

24<sup>th</sup> Annual RMLUI Conference

March 12, 2015

# Planning for Natural Hazards

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**HAWKSLEY**<sup>®</sup>  
CONSULTING

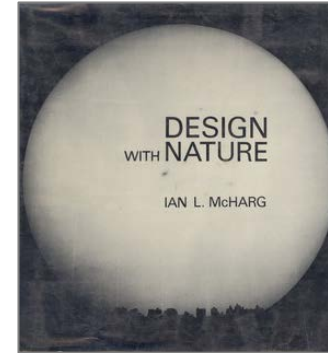
# Planning for Natural Hazards

- **Hazard Resilience**

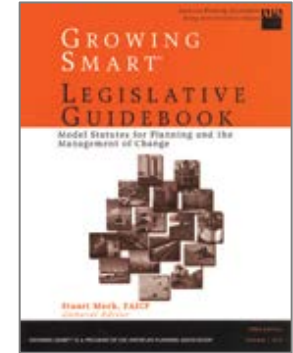
- *Not a new concept!*
- *Plenty of early pioneers & modern examples...*



1942



1969

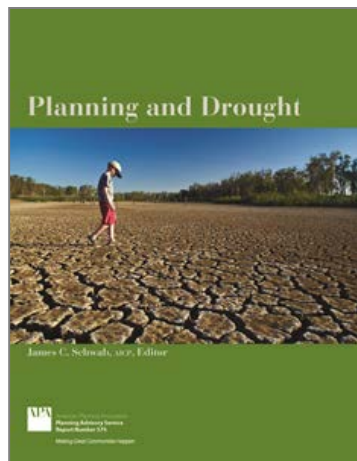
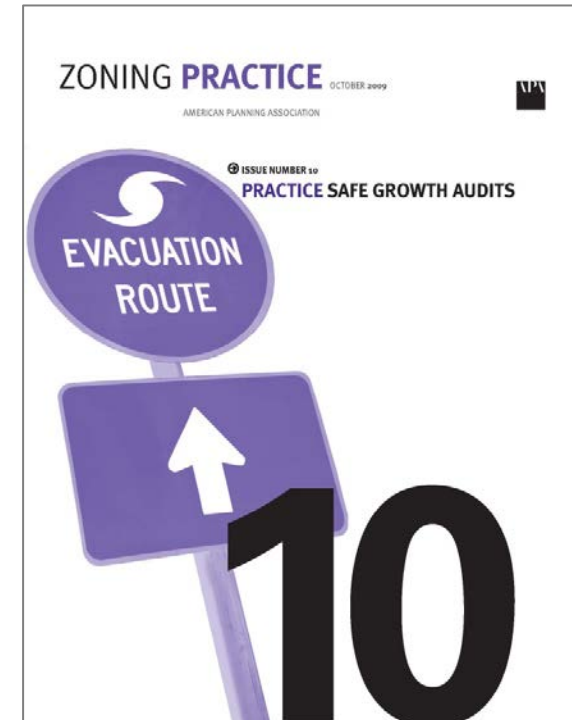
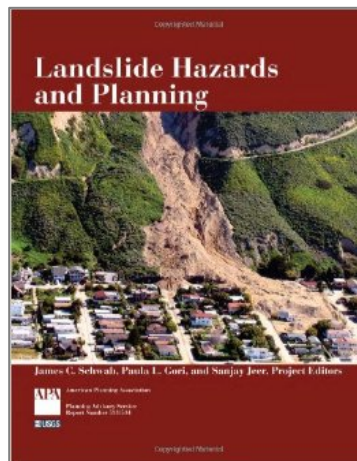
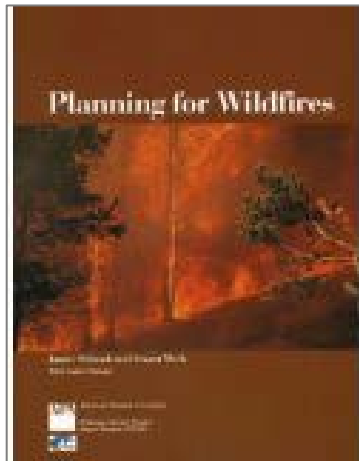


2002

- Further, courts have consistently ruled in favor of public entities seeking to protect public safety
- However...
  - *Our understanding of natural hazards and the long-term risks they pose to society continues to evolve*
  - *Planning tools and strategies must also evolve*

# Planning for Natural Hazards

No shortage of current resources...



American Planning Association

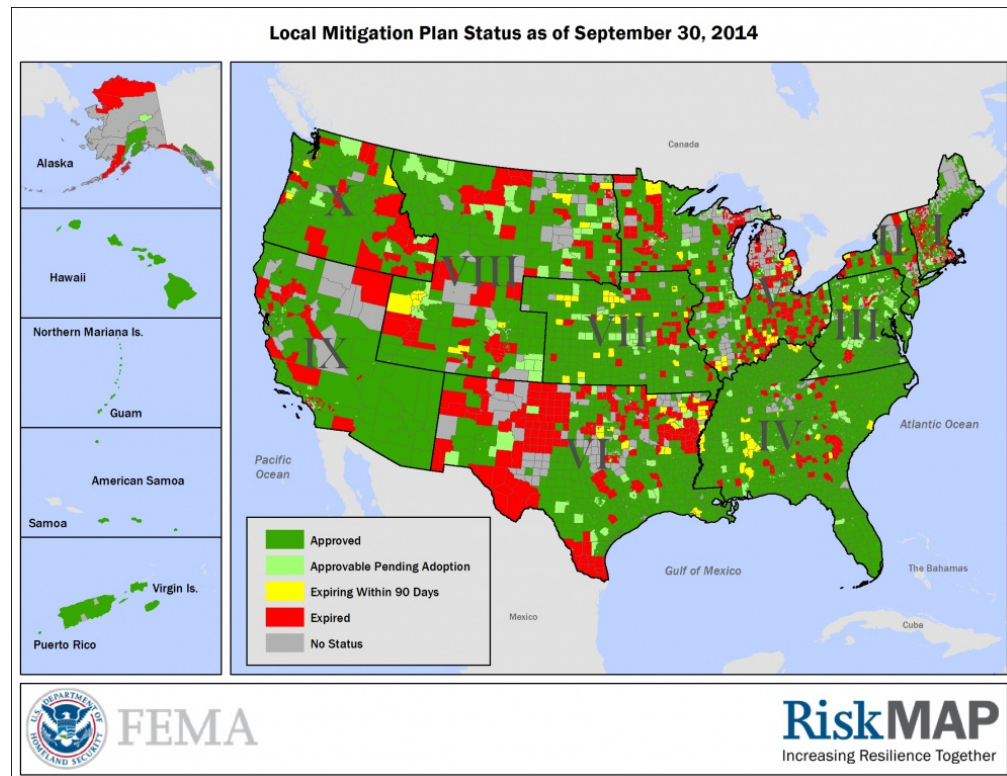
# Multi-Hazard Mitigation Planning

- **The Good News:**

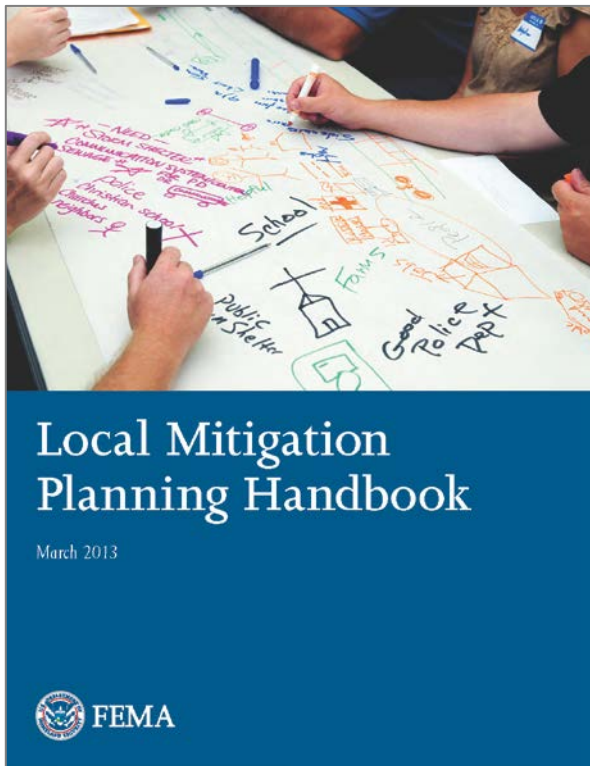
- More than 27,000 communities have adopted FEMA-approved hazard mitigation plans

- **The Challenge:**

- Most plans are multi-jurisdictional
- Many local efforts are not led by planners
- Most plans do not adequately address land use policy or regulatory standards



# Multi-Hazard Mitigation Planning



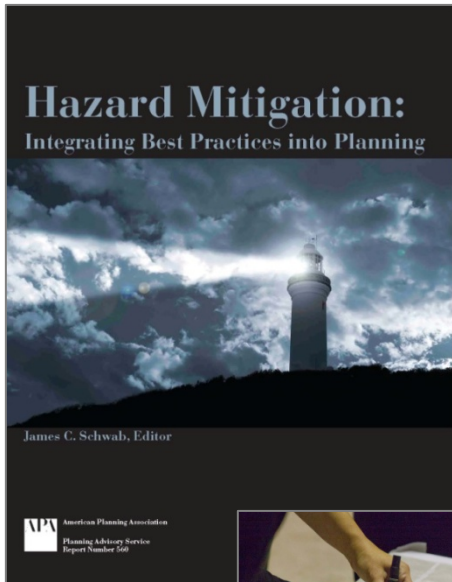
## Element C6

The plan shall include a process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

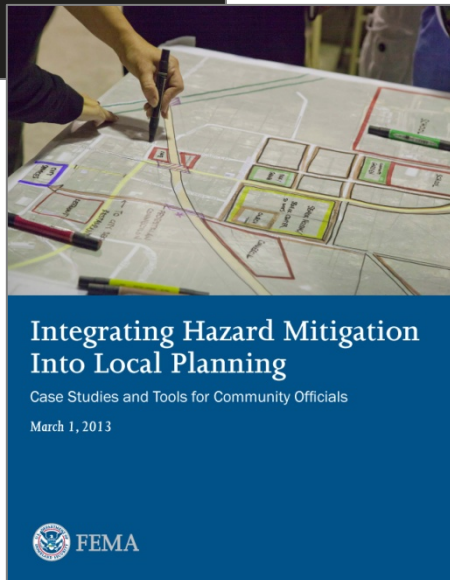
**44 CFR 201.6(c)(4)(ii)**



# Integrating Hazard Mitigation into Local Planning



*Effective integration of hazard mitigation occurs when your community's **planning framework** leads to development patterns that do not increase risks from known hazards or leads to redevelopment that reduces risk from known hazards.*



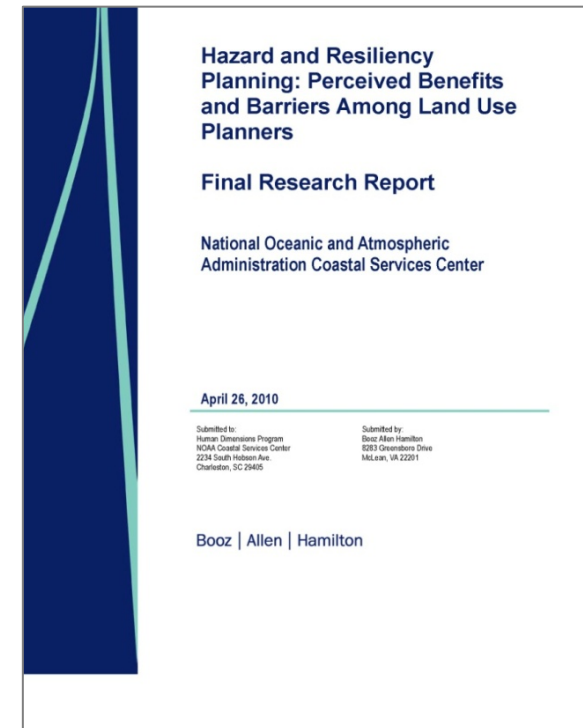
# Are we doing enough?



# Why not?

## Perceived barriers among land use planners (NOAA Study, 2010):

- Lack of public support or political will
- Limited budgets
- Competing priorities
- Limited actionable data
- Disconnect between emergency managers and planners
- Existing development and property rights
- Bias in favor of growth

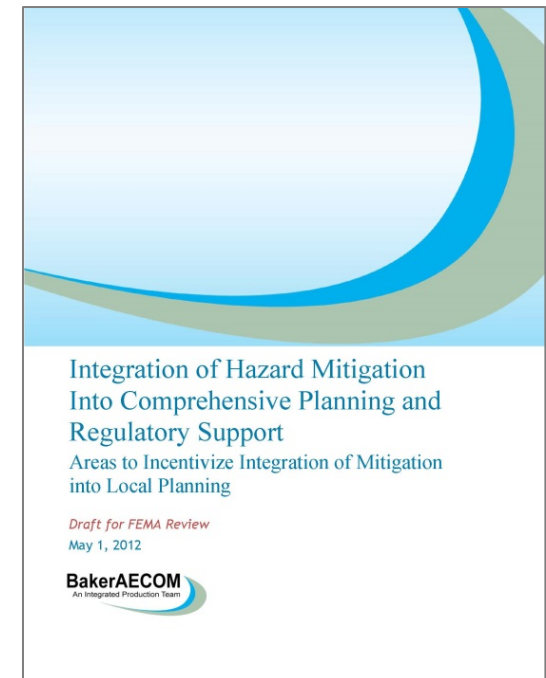




# Why not?

## Common barriers and obstacles to integration (FEMA Study, 2013):

- Lack of awareness of hazard risks and mitigation solutions
- Mitigation not seen as a community priority
- Lack of political will to implement solutions
- Lack of incentives for integrated planning
- Lack of capacity or resources
- Insufficient framework for intergovernmental coordination



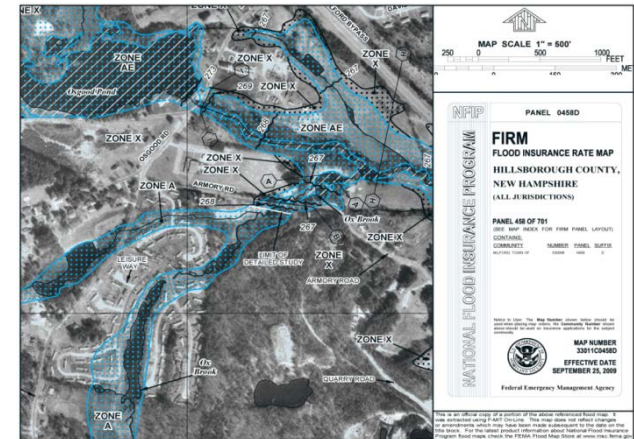
# Planning for Flood Resilience

- **The Good News:**

- More than 22,000 communities participate in the National Flood Insurance Program (NFIP)

- **The Challenge:**

- *Flood Insurance Rate Maps (FIRMs)* – many are grossly outdated; they do not consider future conditions; and are not intended to be complete flood risk maps
- *Floodplain Management Ordinances* – communities typically adopt model code language with minimum NFIP regulations



# Planning for Flood Resilience

*“The minimum NFIP floodplain regulations **do not provide adequate long-term flood risk reduction** for communities.”*

*“They do not take into account **future conditions** (e.g. sea level rise, changing storm patterns or development in the watershed), do not address **all hazards** (e.g. coastal erosion), and do not protect against **large flood or storm surge events**.”*

*“The benefits of flood risk reduction achieved by higher regulatory standards **far outweighs** the burden of administering them.”*

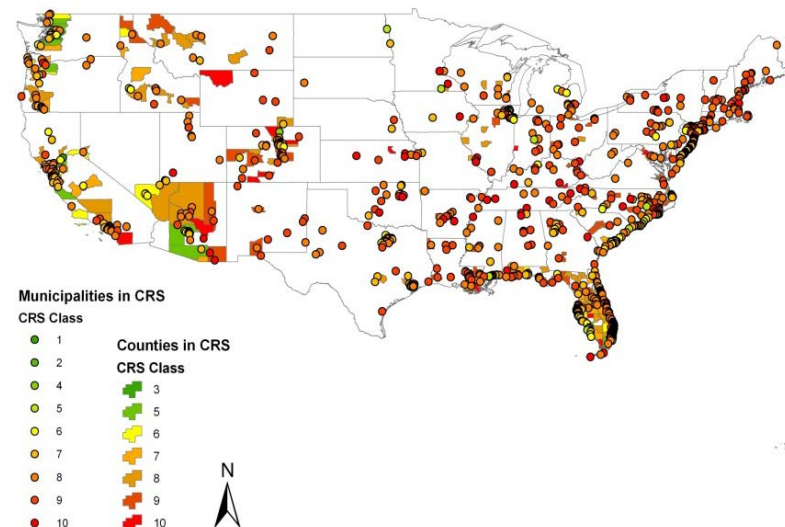
-- Association of State Floodplain Managers



# Planning for Flood Resilience

- **Community Rating System (CRS)**

- Launched by FEMA in 1990
- Voluntary, *incentive-based* program that recognizes, encourages and rewards community floodplain management activities that *exceed* minimum NFIP standards
- Flood insurance rates for private properties are *discounted* to reflect the reduced flood risk resulting from community actions
- Nearly 1,300 communities participate nationwide
  - 5% of NFIP communities
  - 67% of NFIP policies



# Planning for Flood Resilience

- **Freeboard** is the single most effective method for reducing flood risk to a structure in the floodplain.
  - Higher design flood elevation (above 100-year, or base flood)
  - Added measure of safety to address modeling or mapping uncertainties, future conditions, etc.
- 22 states have adopted statewide freeboard regulations (all between 1-2 feet)
  - More than 500 communities outside of these states have adopted freeboard, some going up to 3 feet
- Recent NFIP reform has also driven many communities and property owners alike to consider freeboard



# Planning for Flood Resilience

Freeboard reduces flood risk *and* flood insurance costs!



\*\$250,000 building coverage only (does not include contents), AE (high to moderate risk) zone, single-family, one-story structure without a basement at: 4 feet below Base Flood Elevation (BFE); at BFE; and at 3 feet above BFE. (Rating per FEMA flood insurance manual, October 1, 2012). The illustration above is based on a standard National Flood Insurance Program (NFIP) deductible.

# Federal Flood Risk Management Standard (FFRMS)

- Proposed under Executive Order 13690, issued January 30, 2015 (*in 60-day public comment period*)
- Amends EO 11988: Floodplain Management (1977), which governs Federal “actions” in floodplain:
  - (1) acquiring, managing, and disposing of Federal lands and facilities;
  - (2) providing Federally undertaken, financed, or assisted construction and improvements; and
  - (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating and licensing activities.

# Federal Flood Risk Management Standard (FFRMS)

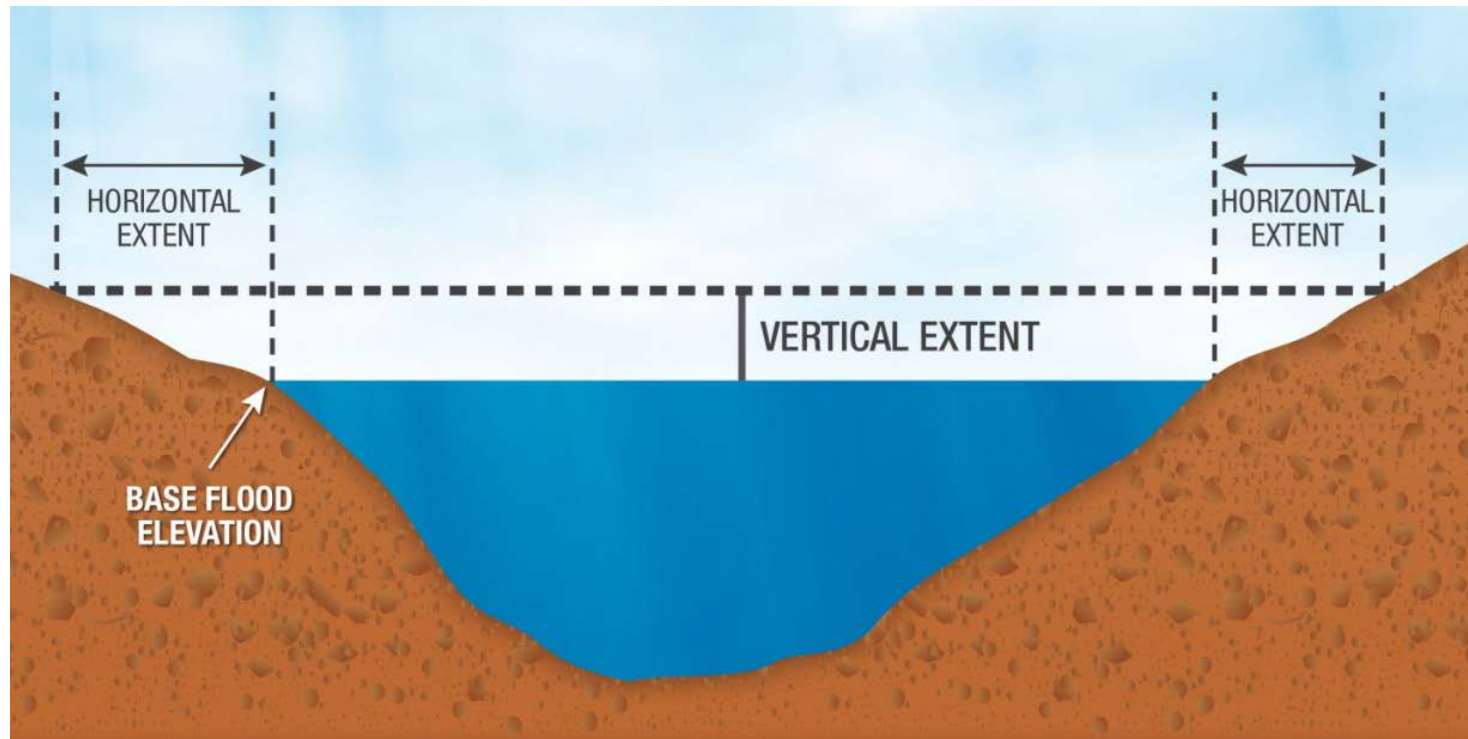
Floodplain and protection standard is defined both vertically and horizontally by one of three approaches:

1. Climate-informed science approach – uses best-available, actionable data and methods that integrate current and future changes in flooding based on climate science.
2. Freeboard value approach – adding an additional 2 feet to the base flood elevation; or an additional 3 feet for critical actions\*.
3. Build to the 500-year (0.2%-annual-chance) flood elevation.

\* Critical Action: *Any activity for which even a slight chance of flooding would be too great.*

# Federal Flood Risk Management Standard (FFRMS)

Example of horizontal flood protection standard:



# Planning for Flood Resilience in Charlotte-Mecklenburg, NC

- Adopted “Community Floodplain” maps based on future conditions modeling
  - Reflects maximum build-out conditions according to future land use, zoning, and projected population growth
  - Accounts for future hydrologic changes to 1%-annual-chance event; extends spatial flood hazard area by 4+ square miles
  - Used for regulatory and planning purposes throughout County



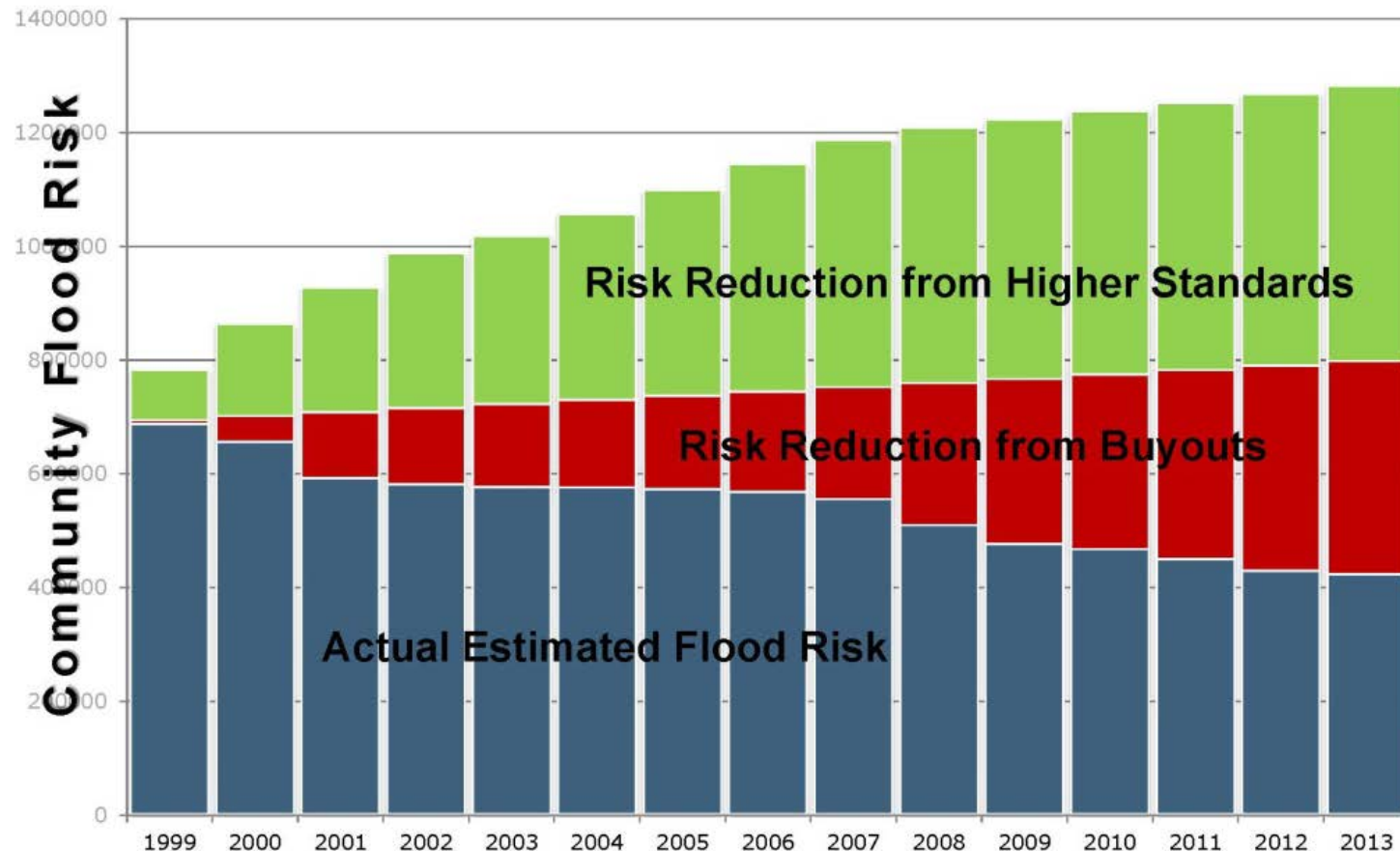


# Planning for Flood Resilience in Charlotte-Mecklenburg, NC

- Higher regulatory standards
  - ☑ Development standards apply to Community Floodplain
  - ☑ Higher floor elevation requirement (1-2 foot freeboard)
  - ☑ More restrictive, wider floodways
  - ☑ Critical facilities must be located outside of 500-year floodplain
  - ☑ Cumulative substantial damage/improvement provisions
  - ☑ Basements prohibited below flood level on filled lots
  - ☑ Parking lots must be elevated for new, non-single family buildings
  - ☑ Many restrictions on levee construction

# Planning for Flood Resilience in Charlotte-Mecklenburg, NC

## Flood Risk Profile for Charlotte-Mecklenburg



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# Thank You!

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