CRS Users Group/Elected Officials Floodplain Seminar
&
CHARM Policy Workshop

North Central Texas Council of Governments

Texas A&M AgriLife Extension

July 18, 2019
Earl Anthony Room, International Bowling Museum & Hall of Fame
621 Six Flags Drive, Arlington, TX 76011

AGENDA

Time	Topic	Speaker
9:00a-9:10a	**Welcome and Introductions**	*Mia Brown, CFM* *NCTCOG*
9:10a-9:40a	**The Future of Flood Planning in Texas** Updates from the 86th Legislature	*Wes Birdwell, P.E.* *Halff Associates*
9:40a-10:10a	**Base Level Engineering (BLE)** Benefits and Uses of Community Driven Data	*Jarred Overbey, PE, CFM* *Halff Associates*
10:10a-10:40a	**Floodplain Benchmarking**	*Ben Pylant, PE, CFM* *Halff Associates*
10:40a-10:50a	**Break**	
10:50a-11:10a	**Community Health and Resource Management (CHARM) Tool**	*Steven Mikulencak, AICP* *Texas A&M AgriLife Extension Service*
11:10a-12:20p	**CHARM Demonstration**	*Steven Mikulencak, AICP* *Timothy Little* *Md Yousuf Reja* *Texas A&M AgriLife Extension Service*
12:20p-1:30p	**Meeting Wrap-Up and Networking Lunch**	

If you have any questions regarding the meeting or agenda items, please contact
Mia Brown: (817) 695-9227; MBBrown@nctcog.org

If you plan to attend this public meeting and you have a disability that requires special arrangements at the meeting, please contact Barbara Bradford by phone at (817) 695-9231 or by email at BBradford@nctcog.org 72 hours in advance of the meeting. Reasonable accommodations will be made to assist your needs.

NCTCOG CRS USERS GROUP/ELECTED OFFICIALS

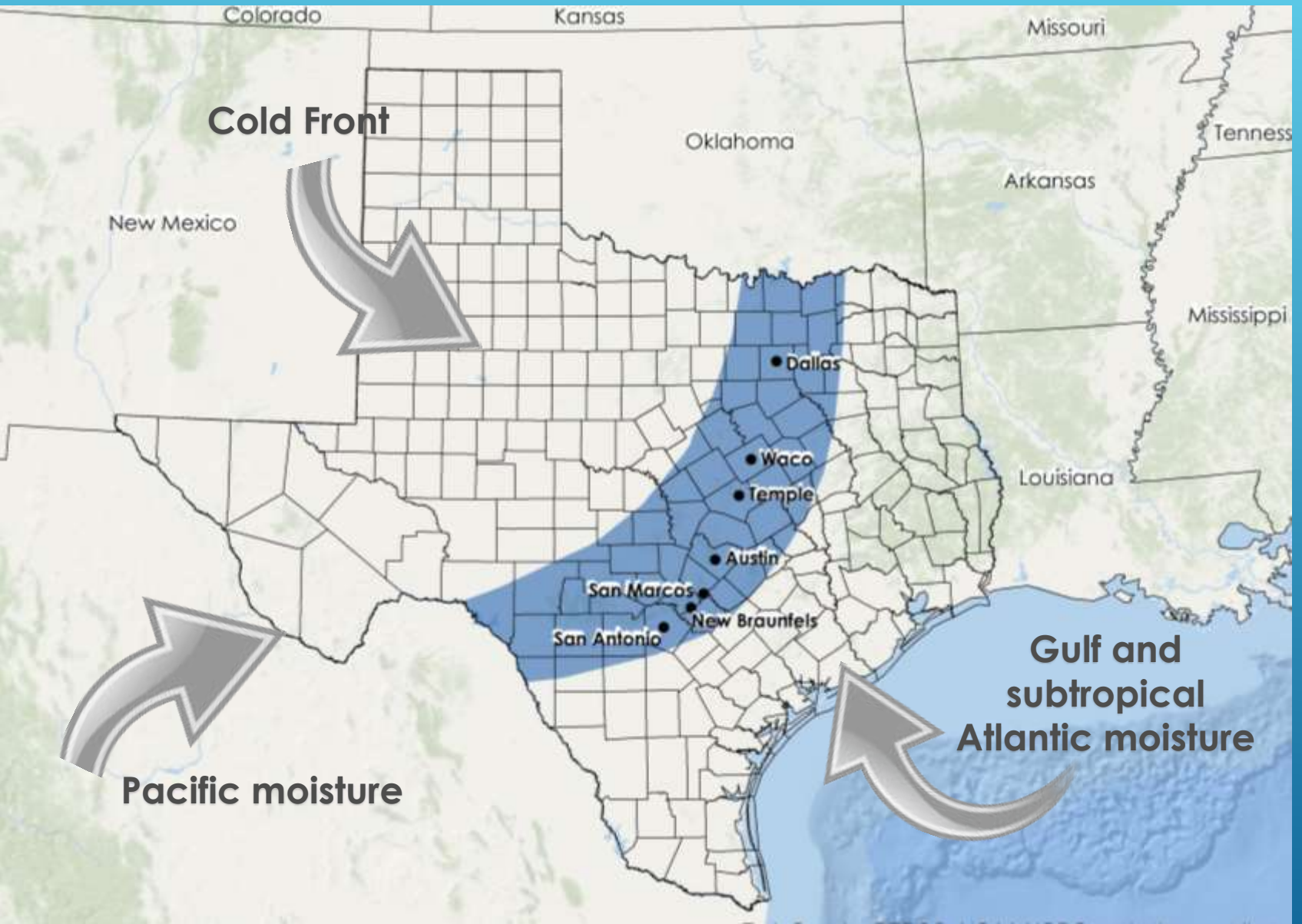
LEGISLATIVE UPDATE

ARLINGTON TX

July 18, 2019

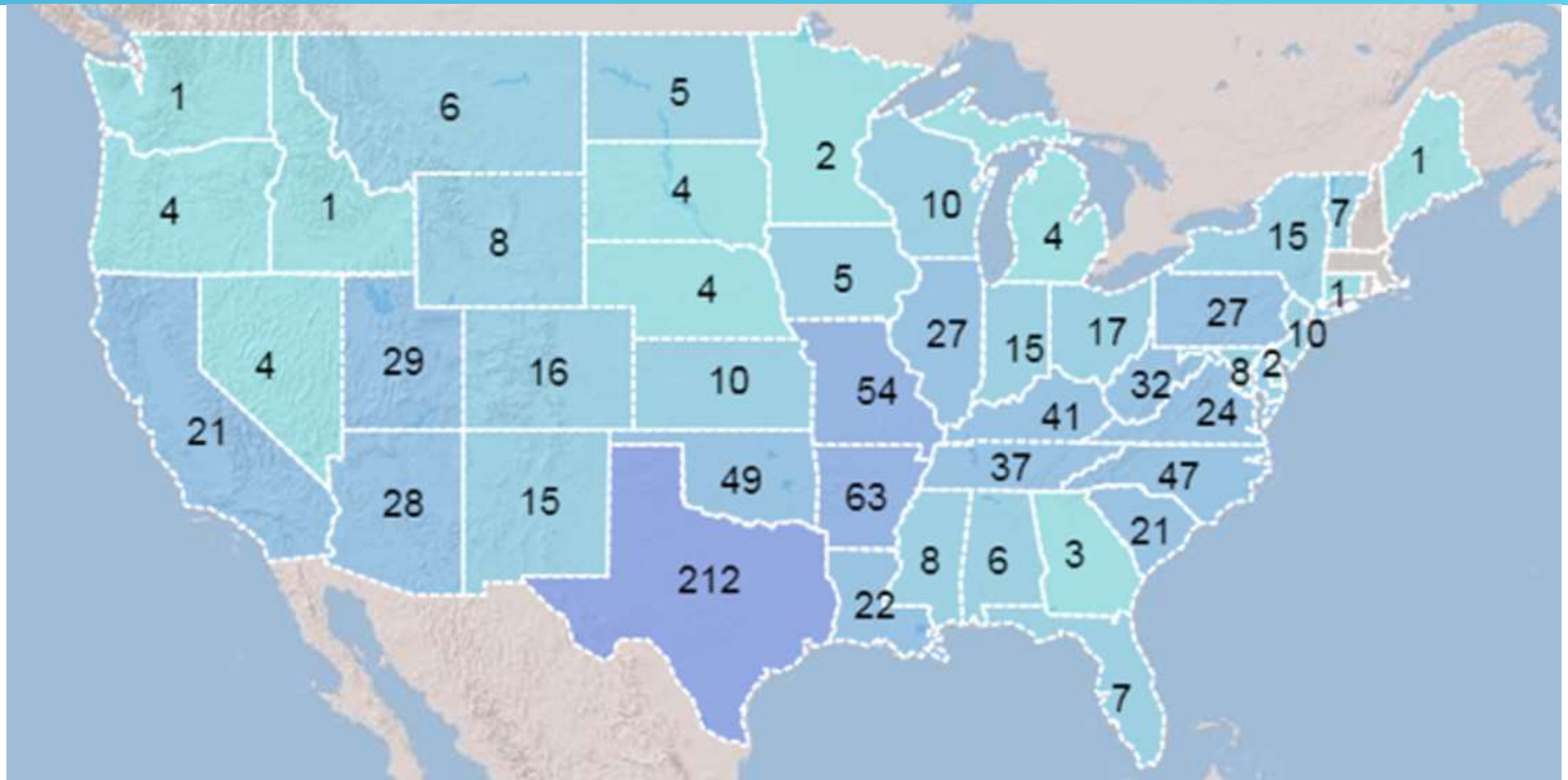
Wes Birdwell PE, Halff Associates Inc

TEXAS IS PRONE TO FLOOD

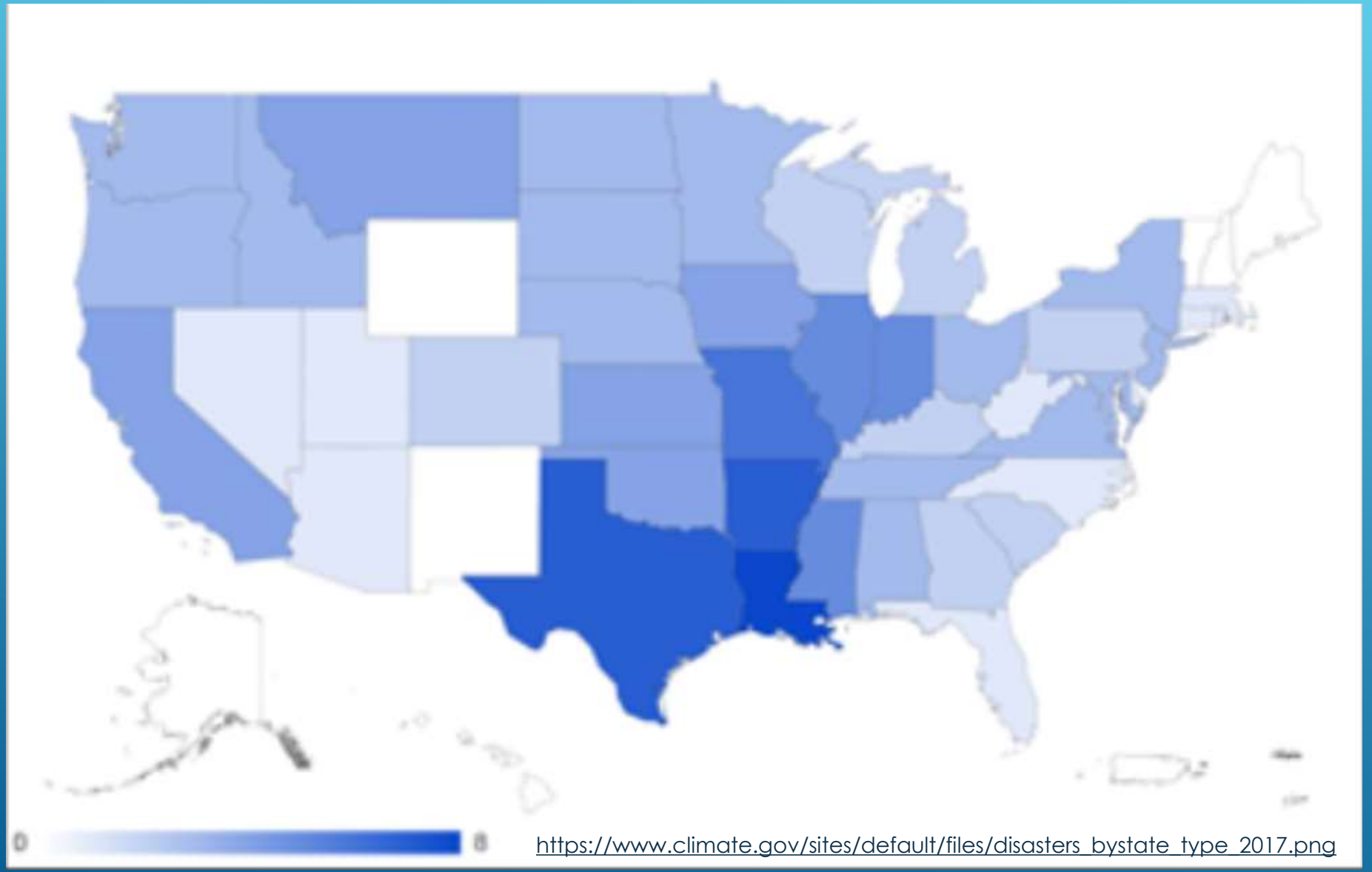


- Texas is geographically located to be subject to big floods
  - Anywhere
  - Anytime

2010 – 2018 U.S. FLOOD FATALITIES

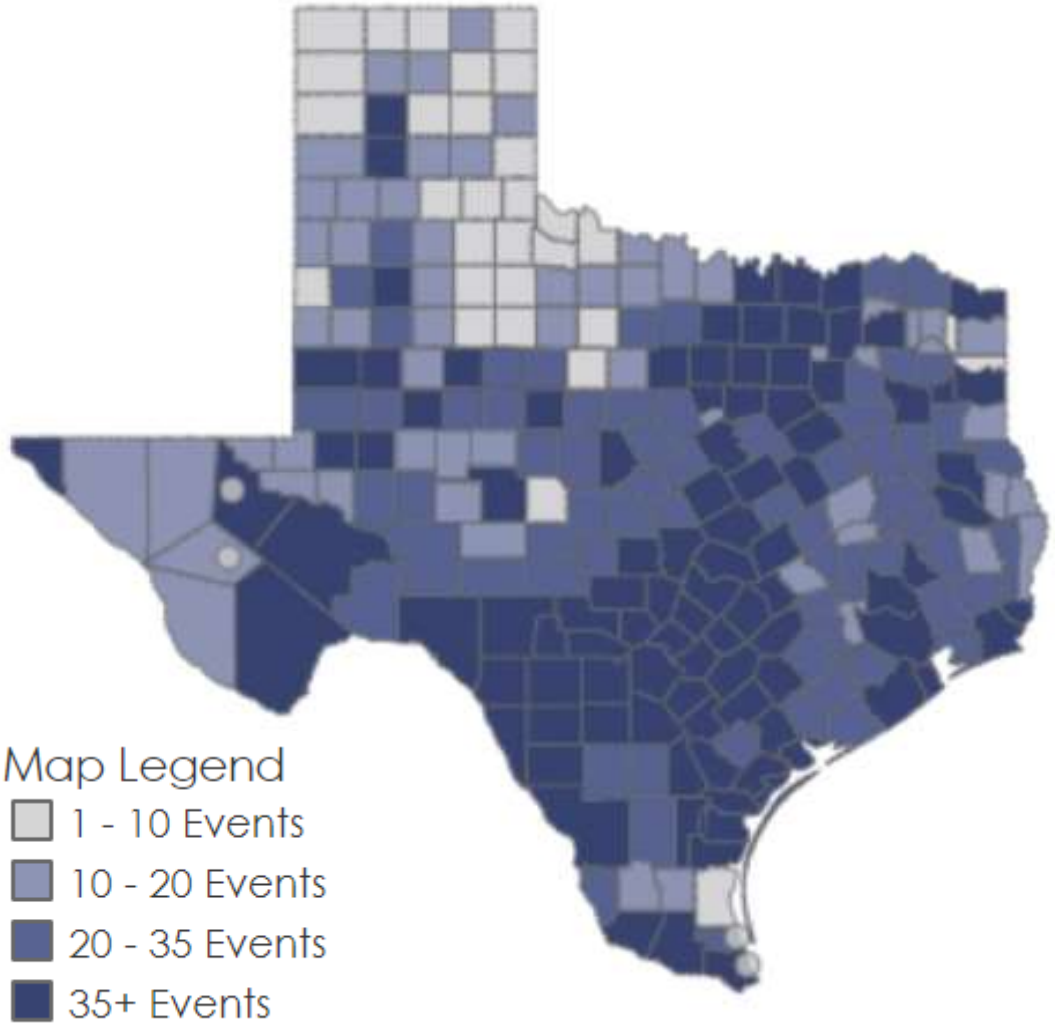


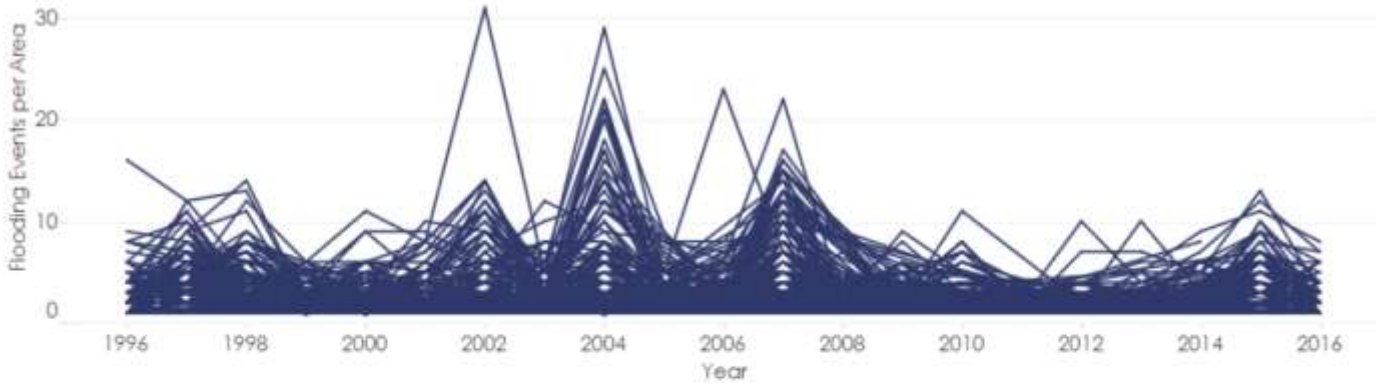
1980 – 2017 BILLION DOLLAR FLOODING DISASTERS BY STATE (CPI ADJUSTED)



https://www.climate.gov/sites/default/files/disasters_bystate_type_2017.png

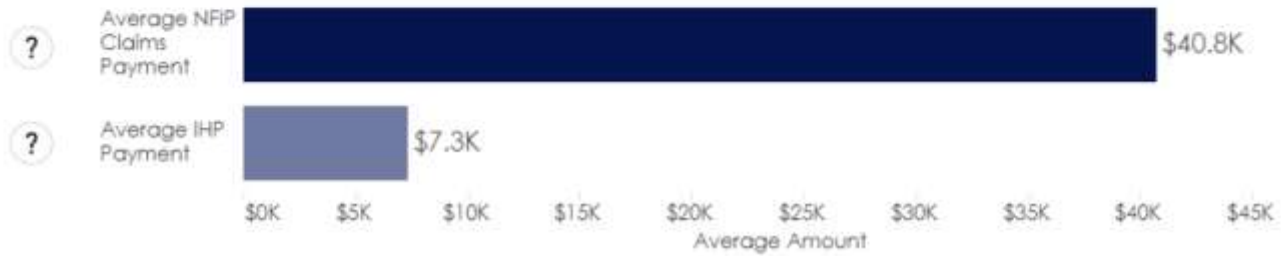
1996 -2016 FLOODING IN TEXAS





Costs of Flooding

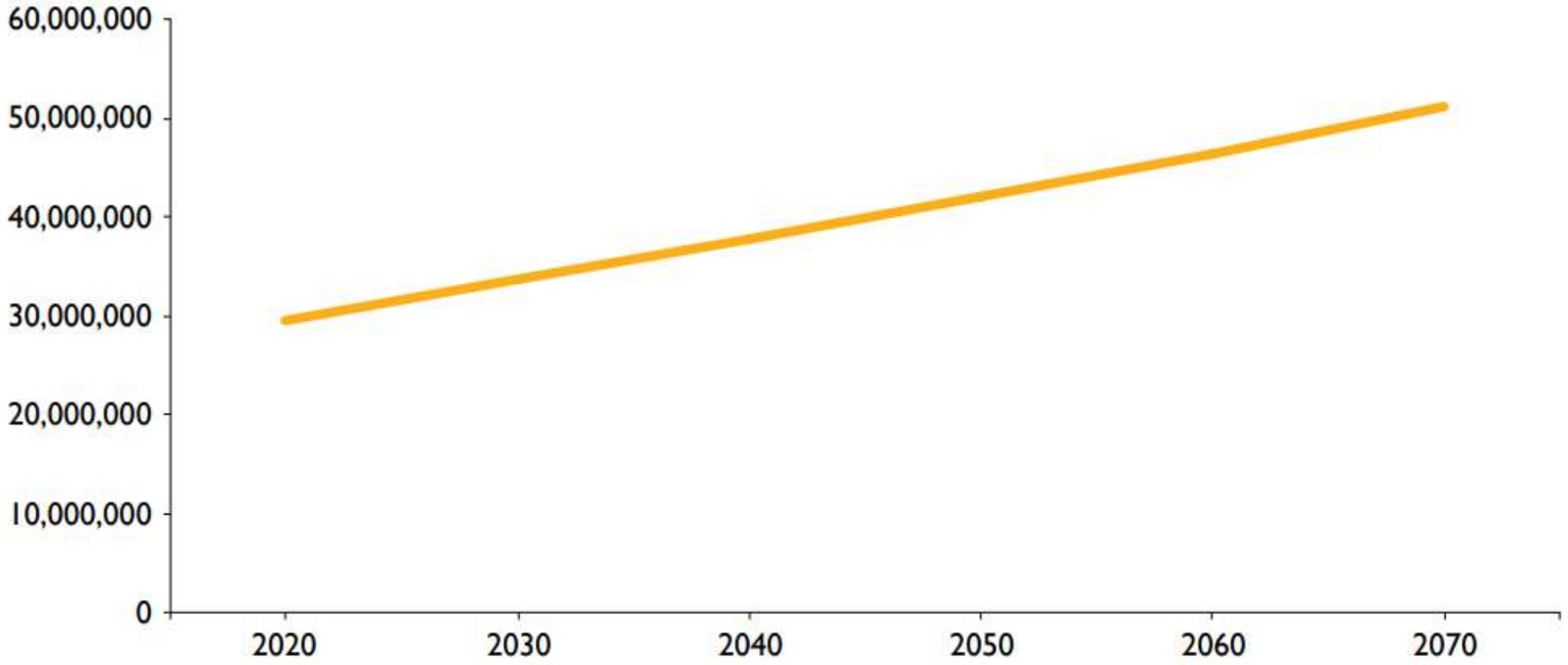
The National Flood Insurance Program (NFIP) provides flood insurance to homeowners, renters, and business owners. FEMA's Individuals and Households Program (IHP) provides financial assistance and direct services to eligible individuals and households who have uninsured or underinsured necessary expenses and serious needs. See differences in NFIP claims paid to individuals from 1996-2016 and funding from IHP for flood-related damages from 2006-2016 for your state.



Source: www.fema.gov/data-visualization-floods-data-visualization

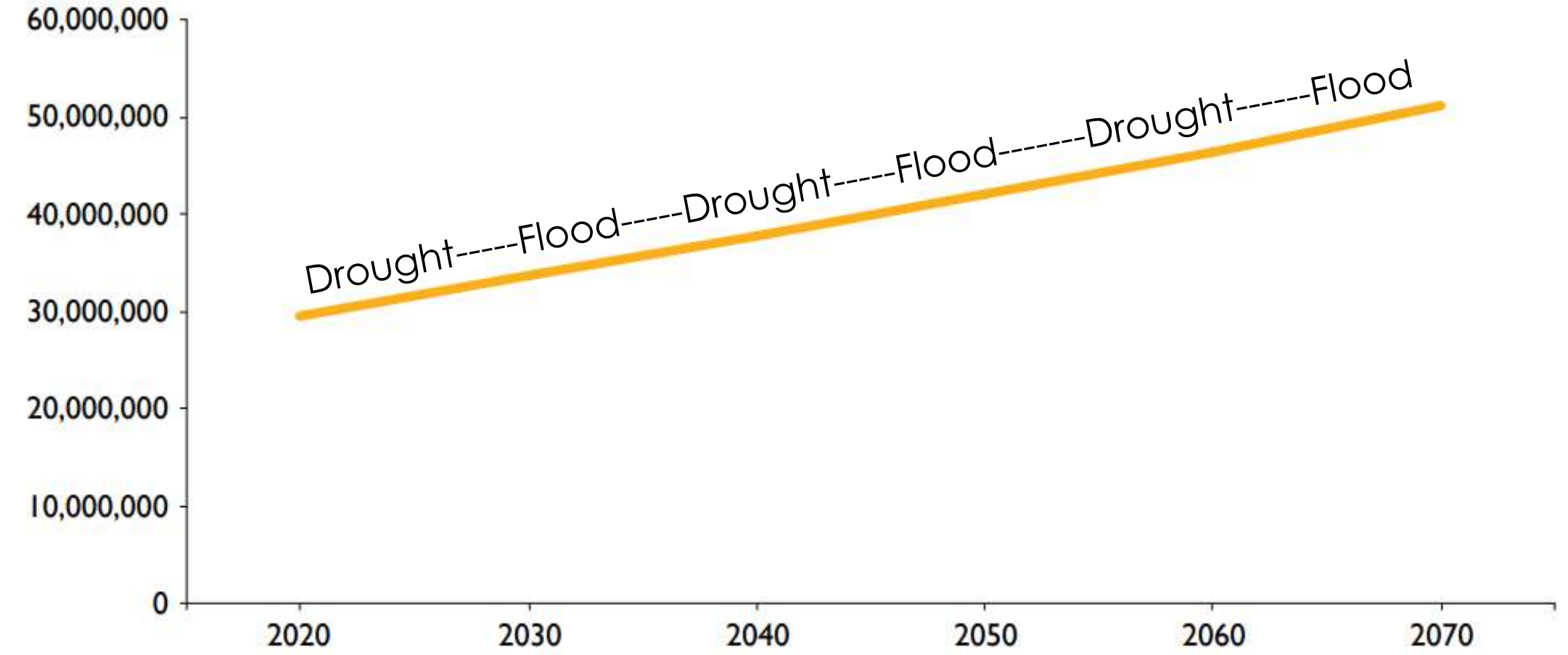
TEXAS PROJECTED POPULATION

Figure 5.1 - Projected population in Texas



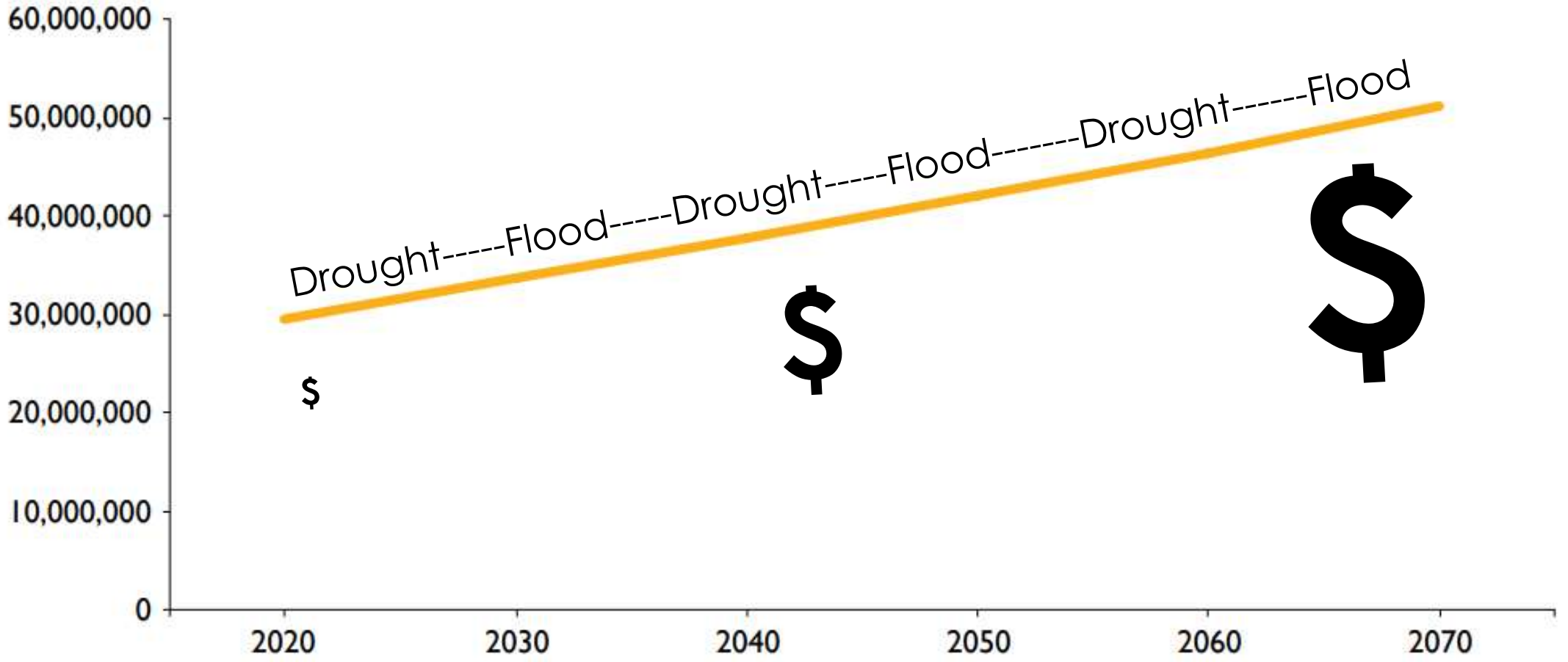
TEXAS DROUGHT/FLOOD CYCLE

Figure 5.1 - Projected population in Texas



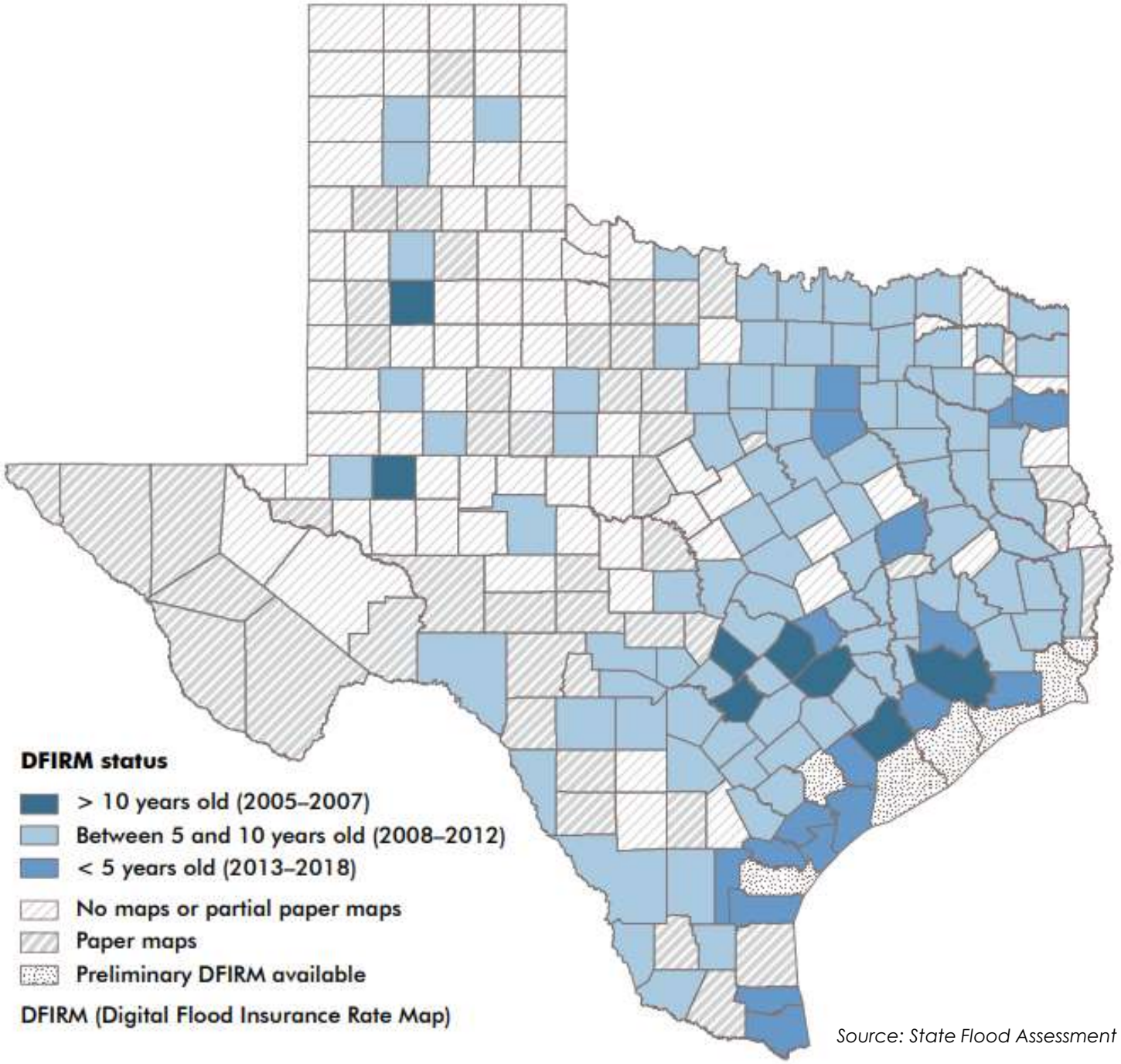
TEXAS INCREASING FLOOD DAMAGES

Figure 5.1 - Projected population in Texas



TEXAS FLOOD RISK DATA IS OUTDATED:

- FEMA FIRM's are used as the best available flood risk information in most communities
- Much of the FEMA information is dated
- Currently difficult to plan and mitigate
- We need to start with current information, updated maps



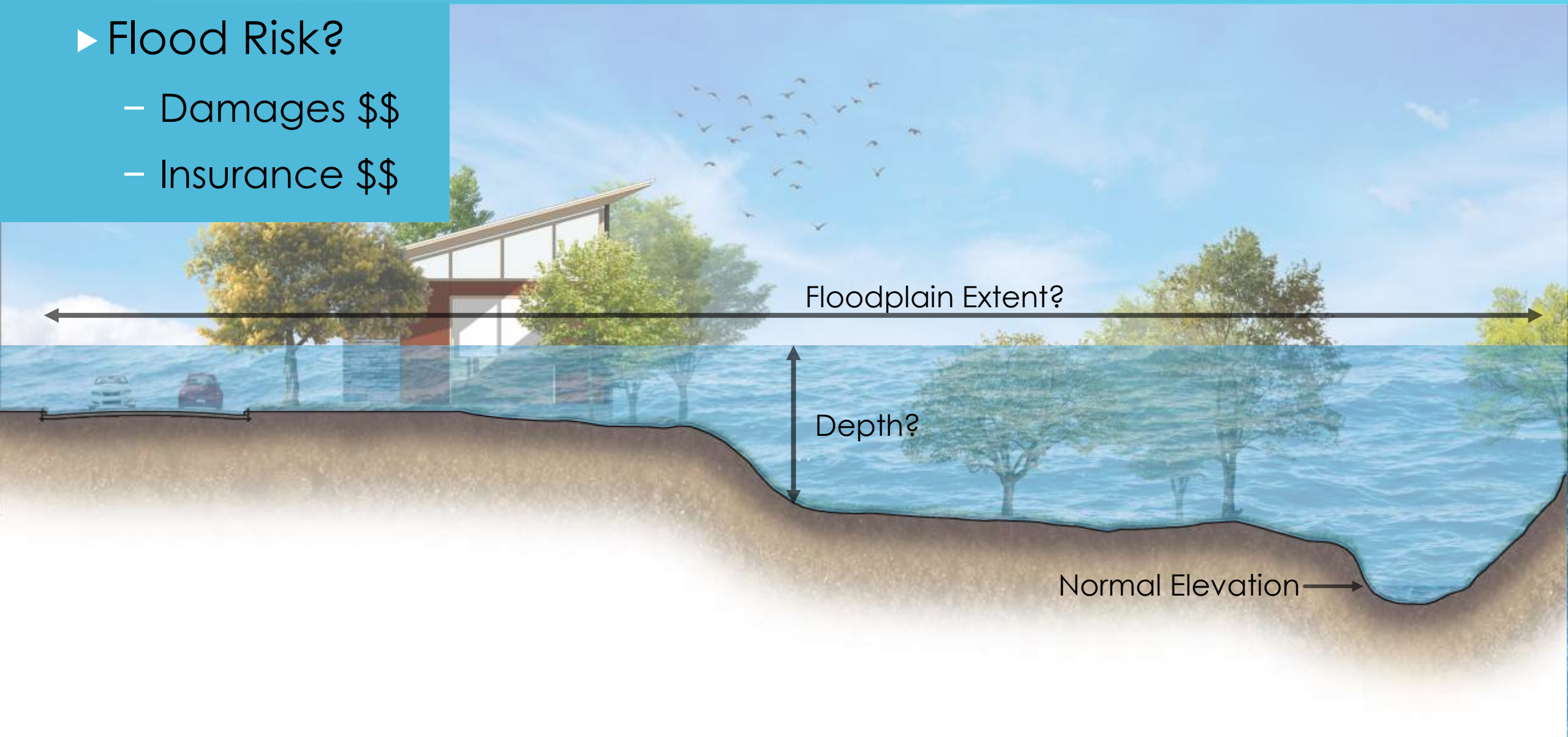
Source: State Flood Assessment

NOT "ONE SIZE FITS ALL"

- A single approach will not work for all of Texas
  - Riverine Flood
  - Coastal Flood
  - Urban Flood
  - Residual Risk
    - Dams
    - Levees

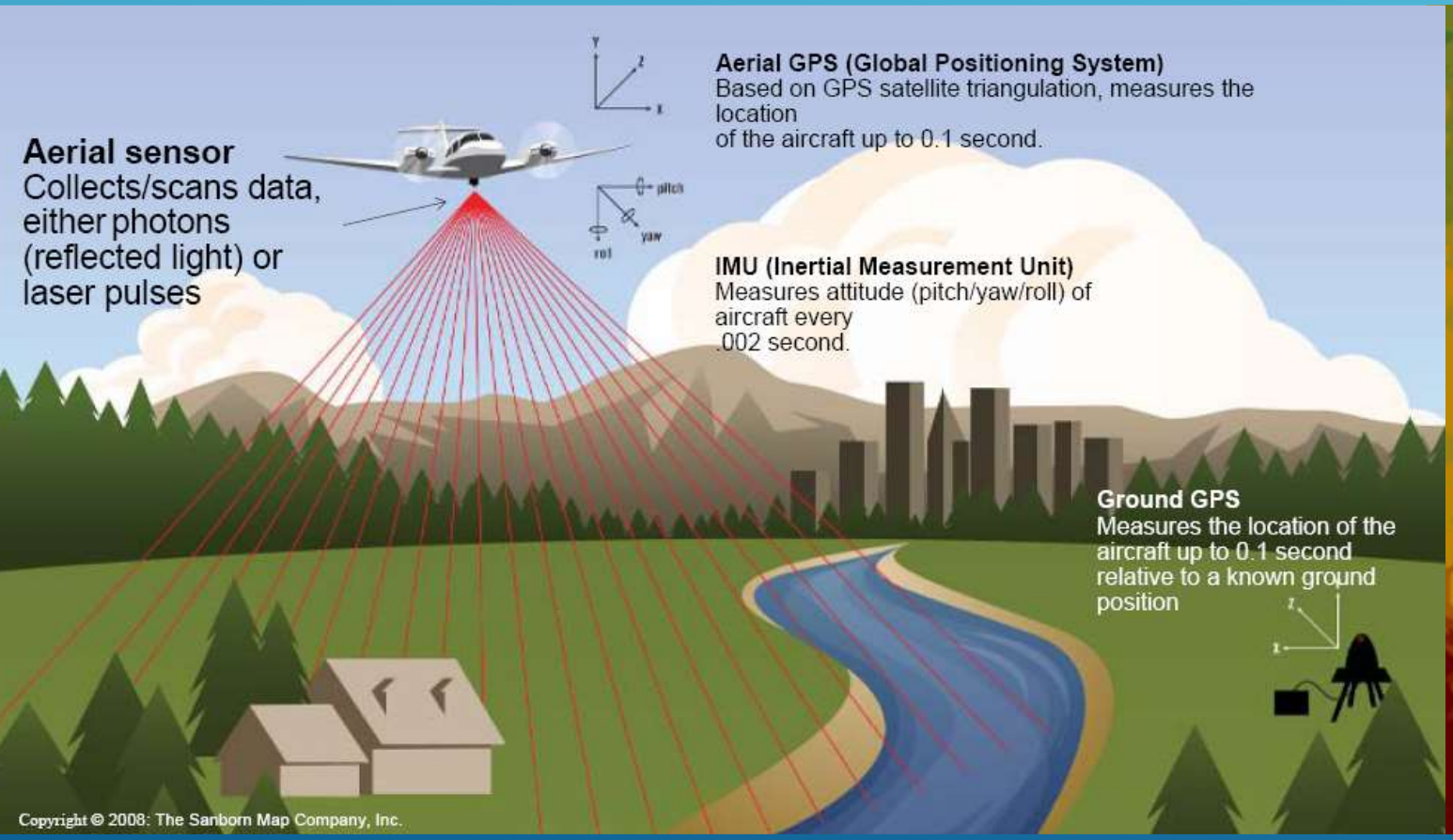
INSUFFICIENT FLOOD RISK INFORMATION

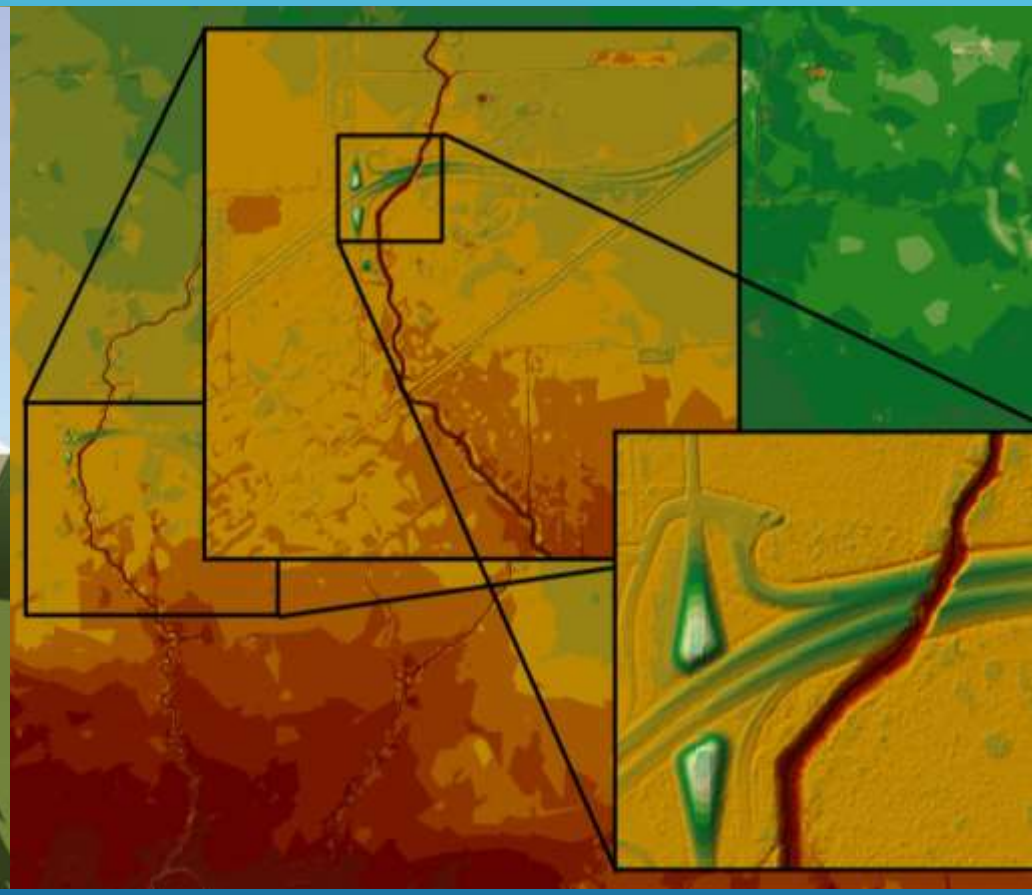
- Flood Risk?
  - Damages $$
  - Insurance $$



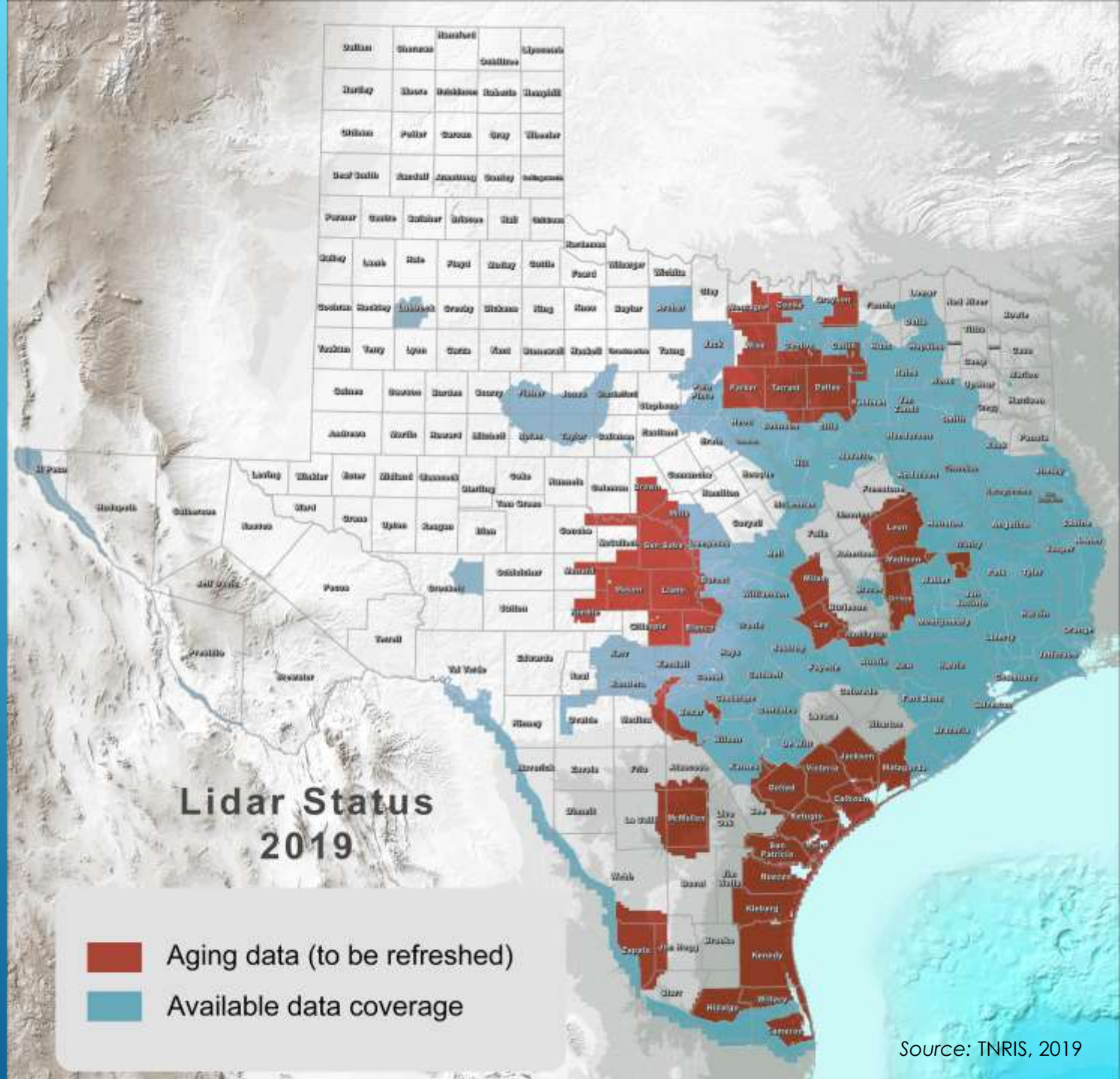
LIGHT DETECTION AND RANGING (LIDAR)

- Remote sensing system that uses laser light to measure distances



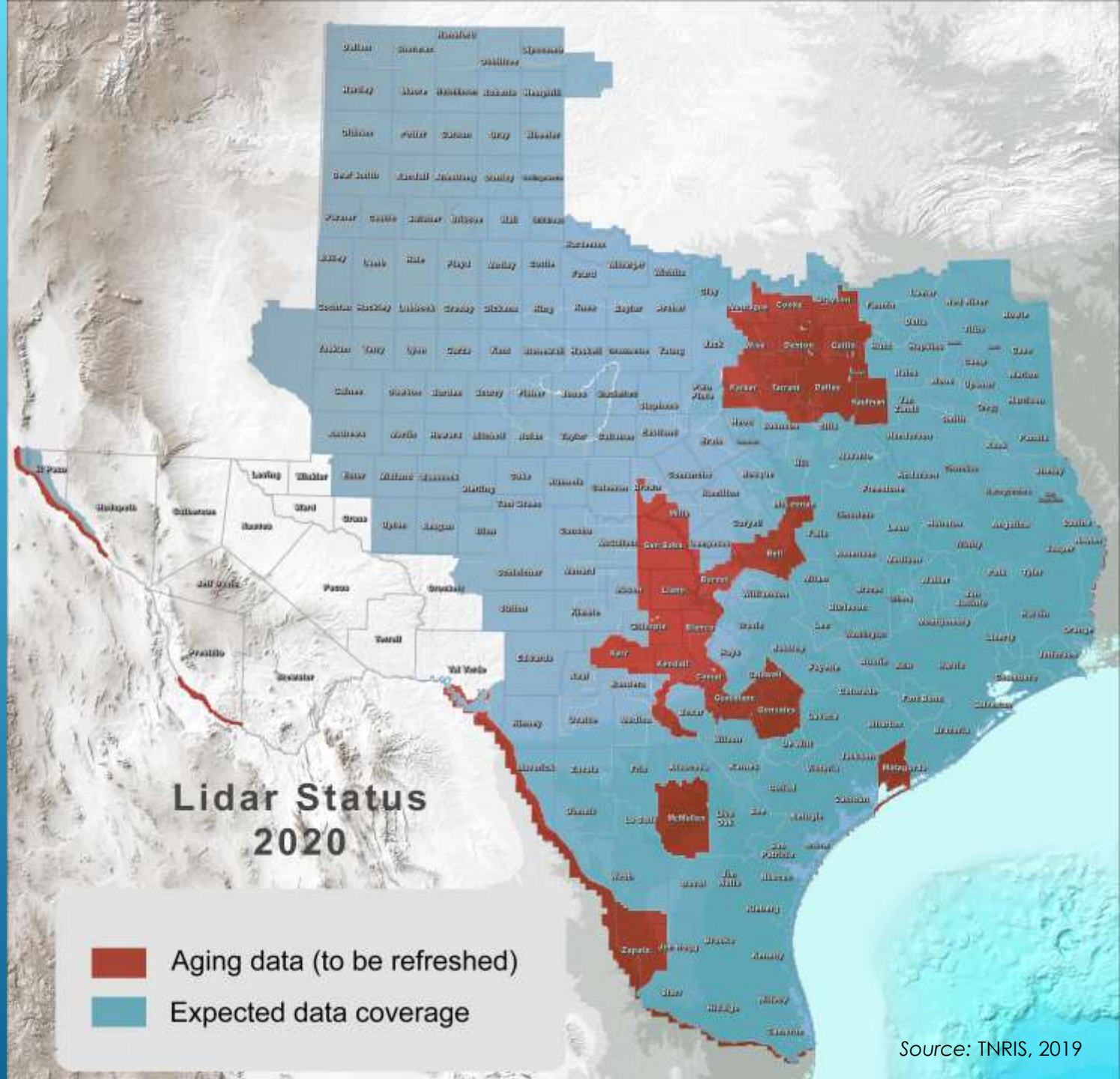


LIDAR STATUS: 2019



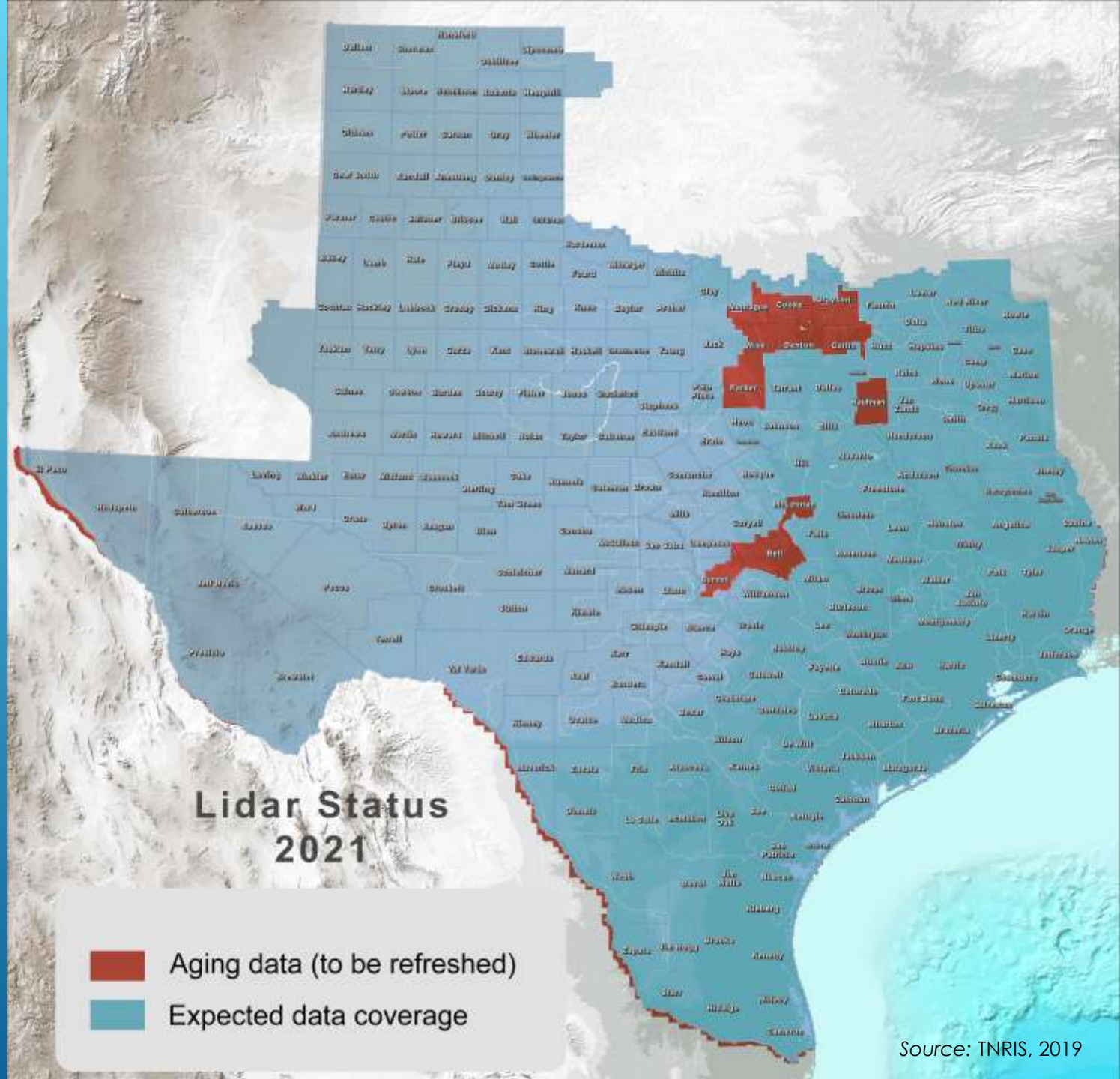
Source: TNRIS, 2019

LIDAR STATUS: 2020



Source: TNRIS, 2019

LIDAR STATUS: 2021



Source: TNRIS, 2019

CHANGING RAINFALL DATA FOR TEXAS

1961 TP-40

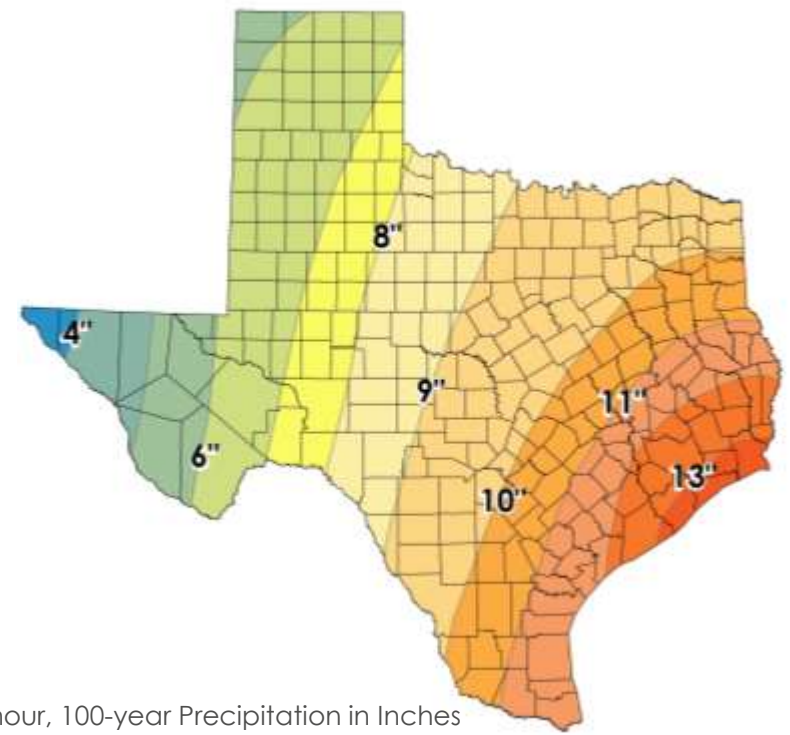
- Weather Bureau Technical Paper 40
  - Rainfall up to 1958

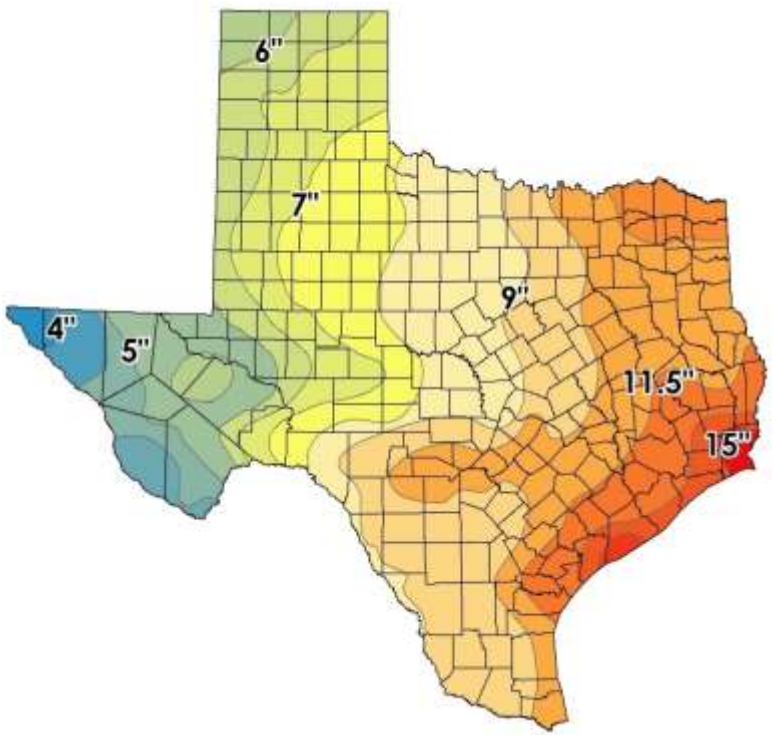
1998 USGS

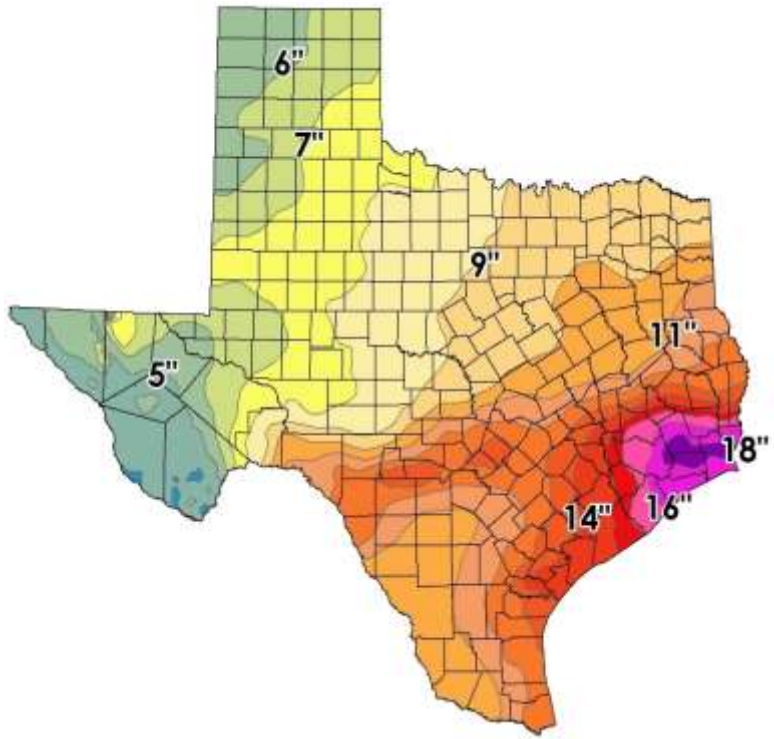
- Depth-Duration Frequency of Precipitation for Texas
  - Rainfall up to 1994

2018 Atlas 14

- NOAA Atlas 14, Volume 11 Precipitation Frequency Atlas of the United States, Texas
  - Rainfall up to 2017



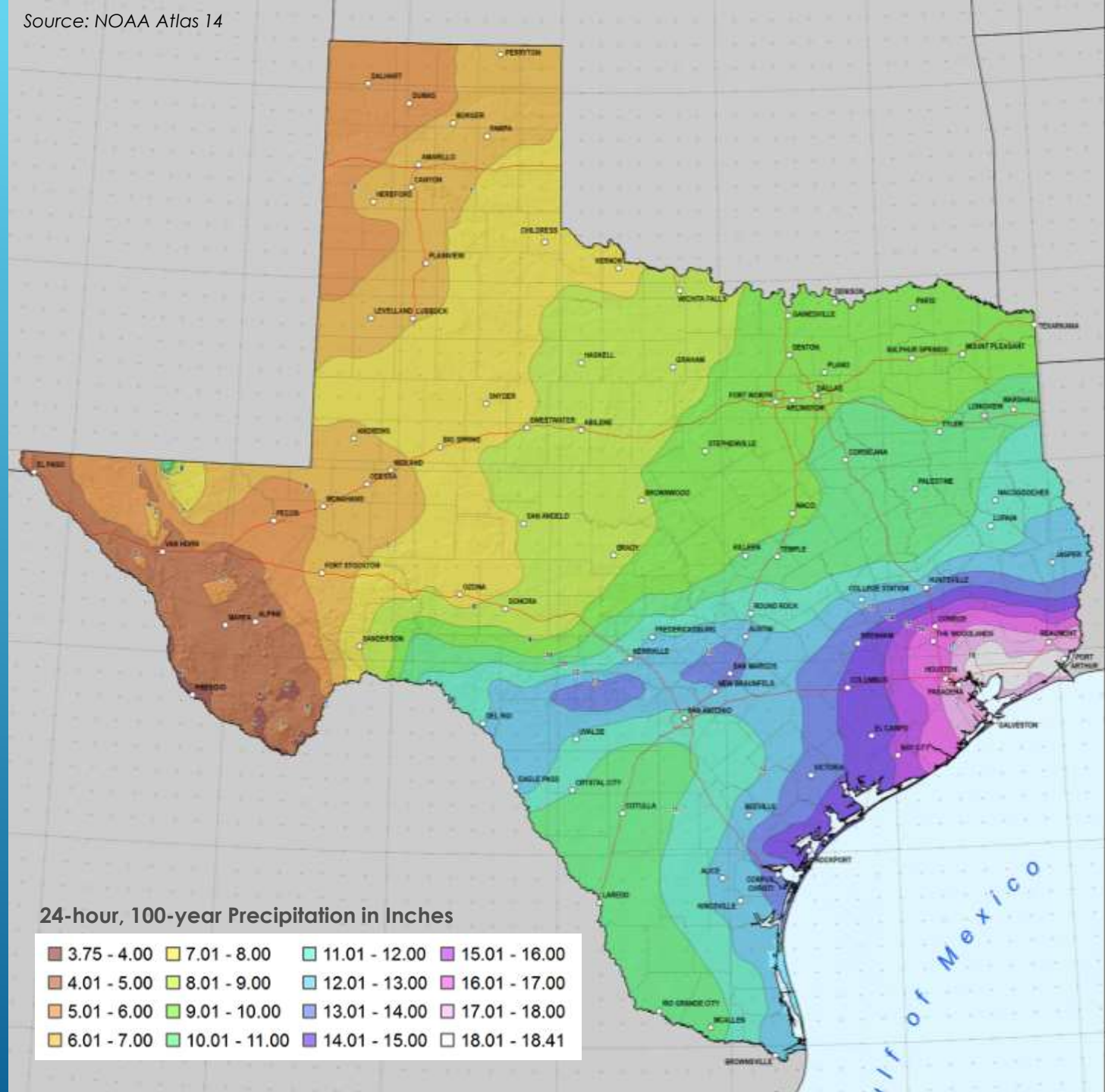




24-hour, 100-year Precipitation in Inches

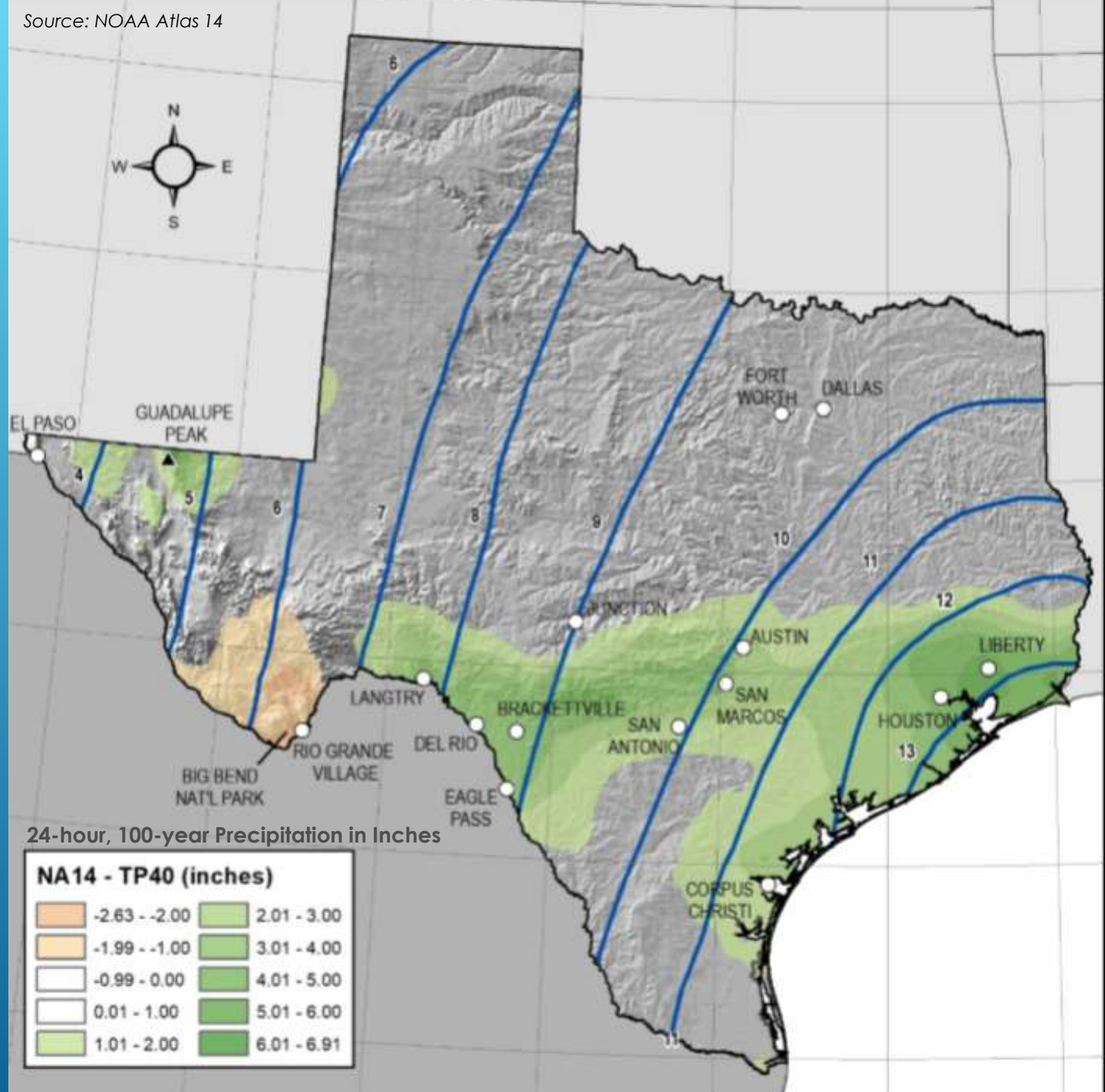
ATLAS 14 RAINFALL

- Released September 27, 2018
- Atlas 14 indicates that the 1% (100-year) annual chance event may be greater than what we previously considered.
- The greatest rainfall changes occur in central Texas and along the Texas coast.



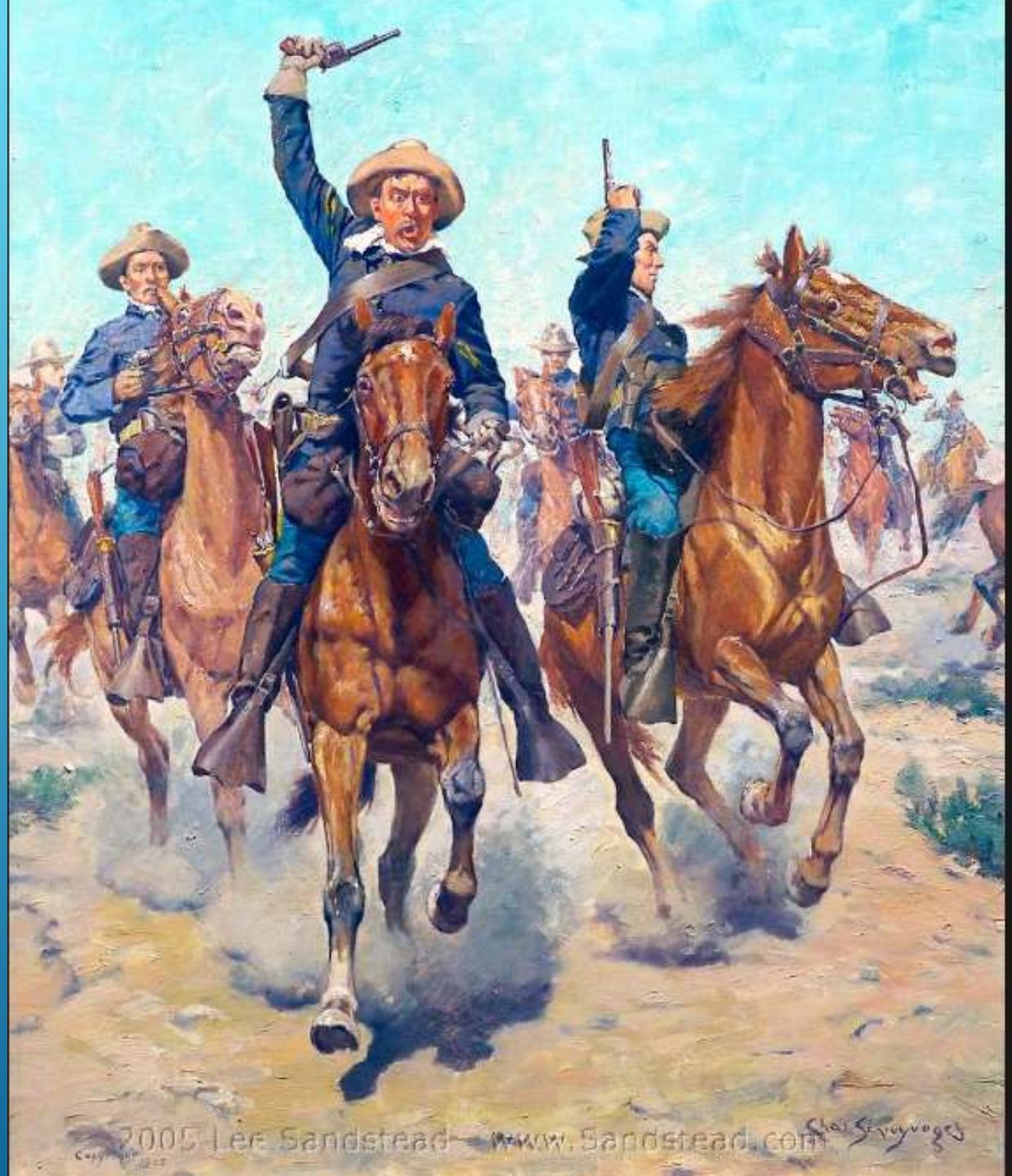
ATLAS 14 RAINFALL

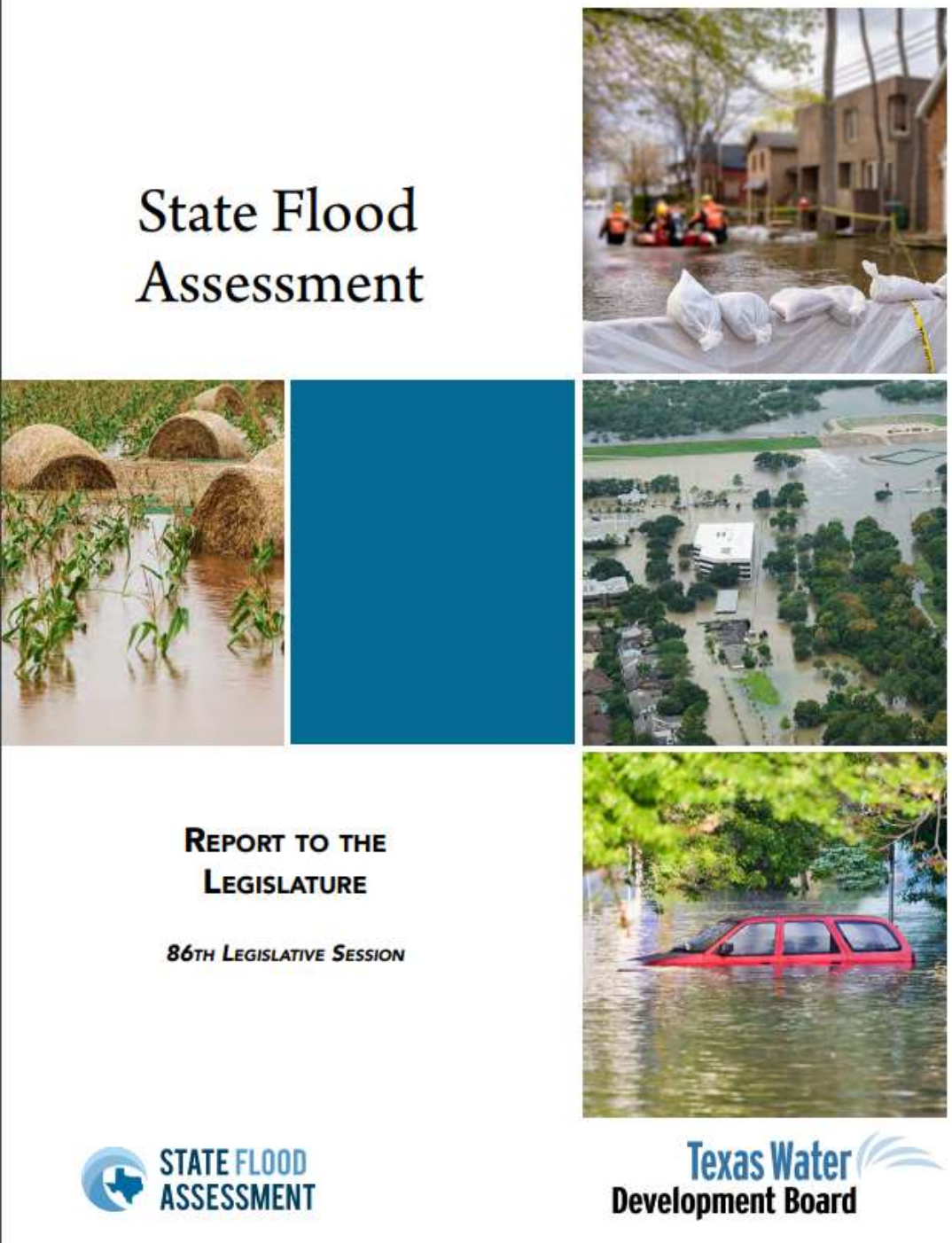
- Atlas 14 compared to TP-40
  - Adds almost 60 years of data
  - Many additional gages



HELP IS ON THE WAY!

- Informed by the TWDB State Flood Assessment
- Tremendous Local Support
- 86th Legislation passed 3 Bills
  - SB 7 (Infrastructure Funding)
  - HJR 4 (Constitution Amend)
  - SB 8 (State Flood Plan)





TWDB STATE FLOOD ASSESSMENT

- Charts a path to flood resilience:
  1. Mapping
  2. Planning
  3. Mitigation

http://www.texasfloodassessment.com/doc/State-Flood-Assessment-report-86th-Legislation.pdf

SENATE BILL (SB) 7

- Infrastructure funding for planning, design, and construction
- Recovery and Resiliency
- Structural and non-structural flood projects
- Will be managed by the TWDB
- Loans, low interest (down to “zero”), and grants
- TWDB will develop rules for this fund
- Encourages federal involvement
- Looks for water supply
- Complicated, ask a banker

HOUSE JOINT RESOLUTION (HJR) 4

- Amend the Constitution to set up infrastructure fund
- Public vote this fall
- Get out the vote

SENATE BILL (SB) 8

- Requires TWDB to develop rules by **Sep 2021**
- Requires regional watershed based plans be developed for each river basin by cities, counties, river authorities, special districts, utilities, etc. by **Sep 2023**
- Requires development of a statewide flood plan by **Sep 2024**
- To be **updated** every subsequent **five years**

SB 8

- Designate flood planning regions corresponding to each river basin
- Provide financial and technical assistance to flood planning groups
- Designate representatives from each flood planning region
- Regional flood planning groups can then add additional members
- Evaluate condition and adequacy of existing flood infrastructure
- Ranked statewide list of ongoing and proposed flood control and mitigation projects and strategies

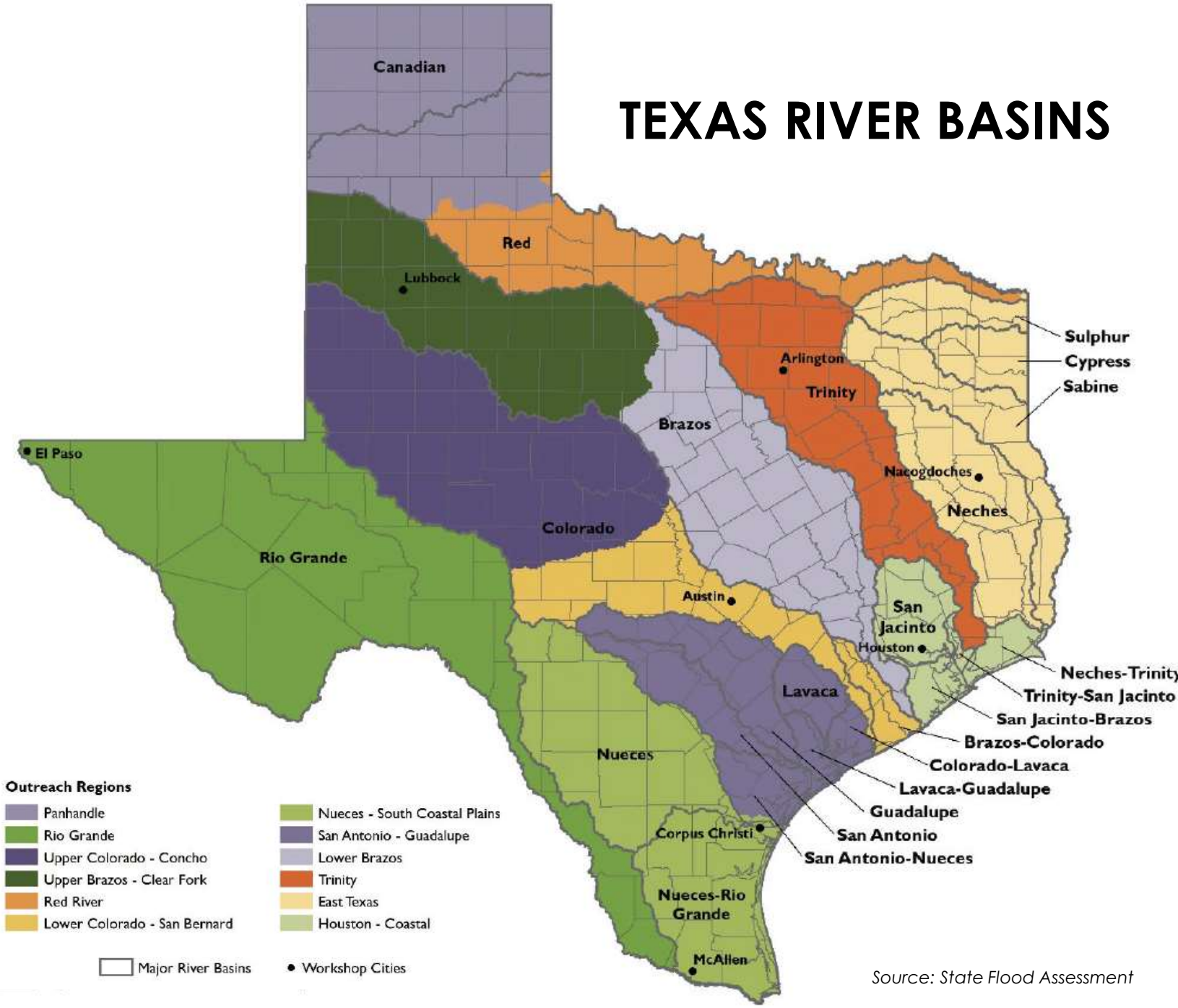
STATEWIDE FLOOD PLAN FUNDING

- Requested State Funding
  - FY 2020-2021: $47 Million
  - FY 2022-2023: $87 Million
  - FY 2024-2025: $43 Million

WATERSHED FLOOD PLANS

- Local flood plans roll up to a….
- Regional (watershed) flood plans roll up to a …
- Statewide flood plan!

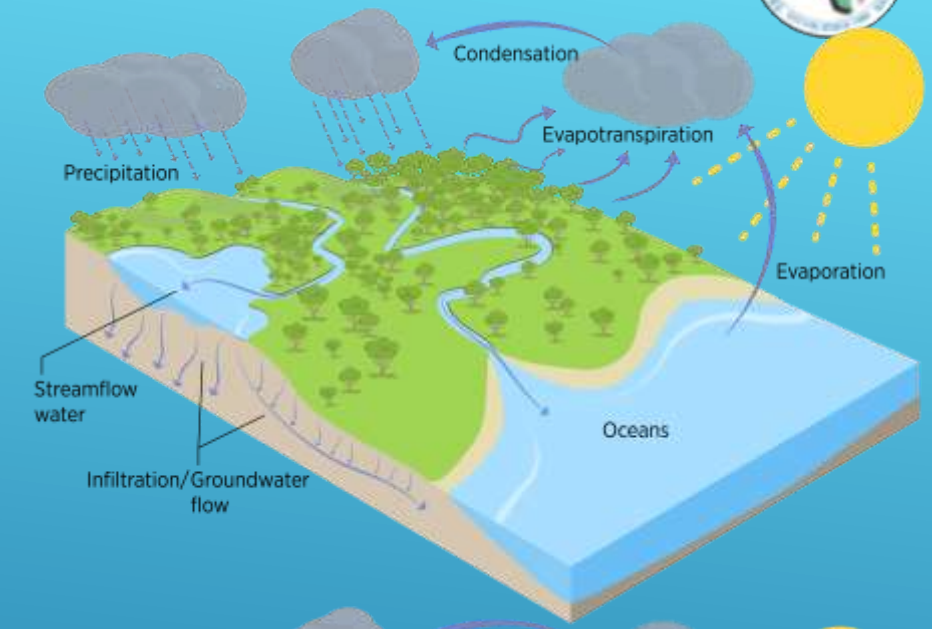
TEXAS RIVER BASINS

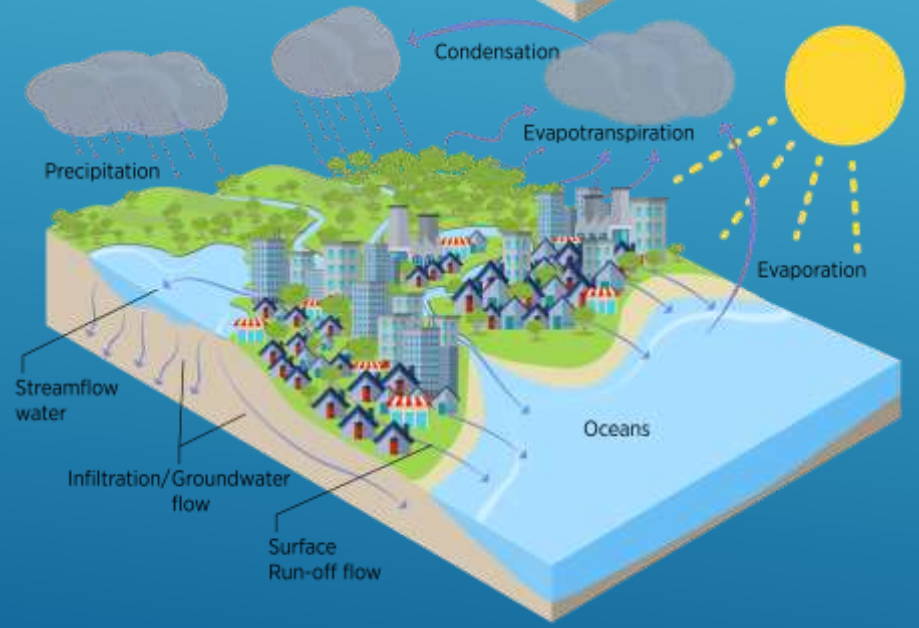


Source: State Flood Assessment

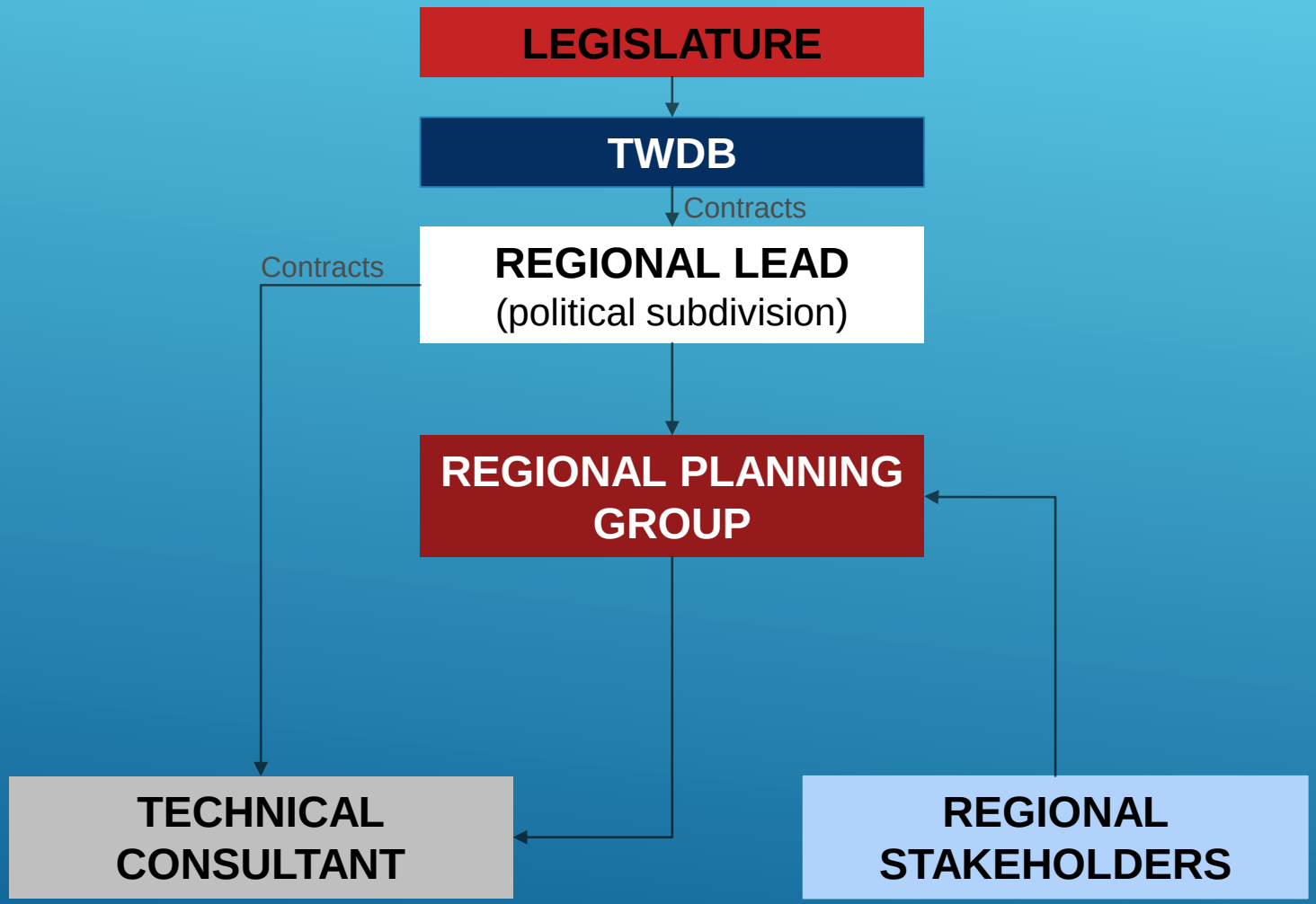
IMPROVED FLOOD RISK INFORMATION

- Hydrology
  - How much water enters our systems
  - When does the water enter the systems
  - Integrate new rainfall
  - Combined impacts
- Hydraulics
  - How high does the water get
  - How fast is it moving
  - What is the impact



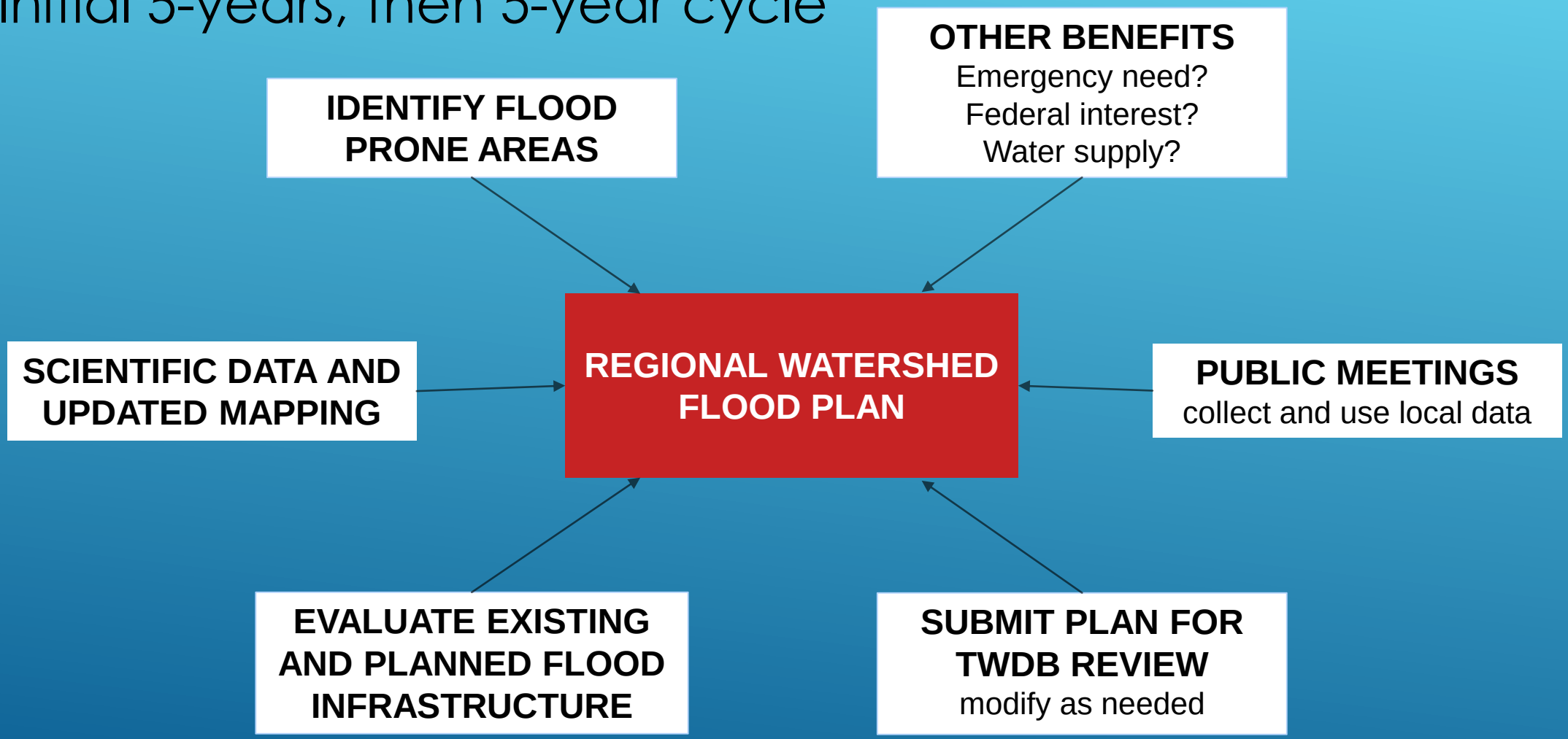


SIMILARITY TO STATE WATER PLANNING?



STATE FLOOD PLAN OBJECTIVES (SB 8)

- Initial 5-years, then 5-year cycle



LATEST FROM TWDB:

Dear friends,

As you may already know, Governor Abbott recently signed legislation creating new flood financing programs and a state flood planning process to be administered by the Texas Water Development Board (TWDB). These programs will greatly expand the State's efforts to plan for and mitigate flood as well as provide funding for drainage and flood projects.

For more information on the programs, please view our newly released frequently asked questions.

To ensure we create programs that meet the needs of our diverse state, we will be asking for comments from the public and as many stakeholders as possible. Later this summer we will be holding meetings around the state and will have a process in place to receive comments as we develop our administrative rules for the programs.

To receive all our information on that process, please sign up for our email updates. The link will take you to a sign-up page that allows you to choose various topics for which you would like to receive our emails. Be sure to check the box for TWDB Flood Information.

For more information, please email flood@twdb.texas.gov or call 512-463-8725.

We hope you will join us in this critical effort.

Sincerely,
Jeff Walker
Executive Administrator
Texas Water Development Board

NCTCOG CRS USERS GROUP/ELECTED OFFICIALS

BASE LEVEL ENGINEERING (BLE) OVERVIEW & BENEFITS

JULY 18, 2019

HALFF

North Central Texas Council of Governments

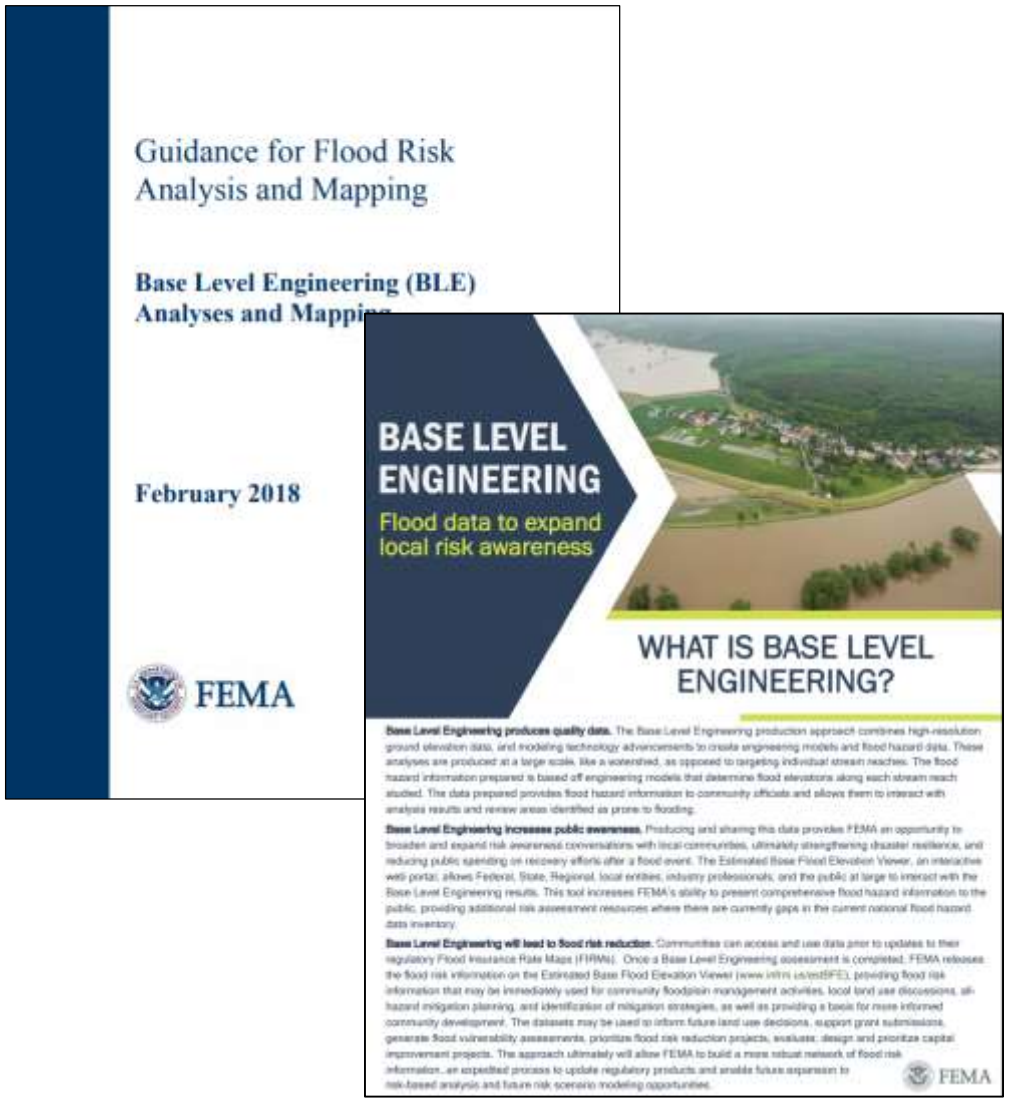
PRESENTATION TOPICS

1. Description of BLE
2. BLE Process and Development
3. Purpose
4. Deployment
5. Benefits and Uses
6. BFE Viewer Tutorial

BLE OVERVIEW | DESCRIPTION

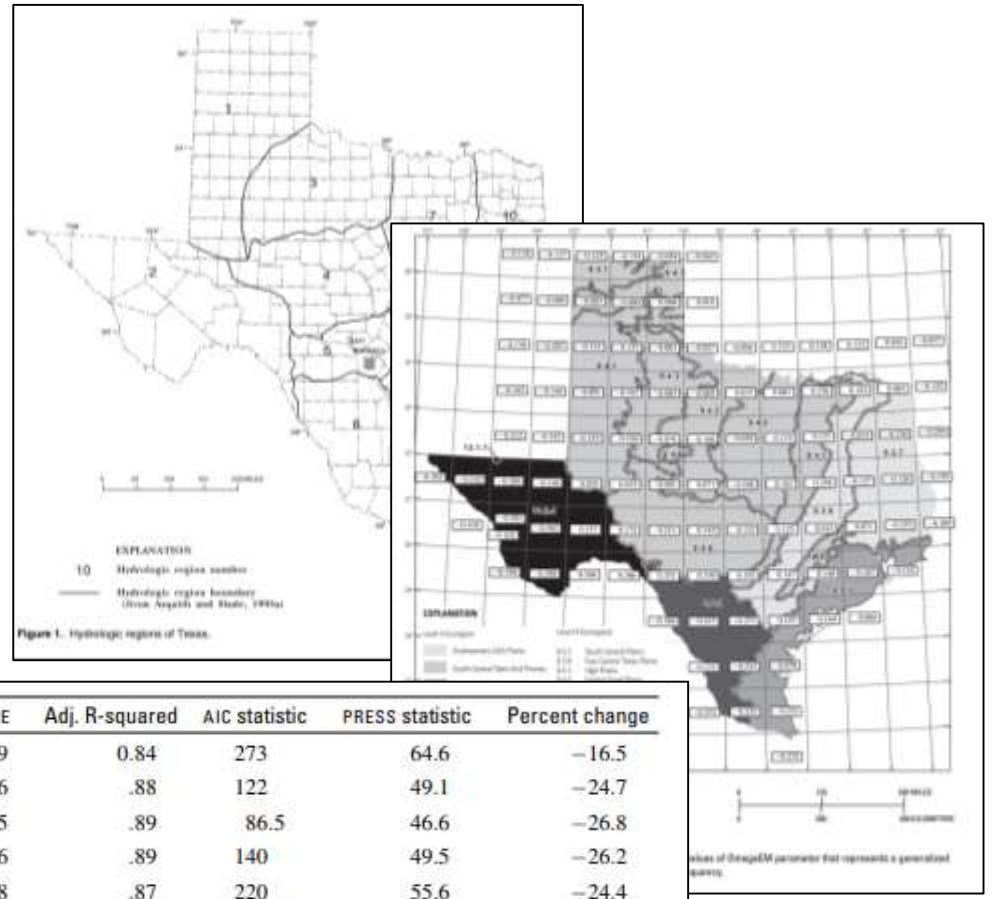
WHAT IS BLE?

- "BLE is an **automated riverine hydrologic and hydraulic modeling** approach, usually generated for large scale watersheds (HUC 8) with high-resolution topography to create and determine flood hazard data
- Engineering models are created during a Base Level Engineering assessment, producing information that **meets the mapping Standards** for Flood Risk Projects (FEMA Policy Memo FP 204-078-1) to produce Zone A (1-percent-annual-chance flood) information. BLE data is intended to represent the base level of investment needed for all flood study efforts FEMA will undertake"



HYDROLOGY (1D)

- Utilizes1996 and 2009 Regional Regression Equations to calculate peak discharges
- Results are adjusted based on existing stream gage and dam storage data if available
- Drainage areas are autogenerated and peak discharges calculated for the 10-, 25-, 50-, 100-, and 500-year storm events

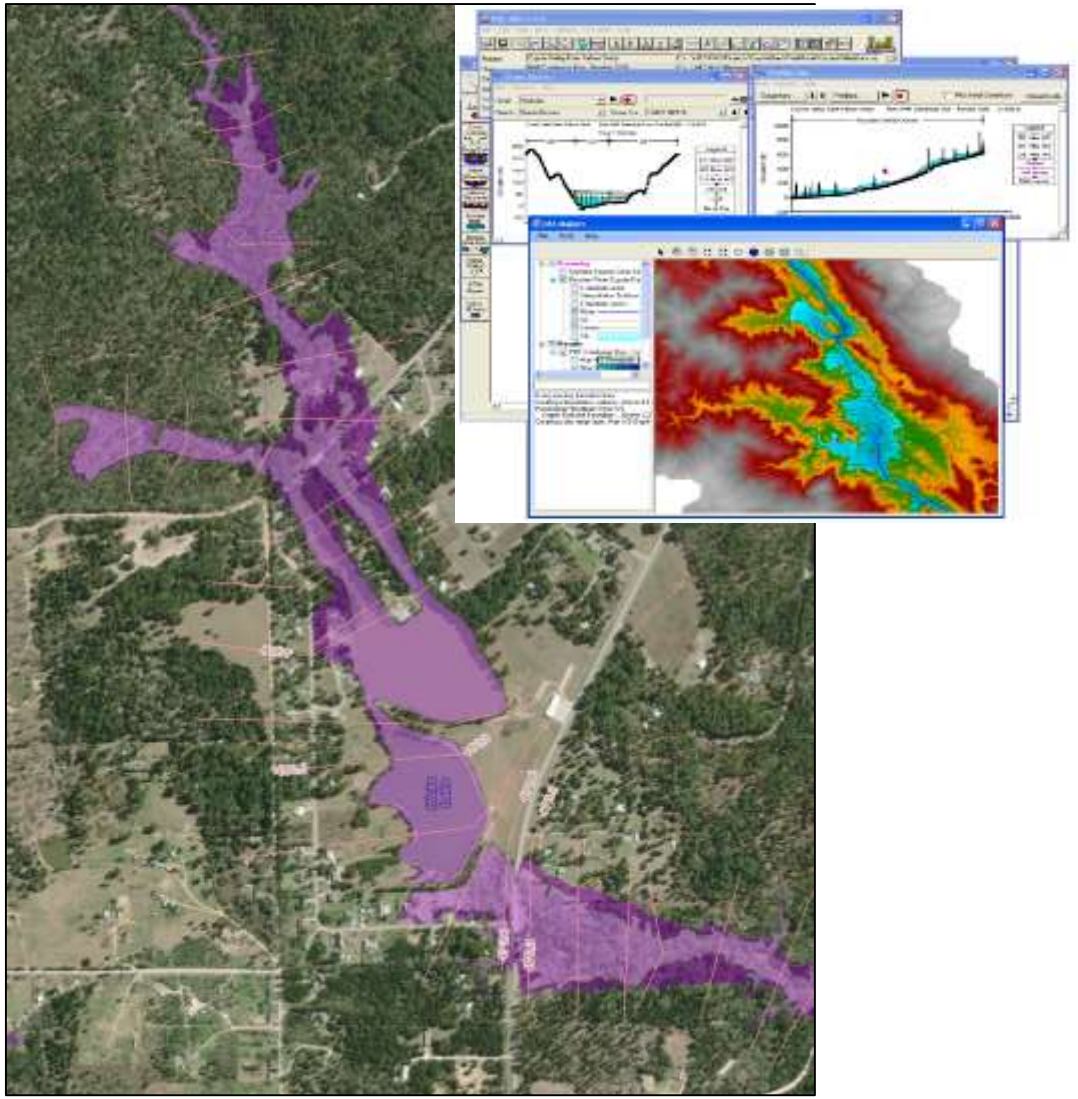


Region 4 (sites with contributing drainage area less than 32 square miles)[2]						
2 yr	$Q_2 = 97.1\ A^{.626}$	A: 0.19 to 81.1	0.49	134	0.44	28
5 yr	$Q_5 = 196\ A^{.650}\ SH^{.257}$		.70	96	.35	28
10 yr	$Q_{10} = 293\ A^{.697}\ SH^{.281}$	SH: 0.05 to 6.52	.74	92	.34	28
25 yr	$Q_{25} = 455\ A^{.741}\ SH^{.311}$		.75	99	.36	28
50 yr	$Q_{50} = 53\ A^{.927}\ SL^{.558}\ SH^{.333}$	SL: 13.5 to 226	.74	107	.38	28
100 yr	$Q_{100} = 51\ A^{.968}\ SL^{.627}\ SH^{.353}$		.72	120	.41	28
Region 4 (sites with contributing drainage area greater than 32 square miles)[2]						
2 yr	$Q_2 = 0.00660\ A^{1.29}\ SL^{2.09}$	A: 12 to 19,819	.68	72	.28	39
5 yr	$Q_5 = 0.0212\ A^{1.24}\ SL^{2.18}$		.76	51	.21	39
10 yr	$Q_{10} = 0.0467\ A^{1.20}\ SL^{2.18}$	SH: 0.49 to 19.7	.76	49	.20	39
25 yr	$Q_{25} = 0.102\ A^{1.16}\ SL^{2.18}$		.70	54	.22	39
50 yr	$Q_{50} = 0.166\ A^{1.13}\ SL^{2.19}$	SL: 3.52 to 36.1	.64	60	.24	39
100 yr	$Q_{100} = 0.252\ A^{1.11}\ SL^{2.19}$		.57	69	.27	39

Regression equation	RSE	Adj. R-squared	AIC statistic	PRESS statistic	Percent change
$Q_2 = P^{1.398} S^{0.270} \times 10^{[0.776\Omega + 50.98 - 50.30A^{-0.0358}]}$	0.29	0.84	273	64.6	−16.5
$Q_5 = P^{1.308} S^{0.372} \times 10^{[0.885\Omega + 16.62 - 15.32A^{-0.0215}]}$	.26	.88	122	49.1	−24.7
$Q_{10} = P^{1.203} S^{0.403} \times 10^{[0.918\Omega + 13.62 - 11.97A^{-0.0289}]}$	.25	.89	86.5	46.6	−26.8
$Q_{25} = P^{1.140} S^{0.446} \times 10^{[0.945\Omega + 11.79 - 9.819A^{-0.0374}]}$	.26	.89	140	49.5	−26.2
$Q_{50} = P^{1.105} S^{0.476} \times 10^{[0.961\Omega + 11.17 - 8.997A^{-0.0424}]}$	.28	.87	220	55.6	−24.4
$Q_{100} = P^{1.071} S^{0.507} \times 10^{[0.969\Omega + 10.82 - 8.448A^{-0.0467}]}$	.30	.86	320	64.8	−21.7
$Q_{200} = P^{1.034} S^{0.531} \times 10^{[0.975\Omega + 10.61 - 8.058A^{-0.0504}]}$	.33	.84	436	77.2	−19.0
$Q_{250} = P^{1.021} S^{0.541} \times 10^{[0.977\Omega + 10.56 - 7.943A^{-0.0516}]}$	.34	.83	474	81.9	−18.1
$Q_{500} = P^{0.988} S^{0.569} \times 10^{[0.976\Omega + 10.40 - 7.605A^{-0.0554}]}$	.37	.81	591	98.7	−15.6

HYDRAULIC MODELING (1D)

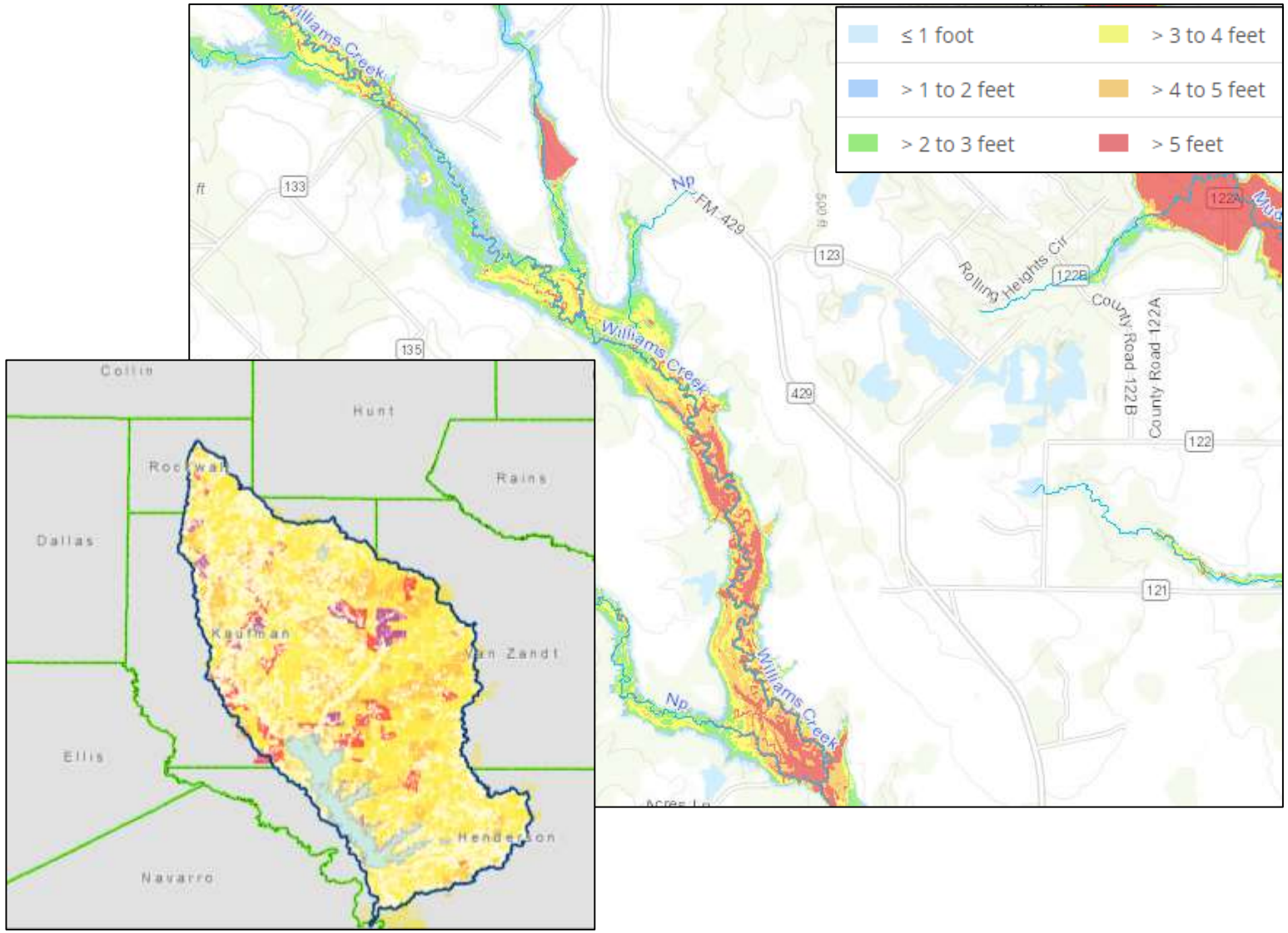
- For the North Texas region automated hydraulic building tools are used to generate HEC-RAS models based on high-resolution topographic data and incorporate the regional regression peak discharges
- Models do not contain infrastructure (dams, levees, culverts, bridges, diversions, etc.) or survey data
- Mapping and water surface elevation grids are autogenerated for the 10-,100-, 500-year storm events



BLE OVERVIEW | PROCESS & DEVELOPMENT

NON-REGULATORY PRODUCTS

- Depth and Analysis Grids for the 100- and 500-year storm events
- Areas of Expanded Flood Risk
- Flood Risk Assessment – Hazus



HALFF

North Central Texas Council of Governments

BLE OVERVIEW | PURPOSE

GOALS OF BLE

- Quickly generate model backed mapping with base flood information at a HUC-8 or countywide scale
- Identify flood risk based on current topographic conditions
- Provide quality data for local planning and decision making
- Aid in Discovery process
- Provide base models for future conversion to detailed studies (Zone AE with and w/o floodways)
- Increase public awareness

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BLE DOES NOT

- Replace existing limited or detailed studies
- Account for effects of routing storage within a stream or detention from dams
- Include hydraulic impacts of creek/stream crossings such as bridges and culverts

BLE OVERVIEW | DEPLOYMENT

PHASE 0 — Investment

LiDAR Acquisition
Base Level Engineering

PHASE 1 — Discovery

Watershed Needs
Coordination

PHASE 2 — Risk ID & Assessment

Engineering Studies

PHASE 3 — Regulatory Product Update

FEMA Region 6

Map Maintenance

Continued Community Update of Models and Maps

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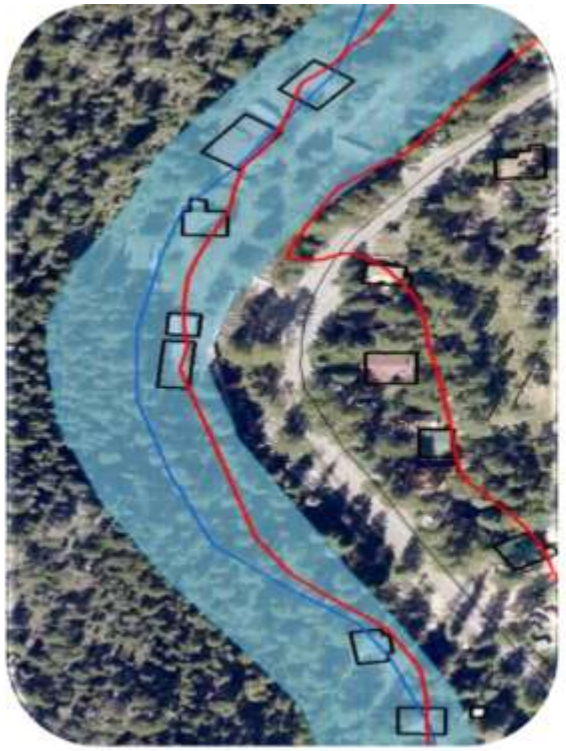
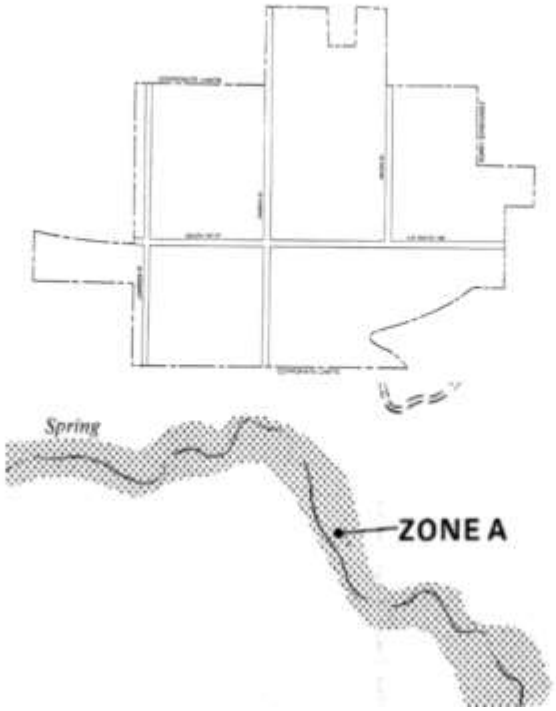
BLE - FOCUS AREAS



UNKNOWN &
UNVERIFIED MILES

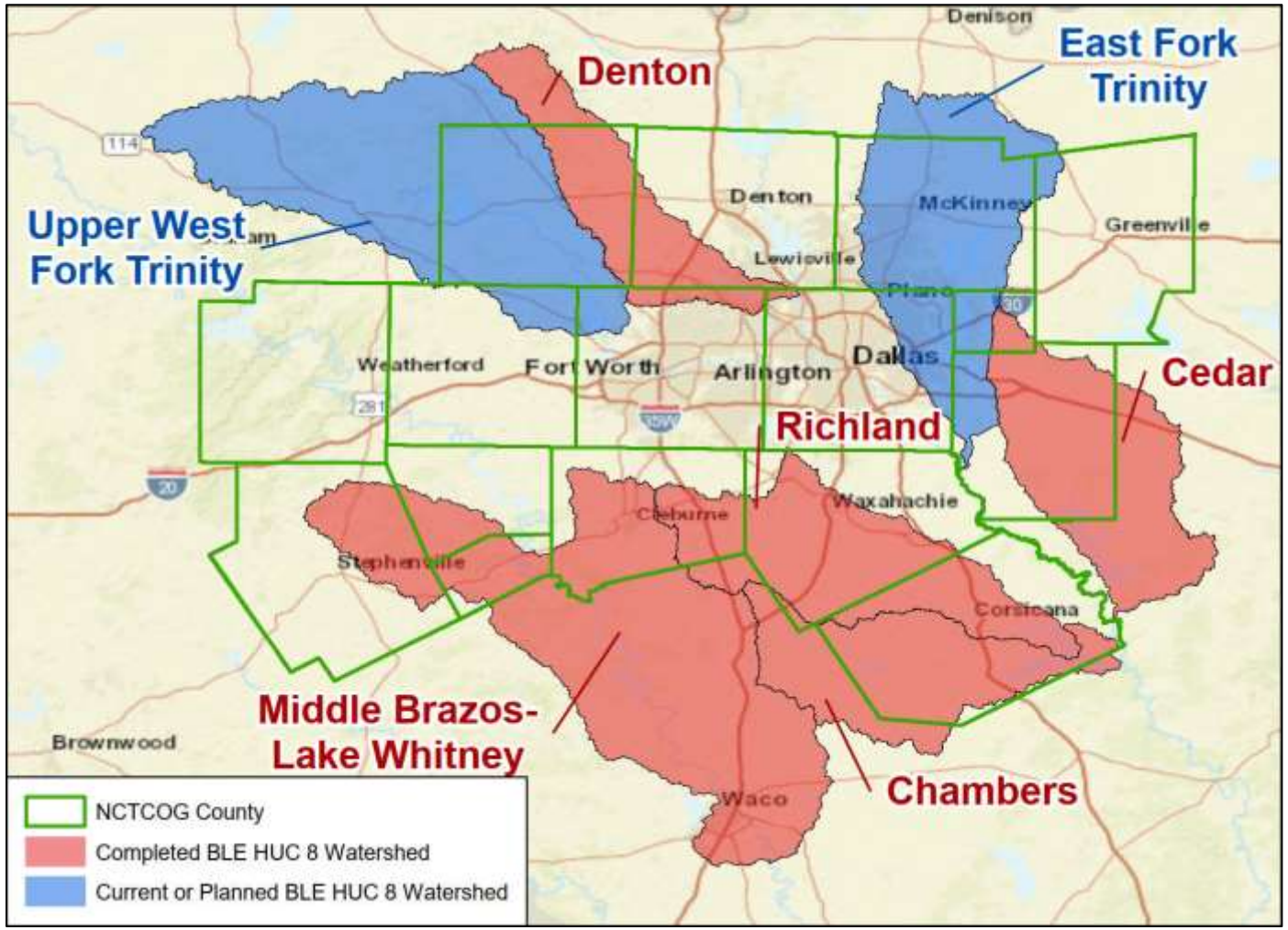


UNMODERNIZED
COMMUNITIES

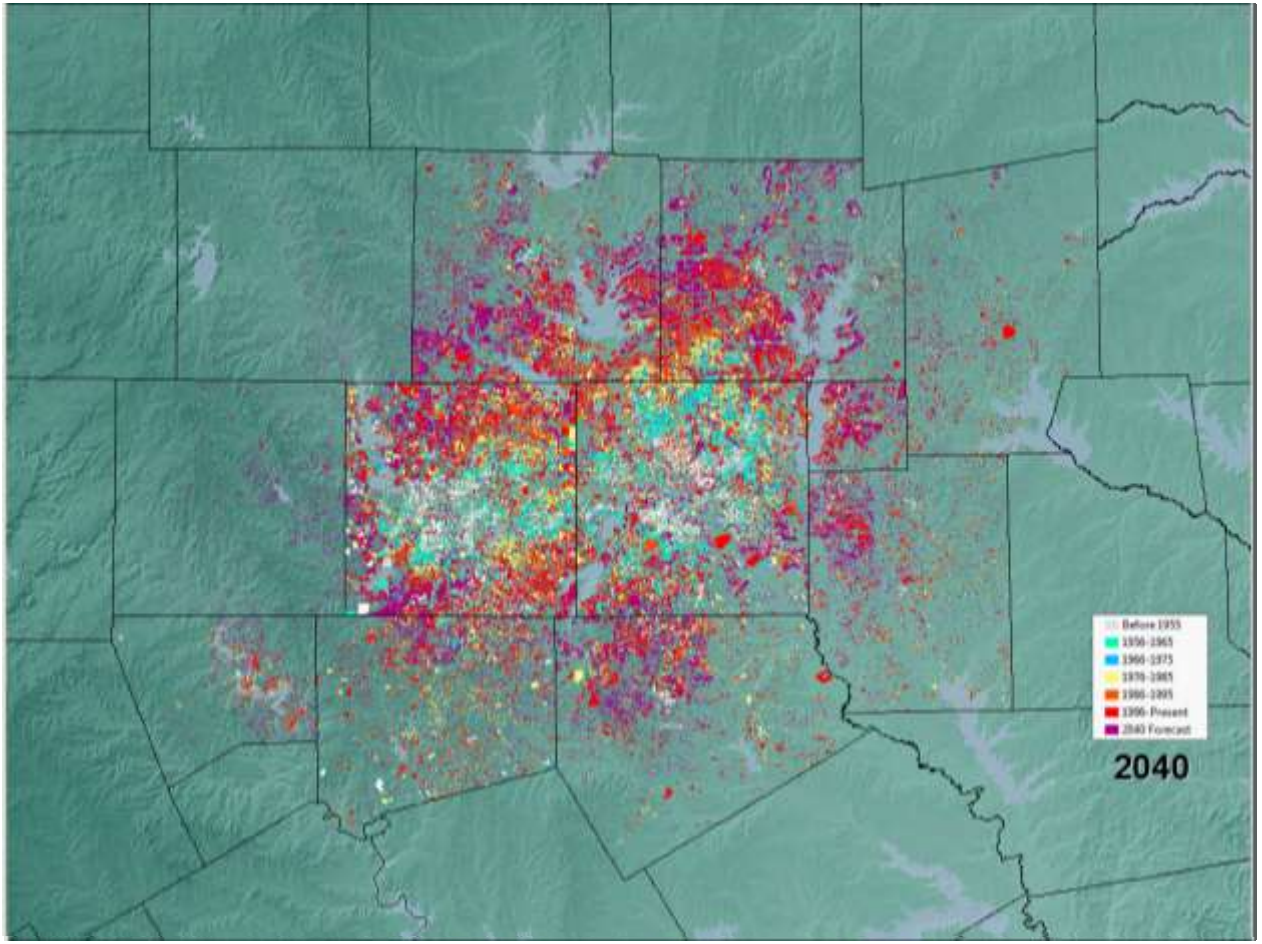
UNMAPPED MILES

Source: FEMA R6 BLE for Community's Local Officials And Decision Makers

BLE – NORTH TEXAS (NCTCOG REGION)



NORTH CENTRAL TEXAS GROWTH 1950-2040

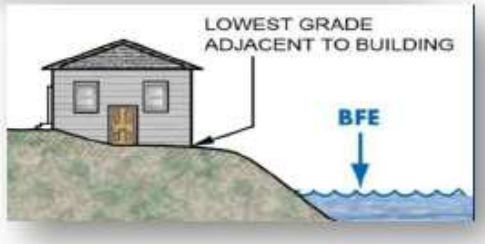


COMMUNITY OFFICIALS AND DECISION MAKERS

COMMUNICATION & PERMITTING

MITIGATION PLANNING

INSURANCE RATING



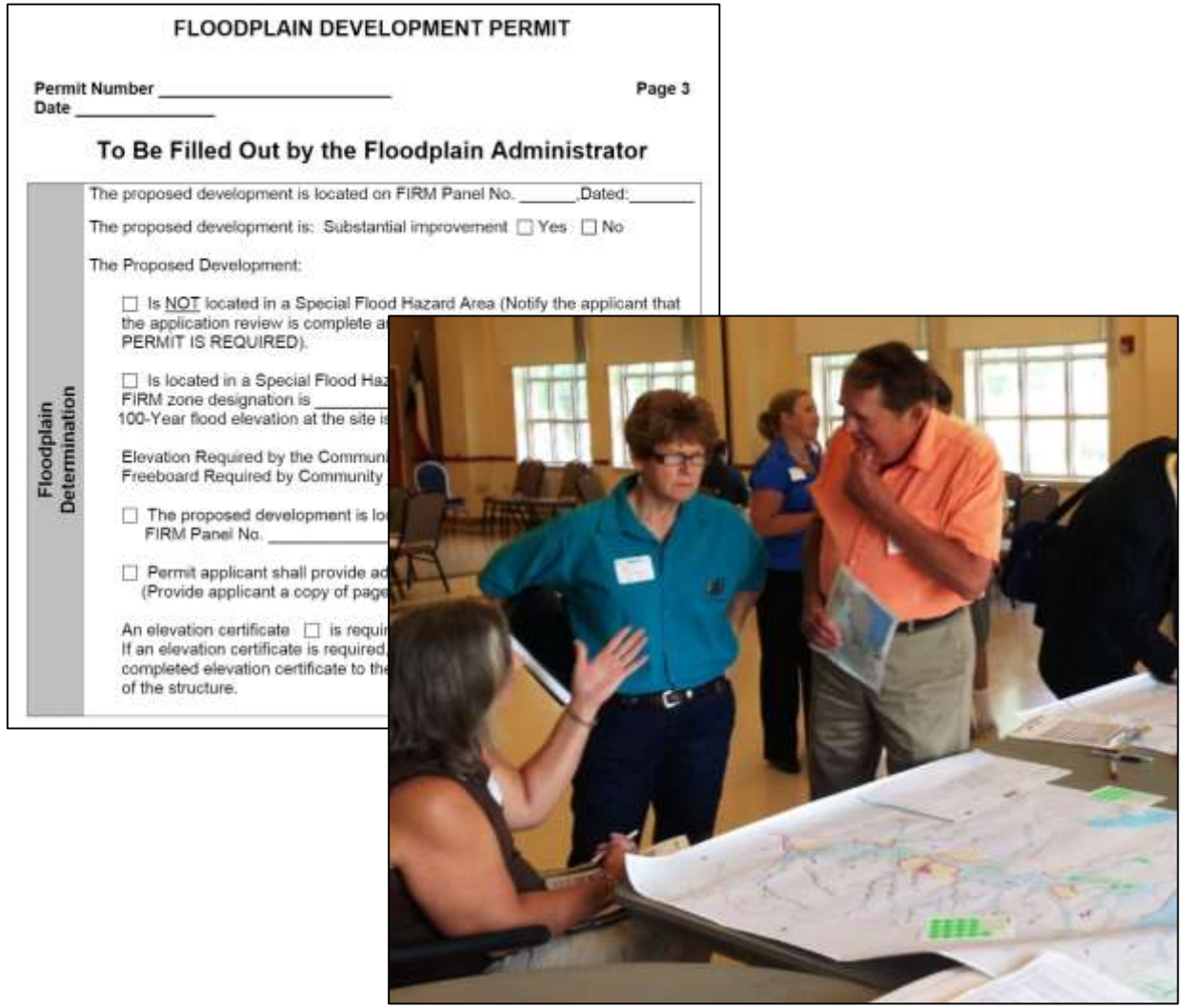
LOMAs

20

Source: FEMA R6 BLE for Community's Local Officials And Decision Makers

COMMUNICATION AND PERMITTING

- Communication of Updated Risk
  - Community Staff
  - Stakeholders (Public & Industry)
- Permitting
  - Identify updated floodplain limits
  - Provide starting model to meet local criteria



FLOODPLAIN DEVELOPMENT PERMIT

Permit Number _____ Page 3
Date _____

To Be Filled Out by the Floodplain Administrator

Floodplain Determination

The proposed development is located on FIRM Panel No. _____ Dated: _____

The proposed development is: Substantial improvement ☐ Yes ☐ No

The Proposed Development:

☐ Is NOT located in a Special Flood Hazard Area (Notify the applicant that the application review is complete a
PERMIT IS REQUIRED).

☐ Is located in a Special Flood Haz
FIRM zone designation is _____
100-Year flood elevation at the site i

Elevation Required by the Commun
Freeboard Required by Community

☐ The proposed development is lo
FIRM Panel No. _____

☐ Permit applicant shall provide ac
(Provide applicant a copy of page

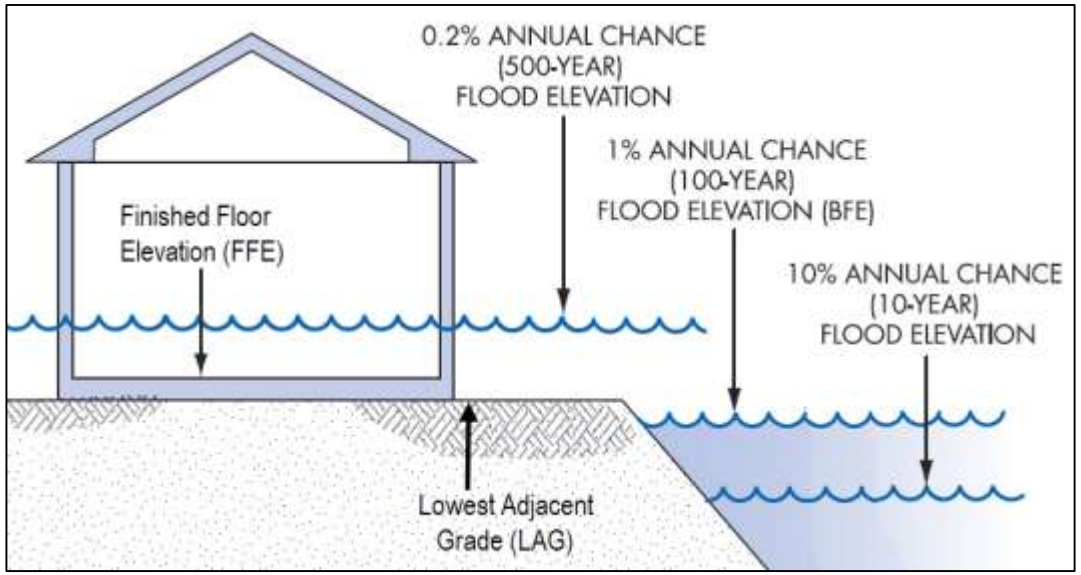
An elevation certificate ☐ is requi
If an elevation certificate is required,
completed elevation certificate to th
of the structure.

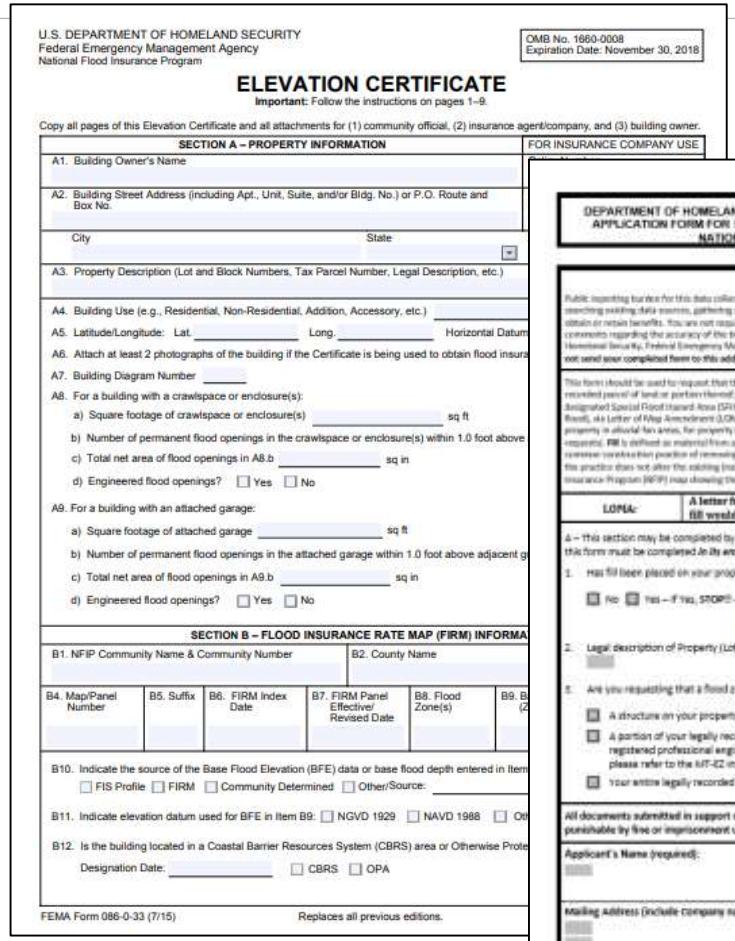
MITIGATION PLANNING

- Prioritize Capital Improvement Projects
- Update models to detailed studies
- Utilize modeling to scale projects
- Planning for future development
- Identify populations at risk
- Identify possible voluntary buyout properties

INSURANCE RATING AND LOMAS

- Generate BFE's from FEMA's BFE Viewer
- Determine 100-year WSEL at a property
- Supply BFE back up data to be submitted with LOMAs





U.S. DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
National Flood Insurance Program

OMB No. 1660-0008
Expiration Date: November 30, 2018

ELEVATION CERTIFICATE

Important: Follow the instructions on pages 1–9.

Copy all pages of this Elevation Certificate and all attachments for (1) community official, (2) insurance agent/company, and (3) building owner.

SECTION A – PROPERTY INFORMATION | FOR INSURANCE COMPANY USE

A1. Building Owner's Name

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.

City State

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.)

A5. Latitude/Longitude: Lat. Long. Horizontal Datum

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insura

A7. Building Diagram Number

A8. For a building with a crawlspace or enclosure(s):

a) Square footage of crawlspace or enclosure(s) sq ft

b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above

c) Total net area of flood openings in A8.b sq in

d) Engineered flood openings? ☐ Yes ☐ No

A9. For a building with an attached garage:

a) Square footage of attached garage sq ft

b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent g

c) Total net area of flood openings in A9.b sq in

d) Engineered flood openings? ☐ Yes ☐ No

SECTION B – FLOOD INSURANCE RATE MAP (FIRM) INFORMA

B1. NFIP Community Name & Community Number | B2. County Name

B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/ Revised Date	B8. Flood Zone(s)	B9. B (Z

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item
☐ FIS Profile ☐ FIRM ☐ Community Determined ☐ Other/Source:

B11. Indicate elevation datum used for BFE in Item B9: ☐ NGVD 1929 ☐ NAVD 1988 ☐ Ot

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Prote
Designation Date: ☐ CBRS ☐ OPA

FEMA Form 086-0-33 (7/15) Replaces all previous editions.

DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY
APPLICATION FORM FOR SINGLE RESIDENTIAL LOT OR STRUCTURE AMENDMENTS TO NATIONAL FLOOD INSURANCE PROGRAM MAPS

O.M.B. NO. 1660-0015
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this data collection is estimated to average 2.4 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and submitting the form. This collection of information is required to obtain or retain benefits. You are not required to respond to this collection of information unless a valid OMB control number is displayed on the form. Send comments regarding the accuracy of this burden estimate and any suggestions for reducing the burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005, Paperwork Reduction Project (1660-0015). **NOTE: Do not send your completed form to this address.**

This form should be used to request that the Department of Homeland Security's Federal Emergency Management Agency (FEMA) remove a single structure or legally recorded parcel of land or portion thereof, described by metes and bounds, certified by a registered professional engineer or licensed land surveyor, from a designated Special Flood Hazard Area (SFHA), an area that would be inundated by the flood having a 1%-chance of being equaled or exceeded in any given year (base flood), via Letter of Map Amendment (LOMA). It shall not be used for requests submitted by developers, for requests involving multiple structures or lots, for property in alluvial fan areas, for property located within the regulatory floodway, or requests involving the placement of fill. (NOTE: Use MT-1 forms for such requests). **Fill** is defined as material from any source (including the subject property) placed that raises the grade to or above the Base Flood Elevation (BFE). The common construction practice of removing unsuitable existing material (topsoil) and backfilling with select structural material is not considered the placement of fill if this practice does not alter the existing (natural grade) elevation, which is at or above the BFE. Also, fill that is placed before the date of the first National Flood Insurance Program (NFIP) map showing the area in an SFHA is considered natural grade.

LOMA:	**A letter from DHS-FEMA stating that an existing structure or parcel of land that has not been elevated by fill would not be inundated by the base flood.**

A – This section may be completed by the property owner or by the property owner's agent. In order to process your request, all information on this form must be completed *in its entirety*, unless stated as optional. **Incomplete submissions will result in processing delays.**

1. Has fill been placed on your property to raise ground that was previously below the BFE?
☐ No ☐ Yes – If Yes, STOP!! – **You must complete the MT-1 application forms; visit** http://www.fema.gov/plan/prevent/fhm/fill_mt-1.shtm or call the FEMA Map Information eXchange toll free: **(877-FEMA MAP) (877-336-2627)**

2. Legal description of Property (Lot, Block, Subdivision or abbreviated description from the Deed) **and** street address of the Property (required):

3. Are you requesting that a flood zone determination be completed for (check one):
☐ A structure on your property? What is the date of construction? (MM/DD/YYYY)
☐ A portion of your legally recorded property? (A certified metes and bounds description and map of the area to be removed, certified by a registered professional engineer or licensed land surveyor, are **required**. For the preferred format of metes and bounds descriptions, please refer to the MT-EZ instructions.)
☐ Your entire legally recorded property?

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

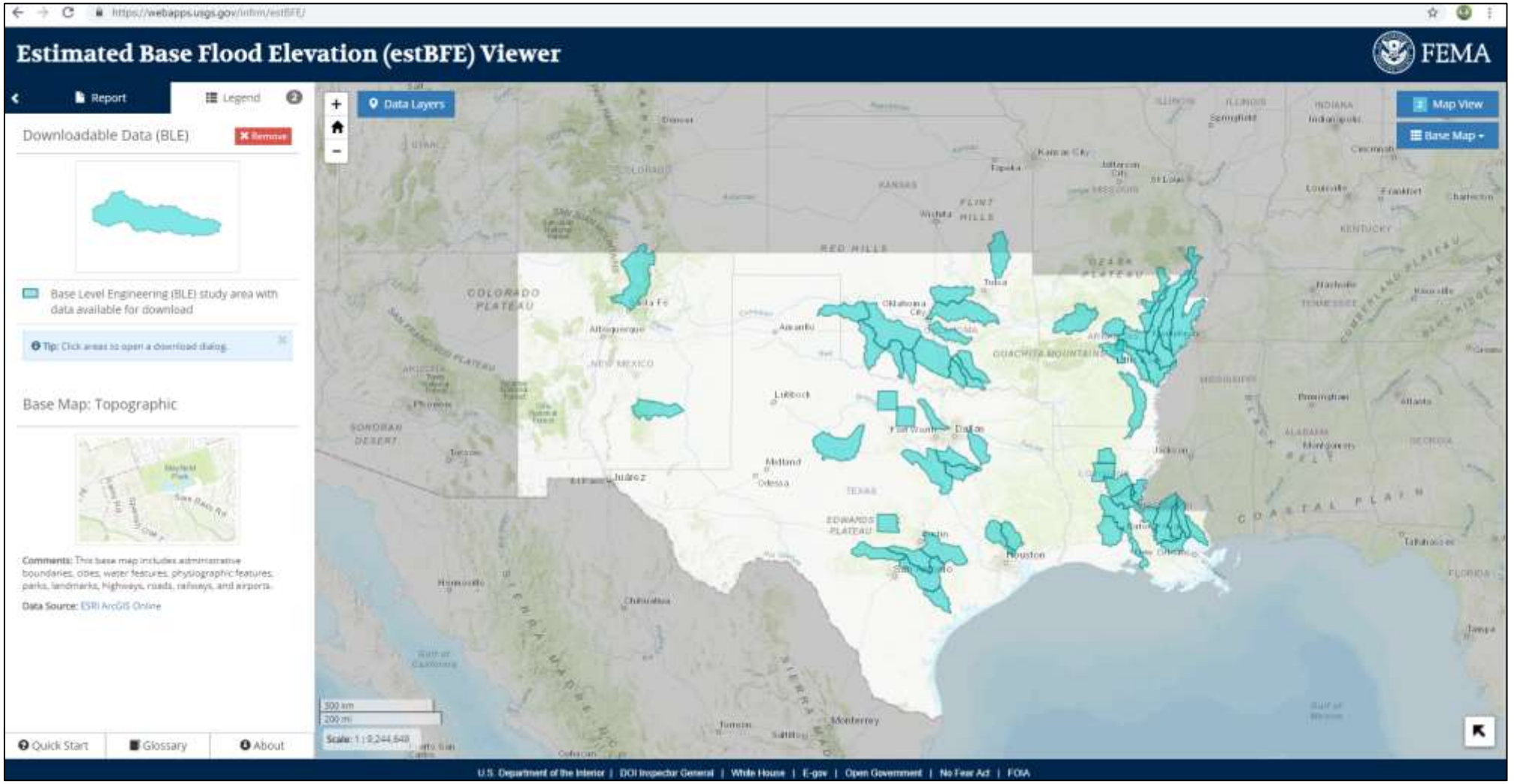
Applicant's Name (required):	E-mail address (optional) (☐ By checking here you may receive correspondence electronically at the email address provided):
Mailing Address (include company name if applicable) (required):	Daytime Telephone No. (required): Fax No. (optional):
Signature of Applicant (required)	Date (required)

End of Section A

DHS - FEMA Form 086-0-22, FEB 11 MT-EZ Form Page 1 of 3

BLE OVERVIEW | BFE VIEWER

https://webapps.usgs.gov/infrm/estBFE/



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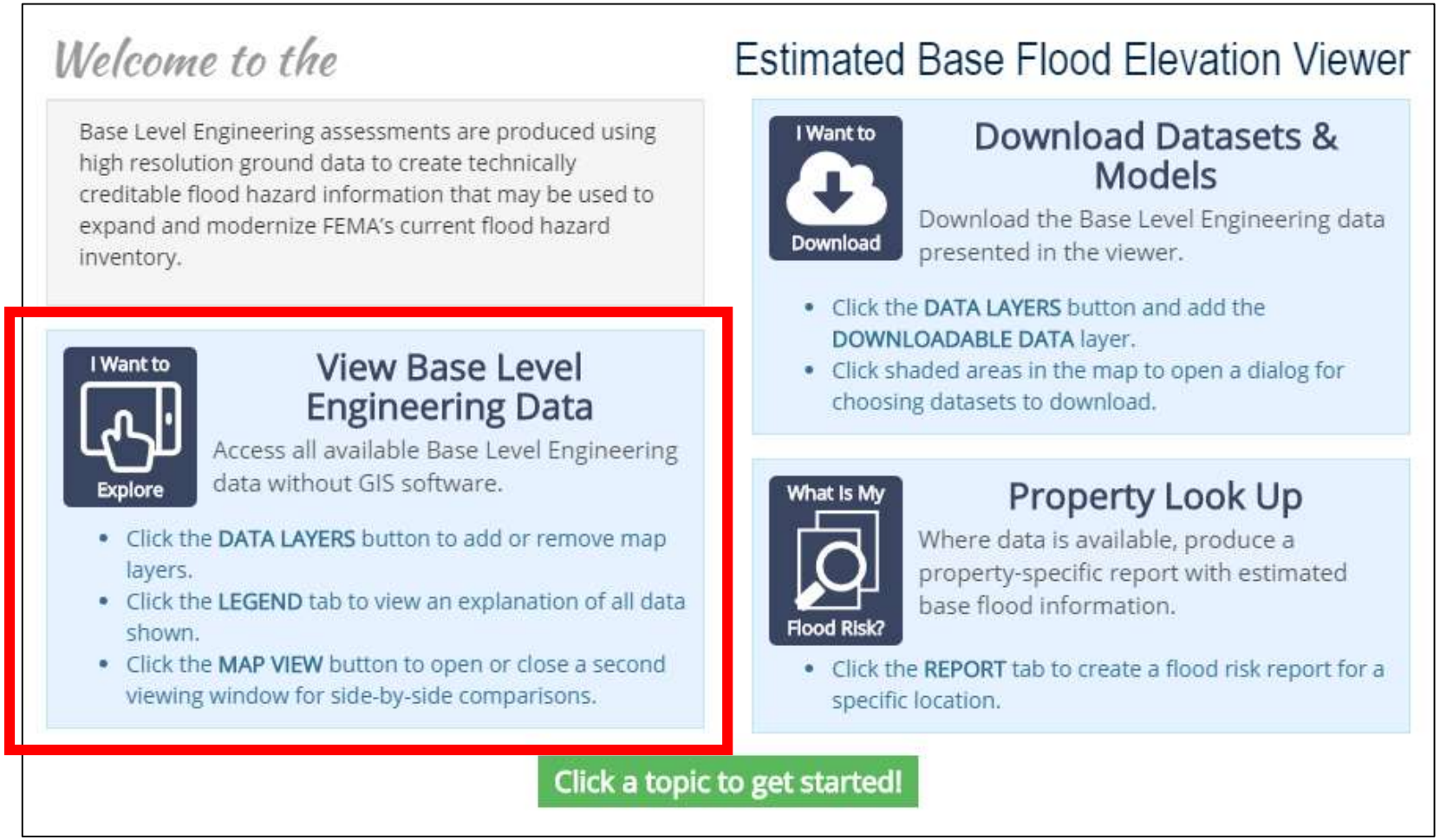
BLE OVERVIEW | BFE VIEWER

https://webapps.usgs.gov/infrm/estBFE/



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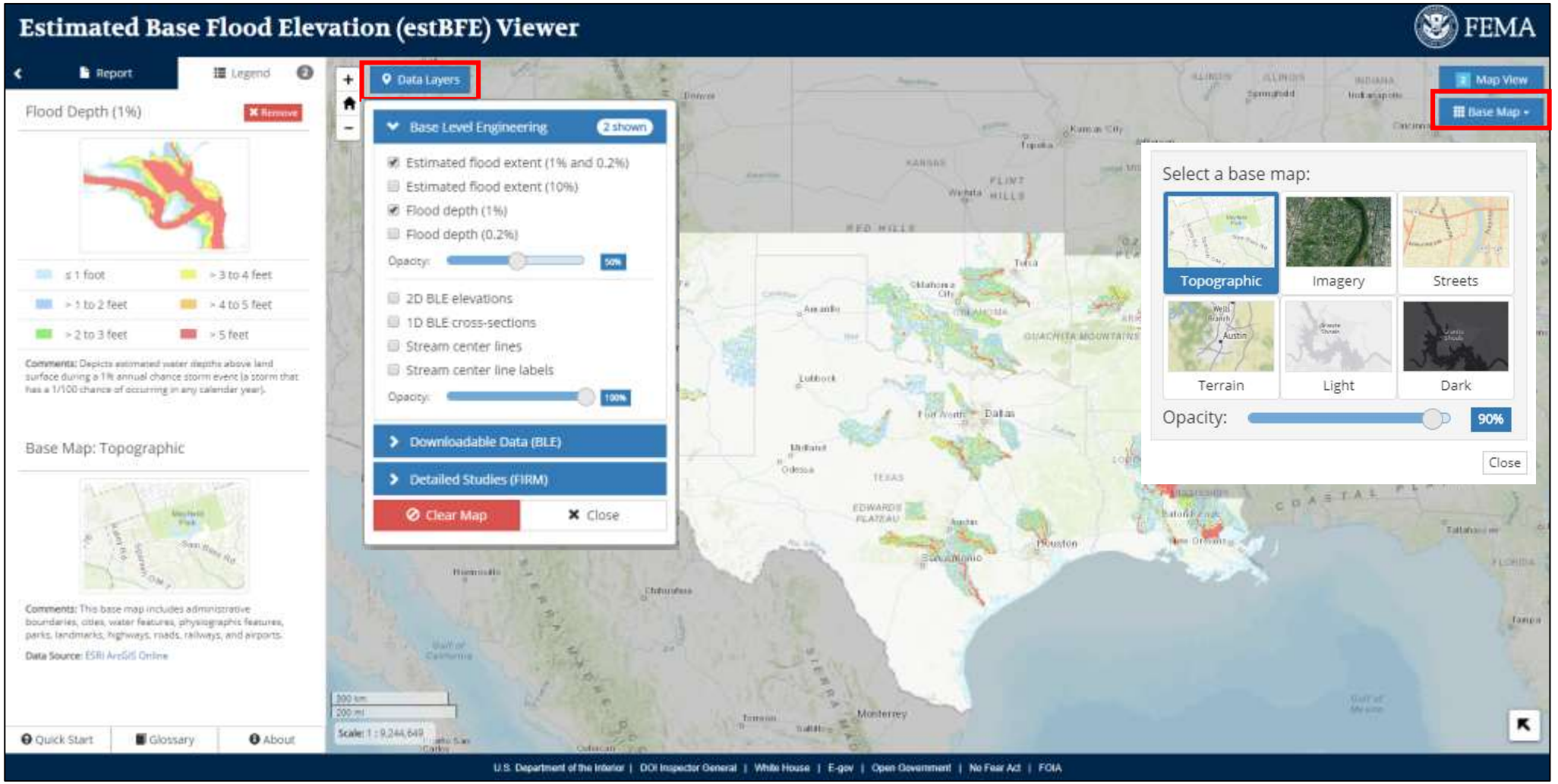

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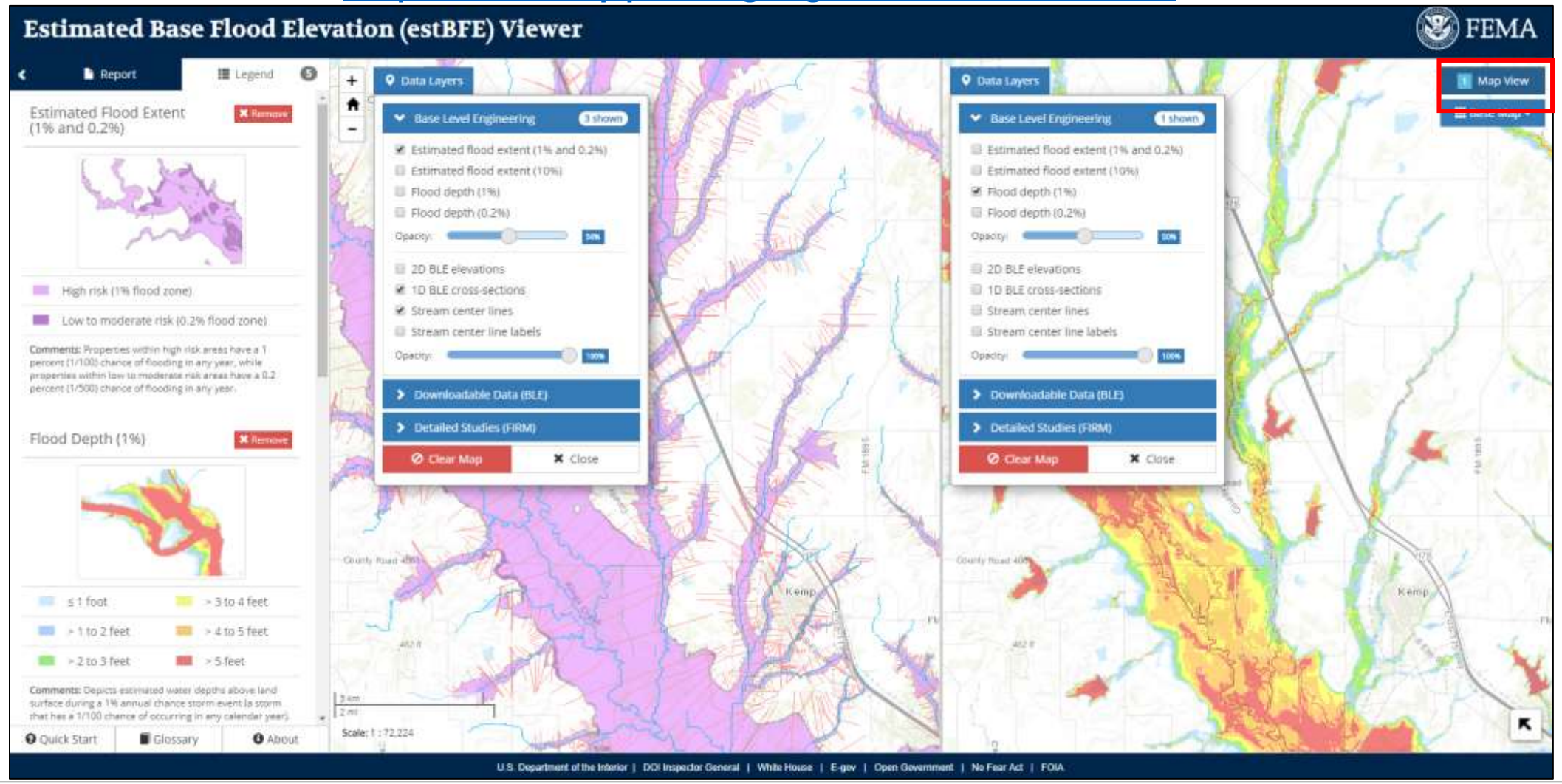

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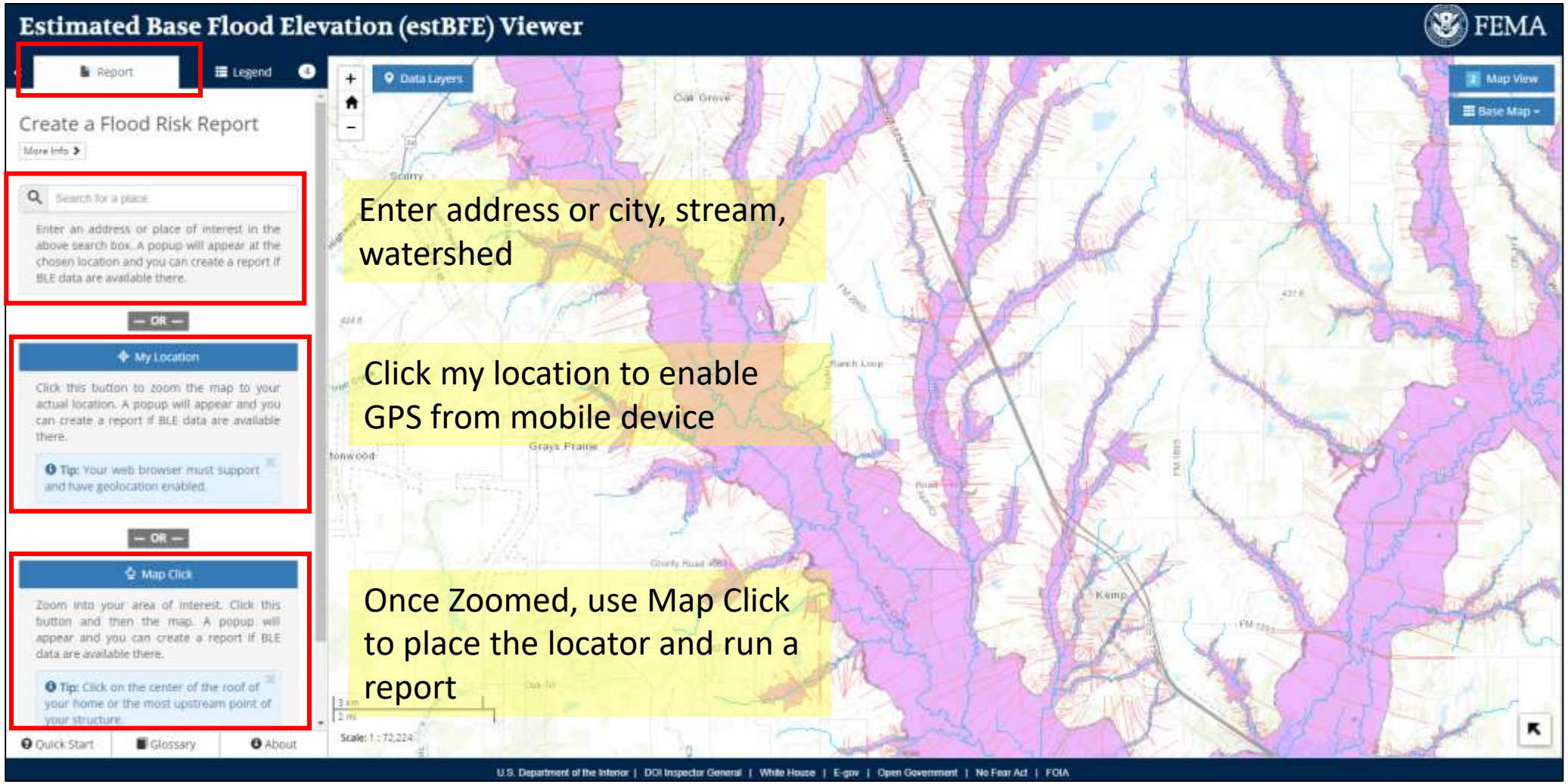

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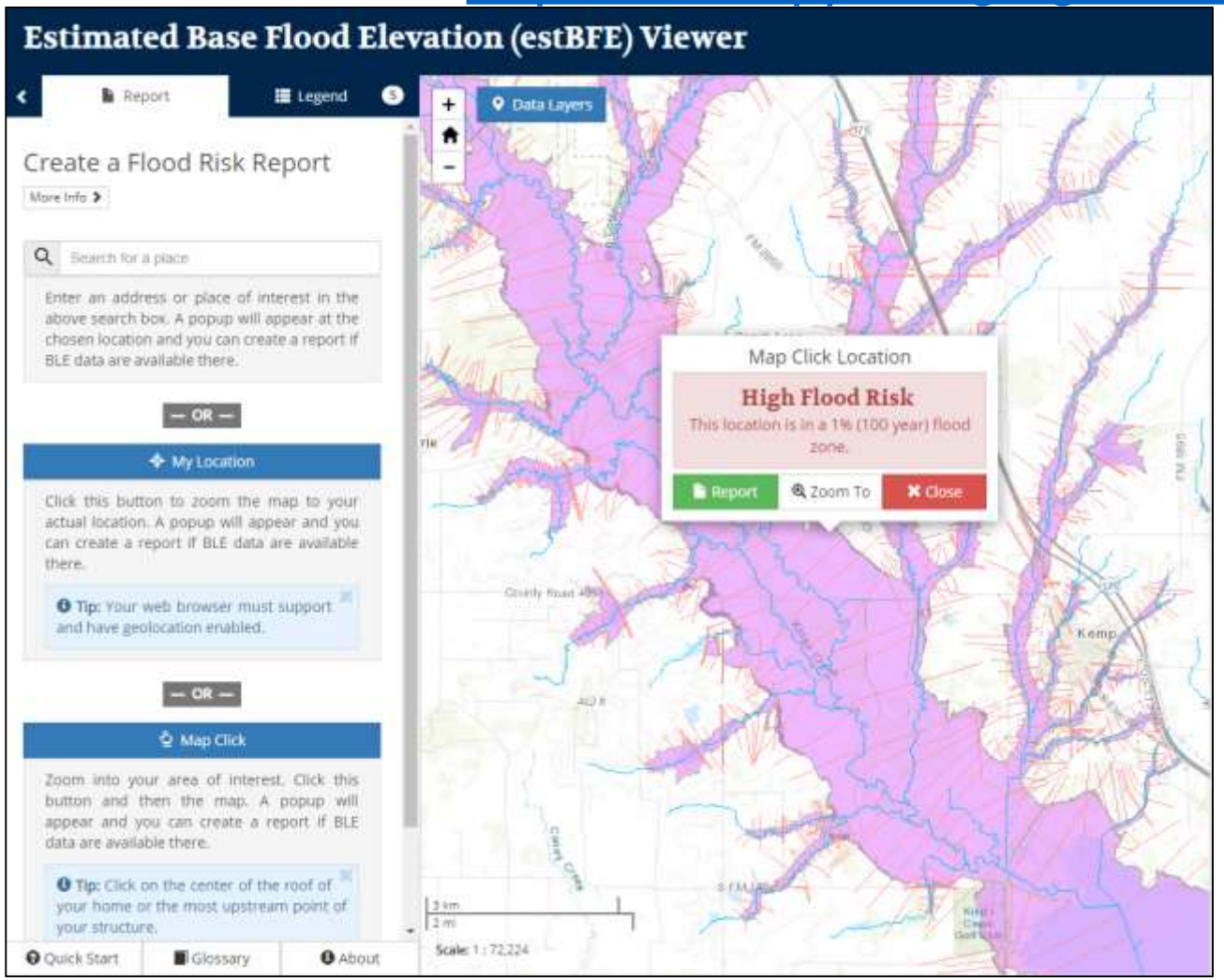

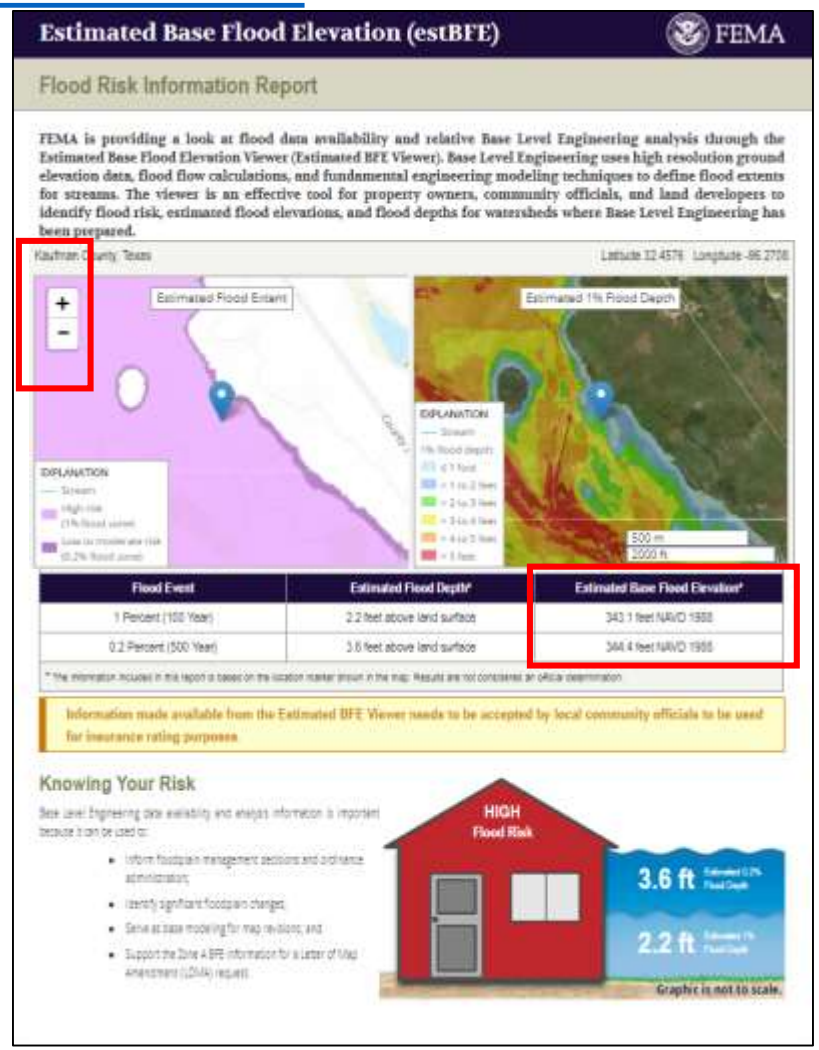

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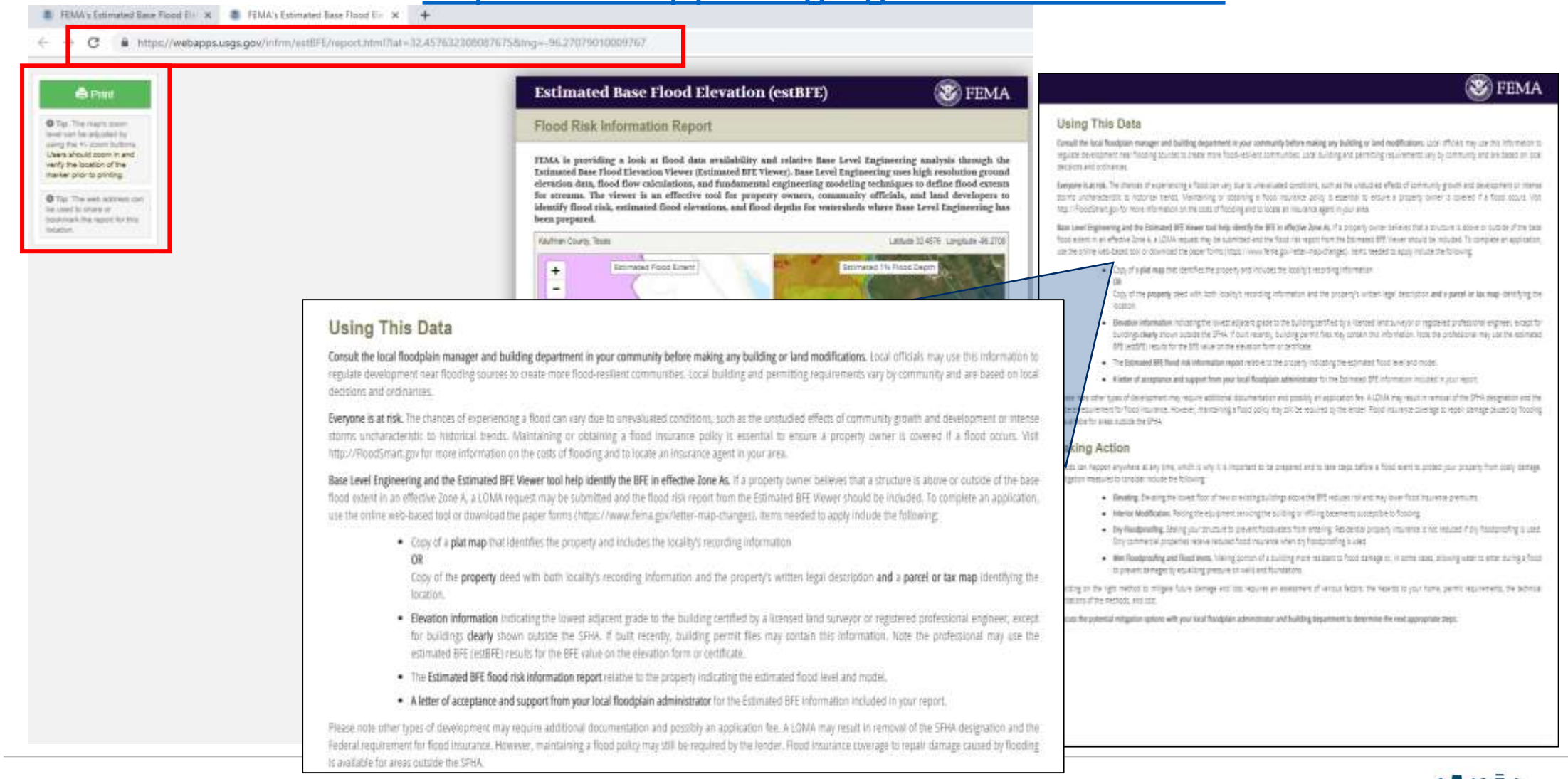

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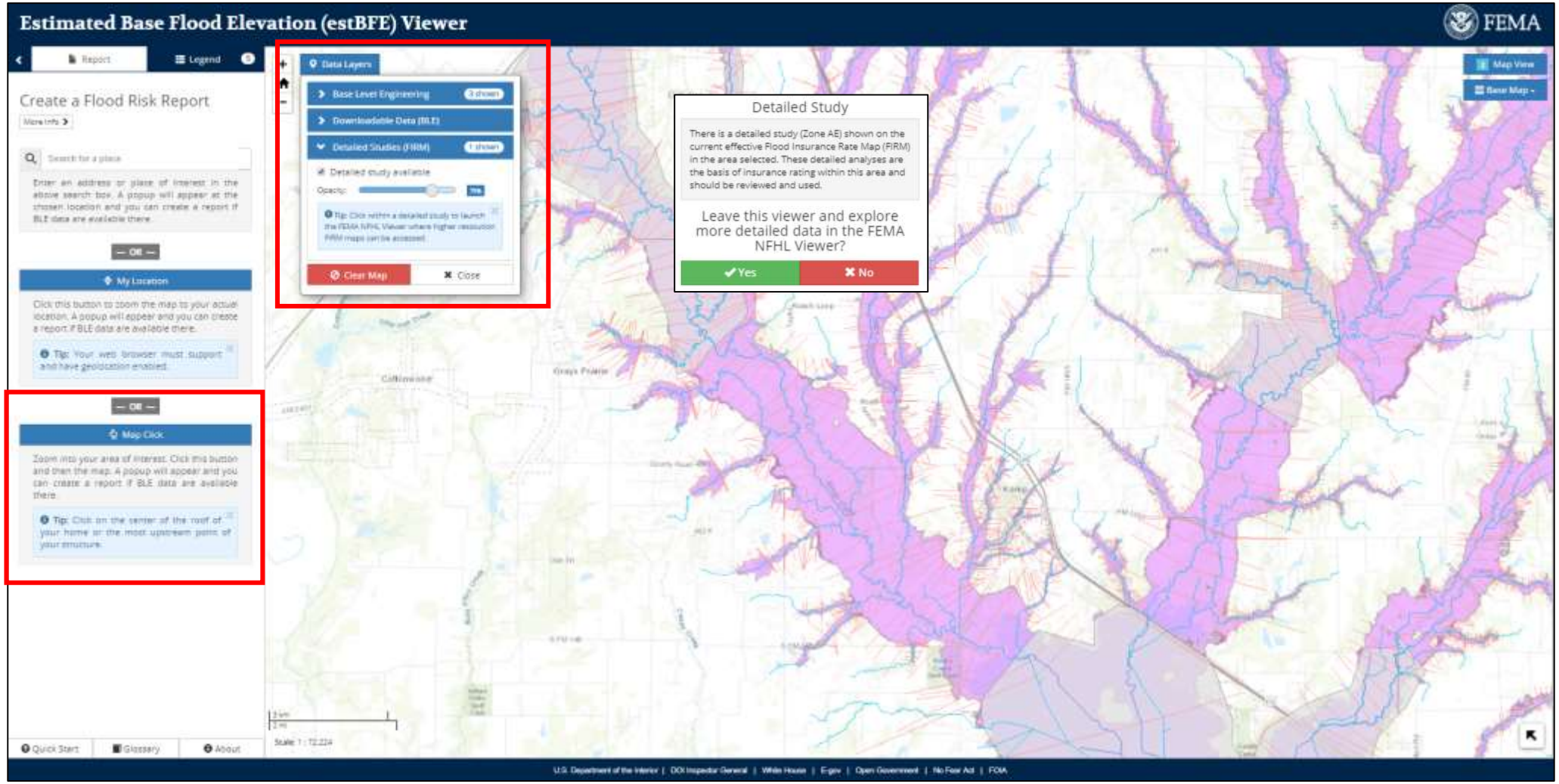

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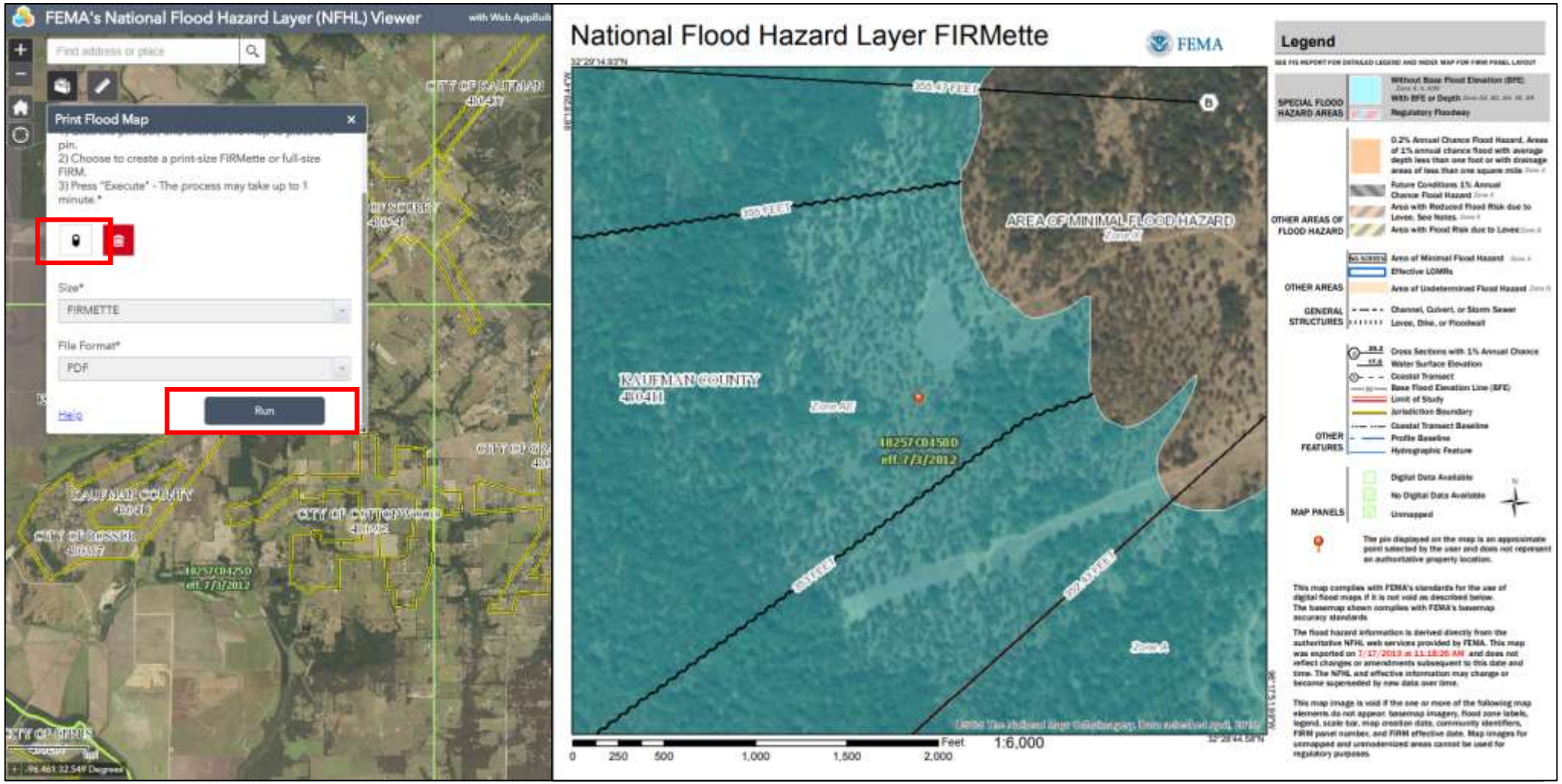

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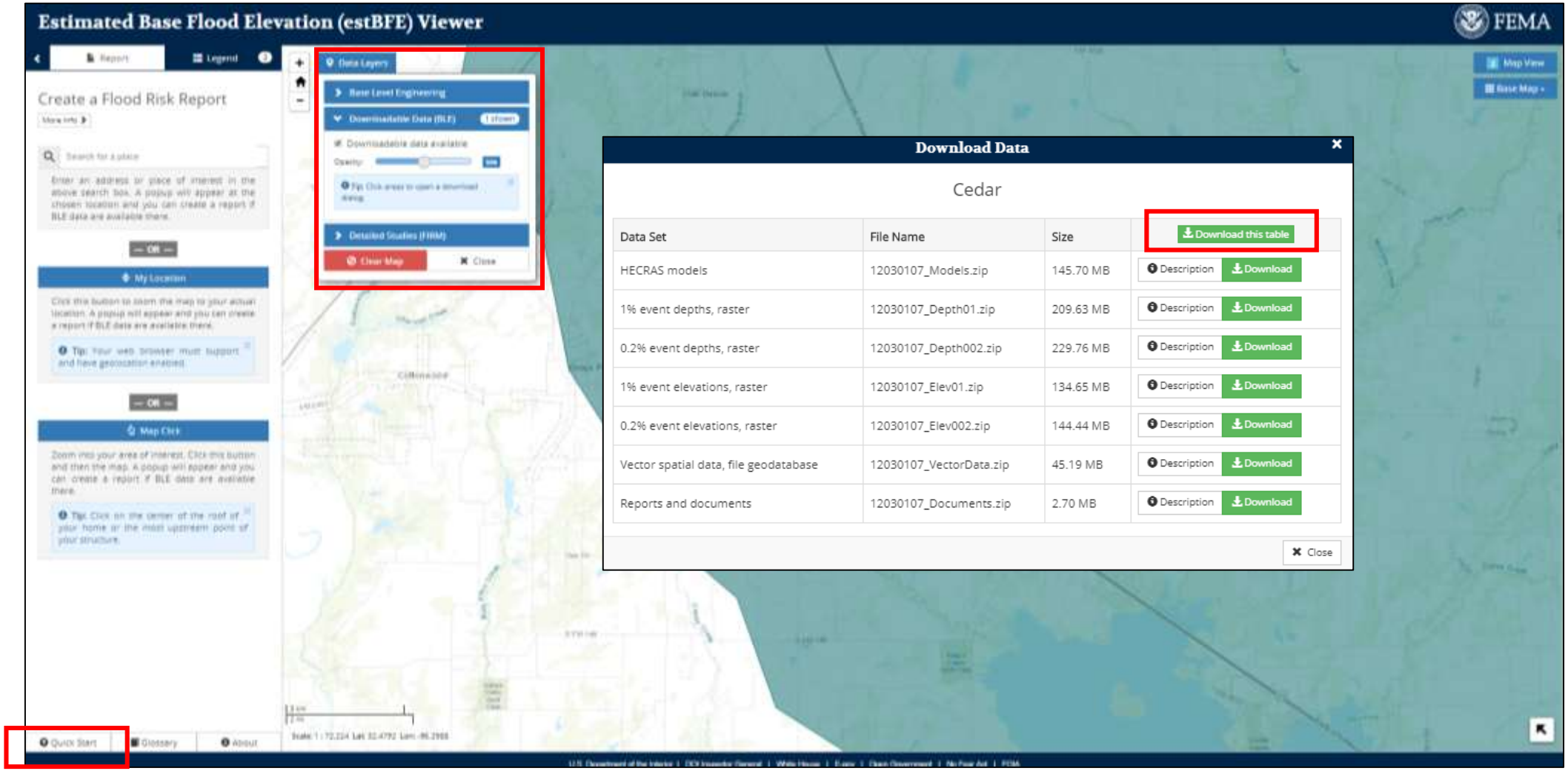

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North Central Texas Council of Governments

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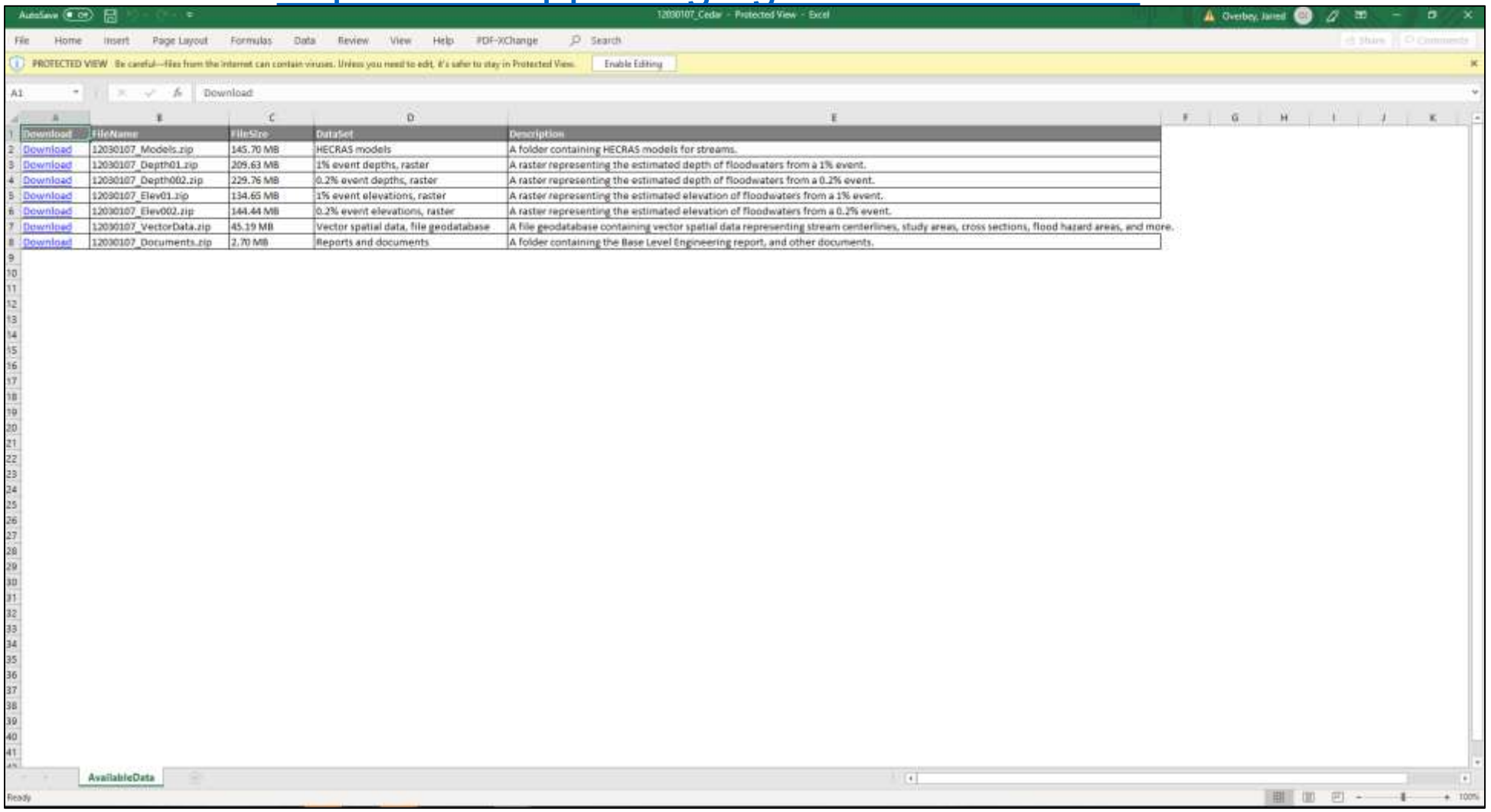


Download	FileName	FileSize	DataSet	Description
Download	12030107_Models.zip	145.70 MB	HECRAS models	A folder containing HECRAS models for streams.
Download	12030107_Depth01.zip	209.63 MB	1% event depths, raster	A raster representing the estimated depth of floodwaters from a 1% event.
Download	12030107_Depth002.zip	229.76 MB	0.2% event depths, raster	A raster representing the estimated depth of floodwaters from a 0.2% event.
Download	12030107_Elev01.zip	134.65 MB	1% event elevations, raster	A raster representing the estimated elevation of floodwaters from a 1% event.
Download	12030107_Elev002.zip	144.44 MB	0.2% event elevations, raster	A raster representing the estimated elevation of floodwaters from a 0.2% event.
Download	12030107_VectorData.zip	45.19 MB	Vector spatial data, file geodatabase	A file geodatabase containing vector spatial data representing stream centerlines, study areas, cross sections, flood hazard areas, and more.
Download	12030107_Documents.zip	2.70 MB	Reports and documents	A folder containing the Base Level Engineering report, and other documents.

HALFF

North Central Texas Council of Governments

QUESTIONS?

Benchmarking and Higher Standards

NCTCOG CRS Users Group / Elected Officials
Arlington, Texas

July 18, 2019

PRESENTERS:
Ben Pylant, PE, CFM
John P. Ivey, PE, CFM

THE CHALLENGE

- Approximately 370k flood insurance claims in Texas since 1978
- Almost $16 billion paid flood insurance claims in Texas since 1978
- Texas ranks No. 2 behind Louisiana for most flood claims in the nation
- Over 33k repetitive loss properties in Texas (2+ claims)

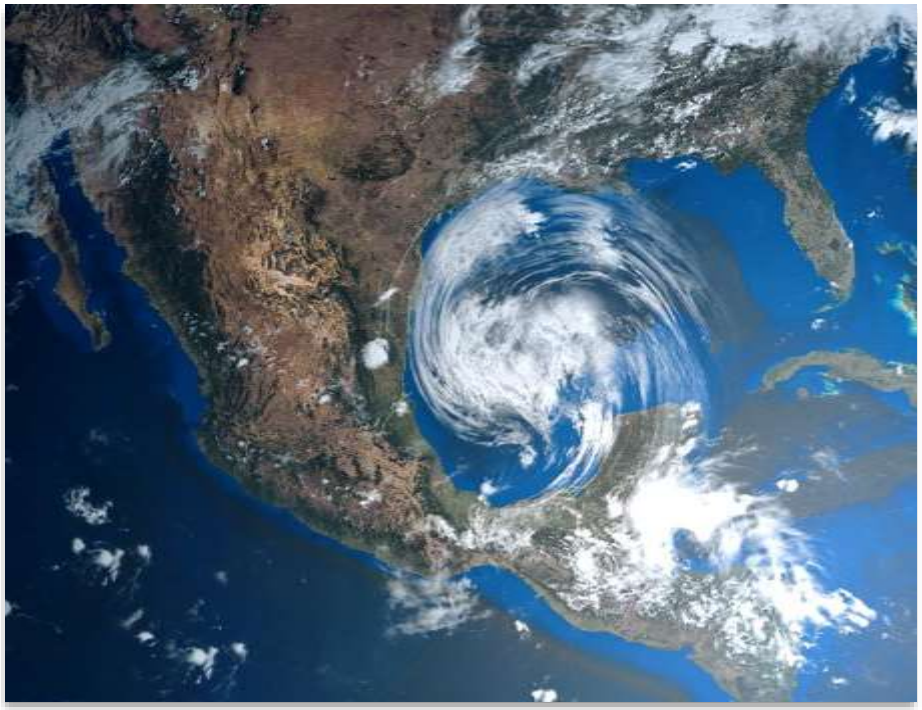
THE CHALLENGE

- Over 5,700 severe repetitive loss properties in Texas (4+ claims – $5,000 each)
- Since 1980, 70 major hurricanes
- Hurricane Harvey (2017) caused $125 billion in damages and ranks as the No. 2 most costly hurricane to hit U.S. mainland since 1900
- Texas 2019 population is 29.1 million and increasing more than 140 persons/day

TWDB STATE FLOOD ASSESSMENT REPORT SHOWCASES TEXAS MITIGATION NEEDS

Texas is still recovering from Hurricane Harvey (2017). In January 2019, the TWDB released the State Flood Assessment Report to the 86th Texas Legislature summarizing:

- Texas floods
- Flood risk
- Floodplain management and mapping
- Planning for floods
- Flood mitigation in Texas
- Blueprint of recommendations to make Texas more resilient



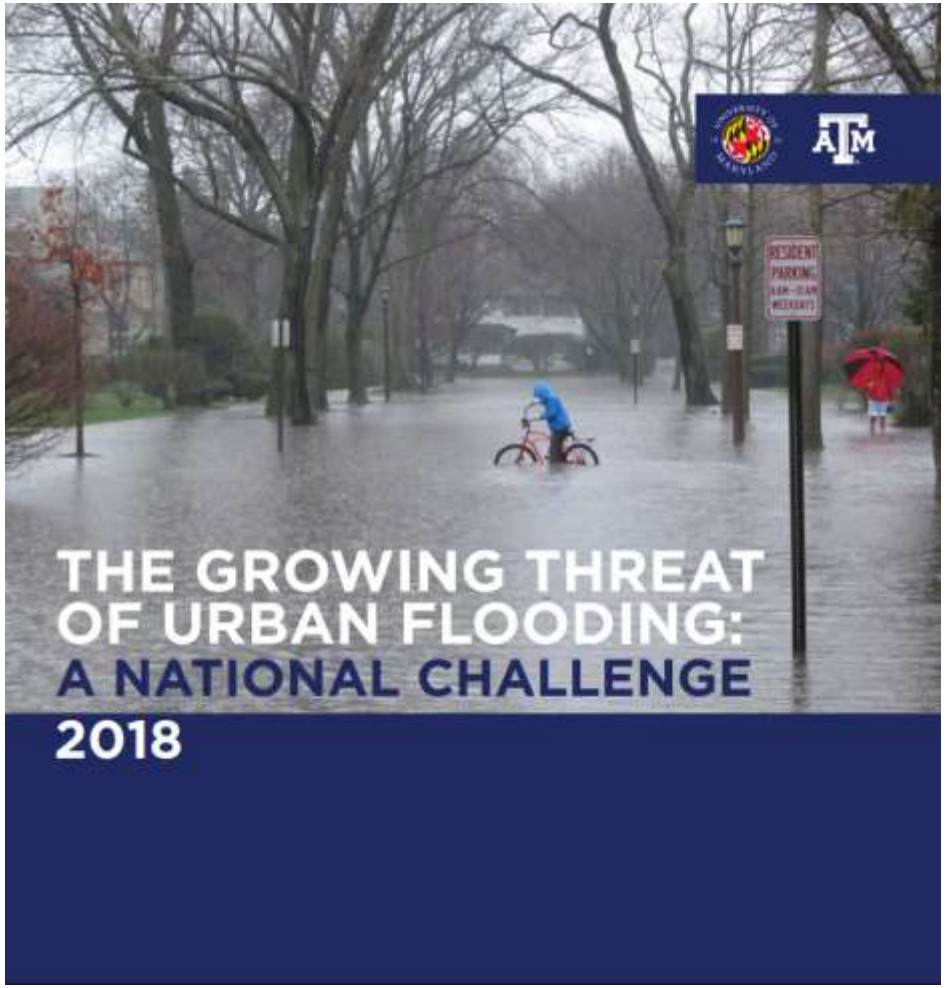
NOAA ATLAS 14 PRECIPITATION FREQUENCY

- Updated Texas rainfall frequency values
- In Austin, 100-year rainfall amounts for 24 hours increased as much as three inches up to 13 inches
- 100-year estimates around Houston increased from 13 inches to 18 inches and values previously classified as 100-year events are now similar to 25-year events

FEMA FLOOD INSURANCE STUDIES AND FIRMS

- Flood damages frequently occur outside of FEMA floodplains
  - Outdated maps
  - Hydrologic changes
  - Local/urban flooding
- **Minimum NFIP standards should not be the only consideration**

LOCAL / URBAN FLOODING

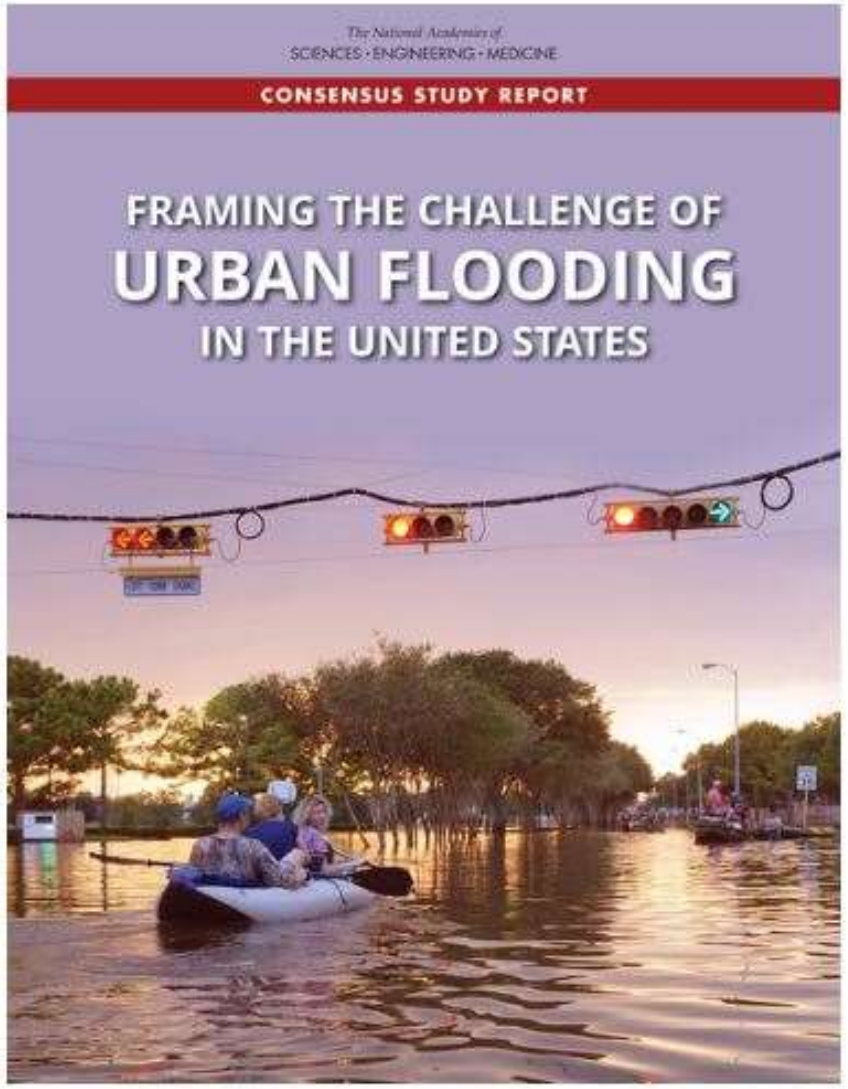


RECOGNIZED NATIONAL ISSUE

Significant flood losses and repetitive loss properties across the U.S. in unmapped areas.

- *The Growing Threat of Urban Flooding: A National Challenge* - 2018
- ASFPM Stormwater Committee
- THE 6TH GILBERT F. WHITE NATIONAL FLOOD POLICY FORUM - Increasing Our Resiliency to Urban Flooding - March 2019

LOCAL / URBAN FLOODING



NATIONAL ACADEMY OF SCIENCE

***FRAMING THE CHALLENGE OF URBAN FLOODING IN THE UNITED STATES* – MARCH 2019**

TEXAS POPULATION EXPLOSION = DEVELOPMENT PRESSURES IN FLOOD-PRONE AREAS

Year	Population (million)	Growth rate
2011	25.65	n/a
2012	26.07	1.64%
2013	26.47	1.53%
2014	26.94	1.78%
2015	27.43	1.82%
2016	27.86	1.57%
2017	28.45	2.12%
2018	28.95	1.72%
2019	29.1	1.80%

+140 persons/day

ENOUGH ABOUT THE CHALLENGE. WHAT CAN WE DO ABOUT IT?

- The solution is sitting in this room
- Community representatives can initiate grass roots, community-initiated solutions to flood problems in Texas

NATIONAL CFM PROGRAM

- TFMA established a Certified Floodplain Manager (CFM) Program in 1996, three years before the National CFM Program was established by ASFPM
- TFMA is an accredited chapter of ASFPM and manages the National CFM Program in Texas
- TFMA has trained and certified more than 3,000 CFM’s in Texas

TEXAS QUICK GUIDE

- In 1998, TFMA prepared the first Texas Quick Guide as a layman's floodplain management handbook
- In 2015, TWDB updated the Texas Quick Guide and posted it on the TWDB website
- https://www.twdb.texas.gov/flood/resources/doc/Texas_Quick_Guide.pdf

FEMA, TWDB AND TFMA STATEWIDE FLOODPLAIN MANAGEMENT TRAINING EFFORT

- FEMA's four-day course, "Managing Floodplain Development through the NFIP"
- TWDB one-day course, Floodplain Management 101
- TWDB online webinars
- TFMA's one-day course, "Federal, State and NFIP Programs"
- TFMA's three-day Floodplain Management Course (2019)
- TFMA's "Ethics in Floodplain Management" shared with the Texas Board of Professional Engineers
- TFMA's short course, "FEMA's Elevation Certificate", approved by the Texas Board of Professional Land Surveying
- TFMA conducts two annual conferences in Texas, which average more than 1,200 attendees

TFMA HIGHER STANDARDS AND WHITE PAPERS

- TFMA members helped create the ASFPM (National) Higher Standards Guide in 2011 and the 2013 update. http://www.floods.org/ace-files/documentlibrary/committees/3-13_Higher_Standards_in_Floodplain_Management2.pdf
- TFMA Higher Standards Guide developed in 2015 and updated in 2018
- In 1999, TFMA submitted a white paper to the Governor's Office, *How to Improve Floodplain Management in Texas.* Wes Birdwell updated the white paper in 2018

HIGHER STANDARD ORDINANCES AND REGULATIONS

- **Dallas, Austin and several others** regulate development to floodway (no rise) standards
- Houston area communities follow the higher standards outlined in the **Houston-Galveston Area Council Floodplain Management Handbook**
- **Harris County and City of Houston** adopted the most stringent flood regulations in the nation.
- NCTCOG cities and counties regulate development in the **Trinity River corridor following Common Vision standards** to the 500-year level
- NCTCOG communities have adopted higher **stormwater standards,** including No Adverse Impacts

HIGHER STANDARDS

- Other States have adopted higher standards
  - CRS Participation (Florida)
  - Corridor Preservation and Permitting (Vermont)
  - State-mandated freeboard (New York, Oregon, Montana, and others)
  - Floodway encroachment requirement less than one foot (New York, Oregon, Montana, and others)
- There are no higher floodplain management standards mandated by state law in Texas
- TFMA's annual Higher Standards Survey documents 334 out of 1255 NFIP communities in Texas have adopted and enforce higher FPM standards

TFMA'S 2019 HIGHER STANDARDS SURVEY TEXAS BEST MANAGEMENT PRACTICES

- 334 (26 percent) Texas communities submitted surveys. Of those respondents:
  - 288 (86 percent) require Freeboard for new development
  - 141 (42 percent) require Freeboard based on fully developed watersheds
  - 180 (54 percent) require detention or mitigation of downstream impacts
  - 249 (75 percent) require an engineering study to define the floodway and BFE's

HARRIS COUNTY'S JAN. 1, 2018 FLOODPLAIN REGULATIONS AMONG "BEST FLOODPLAIN REGULATIONS IN THE NATION"

- **Zones A and V** – Lowest floor elevated more than two feet above 0.2 percent (500-year) flood
- **Zone X (shaded)** – In cases where the structure is located geographically in the 0.2 percent or 500-year flood plain and the ground is lower than the 0.2 percent or 500-year level but higher than the one percent or 100-year level, the finished floor elevation shall be elevated at or above the 0.2 percent or 500-year level.
- **Zone X (unshaded)** – The finished floor shall be a minimum of 12 inches above the highest adjacent natural grade when measured 10 feet from the edge of the slab, or 12 inches above the crown of the adjacent street which ever results in the highest elevation (whichever is higher).
- Critical facilities must be elevated more than three feet above 0.2% (500-year) flood

NCTCOG iSWM

integrated Stormwater Management iSWM

Stormwater Criteria Community Inventory

MAY 23, 2019

HALFF

North Central Texas Council of Governments Environment & Development

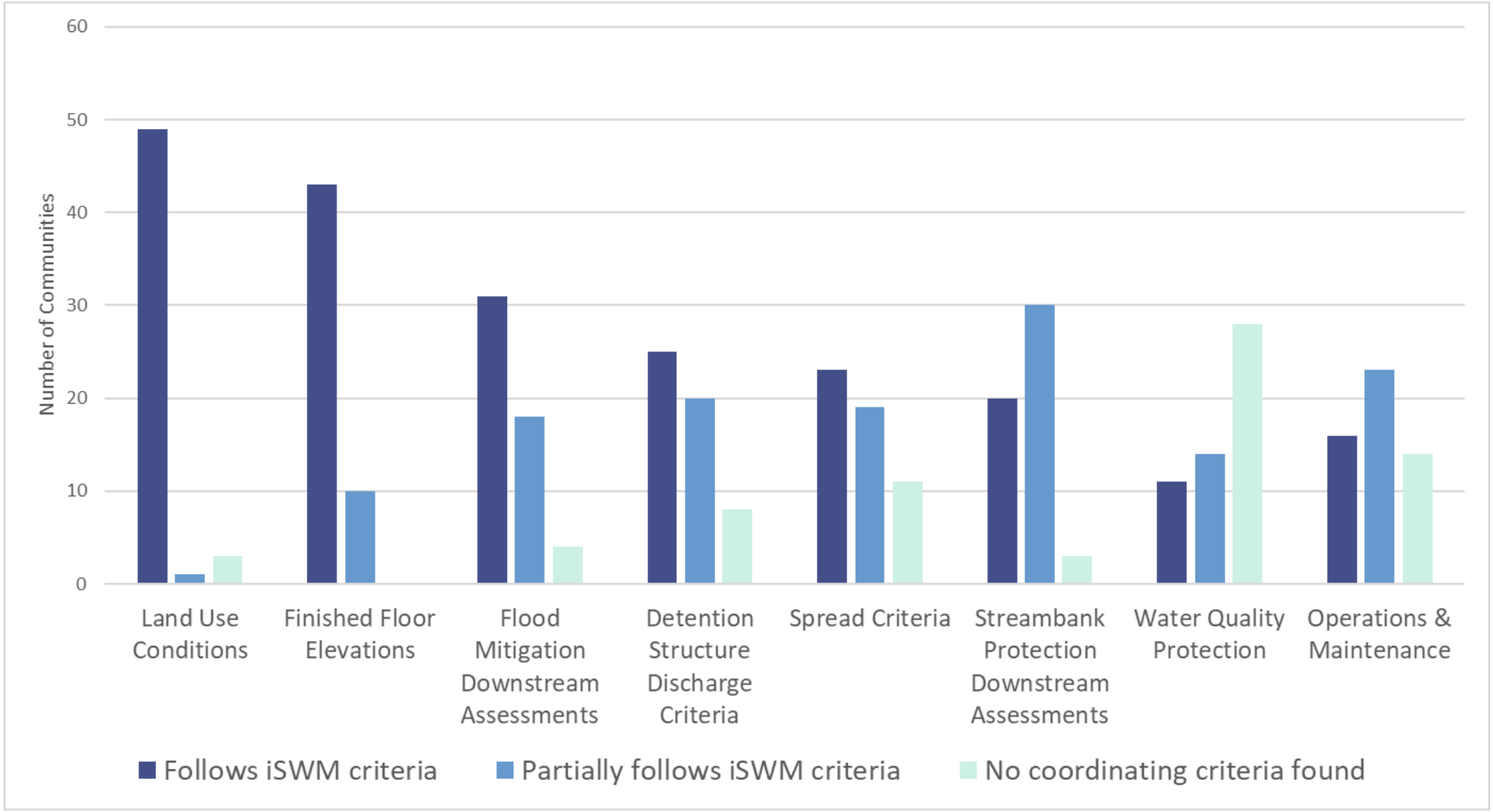
WHAT IS THIS INVENTORY?

- Ordinances and Drainage Criteria Manuals of fifty-three (53) communities were reviewed and compared to eight (8) iSWM Design Criteria:
  - Fully-developed land use conditions
  - Detention structure discharge
  - Streambank protection
  - Flood mitigation/downstream assessments
  - Operations and maintenance
  - Spread
  - Finished floor elevations
  - Water quality protection
- Data was also collected from an NCTCOG email survey completed in December 2018 asking if use of fully-developed land use conditions was required in drainage criteria.
- The iSWM criteria review was based off of the NCTCOG Tiered Measurement Form:
  http://iswm.nctcog.org/Documents/iSWM_Implementation_Tiered_Measurement.pdf
- Upon review, each criteria reviewed for each community was placed in one of the three categories:
  - Follows iSWM criteria
  - Partially follows iSWM criteria
  - No coordinating criteria found

PLEASE NOTE

- This will always be a working inventory, there may have been a separate document that was not initially reviewed and these criteria and ordinances are ever changing. If any changes or updates need to be made, please contact the NCTCOG Department of Environment & Development.

ISWM INVENTORY OVERVIEW



HALFF

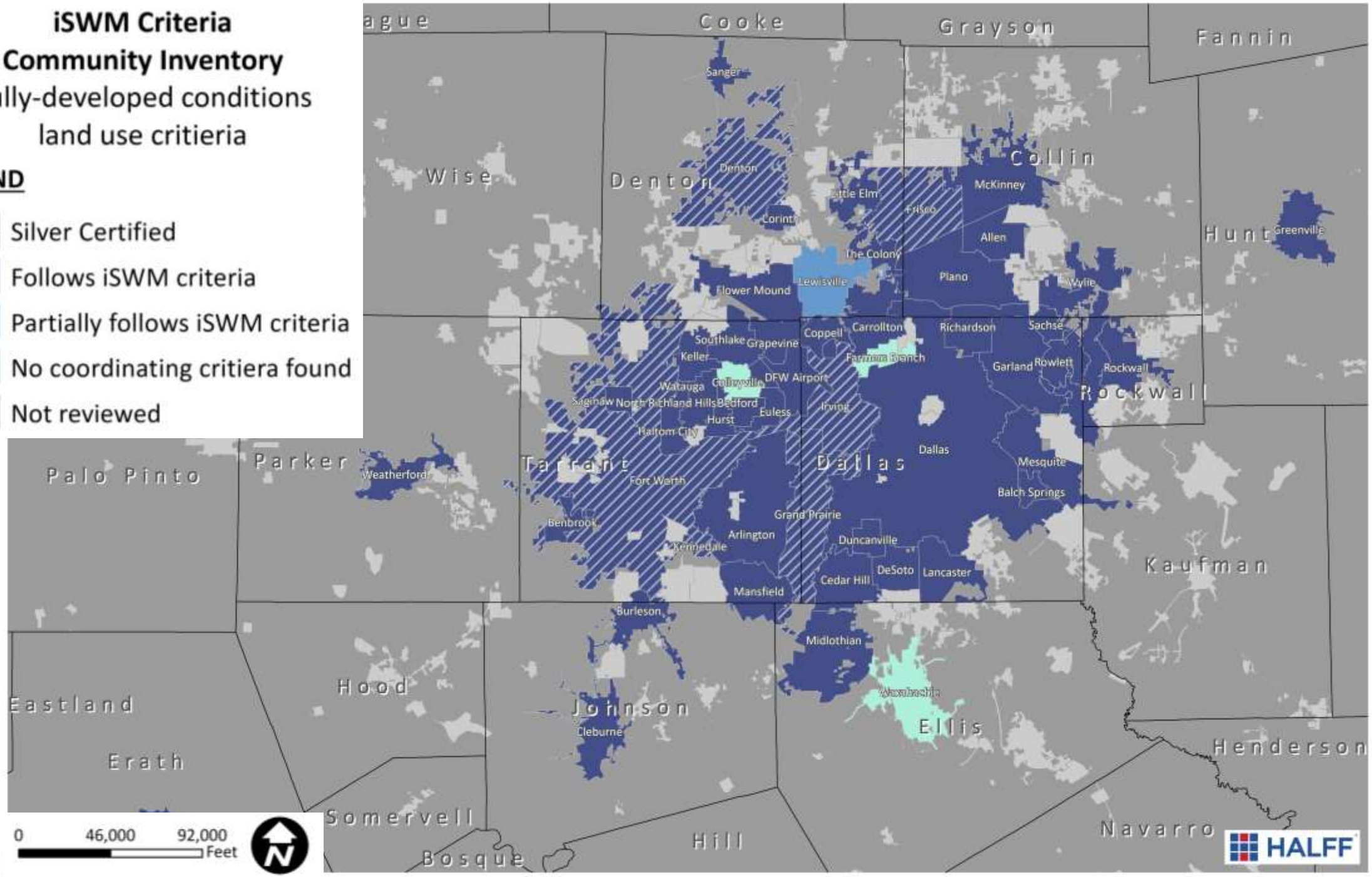
North Central Texas Council of Governments
Environment & Development

iSWM Criteria Community Inventory

Fully-developed conditions land use critieria

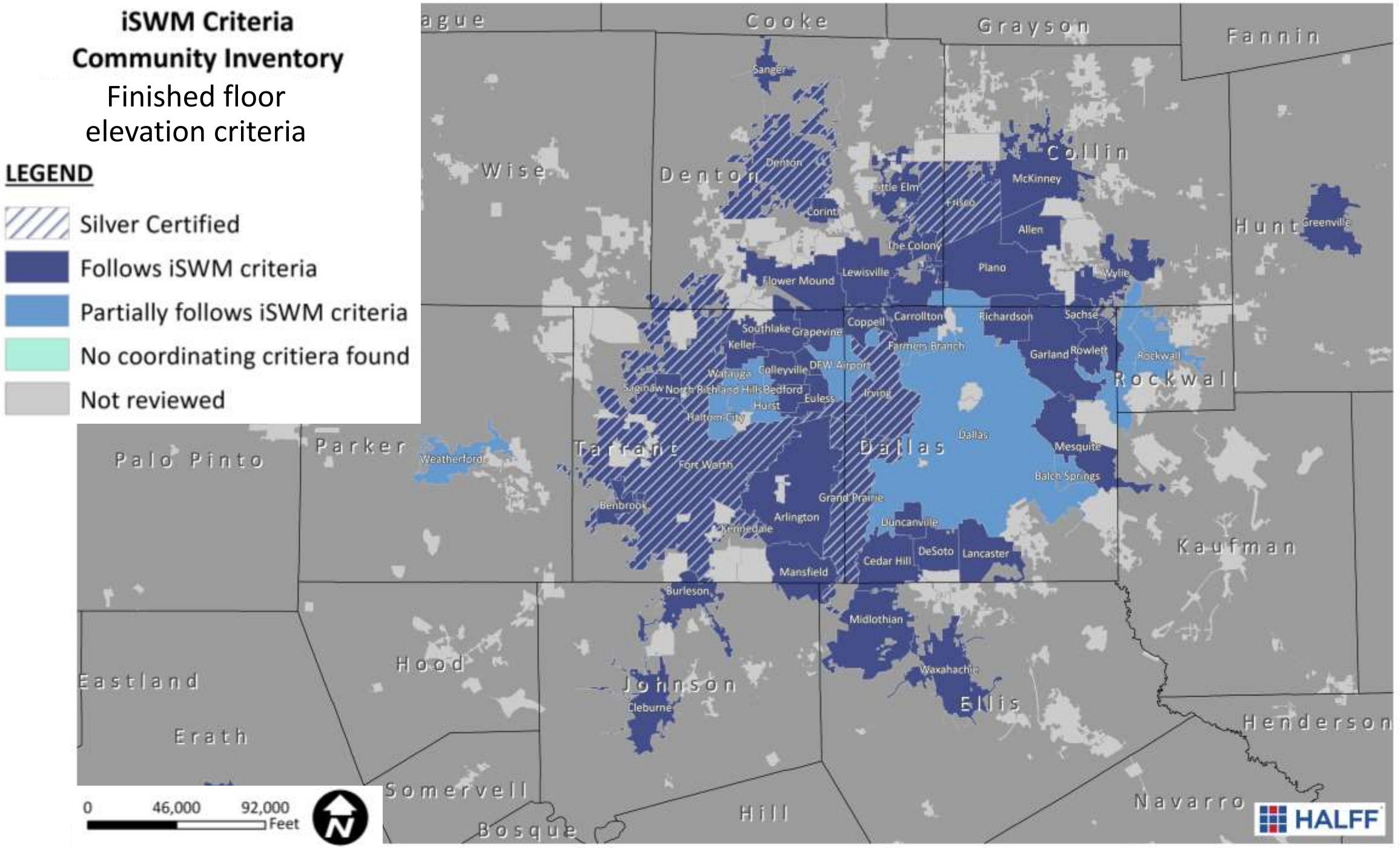
LEGEND

- Silver Certified
- Follows iSWM criteria
- Partially follows iSWM criteria
- No coordinating critiera found
- Not reviewed



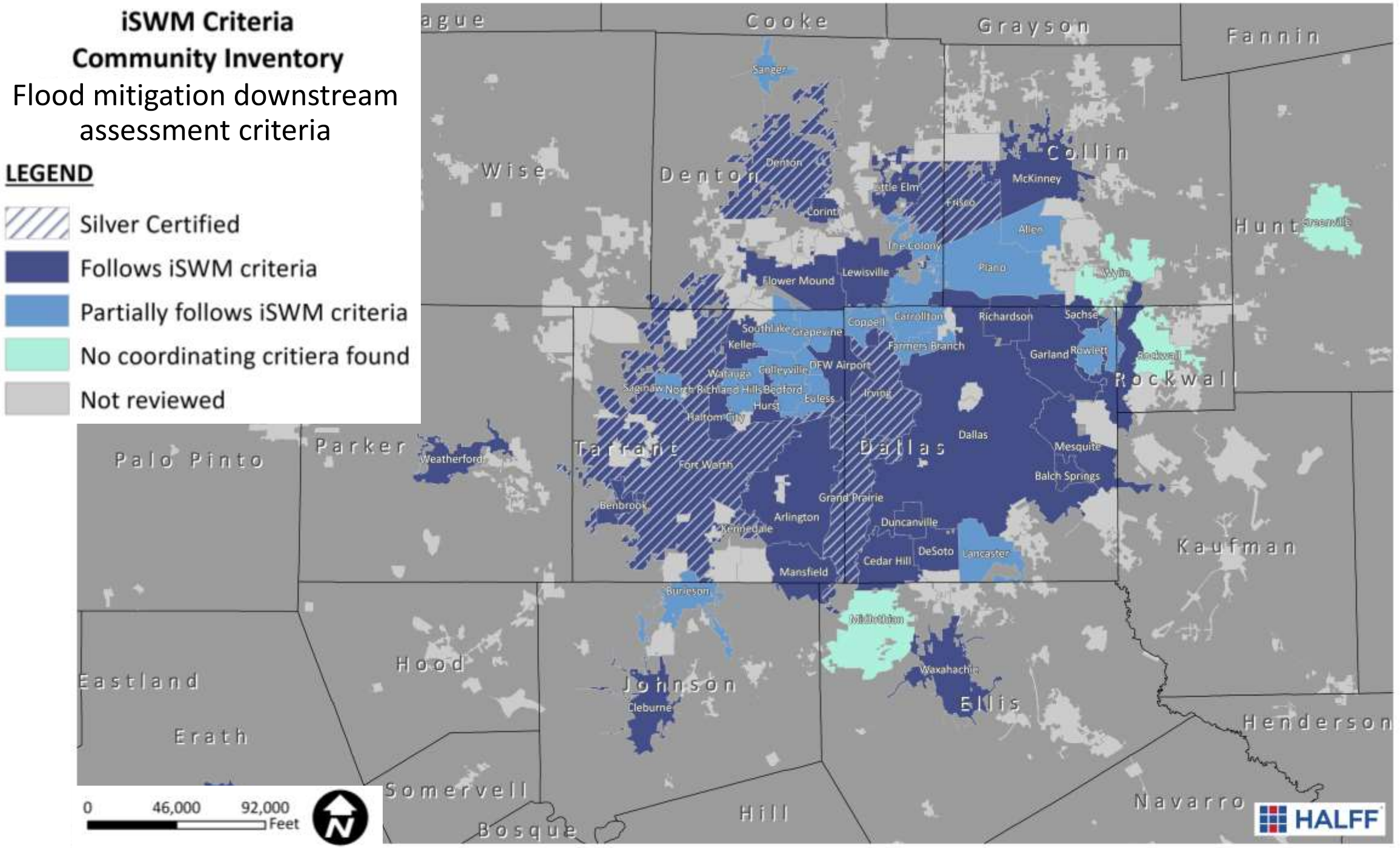
iSWM Criteria Community Inventory

Finished floor elevation criteria



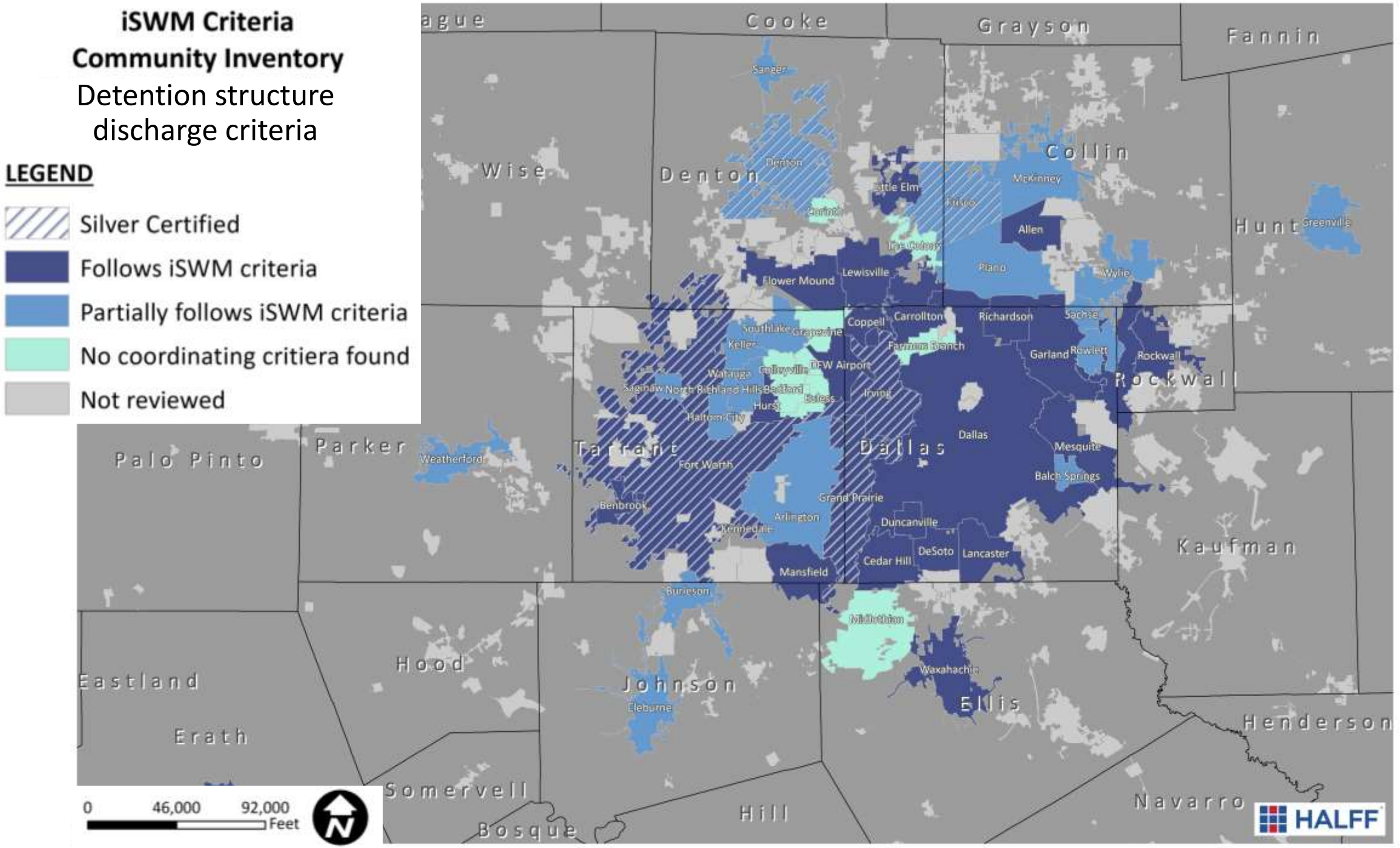
iSWM Criteria Community Inventory

Flood mitigation downstream assessment criteria



iSWM Criteria Community Inventory

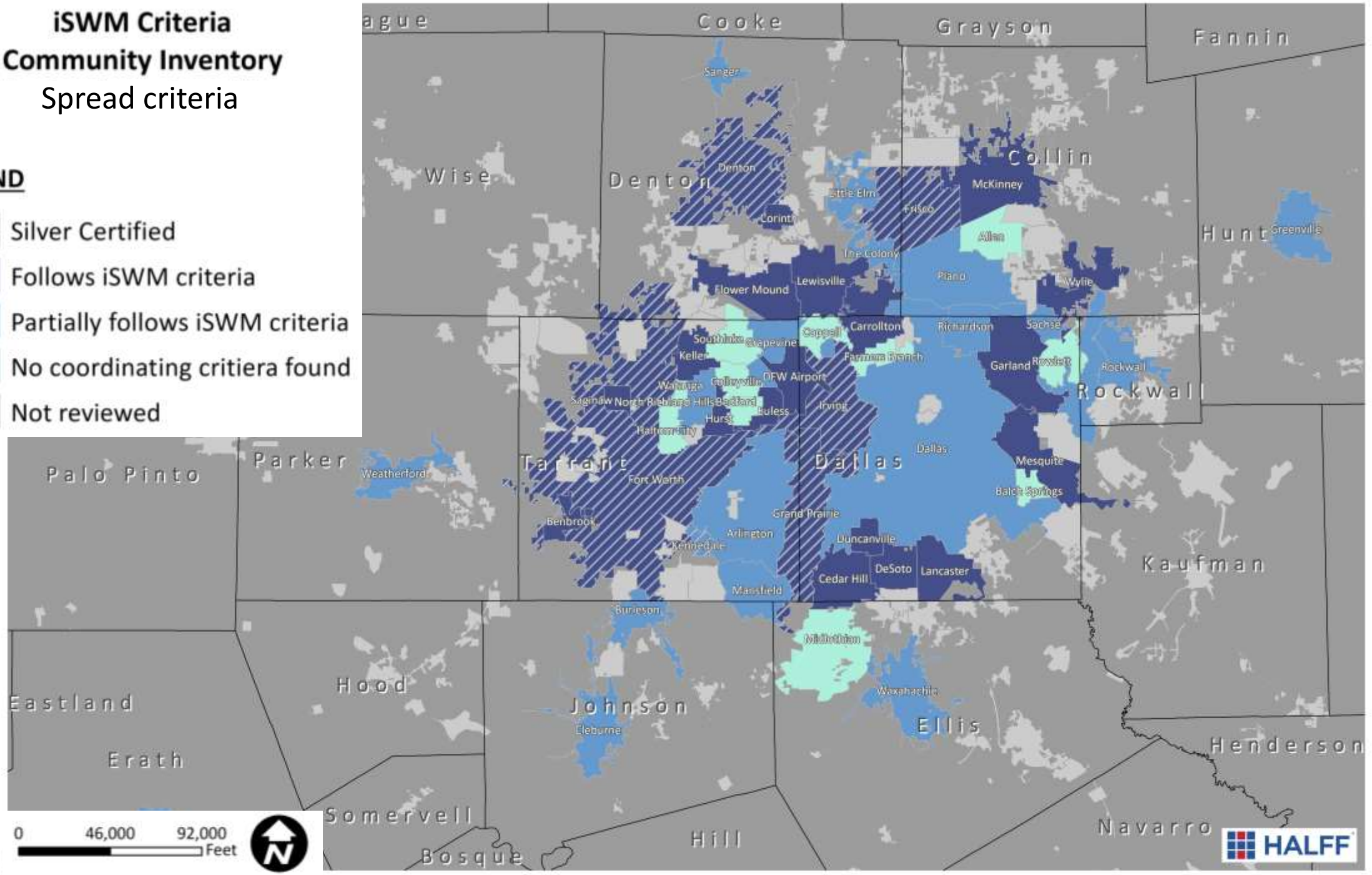
Detention structure discharge criteria



iSWM Criteria
Community Inventory
Spread criteria

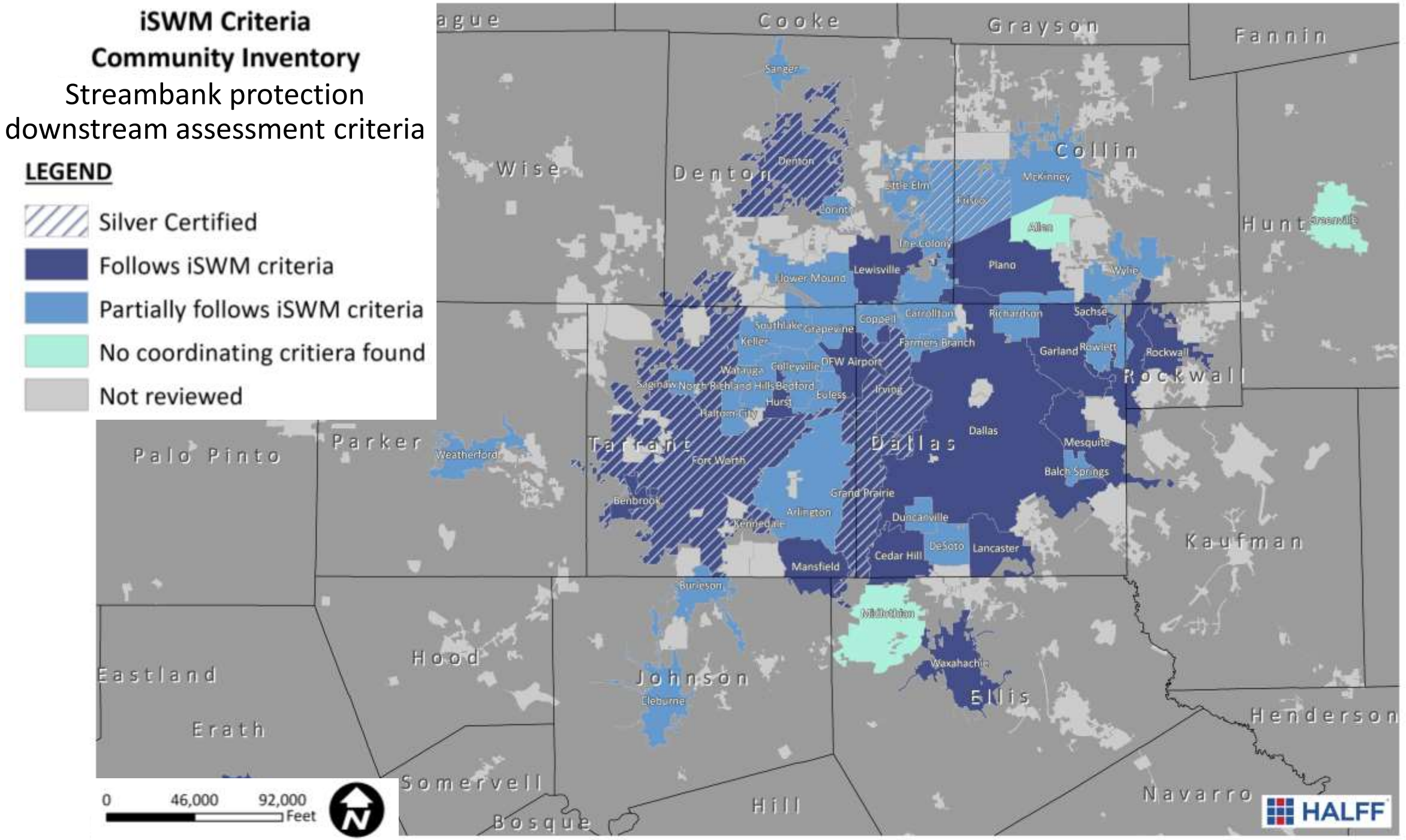
LEGEND

- Silver Certified
- Follows iSWM criteria
- Partially follows iSWM criteria
- No coordinating critiera found
- Not reviewed



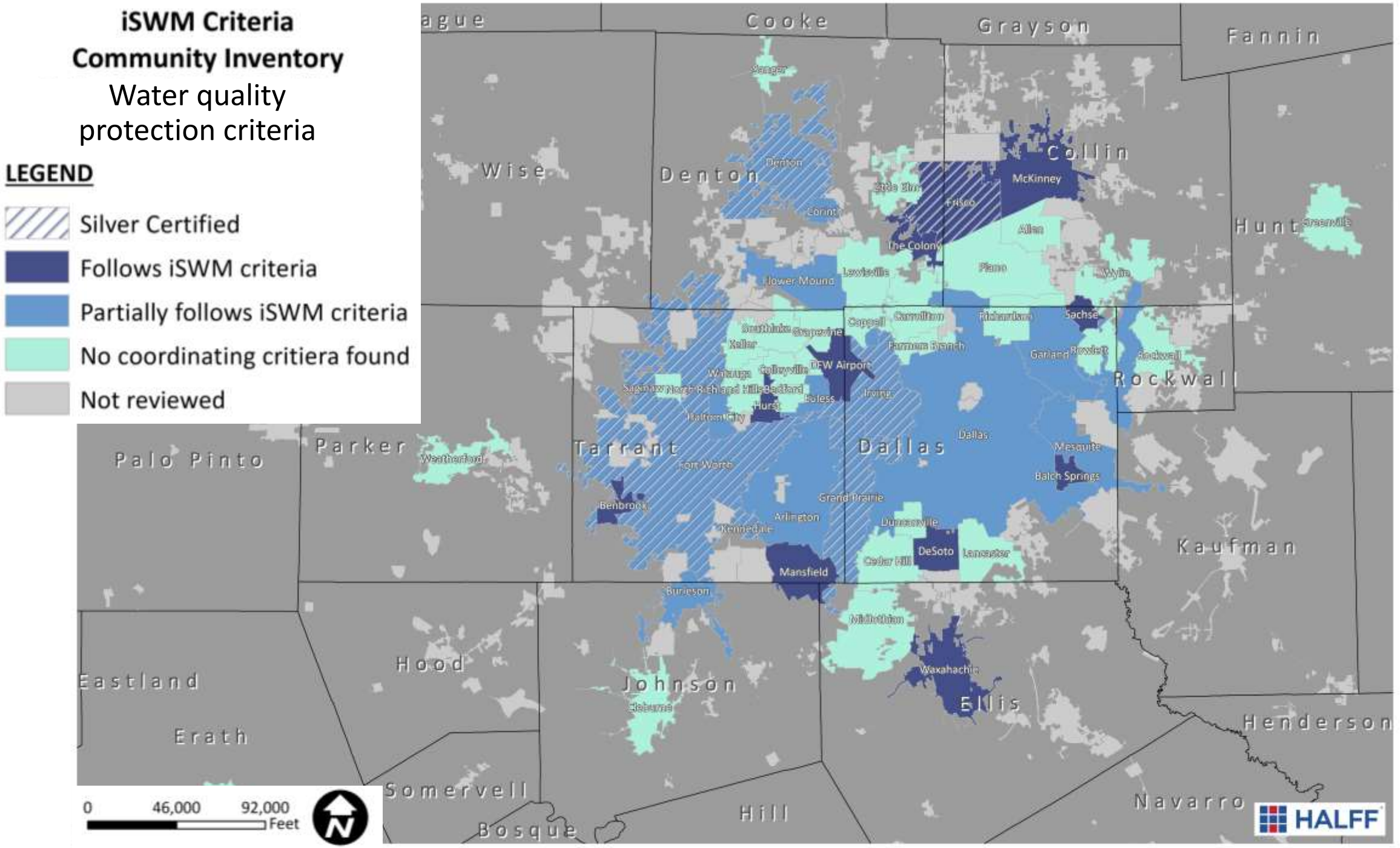
iSWM Criteria Community Inventory

Streambank protection downstream assessment criteria



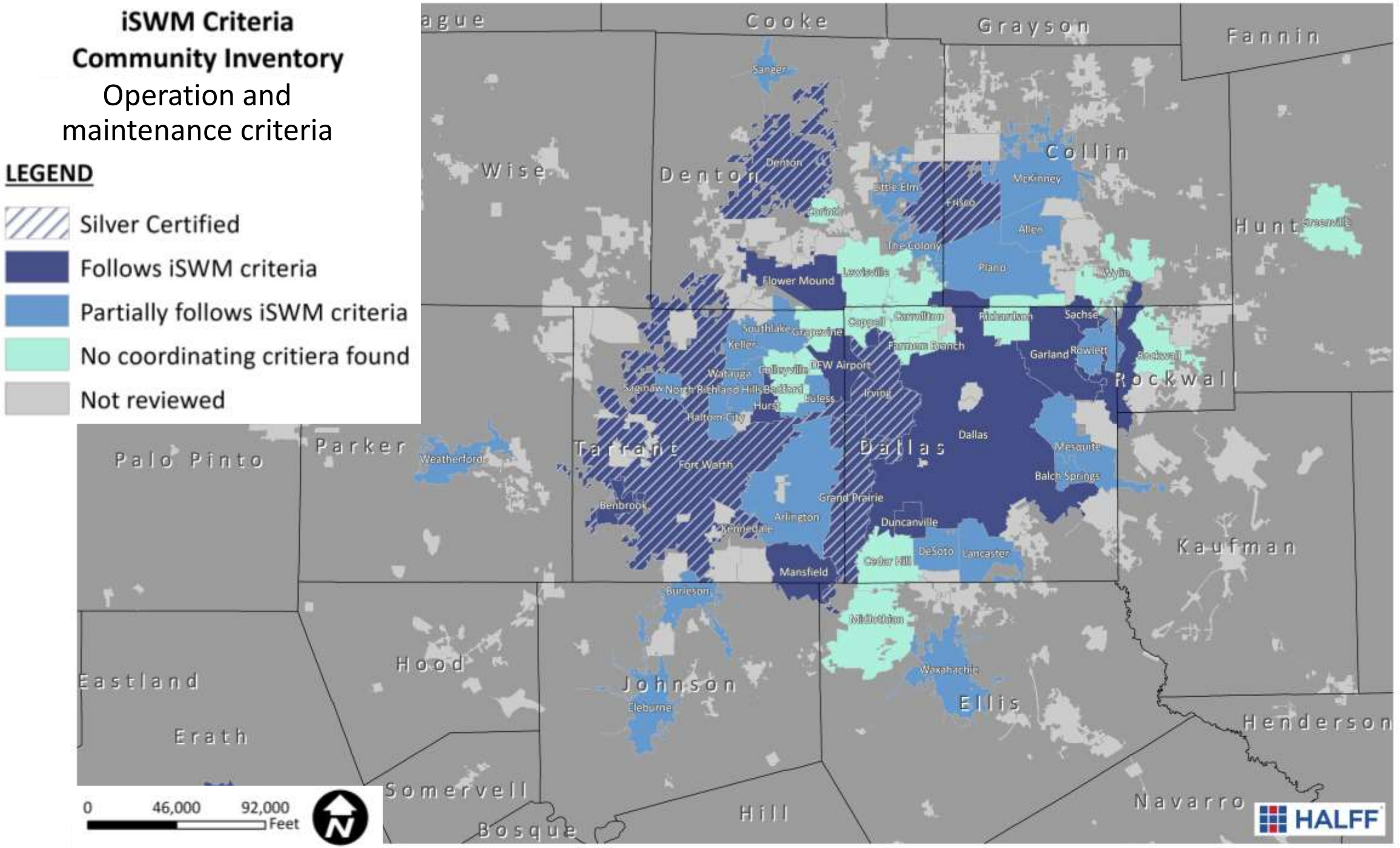
iSWM Criteria Community Inventory

Water quality protection criteria



iSWM Criteria Community Inventory

Operation and maintenance criteria



HOW TO SOLVE THE PROBLEM

- Working together, Texas can reduce flood risks, reduce loss of life from flooding and minimize flood damages, but it will take a joint effort from:
- State agencies, such as TWDB, TDEM, TxDOT, TGLO and TDI
- Federal agencies, such as FEMA, USACE, NOAA/NWS, USGS, NRCS and HUD;
- Associations such as TFMA; Building Professional Institute, Bayou Preservation, Texas Water Conservation Association and others
- River authorities and water districts
- Special districts, such as HCFCD
- Regional planning commissions, such as NCTCOG and HGAC
- Taking advantage of mitigation grants administered by FEMA, TWDB, TxDEM and TxGLO

Benchmarking and Higher Standards

NCTCOG CRS Users Group / Elected Officials
Arlington, Texas

July 18, 2019

PRESENTERS:
Ben Pylant, PE, CFM
John P. Ivey, PE, CFM

NCTCOG CHARM Exercise

July 18, 2019

Texas A&M AgriLife Extension

Texas Community Watershed Partners
A Program Of Texas A&M AgriLife Extension

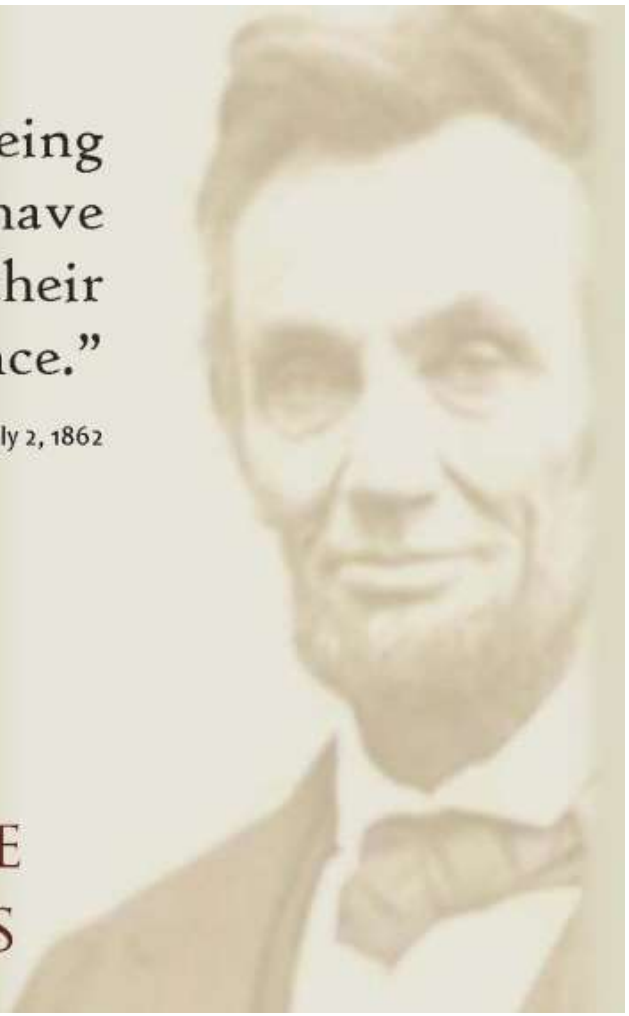
North Central Texas Council of Governments

U.S. Department of Homeland Security

FEMA

"The land grant university system is being built on behalf of the people, who have invested in these public universities their hopes, their support, and their confidence."

Abraham Lincoln, upon signing the Morrill Act, July 2, 1862



SERVING YOU TODAY

TRUSTED RESEARCH
LOCAL EDUCATORS...
EXTENDING KNOWLEDGE
PROVIDING SOLUTIONS

TEXAS A&M AGRILIFE EXTENSION

The planning literature is clear:

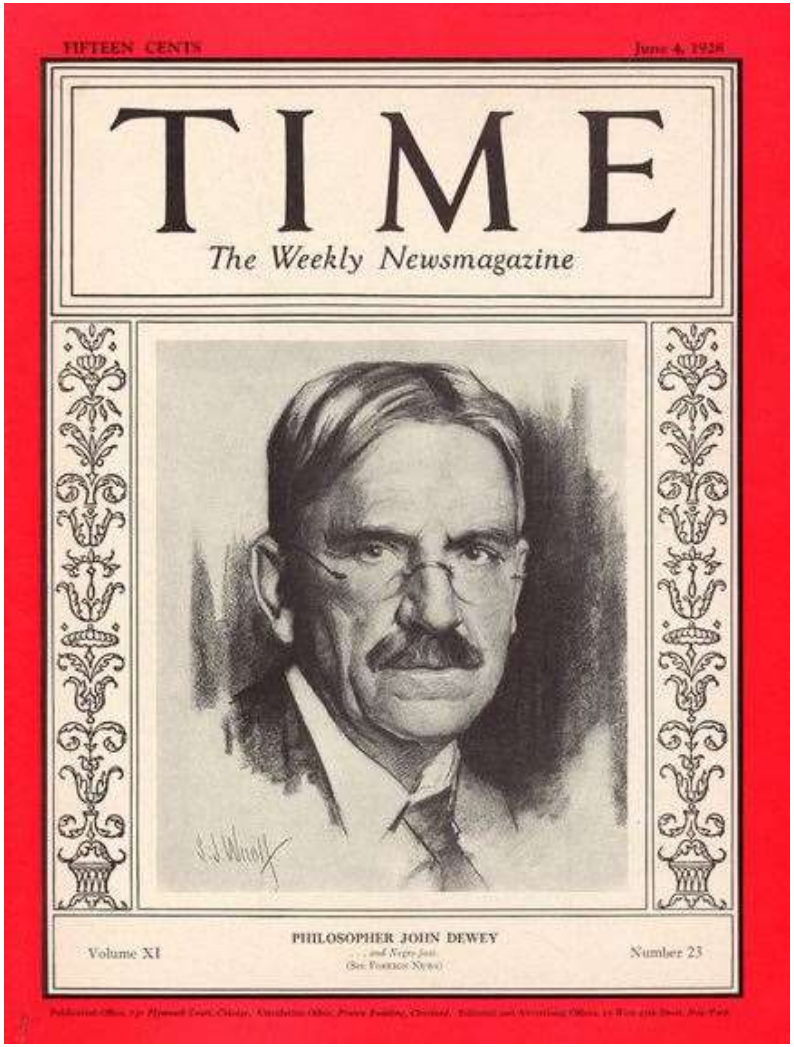
The best laid plans…

… involve extensive citizen involvement and participation

"The man who wears the shoe knows best that it pinches and where it pinches, even if the expert shoemaker is the best judge of how the trouble is to be remedied.

John Dewey

The Public and Its Problems



Community Health And Resource Management

Critical Facilities Exercise

FEMA Resiliency Workshop
Rockport TX, March 2016

CHARM

Go/No-Go Exercise

FEMA Resiliency Workshop
Jackson Co, June 2016

Future Land Use Exercise

FEMA Resiliency Workshop
Galveston, September 2016

Buy Out Exercise

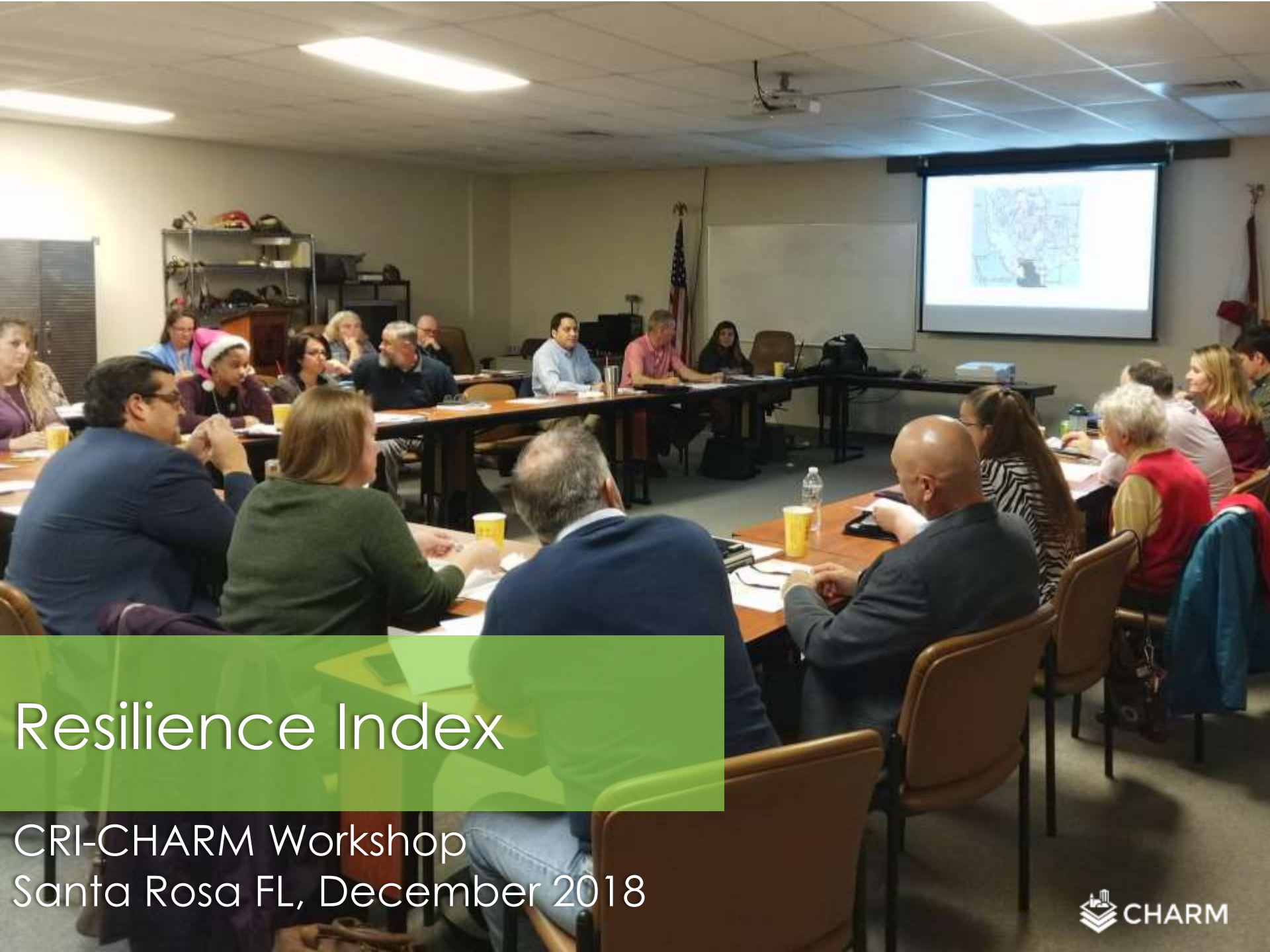
FEMA Resiliency Workshop
Hays Co, August 2017

SOVI Exercise

FEMA Resiliency Workshop
Liberty Co, April 2018

Mitigation Exercises

FEMA Resiliency Workshop
Brazoria Co, April 2018



Resilience Index

CRI-CHARM Workshop
Santa Rosa FL, December 2018

CHARM

Discovery Workshops

LAN Consulting & HCFCD Cedar, Luce & Jackson Bayous
November 2018

Foster & Facilitate Dialogue Asking Better Questions

Participant Goals

- ✓ Facilitate dialogue about values, practical knowledge, and vision
- ✓ Allow participants to directly participate in scenario analysis and view planning and mitigation impacts in real time
- ✓ Engage in collaborative problem solving and catalyze action
- ✓ Advance the conversation about effective planning and mitigation practices


NOAA
U.S.
of Commerce
Nati
nic and
Atm
dministration
NATIONAL MARINE
SANCTUARIES
National Marin

CHARM


CHARM


Plan Using Guiding Principles


EXIT
EDNA
FIRE
DEPARTMENT
CHARM

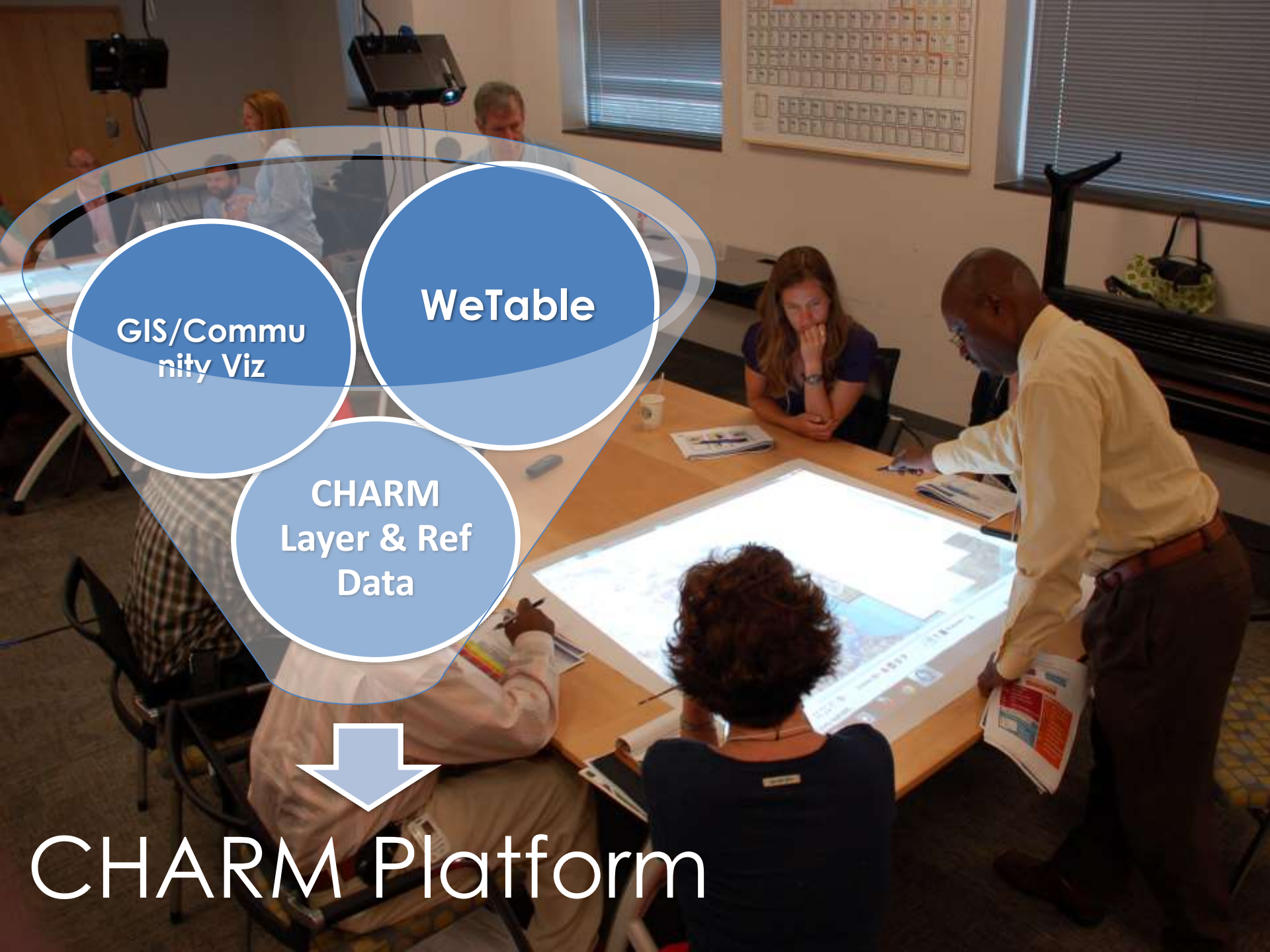

CHARM


City of Corpus Christi
CHARM
CHARM


“This has changed my thinking…”

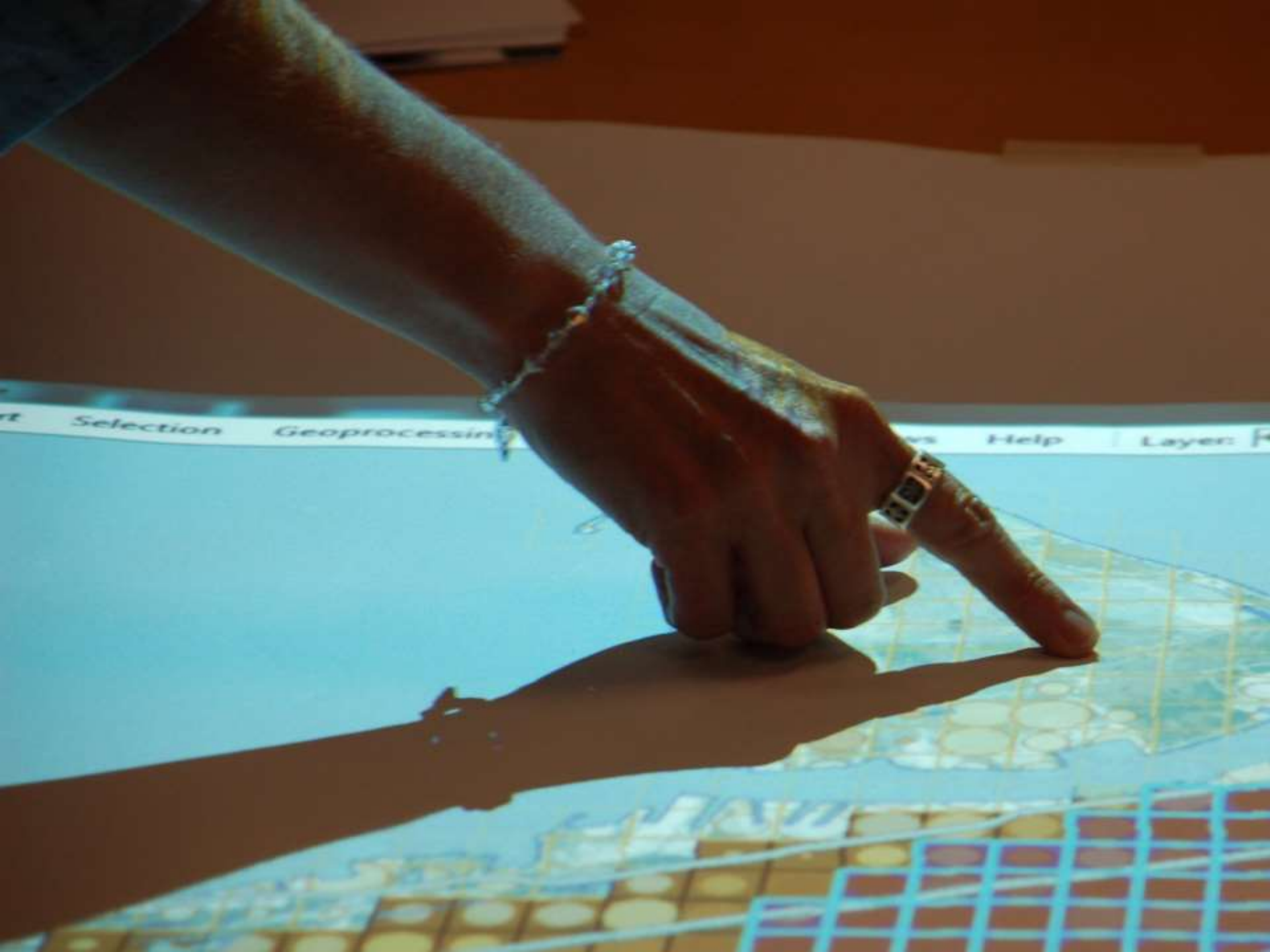
“Ourselves”


"We are talking"



CHARM Platform

WeTable

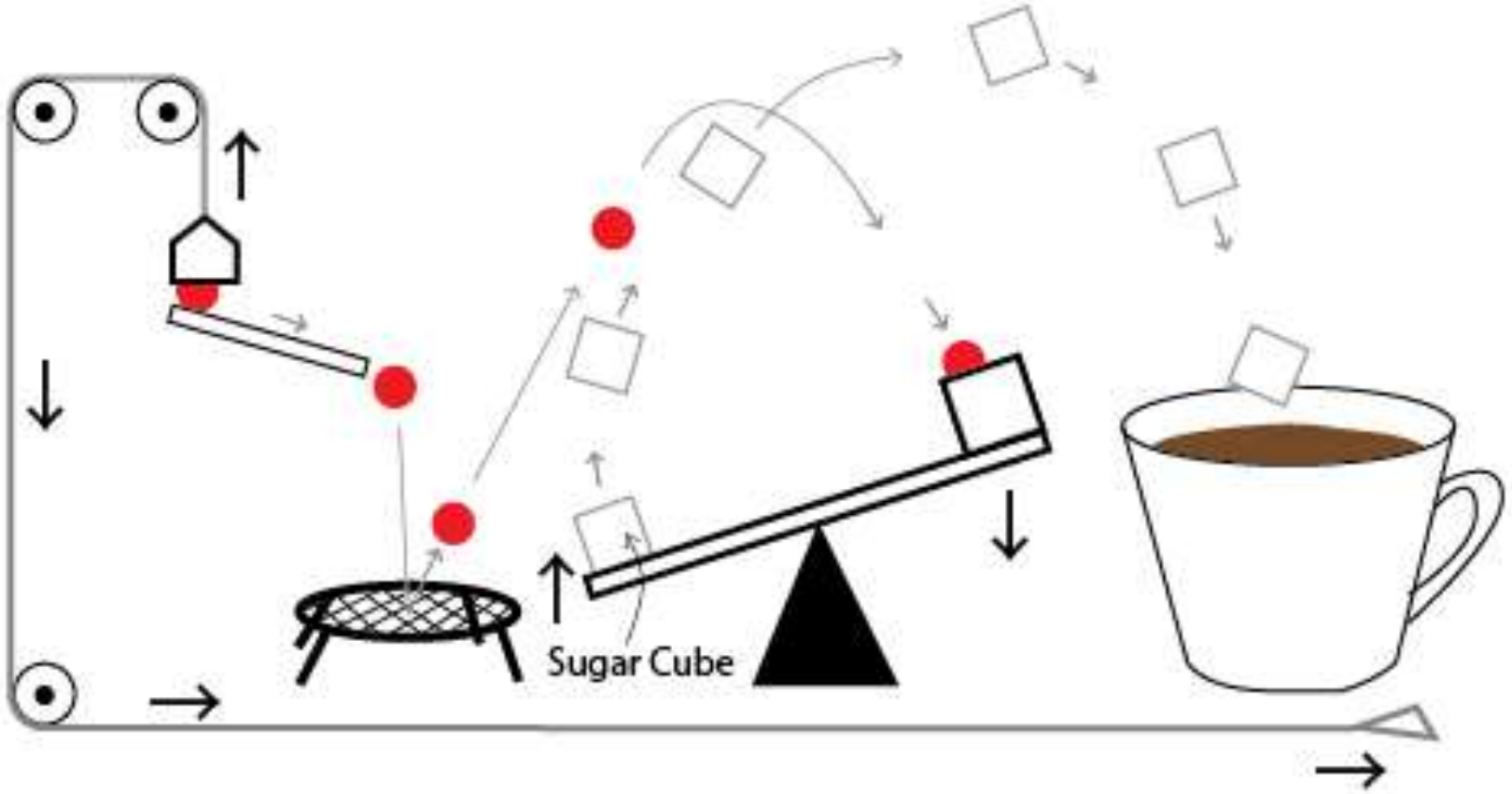

Selection
Help

2.5-Acre Grid


NATIONAL WEATHER SERVICE
FOREST SERVICE
U.S. FISH & WILDLIFE SERVICE
United States Census Bureau
FEMA
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
USGS
science for a changing world
NOAA
NATIONAL PARK SERVICE
USDA
ESRI


LAND USE
HOMES PER ACRE
0.2
BUILDING STORIES
1-2
IMPERVIOUS COVER
15%
INDOOR V.S OUTDOOR WATER USE
SEWAGE
SUBURB RANCHETTES
Centralized Treatment
Residential
Retail (Ret.)
Business (Bus.)
TOWN CENTER MIXED
Walking Friendly
Transit Friendly
Smart Growth

Geographic Information System (GIS or Computer Mapping)



CHARM by the numbers

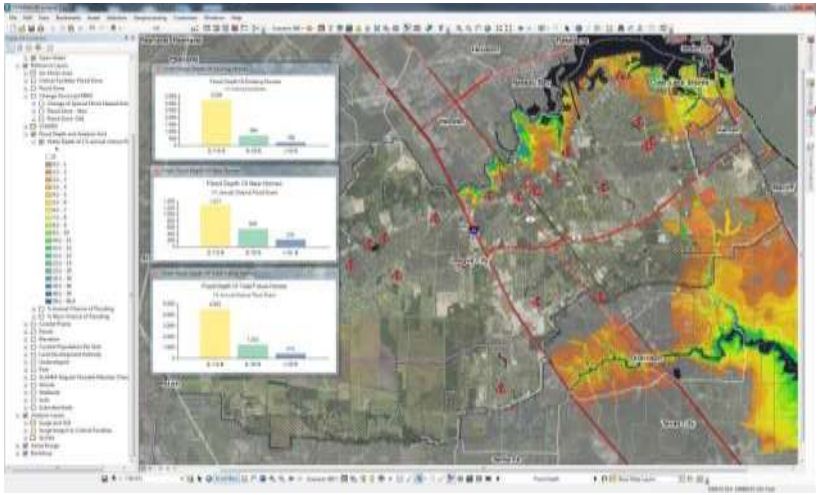
Up to 10 Participants per tables

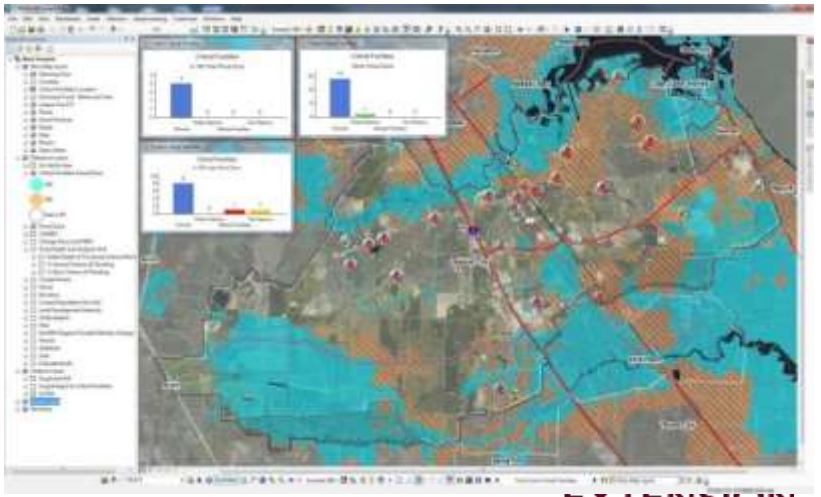
30+ Map Layers

60 Live Updates

14 Development Styles

20 Analytic Layouts





CHARM

TCWP.tamu.edu
CommunityCHARM.org

Steven Mikulencak, AICP
TCWP Planning Team Lead & Project Manager
smikulencak@tamu.edu

TCWP offers technical and facilitative support for Texas communities. Please reach out to us to discuss options.

Texas A&M AgriLife Extension

Texas Community Watershed Partners
A Program Of Texas A&M AgriLife Extension