Moving FEMA towards Probabilistic Flood Risk Analysis and Probabilistic Flood Hazard Analysis

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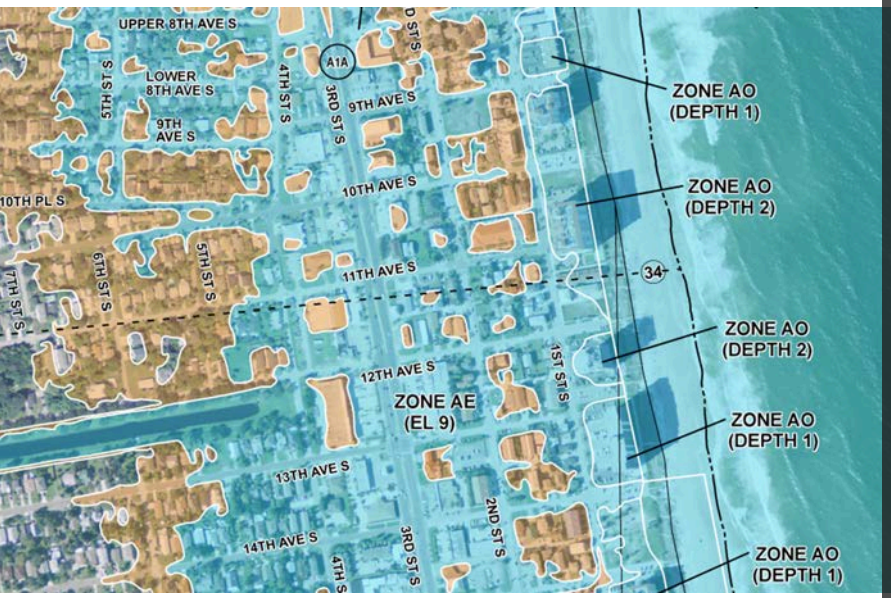
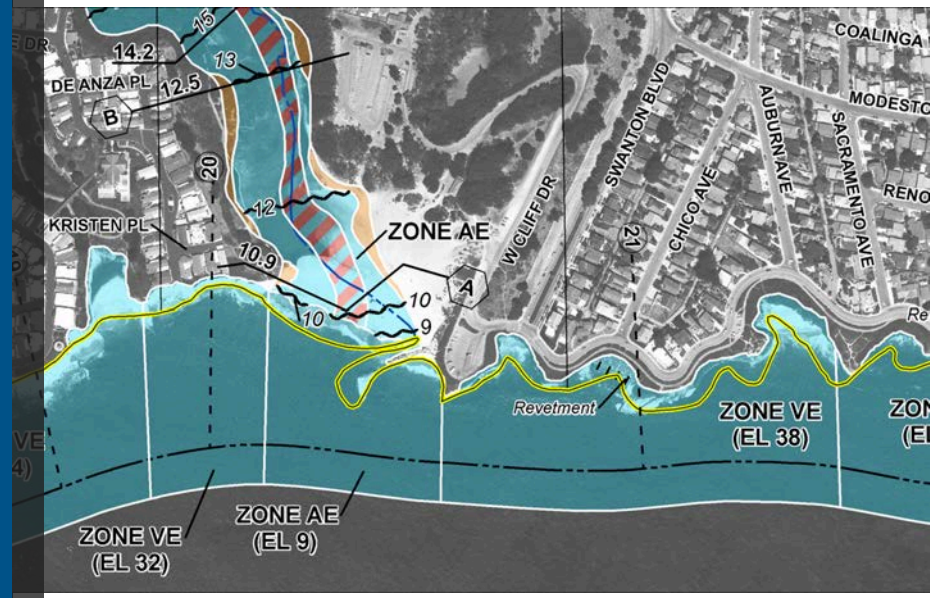
Flood Insurance Rate Maps: A Binary Snapshot of Risk



FLOODWATERS DON'T STOP AT A LINE ON THE MAP.



What do FIRMs show?

FIRMs show a specific condition: the Special Flood Hazard Area (SFHA).

What makes them regulatory?

Regulatory FIRMs are used for flood insurance purchase requirements and floodplain management.

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- Regulatory FIRM leads people to believe that if they are ‘out’ of the SFHA, they are not at risk.
- Leads to communities to focus on lines on a map as a complete picture of flood risk.

A more complete picture

- Flooding can take many forms, can be minimal or severe, can have several driving factors
- FEMA’s Future of Flood Risk Data (FFRD) initiative seeks to improve the state of mapping, adopting a probabilistic, risk-based approach to displaying graduated data

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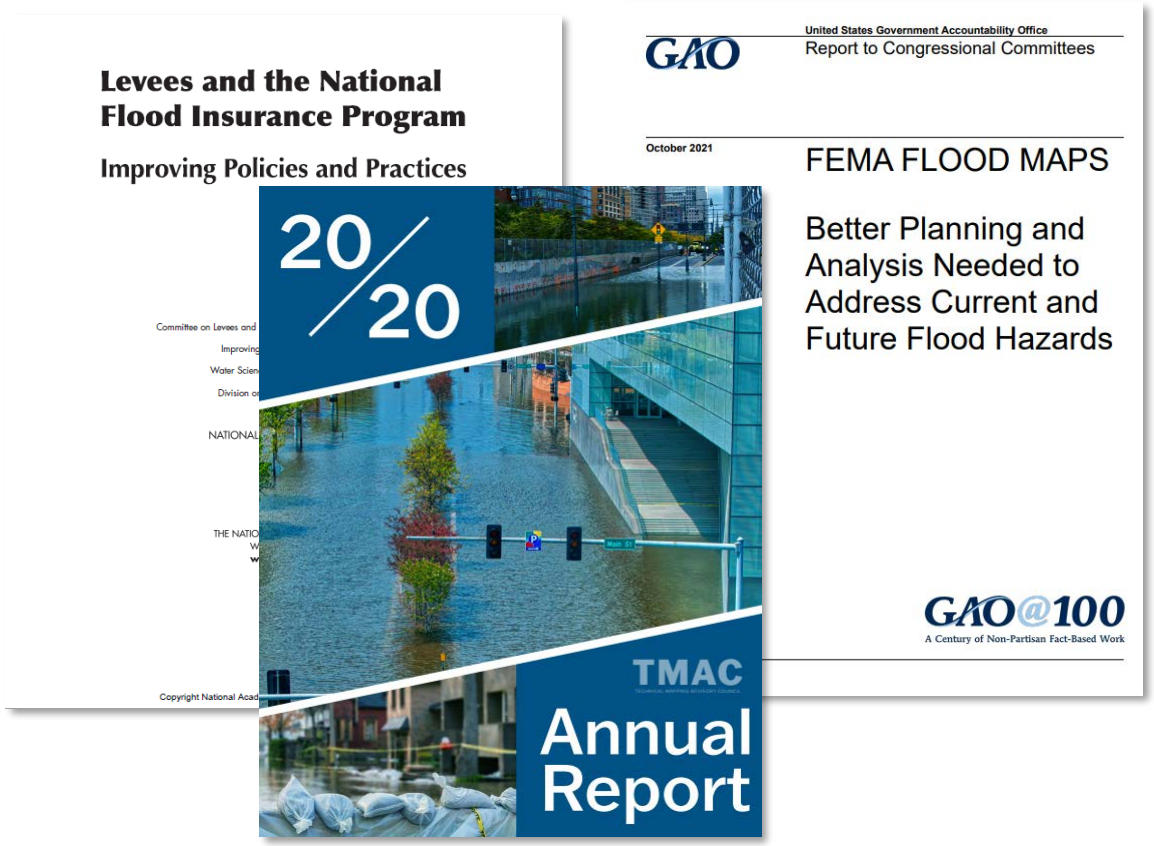
Transition to Future of Flood Risk Data (FFRD)

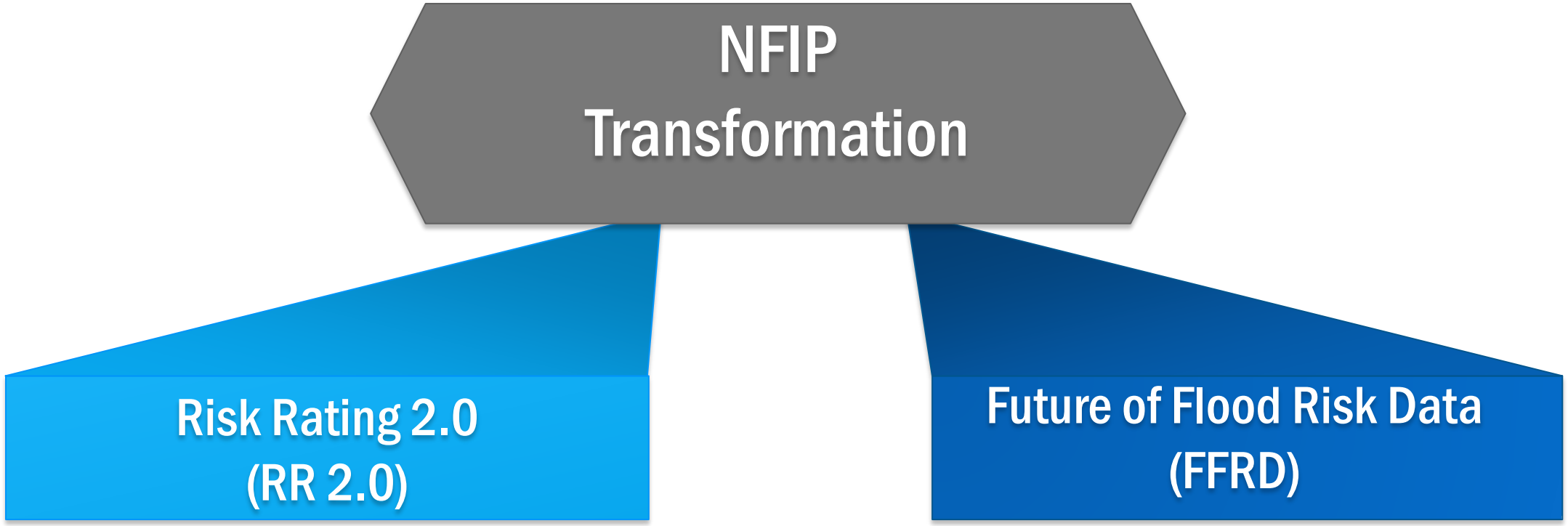
Feedback from stakeholders

- Technical Mapping Advisory Council (TMAC)
- GAO
- National Academy of Sciences
- Other Agencies

- Also, unmet statutory authorities including identifying residual risk behind levees



The NFIP in transforming to a risk-informed framework that enhances the Nation's understanding of risks from flood hazards. Risk Rating 2.0 and Future of Flood Risk Data are two components of this initiative.



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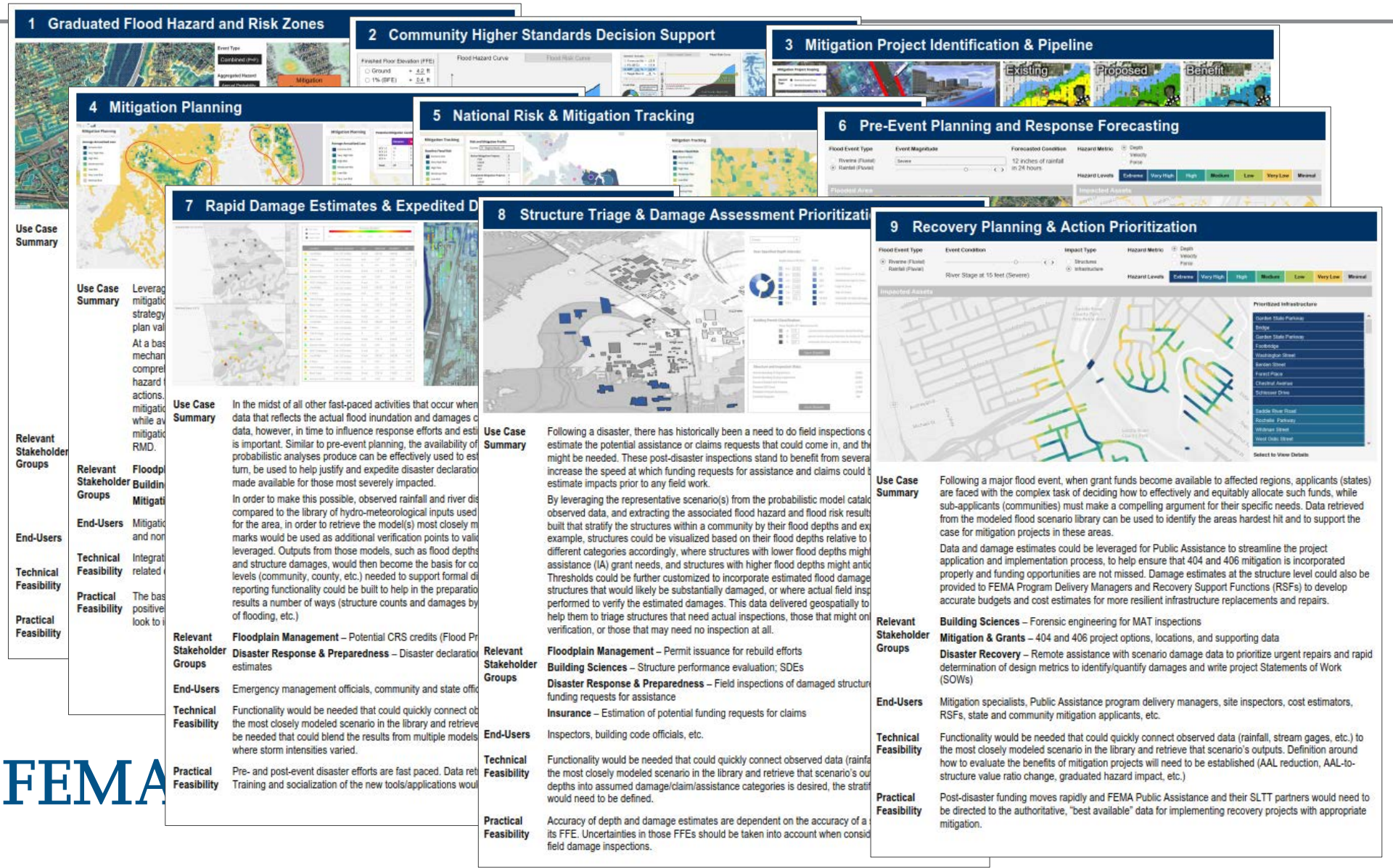
What is different about FFRD?

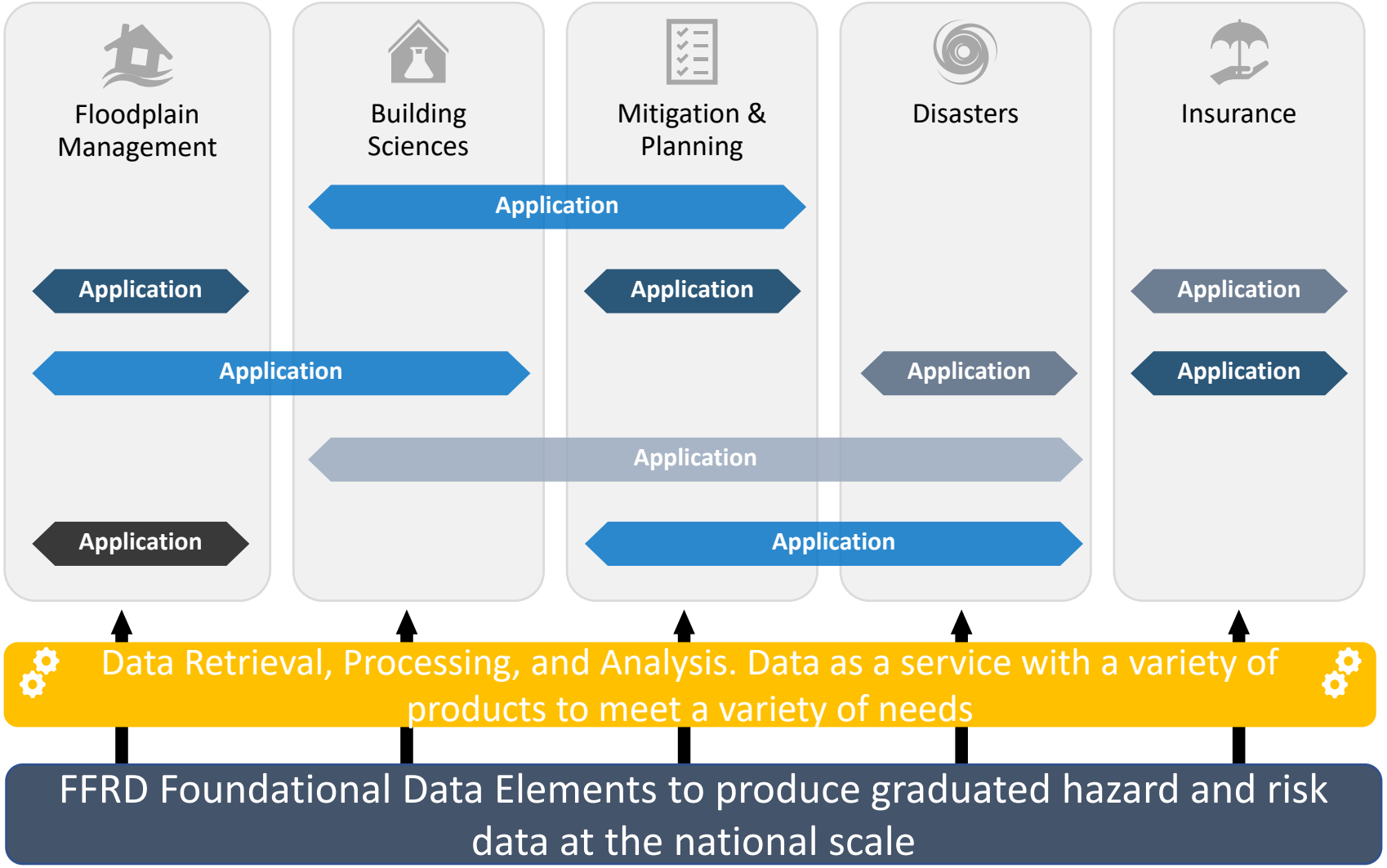
	Risk MAP	Future Flood Risk Data
Service Model	*Product (FIRMs)*	*Data service model; user decision behavior drives product*
Investments	*Project driven - base data only generated for project area*	*National scale base data with federal partners*
Model Coverage	*Patchwork of models and flood hazard assessment*	*Nationwide flood hazard/risk assessments*
Frequency Interval	*Optimized around 1-percent annual-chance*	*Multiple flood hazards, multiple frequencies*

Graduated Flood Hazard and Flood Risk Application and Use Case Examples



Reimagining the Opportunities created by improved Hazard and Risk Data

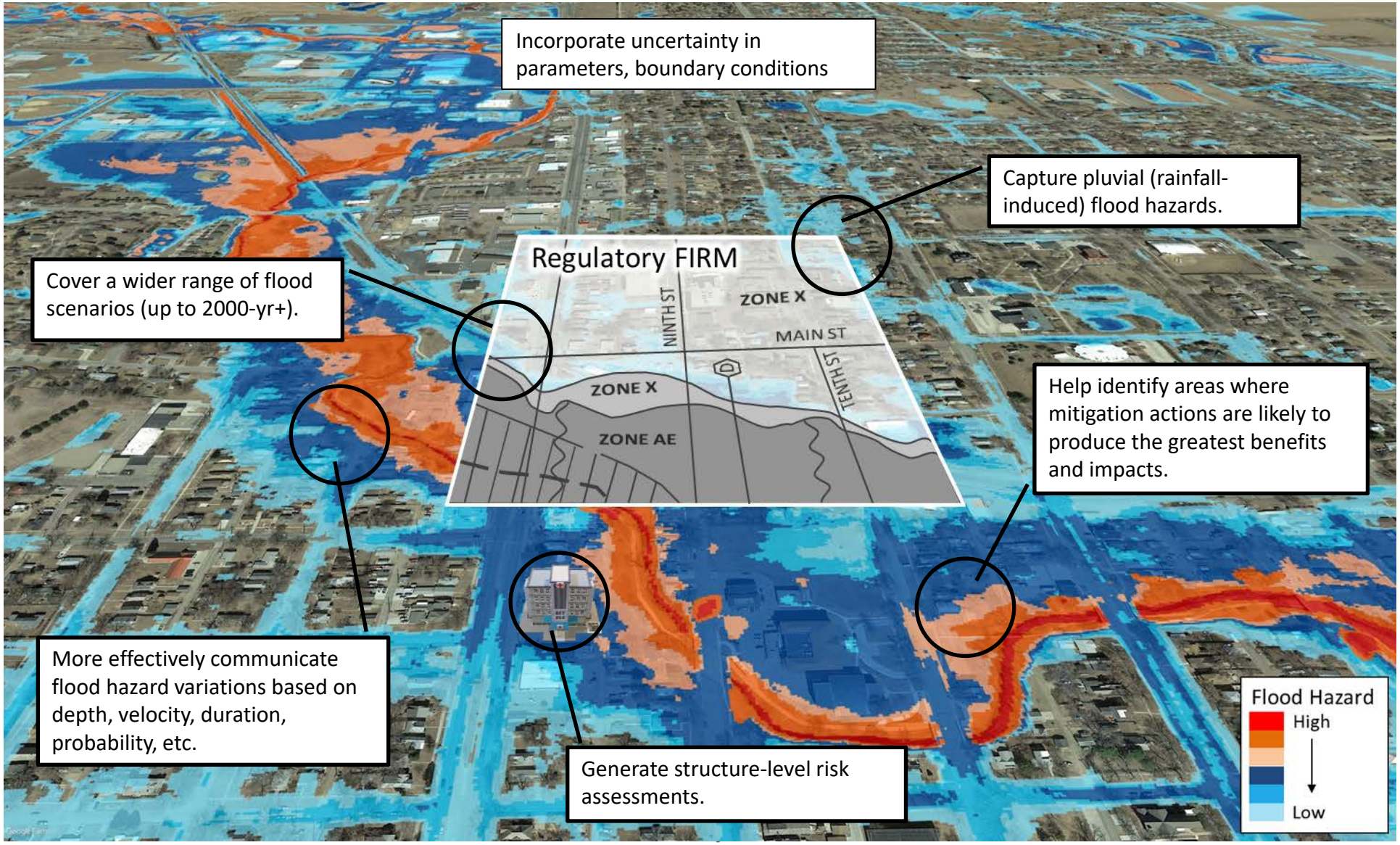
- **FFRD Concept/Use Case Alignment to Individual Stakeholders**



Applications of FFRD

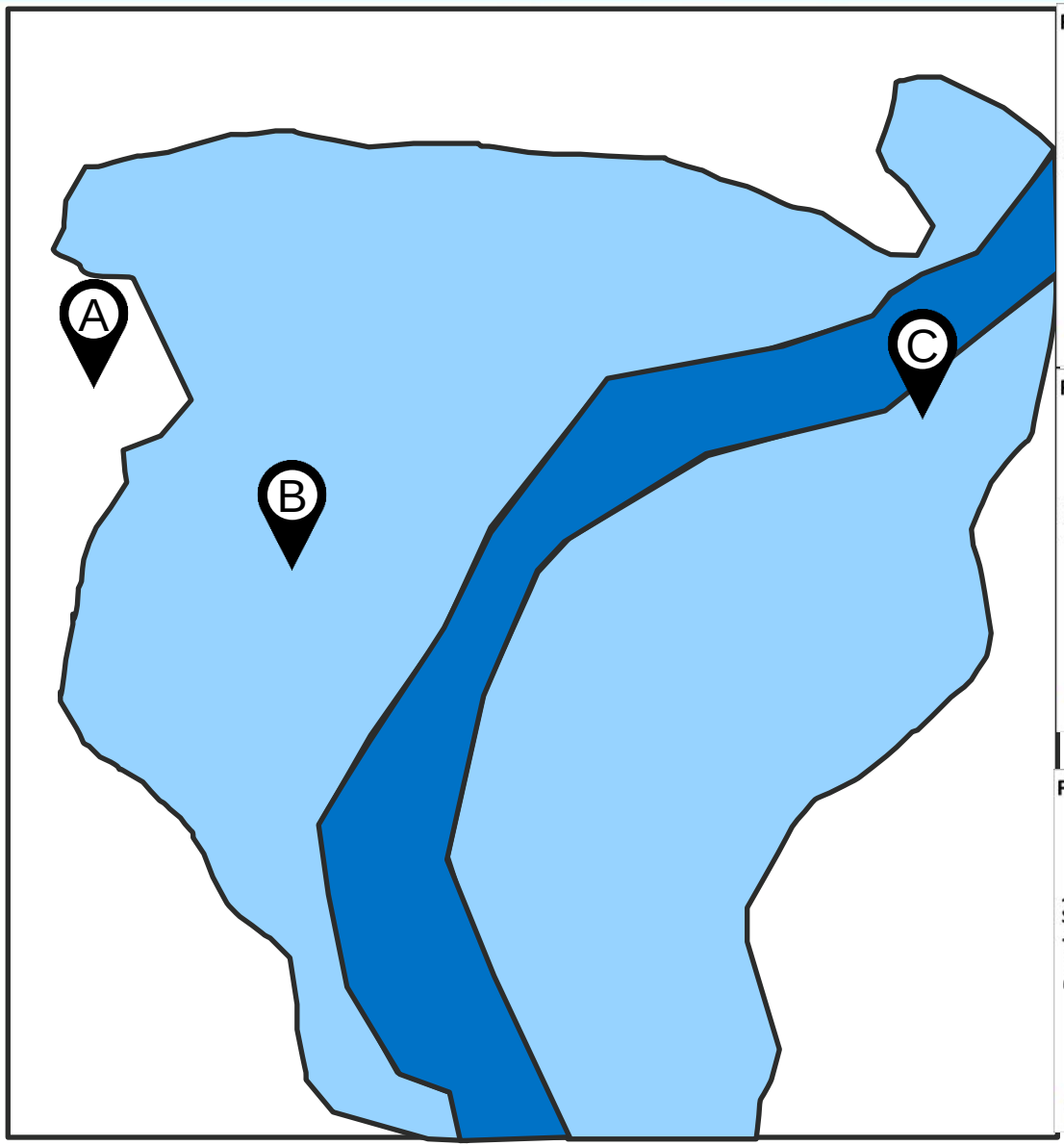
- Data applications by multiple stake-holders with cross-cutting benefits
- Flexibility for FEMA, other agencies, state and local partners, private entities, and other data users to develop tools and products to help meet their needs in reducing flood risk and increasing resiliency

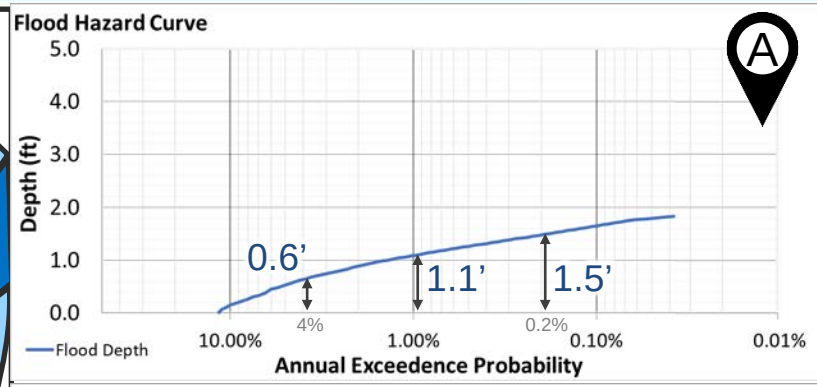
What does FFRD tell us about the Nation's Risk?
Comparison of Probabilistic Data to Traditional FIS Products

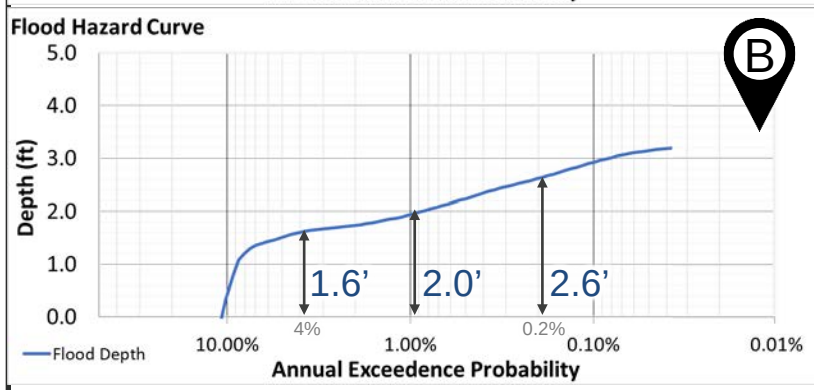


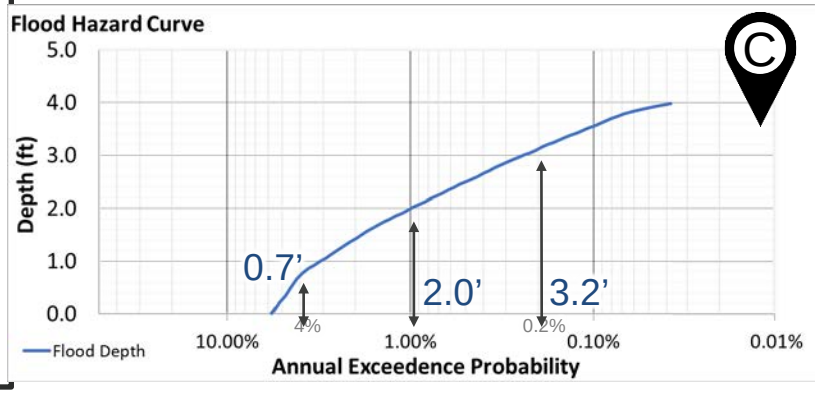
What does FFRD tell us about the Nation's Risk?
FFRD improves the understanding of unique flood hazards

- FFRD accounts for a range of conditions, frequencies, and severities
- Instead of being "inside" or "outside" the floodplain, each structure can have an associated annual exceedance probability (AEP) for each dimension of flood hazards studied.

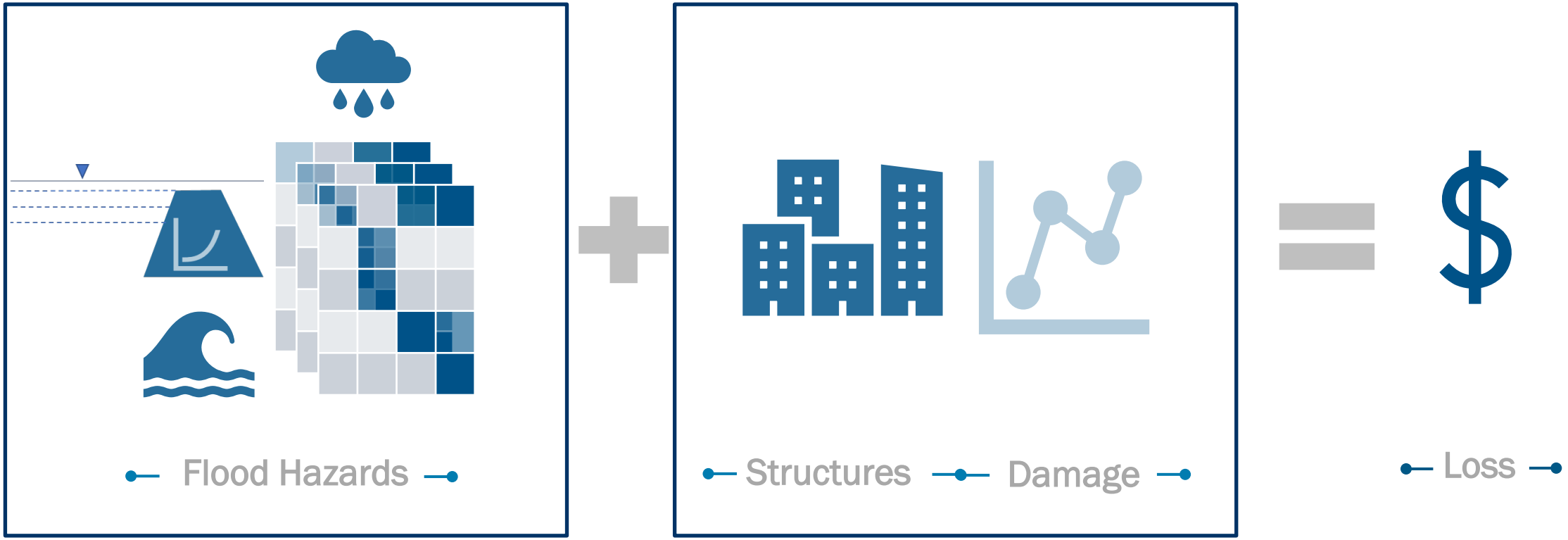








FFRD highlights where there is RISK



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RiskMAP
Increasing Resilience Together

Potential Applications for Graduated Flood Risk Data

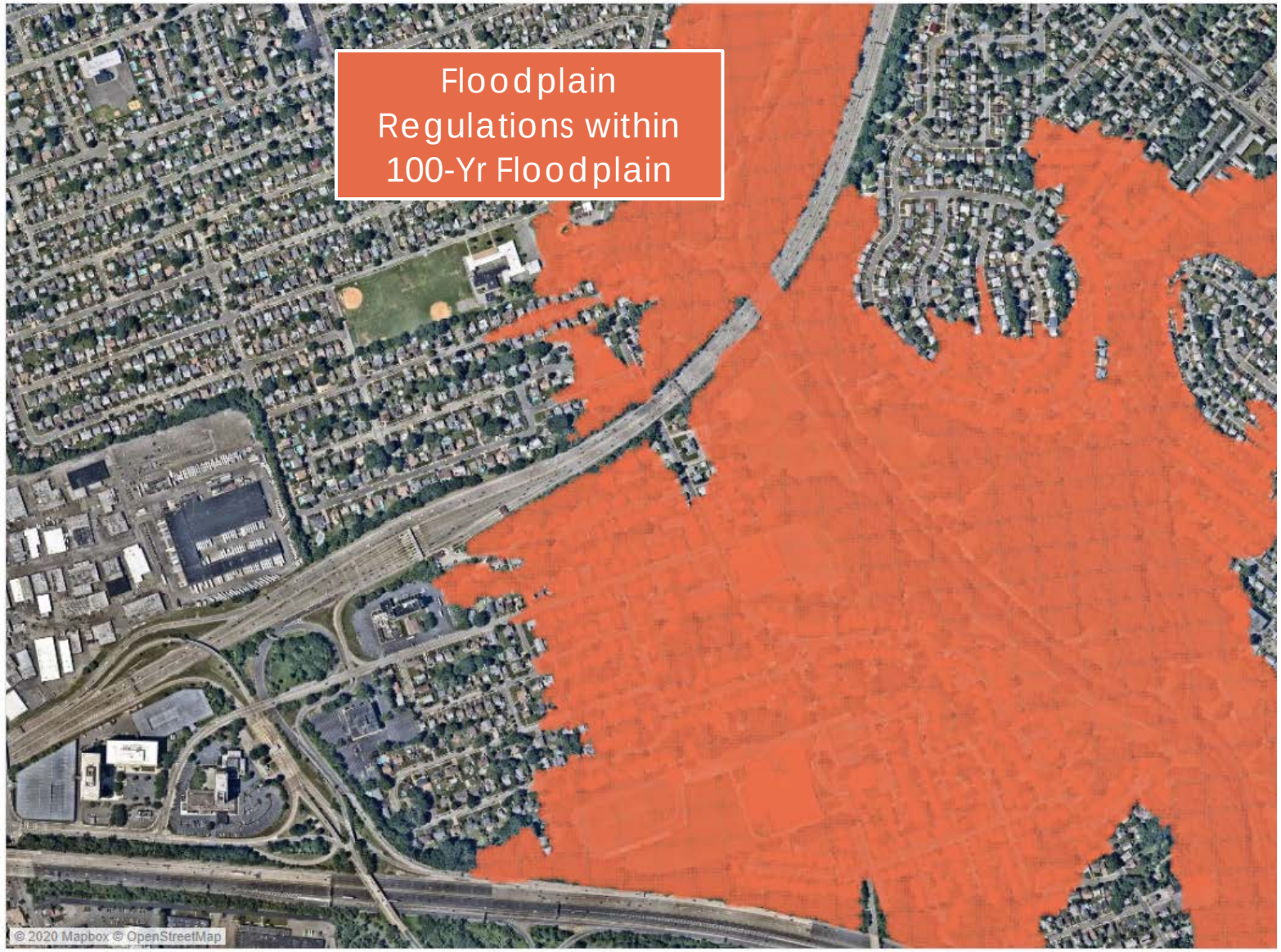
Hazard Data Beyond the SFHA

Existing Scenario

Existing NFHL Zones

- AE, Floodway
- AE
- X500
- X

Hazard Data Beyond the SFHA



Beyond the SFHA: Fluvial Scenarios

Beyond the SFHA: Pluvial Scenarios

Event Type

Rainfall (Pluvial)

Event Magnitude

18-inches of rainfall

Data View

- Depth
- Velocity
- Force

Flood Depth

- Extreme
- Very High
- High
- Medium
- Low
- Very Low

Beyond the SFHA: Graduated Hazard

Event Type

Combined (P+F)

Aggregated Hazard

- Annual Probability of Flooding
- Average Annualized Depth
- Average Annualized Loss

Annual Probability of Flooding

- 50% - Extreme
- 10% - Very High
- 5% - High
- 1% - Medium
- .2% - Low
- .1% - Very Low

Graduated Flood Zones by Hazard Level

Event Type

Combined (P+F)

Aggregated Hazard

- Annual Probability of Flooding
- Average Annualized Depth
- Average Annualized Loss

Annual Probability of Flooding

- 50% - Extreme
- 10% - Very High
- 2% - High
- 1% - Medium
- .2% - Low
- .1% - Very Low

Graduated Flood Zones by Hazard Level

Event Type

Combined (P+F)

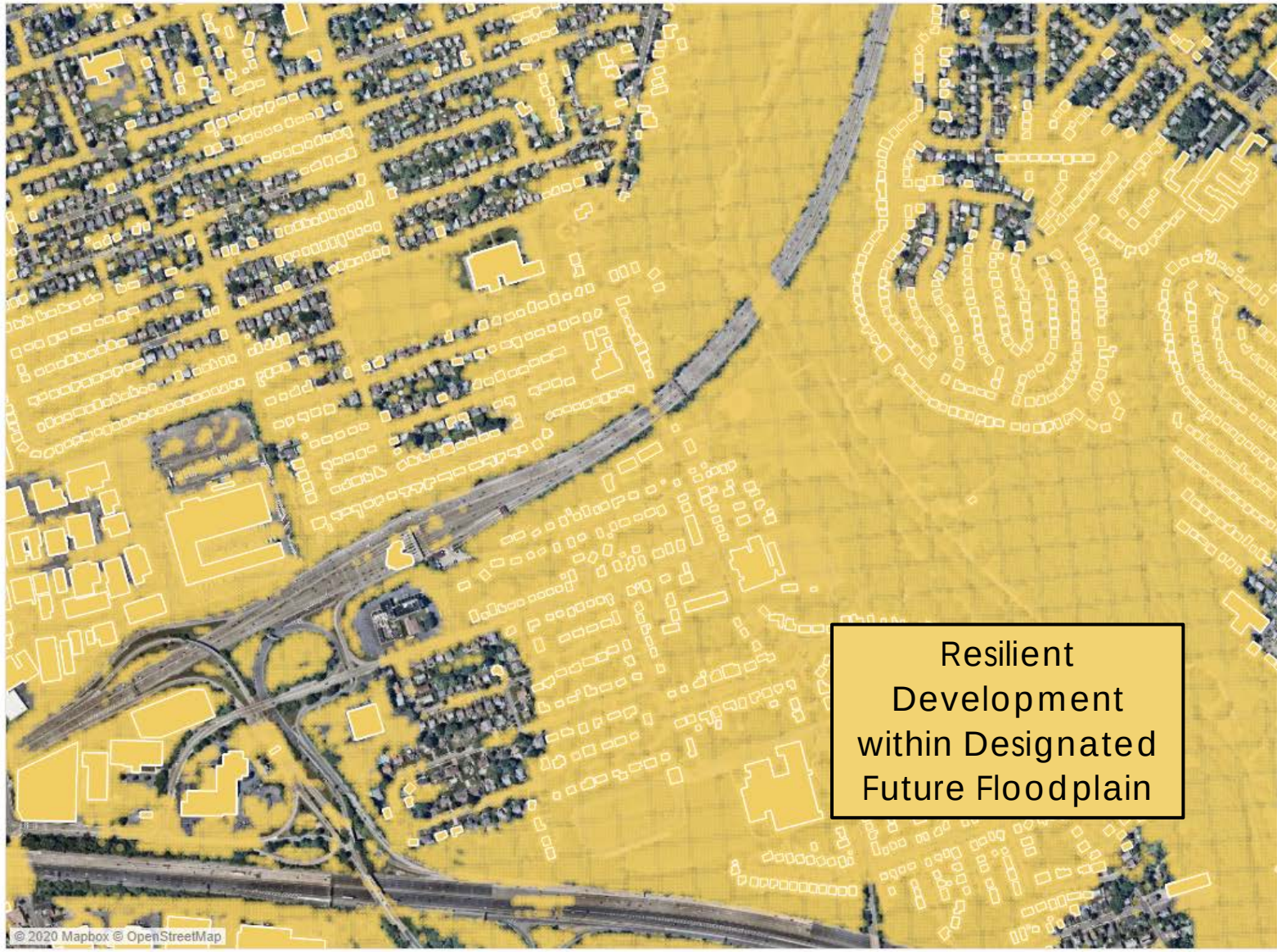
Aggregated Hazard

- Annual Chance of Flooding
- Average Annualized Depth
- Average Annualized Loss

Annual Probability of Flooding

- 50% - Extreme
- 10% - Very High
- 2% - High
- 1% - Medium
- .2% - Low
- .1% - Very Low

Graduated Flood Zones by Hazard Level



Event Type

Combined (P+F)

Aggregated Hazard

- Annual Probability of Flooding
- Average Annualized Depth
- Average Annualized Loss

Annual Probability of Flooding

- 50% - Extreme
- 10% - Very High
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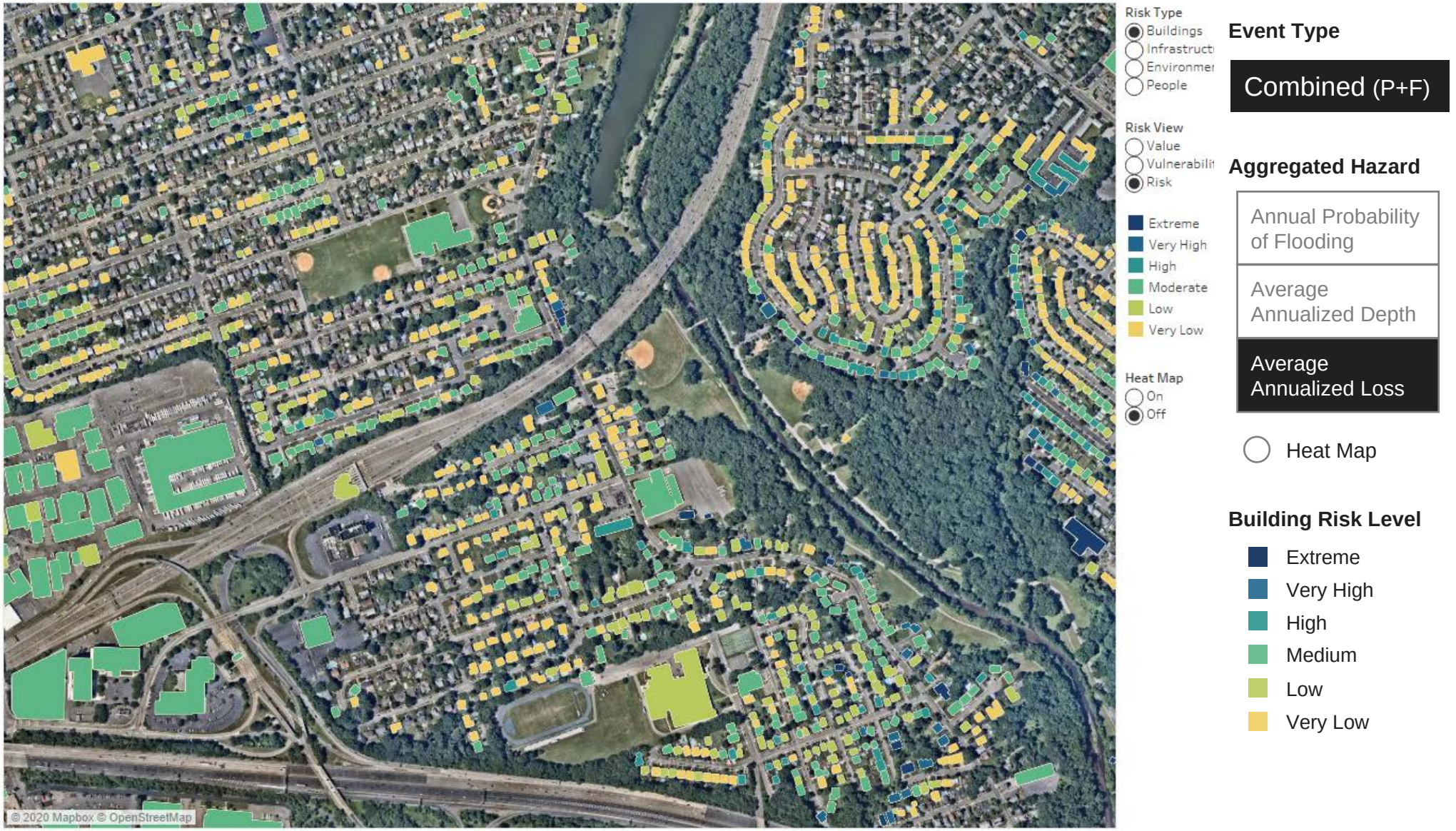
Graduated Risk at the Building Level



Graduated Risk Hot Spots

Event Type

Combined (P+F)

Aggregated Hazard

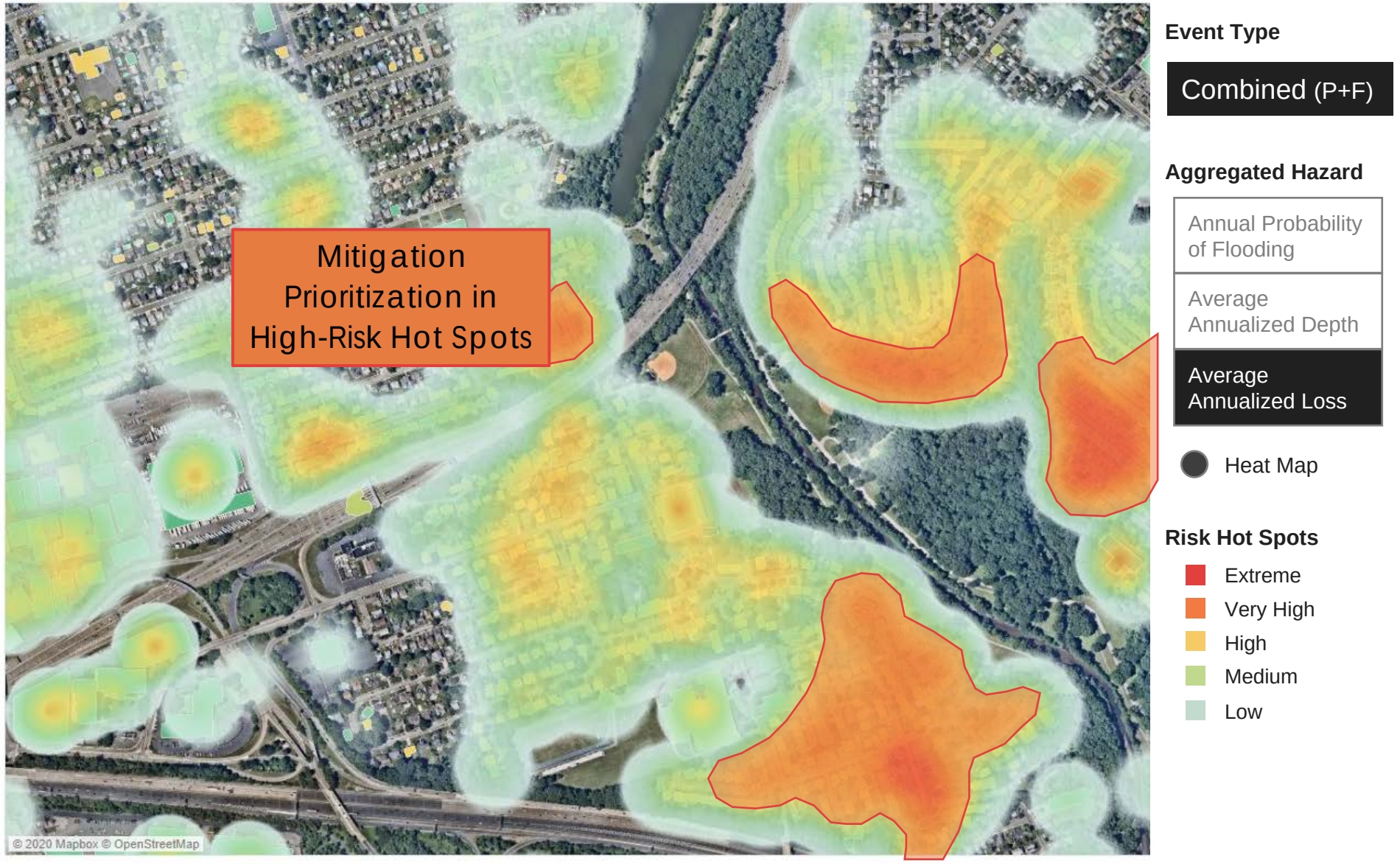
- Annual Probability of Flooding
- Average Annualized Depth
- Average Annualized Loss

Heat Map

Risk Hot Spots

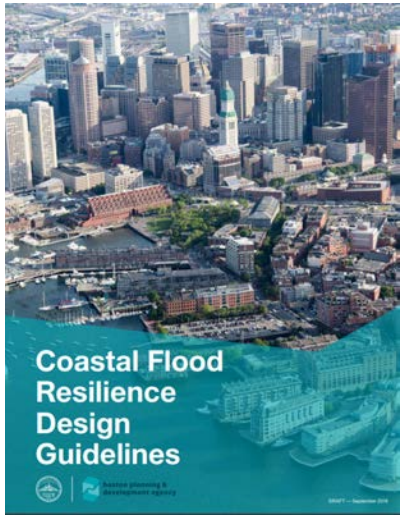
- Extreme
- Very High
- High
- Medium
- Low

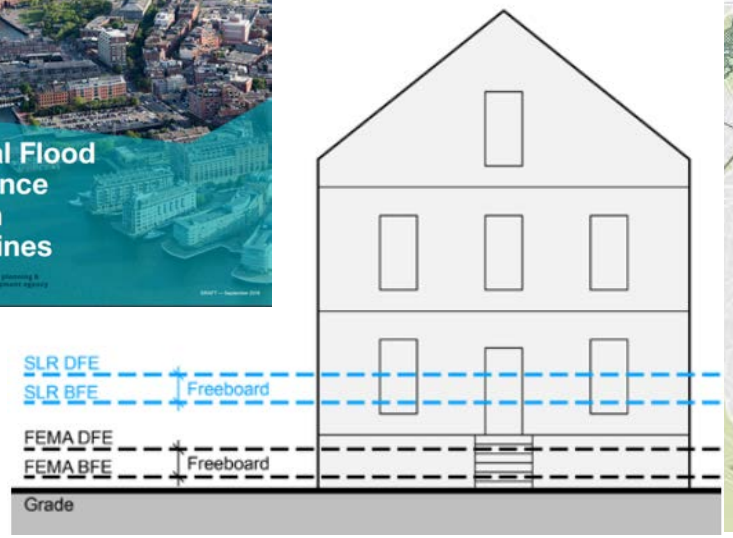
Graduated Flood Zones by Existing Risk

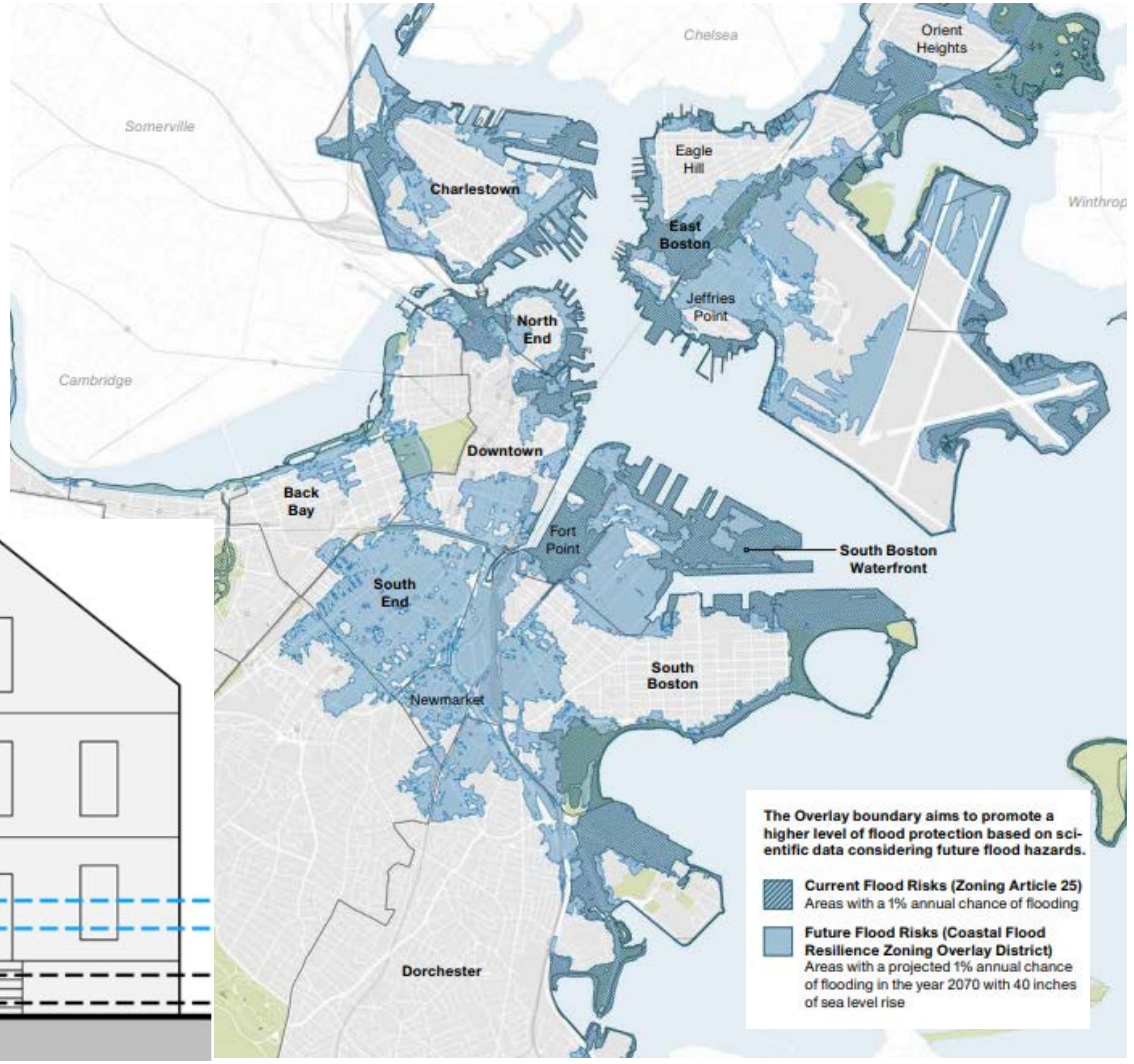


Example:

City of Boston Coastal Flood Resilience Zoning Overlay

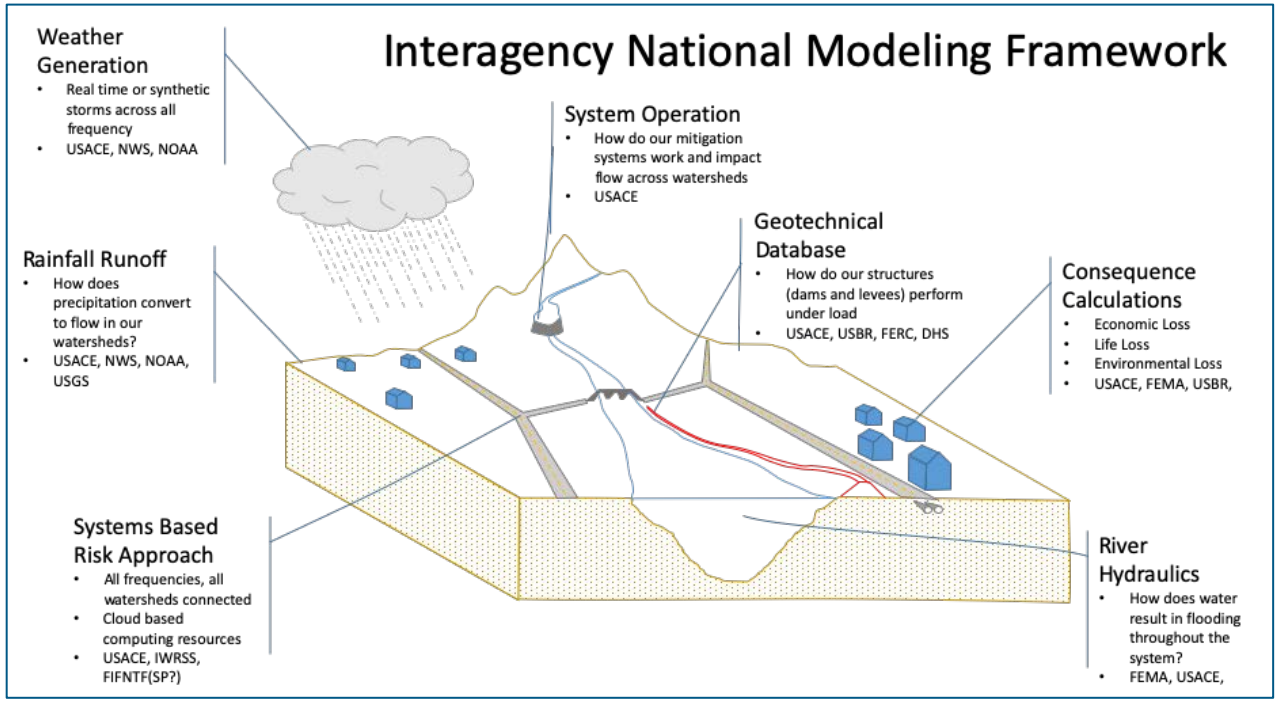


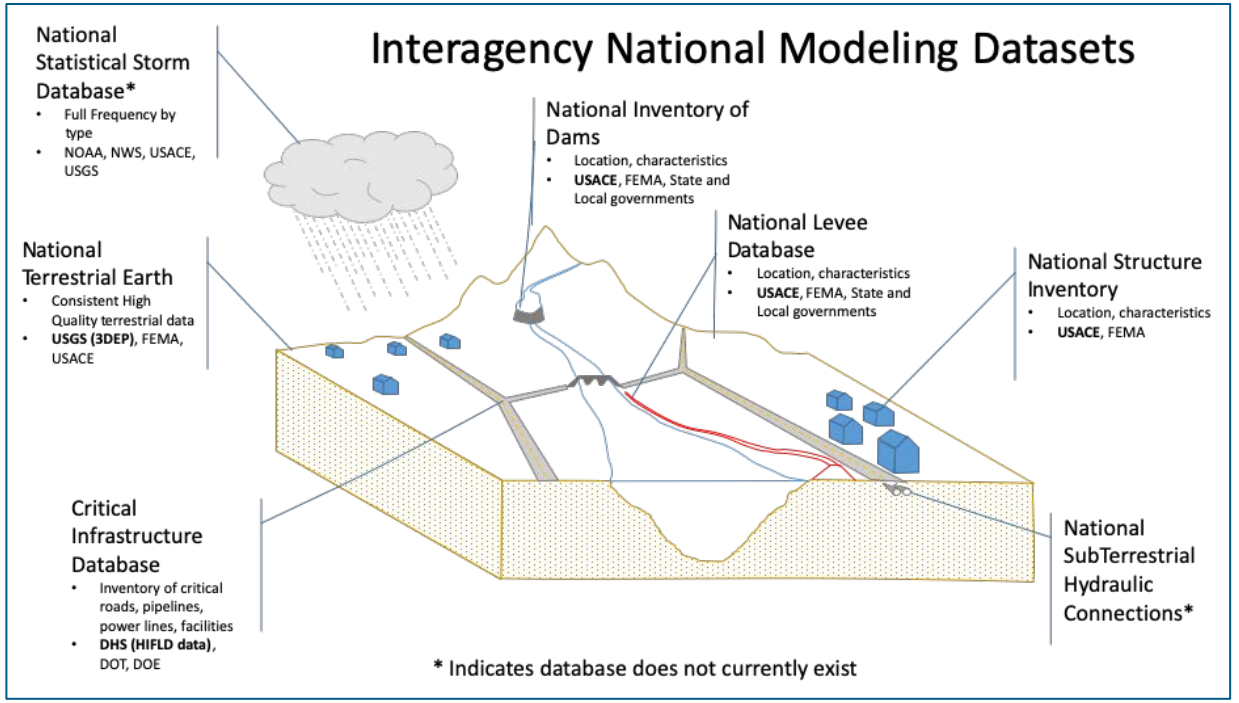




Authorities of FEMA and Other Federal Agencies

The increased data set and methodology for the shift to graduated risk can't be done by FEMA alone…





…so we are currently exploring the best way to leverage the strengths of our federal, state, local, tribal, and territorial community partners to develop and deliver graduated risk data.

FEMA | USGS | USACE | IWRSS | NOAA | NWS

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RiskMAP
Increasing Resilience Together

Q &A

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