

Higher Building Standards Building Code and Freeboard

Region VI Risk Analysis – Virtual Brown Bag
February 28, 2023



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Compliance Audits and Technical Assistance Build Community Resilience

Structures built to meet or exceed NFIP minimum floodplain management standards

INCUR > **65%** LESS FLOOD DAMAGE ON AVERAGE

Flood Damage



SAVING THE NATION
\$2.4 BILLION
in avoided flood losses each year &

\$100 BILLION
over the last 40 years

NFIP COMPLIANCE SAVES

The local adoption and enforcement of land use and development standards that reduce flood losses, protects:



Individuals, their homes, and livelihoods



Communities, their tax base, local economy, and livability



Publicly-owned buildings, infrastructure, and services



The nation and taxpayers, via reduced financial exposure of the Disaster Relief Fund and the National Flood Insurance Fund



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Building Codes Save: A Nationwide Study

How much is the adoption hazard-resistant codes saving the nation?



*Average annualized savings as of 2018

Key Highlights

- First time engineering-based parcel analysis using Big Data (18.1 million post-2000 structures)
- Hazards: flood, hurricane wind, seismic
- Hazard risk and code adoption varies
- \$32 Billion saved over 20 years
- \$132 Billion in savings possible by 2040
- Building and Contents damages only, just the tip of the iceberg!



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Reducing Flood Losses Through the I-Codes, 5th Edition (RFL)

- Goal: Integrate I-Codes into current floodplain management regulatory processes
- Audience: floodplain management and building officials at all levels of government
- Based on 2018 I-Codes and ASCE 24-14
- International Code Council in coordination with FEMA



Reducing Flood Losses Through the International Codes[®]

Coordinating Building Codes and Floodplain Management Regulations

5th Edition, October 2019



in cooperation with



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RFL: Overview

Chapter 2

Describes approaches for coordinating I-Codes and local floodplain management regulations

Chapter 3

Explains differences between the NFIP regulations and I-Code/ASCE 24 flood provisions

Chapter 4

Poses questions that will help guide modifying floodplain regulations to coordinate with the codes

Chapter 5

Illustrates how to modify the codes to incorporate higher standards for buildings

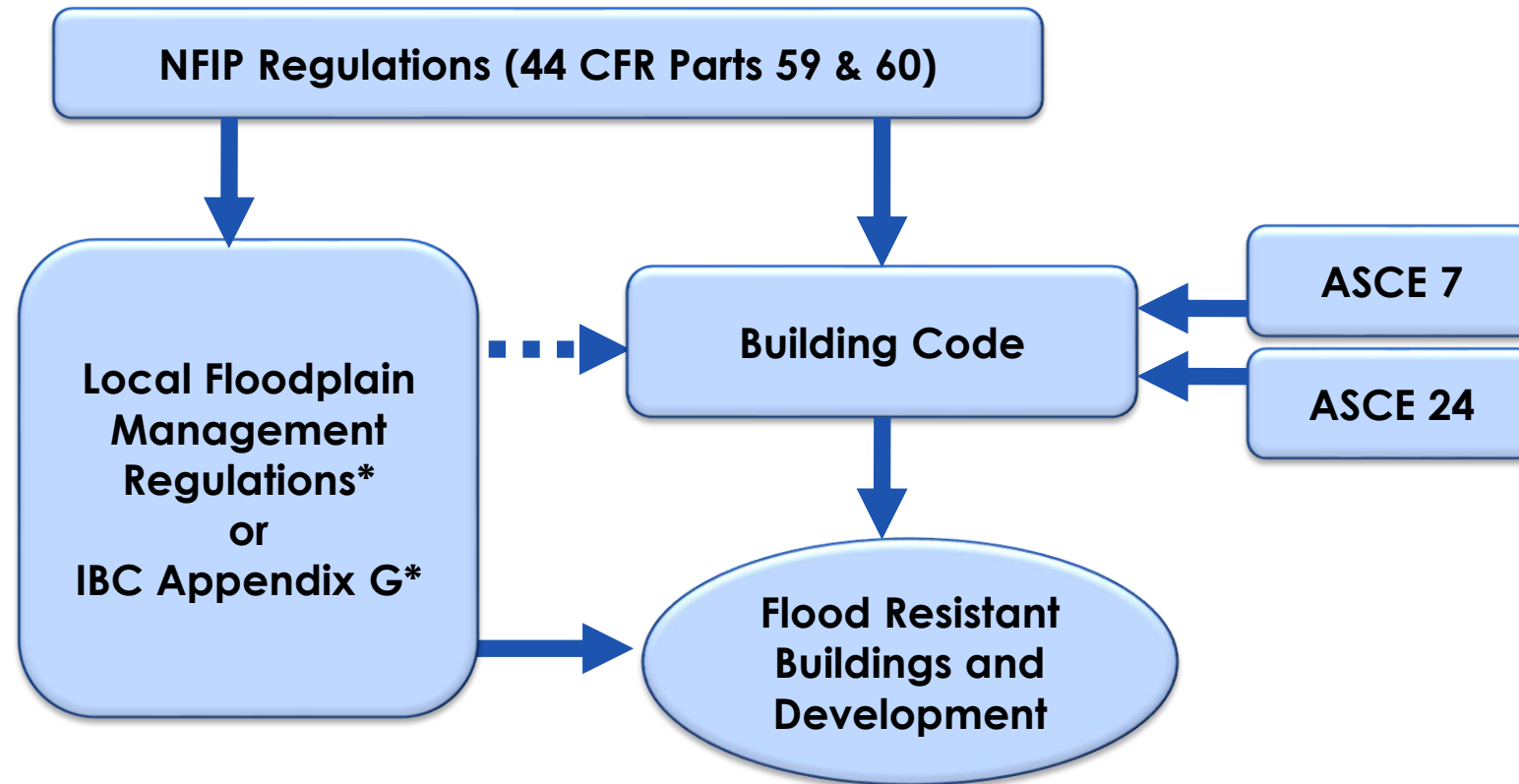
Chapter 6

Introduces model code-coordinated ordinances that are the basis for state or community tailoring



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Relationship Between I-Codes and NFIP



* 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).



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Buildings/Structures & Development

Building codes govern buildings and structures

- **Building:** any structure used or intended for supporting or sheltering any use or occupancy
- **Structure:** that which is built or constructed

NFIP communities regulate development

- **Development:** any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.



Relationship Between I-Codes and NFIP

- Flood provisions of the 2012 and later I-Codes **generally meet or exceed** the NFIP requirements for buildings and structures in flood hazard areas.
- FEMA supports **the latest published editions (2018, 2021)** of the I-Codes as a **minimum standard** for hazard resistance (flood, wind, earthquake, snow)
- The I-Codes are **continually updated** based on best practices and post-disaster investigations
- NFIP requirements for buildings and structures have remained **largely unchanged since 1971**



NFIP and Flood Provisions of the I-Codes: Key Differences



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Why are there differences between the NFIP and I-Codes/ASCE 24?

- **The NFIP regulations (44 CFR Part 60) are:**
 - Controlled by the federal government rulemaking process
 - Do not contain detailed specifications to achieve performance
 - Infrequently revised and largely unchanged since 1971
- **The I-Codes are developed through a public consensus process that considers proposals for changes every three years**
 - The I-Codes contain more detail on how to meet performance expectations
 - The consensus process is designed to allow change based on increases in knowledge
 - FEMA has been engaged in development of the flood provisions since the first I-Codes published in 2000



Why are there differences between the NFIP and I-Codes/ASCE 24?

- The American Society of Civil Engineers also uses a consensus process
 - FEMA has been engaged in development of ASCE 7 and ASCE 24 since the mid-1990s
- Flood requirements in the I-Codes and ASCE 24 that are more restrictive than the NFIP (also called “higher standards”) were proposed by FEMA based on post-disaster investigations of building performance
- The higher standards were accepted through the consensus process
- Many flood provisions are written with more detail than the NFIP, which improves enforcement and compliance





QUICK REFERENCE GUIDE Comparison of Select NFIP and 2018 I-Code Requirements for Special Flood Hazard Areas

Using this Quick Reference Guide

Flood Zone Map	Page 2
NFIP and 2018 IRC (residential)	Page 3 (Zone A & CAZ) and Page 4 (Zone V)
NFIP and 2018 IBC and ASCE 24-14 (non-residential)	Page 5-6 (Zone A & CAZ) and Page 7-8 (Zone V)
Existing Buildings	Page 8



DID YOU KNOW?

The NFIP refers to the Base Flood Elevation (BFE) for lowest floor elevation and other requirements, while the I-Codes and ASCE 24 refer to the BFE or Design Flood Elevation (DFE). The DFE is always the BFE or higher.

Additional height above the BFE is known as “freeboard.”

The IBC/ASCE 24 limits construction in high risk flood hazard areas, including alluvial fan, flash flood, mudslide, erosion-prone, high velocity flow, ice jam, and debris areas.

Communities that participate in the National Flood Insurance Program (NFIP) adopt and enforce floodplain management regulations and codes that govern development in Special Flood Hazard Areas.

The International Residential Code® (IRC) and International Building Code® (IBC), by reference to ASCE 24, *Flood Resistant Design and Construction*, a design standard developed by the American Society of Civil Engineers (ASCE), include requirements that govern the design and construction of buildings and structures in flood hazard areas.

FEMA has determined that the flood provisions in the 2018 edition of the International Codes® (I-Codes) meet or exceed the minimum NFIP requirements (44 CFR §60.3). In some respects, the IRC and IBC/ASCE 24 expand on NFIP requirements with more specificity, additional requirements, and some limitations not found in NFIP regulations.

This Quick Reference Guide illustrates some of the key similarities and differences between the requirements of the NFIP and the requirements in the 2018 I-Codes and ASCE 24-14 for dwellings and buildings assigned Flood Design Class 2 in the IBC/ASCE 24. The similarities and differences shown in this guide are in foundation types, lowest floor elevations, enclosures below elevated buildings, and attendant utilities and equipment.

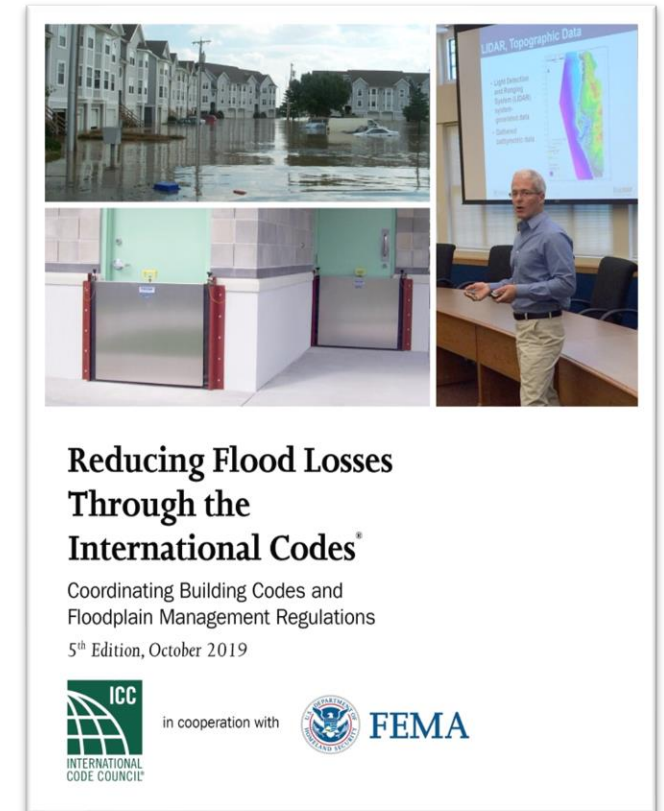
Comparison Guides

- Quick Reference Guide illustrates similarities and highlights differences between NFIP and I-Code requirements
- Additional resources summarizing the “higher standards” and more specific provisions of the I-Codes
- <https://www.fema.gov/emergency-managers/risk-management/building-science/building-codes/flood>



Differences Between NFIP and I-Codes

- RFL Chapter 3 summarizes differences between NFIP requirements and flood provisions of the I-Codes.
- Provisions not described are essentially equivalent.
- Chapter 3 is organized by category
 - Scope and Administration
 - Definitions
 - Planning, Location, and Site Development
 - Building Design
 - Existing Buildings/Structures



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Louisiana State Uniform Construction Code Council (LSUCCC), Technical Codes Study and Advisory Committee



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Bottom Line Upfront (BLUF)

- The Louisiana State Uniform Construction Code Council (LSUCCC) voted 11-3 in favor of adopting 2021 I-Codes WITHOUT weakening flood provisions on September 21, 2022.
- LSUCCC underwent rigorous debate to reach this vote including the breakout of a Freeboard Task Force.
- The Flood Provisions were recommended for adoption with an implementation date of August 1, 2023 to allow time for the legislature to meet.
- It is expected that the flood provisions will be evaluated during the legislature session.
- State and federal representatives may be asked to speak during the legislative session.



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Flood Risk in Louisiana

100-Year Flood Inundation Area in Louisiana

Source: 2019 Louisiana State Hazard Mitigation Plan
<http://gohsep.la.gov/Portals/0/Documents/Mitigate/HMPlan/2019HM-plan-final.pdf>

Louisiana has a mostly flat terrain with an abundance of waterbodies, including 900 named bayous, 110 named rivers and 242 named lakes. The state is also prone to heavy rainfall. FEMA has designated 26,826 square miles of Louisiana as Special Flood Hazard Areas, which translates to 51 percent of the state. What's more, flood risk appears to be changing, as even areas outside of floodplains are now being inundated.

Source: FAQ - Louisiana Watershed Initiative (la.gov)

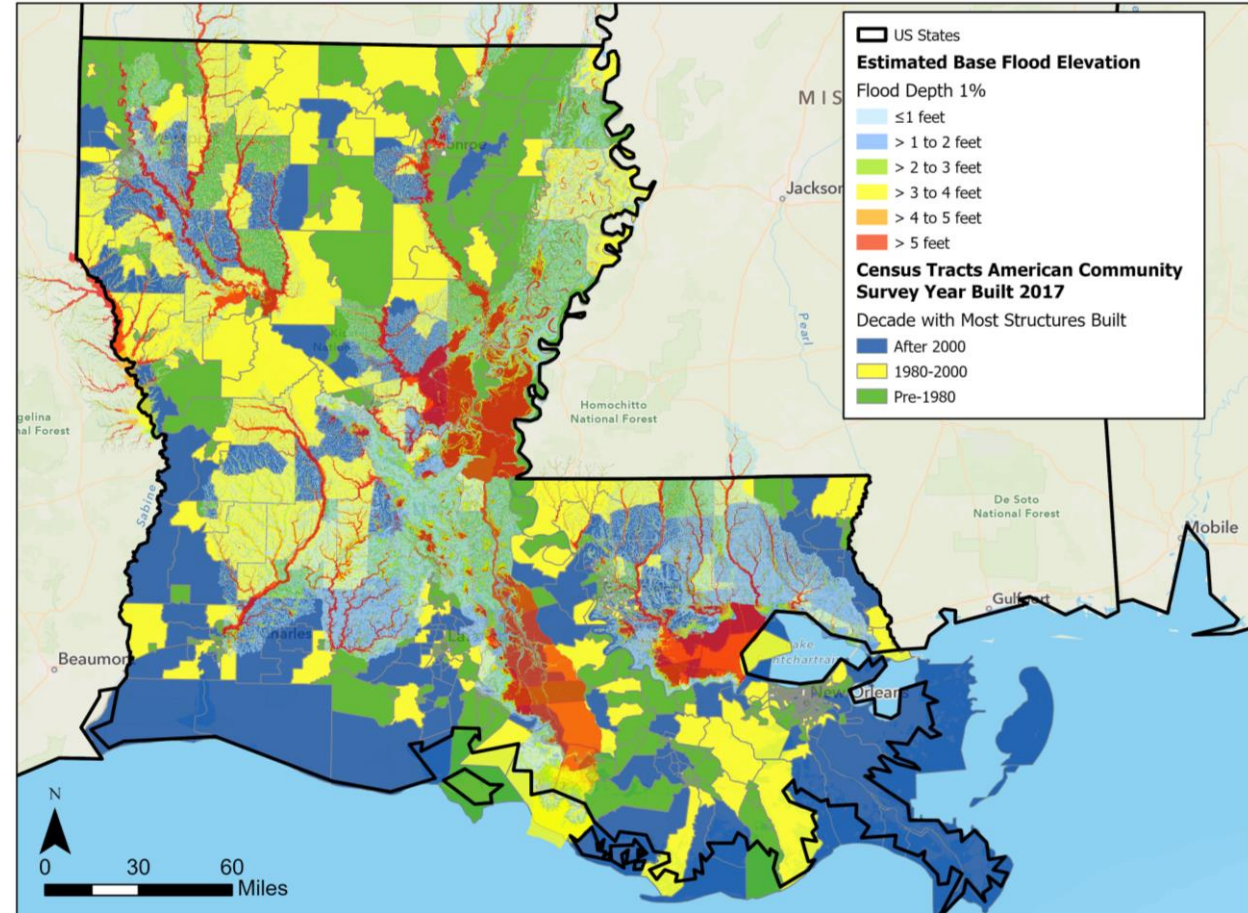
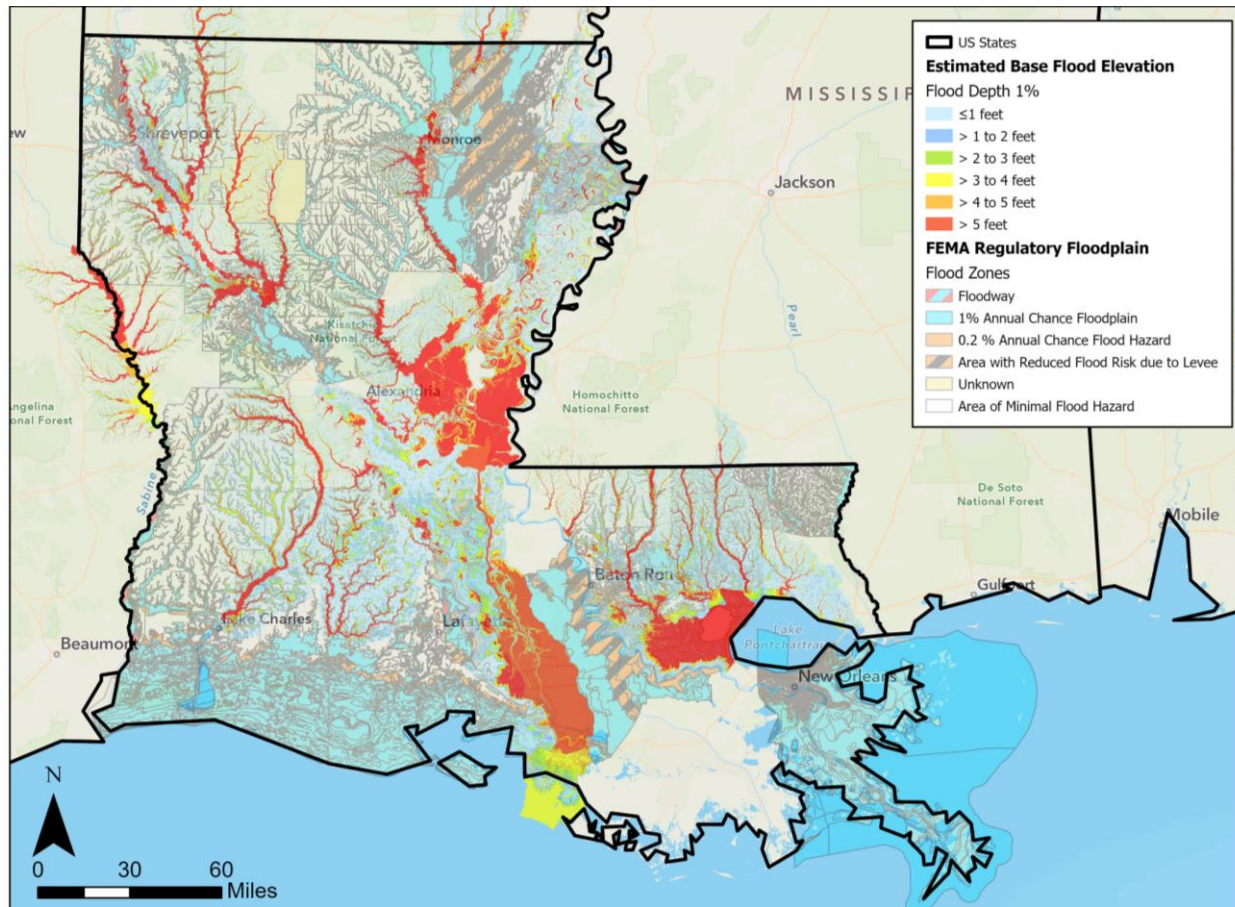


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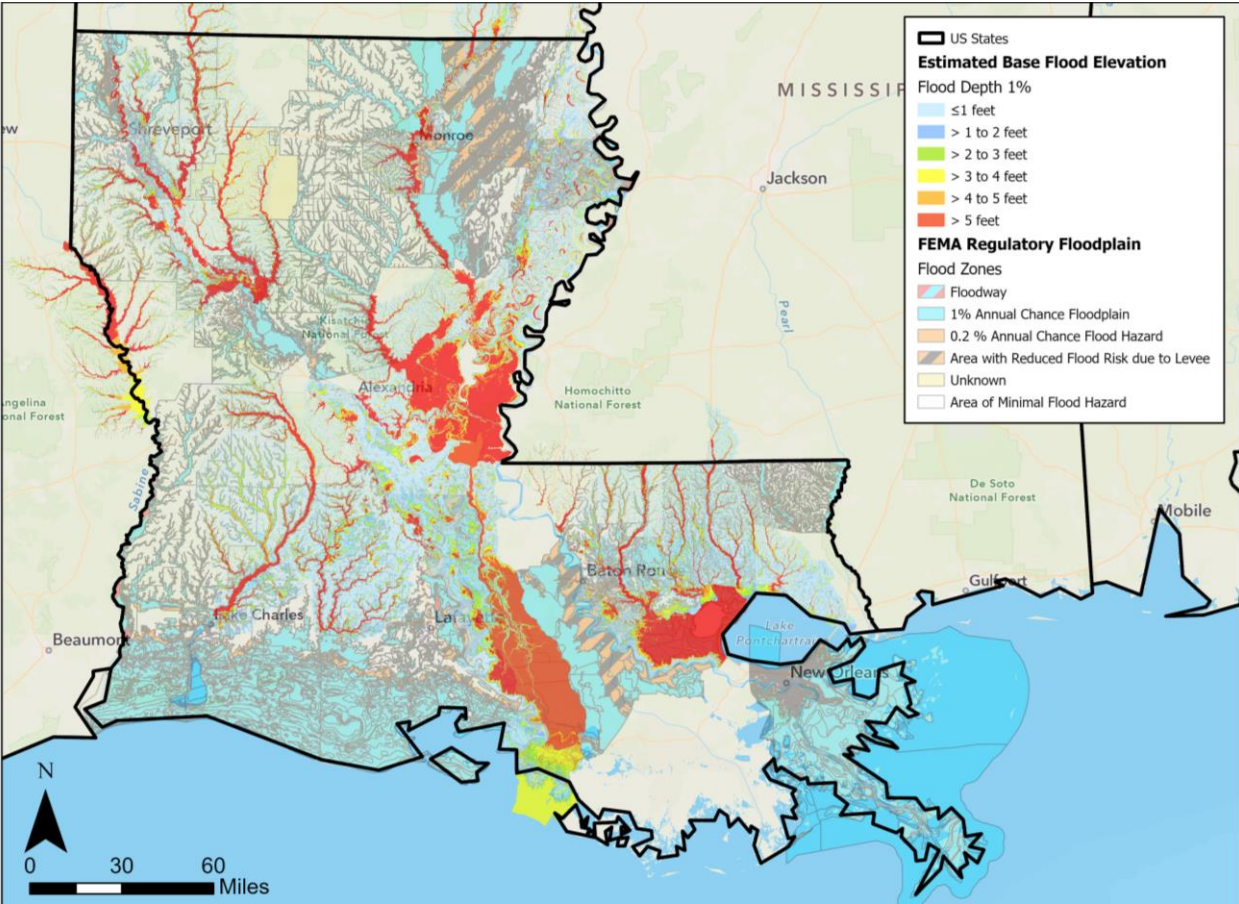
Data Source: Jurisdictional Hazard Mitigation Plans, Various Dates, <https://msc.fema.gov/portal>, 03/19/2018.

Continue to build...and in many cases in flood prone areas



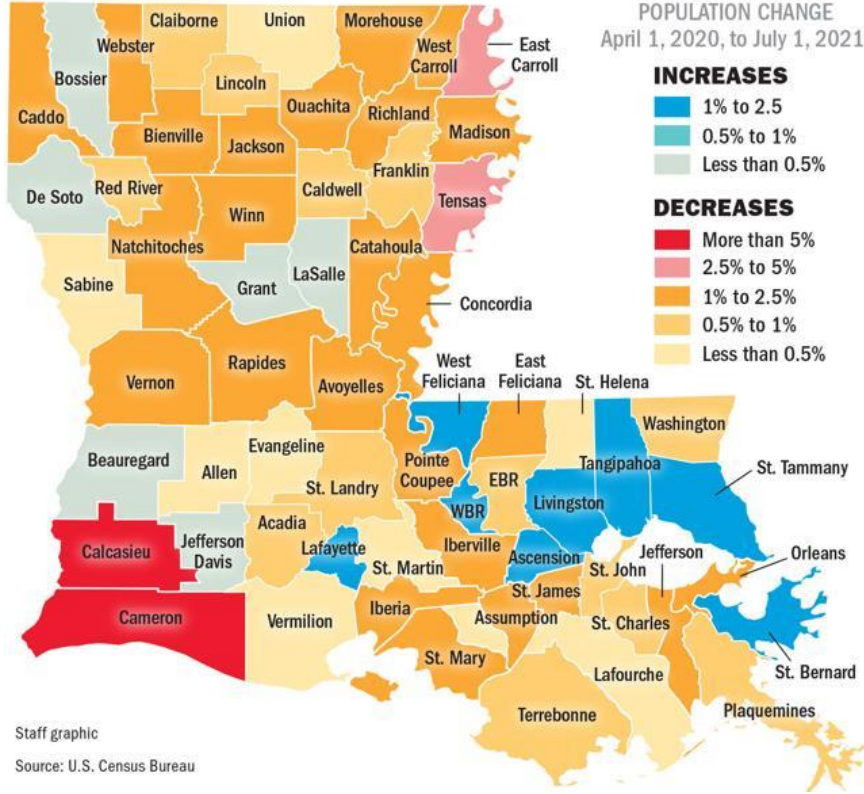
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Population changes...



Population changes across Louisiana

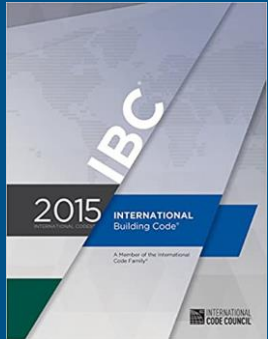
New census estimates show declining population in many parishes across the state, including the first estimates of the dramatic displacement in Calcasieu and Cameron parishes following Hurricane Laura.



https://www.nola.com/news/politics/article_fc5ff816-aba5-11ec-b605-234640609e50.html



Current/Past Louisiana I-Codes – Flood Resilience Weakenings



2015 IBC Sec. 1612.4 [Flood loads] Design and Construction.

The Design and construction of buildings and structures located in *flood hazard areas*, including *coastal high hazard areas* and *coastal A zones*, shall be in accordance with Chapter 5 of ASCE 7 ~~and ASCE 24~~.



2015 IRC R322.2.1 [Flood-resistant construction] Elevation Requirements (partial shown)

1. Buildings and structures in flood hazard areas, including flood hazard areas designated as Coastal A Zones, shall have the lowest floors elevated to or above the base flood elevation plus 1 foot (305 mm), or the design flood elevation, whichever is higher.
2. In areas of shallow flooding (AO Zones), buildings and structures shall have the lowest floor (including basement) elevated to a height above of not less than the highest adjacent grade of not less than the depth number specified in feet (mm) on the FIRM plus 1 foot (305 mm), or not less than 32 feet (915 mm) if a depth number is not specified.

2015 IRC R322.3.2 [Flood-resistant construction] Elevation Requirements (partial shown)

1. Buildings and structures erected within coastal high-hazard areas and Coastal A Zones, shall be elevated so that the bottom of the lowest horizontal structural members supporting the lowest floor, with the exception of piling, pile caps, columns, grade beams and bracing, is elevated to or above the base flood elevation plus 1 foot (305 mm) or the design flood elevation, whichever is higher.



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LSUCCC Freeboard Timeline

- October 2021
 - Building code process began
 - Team began monitoring for potential revisions and weakening of flood provisions
- March 2022
 - FEMA / Ida Building Science Task Order kick-off
- April – June 2022 LSUCCC Meetings
 - Two LSUCCC Meetings where Freeboard was the primary focus
 - LSUCCC established a Freeboard Task Force to recommend three freeboard alternatives.



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LSUCCC Freeboard Timeline

- July – August 2022 Freeboard Task Force Meetings
 - Two Freeboard Task Force meetings
 - FEMA presented technical basis for Freeboard as well as Memo addressing technical questions raised by participants
 - Task Force recommendations included – 1-foot freeboard; No freeboard; 2-foot of freeboard.
 - Informal vote showed the majority in favor of freeboard
- September 21, 2022 LSUCCC Meeting
 - Significant opposition to the Freeboard Task Force recommendations were expressed– Parish Presidents, Building Officials, Legislature
 - No new technical info was presented. Focus of opposition mainly on local authority
 - Vote was 11-3 in favor of adopting freeboard



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Key Entities – Supporting Statewide Freeboard

- LSU Agriculture Center - Metrics driven data provided to support freeboard
- Smart Home America
- Historic Preservation – Proven success elevating historical structures.
- Governor’s Office of Homeland Security and Emergency Preparedness (GOHSEP)
- Governor’s Office of Coastal Activities – Provided Governor’s written support for a more resilient Louisiana.
- Louisiana Watershed Initiative
- Capital Region Planning Commission – Support for the disadvantaged population.
- Department of Transportation and Development (DOTD) Floodplain Management
- Local Floodplain Managers (select individuals)
- Flood Mitigation Industry Association
- Housing Louisiana
- Rapides Area Planning Commission



Issues of Concern during LSUCCC and Task Force Meetings

- Legal Opinion – Can LSUCCC adopt freeboard and allow higher standards at local level?
- Impacts - Where is Freeboard already adopted in Louisiana at municipal levels?
- Local Control - Should this decision be left to the local decision-makers?
- FEMA - Why is FEMA not making this decision at national level?
- Risk Rating 2.0 (RR 2.0) - Will freeboard result in discounts to insurance premiums through RR 2.0?
- Fill - Will this decision result in more fill that negatively impacts flooding?
- Floodplain Managers (FPMs) and Building Officials - Will this decision create discrepancy over authority of FPMs over Building Code components? How will Buildings Officials and FPMs collaborate?



Response to Issues of Concern

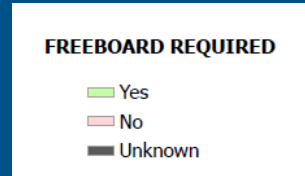
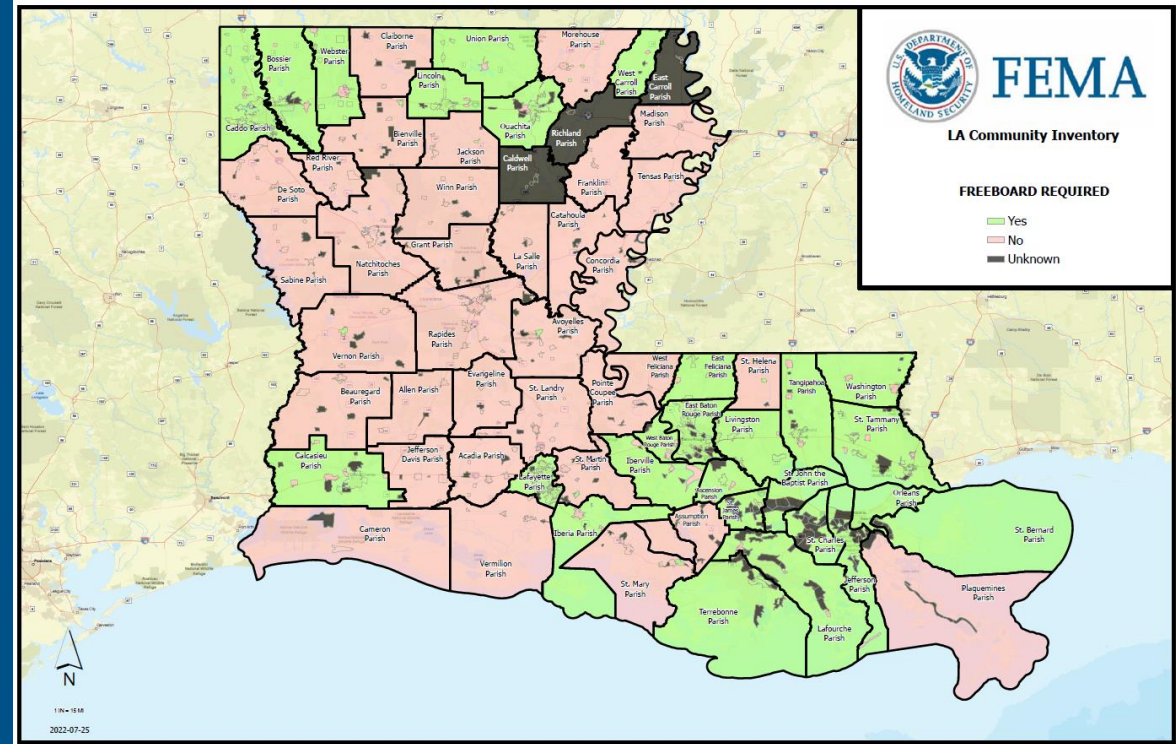
- Legal Opinion – Can LSUCCC adopt freeboard and allow higher standards at local level?
 - The state consulted with legal counsel and provided an opinion that the statewide building code language for freeboard could be drafted in a way that would allow local communities to adopt a higher standard for freeboard without conflicting with the statewide building code.



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Response to Issues of Concern

- Impacts – Where is Freeboard already adopted in Louisiana at municipal levels?
 - Approximately 70% of the population of Louisiana is estimated to be in an area with adopted freeboard



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Response to Issues of Concern

- Local Control – Should this decision be left to the local decision-makers?
 - The entire state has experienced significant flood damages in the past decade and would benefit from a higher freeboard standard.
 - During the LSUCCC meetings, many expressed the need for the state to establish the freeboard standard to overcome local political pressures.
 - Many of the communities without freeboard are in rural areas of the state and may not have the local staff or expertise to drive forward a technical consideration of freeboard adoption at the local levels.



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Response to Issues of Concern

- FEMA – Why is FEMA not making this decision at a national level?
 - FEMA is currently updating the NFIP minimum standards for development. It is following a public regulatory and rulemaking process which requires receiving the public's input.
 - FEMA issued this Request for Information to receive the public's input on revising the NFIP floodplain management standards for land management and use regulations to better align with the current understanding of flood risk and flood risk reduction approaches.
 - Specifically, FEMA is seeking input from the public on the floodplain management standards that communities should adopt to result in safer, stronger, and more resilient communities.



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Response to Issues of Concern

- Risk Rating 2.0 (RR 2.0) – Will freeboard result in discounts to insurance premiums through RR 2.0?
 - The concern expressed during LSUCCC meetings was the perceived lack of discounts in insurance premiums under RR 2.0 for structures elevated to meet freeboard requirements.
 - The first-floor height is a rating variable for the RR 2.0 insurance premiums. The Discount Explanation Guide was provided to the LSUCCC (https://www.fema.gov/sites/default/files/documents/fema_discount-Explanation-Guide.pdf)
 - Gilbert Giron (FEMA Region 6) provided a presentation to the LSUCCC Freeboard Task Force regarding RR2.0.



Response to Issues of Concern

- Fill – Will this decision result in more fill that negatively impacts flooding?
 - Fill is a possible method to meet freeboard requirements. The loss of flood storage as a result of fill is a potentially negative impact.
 - The negative impact varies depending on the flooding type and conditions.
 - Communities have adopted higher standards to limit fill in areas where flood storage is a major concern.



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Response to Issues of Concern

- FPMs and Building Officials – Will this decision create discrepancy over authority of FPMs over Building Code components?
 - How will Buildings Officials and FPMs collaborate?
 - Additional training is recommended to clarify the roles of the building officials and floodplain managers as well as how they can collaborate in these roles.



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2023 Louisiana Legislative Session

- 2023 will be a Regular Session and is typically focused on fiscal topics.
 - Session begins April 10, 2023
 - Session ends June 8, 2023
- Issues and concerns



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Contact your NFIP State Coordinator or FEMA Regional Office

For questions on published guidance, contact:
FEMA-BuildingScienceHelp@fema.dhs.gov



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Potential Poll Question

- What would the biggest barrier to implementing Higher Standards be locally in your opinion?
 - A.) Local Control
 - B.) Is your code a min/max?
 - C.) Fill concerns
- D.) Political



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