North Central Texas CRS Users Group/Elected Officials Floodplain Seminar

July 29, 2021

Virtual Meeting – Hosted by the North Central Texas Council of Governments (NCTCOG) and the Texas Water Development Board (TWDB)

AGENDA

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>1:00p-1:05p</td>
<td>Welcome and Introductions</td>
<td>Breanne Johnson</td>
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<td>NCTCOG</td>
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<tr>
<td>1:05p-1:40p</td>
<td>Overview of Flood Activities and New Initiatives at the Trinity RFPG</td>
<td>Glenn Clingenpeel</td>
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<td>Trinity RFPG, TRA</td>
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<tr>
<td>1:40p-2:20p</td>
<td>Texas Infrastructure Report Card</td>
<td>Mark Boyd, PhD, P.E. ASCE</td>
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<tr>
<td>2:20p-3:00p</td>
<td>Utilizing Building Codes in Floodplain Management</td>
<td>Donald Leifheit, CFM FEMA</td>
</tr>
<tr>
<td>3:00p-4:00p</td>
<td>Risk Rating 2.0</td>
<td>Gilbert Giron, CFM FEMA</td>
</tr>
<tr>
<td>4:00p</td>
<td>Meeting Wrap-Up</td>
<td></td>
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</table>

If you have any questions regarding the meeting or agenda items, please contact Breanne Johnson: (817) 695-9148; BJohnson@nctcog.org

NCTCOG would like to extend a special thank you to the Texas Water Development Board (TWDB) for participating in this event, the Texas Floodplain Management Association (TFMA) for their support and partnership, and the Federal Emergency Management Agency (FEMA) for grant funding to hold this and other trainings for our communities.

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.
Welcome and Introductions

- Thanks for attending!
- Please mute your line.
- Unmute your line when you would like to speak during question and discussion time.
  - We will also watch the chat box for questions
Agenda

1. Overview of Flood Activities and New Initiatives at the Trinity RFPG
   - Glenn Clingenpeel, TRA

2. Texas Infrastructure Report Card
   - Mark Boyd, ASCE

3. Hazard Resistant Building Codes: Floodplain Management and FEMA Grant Funding
   - Donald Leifheit, FEMA

4. Risk Rating 2.0
   - Gilbert Giron, FEMA
Breanne Johnson  
Environment & Development Planner  
North Central Texas Council of Governments  
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817.695.9148

Contact  
Connect

Facebook.com/nctcogenv
@nctcogenv
nctcogenv
youtube.com/user/nctcoged
EandD@nctcog.org
nctcog.org/envir
Elected Officials Floodplain Seminar

Glenn Clingenpeel
Chairman, Region 3 Regional Flood Planning Group
Regional Flood Planning

• Trinity Basin Weather

• Water Planning

• Flood Planning
Trinity River Basin and TRA

- Only counties that touch the main stem of the river are included in our political jurisdiction.

- Arlington/Dallas/Ft. Worth ~ 7 million

- Houston ~ 6.5 million
Rainfall Across the Trinity Basin

NRCS 1981-2010. Average monthly
Precipitation in North Texas
Precipitation Patterns

Long-term Monthly Precipitation Normals in DFW

Monthly Precipitation Totals (Inch)
Precipitation Patterns

Long-term Monthly Precipitation Normals vs 2014 Monthly Precipitation Totals in DFW

- DFW 1981-2010 Normal
- DFW 2014 Monthly Precipitation Totals
Precipitation Patterns


DFW 1981-2010 Normal
DFW 2014 Monthly Precipitation Totals
DFW 2015 Monthly Precipitation Totals
Total Cumulative Flow in Trinity, 2014 v. 2015
The Drought and Flooding in Texas is Cyclical

“Texan’s have seen drought alternate with flood in a disheartening pattern of extremes. In many cases the same areas suffering from acute water shortages are later ravaged by floods...”

1961 State Water Plan
Role of ENSO Cycle in Texas’ Climate

[Graph showing the inverse oceanic Nino index and the percentage of the state in drought (D0-D4) over time from January 2000 to September 2016.]
Hydro-illogical Cycle

- Drought
- Apathy
- Awareness
- Panic
- Planning
- Flood
- Recovery
- $ Shortfall
A brief history of water planning in Texas

• 1961 – first state water plan
  • Top down, 20-yr plan

• In 1997, Legislature passed SB1 overhauled statewide water planning
  • Bottom up, 50-yr plan

• Texas Water Development Board (TWDB) was charged with implementing SB1

• The plans are updated every five years
• Each group is tasked with developing regional water plans for their areas
  • Current Demand v. Supply
  • Projected Demand v. Supply
  • Develop strategies to overcome deficits

• The plans cover a rolling 50-year planning horizon
Regional Water Planning Groups and the Texas Water Development Board

**RWPG**
- Represent 11 interest categories
- Establish bylaws
- Hold Public Meetings
- Prepare Regional Water Plans every five years

**TWDB**
- Provide guidance documents
- Develop plan requirements
- Approve Regional Water Plans and incorporate them into a State Water Plan
- Allocate funding
After repeated record-breaking floods, the Texas Legislature established a process to develop the first-ever State Flood Plan in the 2019 Legislative session.

SB 8 charged the TWDB with implementation.

The regional flood planning process is similar in many ways to the regional water planning process.
First-ever Regional Flood Plan for Texas’ Trinity River Basin underway

- The Trinity RFPG is among 15 regional flood planning groups designated in April 2020 to undertake a new regional flood planning process in Texas

- This group’s plan will then become part of Texas’ first-ever State Flood Plan
Difference Between RWPG and RFPG:

**Water Planning**
- Water supply in 16 regions
- 50-year planning period
- Restrictive – *must be consistent with the plan to obtain water rights*
- Water projects generate revenue stream

**Flood Planning**
- Flood risk in 15 regions
- 30-year planning period
- Permissive – *being in plan provides access to resources and funding*
- Flood control avoids costs but does not generate revenue
Regional Flood Planning Groups

- 15 regions
- 12 interest groups for each region
  - Variety of interest categories
  - Appointments considered geographic representation
- The group selects contract administrators & consultants
- Prepare and submit Regional Flood Plans
Region Three, the Trinity River Basin

- The region spans from Cooke County in the north to Chambers County on the Gulf Coast
- 38 counties in the region (some counties are also represented by at least one other RFPG)
- Area covers 17,919 square miles and approximately 15,855 stream miles
- More than 30 major lakes & reservoirs
The Trinity Regional Flood Planning Group

Voting members:
- Chad Ballard  
- Sano Blocker  
- Melissa Bookhout  
- Glenn Clingenpeel  
- Scott Harris  
- Rachel Ickert  
- Andrew Isbell  
- Jordan Macha  
- Mike Rickman  
- Matt Robinson  
- Lissa Shepard  
- Sarah Standifer

Interest group represented:
- Small business  
- Electric generating utilities  
- Agricultural interests  
- River authorities  
- Water utilities  
- Flood districts  
- Public  
- Environmental interests  
- Water districts  
- Industries  
- Counties  
- Municipalities
The Trinity Regional Flood Planning Group

Non-voting members: Organization represented:

- Brooke Bacuetes General Land Office
- Richard Bagans Texas Water Development Board
- Rob Barthen Texas Department of Agriculture
- Steve Bednarz Texas State Soil and Water Conservation Board
- Justin Bower Houston-Galveston Area Council
- Ellen Buchanan Neches Flood Planning Group (liaison)
- Todd Burrer Region 6 San Jacinto Flood Planning Group (liaison)
- Diane Howe Federal Emergency Management Agency
- Lonnie Hunt Deep East Texas Council of Governments
- Brian Hurtuk Texas Division of Emergency Management
- Edith Marvin North Central Texas Council of Governments
- Kevin McCalla Texas Commission on Environmental Quality
- Greg Waller Natl Weather Service / West Gulf River Forecast Center
- Adam Whisenant Texas Parks and Wildlife Department
Major Components – Flood Plan

• Current and future flood risks

• Current and future flood infrastructure

• Flood mitigation needs analyses

• Development and selection of flood management evaluations, flood management strategies and flood mitigation projects
Major Components – Flood Plan

• Contributions to water supply and impacts on State Water Plan

• Funding recommendations for projects

• Public participation and plan approval
Data Collection

Reported Flooding Incidents

Physical Infrastructure

Policy

H&H Models

Drainage Criteria Manual
The City of Lubbock, Texas

JULY 2019
Flood Risk Analysis

Flood Risk Analyses (existing and future)
- Flood Hazard
- Flood Exposure
- Vulnerability

Future Conditions

No-Action scenario of ~30 years of continued development and population growth under current trends and existing flood regulations and policies.
Floodplain Management Practices

• Are current practices increasing flooding risks?

• Recommend region specific floodplain and land use management strategies
Flood Mitigation and Management Goals

- Identify specific goals addressing risk to life and property

**Short-term goals**
(10-years)

**Long-term goals**
(30-years)

- Determine levels of residual risk
Identification, Assessment and Recommendation of FMEs, FMSs, and FMPs,

**Flood Management Evaluation (FME)**
- A proposed flood study of a specific, flood-prone area that is needed in order to assess flood risk and/or determine whether there are potentially feasible FMSs or FMPs.

**Flood Management Strategy (FMS)**
- A proposed plan to reduce flood risk or mitigate flood hazards to life or property (may or may not require associated FMPs to be implemented).

**Flood Mitigation Project (FMP)**
- A proposed project (structural and non-structural) that when implemented will reduce flood risk, mitigate flood hazards to life or property.

Costs Benefit Analyses and Project Prioritization Funding Analysis
Regional Flood Plan Adoption and Approval Process

- Regional Flood Plan
- Flood Risk Analysis
- Flood Management Strategies
- Flood Mitigation Projects
- State Flood Plan

The initial RFPs shall be delivered on or before January 10, 2023.

The initial SFP shall be delivered on or before September 1, 2024.

5-year cycle
Next steps and planning milestones

- Aug. 19, 2021, 2 p.m. TRFPG Meeting, Arlington, North Central Texas Council of Governments office, Transportation Room
  - Regular meetings throughout the process
- Jan. 2022, Technical Memo submitted to the TWDB
- Aug. 2022, draft Regional Flood Plan(s) due
  - Includes public and TWDB review/comment
- January 2023, final Regional Flood Plan(s) due to TWDB
- September 2024, final State Flood Plan due to Legislature
The plan will only be as good as the input provided.

TRFPG public engagement

Public participation opportunities include:

- Submission of public comments via the Trinity RFPG website, [www.trinityrfpg.org](http://www.trinityrfpg.org)
- Comments or questions can also be sent to the Trinity RFPG email address, [info@trinityrfpg.org](mailto:info@trinityrfpg.org)
- Subscription to the Planning Group’s future e-updates through the “Subscribe” form on the website
- Participation in Planning Group Public Meetings, info on the website
- Identify flood-prone areas on the interactive map available via the button at the top of the website’s Public Comment page
What Flood Planning Can Learn from Water Planning

Cooperation is Crucial
What Flood Planning Can Learn from Water Planning

Embrace Adaptive Management
The website has valuable resources, including:

- Meeting notifications, agendas, agenda packets/presentations and minutes
- Glossary and acronym decoder
- Planning documents such as the group’s bylaws and, when available, draft and final chapters (and ultimately the draft and final plan)
- Spanish translation
- A link to the group’s Twitter handle: @TrinityTRFPG
- Other resources
Questions?

John Doe (name)
Director of Marketing (title)

johndoe@greatcompany.com (contact info)
2021 Texas Infrastructure Report Card

✓ Report Card overview
✓ Focus on Flood Risk Mitigation
✓ In 25 minutes or less.

North Central Texas CRS Users & Elected Officials Flood Plain Seminar


Presented by: Mark K. Boyd PhD, PE, D.WRE, CAPM
Principal Engineer, LCA Environmental, Inc.
Mark K. Boyd PhD, PE, D.WRE, CAPM
Principal Engineer, LCA Environmental, Inc.

ASCE Texas Section 2021 IRC Committee Chair
VP Technical Elect, ASCE Texas Section

Adjunct Associate Professor
Southern Methodist University

"We were environmental before environmental was cool"
ASCE Texas Section  |  www.texasce.org

- Represents more than 10,000 civil engineers
- Supports year-round technical work of state agencies & policymakers
- Hosts a Legislative Drive-In (normally, this year “zoom-in”)
- Has an obligation to educate the public & policy makers about the condition of our state’s infrastructure
ASCE Texas recommendations on flood risk mitigation were adopted & funded through actions of the 86th Texas Legislature, in the aftermath of Hurricane Harvey.

ASCE urges Congress to consider key priorities including: Sustainability, Resilience, and Prioritizing Asset Management and Operation & Maintenance needs.

On popular media! Script in Netflix Series “Designated Survivor”. Fictional President Tom Kirkman (played by Kiefer Sutherland...that’s Donald’s son to us old guys).
2021 Texas Report Card – A Labor of Volunteer Dedication

**Flood Risk Mitigation Subcommittee**
Melvin Spinks, PE, CFM (Chair) | CivilTech
Chris Van Heerde, PE (co-Chair) | MHT Engineering
Jessica Sprague, PE, CFM | CivilTech
Stephanie Zertuche, PE, CFM | GeoSolutions, LLC

**Levees Subcommittee**
Curtis Beitel, PE CFM, ENV SP (Chair) | HDR
Andrew Wilson, PE, CFM | Peloton Land Solutions
Umesh K. Bachu, PE | ECS

*The late* Russell “Rusty” Gibson, PE* | ETTL Engineers & Consultants

*report card dedicated to Rusty

https://www.texasce.org/our-programs/infrastructure-report-card/
2. Explain 100 year event. 1/100, 1% chance any given year, could happen twice in a year... Huh??
3. Lecture them on the hydrologic cycle.
4. Don’t worry, we have a stochastic model and a unit hydrograph for that.
5. Anything Evapo-transportation rates.
6. Anything about antecedent moisture conditions
7. Anything about conditional probability distribution, sequential heavy rainfall events
8. The record fits the Type I Gumbel extreme probability distribution.
10. Play LED ZEPPELIN – When the Levee Breaks, tell them it couldn’t get worse than the Great Mississippi flood of 1927.

“when the levee breaks, we’ll have no place to stay”.

How to best summarize infrastructure issues?
Why not school letter grade?
Methodology
- CAPACITY
- CONDITION
- FUNDING
- FUTURE NEED (Texas Population Growth!)
- OPERATION & MAINTENANCE
- PUBLIC SAFETY
- RESILIENCE
- INNOVATION
Texas Category Grades and Texas GPA on the rise:

- Aviation: B-
- Bridges: B-
- Dams: D+
- Drinking Water: C-
- Energy: B+
- Flood Risk Mitigation: C-
- Highways & Roads: D+
- Levees: D
- Parks & Recreation: C-
- Solid Waste: B
- Transit: B-
- Wastewater: D


National GPA: C-
Energy

• Two Energy categories: oil & gas and electricity
• Texas leads the U.S. in oil & gas production
• Texas is the energy innovation capitol of the world
• Oil production increased from 1 million barrels per day in 2011 to over 5.4 million barrels per day in 2019
• Texas needs to continue its leadership by example
• Big elephant in the room. What about the winter storms of 2021?
• Texas ASCE “Beyond the Storms” Committee producing a report similar to Hurricane Harvey report of aftermath that helped prompt the first Texas Flood Plan

Beyond the Storms Committee
Flood Risk Mitigation

• Roughly 1 in 10 Texans is exposed to moderate or high annual riverine flood risks.

• Initiatives are underway to reduce risks through better planning, improved asset management, & new funding sources to support flood risk mitigation infrastructure.

• 2019 Texas State Flood Assessment report: More than $31.5 billion needed over the next decade.

• TWDB Estimate: local communities need 18 to $27 Billion in financial assistance.
Major metropolitan areas passed flood control bond referendums
- Harris County $2.5 Billion
- Fort Bend County - $83 million
- Dallas $1.05 Billion ($139 million to drainage and flood control projects)
- San Antonio $550 million

Senate Bill 500 (86th legislature, 2019)
- TWDB new responsibilities creating Texas Flood Infrastructure fund (FIF) and Texas Infrastructure resilience Fund (TIRF).

2019 State Flood Assessment report 31 of 40 Texas Cities (pop. 100,000+) have stormwater utilities.
• 180 flood related deaths, 2015-2019, highest in US.
• Hurricane Harvey – 68 deaths (highest from hurricane since 1919)
• What’s ahead? Uncertain.
• NOAA Atlas 14, Volume 11, planning/design has not yet adjusted.
• Not enough there, there to address growing, accelerating Texas population.
• More building standards improvements
• More protective policies
• More/better smart growth
• New/better urban planning.

FIGURE 16. The 100-year rainfall estimates increased anywhere from 1 to 5 inches for a 24-hour storm. Source: NOAA.
SELECTED FLOOD RISK RECOMMENDATIONS

- Planning leads to “analysis by paralysis”. Committee recommended, a mix of shovel ready and planning projects to make sure public sees public dollars at work.

- Work with local communities to minimize development in identified flood hazard and at-risk areas.

- Encourage development standards and alternatives to design practices based on the latest data from NOAA Atlas 14. This relates to a separate recommendation to incorporate design and planning to consider environmental and data impacts.

- Continue to do what’s working, as this has resulted in improving the grade and path toward greater resilience and preparedness.

Note: Similar recommendations pages are available in the report card for all categories.
Dams

- About 1/3 of the state’s dams are for flood risk mitigation and 1 in 7 dams are for irrigation or water supply.
- Dams have great value and great consequence. The consequences of a dam failure far exceed the loss of a water supply or your favorite fishing hole.
- $5 Billion 2019 Association of State Dam Safety Officials estimated cost to rehabilitate all non-federal dams in Texas.
- $2.1 billion repair/rehab estimate, Texas State Soil and Water Conservation Board dams in the Small Watershed Programs.
Levees

• More than 1 million Texans and $127 billion dollars’ worth of property are protected by levees.

• **There is no state levee program.**

• Texas has 327 levee systems total, extending a combined 567 miles.

• More than 75% of Texas levee systems are without **screened risk classification.**

• 5 levee systems (**about 100 miles of levees**) are classified as **high to very high risk.**
Three of the major Texas infrastructure identified funding shortfalls are related to flood risk:

- Flood Risk Mitigation - $31.5 Billion (next 10 years)
- Levees - $Billions (truly unknown)
- Dams - $5 Billion (rehab/repair)
- Wastewater - $250 million / year
- Drinking Water capital costs – $ 26.8 Billion (50 year, to be funded by utility bills)
- Highways & Roads - $15 Billion thru 2040
The American Jobs Plan

• $50 Billion toward infrastructure resilience (none toward flood risk).

• $17 Billion for inland waterways, related to freight capability (nothing toward flood mitigation).

• $621 Billion toward transportation (which if planned improperly, could make flooding worse).
✓ Policy makers should collaborate with civil engineers to craft infrastructure legislation with resilience at the forefront, to maximize the return on investment and build a stronger Texas.

✓ Resilience refers to the capability to mitigate against significant all-hazards risks and incidents and to expeditiously recover with minimal impacts to public, the economy, & national security.

✓ Texas needs to understand the impact of the loss of infrastructure, as well as the timeline and cost to restore its function.

✓ An all-hazard, comprehensive risk assessment that considers both event likelihood and consequences is necessary to prepare systems for the impacts of extreme events.

✓ Texas needs to develop performance criteria and uniform statewide standards that address interdependencies and establish minimum performance goals for resilient infrastructure.
Infrastructure is Critical to Texas’ Economy

- Every additional $1.00 invested in infrastructure delivers a return of roughly $3.70 in additional economic growth over 20 years, according to the Business Roundtable.
- Neglecting infrastructure will leave us mired in static 20th Century status quo, or worse.
- The report card is an important advocacy tool
- ASCE commends governmental agencies for their work & dedication to serving the citizens of Texas
- Texas is the largest continental state, the 2nd most populous state, & an economic powerhouse, leading the Nation in wind power energy production
- Too often, we take infrastructure for granted & simply expect it to work
- Until....
Legislator Support

“The ASCE Texas Infrastructure Report Card is a critical tool as we assess our needs and measure progress in actively building Texas into a better place to live, work, and raise a family. We must continue to work together with all levels of government, community leaders, industry partners, and universities, using this invaluable resource to help keep us better informed about the issues facing Texas.”

- Representative Dennis Paul PE, Texas House of Representatives, District 129
“... if Texas was its own country, we would have the 9th largest economy in the entire world.”

- Texas Governor Greg Abbott, February 1, 2021

“To sustain a higher quality of life for all, and to support its massive economy, growing population, and increasingly complex interconnected systems, Texas deserves and can afford the best, most resilient and sustainable infrastructure in the world.”

Mark K. Boyd, PhD, PE | Chair Texas ASCE 2021 Infrastructure Report Card Committee
WANT TO KNOW MORE? READ ENTIRE 92 PAGE REPORT CARD
https://www.texasce.org/our-programs/infrastructure-report-card/

THANK YOU!

OPEN Q&A
Building Science Branch Presenters and HQ Support

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Overview and Goals

- Provide a basic understanding of hazard-resistant building codes, focusing on flood provisions and grant opportunities

- Encourage communities to:
  - Adopt the latest published editions of hazard-resistant building codes
    - Currently deemed 2015 and later International Codes
  - Review and update adopted building codes on a regular schedule
    - Soon we will be rating the States code adoption using the 2018 and later editions of the I-Codes
  - Identify and utilize resources to achieve hazard-resistant code adoption and enforcement
  - Identify grant opportunities from multiple sources related to hazard-resistant codes
Hazard Resistance in Building Codes

Rockport, Texas after Hurricane Harvey

Photo courtesy of the 2017 FEMA Hurricane Harvey Mitigation Assessment Team (MAT)
Relationship Between I-Codes and NFIP

NFIP Regulations (44 CFR Parts 59 & 60)

Local Floodplain Management Regulations* or IBC Appendix G*

Building Code

Flood Resistant Buildings and Development

ASCE 7
ASCE 24

* NFIP-consistent administrative provisions, community-specific adoption of FIS and maps, and technical requirements for development outside the scope of the building code (and higher standards, in some communities).
Hazard Resistance in Building Codes in Texas

Hazard-resistant code: 2015 or later IBC and IRC without weakening hazard provisions

**Now: 2003 IBC/2000 IRC**
- References ASCE 24-98
- No freeboard

**Jan. 2022: 2012 IBC/IRC**
- References ASCE 24-05
- Limited freeboard
- Explicit flood damage-resistant materials requirement
- Final elevation inspection
- Floodway analysis

**Goal: 2021 IBC/IRC**
- References ASCE 24-14
- Consistent freeboard 1 ft +
- Emergency power for critical facilities
- More specific SI/SD administration
People’s Assumptions of Protection

8 out of 10 Americans assume they are at least moderately protected.

## People Have High Expectations

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Somewhat Agree</th>
</tr>
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<tbody>
<tr>
<td>It’s important to me to work with a builder who supports the latest building codes</td>
<td>49%</td>
<td>41%</td>
</tr>
<tr>
<td>State and local leaders should protect the integrity and independence of building code enforcement</td>
<td>46%</td>
<td>45%</td>
</tr>
<tr>
<td>It’s important for state and local elected officials to prepare communities to resist damage from a natural disaster or extreme weather</td>
<td>40%</td>
<td>50%</td>
</tr>
<tr>
<td>Reputable builders and contractors support the latest building codes</td>
<td>40%</td>
<td>47%</td>
</tr>
<tr>
<td>My state and local leaders should adopt the latest building codes to protect the community from disasters</td>
<td>40%</td>
<td>46%</td>
</tr>
<tr>
<td>Builders and contractors who don’t support stronger building codes are looking for ways to cut corners</td>
<td>36%</td>
<td>46%</td>
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Strongly Agree  ▪  Somewhat Agree
60% of NCTCOG jurisdictions are hazard-resistant


Help us fill the map! Email FEMA-BuildingScienceHelp@fema.dhs.gov with code status if missing
Building Code Adoption Status: NCTCOG Jurisdictions

- NCTCOG Code Adoption Surveys: https://www.nctcog.org/envir/regional-building-codes/code-adoption-surveys
  - Adopted code editions?
  - Code adoption schedule?
  - Plans for adopting 2018 codes?
  - Use of NCTCOG amendments?
Freeboard: Losses Avoided in TX

Building Codes Save: A Nationwide Study (FEMA, 2020)

- Post-2000 growth: 12% of total buildings modeled
  - COG: 20% of TX

- 62% in SFHA with freeboard
  - COG: 79%

- $63M losses avoided (buildings and content)
  - COG: $7.8M

Source: FEMA Building Codes Save
### National Risk Index: NCTCOG Counties

#### NCTCOG Exposure to Riverine Flooding

<table>
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<th>Pop. at Risk Without Recent Codes*</th>
<th>Expected Annual Loss to Buildings (EALB)</th>
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<tr>
<td>All Communities</td>
<td>181,827 (67%)</td>
<td>$7,429,636</td>
</tr>
<tr>
<td>Socially Vulnerable Communities**</td>
<td>64,584 (28%)</td>
<td>$4,298,834</td>
</tr>
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*2015 IBC and IRC or later editions

**Includes Relatively Moderate, Relatively High, Very High Vulnerability

Savings Outweigh the Costs

- **Opportunities for More Savings:** *Building Codes Save* identified Priority High Hazard, Higher Growth Counties with Limited I-Code Use

<table>
<thead>
<tr>
<th>County</th>
<th>Wise</th>
<th>Hunt</th>
<th>Parker</th>
<th>Rockwall</th>
<th>Hood</th>
<th>Johnson</th>
<th>Ellis</th>
<th>Kaufman</th>
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<tr>
<td>In SFHA</td>
<td>140</td>
<td>103</td>
<td>290</td>
<td>219</td>
<td>130</td>
<td>269</td>
<td>327</td>
<td>166</td>
</tr>
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- 1 foot of freeboard only adds ~1.5% to construction costs*
- Adopting the latest building codes saves $11 per $1 invested*
- Indirect losses slow recovery: business interruptions, lost personal income, outsized debt, homelessness, lost municipal tax receipts
- Communities can work together to share costs and resources for code enforcement

Building Code Effectiveness Grading Schedule (BCEGS®)

- BCEGS score 1 (best) to 10 based on code administration, plan review, and field inspection
- **Stronger codes = more hazard resilience = better score = lower rates/premiums**
- Competitive BRIC: 15 Technical Points awarded to subapplicants with BCEGS score of 1 to 5 (out of 10)
- CRS class prerequisites based on BCEGS score
- 138 jurisdictions within NCTCOG participate in BCEGS (and have a BCEGS score), does not include the 16 counties
- **No BCEGS score?:** Contact ISO to begin the scoring process, typically a 2-4 month process at no cost to the community (other than personnel time)
- Visit: [https://www.isomitigation.com/bcegs/](https://www.isomitigation.com/bcegs/)
Advantages of Building Codes

- Administration and enforcement
- Consistent permitting and inspections
- Flood provisions that are more specific or more resilient than NFIP go into effect automatically (such as Substantial Improvement/Substantial Damage administration; freeboard)
- Competitive edge in FEMA grant funding
- Community Rating System (CRS):
  - Class 8 prerequisite: 1 foot of freeboard for residential buildings
  - Class 6 prerequisite: BCEGS score of 5/5 or better
  - Class 4 prerequisite: BCEGS score of 4/4 or better
  - Credits for Activity 430 “higher regulatory standards” meaning stronger standards and more resilient
More Specific and Resilient Standards in Codes

- Specific design requirements for foundations, geotechnical characteristics, flood loads
- High risk flood hazard areas (alluvial fans, flash flooding, mudslides, ice jams, high velocity flow, high velocity wave action, Coastal A Zone, erosion)
- Freeboard as function of Flood Design Class
- Dry floodproofing specifications
- Flood opening specifications
- Elevators, pools, parking structures, accessory structures
- Two elevation inspections (after foundation prior to further vertical construction; final inspection)
- Substantial Improvement/Substantial Damage determinations

What’s Next: Building Codes Strategy

FEMA is developing an Agency Strategy to advance disaster-resistant building codes at the State and local level as a starting point for a coordinated effort involving Other Federal Agencies to achieve a resilient Nation with superior building performance in disasters.
FY2020 BRIC Grants Award Summary

- Building Code Activities
  - 15 selected
  - $2.2 million federal share
  - 2 in Texas
- All 400+ projects ($500 million federal share) selected under national competition came from states with statewide code mandate of either the 2015 or 2018 IBC and IRC
- Want to apply for BRIC? contact Josh Davies (TDEM) at (512) 462-6142 or TDEM-Mitigation@tdem.texas.gov

BRIC Building Code Activities

Evaluate adoption and/or implementation of codes that reduce risk that are best suited to the community

Enhance existing adopted codes to incorporate more current requirements or higher standards that increase resilience

Develop professional workforce capabilities through technical assistance and training

FEMA Grants Require Latest Codes

- DRRA 1235b requires incorporation of latest published hazard-resistant codes, standards, and specifications into Public Assistance project design and construction.
- HMA guidance requires the latest hazard-resistant codes in flood projects.
- HMA guidance requires FEMA P-361 for safe rooms, based on ICC 500, the standard for storm shelter design and construction.
- Regardless of community code adoption status.
DRRA 1206 Post-Disaster Resources

FEMA Policy FP 204-079-01 Building Code and Floodplain Management Administration and Enforcement

**Building Code Administration** (review and process building applications; collect fees; hire, train, supervise staff; etc.)

**Code Enforcement** (inspect structures; review elevation certificates; conduct and process condemnation determinations; etc.)

**Floodplain Management Regulation, Administration, and Enforcement** (hire, train, supervise extra staff; provide training; process permits; etc.)

**Substantial Damage Operations** (conduct field surveys; prepare cost information; perform inspections; etc.)

**FEMA Policy Requirements:**

- Designated area of the major disaster declaration
- Performed within 180 days after the disaster
- Relate to the repair, replacement or retrofit of disaster-damaged structures
- Funded at the permanent work cost share applicable to the event

Mutual Aid Response

- Mutual Aid teams can be funded through DRRA 1206 to assist with post-disaster building tasks
- Texas Statewide Mutual Aid System allows political subdivisions to provide mutual aid
- Texas DEM can employ and pay disaster reservists with specialized skills
- Build relationships with community Public Assistance (PA) personnel who work directly with FEMA

**Mutual Aid agreements** enable jurisdictions to share personnel and resources during emergencies. Code-related activities include building safety evaluations, post-disaster code enforcement and administration, as well as floodplain administration.
The Texas General Land Office (GLO) works to rebuild Texas communities by putting Texans back in their homes, restoring critical infrastructure and mitigating future damage through resilient community planning.

- GLO is the lead agency for administering over $14 billion in HUD Community Development Block Grant Disaster Recovery (CDBG-DR) funds
- Eligible activities include: acquisition, relocation, rehabilitation, construction of public facilities, public services, energy conservation/renewables, economic development
- Activities primarily benefit low- and moderate-income persons
- [https://recovery.texas.gov/](https://recovery.texas.gov/)
- [https://www.hud.gov/program_offices/comm_planning/cdbg](https://www.hud.gov/program_offices/comm_planning/cdbg)
What’s Next for NFIP

- Upcoming Risk Rating 2.0: Equity in Action
  - Deliver actuarially sound rates & new pricing methodology using multiple flood variables
  - [https://www.fema.gov/flood-insurance/risk-rating](https://www.fema.gov/flood-insurance/risk-rating)

- Issued FEMA RFI on FEMA Programs to further advance equity, climate change resilience, and environmental justice

- Upcoming RFI in response to ASFPM/NRDC petition to reform NFIP building performance requirements
  - Expected in September
How Do We Adopt a Code?

1. Add the code adoption item to City Council (workshop) agenda for discussion.
2. Place an item on the City Council regular agenda for adoption of each code or as a group of codes.
3. Prepare packets for the City Council meeting.
4. Present your codes or code amendment items to the City Council, answer any questions they may have and get your code or code amendment items passed.

Congratulations! You have now adopted new building codes or building codes amendments for your city!

NCTCOG Regional Codes Coordinating Committee Resources:
https://www.nctcog.org/envir/regional-building-codes

https://youtu.be/fZRmdKYDFJU
Key Takeaways; Remember to Advocate Adoption of Updated Codes

- Adopt the latest published editions of hazard-resistant building codes that provide the greatest level of hazard resilience for your community (October 2021; FEMA BCAT will move to 2018 and later editions of the I-Codes)

- Maintaining the latest codes is an ongoing process as codes continue to improve hazard resilience. Review and update codes on a regular basis, and the closer we update to the two most recent code editions (Approx. every 6 years) will increase your grant opportunities both in preferred status, i.e., BCEGS rating, including CRS rating (or lower insurance dollars)

- Adopting the latest published editions of the 2021 codes:
  - Protects people, property, and communities from natural hazards
  - Reduces disaster losses and saves money
  - Gives a competitive advantage in grant funding
Key Takeaways; What are your resources?

- Continue to monitor FEMA’s BCAT Portal, Partner code tracking websites; including the NTC-cog Portals and surveys to demonstrate to your community and neighboring communities to consider adopting the 2018 I-Codes as a minimum standard.

- Work on improving your communities BCEGS rating which in turn improves your communities CRS rating, which in turn saves your residents with lower insurance premiums.

- Contact Region VI, Texas Department of Emergency Management, or the Texas General Land Office and apply for Building Code funding through the Disaster Recovery Reform Act of 2018, specifically “Building Resilient Infrastructure and Communities” BRIC, both in Disaster related or Non-Disaster related building code funding opportunities.
Available Tools and Emerging Policies

- www.Inspect2Protect.org
- DRRA 1206 authorizes FEMA to provide SLTTs with resources to administer and enforce adopted building codes and floodplain ordinances
- DRRA 1234 authorizes capability and capacity building activities as allocation/set-aside
- BRIC competitive program rewards states with statewide code mandate of either the 2015 or 2018 IBC and IRC, soon to be 2018 to 2021 I-Codes
- HMA and PA Grants (DRRA 1235b) require adherence to latest codes for flood projects
Additional Resources

- https://www.nctcog.org/home
- https://www.fema.gov/about/organization/region-6
- https://www.fema.gov/grants
- https://www.iccsafe.org/texas/
- https://agrilife.org/resilienttexas/

Sign up for FEMA email updates: https://public.govdelivery.com/accounts/USDHSFEMA/subscriber/new
Questions?

Helping people before, during, and after disasters.