Flood Planning for the State of Texas

Society of Military Engineers Workshop

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Texas Water Development Board

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How do we plan?

- **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.

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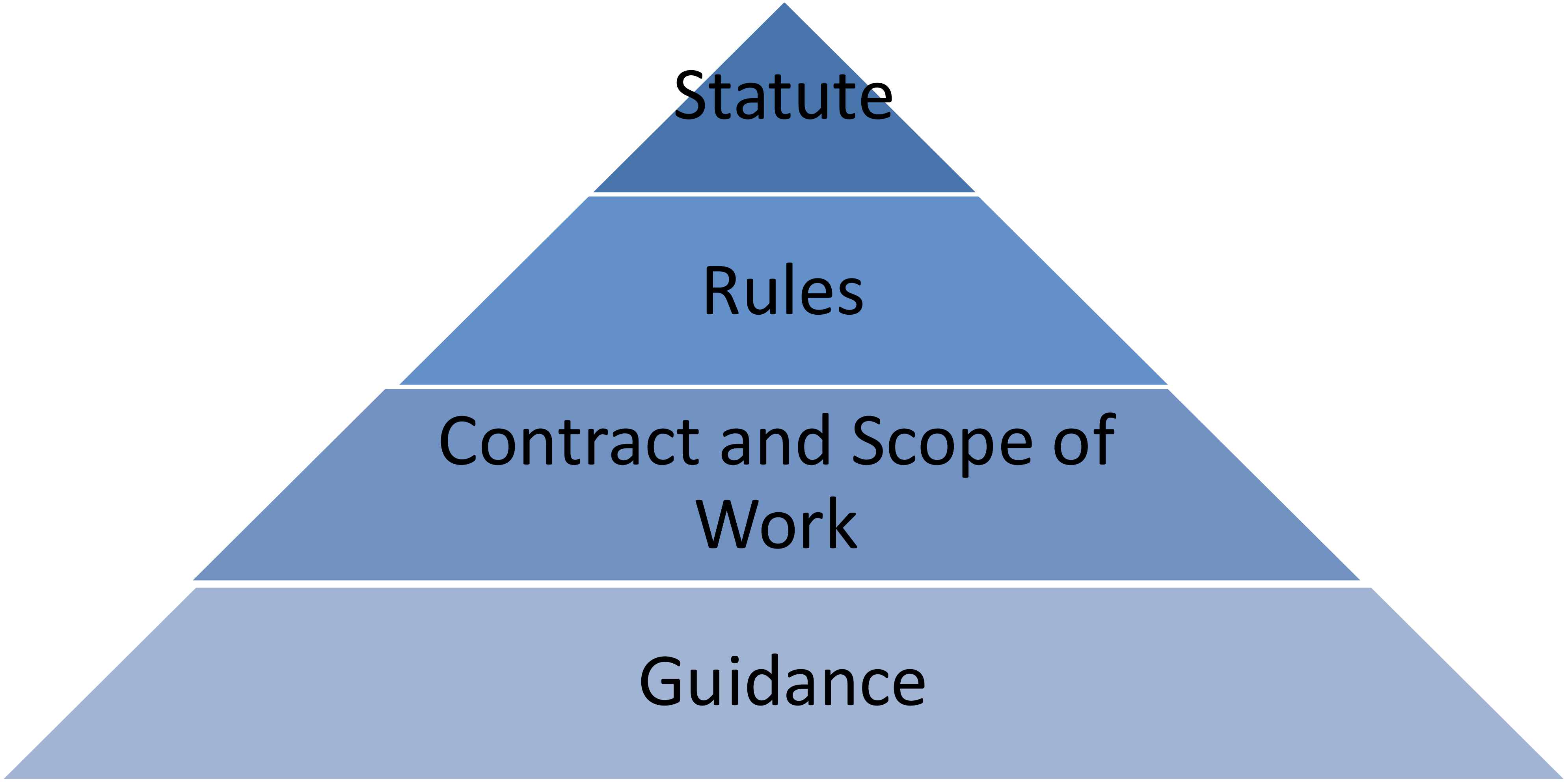
Planning Framework



Scope of Work

Task 1 – Planning area description

Task 2 – Existing and future flood risk analyses

Task 3 – Floodplain management practices and flood protection goals

Task 4 – Assessment and identification of flood mitigation needs

Task 5 – Evaluation and recommendation of flood projects

Task 6 – Impact and contribution of the regional flood plan

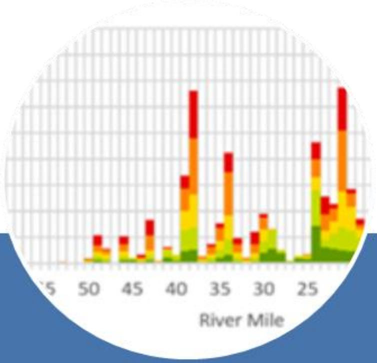
Task 7 – Flood response information and activities

Task 8 – Administrative, regulatory, and legislative recommendations

Task 9 – Flood infrastructure financing analysis

Task 10 – Public participation and plan adoption

Key Planning Objectives



Collect Data

Identify Risks

Recommend Projects

15 Regional Flood Plans

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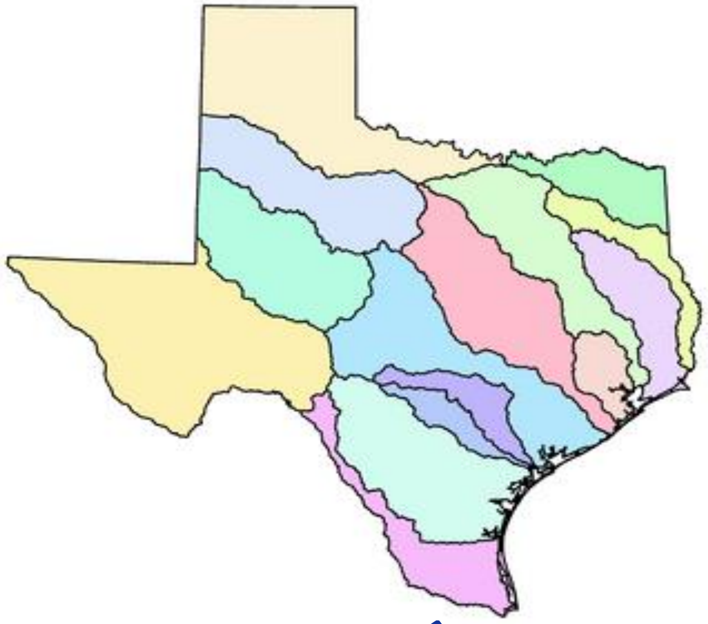
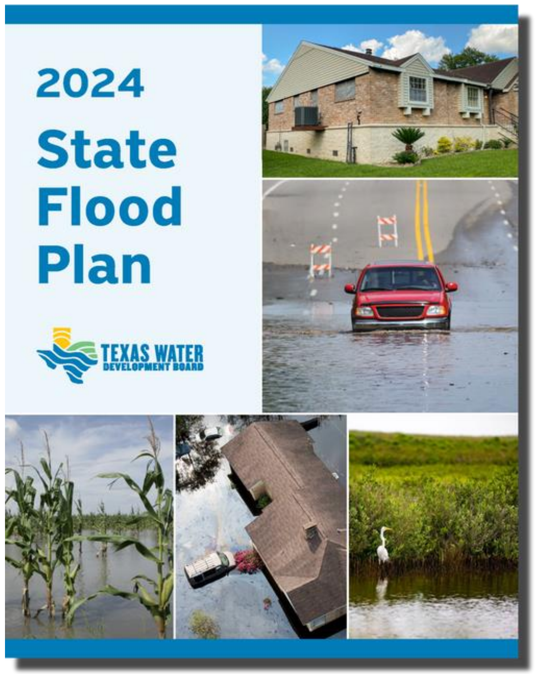
State Flood Plan



over
61,000
pages



condensed
into
285 pages

An overview of 2024 State Flood Plan findings

Existing flood risk

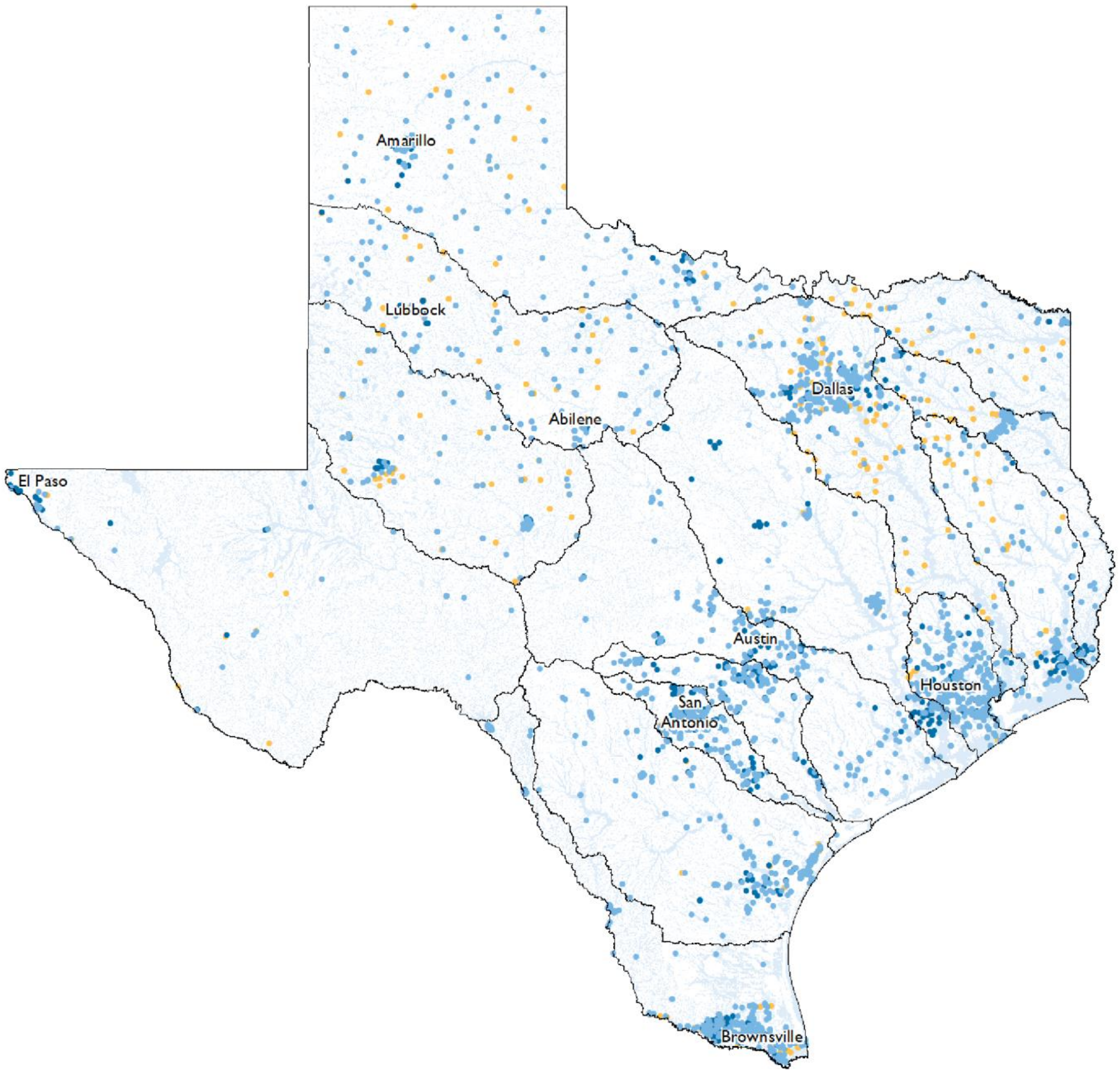
(in 1 percent [100-year] and 0.2 percent [500-year] annual chance flood hazard areas)

- **5,219,900** Population
- **1,664,200** Buildings
- **12,654,000** Agricultural area (acres)
- **63,900** Roadway miles
- **1,295,700** Residential buildings
- **6,258** Hospitals, emergency m services, fire stations, pc stations, and schools

Recommended Studies, Projects and Strategies

- Flood management evaluations (3,097) $2.6 billion+
- Flood mitigation projects (615) $49 billion+
- Flood management strategies (897) $2.8 billion+

Total $54.5 billion+



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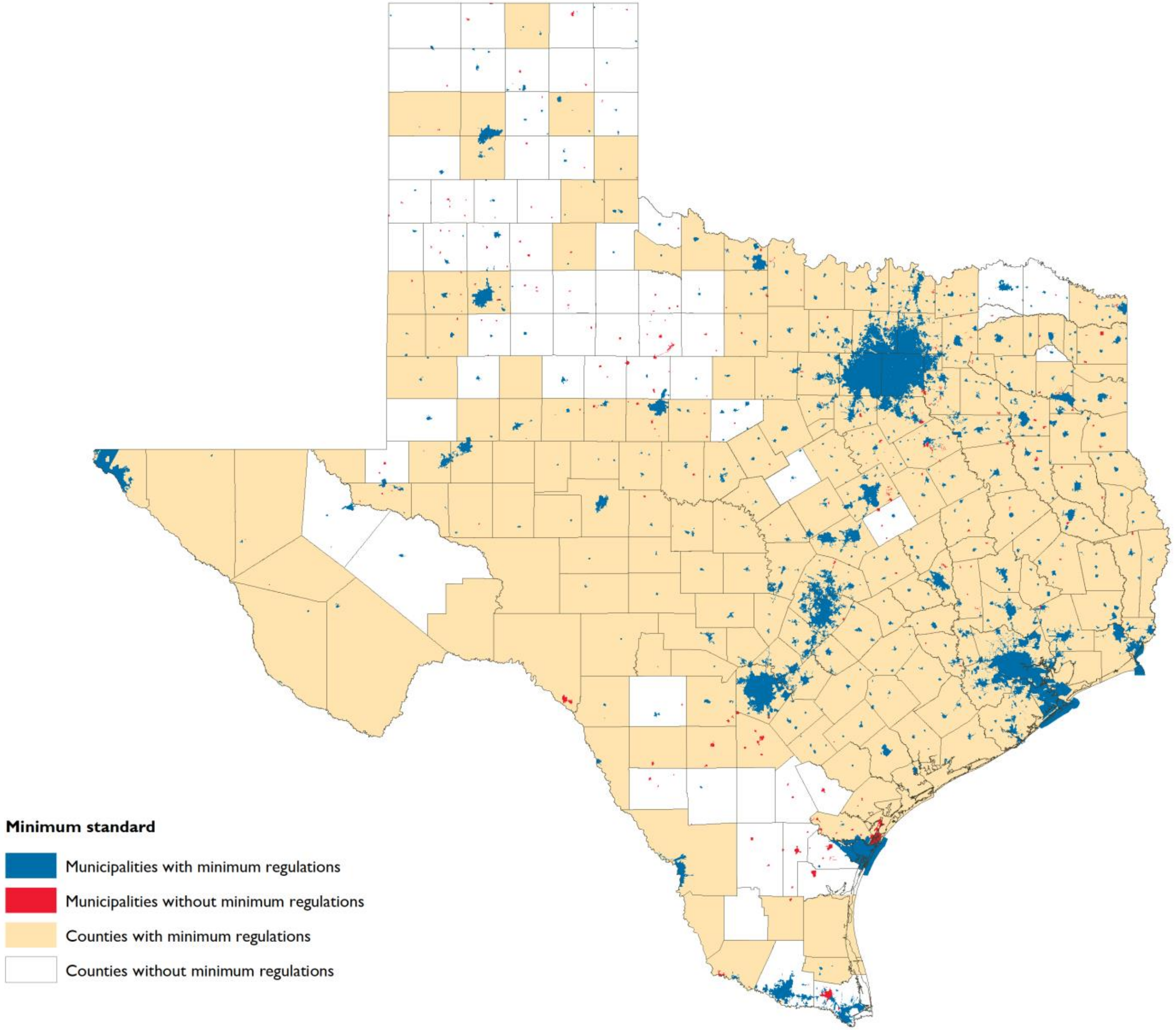
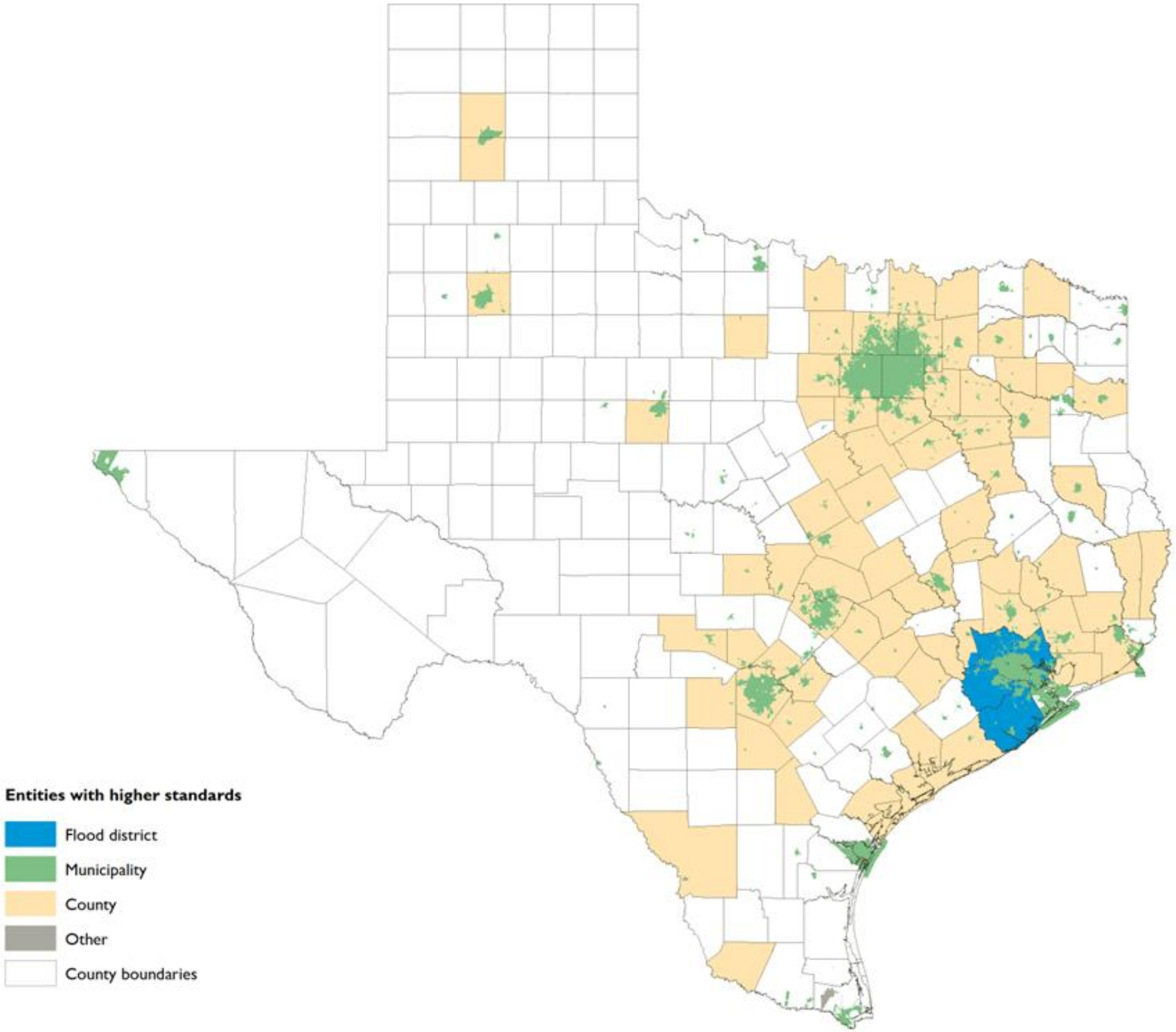
Locations of entities with and without minimum floodplain management regulations*



Locations of entities with higher floodplain management standards



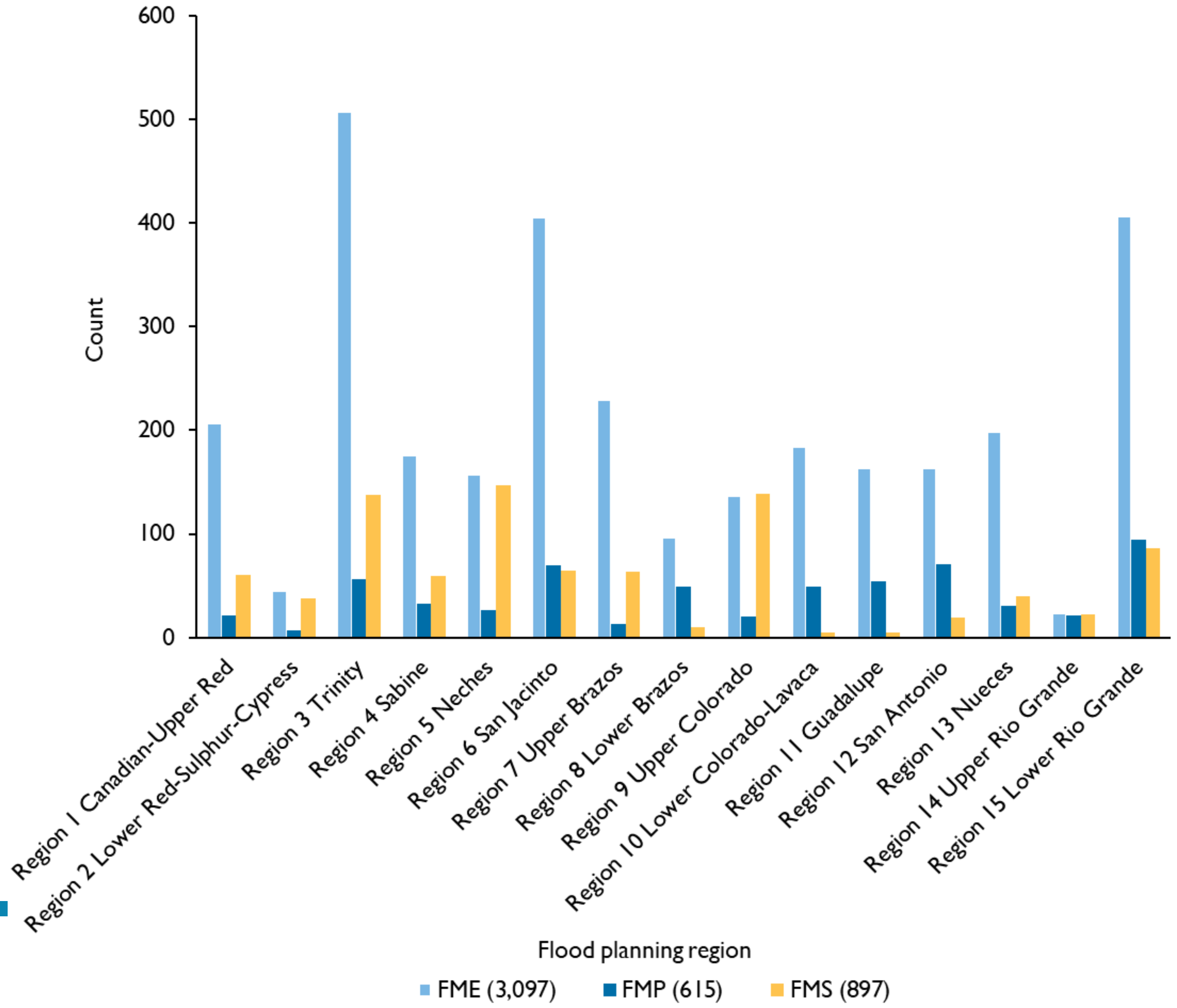
Recommending Flood Risk Reduction Solutions

Flood Management Evaluation (FME): A proposed study to identify flood risk or flood risk reduction solution (e.g., FMPs)

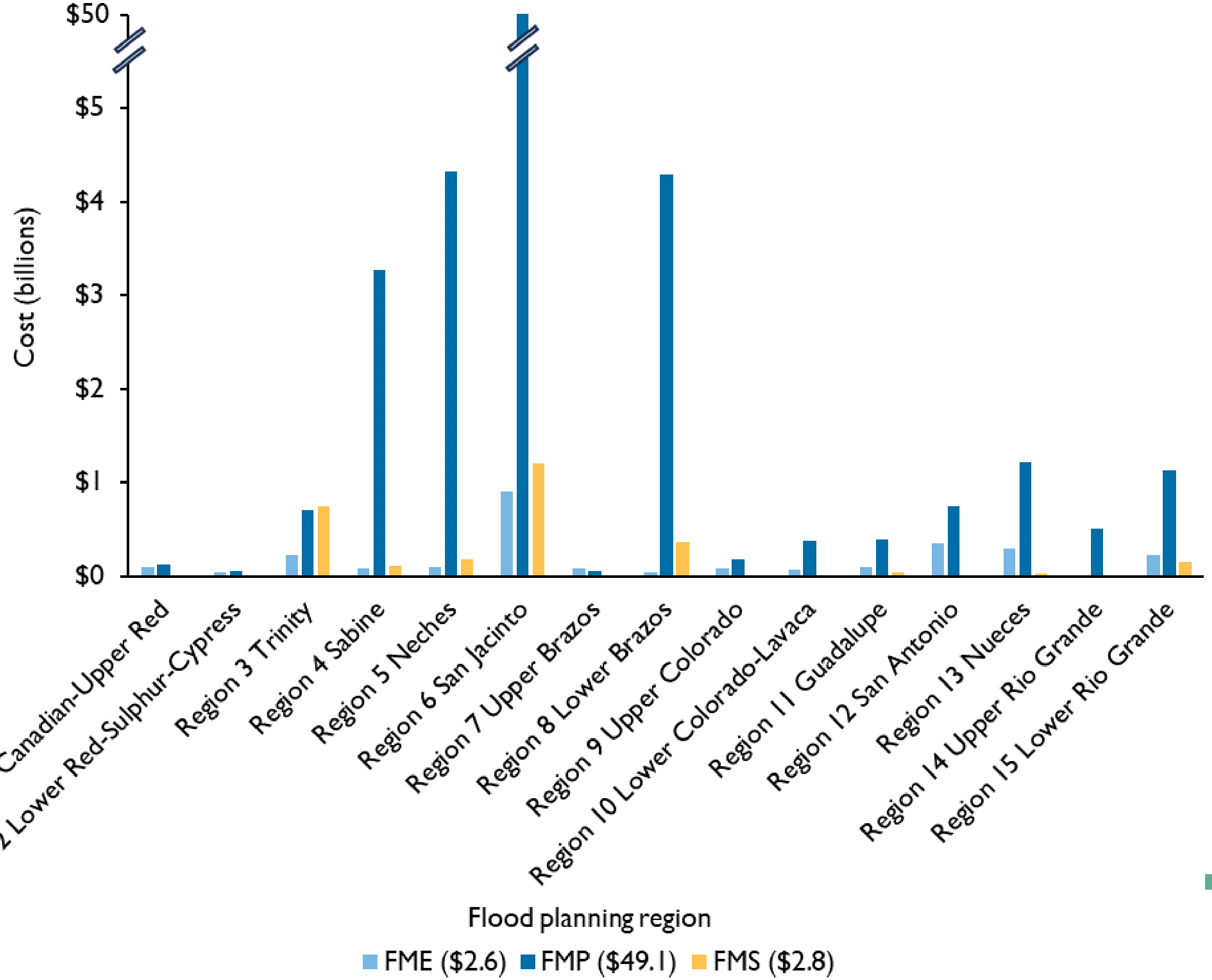
Flood Mitigation Projects (FMP): A proposed project, both structural and nonstructural, that has a non-zero capital costs or other non-recurring cost and that when implemented will reduce flood risk, mitigate flood hazards to life or property

Flood Management Strategies (FMS): Long term flood risk reduction solution ideas that still need to be formulated, for example, regulatory enhancements. All solutions and strategies that do not belong in FME or FMP belong to FMS

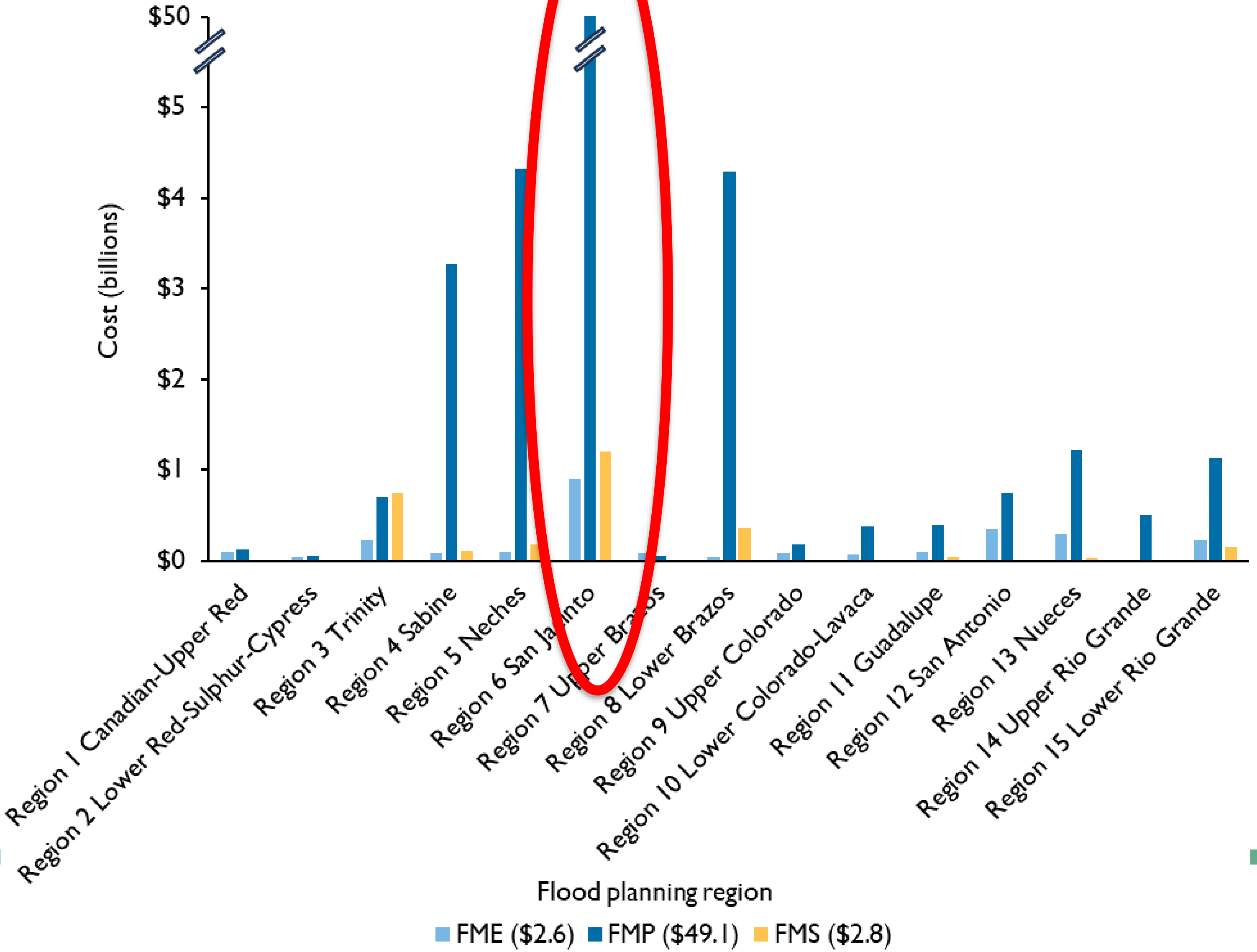
Recommended flood risk reduction solutions by type and region



Estimated cost of all recommended flood risk reduction solutions by 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%	

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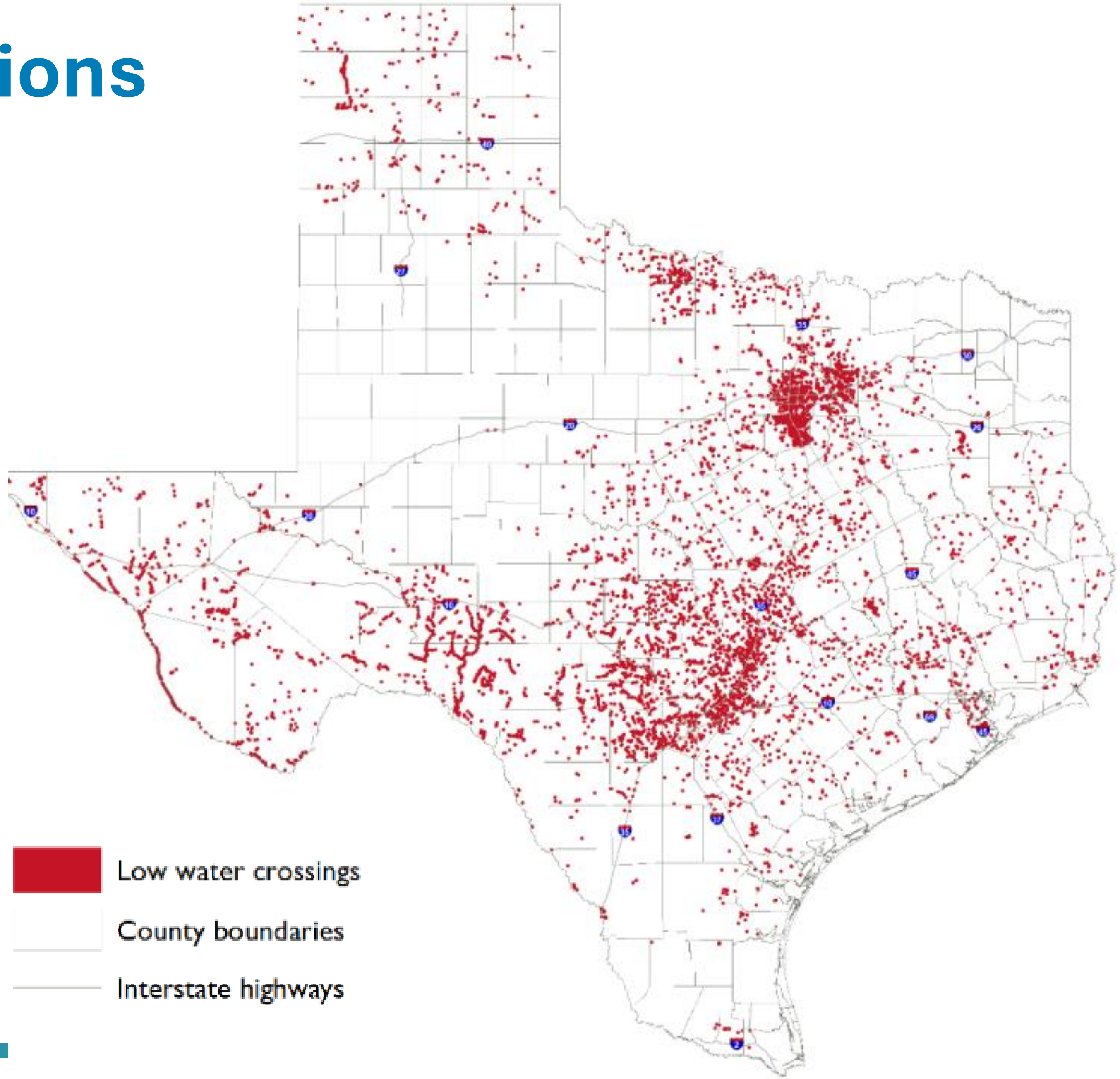
Legislative Recommendations

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**

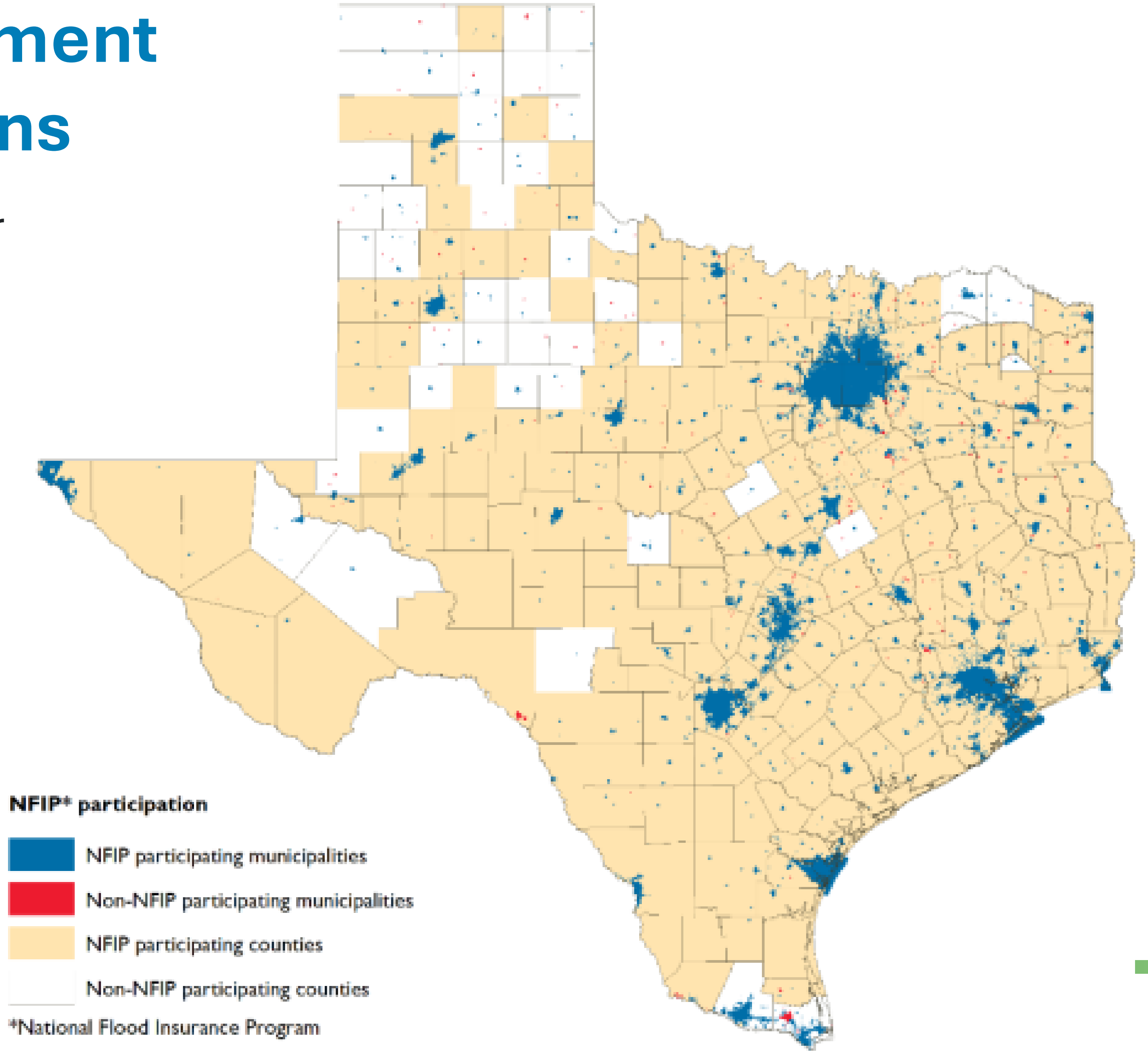
1. Authority of counties, including regarding drainage fees
2. Statewide floodplain management standards for infrastructure and buildings for flood risk reduction
3. Statewide building codes regarding flood risk
4. Transportation infrastructure considerations



Floodplain Management Recommendations

TWDB general recommendations for floodplain management includes

1. Existing minimum FEMA floodplain standards required for cities and counties under Texas Water Code § 16.3145 and recommendations for higher standards
2. Enhance current floodplain management activities
3. Nature-based solutions
4. Asset management
5. Education and outreach
6. State flood planning continued coordination



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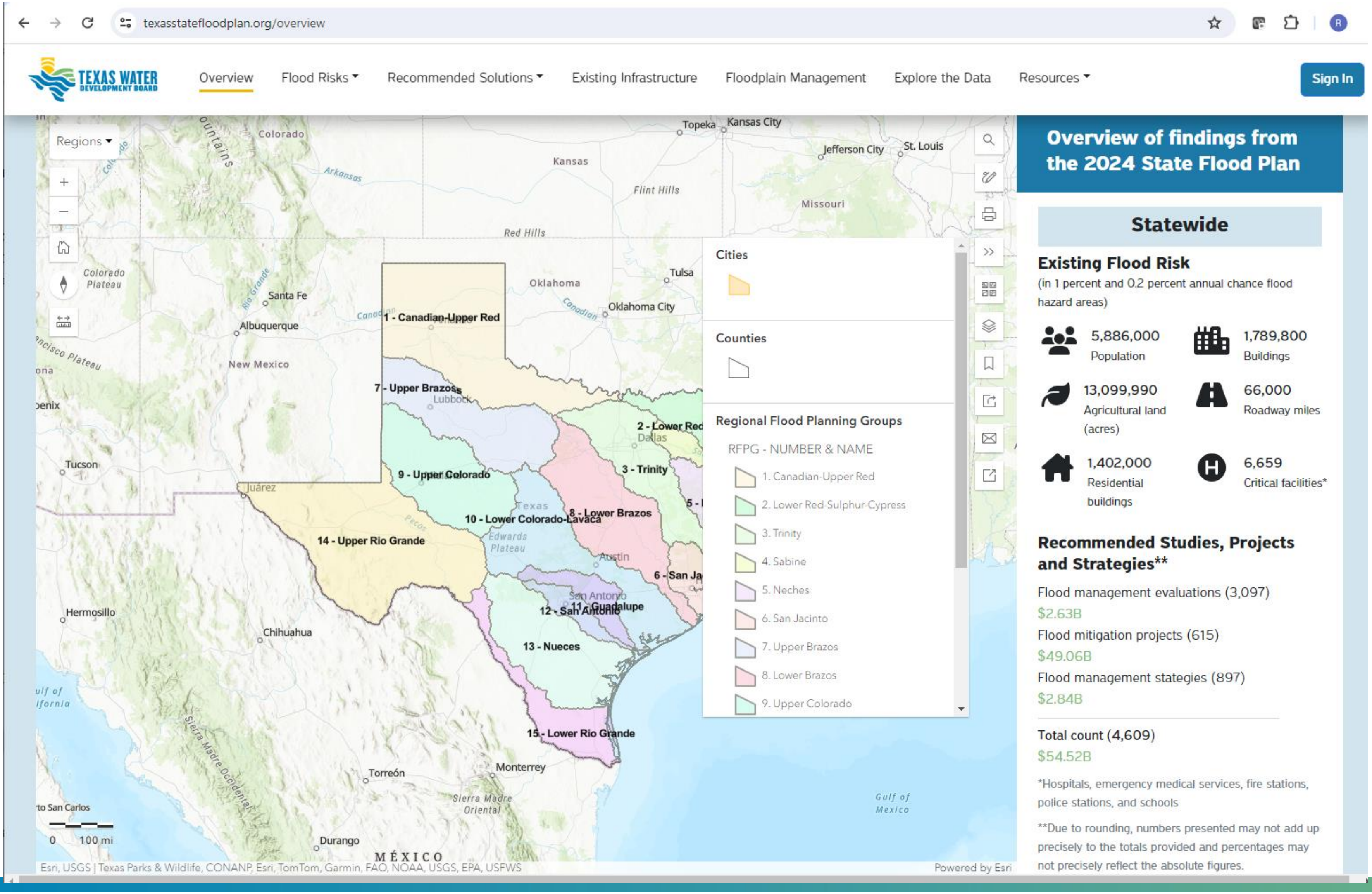
Interactive State Flood Plan Viewer

https://texasstatefloodplan.org/overview

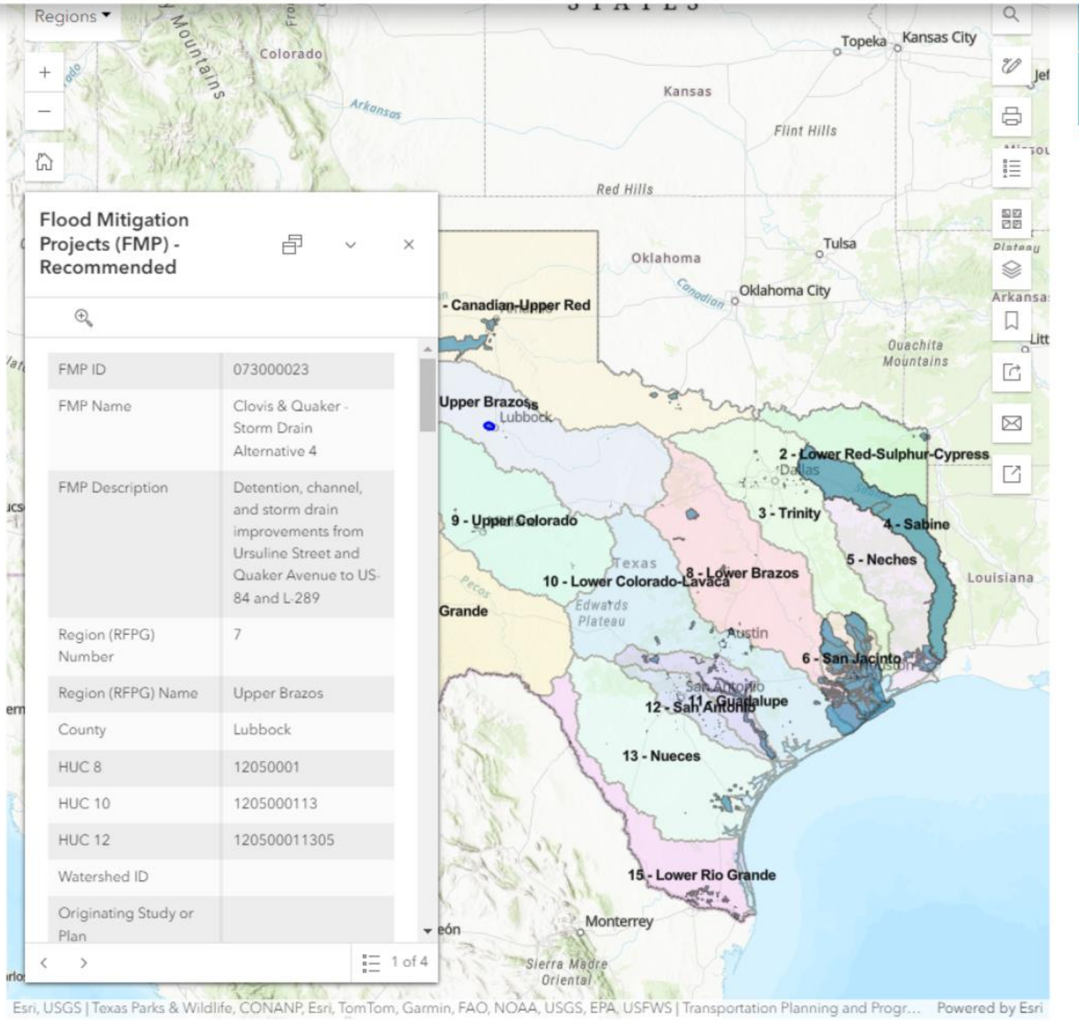


Interactive State Flood Plan Viewer

https://texasstatefloodplan.org/

texasstatefloodplan.org/solutions-fmp

TEXAS WATER DEVELOPMENT BOARD | Overview | Flood Risks | Recommended Solutions | Existing Infrastructure | Floodplain Management | Explore the Data | Resources



+ 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
• 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	• 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 7: Upper Brazos

Total count of recommended FMP	13
Total cost of recommended FMP	$48.84M

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Interactive State Flood Plan Viewer
https://texasstatefloodplan.org/

texasstatefloodplan.org/infrastructure

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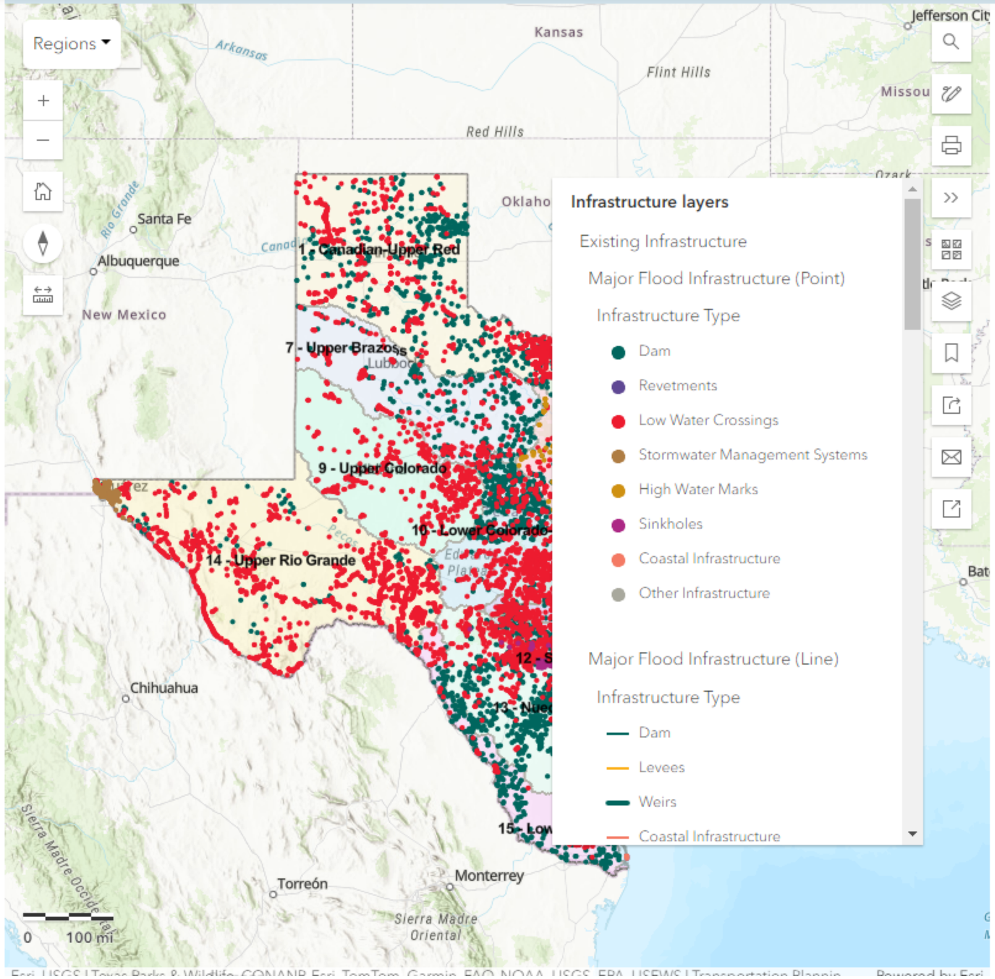
Overview | Flood Risks | Recommended Solutions | Existing Infrastructure | Floodplain Management | Explore the Data | Resources | Sign In



— 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

+ Functionality

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Implementing the State Flood Plan

- Only FMX ranked in the SFP are eligible for funding with the Flood Infrastructure Fund (FIF)
  - FMX ranked by technical merits
- 2023 Regional Flood Plans and the 2024 State Flood Plan may be amended **two times** to align with [expected] FIF cycles (26-27, 28-29)
- Flood planning funding is in base budget, FIF funding decisions at the discretion of the Texas Legislature

What's Next?

- Beginning the second cycle of flood planning.
- $38M allocated to the RFPGs.
- Recommended flood risk reduction solutions will be funded via FIF Second Cycle.
- Updating the Flood Planning Data HUB for the RFPGs.

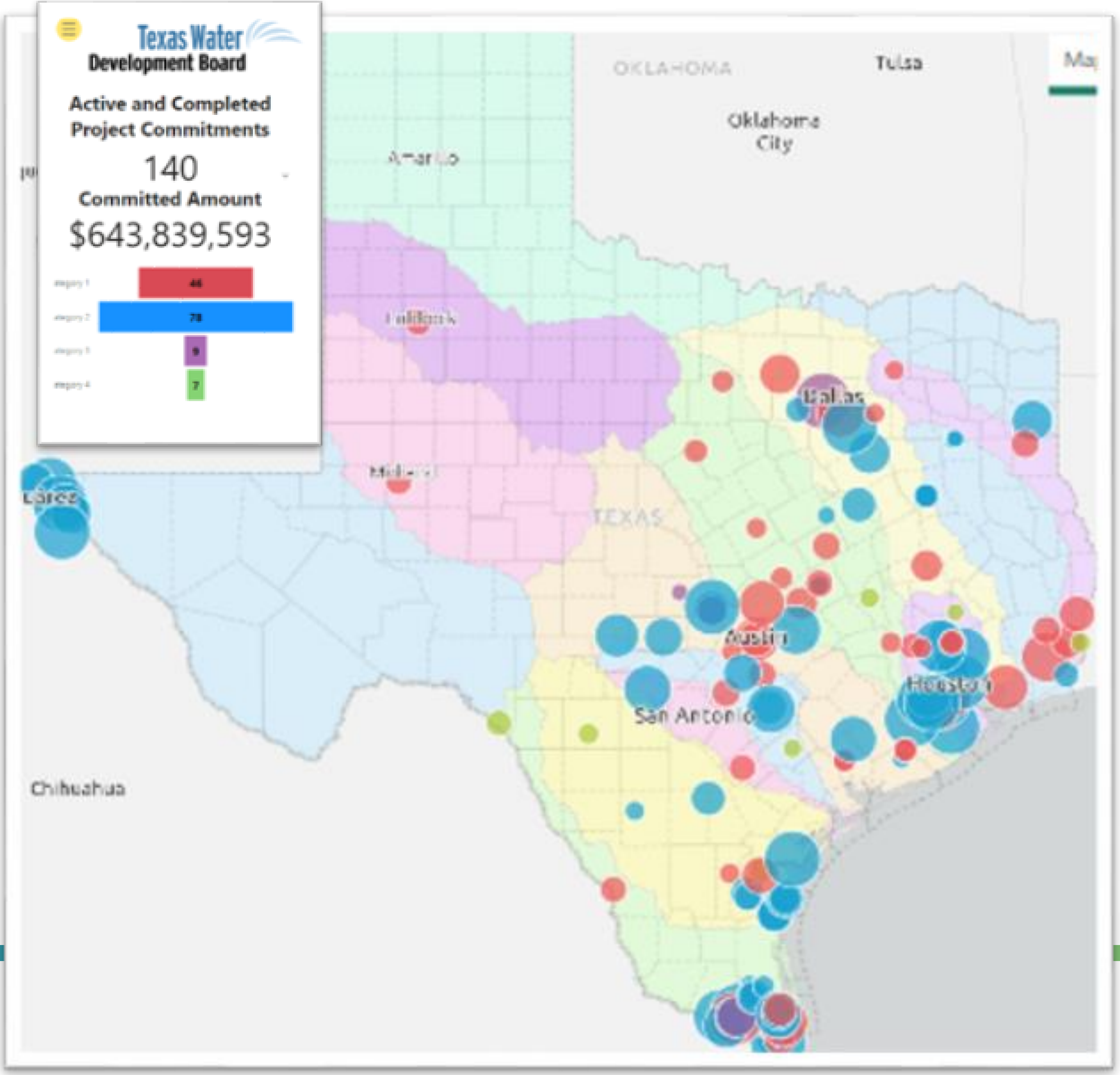
https://twdb-flood-planning-resources-twdb.hub.arcgis.com/

Ongoing TWDB Efforts to Support Flood Planning

- Benefit-cost analysis guidance
- Nature-based solutions statewide manual
- Infrastructure condition assessment toolkit
- Statewide future condition flood hazard dataset (2060)
- Texas Flood Social Vulnerability Index
- Statewide BLE (mapping and modeling)

Flood Infrastructure Fund (FIF)

- Created by 86th Texas Legislature in 2019 and approved by voters on Nov 5, 2019
- Original funding = $770M; 140 active projects totaling $643M
- In 2023 the legislature appropriated an additional $624M
- TWDB anticipates utilizing $375 million during this two-year cycle (SFYs 2024-2025).
- FIF Second cycle (24-25) is currently underway



Getting Involved

Contact regional flood planning sponsors/chairs for more information on how to include additional FMXs in future plans.

Questions?

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