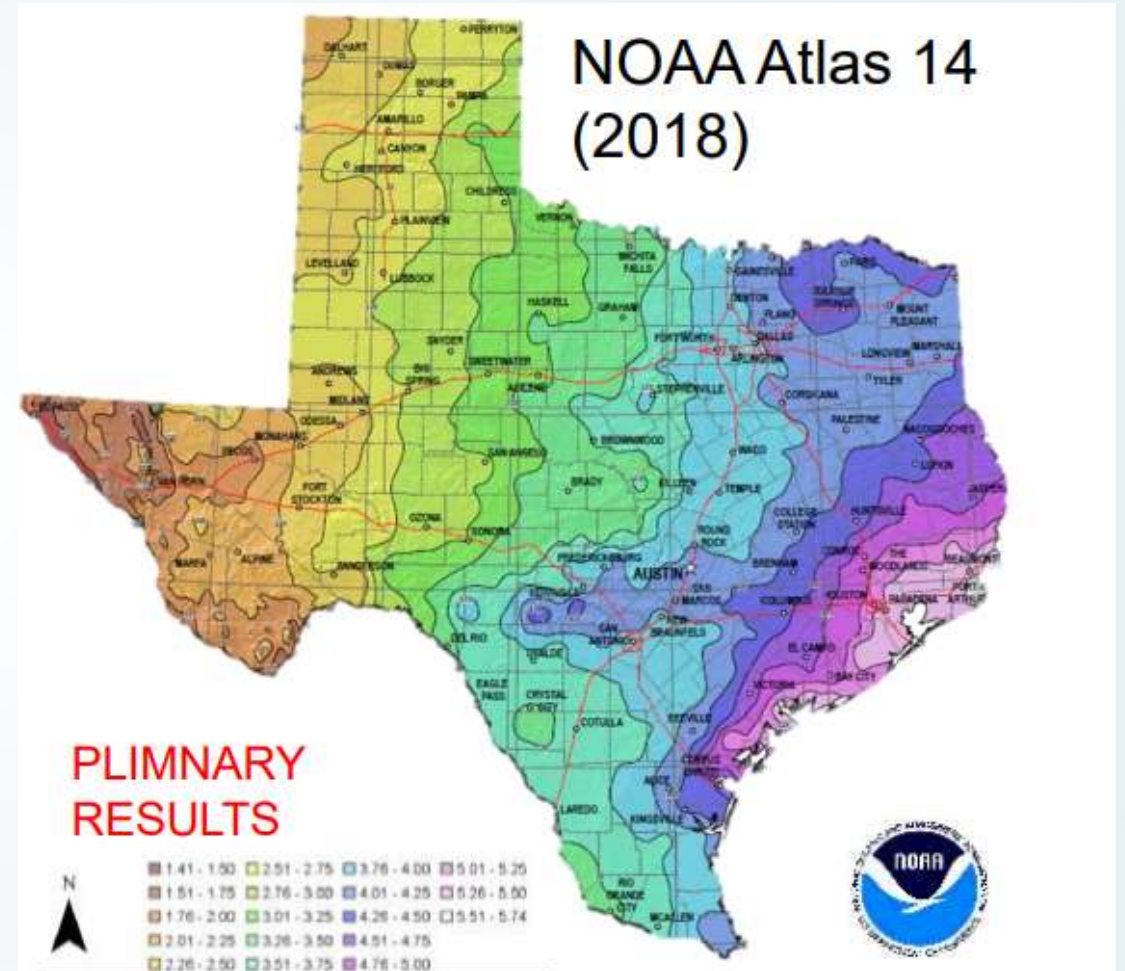
- A non-regulatory product that informs us of how much rain to expect in a 100-yr storm event.
- Released September 2018 after extensive peer review

## ➤ Benefits

- Better understanding of risk from extreme precipitation events
- Infrastructure design, bridges, culverts, wastewater, and water supply
- Use in updated NFIP floodplain mapping, TxDOT design manuals, and community design manuals.
- Preparedness and mitigation planning

## ➤ Access

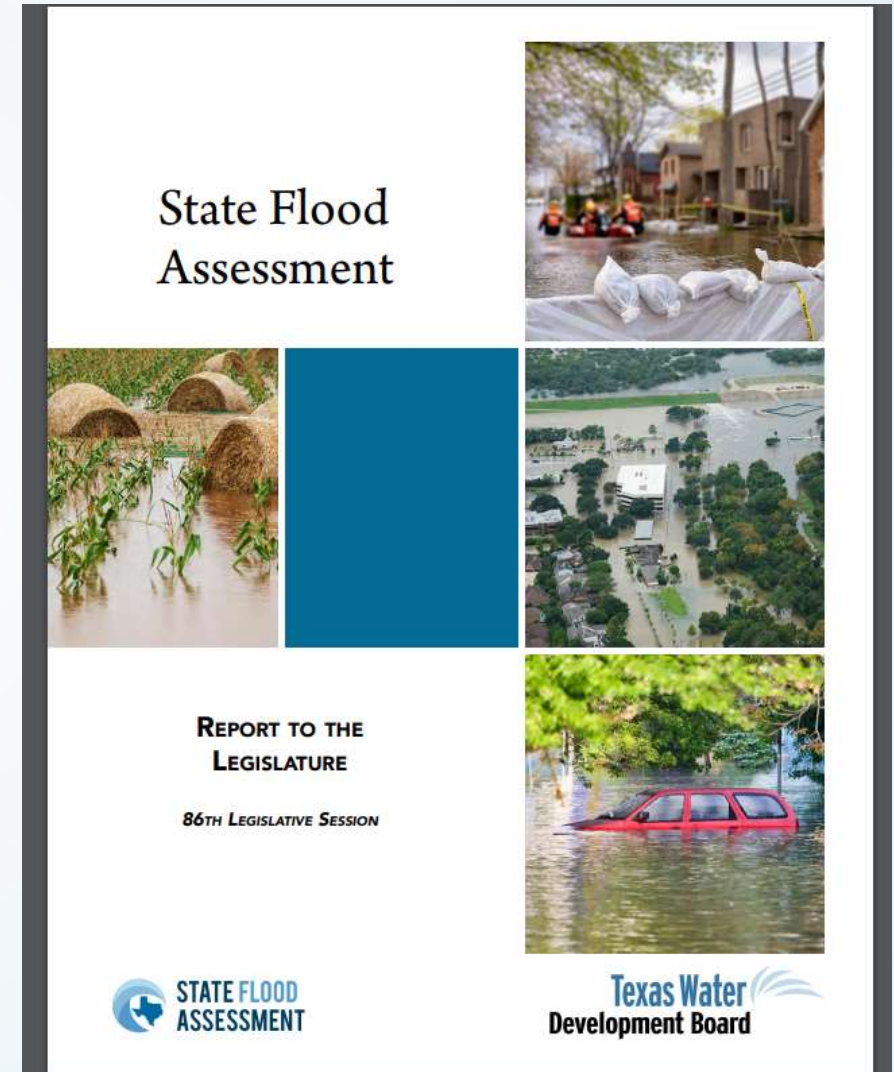
- <http://hdsc.nws.noaa.gov/hdsc/pfds/> or [www.InFRM.US](http://www.InFRM.US)



# TWDB State Flood Assessment

- ▶ The TWDB released the State Flood Assessment to the 86<sup>th</sup> Texas Legislature in December 2018, identifying \$36 billion in statewide flood funding needs.

[http://www.twdb.texas.gov/publications/reports/special\\_legislative\\_reports/doc/State-Flood-Assessment-report-86th-Legislation.pdf?d=15025.900000007823](http://www.twdb.texas.gov/publications/reports/special_legislative_reports/doc/State-Flood-Assessment-report-86th-Legislation.pdf?d=15025.900000007823)



# Senate Bills 7 & 8 – State Flood Plan and Texas Infrastructure Resiliency Fund

- ▶ SB 8 was signed into law, providing guidance for creating a State Flood Plan
  - ▶ 9/1/21: TWDB shall adopt guidance principals for regional flood plans and designate flood planning regions corresponding to each river basin
    - ▶ TWDB has gathered public comment on the designation and structure of regions, how money should be distributed, and many other issues. These considerations can be viewed in this document:  
[http://www.twdb.texas.gov/flood/doc/Flood\\_Implementation\\_Issues\\_for\\_Stakeholder\\_Consideration.pdf?d=14270.185000030324](http://www.twdb.texas.gov/flood/doc/Flood_Implementation_Issues_for_Stakeholder_Consideration.pdf?d=14270.185000030324)
  - ▶ 1/10/23: Each flood planning group shall submit a regional flood plan to TWDB
  - ▶ 9/1/24: A state flood plan must be prepared and adopted by TWDB
    - ▶ An updated flood plan will be prepared and adopted every 5 years

# Senate Bills 7 & 8 – State Flood Plan and Texas Infrastructure Resiliency Fund

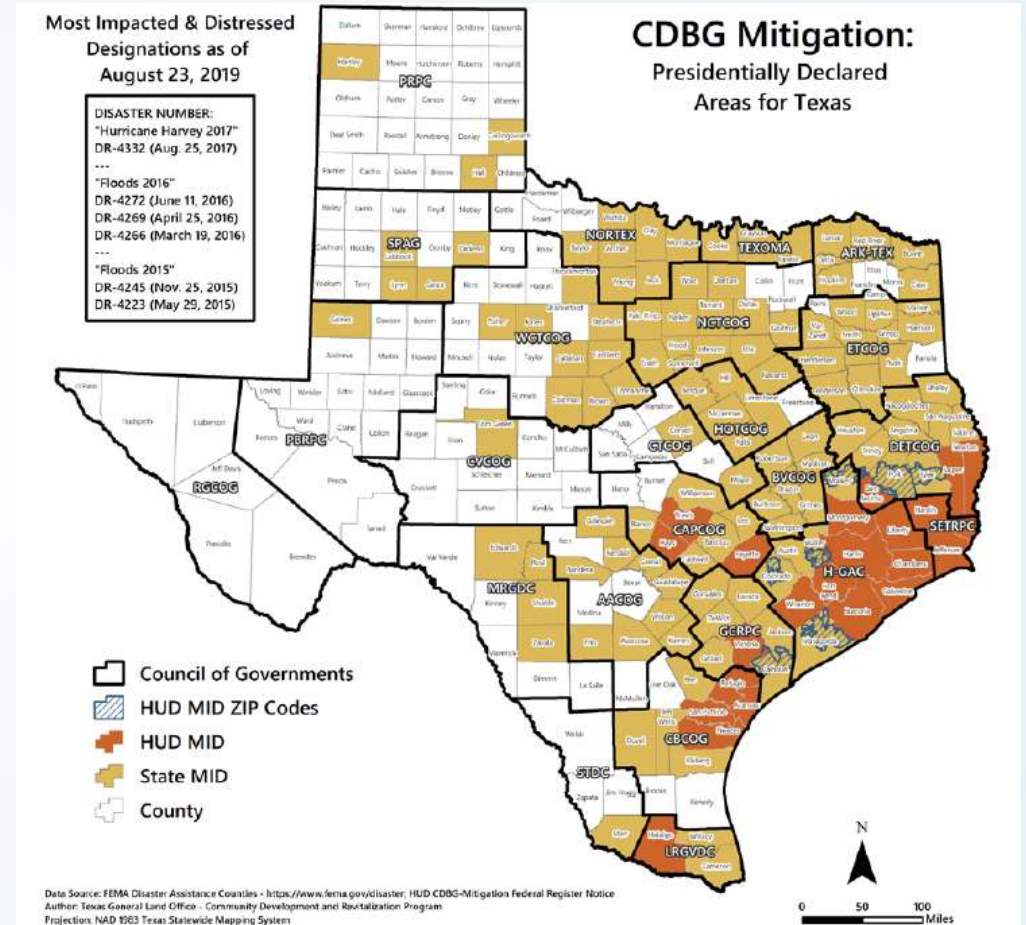
- ▶ Senate Bill 7 was signed into law, creating the **Texas Infrastructure Resiliency Fund** and its accounts. The funding of the accounts are dependent upon the proposed constitutional amendment, HJR 4, passing in November.
  - ▶ Four accounts in the fund
    - ▶ Floodplain Management Account
    - ▶ Hurricane Harvey Account
    - ▶ Federal Matching Account
    - ▶ Flood Plan Implementation Account (added after the state flood plan is completed; only for projects in plan)
  - ▶ TWDB is still deciding how much of the funds will be available as loans or grants

\*Now is the time for communities to create a list of shovel-ready projects.



# CDBG-MIT Funding

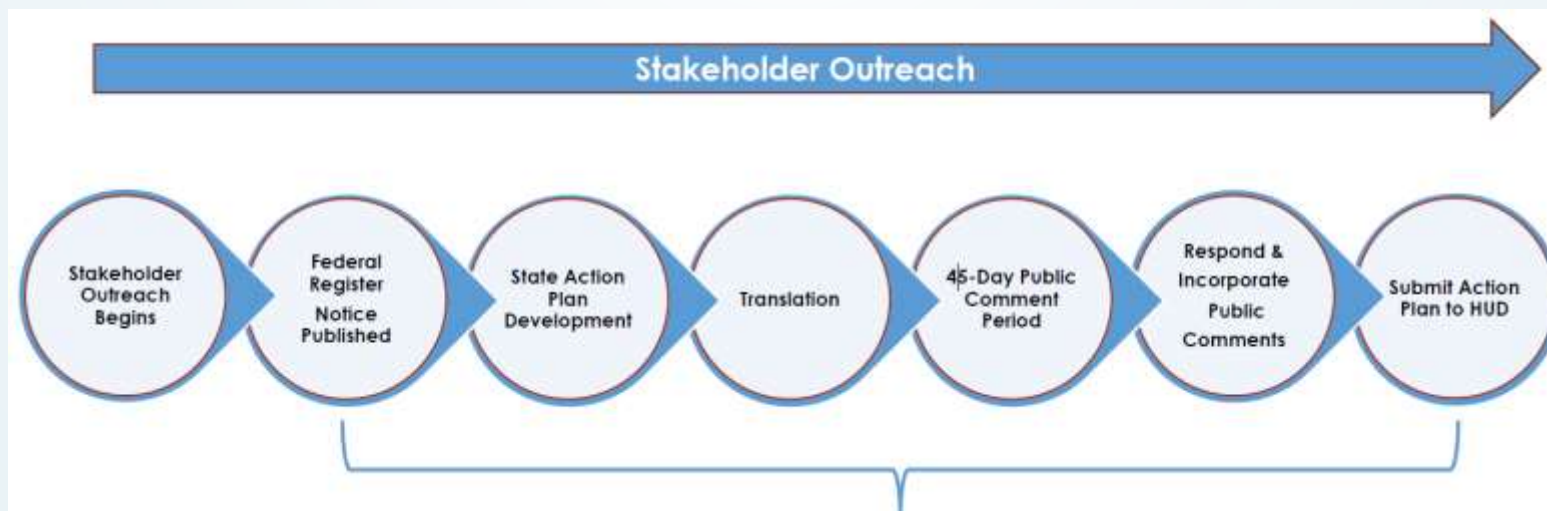
- \$4.3 billion has been set aside for Texas from CDBG-DR funds for mitigation.
  - All NCTCOG counties except Collin, Hunt, and Rockwall are eligible.
    - While at least 50% of funds must be spent in HUD Most Impacted & Distressed Areas (MID), the 13 eligible NCTCOG counties are State MID and can still compete for funds.
  - 50% of all CDBG-MIT funds must benefit low-to-moderate income (LMI) persons.





# CDBG-MIT Funding

- ▶ TDEM is charged with creating a state action plan for these funds, to be completed by February 3, 2020
  - ▶ There will be a 45-day public comment period prior to submission of the plan
  - ▶ There will be 4 public hearings for feedback- 2 before and 2 after the public comment period
- ▶ No requirement for a tie-back to the qualified disaster.
- ▶ There will be a big focus on regionalism.
- ▶ The application period is anticipated to open in May 2020.
- ▶ The GLO/TDEM webinar recording about these funds can be viewed here: <https://www.youtube.com/watch?v=HHrvPgvXWkU&feature=youtu.be>



# 16-County Watershed Management Effort

- Menu of Regionally Recommended Standards in Watershed Management for New Development Within County Regulated Areas.
- Developed by our counties at a March 2017 Roundtable.
- Presented to the 16-County Watershed Management Forum on July 12, 2017.
- NCTCOG Executive Board endorsed this effort in October 2017.
- Dallas, Denton, and Kaufman Counties have fully or partially adopted these standards.



## Menu of Regionally Recommended Standards in Watershed Management For New Development Within County Regulated Areas

1. Design infrastructure to fully developed conditions with approved land-use maps if data is available
2. Begin protection at the most upstream end of the watershed above Federal Emergency Management Agency Limit of Detail Study
3. Maintain unfilled valley storage areas
4. Protect against and reduce erosive velocities
5. Match pre-developed site runoffs
6. Verify/require adequate downstream conveyance
7. Require freeboard from fully developed (if data is available) and changing watershed conditions
8. Define written operation and maintenance responsibilities
9. Size conveyance of street and storm systems adequately to safely convey traffic
10. Create stream buffers and preserve open space; limit clearing and grading
11. Consider regional (on or off stream) detention incentives
12. Implement Conservation and/or Cluster Development incentives
13. Encouraging low impact development techniques and/or green infrastructure

These Regionally Recommended Standards in Watershed Management were developed by the North Central Texas Countywide Watershed Management Roundtable held on March 14, 2017

# Transportation Stormwater Initiative

Jerry Cotter - USACE





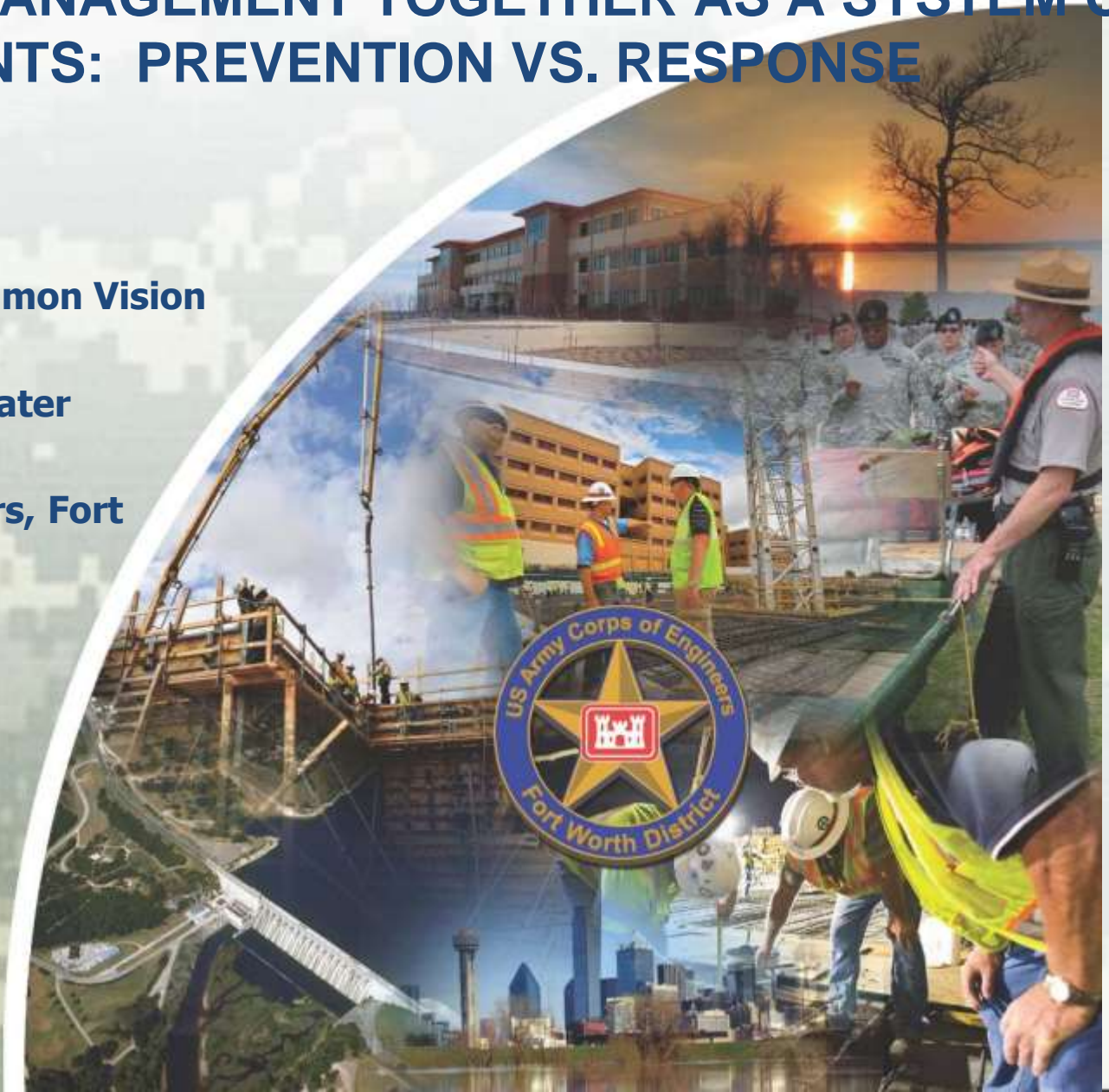
# TSI Project: INTEGRATED PLANNING OF REGIONAL TRANSPORTATION AND STORMWATER MANAGEMENT TOGETHER AS A SYSTEM OF IMPROVEMENTS: PREVENTION VS. RESPONSE

**Date: 12 September 2019**

**Audience: Trinity River Common Vision Steering Committee**

**Jerry L. Cotter P.E., Chief Water Resources**

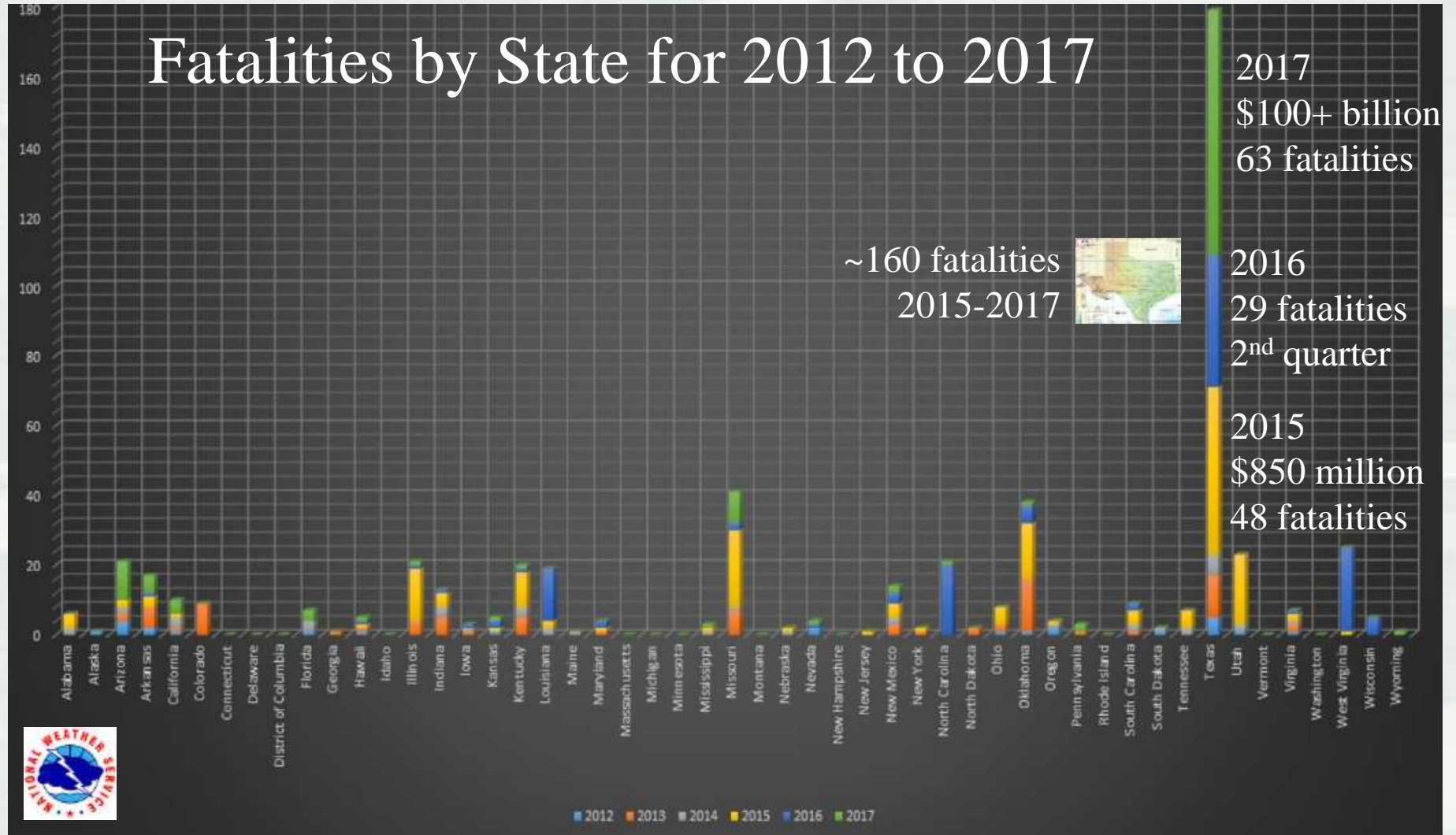
**U.S. Army Corps of Engineers, Fort Worth District**





# Flooding: #1 Cause of Natural Disasters

Texas Far  
Outpaces ALL of  
the States In Flood  
Related Fatalities  
& Flood Related  
Damages



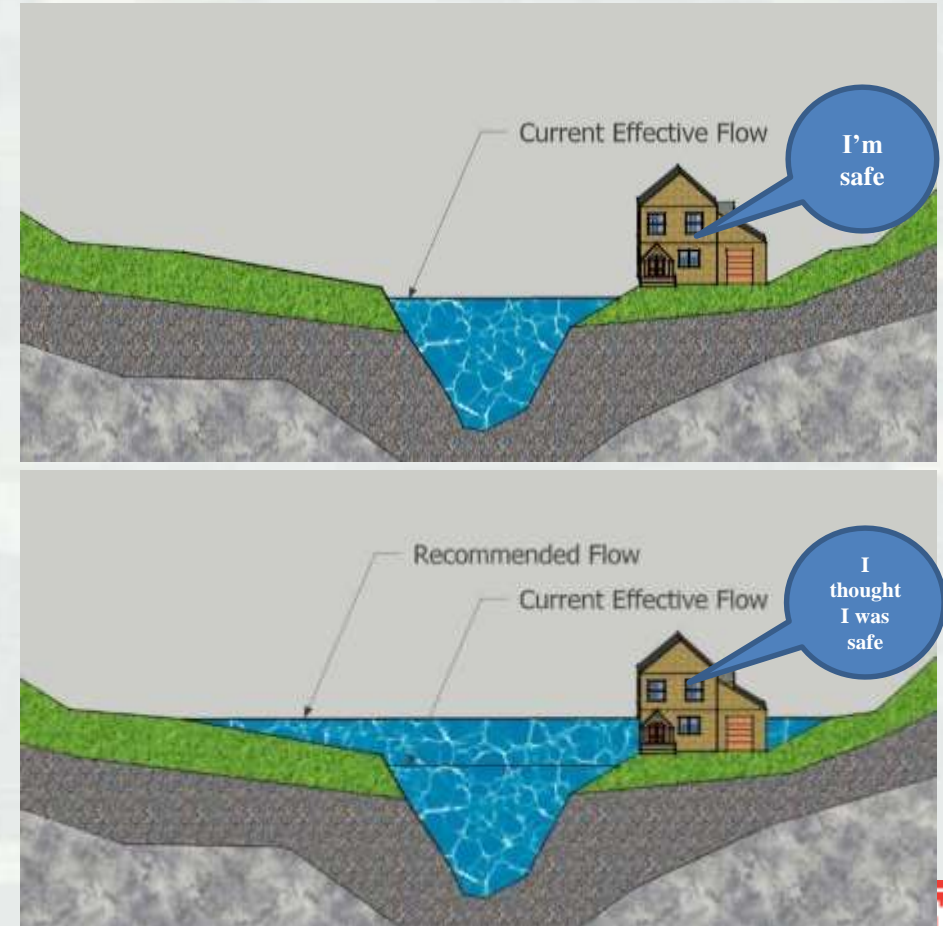
(Source: Gregory Waller,  
Service Coordination  
Hydrologist, NWS – West  
Gulf River Forecast  
Center,  
<http://www.nws.noaa.gov/om/hazstats.shtml>,  
11/18 TFMA)



5 Year Tally of Flood Fatalities

# What Flooding Disasters Do

- Destroy infrastructure (roads, bridges, waste water, water supply)
- Destroy property (homes, automobiles, belongings)
- Loss of life
- **Ruin family photos and heirlooms**
- **Disconnect people - friends, schools, work, and familiar places**
- **Alter relationships**
- **Permanent harm to culture and way of life**
- **Impacts those least able to manage**
- **Long-term consequences to the health (mental) and collective well-being of those effected**
- **Loss of pets**
- **Destroy natural ecosystems that are integral parts of communities**
- **Disrupt populations in ways that are difficult to articulate, let alone assign monetary worth**



# Why Is This Happening

FORT WORTH

## North Texas neighborhoods are flooding more than ever before. Why?

BY BILL HANNA AND LUKE RANKER



OCTOBER 12, 2018 06:00 AM, UPDATED OCTOBER 12, 2018 04:07 PM



<https://www.star-telegram.com/news/local/community/fort-worth/article219740795.html>



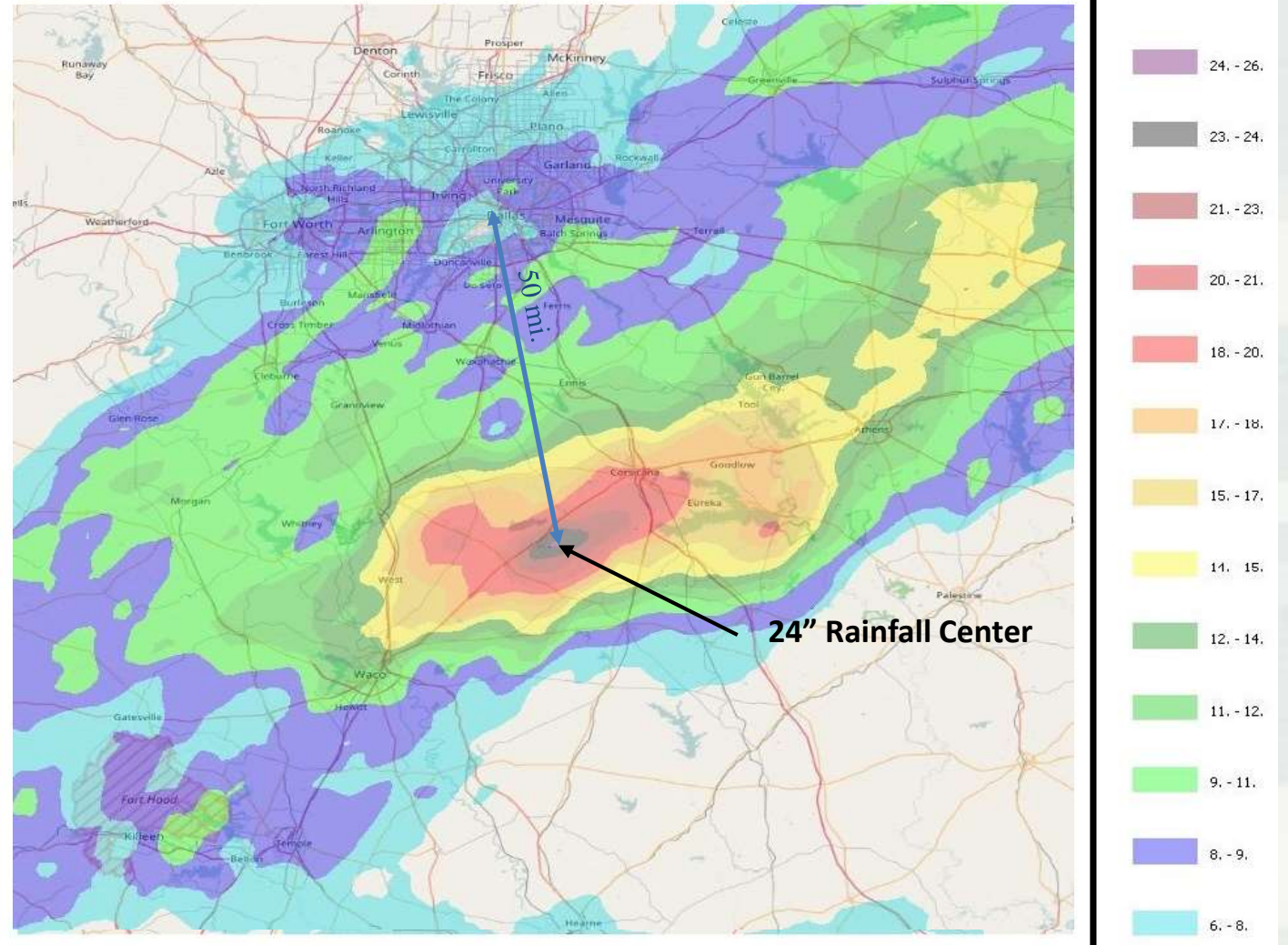
North Central Texas  
Council of Governments



# Tropical Storm Patricia - Corsicana, TX

October 2015

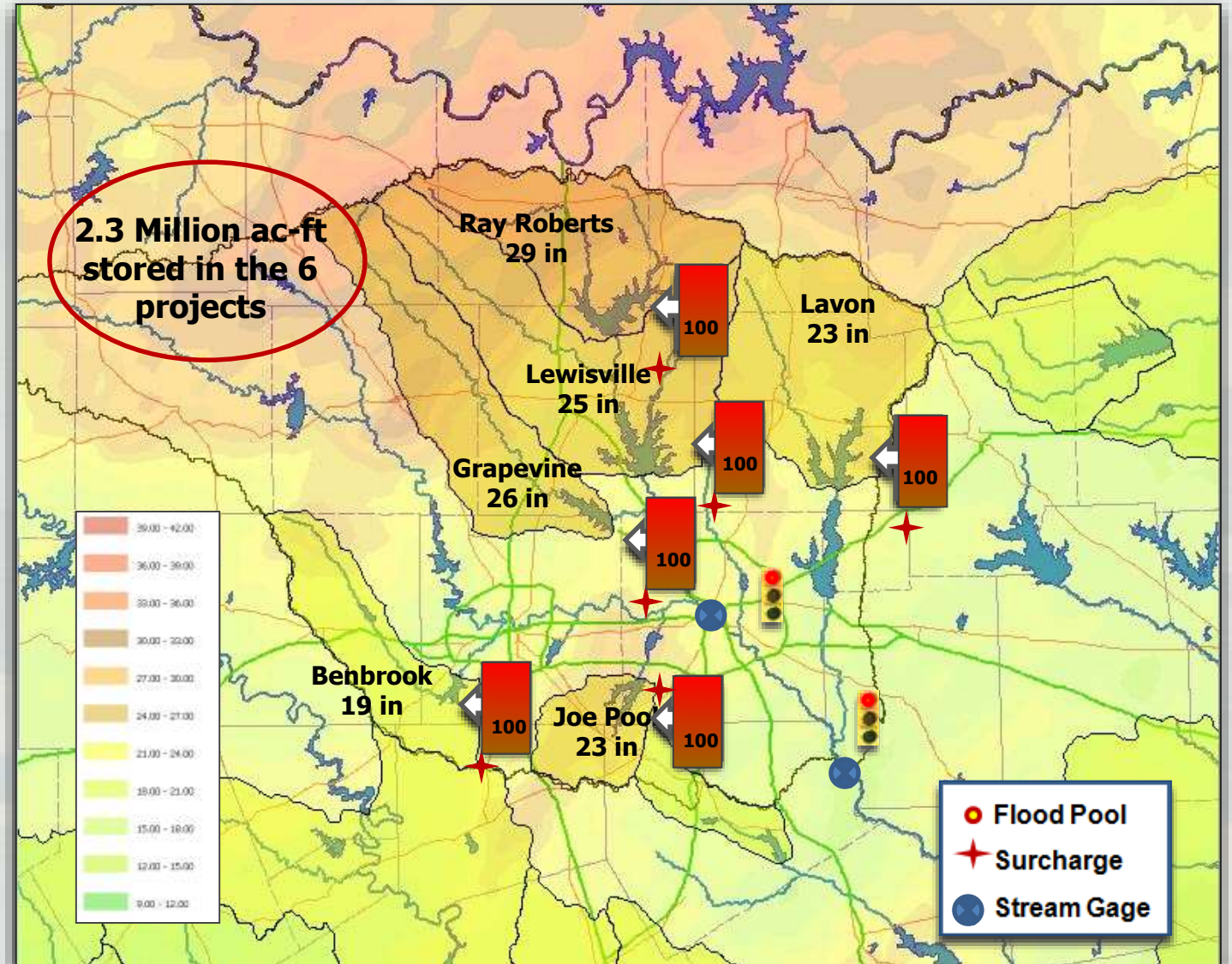
- Rainfall totals of 24" in 24 hours
- Tropical storm
- Less than 50 mi from DFW Communities





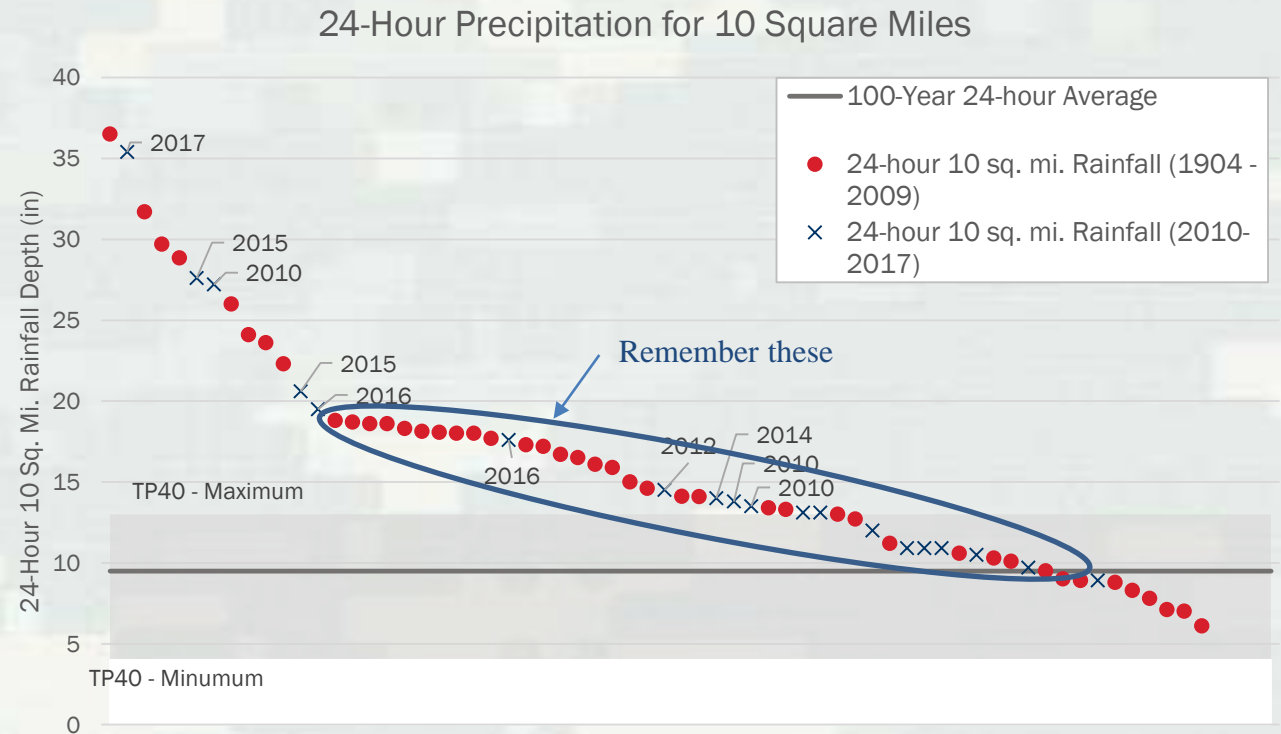
# Dallas-Fort Worth, May-June 2015 Flooding

- 20” to 30” across entire upper Trinity River
- Surcharge 6 projects in DFW metroplex
- Surcharged 10 projects in Fort Worth District AOR



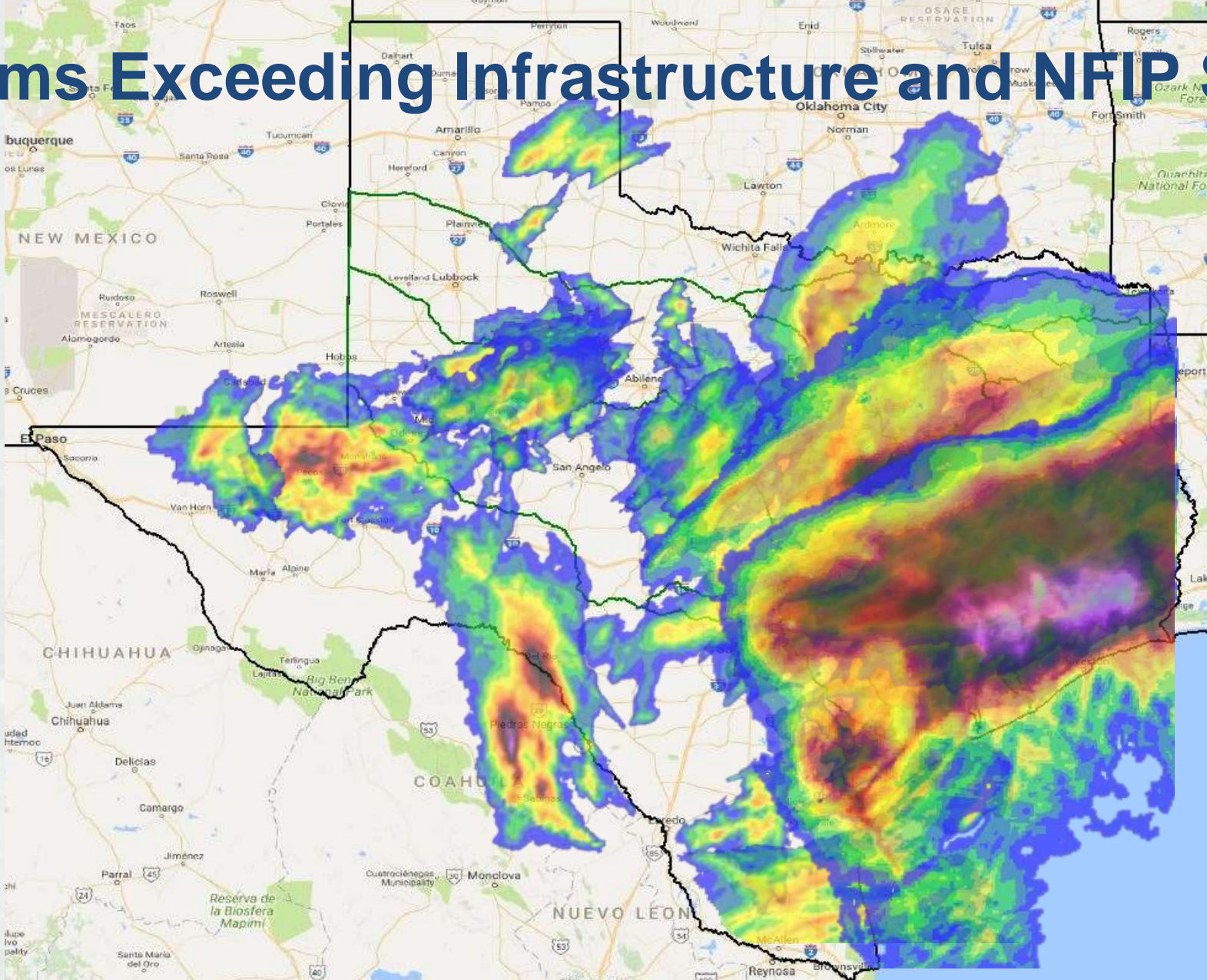
# Storms Exceeding Infrastructure and NFIP Standards

- Regional observed storms
  - USACE extreme storm database
- 24-hour rainfall for 10 mi<sup>2</sup>
- Plotted in descending order
- Grey band is current design standard (100-year) for all of TX
- Blue X's points are 2010-2017 storms that exceed 100-year
- 18 events exceeded the 100-yr design standard

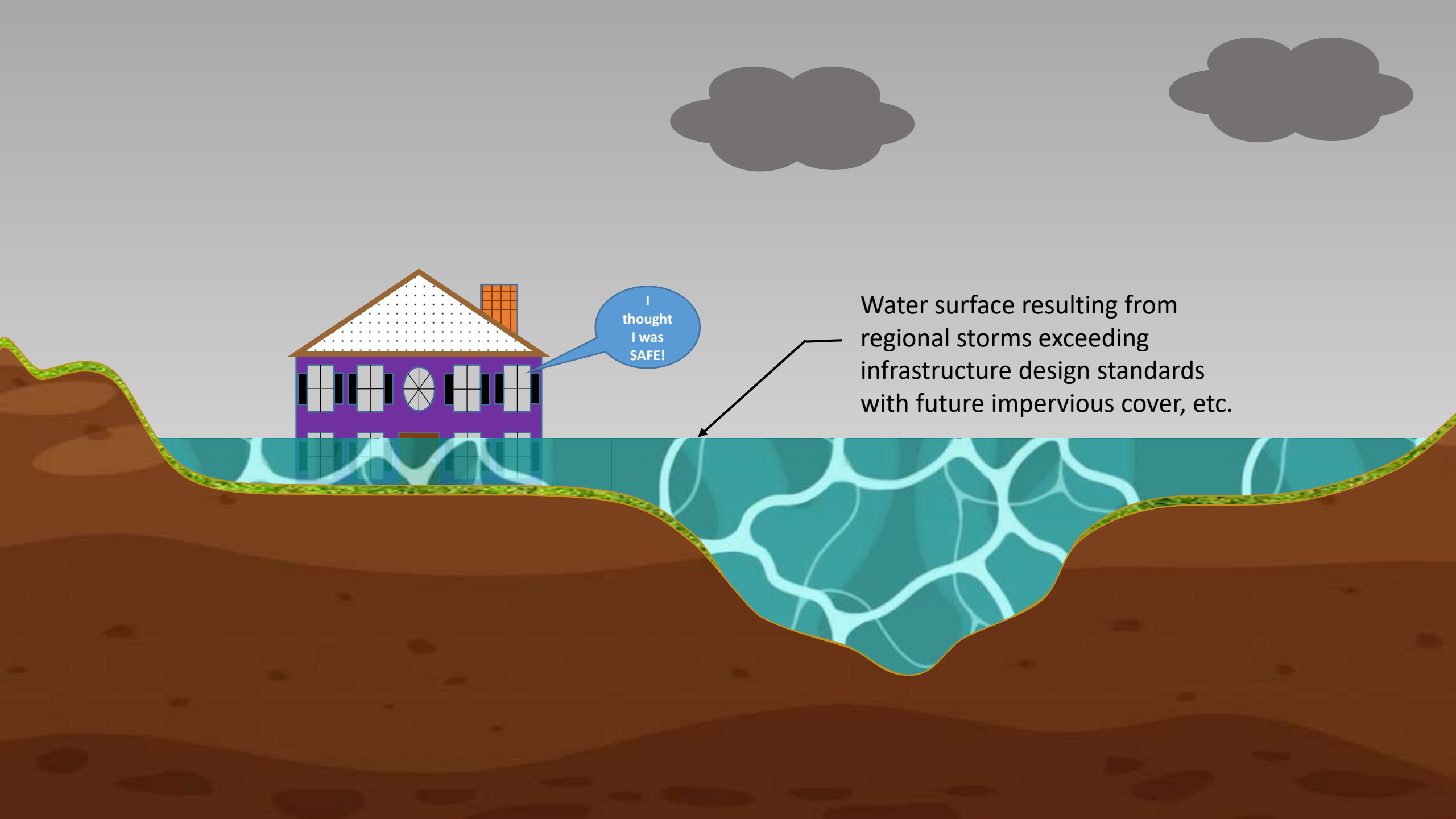




# Storms Exceeding Infrastructure and NFIP Standards



BUILDING STRONG®



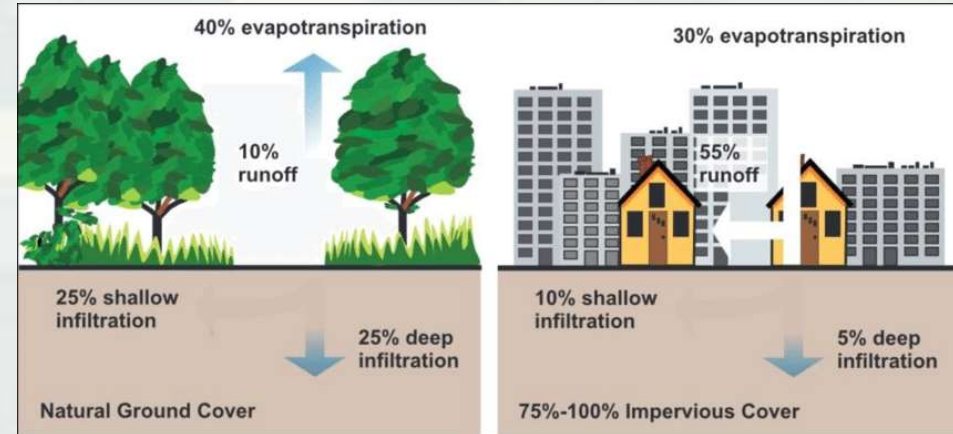
I  
thought  
I was  
SAFE!

Water surface resulting from regional storms exceeding infrastructure design standards with future impervious cover, etc.

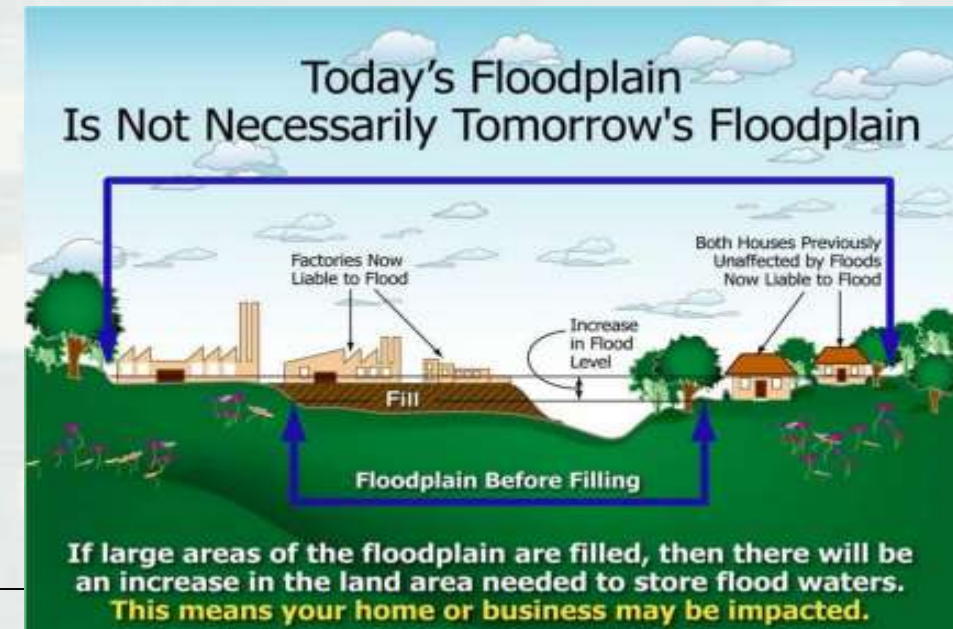


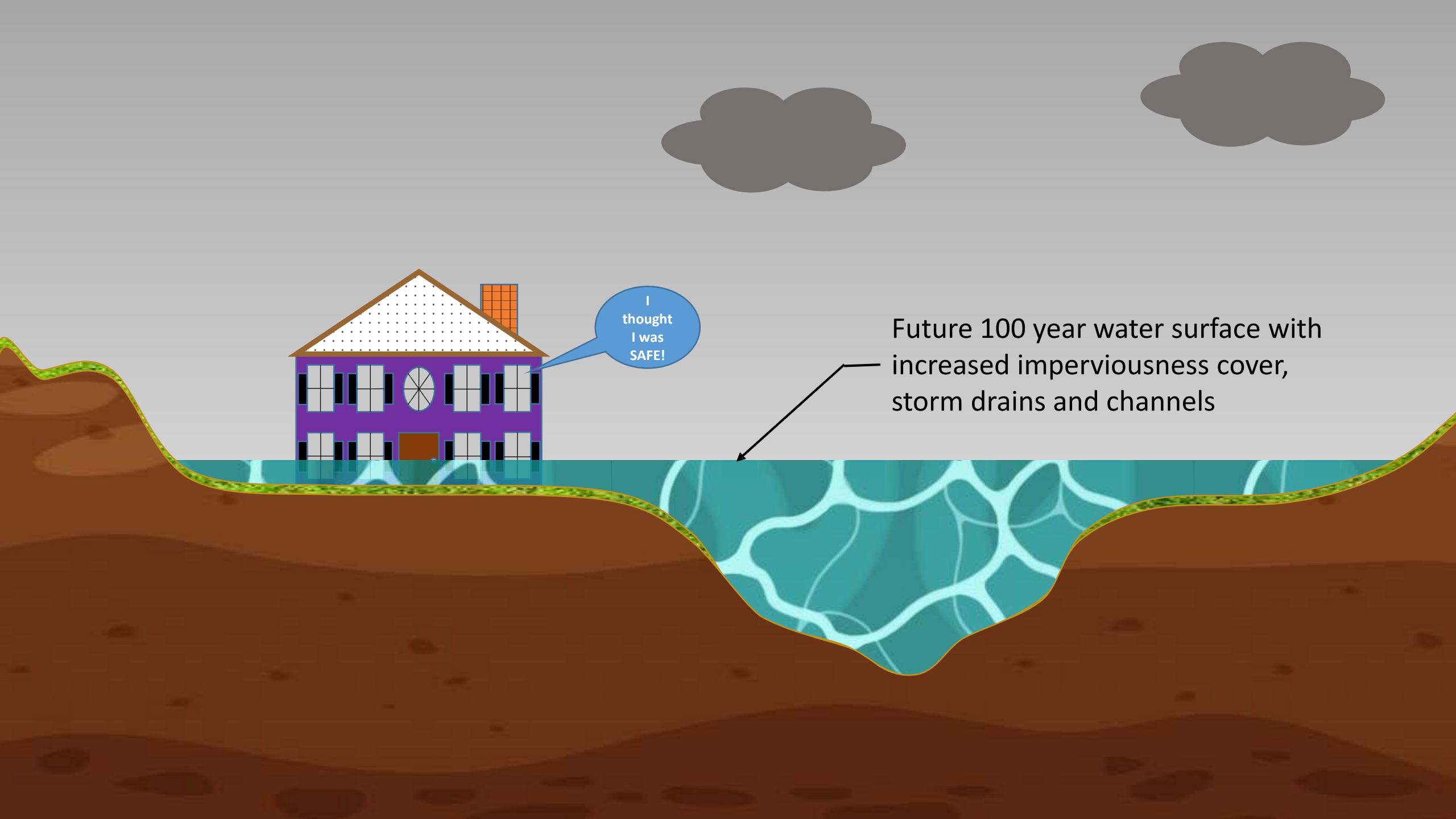
# Growth and Development Increases Flooding

- Floodplains are among the most valuable ecosystems on earth, they are also one of the most threatened
- Growth and development increases impervious cover and runoff
- Growth and development depletes storage
- Flooding increased
- Negative societal impacts



Kazemi, Hamidreza (Kasra). (2014). Evaluating the effectiveness and hydrological performance of green infrastructure stormwater control measures. 10.18297/etd/1744



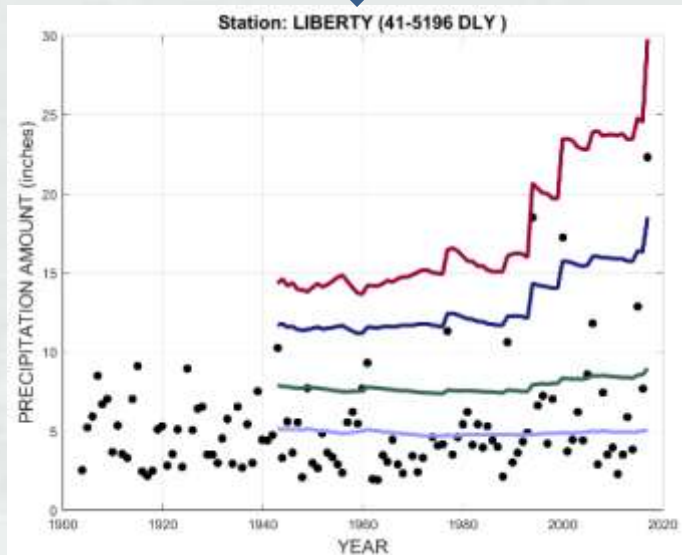
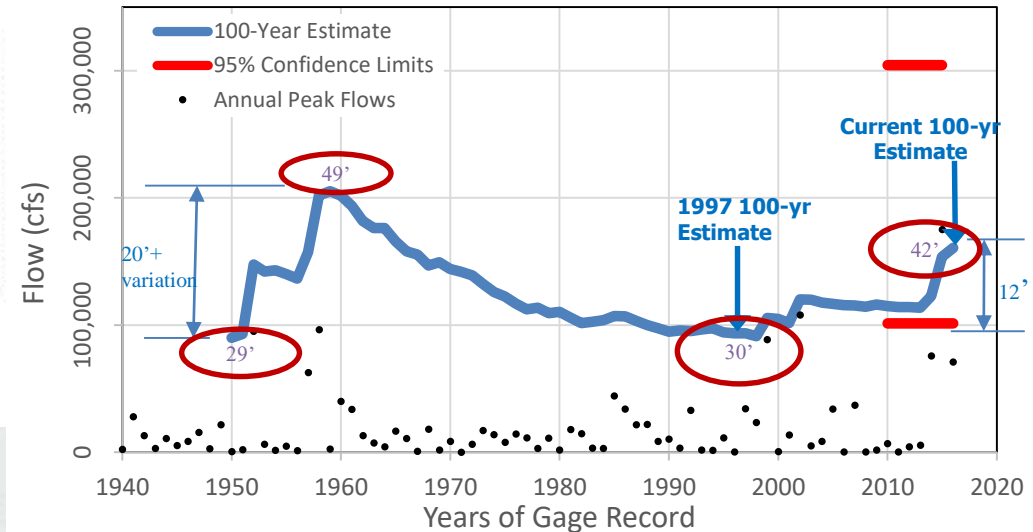


I  
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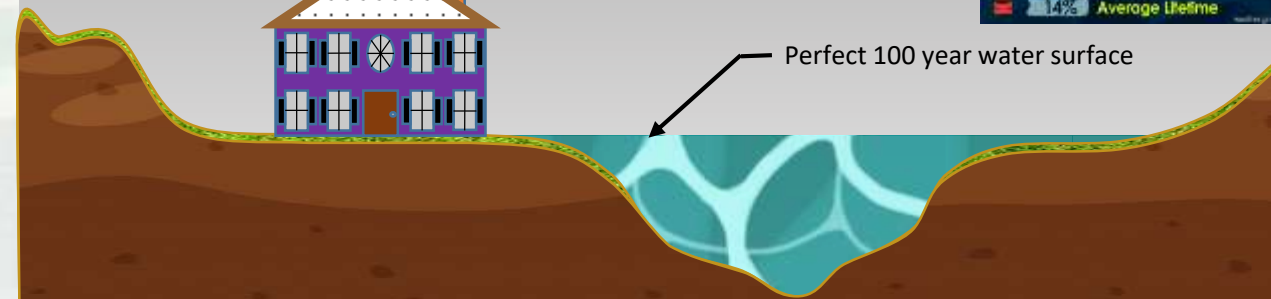
Future 100 year water surface with  
increased imperviousness cover,  
storm drains and channels

# Uncertainties in Determining Flood Risk Potential

- The most commonly used techniques to estimate flood and rainfall frequencies rely on observations
- Need record length 3-4 times estimated return interval
- Short Observation Periods - On average TX has 50 years of stream record and 70 years of precipitation records
- Significant variability and/or non-stationarity observed in flood flow and rainfall frequency estimates

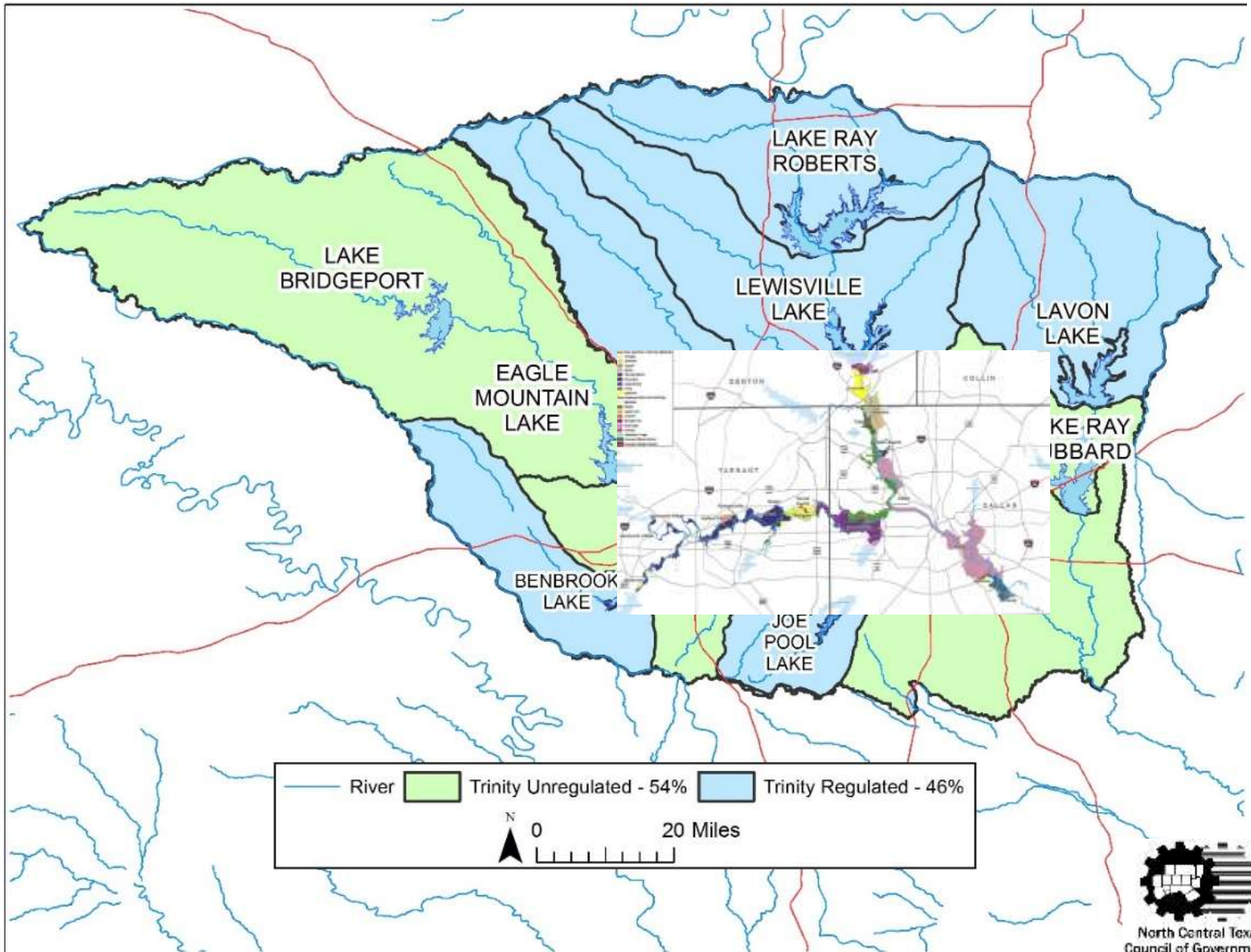


- 1:100 probability changes for blocks of years
- > 1:4 chance of being flooded over a 30 year mortgage
- > 1:2 chance of flooding over life of the structure (80 years)





# Common Vision: Progress We Have Made

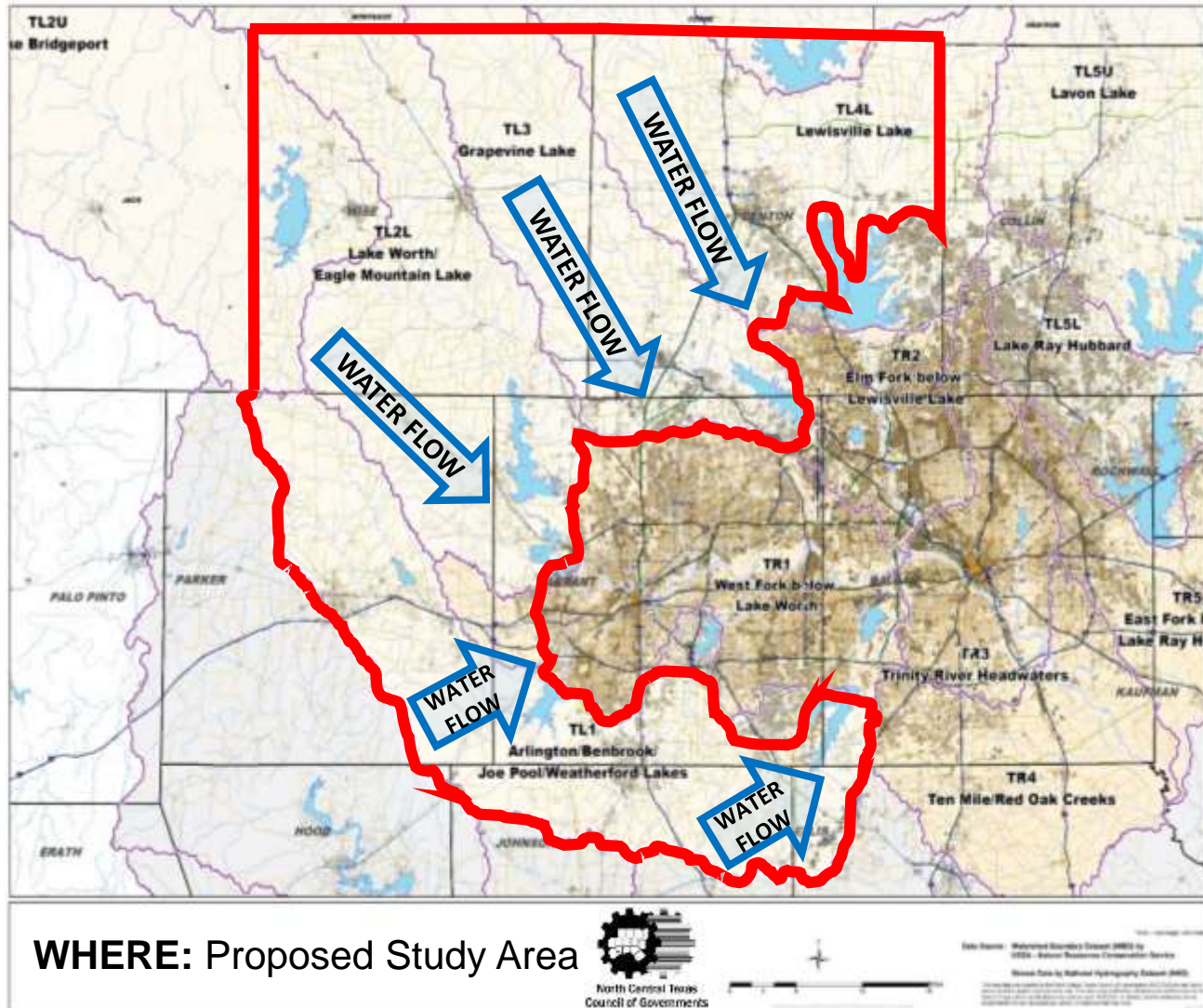


## NCTCOG Recommended Regional Standards

- 1 Design infrastructure to fully developed conditions with approved land-use maps if data is available
- 2 Begin protection at the most upstream end of the watershed above Federal Emergency Management Agency Limit of Detail Study
- 3 Maintain unfilled valley storage areas
- 4 Protect against and reduce erosive velocities
- 5 Match pre-developed site runoffs
- 6 Verify/require adequate downstream conveyance
- 7 Require freeboard from fully developed (if data is available) and changing watershed conditions
- 8 Define written operation and maintenance responsibilities
- 9 Size conveyance of street and storm systems adequately to safely convey traffic
- 10 Create stream buffers and preserve open space; limit clearing and grading
- 11 Consider regional (on or off stream) detention incentives
- 12 Implement Conservation and/or Cluster Development incentives
- 13 Encouraging low impact development techniques and/or green infrastructure



# What?



# How?

## PROJECT TASKS & COST COMPONENTS

Inventory of Relevant Data

Inventory of Stormwater Management Structures

Land Inventory and Site-Specific Design Considerations

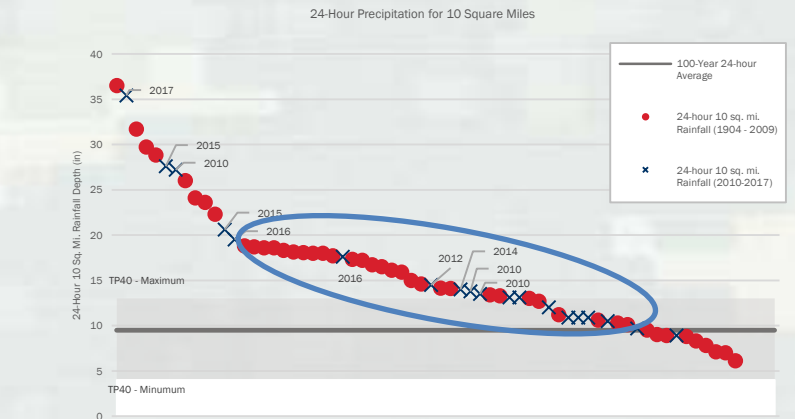
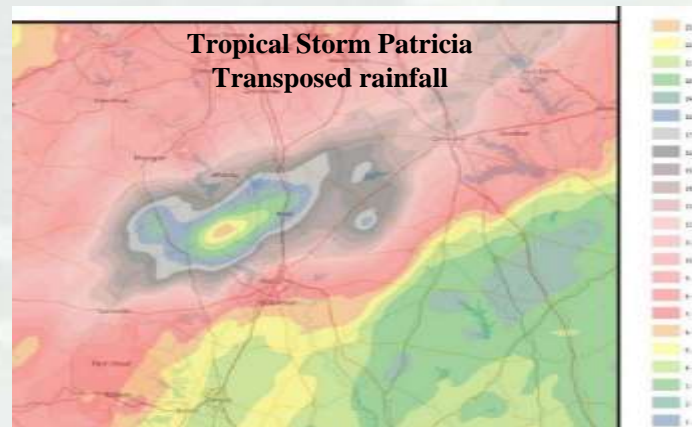
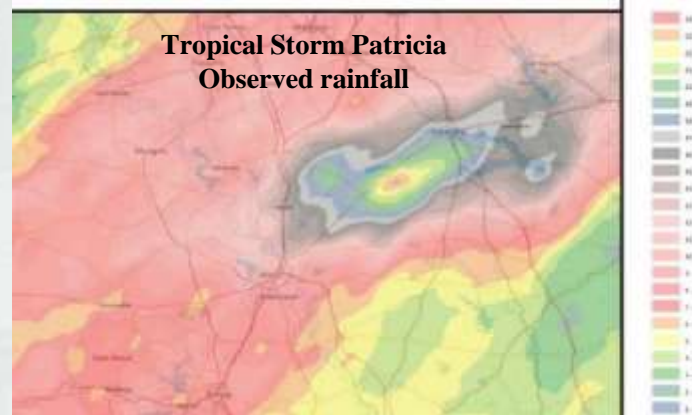
Plans to Offset Future Transportation and Indirect Development Impacts

Project Management and Organization

Implementation  
(Products and Technical Tools)

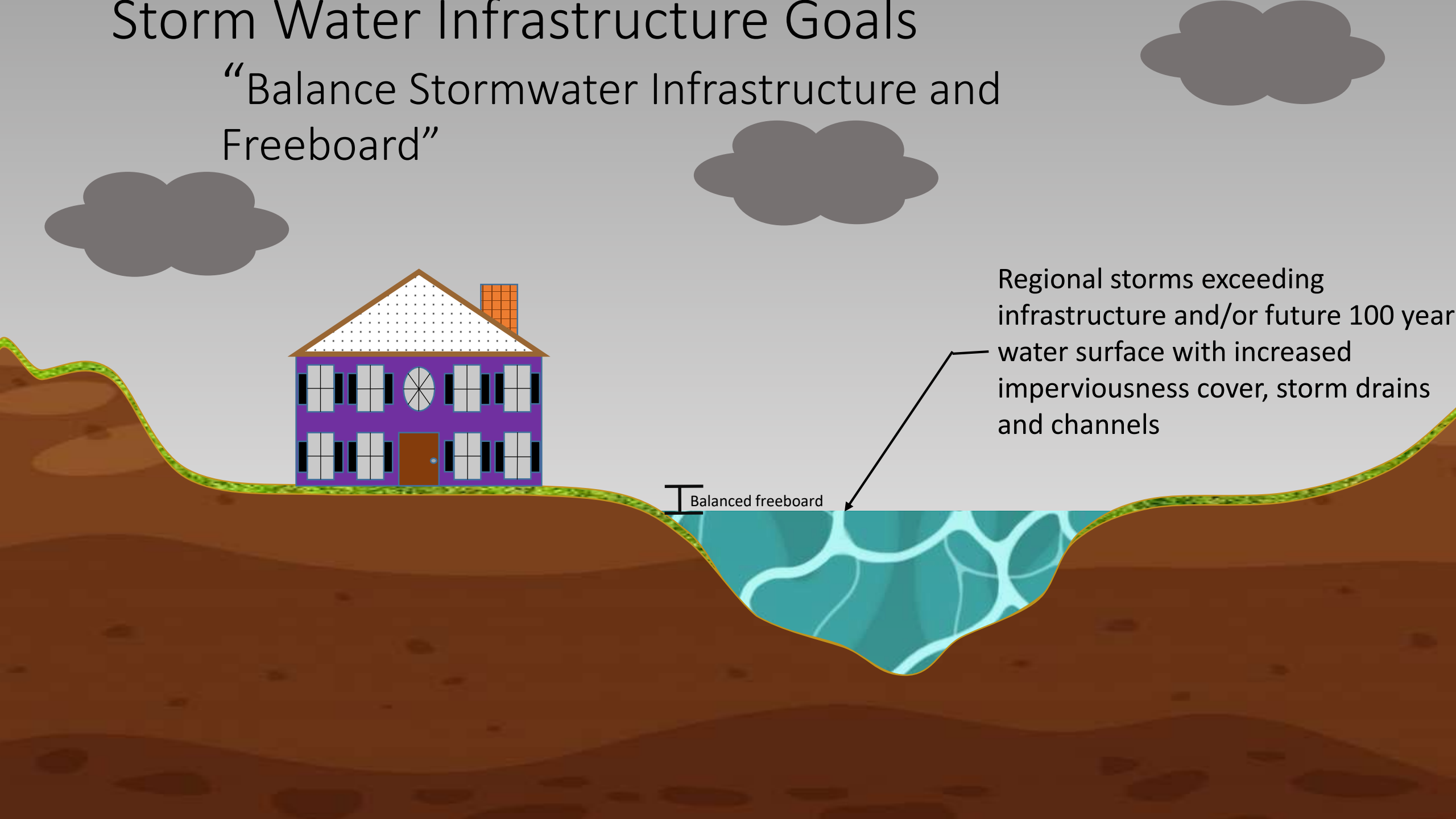
# How?: Realistic Meteorological and Hydrologic Loading

- Existing conditions 100-yr
- Future conditions 100-yr
- Alternative meteorological and hydrologic loading
  - ▶ Leverage regional storm catalog
  - ▶ Storm transpositions using **HEC-MetVue**
- Realistic indication of flooding potential



# Storm Water Infrastructure Goals

“Balance Stormwater Infrastructure and Freeboard”





# Return on Investment

- 2017 “*Natural Hazard Mitigation Saves*” report by: National Institute of Building Sciences Institute, Multi-hazard Mitigation Council (MMC),
- Investment in stormwater infrastructure returns \$5 to \$7 for every \$1 invested
- Lower community flood insurance premiums
- Provides connected open space
- Increased safety from flooding
- Human health benefits
- Recreation benefits
- Attract and retain talent

Natural Hazard Mitigation Saves: 2017 Interim Report		National Benefit-Cost Ratio Per Peril <small>*BCR numbers in this study have been rounded</small>	
		Federally Funded	Beyond Code Requirements
<b>Overall Hazard Benefit-Cost Ratio</b>		<b>6:1</b>	<b>4:1</b>
 <b>Riverine Flood</b>		7:1	5:1
 <b>Hurricane Surge</b>		Too few grants	7:1
 <b>Wind</b>		5:1	5:1
 <b>Earthquake</b>		3:1	4:1
 <b>Wildland-Urban Interface Fire</b>		3:1	4:1

Table 1. Benefit-Cost Ratio by Hazard and Mitigation Measure.

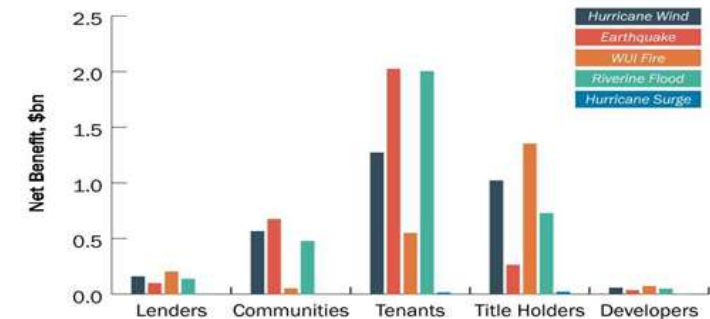


Figure 8. Stakeholder net benefits resulting from one year of constructing all new buildings to exceed select 2015 IBC and IRC requirements or to comply with 2015 IWUIC.

Community Rating System (CRS)



### How much discount property owners in your community can get

Rate Class	Discount		Credit Points Required
	SFHA*	Non-SFHA**	
1	45%	10%	4,500 +
2	40%	10%	4,000 - 4,499
3	35%	10%	3,500 - 3,999
4	30%	10%	3,000 - 3,499
5	25%	10%	2,500 - 2,999
6	20%	10%	2,000 - 2,499
7	15%	5%	1,500 - 1,999
8	10%	5%	1,000 - 1,499
9	5%	5%	500 - 999
10	0%	0%	0 - 499

\* Special Flood Hazard Area  
 \*\* Preferred Risk Policies are available only in B, C, and X Zones for properties that are shown to have a minimal risk of flood damage. The Preferred Risk Policy does not receive premium rate credits under the CRS because it already has a lower premium than other policies. Although they are in SFHAs, Zones AR and A99 are limited to a 5% discount. Premium reductions are subject to change.

Source: [http://www.wbdg.org/files/pdfs/MS2\\_2017Interim%20Report.pdf](http://www.wbdg.org/files/pdfs/MS2_2017Interim%20Report.pdf)



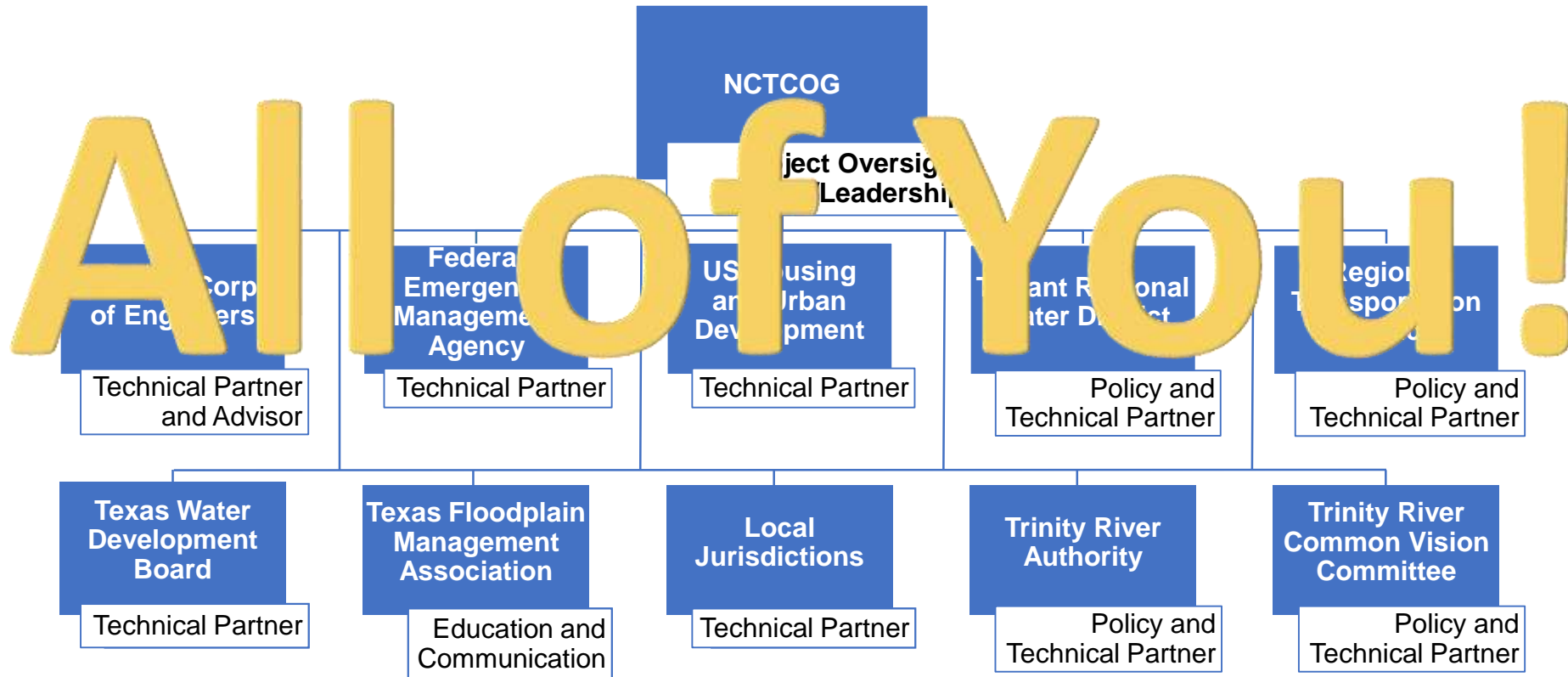
# Products and Benefits

- **Transportation Infrastructure**
  - ▶ Structure Elevation / Culverts / Model Growth
  - ▶ Transportation “LEED” Certified (Ray Roberts / Lewisville)
  - ▶ Green Parkway Widths / Detention
  - ▶ Safety
    - Technology/routing
    - Better prioritization of low lying structures
- **Flooding**
  - ▶ Numerical models (meteorology, hydrology, hydraulics)
  - ▶ Reduced risk
  - ▶ Regulatory products
  - ▶ Designated stormwater areas
    - Tree farms, Wetlands, Mitigation banks, Detention areas
- **Environmental Stewardship (ES) and ES as a Revenue Element**
  - ▶ Environmental areas
  - ▶ Horse farms
  - ▶ Preserve riparian areas
  - ▶ Mitigation areas/wetland banking
  - ▶ Eco-tourism
- Stormwater infrastructure plans
- Emergency preparedness
- Emergency response
- Groundwater recharge
- Open space and connected open space



# WHO: Project Team Members

A working group of partners and stakeholders to carry out a comprehensive planning effort in Wise County and portions of Dallas, Denton, Ellis, Johnson, Parker, and Tarrant counties



# INTEGRATED PLANNING OF REGIONAL TRANSPORTATION AND STORMWATER MANAGEMENT TOGETHER AS A SYSTEM OF IMPROVEMENTS: PREVENTION VS. RESPONSE

## QUESTIONS/CONTACT:

### Transportation

Michael Morris, P.E.

817-695-9241

[mmorris@nctcog.org](mailto:mmorris@nctcog.org)

### Environment & Development

Edith Marvin, P.E.

817-695-9211

[emarvin@nctcog.org](mailto:emarvin@nctcog.org)



US Army Corps  
of Engineers

**Jerry L. Cotter, P.E.**

Chief Water Resources

U.S. Army Corps of Engineers

Fort Worth District (SWF)

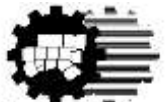
819 Taylor Street

Fort Worth, TX 76102

(817) 886-1549 TEL

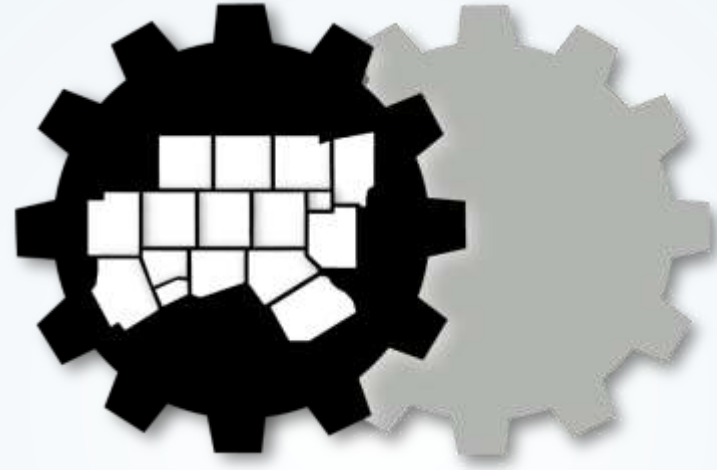
(817) 454-1290 CEL

[Jerry.L.Cotter@usace.army.mil](mailto:Jerry.L.Cotter@usace.army.mil)



North Central Texas  
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# Roundtable

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# Contact

## **Mia Brown, CFM**

Sr. Planner, Environment & Development

[mbbrown@nctcog.org](mailto:mbbrown@nctcog.org)

817.695.9227

## **Edith Marvin, P.E., CFM**

Director, Environment & Development

[emarvin@nctcog.org](mailto:emarvin@nctcog.org)

817.695.9211

# Connect



Facebook.com/nctcogenv



@nctcogenv



nctcogenv



youtube.com/user/nctcoged



EandD@nctcog.org



nctcog.org/envir