Flooding in Connecticut

Through the Lens of Land Use & Zoning

A WestCOG Webinar Event

Thursday October 2, 2025

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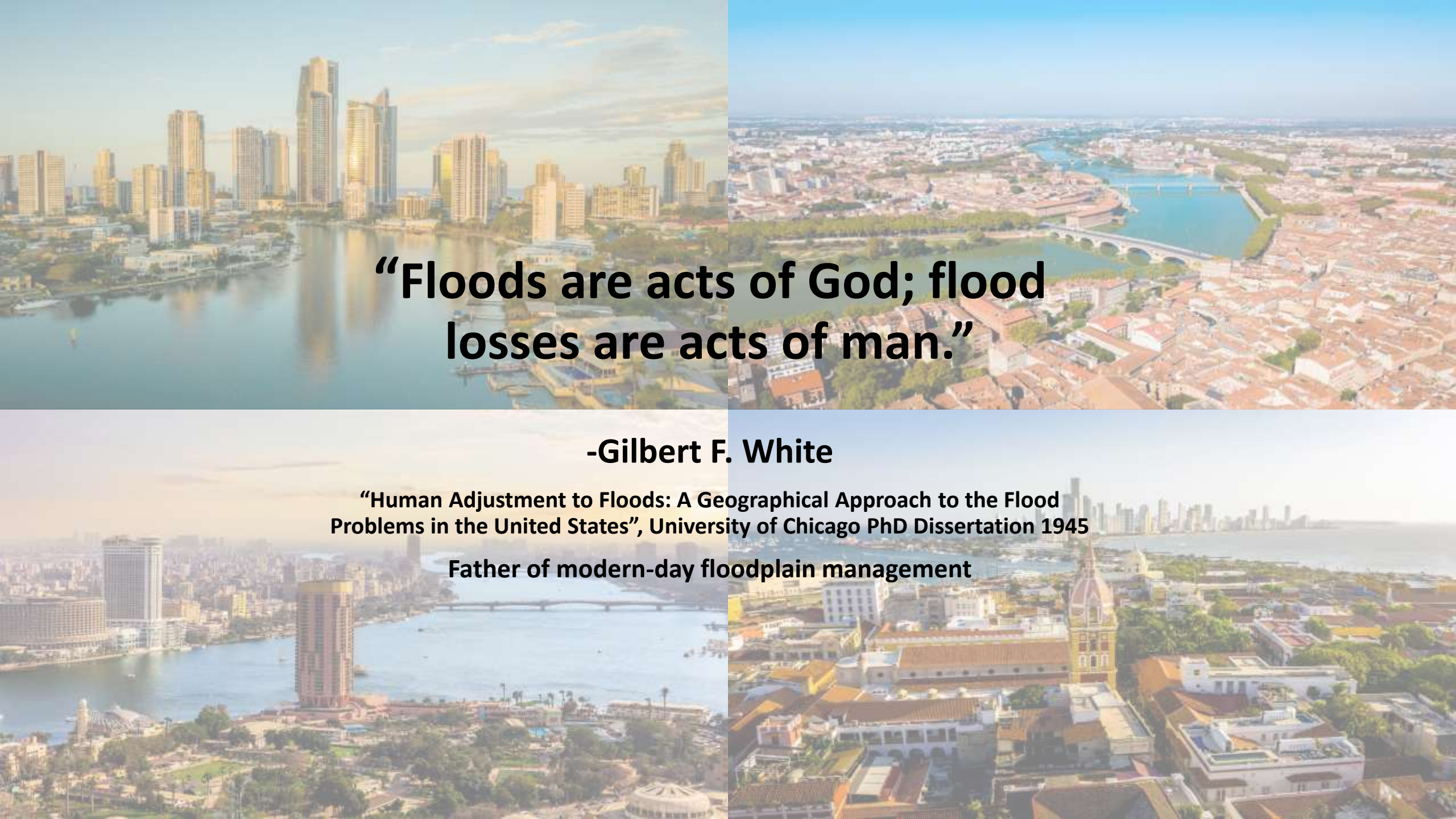
Sustainability & Resiliency Week



“Floods are acts of God; flood losses are acts of man.”

-Gilbert F. White

“Human Adjustment to Floods: A Geographical Approach to the Flood Problems in the United States”, University of Chicago PhD Dissertation 1945

Father of modern-day floodplain management

Overview

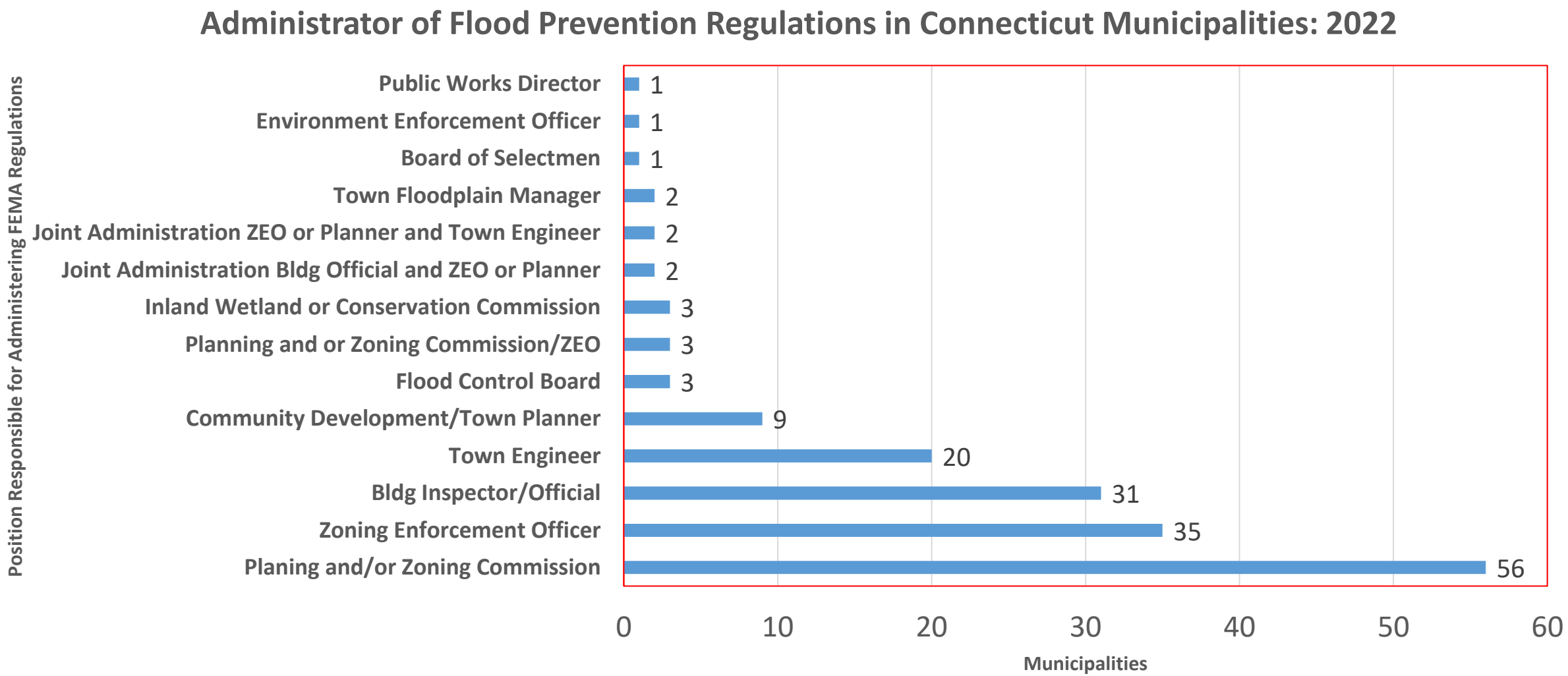
1. Problem Statement
2. Administration of Floodplain Regulations
3. Status of Flood Insurance Studies & Rate Maps
4. Lack of Compensatory Storage Regulations
5. Local vs. Regional Perspective
6. Establishing the Base Flood Elevation & Building Code Considerations
7. Why the Building Code Standard is Not Enough
8. Outdated FEMA Rules – Parts 1 & 2
9. Buildable Lot, Pervious Cover Concepts & Floodplain Management
10. Conclusions

Problem Statement

The 100-year flood is a statistical construct based on data that no longer hold. In a world of wetter storms and rising sea levels, the so-called “100-year flood” gives an inaccurate – and dangerous – impression of the frequency and magnitude of flooding events.

According to a recent Northeast study, the 100-year flood now occurs on a 60-year recurrence interval.

Varied Administration of Floodplain Standards



Why do we need more CFMs?

- CFM = Certified Floodplain Manager = A professional who obtained certification through ASFPM and is responsible for administering and implementing federal, state, and local regulations related to floodplain management
- A key takeaway from the Flood Prevention Regulation Administrators: over 50% are P&Z municipal staff, **only 2 are Floodplain Managers**
- 37 CFMs in CT

What does it take to become a CFM?

- Pass the CFM exam through ASFPM
- Continuing education credits every two years

Status of Flood Insurance Studies in CT

- 83% of flood insurance studies (FIS) are out of date as of 2025.
- FEMA policy calls for five-year updates to FIS
- Reasons for FIS Obsolescence
  - Climate change
  - Impervious land cover change
  - Lack of riparian corridor protections

Year of Flood Insurance Study	Municipalities
None	5
Pre 1980	3
1980 to 1989	28
1990 to 1999	9
2000 to 2009	2
2010 to 2015	38
2016 to 2020	56
2021 to 2025	28
Total	169

Source: WestCOG Staff & FEMA Flood Map Service Center, September 2025

Status of Flood Insurance Rate Maps in CT

- 93% of flood insurance rate maps are also out of date as of 2025.
- FEMA policy calls for five-year updates to FIS – the basis for FIRM maps.
  - **Public not apprised of real flood risks.**
- Reasons for FIRM Obsolescence
  - Lack of regular updates to FIS
  - FEMA funding priorities

Year of Flood Insurance Rate Maps	Number of FIRM in Connecticut
None	0
Pre 1980	25
1980 to 1989	411
1990 to 1999	32
2000 to 2009	534
2010 to 2015	930
2016 to 2020	135
2021 to 2025	162
Total	2,229

Source: WestCOG Staff & FEMA Flood Map Service Center, September 2025

Outdated FIS: What are the Implications?

- Inaccurate insurance rates
- Development in areas now in the floodplain that weren't at the time of the study
- Lack of understanding of present-day vulnerabilities (i.e. Critical Infrastructure)
- Grant Eligibility – changes to the floodplain occur overtime, resulting in changes to the BFE

Lack of Compensatory Storage Regulations

Need to Update pre 2004 Floodplain regulations to address compensatory storage requirements

	Do Municipal Regulations Address Compensatory Storage		
Year of FIS	No	Yes	Total
None	3	2	5
Pre 2004	36	4	40
2004 to 2025	15	109	124
Total	54	115	169
Percent Distribution			
Year of FIS	No	Yes	Total
None	60.0%	40.0%	100.0%
Pre 2004	90.0%	10.0%	100.0%
2004 to 2025	12.0%	88.0%	100.0%
Total	32.0%	68.0%	100.0%

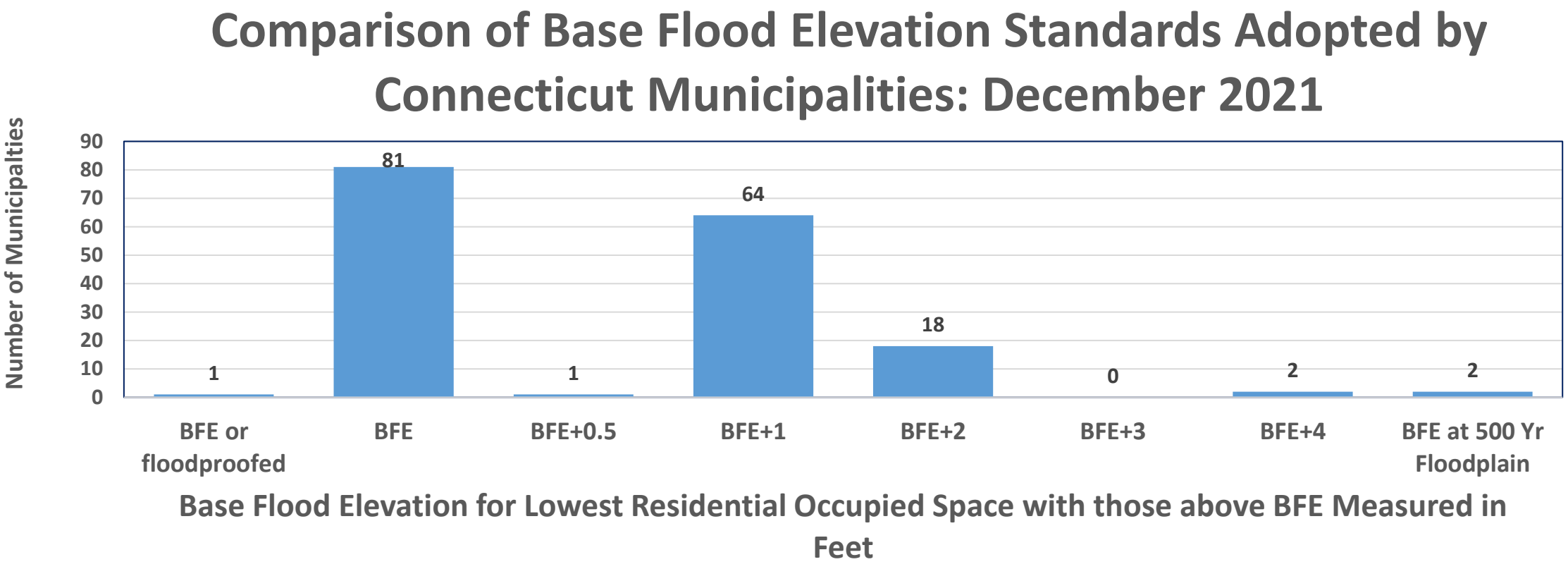
Source: Municipal Flood Prevention Ordinances & FEMA Flood Map Service Center, September 2025

Plan Upstream, Protect Downstream


Source: ctpublic.org

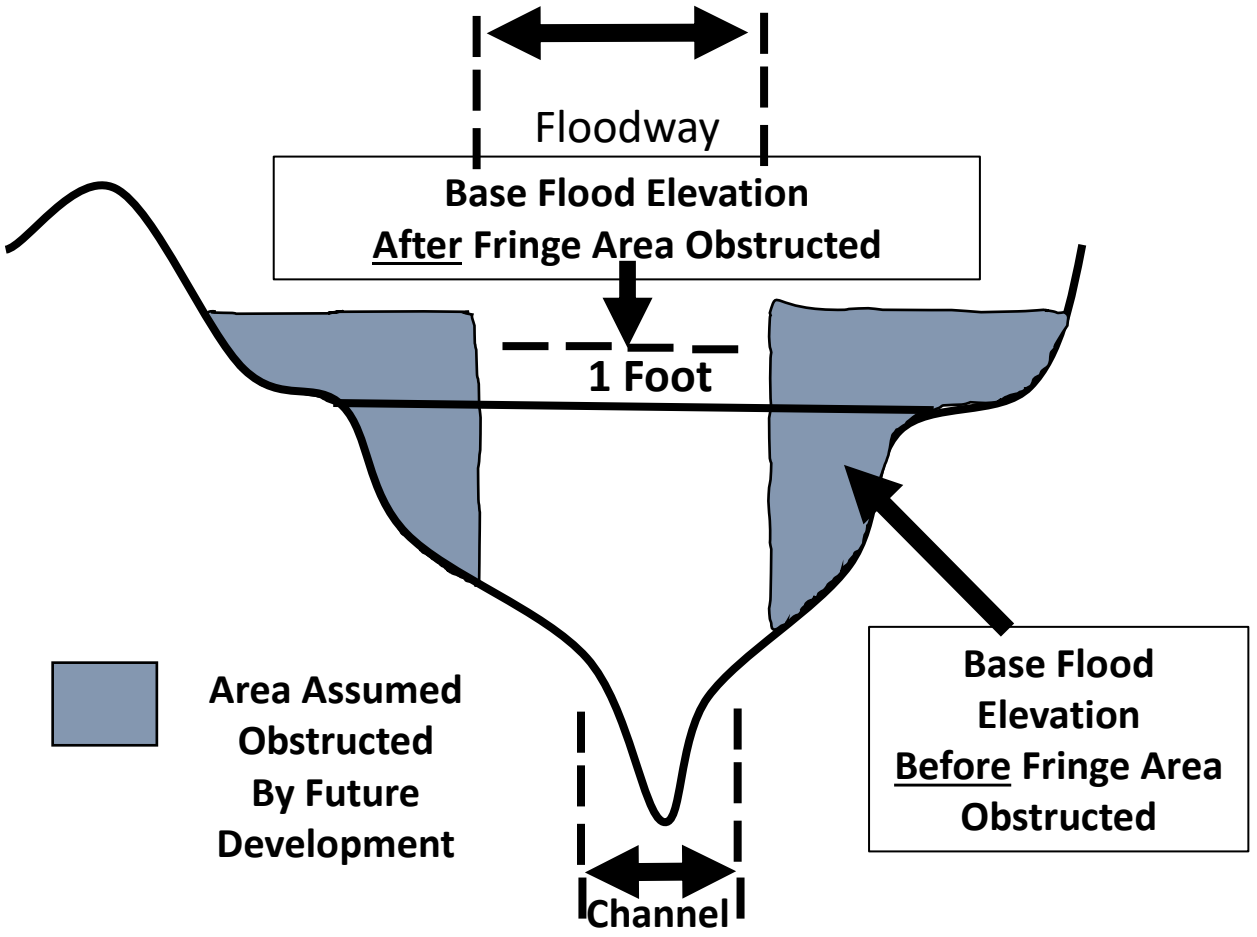
- Local planning is good, regional planning is better
- Lack of flood control in Northern Town can greatly impact its Southern Neighbor
- How can we improve regional collaboration?
  - Regional staff (i.e. COG) could review FIS and floodplain regulations for municipalities to ensure consistency across the board

49% of Connecticut's municipalities allow buildings in floodplain at level reached by "100-year storm"



State Building Code is Stricter than 49% of State's Zoning Regulations

- Precautionary principle drives towns to set base flood elevation above FEMA minimum.
- CT adopted 2015 International Residential Code (effective 1, 2018).
  - Requires new residential construction elevated at least one foot above base flood elevation.



Yet the Building Code BFE +1 is not Enough

- Factors that Make BFE+1 Less than Optimal
  - Lack of adequate enforcement of Compensatory Storage
  - Lack of Riparian Corridor Protections
  - Increased impervious land cover over last 50 years
  - Outdated Flood Insurance Rate Maps
  - Failure to Address Critical Infrastructure as a special need
  - Dependence on flood insurance in lieu of land use controls

What minimum elevation does the State require for FEMA-funded home elevations?

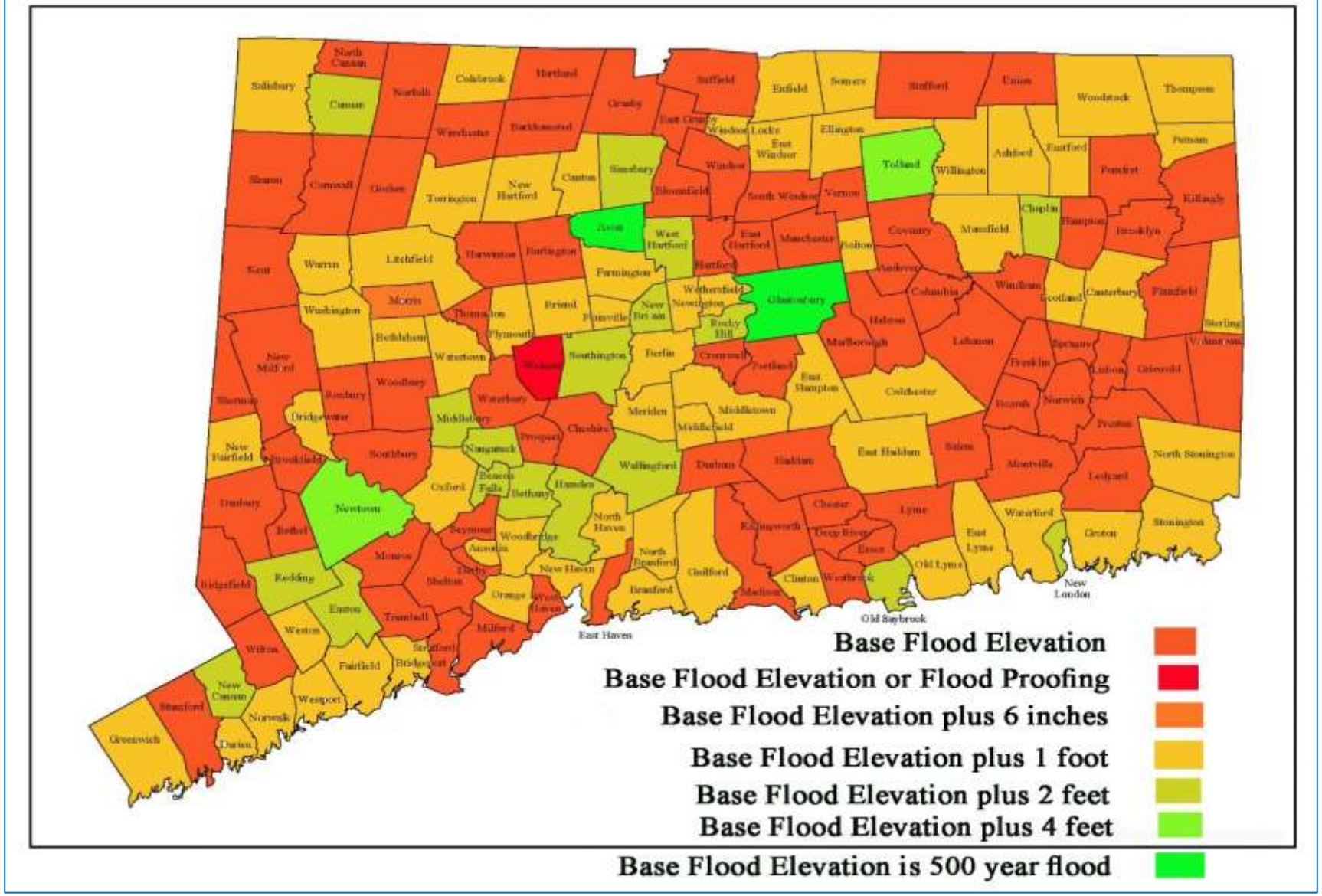
- **500-year elevation + 2 feet**
- Coastal: 500-yr elevation (according to FEMA fact sheets) = 100-yr (BFE) elevation x 1.25 feet
- Most coastal communities have BFE of 10-17’
  - This indicates *most* coastal home elevations must raise at least 4-6 feet above BFE

Freeboard: Benefits vs Costs

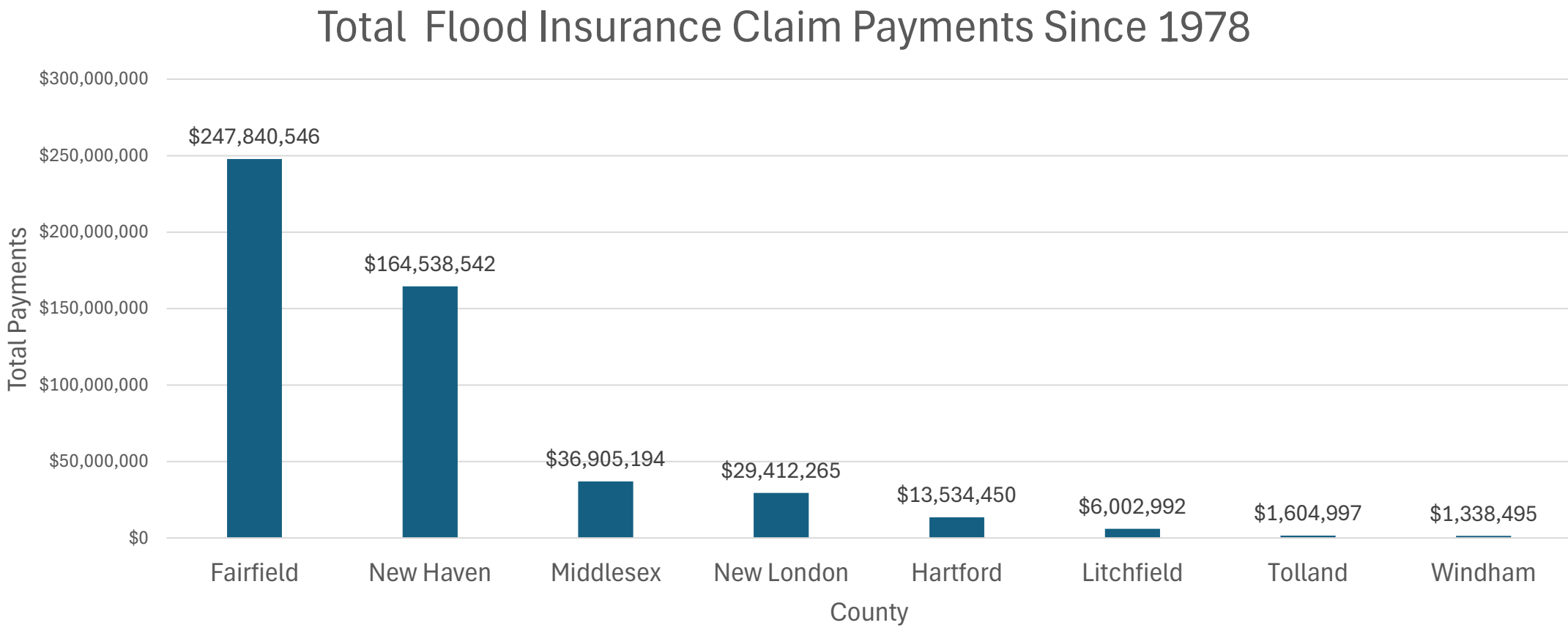
Flood Zone	Freeboard (ft)	Cost of Freeboard (% increase)	Average Premium Savings as a Percent of Total Cost of Construction	Average Payback Period for Additional Cost of Freeboard (years)
V Zone	BFE + 1	0.4–1.8	0.45	2.0
	BFE + 2	0.8–3.6	0.87	2.5
	BFE + 3	1.3–5.4	1.09	2.7
	BFE + 4	1.7–7.2	1.19	3.1
Coastal A Zone	BFE + 1	0.5–3.9	0.18	4.4
	BFE + 2	0.7–4.8	0.24	6.0
	BFE + 3	1.1–6.1	0.26	7.9
	BFE + 4	1.4–8.1	0.25	9.6
A Zone	BFE + 1	0.2–2.3	0.20	3.3
	BFE + 2	0.3–4.5	0.26	4.6
	BFE + 3	0.7–6.8	0.28	6.4
	BFE + 4	0.9–9.1	0.27	8.2

Freeboard	BFE	BFE + 1	BFE + 2	BFE + 3	BFE + 4
Construction Cost					
Flood Insurance Premium Savings	0	$	$$	$$$	$$$
Risk Level					

Coastal Municipalities Lead with Climate Change



Flood Losses are not Trivial



Outdated FEMA Rules Create Water Pollution Part 1

- **FEMA's "So-Called" Model Language state:**
  - "New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of floodwaters into the systems and discharges from the system into floodwaters"
- **FEMA Model Language fails to address:**
  - Failing septic systems in 100-year floodplain
  - Higher water table on septic system functioning
    - "Leach fields are rendered inoperable if surrounding soil becomes saturated" - FEMA
- **"Water Quality Conscious" Zoning Lacking:**
  - **Only Killingly & Union prohibit septic systems in floodplain**

When Septic Prohibitions Aren't Feasible

- How far above 100-year flood should a leaching field be placed when prohibitions aren't feasible?
  - Connecticut's municipal flood prevention regulations don't address this issue
- The exception is the City of Danbury – Requires leaching fields to be 24 inches above 100 year floodplain.

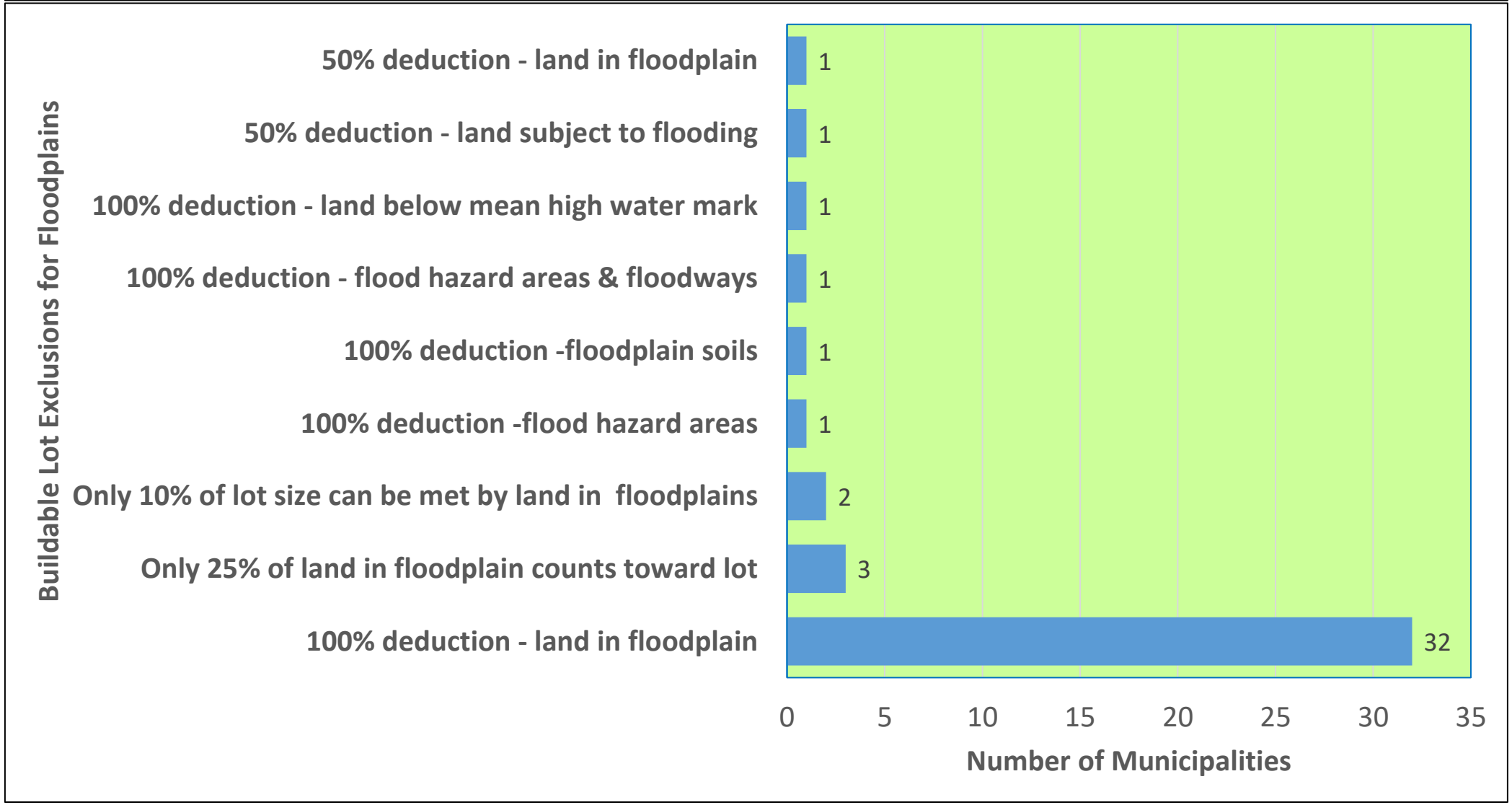
Outdated FEMA Rules Create Water Pollution Part 2

- Water Pollution is a function of both elevation and separation
- Leaching Fields must be setback from rivers
  - The latest science points to the need for stricter standards
- DEEP's Rule: effluent must have 21 days of travel time & 50 feet separation from surface water or a drinking water well
  - "One size fits all" fails to address wide range of soil types and porosities
- Bacteria survival times longer than 6 months can travel in groundwater beyond 100 feet – depending on soils, slopes & climate

Alternative Approach #1: The Buildable Lot

- **Buildable Lot Concept Reduces Case by Case Review Process**
  - Buildable lot has taken hold during last 40 years
  - 150 Municipalities have Buildable Lot Standards
- **Key Factors Used to Determine Buildability Statewide:**
  - Lack of wetlands
  - Lack of Floodplains
  - Lack of Steep Slopes
  - Lack of Shallow to Bedrock
- **Limited Use of Buildable Lot Standards for Floodplains**
  - 43 Municipalities have Buildable Lot Standards that Address floodplains
- Let’s look at the Current State of Affairs

Municipal Buildable Lot Standards Regulating Floodplains as a Town-wide Buildable Lot Factor



Alternative Approach #2: Pervious Cover

- **Nearly all Zoning regulations govern lot coverage but only 45 municipalities have impervious cover standards**
  - Impervious cover standards not aligned with flood management goals
  - Flooding increases with increasing levels of impervious cover
- **What the Impacts of Excessive Impervious Cover?**

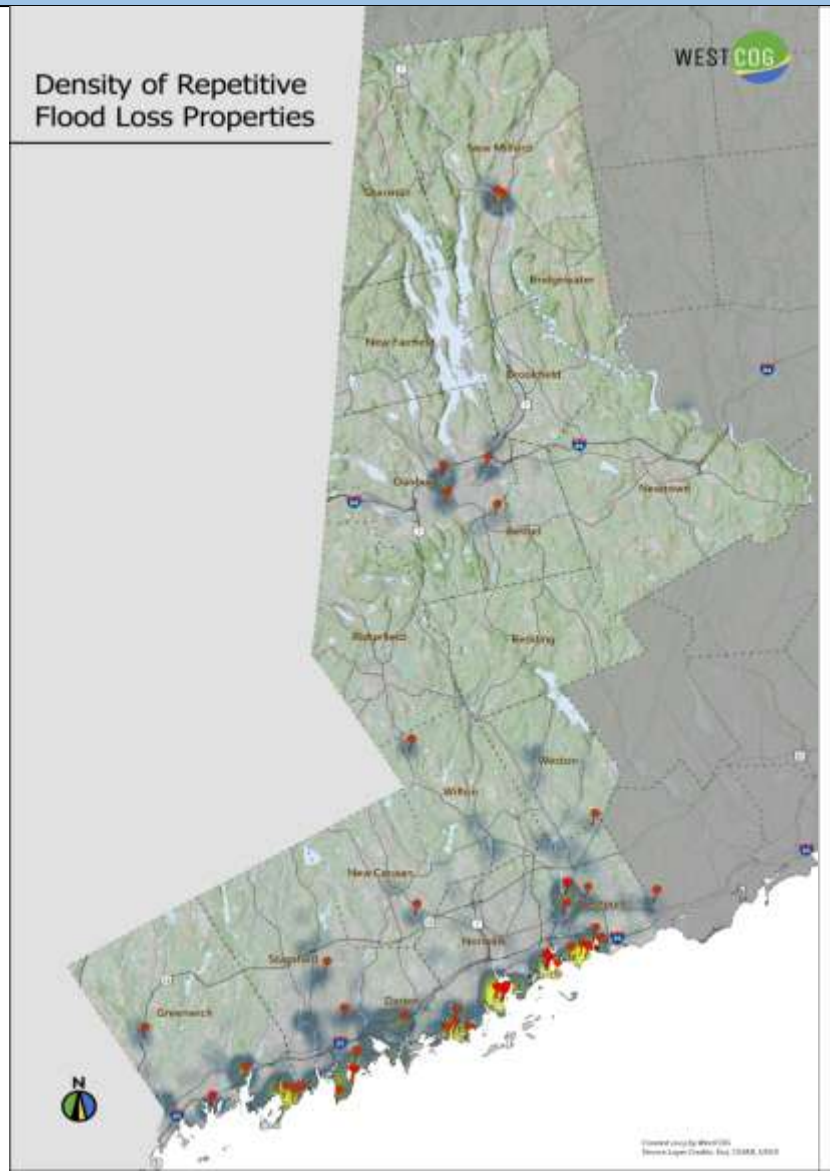
- Let’s look at the effects of Impervious cover in the 2024 Stormwater Quality Manual

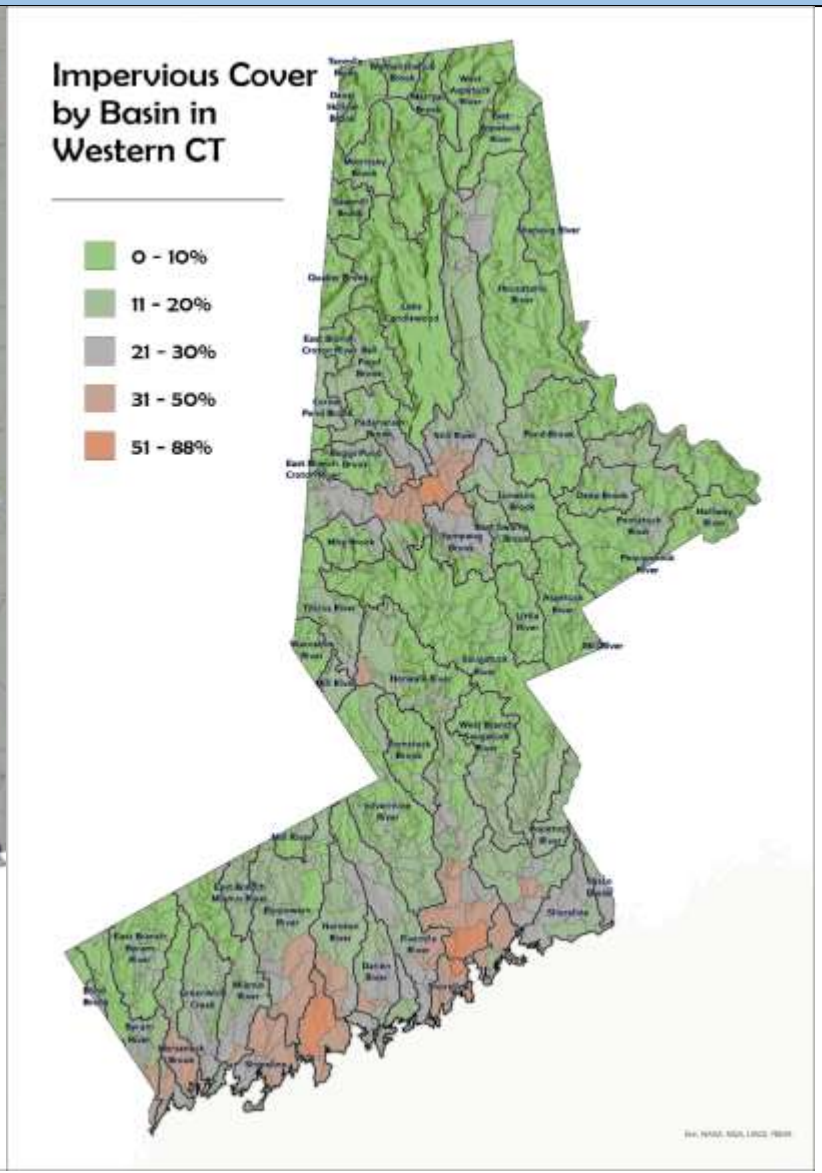
Hydrologic Impacts of Impervious Cover

- Increased runoff volume
- Increased peak discharges
- Decreased runoff travel time
- Reduced groundwater recharge
- Reduced stream baseflow
- Increased frequency of bankfull and overbank flow
- Increased flow velocity during storms
- Increased frequency and duration of high stream flow

Source: Connecticut Stormwater Quality Manual, March 30, 2024

Repetitive Loss Properties & Impervious Coverage





Observations: Three Outdated Floodplain Standards

- **Need More Frequent Flood Insurance Studies:**
  - As of September 2025, 87% of 169 municipalities have some/all of their flood Insurance maps ten years old or older.
- **Need Critical Infrastructure Standards:**
  - Only Stamford & Old Saybrook have established more protective floodplain standards for critical infrastructure as recommended by FEMA & Governor Lamont (Executive Order 21-3)
- **Need 100 Foot Riparian Setbacks:**
  - Development within 100 feet of watercourses is a recipe not only for increased flood damages but increased water pollution

Conclusions & Recommendations

- **FEMA & Building Code Fail to Adequately address Climate Change**
  - Minimum BFE+1 is not enough
  - 22 Municipalities have a BFE+2 or more – the state's climate change planners
    - BFE+2 increases development cost by about 2% - A Fair trade for future protection
    - ↑Construction Costs, but ↑Insurance Savings ↓ Flood Risk
  - FEMA-funded elevations must elevate to 500-yr + 2'
- **Zoning Commissions Can Exceed FEMA Model Rules:**
  - Yet few municipalities have exercised this Statutory authority
- **Municipal & Dept. of Health septic standards Must be Revised**
  - Result of status quo: contaminated ground & surface water
    - Only 25% of Municipalities use Buildable Lot Standards to protect water quality
    - There must be at least a 100 foot setback of septic systems from Rivers & Streams

Conclusions & Recommendations

- **More CFMs needed at the local or regional level**
  - Many local staff may already be halfway – only must take exam
  - Alternative: Regional CFM (1 per COG) could reduce burden on local municipalities
- **Outdated FIS and floodplain regulations need to be addressed**
  - Outdated floodplain data may lead to development in floodplain, mitigation grant ineligibility, lack of protection of critical infrastructure and insurance discrepancies

Land Use & Flooding Resources

- WestCOG, Flooding in Connecticut: A Status Report on Municipal Flood Prevention Efforts: Strategies to Reduce Flooding & Address Water Quality Impacts, 2022.
- WestCOG, The Case for Riparian Corridor Protections: Zoning Strategies to Reduce Pollution of Inland Waters and Resultant Hypoxia of Long Island Sound, 2021.
- WestCOG, The Buildable Square: An Innovative Way to Protect Inland Wetlands and Reduce System Failures, 2023.
- Christopher Jones & Associates, Evaluation of the National Flood Insurance Program's Building Standards, October 2006.
- FEMA, 2008 Supplement to the 2006 Evaluation of the National Flood Insurance Program's Building Standards, 2008
- William R. Rath, Floodplain Building Elevation Standards: Current Requirements and Enhancement Options for Connecticut Shoreline Municipalities, UCONN School of Law, May 1, 2018
- Louanne Cooley, Floodplain Building Elevation Standards for Critical Facilities and Activities, UCONN School of Law, CT Institute for Resilience and Climate Adaptation, March 2022.

Thank you!

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