

Bottom-Up Statewide Flood Planning In Texas

American Planning Association
TXAPA College Station, Texas

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Regions 1, 2, 11

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Regions 6, 14, 15



This Presentation Will Cover:

- Senate Bill 8 and the **Start of State and Regional Flood Planning** in Texas
- **Regional Flood Planning** Framework & Process
- **2024 State Flood Plan** Highlights
- Implementing the Plans
- Moving Forward: Key Updates for **Cycle 2**

Senate Bill 8, 2019

- 86th legislature (2019) **Senate Bill 8** directs TWDB to develop a state flood plan, which must:
 - provide for orderly preparation for and response to flood conditions **to protect against the loss of life and property;**
 - be a guide to state and local flood control policy
- Texas Water Code Section 16.062 requires:
 - Designation of Flood Planning Regions by major river basin
- First Cycle: \$19.5 million initially, \$10 million more with an amendment
- ‘Prevention is better than cure’ – applies to flood risk as well

Regional Flood Planning Overview

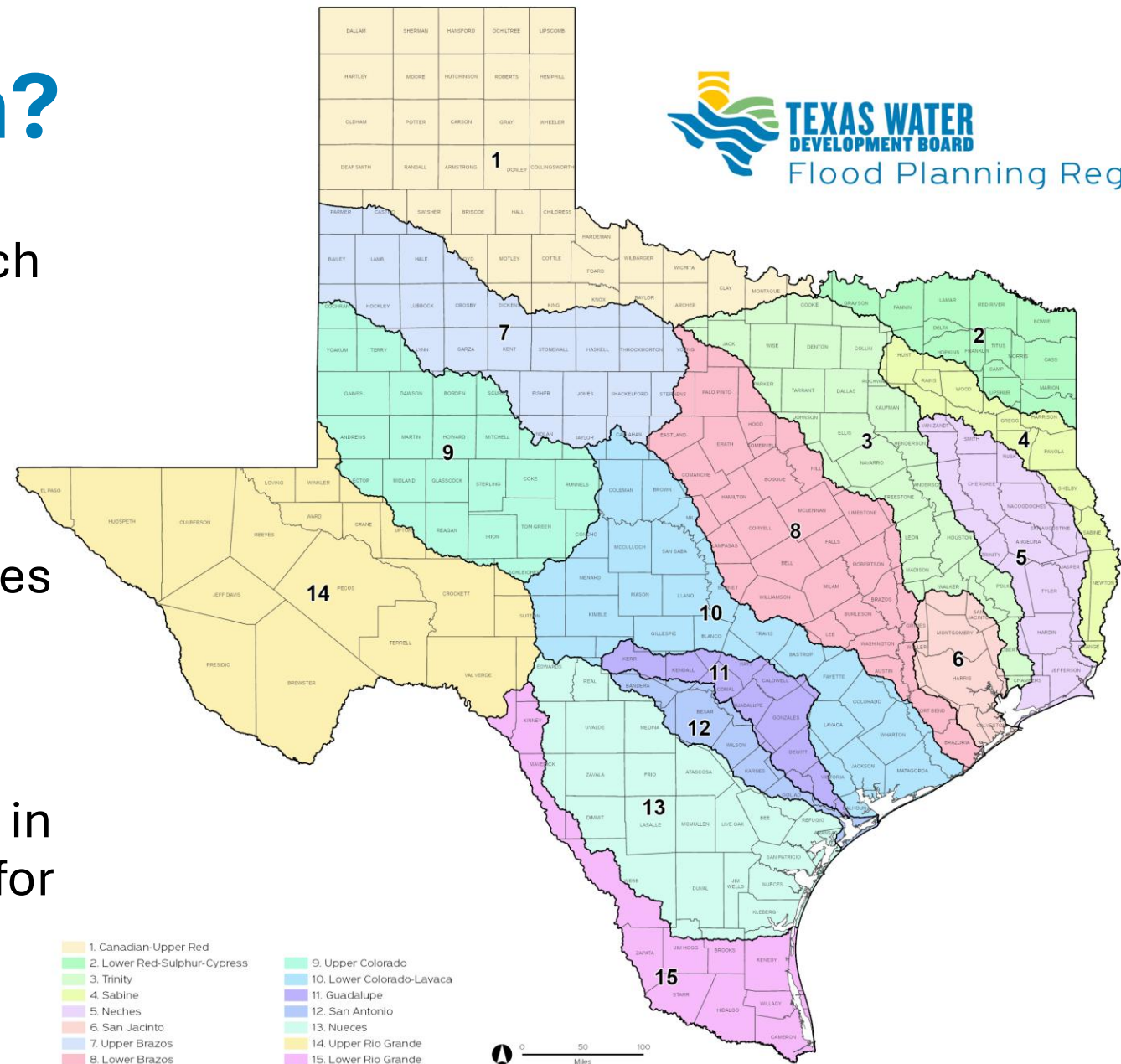
How do we plan?



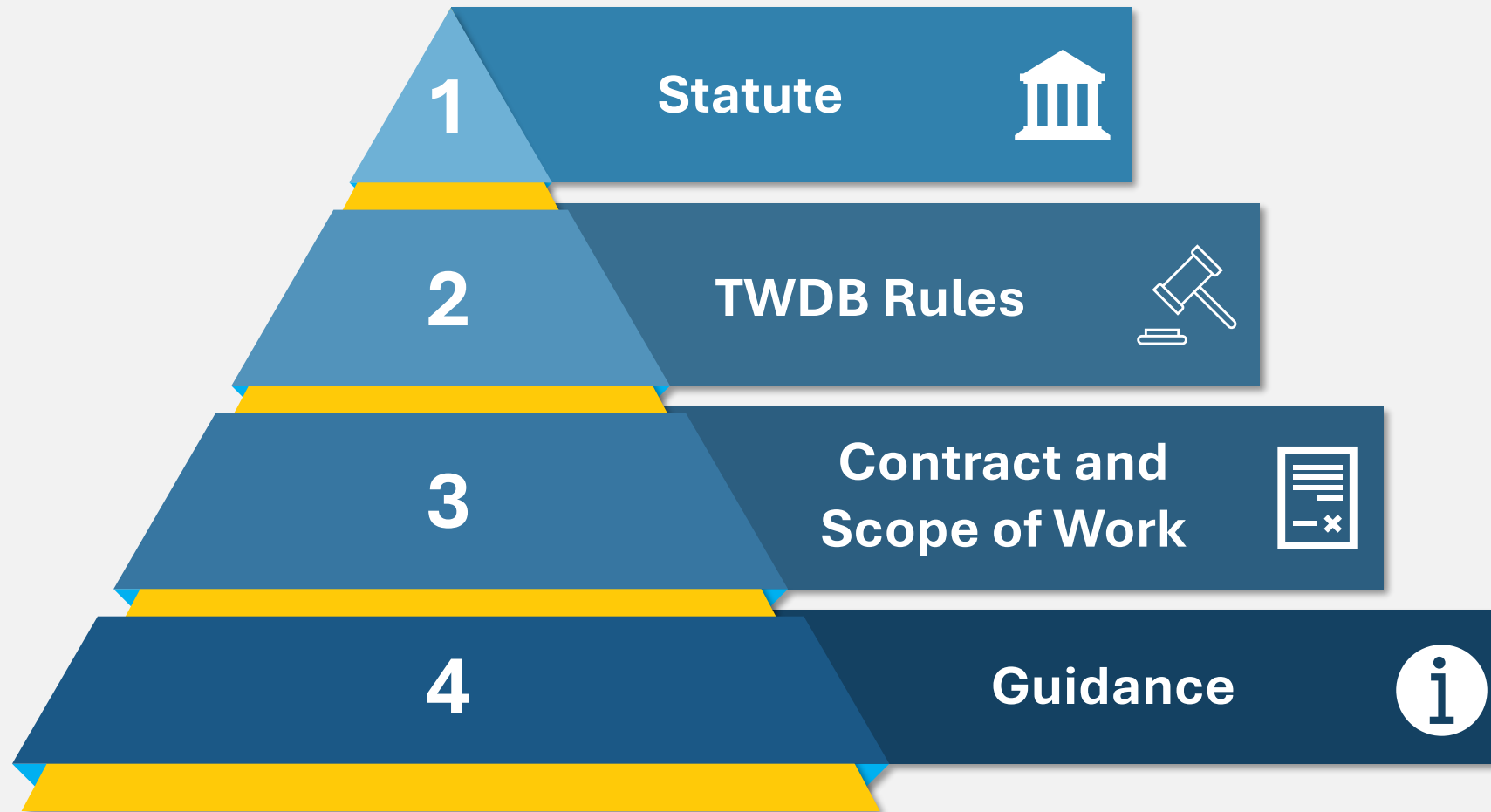
TEXAS WATER
DEVELOPMENT BOARD

Flood Planning Regions

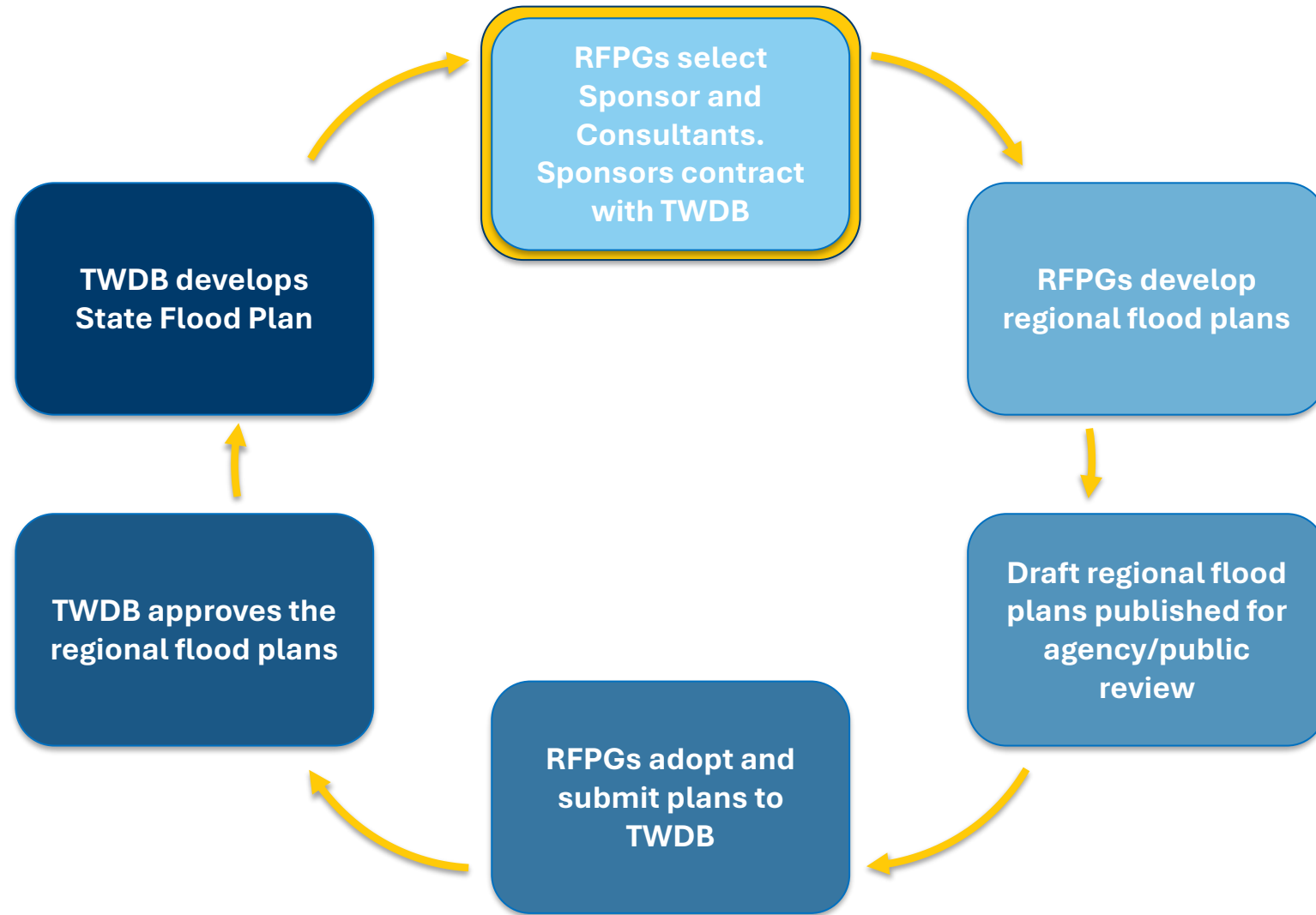
- **15 watershed-based regions**, each with a regional flood plan
- **Bottom-up approach:** Groups governed by local, volunteer members.
- **Open process:** Ample opportunities for public input at RFPG meetings, comment on plans, written comments.
- **Future funding:** Projects included in regional flood plan will be eligible for future Flood Infrastructure Fund financing.



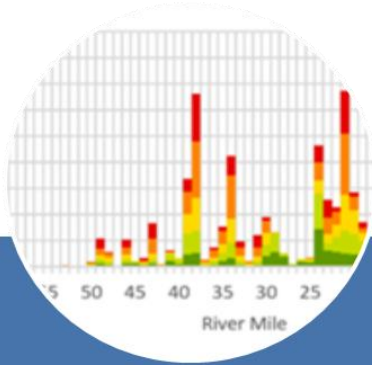
Planning Framework



Regional Flood Plan Overview



Key Planning Objectives



**Collect
Data**



**Identify
Risks**



**Recommend
Projects**

Regional Flood Planning Groups

- RFPGs develop regional flood plans, alongside technical consultants, on a 5-year cycle
 - Hold public meetings and solicit public input
 - Identify specific flood risks and flood risk reduction goals
 - Flood hazard and flood exposure analysis
 - Vulnerability analysis
 - Identify and recommend flood management evaluations, strategies, and flood mitigation projects (FMXs)



Where's College Station?

- **Region 8 Lower Brazos**
 - Lower Brazos is the major river running through Region 8 starting in Possum Kingdom, extending into the Gulf of Mexico near Lake Jackson and Freeport
 - Major cities:
 - Waco, Georgetown, College Station, Fort Cavazos, Killeen, Sugar Land



Region 8 Lower Brazos Flood Planning Region
Provided by: <https://texasstatefloodplan.org/overview>

Regional Flood Planning Group Members

Voting members

1. Agricultural interests
2. Industries
3. River authorities
4. Counties
5. Municipalities
6. Water districts
7. Flood districts
8. Electric generating utilities
9. Public
10. Water utilities
11. Environmental interests
12. Small businesses

Non-Voting members

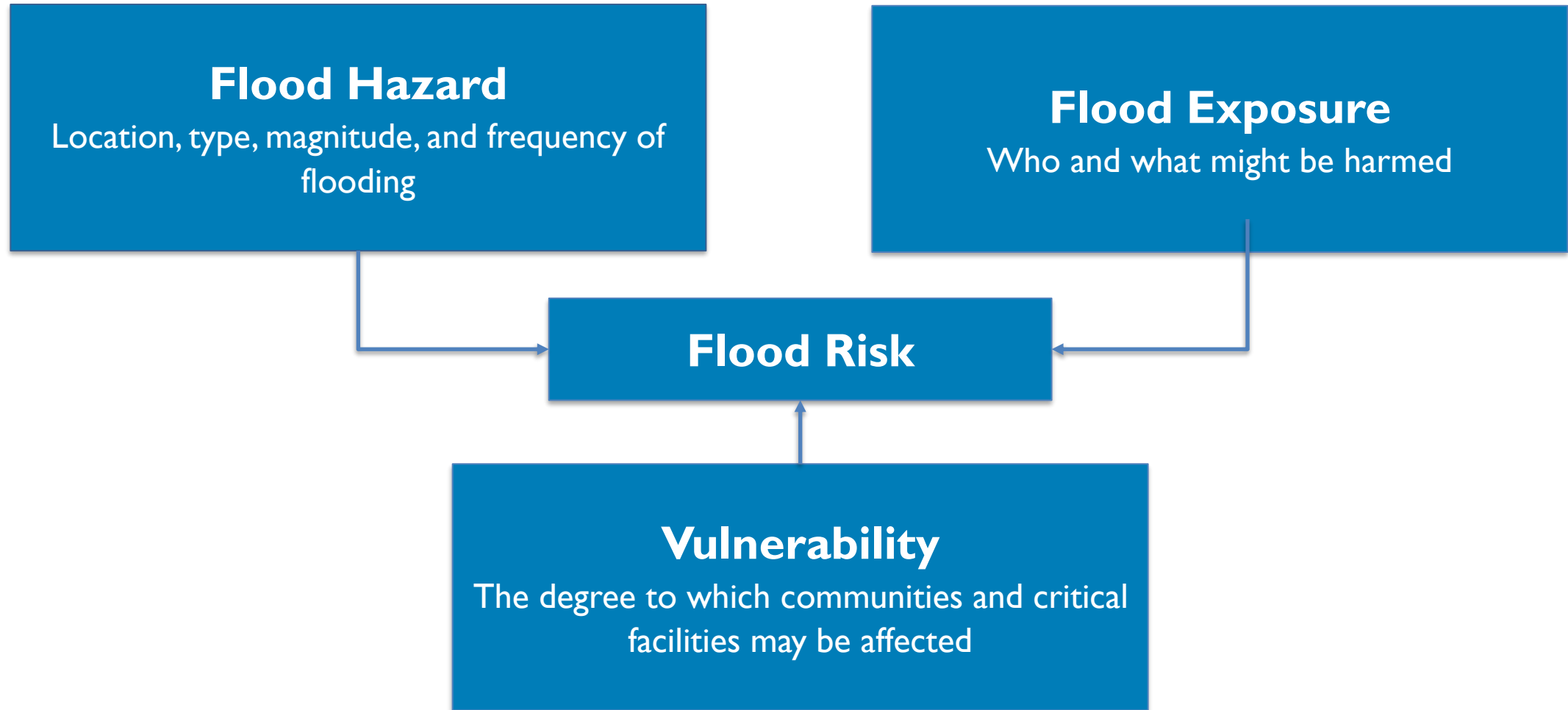
1. Texas Water Development Board
2. Texas Commission on Environmental Quality
3. Department of Agriculture
4. General Land Office
5. Texas Department of Emergency Management
6. Texas State Soil and Water Conservation Board
7. Texas Parks and Wildlife Department

*All members listed are required by state law

What's In A Flood Plan?

- A Regional Flood Plan consists of 11 tasks:
 - 1) Description of planning region
 - 2) Flood exposure and vulnerability – Existing and Future
 - 3) Floodplain management practices and goals
 - 4) **Methodology for choosing flood studies, projects, and strategies**
 - 5) **Recommending flood studies, projects, and strategies**
 - 6) Water supply impacts
 - 7) Listing flood response and recovery activities
 - 8) Legislative and administrative planning recommendations
 - 9) Surveying financing options
 - 10) Public outreach
 - 11) **Implementation and Comparison to Previous RFP**

Components of Flood Risk



Flood Hazard

- Approximately 21% (56,000 square miles) of Texas land area in the 1% annual chance floodplain
 - **4700 square miles** in Region 8 Lower Brazos
- Types
 - Riverine
 - Coastal
 - Urban



Fathom Floodplain Outputs

Flood Exposure

- Statewide:
 - 2.1 million people live or work in 1% (100-year) annual chance floodplain
 - 878,100 buildings in 1% annual chance floodplain
 - 8,500 low water crossings
- Region 8 Lower Brazos:
 - 129,890 people in 1% annual chance floodplain
 - 940 low water crossings
 - 63,060 structures in 1% annual chance floodplain

Vulnerability

- Assessing the degree of flood impacts on communities and critical facilities
 - Higher the social vulnerability index value, greater the vulnerability to flood and other hazards
- Approximately 6,100 police, fire, medical, EMS, and schools in 1% floodplain statewide
 - Approximately 209 in Region 8

Flood Risk Reduction Solutions (FMXs)

Our tools for identifying and reducing flood risk:

- Flood Management Evaluations (FMEs)
- Flood Mitigation Projects (FMPs)
- Flood Management Strategies (FMSs)



Image: Ian Blair

Defined Flood Risk Reduction Solutions

Flood Management Evaluation (FME)

Study flood risk and identify potential solutions.

Flood Mitigation Projects (FMP)

Funded projects (structural or non-structural) that reduce flood hazards.

Flood Management Strategies (FMS)

Long-term strategies like policy or regulatory improvements not covered by FME or FMP.

Changes For Cycle 2

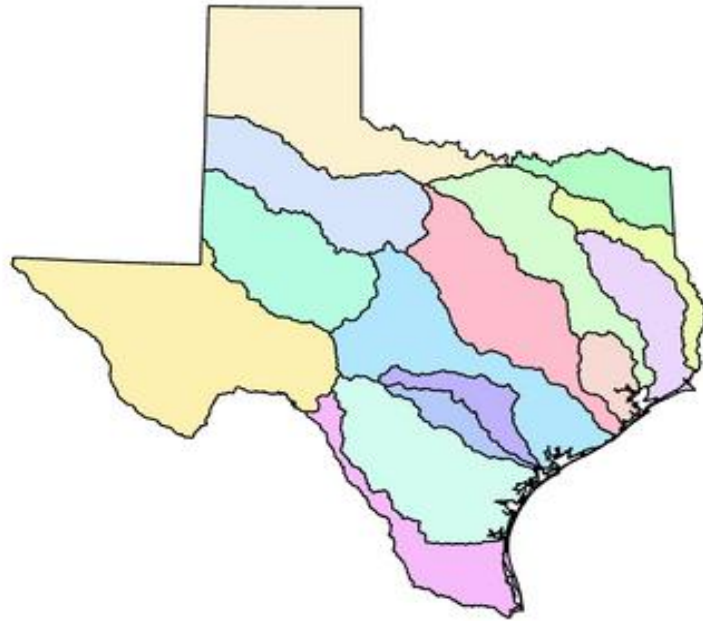
Scope of Work Tasks:

- Task 4C – RFPG preforms portion of FMEs identified under Task 4A
- Task 5B – Recommend a list of FMEs to be performed by TWDB
- Task 11 – Implementation and comparison to previous Regional Flood Plan

TWDB FME For Small Communities Overview

- Prioritize FMEs for **small and rural communities that lack resources and staff.**
- Consider FMEs most likely to result in potentially feasible FMPs and FMSs.
- Beyond this requirement, RFPG has flexibility.
- RFPGs provide list **in order of timing.**
- RFPGs approve the FME list at regular RFPG meetings.

15 Regional Flood Plans



=

over
61,000
pages



State Flood Plan

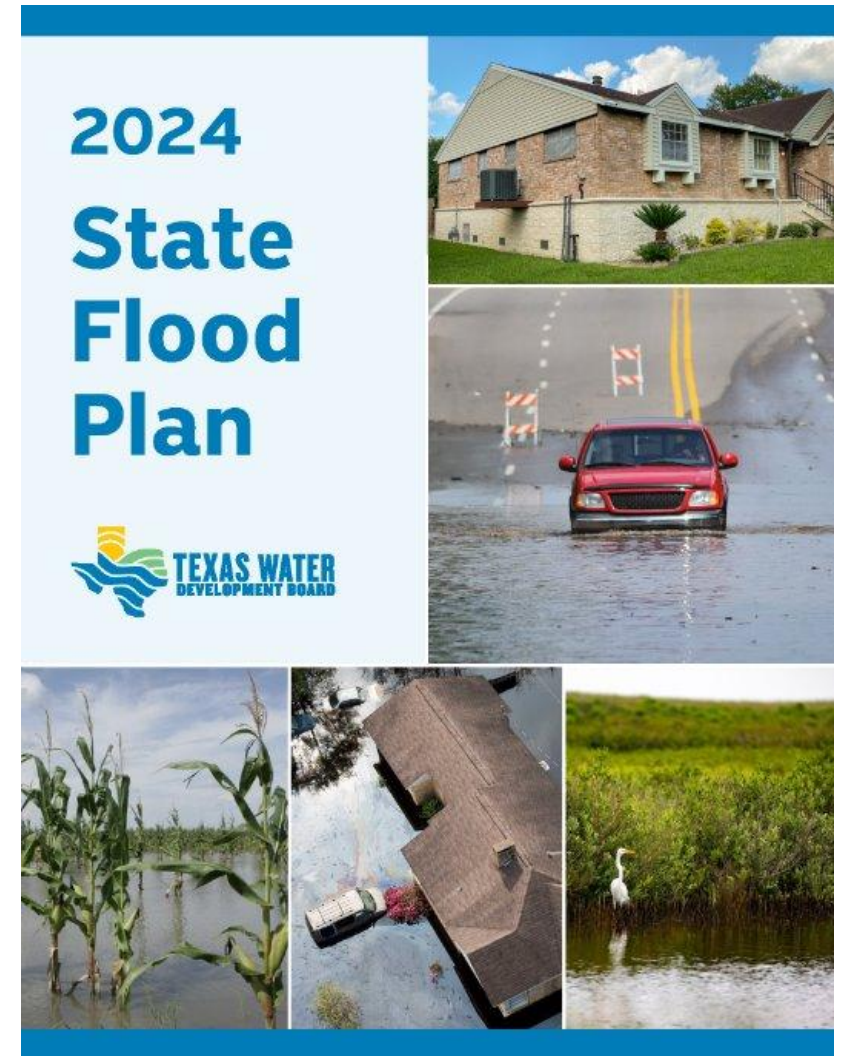


condensed
into
285 pages

2024 State Flood Plan

Purpose Of The State Flood Plan

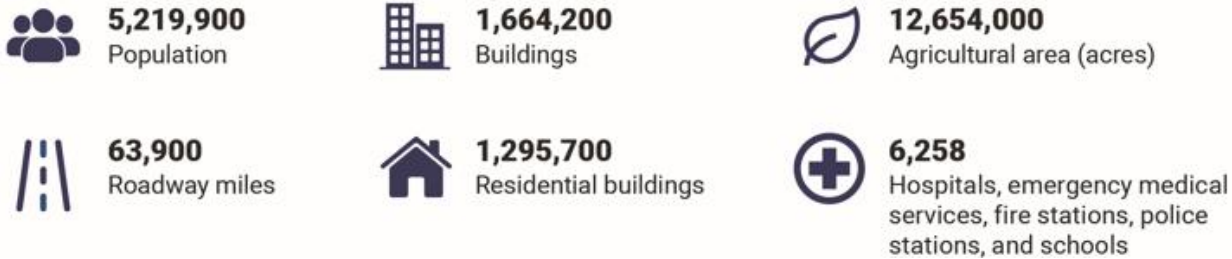
- Texas Water Code § 16.061
 - *Protect against the loss of life and property*
 - Synthesize RFPG findings
 - Provide legislative recommendations
- <https://www.twdb.texas.gov/flood/planning/sfp>
- <https://www.texasstatefloodplan.org>



An Overview Of 2024 State Flood Plan Findings

Existing flood risk

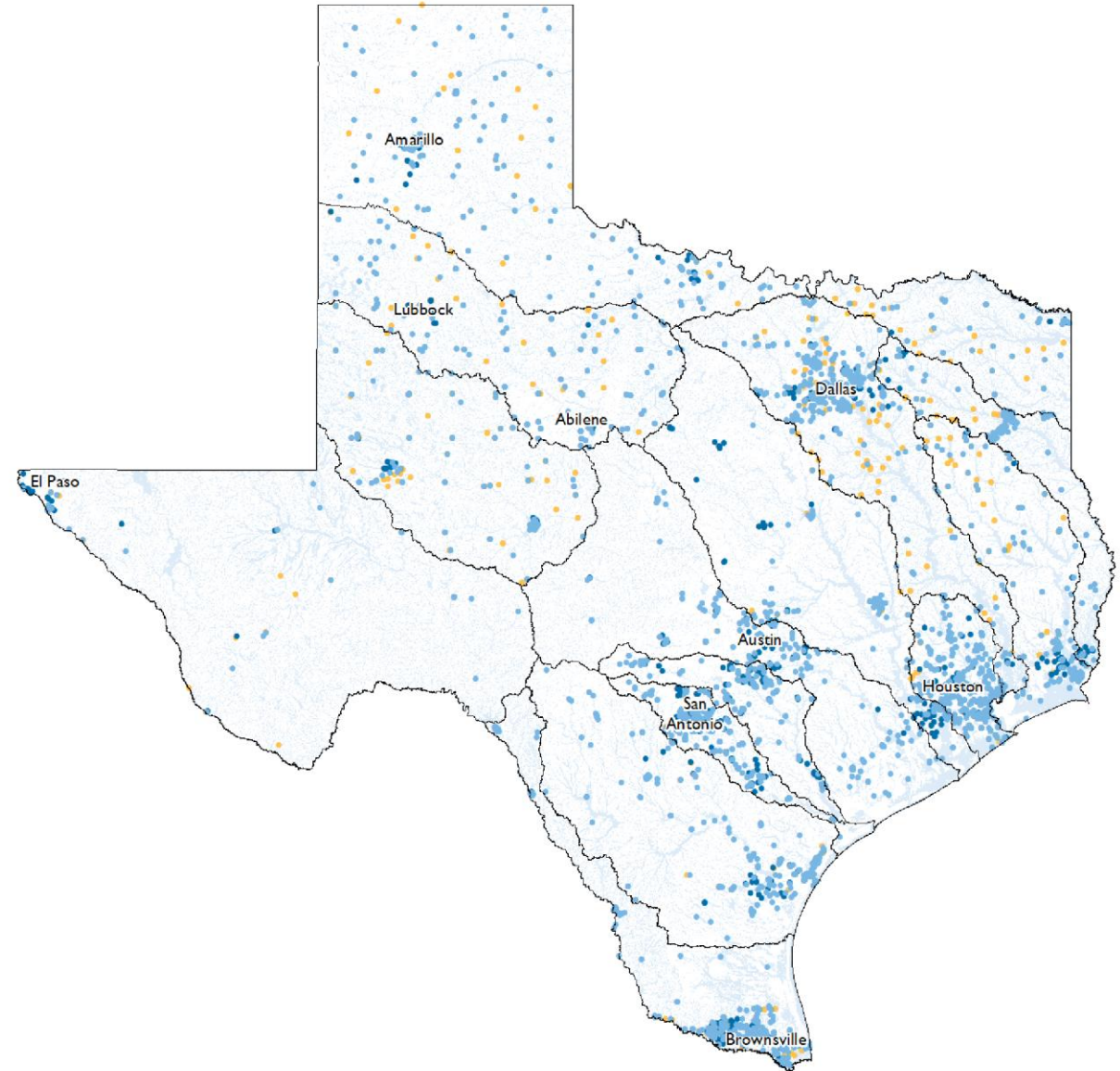
(in 1 percent [100-year] and 0.2 percent [500-year] annual chance flood hazard areas)



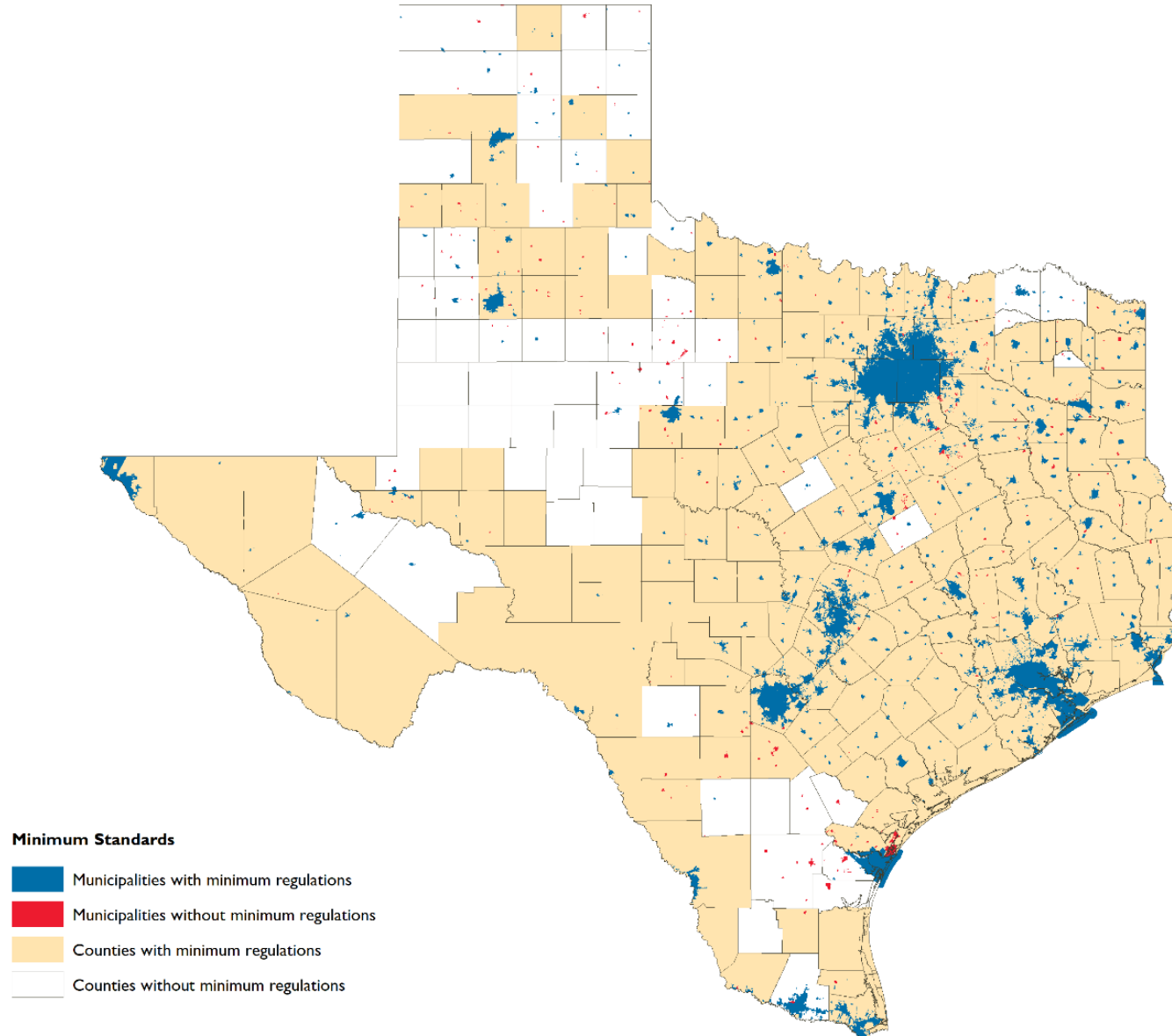
Recommended Studies, Projects and Strategies



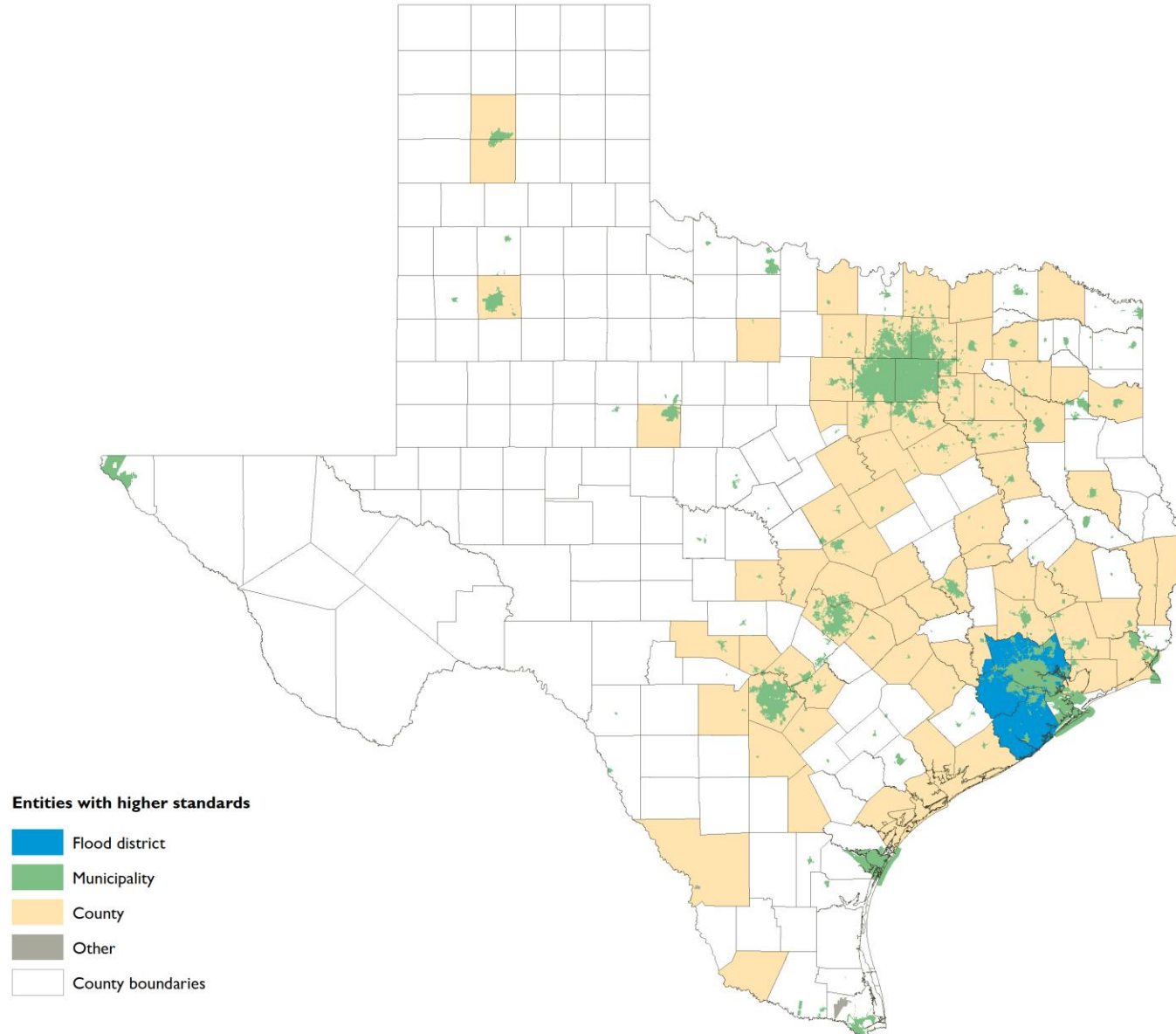
Total \$54.5 billion+



Locations Of Entities With And Without Minimum Floodplain Management Regulations*



Locations Of Entities With Higher Floodplain Management Standards



Defined Flood Risk Reduction Solutions

Flood Management Evaluation (FME)

Study flood risk and identify potential solutions.

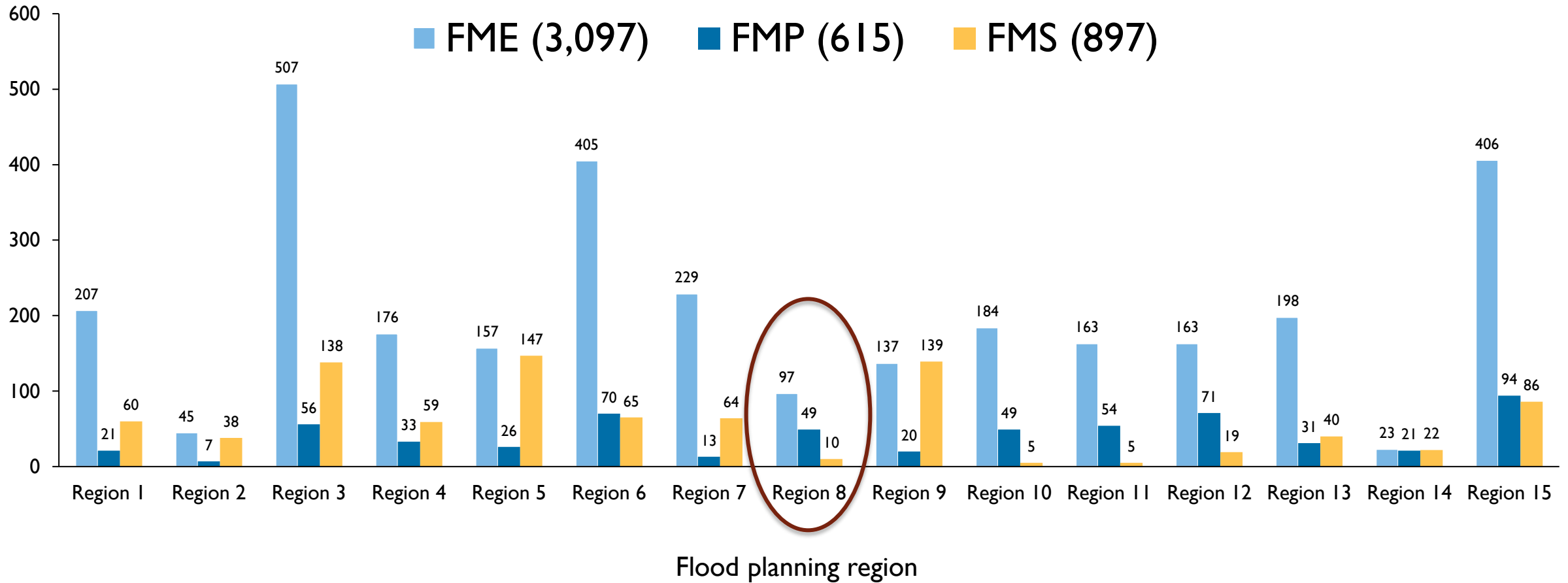
Flood Mitigation Projects (FMP)

Funded projects (structural or non-structural) that reduce flood hazards.

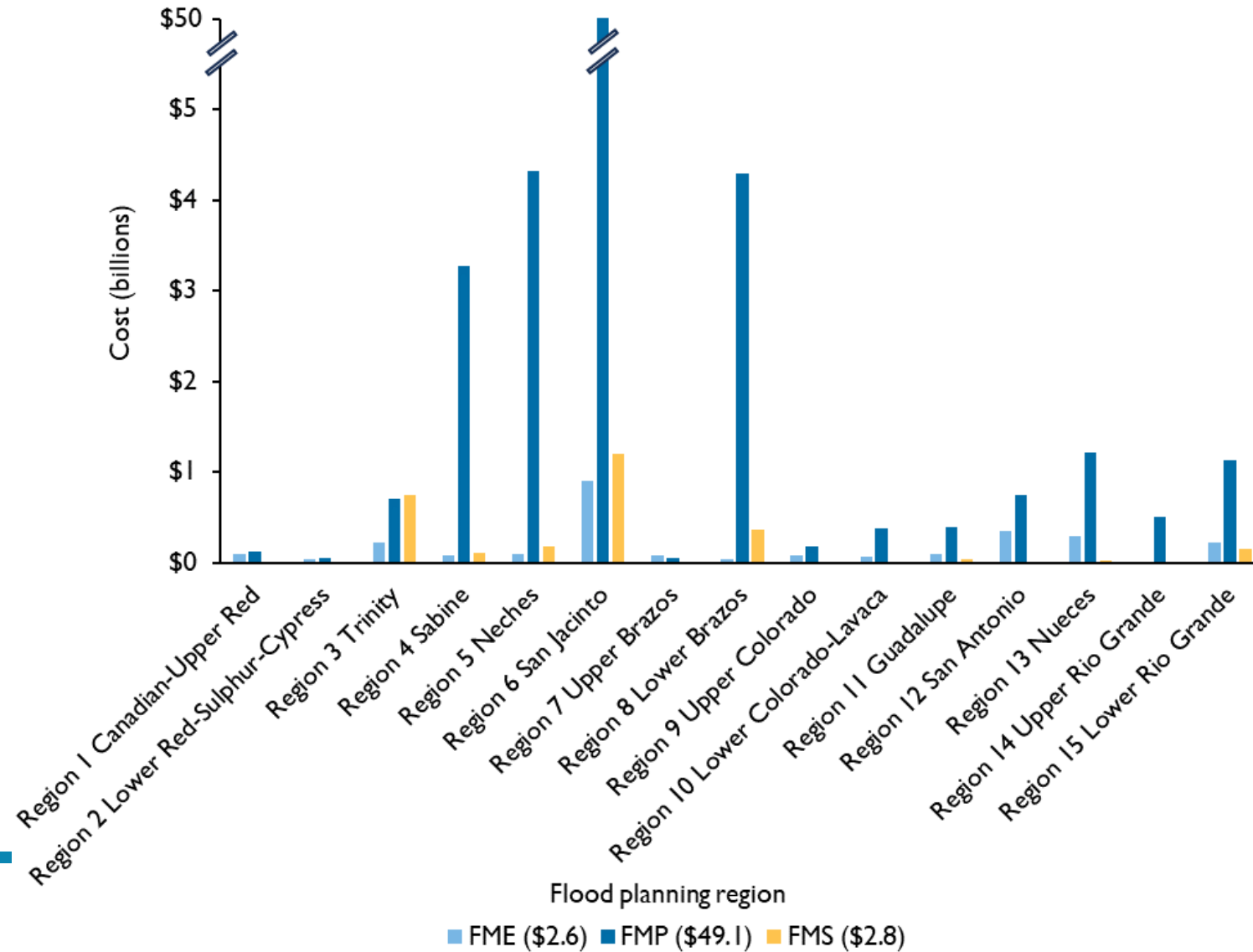
Flood Management Strategies (FMS)

Long-term strategies like policy or regulatory improvements not covered by FME or FMP.

Recommended Flood Risk Reduction Solutions By Type And Region



Estimated Cost Of All Recommended Flood Risk Reduction Solutions By Region



Ranking Flood Risk Reduction Solutions

		Criterion	Criterion type	Criteria grouping	FME ranking criterion?	FME ranking weight	FME grouping weight	FMP ranking criterion?	FMP ranking weight	FMP grouping weight	FMS ranking criterion?	FMS ranking weight	FMS grouping weight	Max score
Reported data from FME, FMP, and FMS GIS feature classes	1	Estimated structures at 1 percent (100-year) flood risk**	Flood risk	Life, safety, and property	Yes	15.0%	75.0%	No	0.0%	0.0%	Yes	10.0%	40.0%	10
	2	Estimated population at 1 percent (100-year) flood risk**	Flood risk		Yes	15.0%		No	0.0%		Yes	10.0%		10
	3	Critical facilities at 1 percent (100-year) flood risk**	Flood risk		Yes	25.0%		No	0.0%		Yes	10.0%		10
	4	Low water crossings at flood risk**	Flood risk		Yes	20.0%		No	0.0%		Yes	10.0%		10
	5	Estimated road closures**	Flood risk	Mobility	Yes	5.0%	15.0%	No	0.0%	0.0%	Yes	5.0%	15.0%	10
	6	Estimated road miles at 1 percent (100-year) flood risk**	Flood risk		Yes	10.0%		No	0.0%		Yes	10.0%		10
	7	Estimated farm & ranch land at 1 percent (100-year) flood risk (acres)**	Flood risk	Agriculture	Yes	10.0%	10.0%	No	0.0%	0.0%	Yes	5.0%	5.0%	10
	8	Structures removed from 1 percent (100-year) floodplain**	Flood risk reduction	Life, safety, and property				Yes	5.0%	45.0%	Yes	10.0%	25.0%	10
	9	Percent structures removed from 1 percent (100-year) floodplain (Calculated by TWDB from reported data)	Flood risk reduction					Yes	10.0%		No	0.0%		10
	10	Residential structures removed from 1 percent (100-year) floodplain**	Flood risk reduction					Yes	2.5%		Yes	5.0%		10
	11	Estimated population removed from 1 percent (100-year) floodplain**	Flood risk reduction					Yes	10.0%		Yes	10.0%		10
	12	Critical facilities removed from 1 percent (100-year) floodplain**	Flood risk reduction					Yes	10.0%		No	0.0%		10
	13	Low water crossings removed from 1 percent (100-year) floodplain**	Flood risk reduction					Yes	7.5%		No	0.0%		10
	14	Estimated roadway miles removed from 1 percent (100-year) floodplain**	Flood risk reduction	Mobility				Yes	5.0%	5.0%	No	0.0%	0.0%	10
	15	Estimated farm & ranch land removed from 1 percent (100-year) floodplain (acres)**	Flood risk reduction	Agriculture				Yes	5.0%	5.0%	No	0.0%	0.0%	10
	16	Percent nature-based solution (by cost)	Other					Yes	5.0%		Yes	7.5%		10
	17	Benefit-cost ratio	Other					Yes	2.5%					10
	18	Water supply benefit (Y/N)	Other					Yes	5.0%		Yes	5.0%		10
	19	FMP project type (10 points) Low water crossing (4 points) Preparedness	Other					Yes	2.5%		No	0.0%		
	20	FMS project type (10 points) Flood measurement and warning (8 points) Regulatory and guidance (6 points) Education and outreach (4 points) Property acquisition and structural elevation (4 points) Infrastructure projects (2 points) Other	Other					No	0.0%		Yes	2.5%		10
	Subtotal					100.0%			70.0%			100.0%		
FMP project details scoring (computed by the regional flood planning groups)**	21	Score 1: Severity - Pre-project average depth of flooding (100-year)	Flood risk					Yes	5.0%					10
	22	Score 2: Severity - Community need (percent population)	Flood risk					Yes	5.0%					10
	23	Score 6: Life and safety	Flood risk reduction					Yes	5.0%					10
	24	Score 8: Social vulnerability	Other					Yes	5.0%					10
	25	Score 10: Multiple benefits	Other benefits					Yes	2.5%					10
	26	Score 13: Environmental benefit	Other benefits					Yes	2.5%					10
	27	Score 15: Mobility	Other benefits					Yes	5.0%					10
	Subtotal					0.0%			30.0%			0.0%		
Total (must add to 100 percent)					100.0%			100.0%			100.0%			

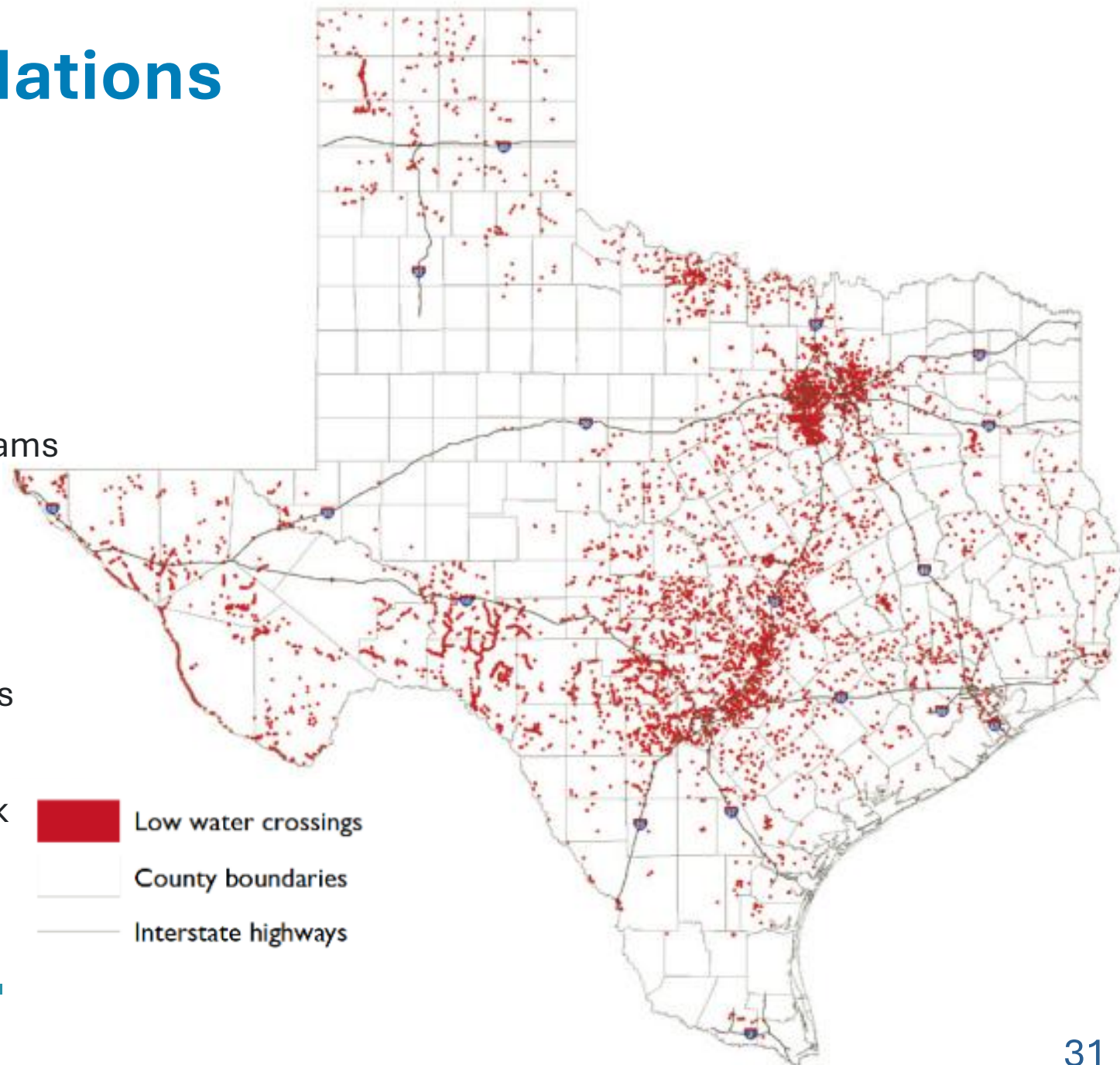
Legislative Recommendations

TWDB legislative recommendations

1. Flood funding and financial mechanisms
2. Community financial and technical assistance
3. Low water crossing safety
4. Flood early warning systems
5. Enhanced dam and new levee safety programs

Select regional flood planning group legislative recommendations

1. Authority of counties, including regarding drainage fees
2. Statewide floodplain management standards for infrastructure and buildings for flood risk reduction
3. Statewide building codes regarding flood risk
4. Transportation infrastructure considerations



Floodplain Management Recommendations

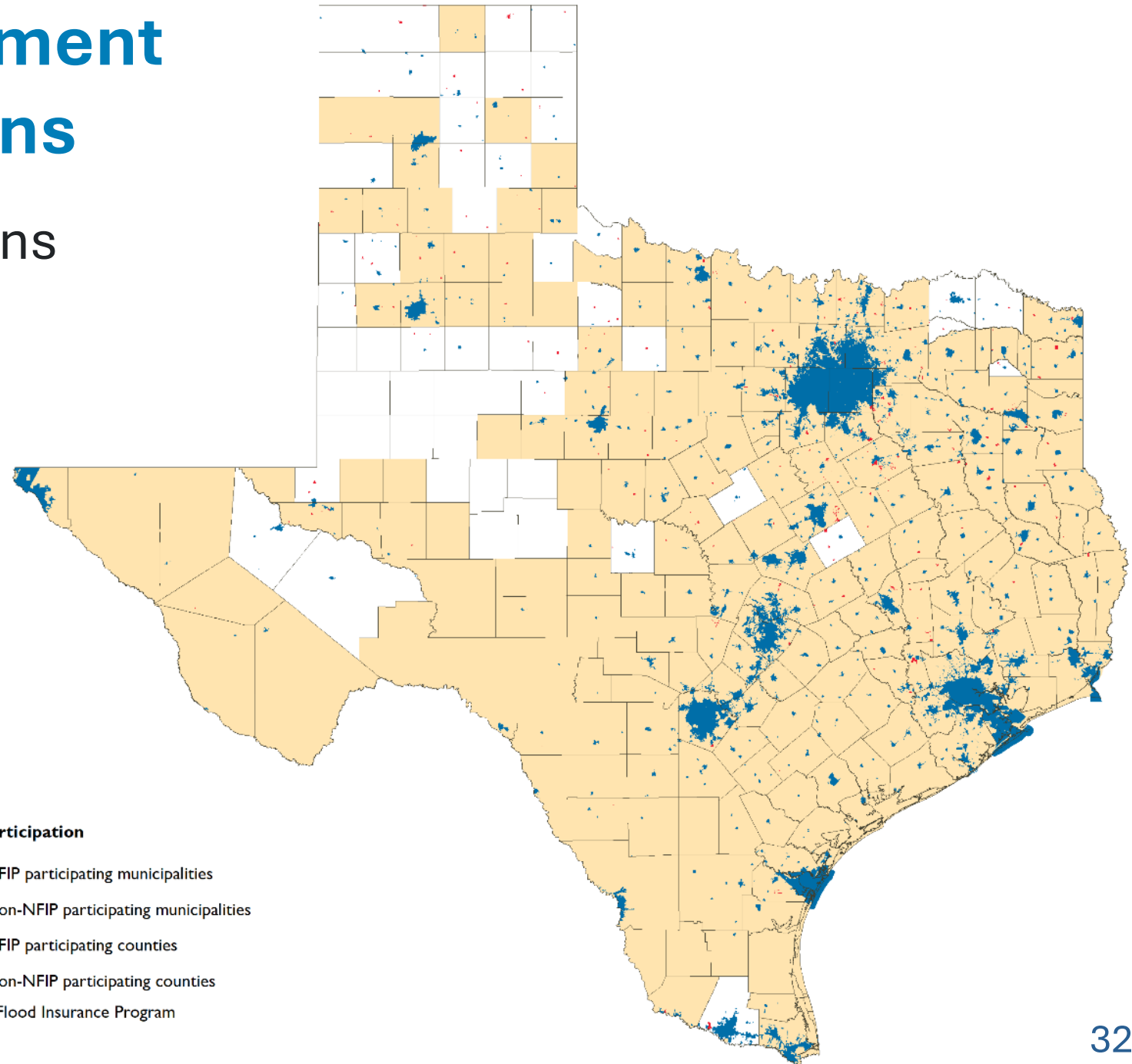
TWDB general recommendations for floodplain management includes

1. Meet & exceed FEMA minimum standards
(Texas Water Code § 16.3145)
2. Enhance local management
3. Nature-based solutions
4. Asset management
5. Education & outreach
6. Continued SFP coordination

NFIP* participation

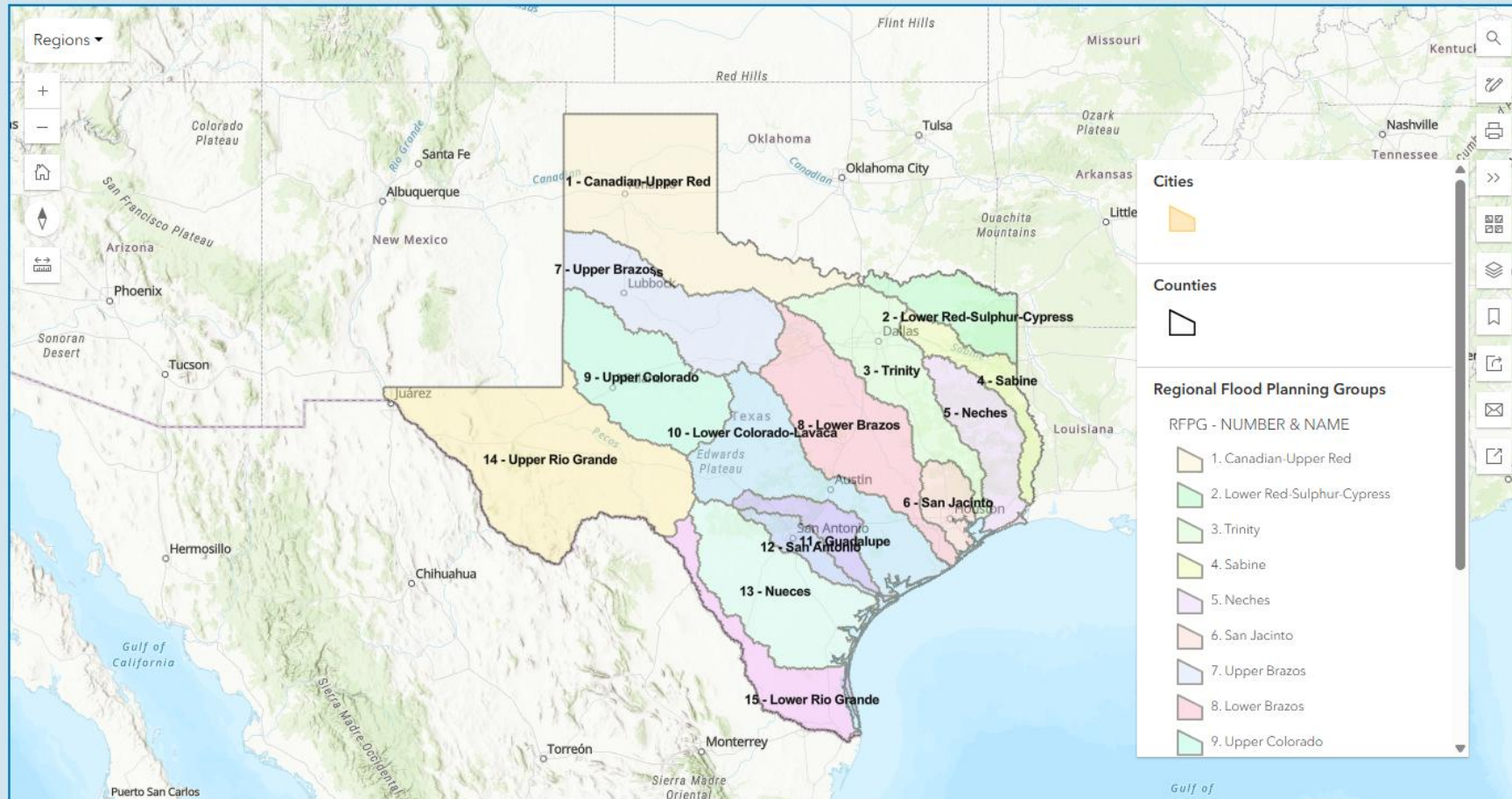


*National Flood Insurance Program



Interactive State Flood Plan Viewer

<https://texasstatefloodplan.org/overview>





[Overview](#)[Flood Risks ▾](#)[Recommended Solutions ▾](#)[Existing Infrastructure](#)[Floodplain Management](#)[Explore the Data ▾](#)[Resources ▾](#)[Sign In](#)

Overview of findings from the 2024 State Flood Plan

Statewide

Existing Flood Risk

(in 1 percent and 0.2 percent annual chance flood hazard areas)

	5,886,000 Population		1,789,800 Buildings
	13,099,990 Agricultural land (acres)		66,000 Roadway miles
	1,402,000 Residential buildings		6,659 Critical Facilities*

Recommended Studies, Projects and Strategies**

Flood management evaluations (3,097)

\$2.63B

Flood mitigation projects (615)

\$49.06B

Flood management strategies (897)

\$2.84B

Total count (4,609)

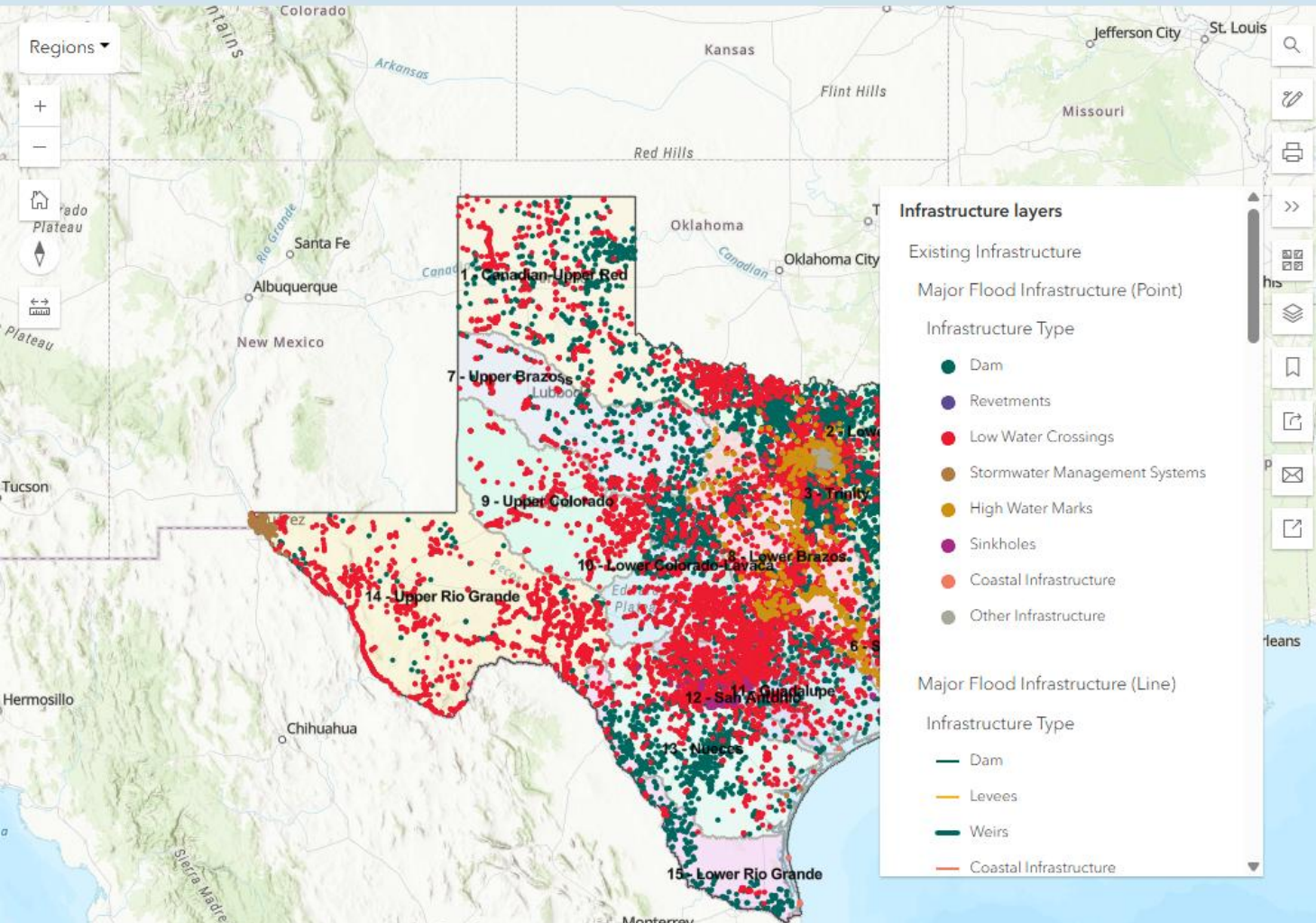
\$54.52B

*Hospitals, emergency medical services, fire stations, police stations, and schools

Interactive State Flood Plan Viewer

<https://texasstatefloodplan.org/>

Click on the map to view the features, conditions, and functionality of completed, proposed, or ongoing major flood infrastructure projects submitted to the TWDB during the 2020-2023 planning cycle.



Key stats

Statewide

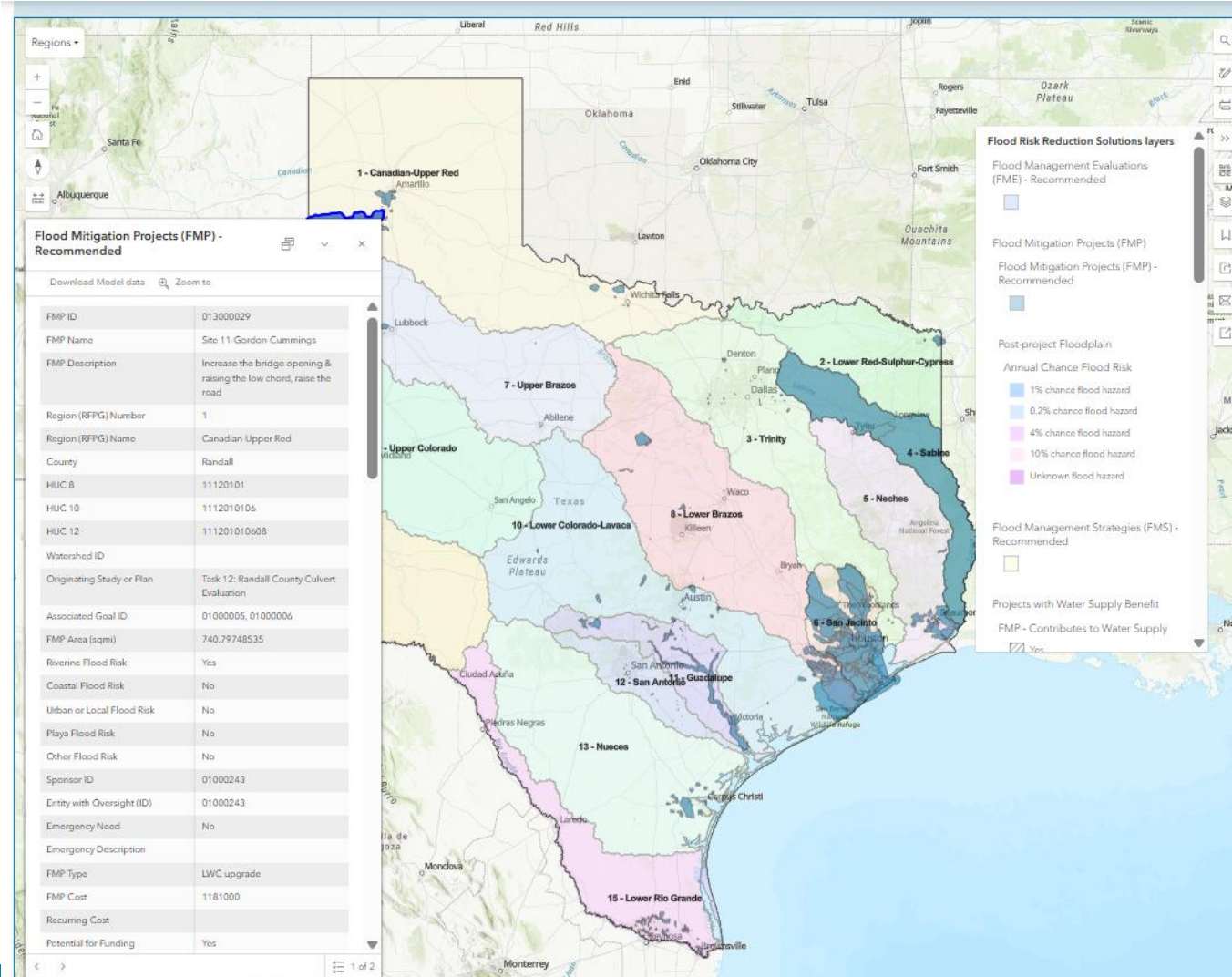
Total miles of river tributaries	190,000
Total acres of wetlands	3,379,000
Total acres of playas	352,000
Total count of existing flood projects	2,798
Total cost of existing flood projects	\$8.02B
Total acres of open parks	781,000
Total count of sink holes	138
Total count of reservoirs	1,443
Total count of dams	6,731
Total miles of levees	1,884
Total count of low water crossings	11,395
Total count of ponds	266,065
Total miles of storm drain systems	7,940
Total count of existing proposed projects	2,115
Total count of existing ongoing projects	683

*Due to rounding, numbers presented may not add up precisely to the totals provided and percentages may not precisely reflect the absolute figures.

+ Features

Interactive State Flood Plan Viewer

<https://texasstatefloodplan.org/>



Flood management evaluations

Flood mitigation projects

Flood mitigation projects are proposed projects, **structural** or **non-structural**, that when implemented will reduce or mitigate flood risk to life and property. Flood mitigation projects have capital costs or other non-recurring costs. A single flood mitigation project may be associated with multiple flood management strategies or vice versa. As part of the flood planning process, regional flood planning groups identified and recommended flood management strategies and projects.

Structural	Non-structural
<ul style="list-style-type: none"> Low water crossings Bridge improvements Infrastructure (channels, ditches, ponds, stormwater, pipes) Regional detention Regional channel improvements Storm drain improvements Dam improvement, maintenance, and repair Flood wall and levees Coastal protections Nature-based projects Comprehensive regional projects 	<ul style="list-style-type: none"> Property or easement acquisition Elevation of individual structures Flood readiness and resilience Other

Flood mitigation projects can be viewed by selecting the *Flood Mitigation Projects (FMP)* layer from *Map Layers*.

Region 1: Canadian-Upper Red

Total count of recommended FMP	21
Total cost of recommended FMP	\$120.98M

FMP = Flood mitigation projects

*Due to rounding, numbers presented may not add up precisely to the totals provided and percentages may not precisely reflect the absolute figures.

Flood management strategies

Solutions with flood and water supply benefits

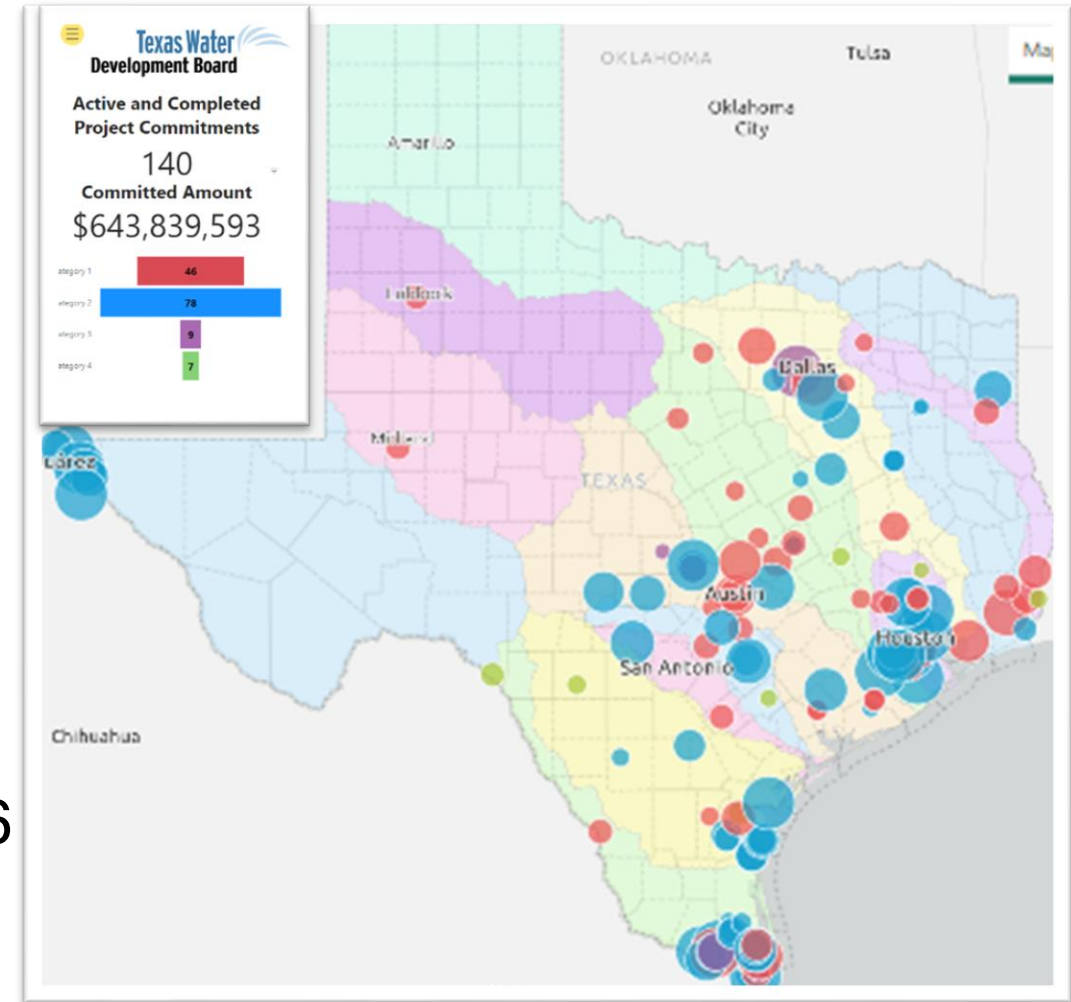
Get project models

Implementing The State Flood Plan

1. Only FMX ranked in the SFP are eligible for funding with the Flood Infrastructure Fund (FIF)
 - FMX ranked by technical merits, (i.e) number of people or structures are within the 100-yr floodplain
2. 2023 Regional Flood Plans and the 2024 State Flood Plan may be amended to align with funding cycles
3. Flood planning funding is in base budget, FIF funding decisions at the discretion of the Texas Legislature

Flood Infrastructure Fund (FIF)

- Created by 86th Texas Legislature in 2019
- Provides 0% interest loans and grants, based on project's eligibility category.
- TWDB anticipates utilizing \$375 million during this two-year cycle (SFYs 2024-2025).
- Project solicitation and prioritization
- FIF 2026-2027 IUP anticipated Winter 25-26



What's Next?

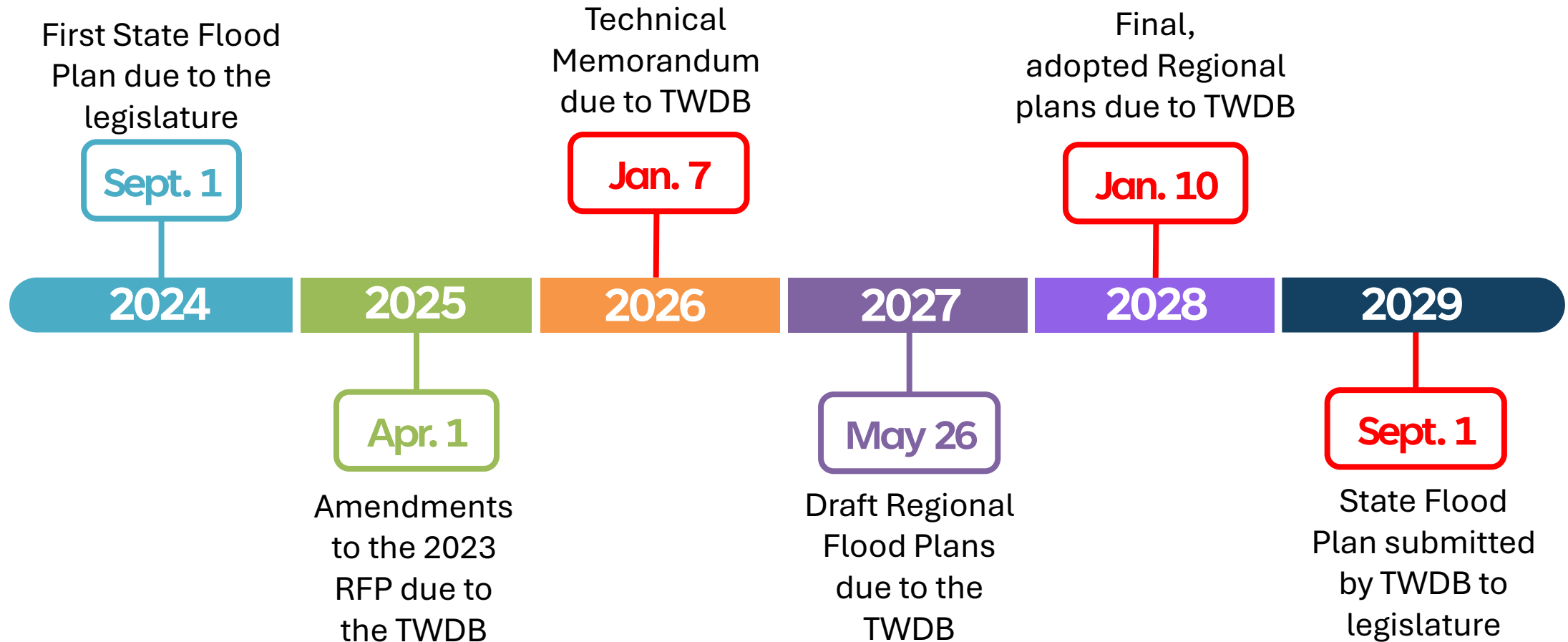
Where We're At

- **\$38M** allocated to the RFPGs.
- Midpoint of the second cycle of flood planning
- 2023 Regional Flood Plan amendments
- Recommended flood risk reduction solutions may be funded via FIF



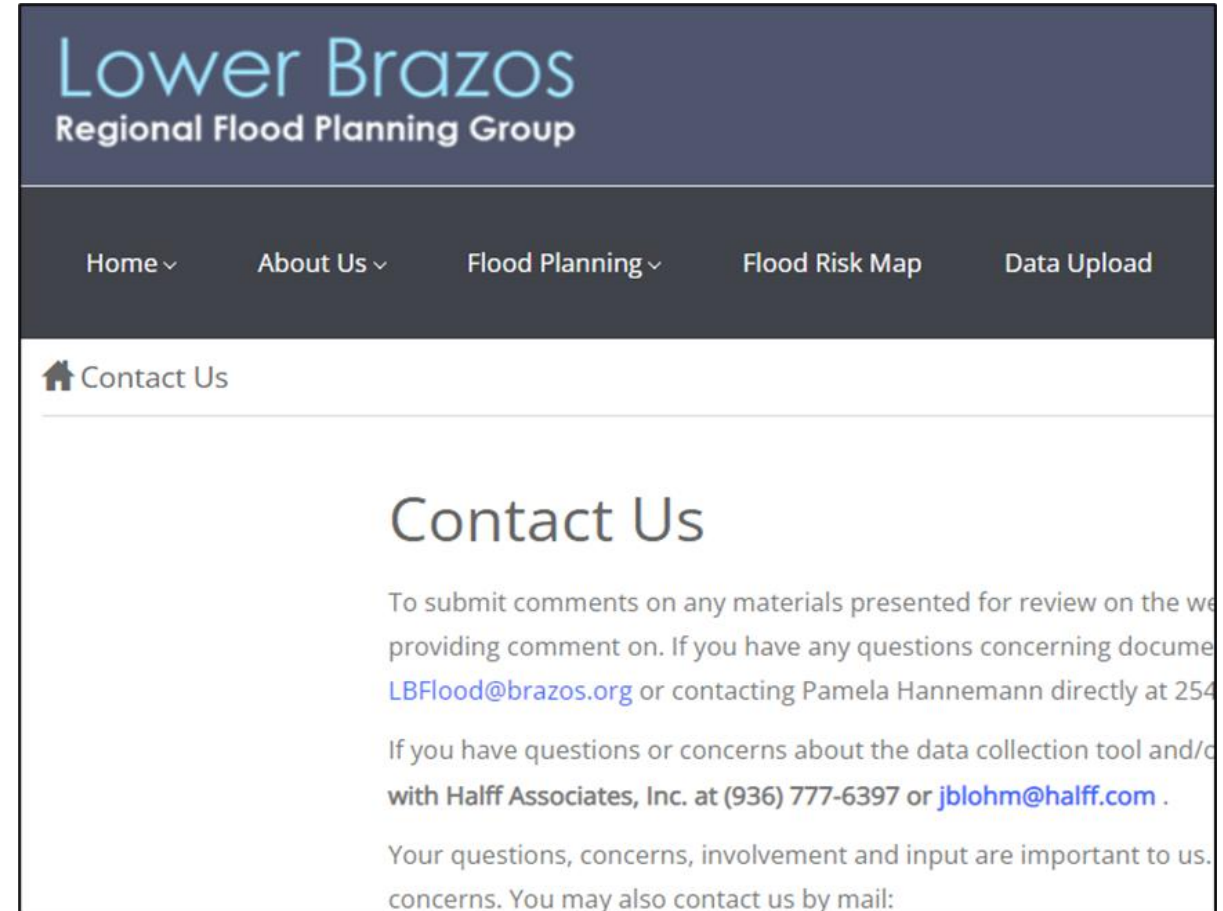
<https://twdb-flood-planning-resources-twdb.hub.arcgis.com/>

Second Cycle Flood Planning Timeline



How to get involved

1. Utilize the Region 8 Website
 - <https://lowerbrazosflood.org/>
 - Contact information for the sponsors, chairs, and full member list of the RFPG available here
2. Attend RFPG meetings (most are hybrid)
 - Meeting dates can be found on your RFPG's webpage
3. Become a Voting or Non-Voting Member!



Contact Us page on Region 8 Website

Image: [Lower Brazos Regional Flood Planning Group > Contact Us](#)

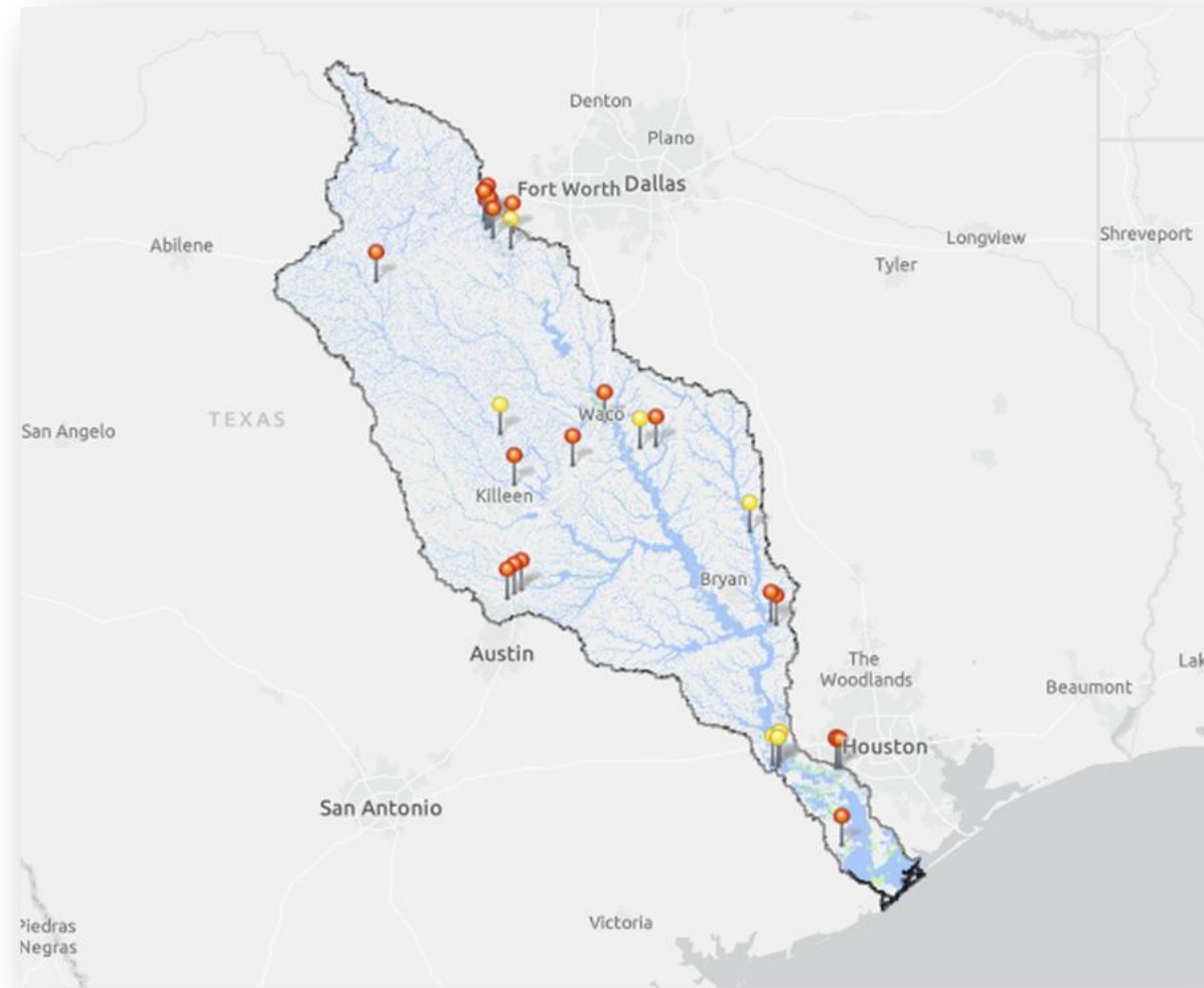
3. Provide input to the RFPG

- Provide public comments in their meetings
- Submit information to them
 - Region 8 webpage has a [Flood Risk Map](#) where you can self-report areas of known flood risk

<https://lowerbrazosflood.org/Flood-Risk-Map>

4. Encourage others, including public officials, to engage and provide input

5. Submit an FMX to the Regional Flood Plan



Lower Brazos Regional Flood Map with
Public and Community Comments on Known Areas of Flood Risk
Image: Provided by [Halff Region Viewer](#)

Meet the TWDB RFP Team Members



Reem Zoun,
Assistant Deputy Executive
Administrator



Tressa Olsen,
Assistant Director
(Interim) Region 8, 12, 13



Kevin Wessels,
Manager



Cynthia Nolasco,
State Flood Planner
Regions 1, 2, 11



Sarah Magana, Team Lead
Regions 7, 9, 10



Katie Koslan, CFM, CTCM
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Questions?

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