Slide 1

Update from Consultant Team

Neches Regional Flood Planning Group

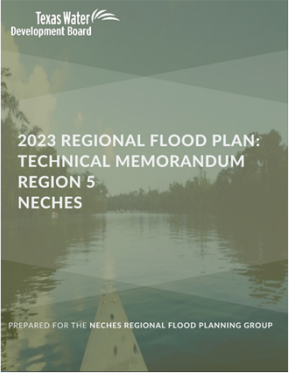January 27, 2022

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Slide 2

Regional Flood Plan Updates

- January 7th Technical Memorandum Submission
- March 7th Technical Memorandum
- Flood Mitigation and Floodplain Management Goals
- Existing Flood Risk Public Meeting
  - January 11th Recap
  - Date of future meeting
- Existing/Future Condition Flood Risk Analyses (2A/2B)
  - Additional Flood Prone Areas
  - Gap Analysis
  - Population Projection Methodology
- Mitigation Needs Analysis (4A)

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Slide 3

Task 4C – Technical Memorandum

- First Technical Memo Submitted to TWDB January 7, 2022
  - TWDB 30-day Administrative Review
    - If administratively complete, NTP for Task 5
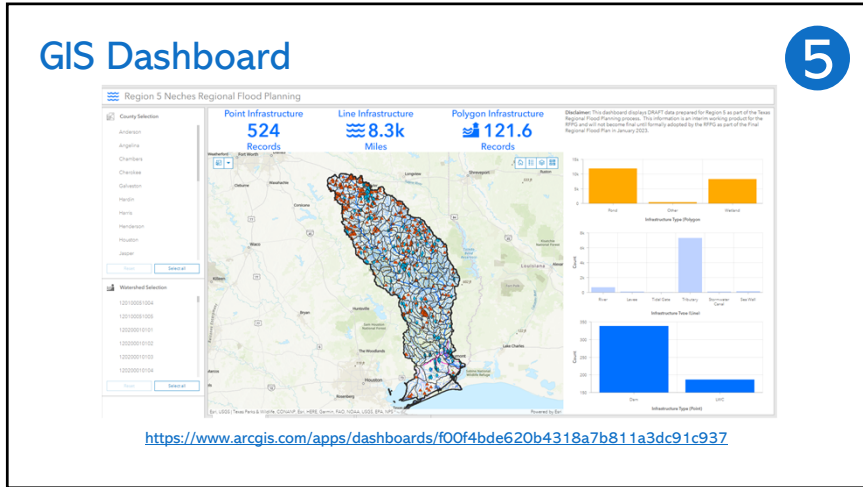 - Detailed Technical Review with informal comments late Spring 2022.

Texas Water Development Board

2023 REGIONAL FLOOD PLAN: TECHNICAL MEMORANDUM REGION 5 NECHES

PREPARED FOR THE NECHES REGIONAL FLOOD PLANNING GROUP

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Slide 4

Task 4C – Technical Memorandum

Deliverables	Deadline
a. List of political subdivisions and flood-related authorities	January 7th, 2022
b. List of relevant previous flood studies	January 7th, 2022
c. Maps and geospatial data representing the 100-year and 500-year flood events • Existing and Proposed Flood Hazard • Flood Mapping Gaps • Existing and Proposed Exposure	March 7th, 2022
d. Maps and geospatial data representing flood prone areas	March 7th, 2022
e. Maps and geospatial data identifying where existing hydrologic and hydraulic models are available to evaluate FMSs and FMPs	March 7th, 2022
f. List of available flood-related models	January 7th, 2022
g. Flood mitigation and floodplain management goals adopted by the RFPG	January 7th, 2022
h. Documented process used by the RFPG to identify potentially feasible FMSs and FMPs	January 7th, 2022
i. List of FMEs and potentially feasible FMSs and FMPs identified	January 7th, 2022
j. List of FMSs and FMPs that were identified but determined to be infeasible	January 7th, 2022

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GIS Dashboard ⑤

Region 5 Neches Regional Flood Planning

Point Infrastructure	Line Infrastructure	Polygon Infrastructure
524 Records	8.3k Miles	121.6 Records

Disclaimer: This dashboard displays DRAFT data prepared for Region 5 as part of the Texas Regional Flood Planning process. This information is an interim working product for the RFPG and will not become final until formally adopted by the RFPG as part of the Final Regional Flood Plan in January 2023.

https://www.arcgis.com/apps/dashboards/f00f4bde620b4318a7b811a3dc91c937

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Task 3B – Potential Changes to Approved Goals ⑤

Goal ID	Goal	Short-Term Goal	Long-Term Goal
05000003 05000004	RFPG will consider and incorporate nature-based practices and floodplain preservation in xx% of their new flood risk reduction projects	10%	25%

- San Jacinto RFPG
  - "At least xx% of all flood mitigation strategies (FMSs) and flood mitigation projects (FMPs) identified within the regional flood plan will incorporate nature-based practices by 2033."
    - 35% by 2033, 90% by 2053

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Task 3B – Goal Comparisons ⑤

- FMEs, FMPs, and FMPs must be tied to a specific flood mitigation or floodplain management goal.

RFPG Region Name	Improve Flood Infrastructure				Improve Data				
	Regional Projects	Nature Based Practices	Critical Facilities	Reduce exposure to Structures	Detailed Studies	Gages	Critical Infrastructure Database	Stormwater Asset Management	Latest Rainfall
Neches	*	*	*	*	*	*	*		
Sabine	*		*		*			*	*
Trinity					*				*
San Jacinto	*	*	*	*					
Lower Brazos			*		*	*			*

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Task 3B – Goal Comparisons ⑤

RFPG Region Name	Expand Funding			Education & Outreach	Policy & Regulation	Protect Life & Safety				Protect Property
	State/Federal Projects	O&M	Self-Funding	Expand Education & Outreach	Improve Policy & Regulation	Agriculture	Warning Systems	Roadway Flooding	Natural Areas	Repetitive Loss
Neches	*	*	*	SUGGESTED				SUGGESTED		
Sabine		*		*			*	*		
Trinity				*	*	*			*	
San Jacinto	*			*	*			*		
Lower Brazos				*	*		*			*

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1/20/2022

Task 3B – Potential Changes to Approved Goals ⑤

- Low Water Crossings
  - Roadway creek crossing subject to frequent inundation or subject to inundation during a 2-year storm event.
  - 186 identified within the Neches FPR

- Example Goals
  - Sabine RFPG:
    - "Improve XX% of Low Water Crossings to no longer be classified as Low Water Crossing."
      - 20% by 2033, 40% by 2053
    - "Install warning signage at XX% of identified low water crossings in the floodplain and coordinate with TxDoT where applicable."
      - 100% by 2033, no associated long-term goal

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Task 3B – Potential Changes to Approved Goals ⑤

Public Education/Outreach

- Example Goals
  - Sabine RFPG:
    - "100% of counties to perform public education and awareness campaigns to better inform the public of flood-related risks on an annual basis."
      - Full participation by 2033, Maintain participation by 2053
  - San Jacinto RFPG:
    - "Expand the understanding of flood risk in the San Jacinto Region."
      - Short-term goal; measured by percentage of floodplain quilt by studied stream length that is based on NOAA Atlas 14 rainfall data

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January 11th Public Meeting ⑤

- 30 attendants
- Stakeholder responses
  - 18 total Stakeholder responses as of 1/20/2022
    - Barbara Emmons, Mayor of Bevil Oaks
- Public responses
  - 50 total Public responses as of 1/20/2022
    - 12 new responses

Neches Regional Flood Planning Group searching for solutions to reduce risk of flooding

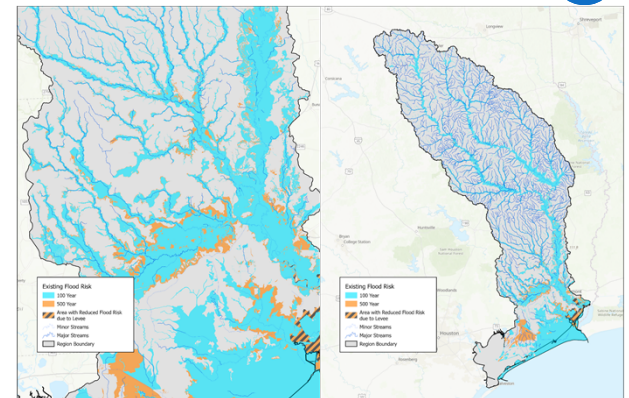Leaders met with residents Tuesday night to learn more about what areas face the highest risk.
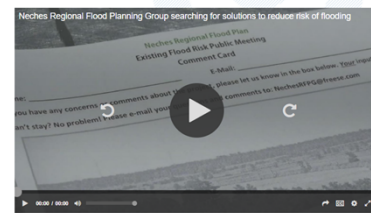
11

Task 2 – Existing Flood Hazard ⑤

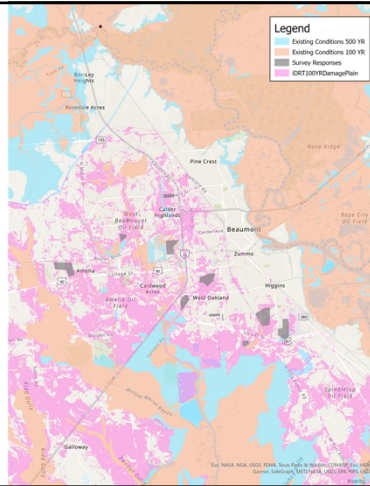NFHL Pending → NFHL Preliminary → NFHL Detailed → BLE → NFHL Approximate

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## Task 2A - Additional Flood Prone Areas

- Areas that have not been previously identified as mapped flood hazard areas
- Identified by local knowledge and public input
- Leverage Fathom and iDRT data to delineate extents of additional flood prone areas.


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Task 2A - Additional Flood Prone Areas

- Additional Flood Prone Areas added based on proximity to:
  - Location of identified Low Water Crossings
  - Drainage crossings along Major Roadways
    - (US Highways, Interstate Highways, State Highways)
  - Communities within the region
    - TxDOT City Boundaries from TWDB Data Hub
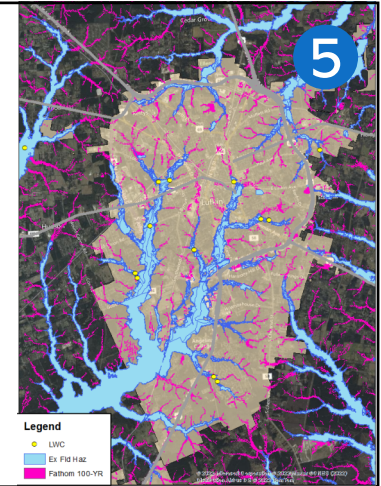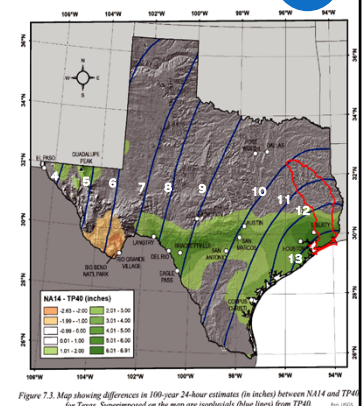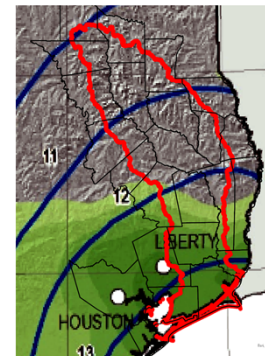

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Task 2A – Gap Analysis

- "Gap" defined by lack of data, outdated modeling and mapping, change in rainfall, etc.
  - 82.5% Approximate Information
  - 14.8% Detailed > 10 years
  - 1.5% Detailed ≤ 10 years
  - 1.2% No data
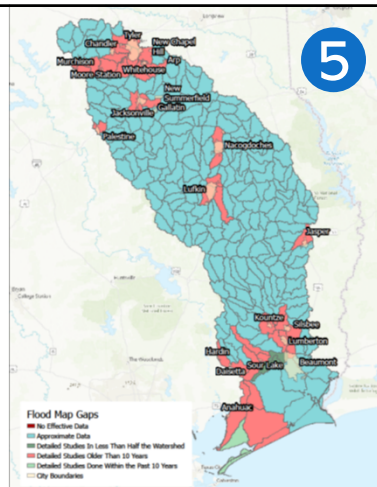
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Task 2A – Gap Analysis

- Incorporate Atlas 14
  - Chambers
  - Jefferson
  - Liberty
  - Hardin
  - Orange
  - Polk
  - Tyler
  - Jasper

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Task 2B – Future Condition Flood Risk ⑤

- Same Goals from Existing Condition Risk Analysis
  - Future Condition Flood Hazard Boundaries
  - Flood Exposure Analysis
  - Vulnerability Analysis
- "No-action" scenario for 30 years of continued trends, climate patterns, and current regulations
  - Continued population growth
  - Continued development increase
  - Current floodplain management regulations/policy
  - Future rainfall patterns
  - Anticipated land changes
  - Completion of currently-planned flood mitigation projects by 2050

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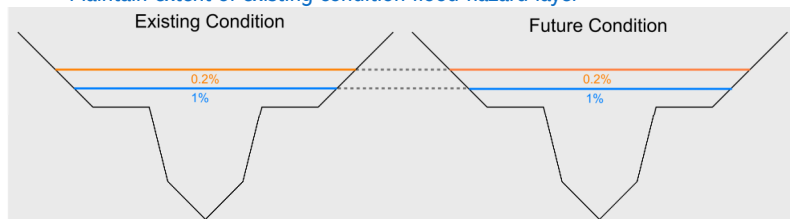## Task 2B – Future Condition Flood Risk ⑤

- Desktop Analysis to generate future condition flood hazard boundary
  - Use available information, no H&H modeling
  - Rely on existing conditions Flood Hazard Boundaries (Task 2A)
  - Four methods available to determine future flood hazard boundaries
    1. Change in WSEL based on change in population
    2. Existing 0.2% → Future 1%
    3. Combination of 1 & 2, or a RFPG proposed method
    4. Request TWDB for Desktop Analysis

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Task 2B – Future Condition Flood Risk ⑤

- Approach for Large Rivers
  - For streams with large contributing drainage areas
    - Drainage areas > 5,000 square miles
    - Only recommended for Neches River
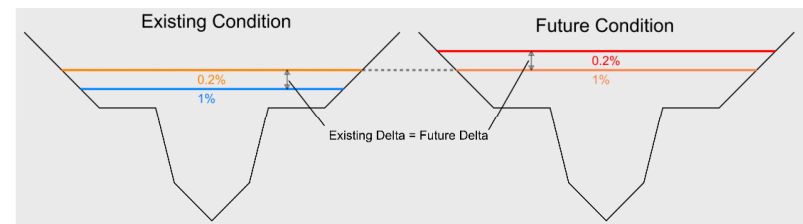 - Maintain extent of existing condition flood hazard layer

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Task 2B – Future Condition Flood Risk ⑤

- Approach for rivers with smaller contributing area and tributaries
  - Existing 0.2% becomes Future 1%
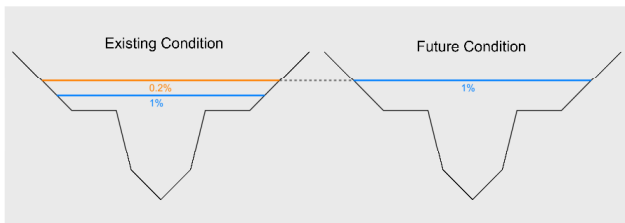 - Future .2% = Future 1% + Difference between existing 0.2% and 1%

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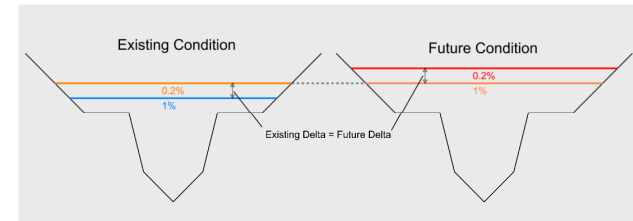## Task 2B – Future Condition Flood Risk ⑤

- Existing 0.2% becomes Future 1%

Existing Condition — Future Condition

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Task 2B – Future Condition Flood Risk ⑤

- Existing 0.2% becomes Future 1%
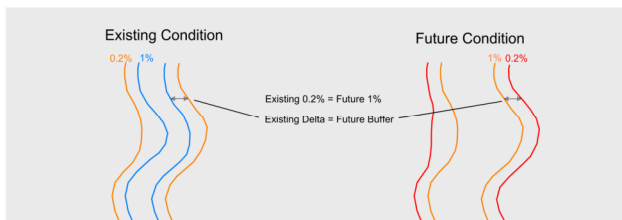**1** - Future 0.2% = Future 1% + Difference between 0.2% and 1%

Existing Condition — Future Condition

Existing Delta = Future Delta

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Task 2B – Future Condition Flood Risk ⑤

- Existing 0.2% becomes Future 1%
2 - Future 0.2% = Extents of Future 1% + horizontal buffer

Existing Condition — Future Condition

Existing 0.2% = Future 1%
Existing Delta = Future Buffer

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Task 2B – Future Condition Flood Risk ⑤

Coastal Areas
- Relative Sea Level (RSL) Factors
  - Historical Observations
  - Rapid Ice Melt in Greenland and Antarctica
  - Future Greenhouse-Gas Emissions
  - Associated Ocean-Atmosphere Warming
- USGS and USACE Scenarios being considered
- Internal discussions are being held to better evaluate considerations for coastal floodplains

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Task 2B – Future Condition Flood Risk ⑤

- Define Future Developed Areas
  - Population projections
  - Potential areas to be developed in the future
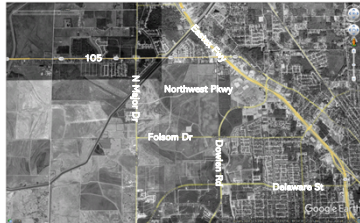

Northwest Beaumont, 1998

Northwest Beaumont, 2020

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Task 2B – Future Condition Flood Risk

Population Projects

- Growth projected in 2022 State Water Plan (SWP) through 2070.
  - By county
  - By water utility
- Regional Flood Plans assessing at more localized level through 2050.
  1. SWP projections allocated to HUC10 watersheds within each county and water utility.
  2. Projected growth in each decade distributed to specific locations within each (County x Utility x Watershed) area.
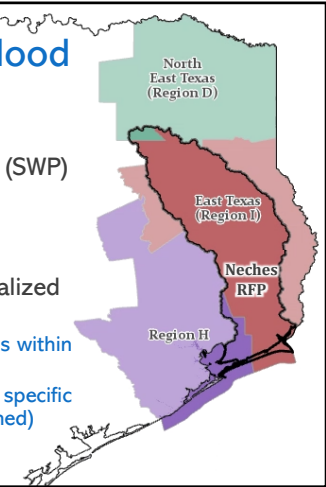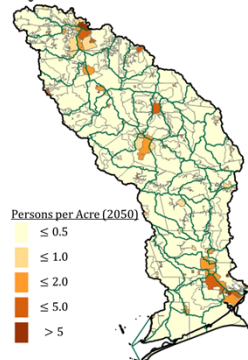

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Task 2B – Future Condition Flood Risk ⑤

Allocations of County/Utility Projections to Watersheds

Spatial Distribution of Growth Each Decade

- Realistic growth patterns based on:
  - Proximity to highways, existing development, and recent development
  - Discouraged growth within floodplains
  - No growth in parks, natural reserves, wetlands, floodways, right of way

Persons per Acre (2050)
- ≤ 0.5
- ≤ 1.0
- ≤ 2.0
- ≤ 5.0
- > 5

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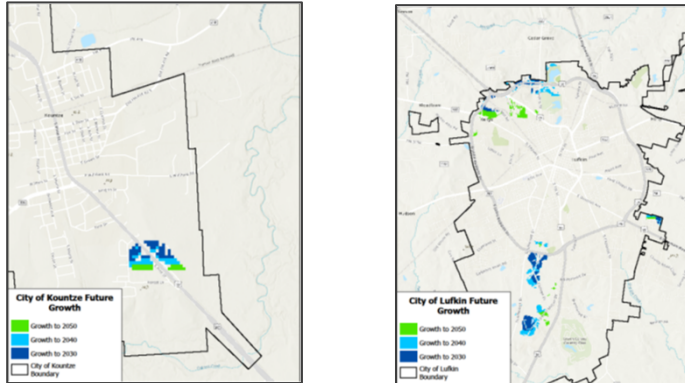## Task 2B – Future Condition Flood Risk ⑤

Example of Potential Areas to Develop

- Realistic growth patterns based on
  - Proximity to transportation, existing development, and recent development
  - Existing floodplains, wetlands
  - Areas of no development (floodways, lakes, parks, natural reserves)

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Task 2B Sample Analysis ⑤

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Task 2B – Flood Exposure ⑤

RFP will consider flood risk to:

| Structures 🏠 | Population 👥 | Roadways 🚗 | Agricultural 🚜 | Critical Facilities 🏫 |

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## Task 2B – Vulnerability Analysis ⑤

- Compute Social Vulnerability Index (SVI) for structures identified in flood exposure analysis
  - SVI is intended as the proxy for resilience for this planning cycle
- FEMA defines vulnerability as the measure of the capacity to weather, resist, or recover from the impacts of a hazard in the long term as well as the short term
- U.S. Centers for Disease Control and Prevention (CDC) SVI ranks each Census tract (subdivisions of counties) on 15 social factors
  - Influence a community's ability to prepare for, respond to, and recover from a disaster.
  - Socioeconomic
    - Poverty, Unemployment, Per Capita Income, Education
  - Population
    - Children, Elderly, Disability, Single Parent, Minority, Limited English
  - Housing/Transportation
    - Large apartment buildings, Mobile homes, Crowding, No vehicle, group quarters

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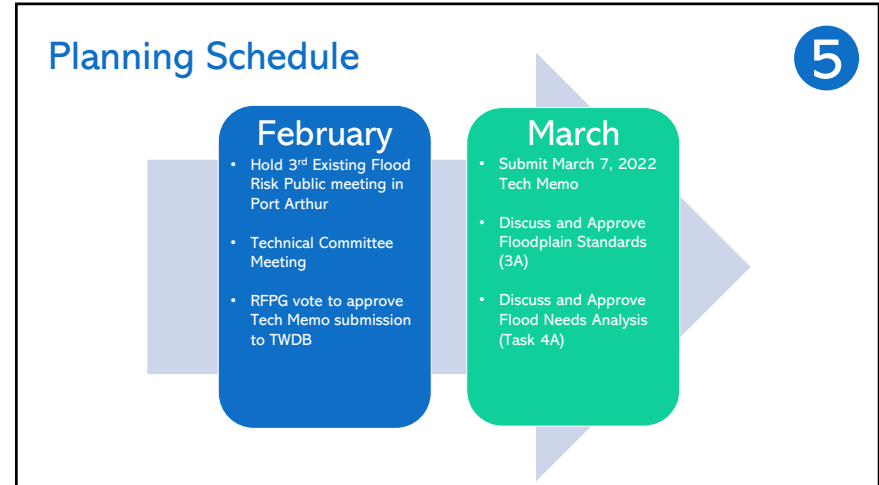## Task 4A – Flood Mitigation Needs Analysis ⑤

- Two kinds of areas identified:
  - Areas with greatest "gaps" in current flood risk knowledge
  - Areas with greatest known flood risk and mitigation needs
- Analysis done on HUC12 extent
- Data categories scored from 1 to 5 depending on severity
  - Higher scores indicate greater flood risk and/or knowledge gaps
- Potential for weighting of categories
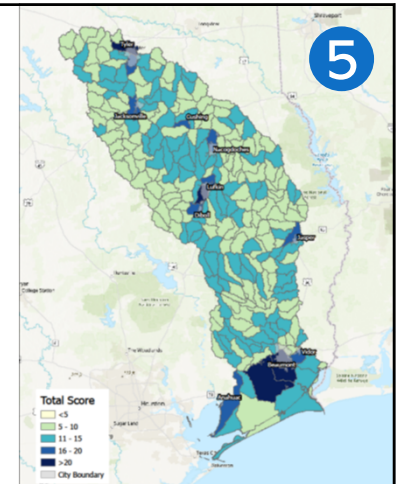
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Mitigation Needs Analysis Factors	Scoring						Weight/Ranking
	0	1	2	3	4	5	
Number of Buildings in 100-year Floodplain	0	1-50	51-250	251-500	501-750	751+	
Number of Low Water Crossings	0	1-5	6-10	11-15	16-20	21+	
Agricultural Land at Flooding Risk (sq.mi)	0	0.01-0.35	0.36-2	2.01-3	3.01-5.5	5.51+	
Number of Critical Facilities	0	1-5	5-10	11-25	26-50	51+	
Communities not participating in NFIP	0	-	-	-	-	1	
Social Vulnerability Index	0	0.01-0.16	0.17-0.33	0.34-0.50	0.51-0.67	0.67+	
FEMA Claims	0	1-5	6-10	11-30	31-50	51+	
Occurrence of Historic Storms	0	1-2	3-4	5-6	7-8	9+	
Damage caused by Historic Storms (Property Damage, $)	0	1-10,000	10,001-30,000	30,001-100,000	100,001-500,000	500,000+	
Inadequate Inundation Mapping (% of HUC12 area with inadequate data)	0%	0.01-20%	21-50%	51-75%	76-90%	90%+	
Additional flood prone areas identified from public mapping survey	0	1	2	3	4	5+	

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Planning Schedule ⑤

February
- Hold 3rd Existing Flood Risk Public meeting in Port Arthur
- Technical Committee Meeting
- RFPG vote to approve Tech Memo submission to TWDB

March
- Submit March 7, 2022 Tech Memo
- Discuss and Approve Floodplain Standards (3A)
- Discuss and Approve Flood Needs Analysis (Task 4A)

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