

The slide features two circular logos at the top left: the State of Texas seal and the Fort Bend County seal. The background is an aerial photograph of a residential neighborhood with a blue diagonal line running from the bottom left to the top right. A white text box on the right contains instructions for virtual attendees.

**Fort Bend County
Hazard Mitigation Action
Plan
2023 Update**

Risk Assessment and Mitigation
Strategy Workshop
March 28, 2023 | 10:00 am

If you are joining virtually,
please enter your name and
department/agency in the
chat.

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The slide has a background image of tall grasses and wildflowers. A dark blue horizontal band across the middle contains the title and a numbered list of agenda items.

**Today's
Agenda**



1. Welcome
2. Progress Report
3. Public and Stakeholder Outreach
4. Risk Assessment Overview
5. Identifying Mitigation Strategies
6. Schedule
7. Questions/Next Steps/Wrap Up

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Project Schedule

<input checked="" type="checkbox"/> November 9, 2022	Steering Committee Kick-Off Meeting
<input checked="" type="checkbox"/> November 19, 2022	Municipal Kick-Off Meeting
<input checked="" type="checkbox"/> November – February	Data Collection and Update Hazard Profiles
<input checked="" type="checkbox"/> February 9, 2023	Steering Committee Meeting #2 (Goals and Objectives)
<input checked="" type="checkbox"/> March 29, 2023 – TODAY!	Risk Assessment Presentation and Identifying Mitigation Actions
<input type="checkbox"/> April 2023	Update and Finalize Jurisdictional Annexes
<input type="checkbox"/> May 2023 (tentative)	Public Review Period
<input type="checkbox"/> May-June 2023 (tentative)	Submit Plan to TDEM and FEMA
<input type="checkbox"/> July-August 2023 (tentative)	APA

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Participation Status

- Annex updates are in progress
- Next round of worksheets (online forms) will go out in the next week
 - Feedback on hazard ranking
 - Mitigation actions
- If your municipality is highlighted, we are missing information for your annex

- Fort Bend County
- Arcola (C)
- Beasley (C)
- **Fairchilds (V)**
- Fulshear (C)
- Katy (C) – not participating
- **Kendleton (C)**
- **Meadows Place (C)**
- Missouri City (C)
- **Needville (C)**
- **Orchard (C)**
- Pearland (C) – not participating
- Pleak (V)
- Richmond (C)
- Rosenberg (C)
- Simonton (C)
- Stafford (C)
- Sugar Land (C)
- Thompsons (C)
- Weston Lakes (C)

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Public and Stakeholder Outreach


- Public Outreach Toolkit
 - Social media templates and posts
 - Press release templates
 - Printable materials
- Surveys
 - Stakeholders
 - Neighboring communities
 - Public
- County Project Website
- Thank you to everyone for helping with this!

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Risk Assessment



*How are the rankings calculated?
What is the preliminary ranking?*

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2023 Hazards of Concern

- Dam/Levee Failure
- Disease Outbreak
- Drought
- Extreme Temperature (heat/cold)
- Flood (Riverine/Flash/Stormwater)
- Geologic Hazards (expansive soils, erosion)
- Hurricane/Tropical Storm
- Severe Weather (Lighting/Hail/Wind/Derechos)
- Tornado
- Wildfire
- Winter Weather

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What is Risk?

- ✓ Hazard
 - *Something that has the potential to cause damage*
- ✓ Exposure
 - *People, property and infrastructure located in hazard-prone areas*
- ✓ Vulnerability
 - *Characteristics of community assets that make them susceptible to damages from the hazard*
- ✓ Risk
 - *Probability of damages to people, property, and infrastructure*

HAZARD + EXPOSURE = RISK

Lightning is a hazard

Standing under a tree during a thunderstorm is a risk

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Purpose of the Risk Assessment

- To get a better understanding of the risks you face
- Initial results based on available data
- Quantitative data (population/structures exposed, structural damages within hazard zones) used when available
- Qualitative community input (such as unmapped flood areas) integrated to adjust results
- Local community input to adjust relative rankings

Spatial Hazard Data

+

County Specific Building Data

+

Scientific Modeling (HAZUS v5 & ArcGIS)

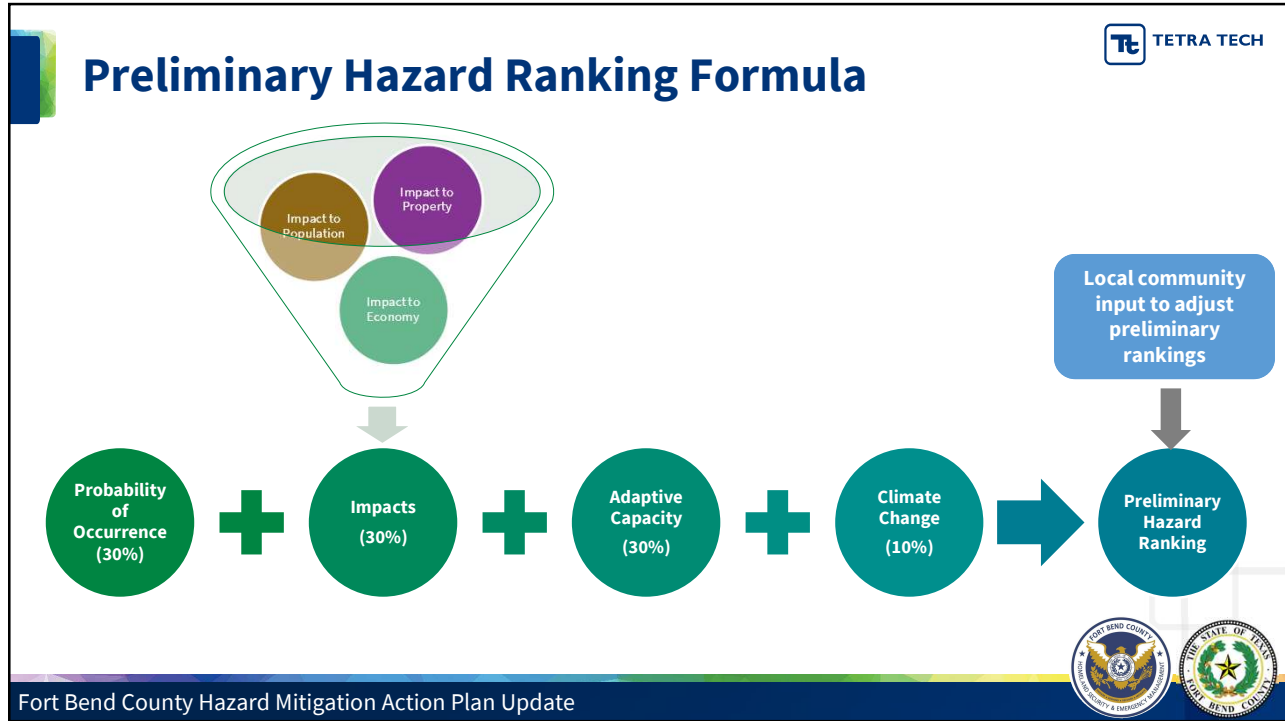
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Historic Data

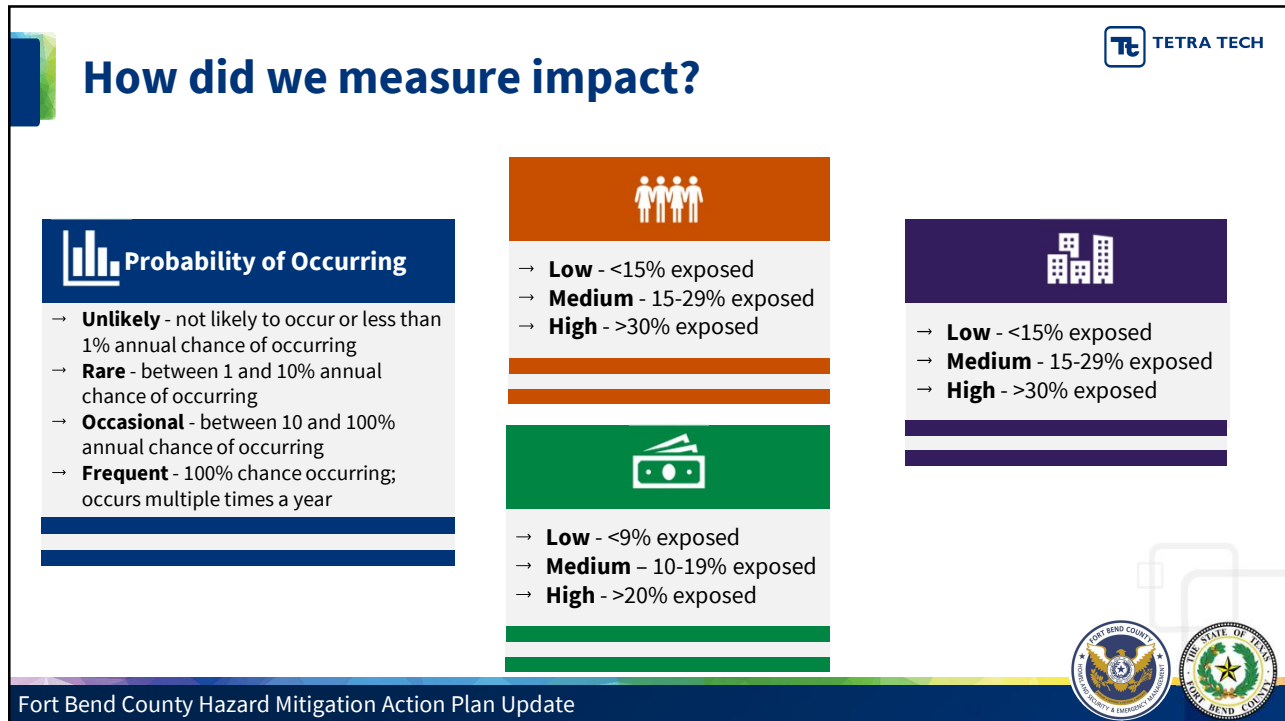
→ Comprehensive List of Expected Damages (\$\$\$)

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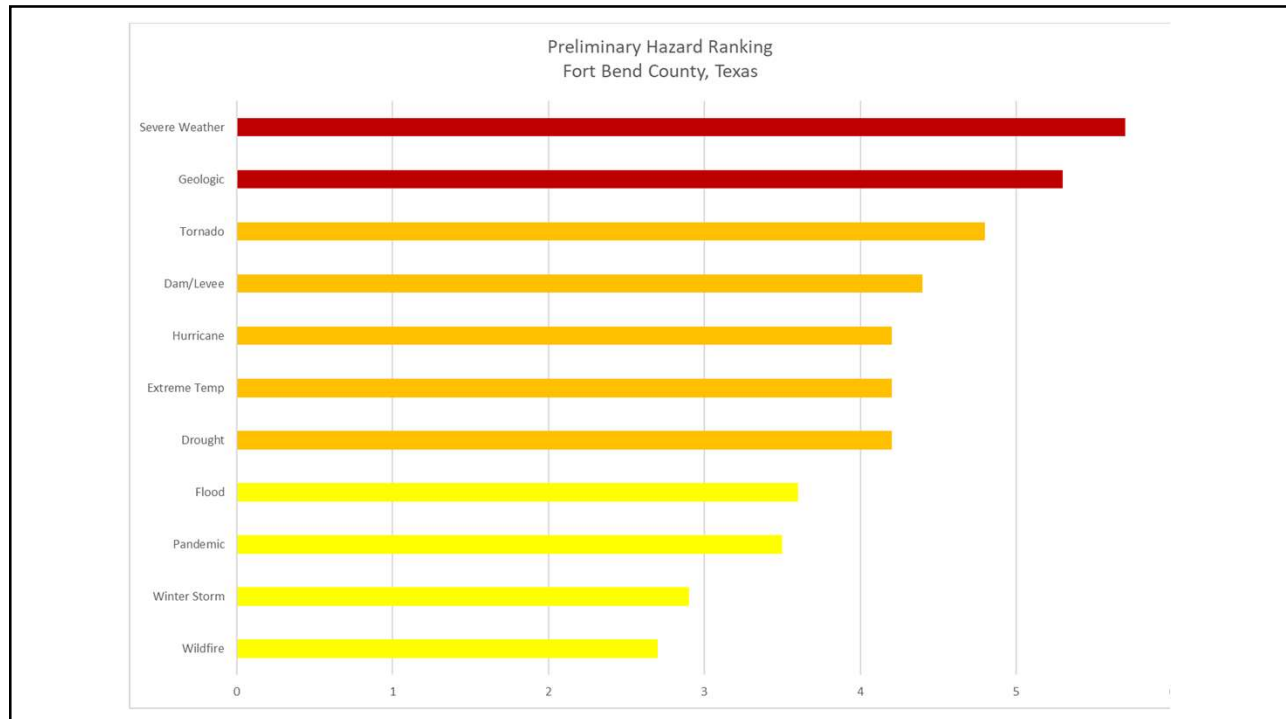
How did we measure impact?

Capacity

- **Low (-1)** - Weak/outdated/inconsistent plans, policies, codes/ordinances in place; no redundancies; limited to no deployable resources; limited capabilities to respond; long recovery.
- **Medium (0)** - Plans, policies, codes/ordinances in place and meet minimum requirements; mitigation strategies identified but not implemented on a widespread scale; county/jurisdiction can recover but needs outside resources; moderate county/jurisdiction capabilities.
- **High (1)** - Plans, policies, codes/ordinances in place and exceed minimum requirements; mitigation/protective measures in place; county/jurisdiction has ability to recover quickly because resources are readily available, and capabilities are high.

Climate Change

- **Low (1)** - No local data is available; modeling projects are uncertain on whether there is increased future risk; confidence level is low (inconclusive evidence).
- **Medium (2)** - Studies and modeling projections indicate a potential for exacerbated conditions due to climate change; confidence level is medium to high (suggestive to moderate evidence).
- **High (3)** - Studies and modeling projections indicate exacerbated conditions/increased future risk due to climate change; very high confidence level (strong evidence, well-documented and acceptable methods).





Preliminary Hazard Ranking

Jurisdictions	Hazard Ranking											
	Dam/Levee	Drought	Extreme Temp	Flood	Geologic (Erosion)	Geologic (Expansive Soils)	Hurricane	Pandemic	Severe Weather	Tornado	Winter Storm	Wildfire
Arcola (C)	Low	Low	Low	Low	Low	High	Medium	Low	High	Medium	Low	Low
Beasley (C)	Low	Medium	Medium	Low	Low	High	Medium	Low	High	Medium	Low	Low
Fairchilds (V)	Medium	Medium	Medium	High	Low	High	Medium	Low	High	Medium	Low	Low
Fulshear (C)	Low	Low	Low	Low	High	Low	Medium	Low	High	Medium	Low	Low
Kendleton (C)	Medium	Medium	Medium	Low	Low	High	Medium	Low	High	Medium	Low	Low
Meadows Place (C)	Low	Medium	Medium	Low	Low	High	Medium	Low	High	Medium	Low	Low
Missouri City (C)	Medium	Medium	Medium	Low	Medium	High	Medium	Low	High	Medium	Low	Low
Needville (C)	Medium	Medium	Medium	Low	High	Medium	Medium	Low	High	Medium	Low	Low
Orchard (C)	Low	Medium	Medium	Low	Low	Medium	Medium	Medium	High	Medium	Low	Low
Pleak (V)	Low	Low	Low	Low	High	High	Medium	Low	High	Medium	Low	Low
Richmond (C)	Medium	Medium	Medium	Low	Low	High	Medium	Low	High	Medium	Low	Low
Thompsons (T)	Medium	Low	Low	High	High	High	Medium	Low	High	Medium	Low	Low
Weston Lakes (C)	Low	Low	Low	Low	High	High	Medium	Low	High	Medium	Low	Low
Fort Bend County	Medium	Medium	Medium	Low	High	High	Medium	Low	High	Medium	Low	Low



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Dam/Levee Failure

- Number of dams
 - 20 dams (USACE) – none identified as high hazard
- Number of levees
 - 12 levee systems (USACE); majority used for flood risk reduction
- No reported failures or incidents
 - Any events we should include?
- Potential mitigation actions

Preliminary Hazard Ranking
MEDIUM



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Disease Outbreak/Pandemic

- Previous Events –
 - Looked at COVID-19, Influenza, and West Nile Virus
- Exposure –
 - Entire county exposed and vulnerable; however, not occurring multiple times a year
 - Severe events can lead to staffing and bed shortages in hospitals
- Potential mitigation actions


Preliminary Hazard Ranking

LOW

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Drought

- Previous Events –
 - Between 1996 and 2022, 13 events reported; however, this may not represent all drought events
- Exposure –
 - Entire county exposed and vulnerable
 - Increased risk to vulnerable populations (65+ / <5)
- Potential Impacts –
 - Increase wildfire/brush fire risk
 - Impacts to farms
 - Drinking water supply
- Potential mitigation actions


Preliminary Hazard Ranking

MEDIUM

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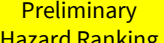
Extreme Temperature (heat/cold)

- Previous Events –
 - Looked at both hot and cold events
 - Between 1999 and 2022, 9 events reported; however, this may not represent all events
- Exposure –
 - Entire county exposed and vulnerable
 - Increased risk to vulnerable populations (65+ / <5)
- Potential Impacts –
 - Increase wildfire/brush fire risk
 - Impacts to farms
 - Long periods of warm temperatures can lead to drought conditions
- Potential mitigation actions

Preliminary Hazard Ranking
MEDIUM

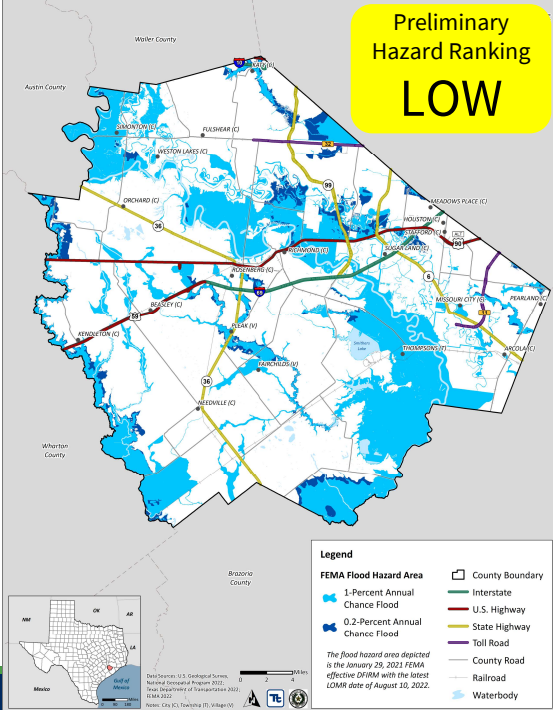
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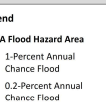
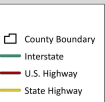


Flood (Riverine, Flash, Stormwater)

- Previous Events –
 - Looked at riverine, flash, and stormwater flooding
 - Between 1997 and 2022, 58 events reported; however, this may not represent all events
 - \$8 billion in property damage
- Exposure –
 - 17,793 people living in the 1% SFHA (2.2% of total population)
 - 26% of land located in 1% SFHA
 - 20% of community lifelines in 1% SFHA
- Potential mitigation actions

Preliminary Hazard Ranking
LOW



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Hurricane/Tropical Storm

- Previous events –
 - 36 storms recorded within 60 miles of Fort Bend County
 - 12 FEMA declarations
- Exposure –
 - Assets exposed to 100-year peak wind gusts (Cat 2 and 3-level winds)
- Potential Impacts –
 - Power outages
 - Infrastructure damage
- Potential mitigation actions

Preliminary Hazard Ranking
MEDIUM

100-Year Peak Wind Gust: Tropical Storm: 39-73 mph, Category 1: 74-95 mph, Category 2: 96-110 mph, Category 3: 111-129 mph, 100-Year Storm Track
 Symbols: County Boundary, Interstate, U.S. Highway, State Highway, Toll Road, County Road, Railroad, Waterbody

Prepared by: T. S. Dierker/Hurricane Mitigation Analysis Program 2022
 Texas Department of Transportation 2022
 March 15, 2023
 Home City (C), Oakridge (C), Sugar Land (C)

Severe Weather (Lightning, Hail, Wind, Derechos)

- Previous events –
 - Over 200 severe weather events; \$7.8 million in damages
 - 3 FEMA declarations
- Exposure –
 - All assets exposed
- Potential Impacts –
 - Power outages
 - Infrastructure damage
- Potential mitigation actions

Preliminary Hazard Ranking
HIGH

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Tornado

- Previous events –
 - 74 tornadoes since 1950; over \$15 million in damages
- Exposure –
 - All assets exposed
- Potential Impacts –
 - Power outages
 - Infrastructure damage
- Potential mitigation actions

Preliminary Hazard Ranking
MEDIUM

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Wildfire

- Previous events –
 - Most fire occurred on November 24, 2020 in Needville
 - 3 FEMA declarations – wildfire threat (1999 and 2006) and Lake Olympia Fire (2006)
 - Any other events we should include?
- Exposure –
 - Assets located in Moderate Threat areas
- Potential mitigation actions

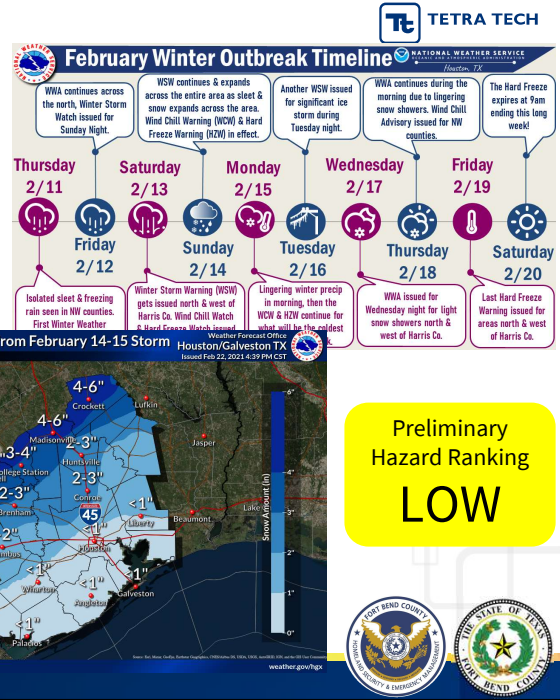
Preliminary Hazard Ranking
LOW

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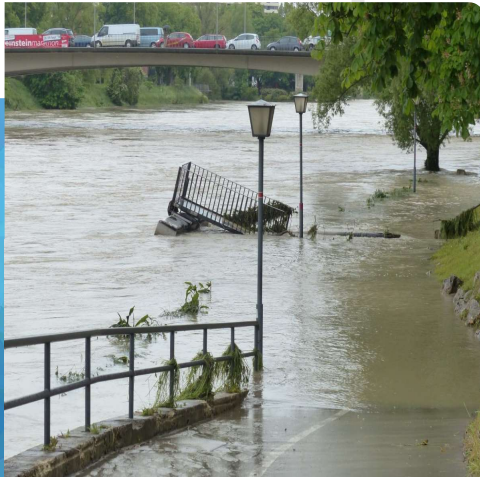
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Winter Weather

- Previous events –
 - 9 events since 1997 with most recent storm in February 2022
 - 2 FEMA declarations (2021 and 2022)
- Exposure –
 - All assets exposed; vulnerable populations at higher risk
- Potential Impacts –
 - Power outages
 - No heat
- Potential mitigation actions



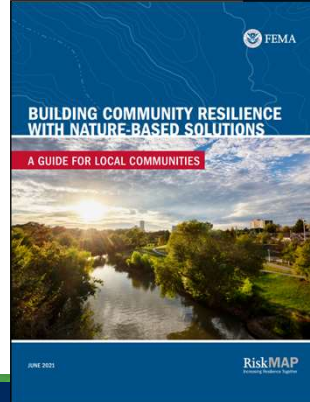
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Mitigation Strategy

How do you reduce risk?

- How do you reduce risk for a hazard?
 - **Manipulate the Hazard**
 - Structural flood control (e.g., flood walls, levees)
 - **Reduce/Eliminate Exposure**
 - Acquire floodprone properties
 - **Reduce Vulnerability**
 - Retrofit (e.g., floodproofing structures)
 - **Increase Capability**
 - \$, preparation, technical assistance, planning enforcement




Using Your Mitigation Strategy to Reduce Risk



- What is a **Mitigation Strategy**?
 - A group of projects or actions to reduce the impacts of the hazards of concern on your community
 - Plans and Regulations
 - Structure and Infrastructure Studies and Projects
 - Natural Systems Protection Studies and Projects
 - Education and Awareness Programs
- Terms to describe the Mitigation Strategy include:
 - **Mitigation Action Plan** or **Action Plan**
 - **Mitigation Projects** or **Initiatives** or **Actions**



Your Mitigation Strategy table is included in your annex. We will use action worksheets and online forms to collect details on the actions you will include in the 2023 Update.





Requirements for the Mitigation Strategy Update

- TDEM and FEMA would like to see more creative/big projects that would work well under the BRIC grant program
- 2018 projects
 - If a project is not finished and still a priority, include in 2023 HMP
 - Remove general projects or make more specific
 - Remove routine maintenance
 - Remove ongoing capabilities
- Minimum of 2 mitigation actions for EACH hazard of concern
 - One action can cover multiple hazards and jurisdictions. For example, education program on mitigation technics you can implement – applies to all hazards and all jurisdictions.

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Other Mitigation Actions to Consider



REGION 8
TEXAS MITIGATION
ASSISTANCE RESOURCE GUIDE



Mitigation Ideas

A Resource for Reducing Risk to Natural Hazards

- Local Disaster Debris Management Plans
- Substantial Damage Management Plan
- Actions to address high-hazard or significant-hazard dams
- Public education and outreach programs
- Generators at critical facilities and community lifelines
- Floodproofing critical facilities and community lifelines
- Addressing repetitive and severe repetitive loss properties




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Connecting to the Mitigation Strategy

TETRA TECH

- Need a clear connection between vulnerability and proposed mitigation actions.
- Capability assessment provides insight into challenges and opportunities for the mitigation strategy.
- Provides the factual basis for activities proposed in the mitigation strategy.

```

graph TD
    CA[Capability Assessment] --> MS((Mitigation Strategy))
    HC[Hazards of Concern] --> MS
    RA[Risk Assessment] --> MS
    PAC[Problem Areas in Community] --> MS
  
```

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Where do you need to focus?

TETRA TECH

- Stronger connection between the risk assessment and mitigation strategy
- More specific, achievable actions
 - Specific projects, in specific locations, in a specific timeframe
- Diverse actions
 - You need at least 2 actions per hazard of concern. Think about actions that can cover multiple hazards.
 - Include a variety of action types (e.g., developing plans, outreach, structural, etc.)



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Where do you start?

- **Problems –**
 - Turn challenges/obstacles/gaps into mitigation actions
 - Examine historic impacts
 - Review the risk and capability assessment results
 - RL/SRL properties
 - Stormwater/urban flooding areas
 - Critical facilities and lifelines located in a hazard area (if feasible)
 - Additional areas of vulnerability
 - Previous FEMA HMA submitted projects – awarded/unawarded
- Include ‘carry-over’ actions from the 2018 HMP
 - More specific or address different aspects of the original problem
- Identify new actions
- Two actions for every hazard of concern

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Range of Mitigation Actions

- Primary types of mitigation actions to reduce long-term vulnerabilities include:

Local Plans and Regulations	<ul style="list-style-type: none"> • Substantial Damage Management Plans • Update comprehensive plans to include hazard mitigation • Open space plan • Debris management plan
Structural Projects	<ul style="list-style-type: none"> • Structural elevations of flood-prone properties • Drainage improvements • Stormwater improvements • Backup power to critical facilities and community lifelines
Natural Systems Protection	<ul style="list-style-type: none"> • Stream and wetland restoration • Erosion control • Vegetative management to help with flooding, erosion, etc. • Water quality improvement
Education and Outreach	<ul style="list-style-type: none"> • Developing and implementing multi-hazard public awareness programs • Enhancing municipal website to include hazard mitigation and preparedness • Real estate disclosure for flooding and other hazards • Working with the private sector to enhance hazard awareness

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Proposed Action Table

- Each municipality will need to complete the *Proposed Hazard Mitigation Initiatives* table in your annex
- Each column needs to be filled in. Tetra Tech will assist you with completing each cell.
- Action Worksheets will need to be completed for all projects.
 - Online form

Initiative Number	Mitigation Initiative Name	Description of the Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met
2021-Your Town-001	Repetitive Loss Property Outreach	<p>Problem: There are 100 repetitive loss properties located in the City. According to NFIP claims records, these properties have experienced extensive flood damage through the years. Without proper mitigation, the structures will continue to experience flood damages.</p> <p>Solution: Conduct outreach to the property owners to inform them of their repetitive loss designation and provide mitigation options to protect the structures. If the property owners choose elevation or acquisition, the City will develop a grant application to fund acquisitions or elevations of the properties.</p>	Existing	Flood, Severe Storm, Hurricanes/ Tropical Storms	All

Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Cost	Timeline	Priority	Mitigation Category
City Floodplain Administrator, Property Owner	Borough Budget for outreach; FEMA FMA or HMGP for mitigation measures	Increase resilience of structure and City; decrease flood damages	<\$10,000 for outreach; mitigation costs vary depending on project	One year for outreach; 5 years for mitigation measures	High	EAP, SIP



Next Steps / Upcoming Schedule

- Complete worksheets – to be distributed via email – due December 7th
- Mitigation Strategy Workshop – early February (tentatively)
- Risk Assessment Meeting – late March (tentatively)
- Public Review Period – April 2023 (tentatively)
- Draft Plan to TDEM – April 2023 (tentatively)
- Final Draft to FEMA – May 2023 (tentatively)
- APA – June 2023 (tentatively)





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Tetra Tech Project Contacts	
Brian Rutherford, Project Manager (281) 414-6741 brian.rutherford@tetrattech.com	Heather Apgar, Lead Planner (973) 630-8046 heather.apgar@tetrattech.com

Thank You!

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