

Southern Municipal Finance Society

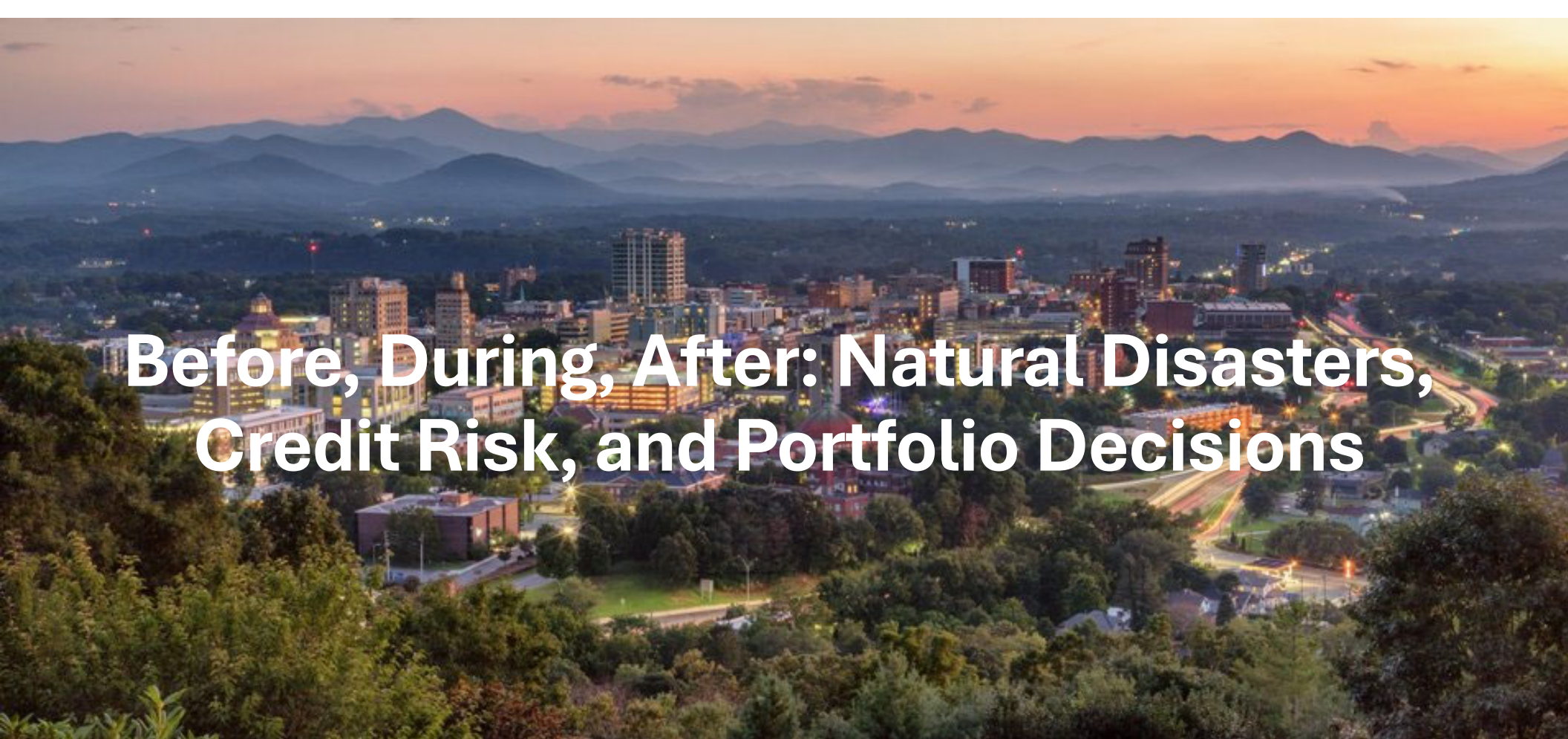


Disaster Recovery, Rebuilding, and Resilience Conference

September 23 – 25, 2026

**Before, During, After:
Natural Disasters,
Credit Risk, and
Portfolio Decisions**





Before, During, After: Natural Disasters, Credit Risk, and Portfolio Decisions

Moderator:

James Dearborn, former Director of Municipal Research, DWS

Speakers:

Lauren Patterson, Manager, Research & Product Development, Intercontinental Exchange – Climate

Pat Squeglia, Municipal Research Analyst, Nuveen

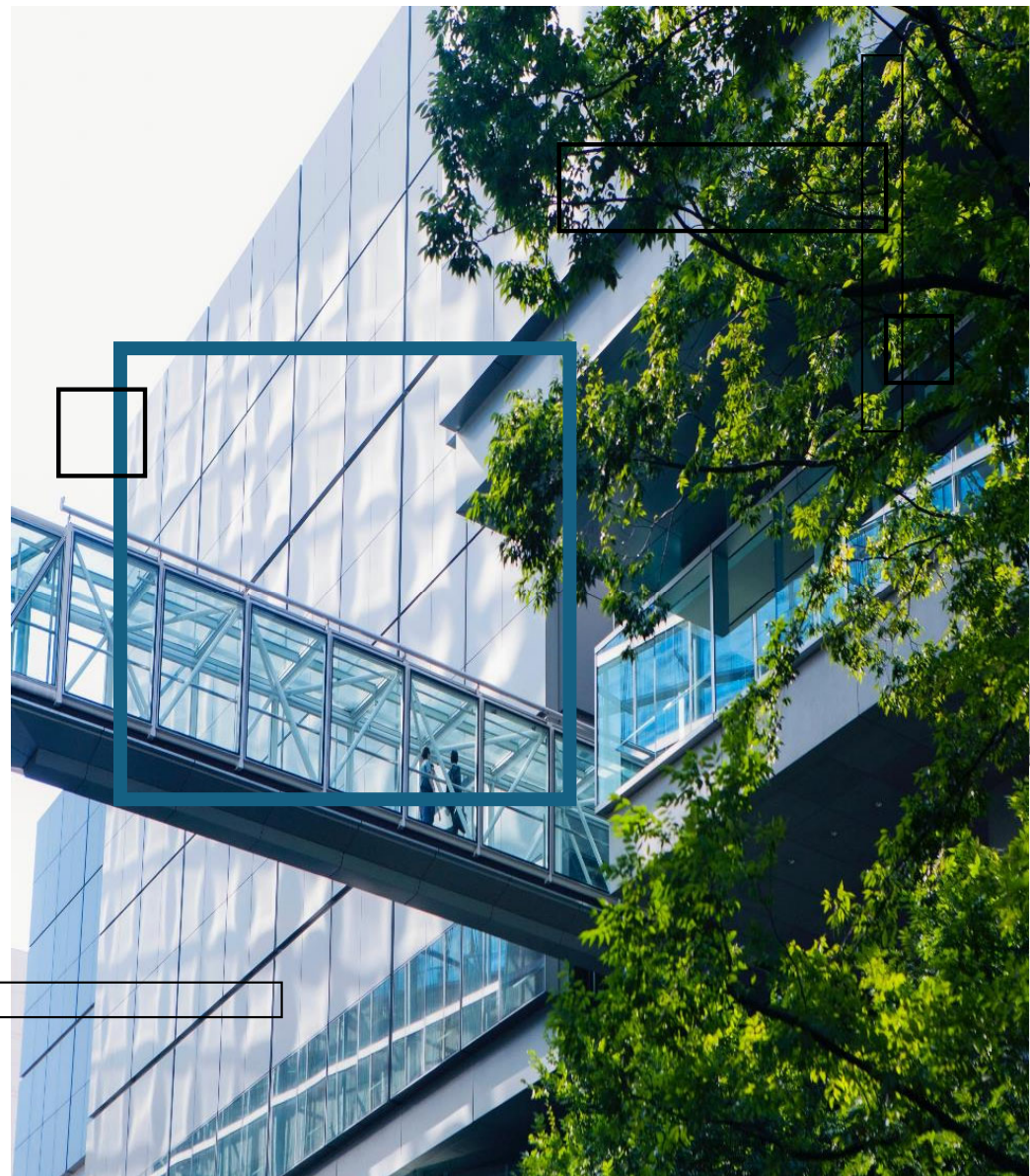
Lisa Washburn, Managing Director, Chief Credit Officer, Municipal Market Analytics



Before, During, After:

**Natural Disasters, Credit Risk,
and Portfolio Decisions**

September 25, 2026



About ICE

Thousands of global organizations in more than 50 countries, including major banks, brokerage firms, and investment management firms, leverage ICE's data solutions

❑ Exchanges

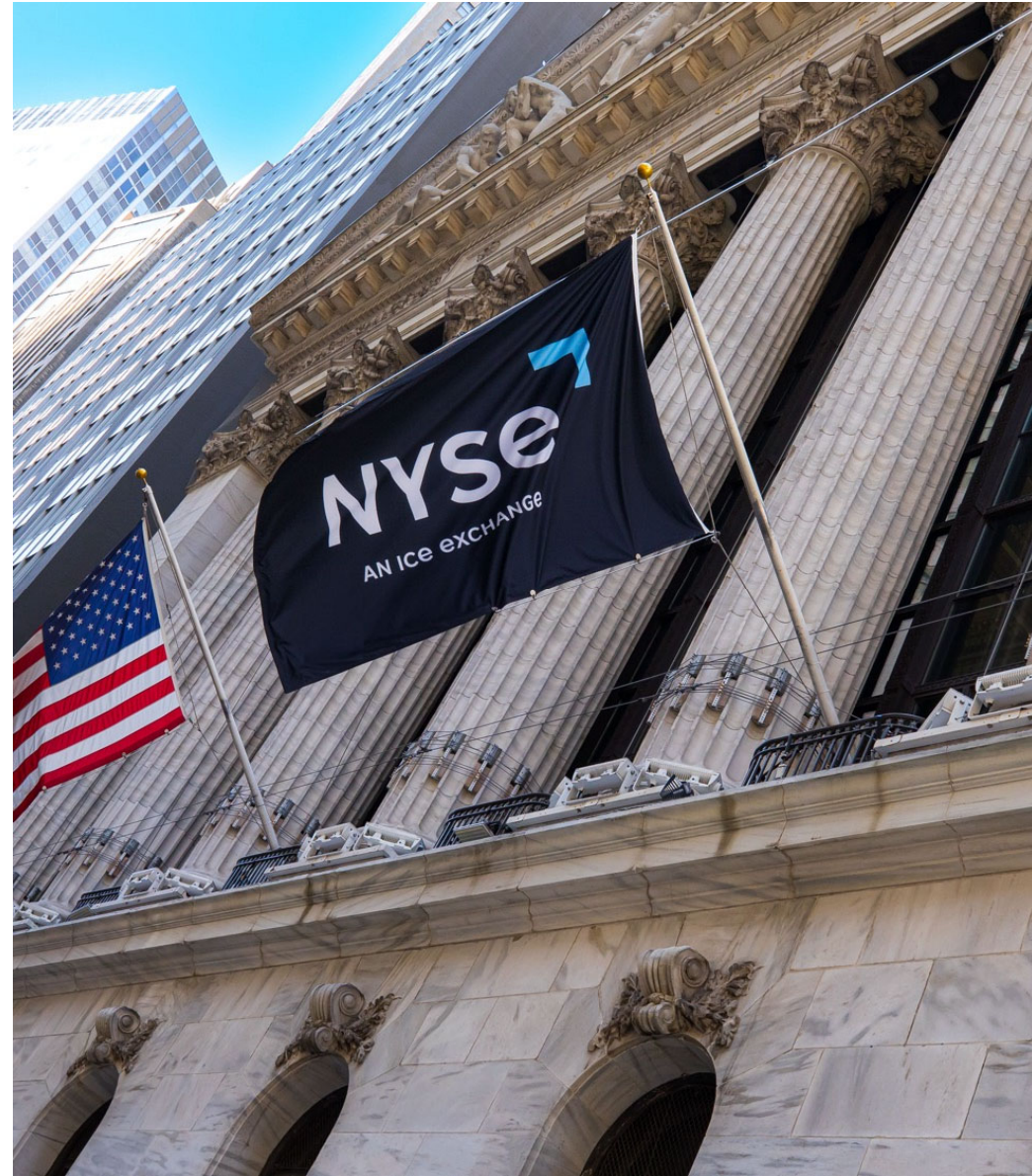
We operate [exchanges](#), including the [New York Stock Exchange](#), and [clearing houses](#) that help people invest, raise capital and manage risk across multiple asset classes.

❑ Fixed Income & Data Services

Our comprehensive fixed income [data services](#) and execution capabilities provide information, analytics and platforms that help our customers capitalize on opportunities and operate more efficiently.

❑ Mortgage Technology

With [ICE Mortgage Technology](#), we are transforming and digitizing the U.S. residential mortgage process, from consumer engagement through loan registration.



The ICE Geospatial Intelligence Platform

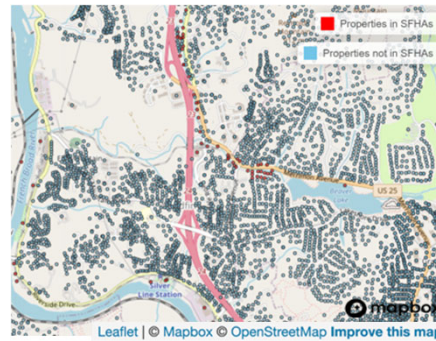
1.6 billion
Global building locations



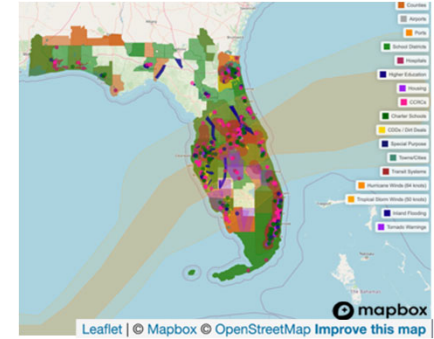
13 million
Corporate asset locations



100+ million
U.S. properties



50,000+
Muni issuers in our geospatial library



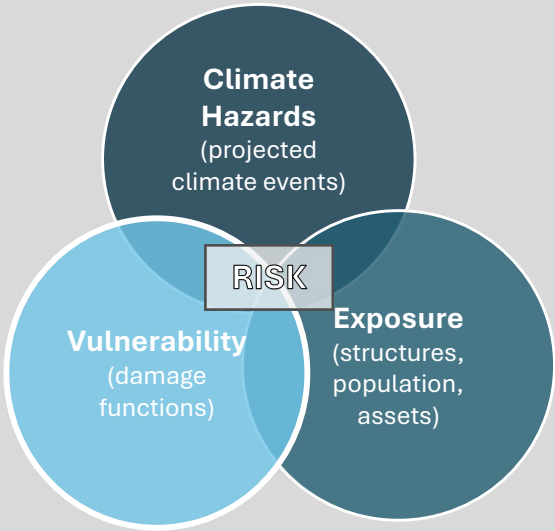
Linking location-specific data to financial assets and securities

Global · Near real time · Multi-asset class

ICE physical risk model

MODEL INPUTS

Climate Hazards
Hurricane Wind Speeds
Wildfire Flame Lengths
Flood Depths
Climate Models and Scenarios
Coupled Model Intercomparison Project (CMIP) - CMIP 5 and CMIP 6
Scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5 (Business as Usual)
Building Footprints (Exposure)
Regrid
Microsoft
ICE Mortgage Technology (attributes)
Damage Functions (Vulnerability)
Federal Emergency Management Agency's (FEMA) Hazus database



Climate & Temperature Metrics

Hazard Layers
Hurricane Wind
Wildfire
Coastal Flood
Fluvial Flood
Pluvial Flood
Extreme Heat
Extreme Cold
Water Stress

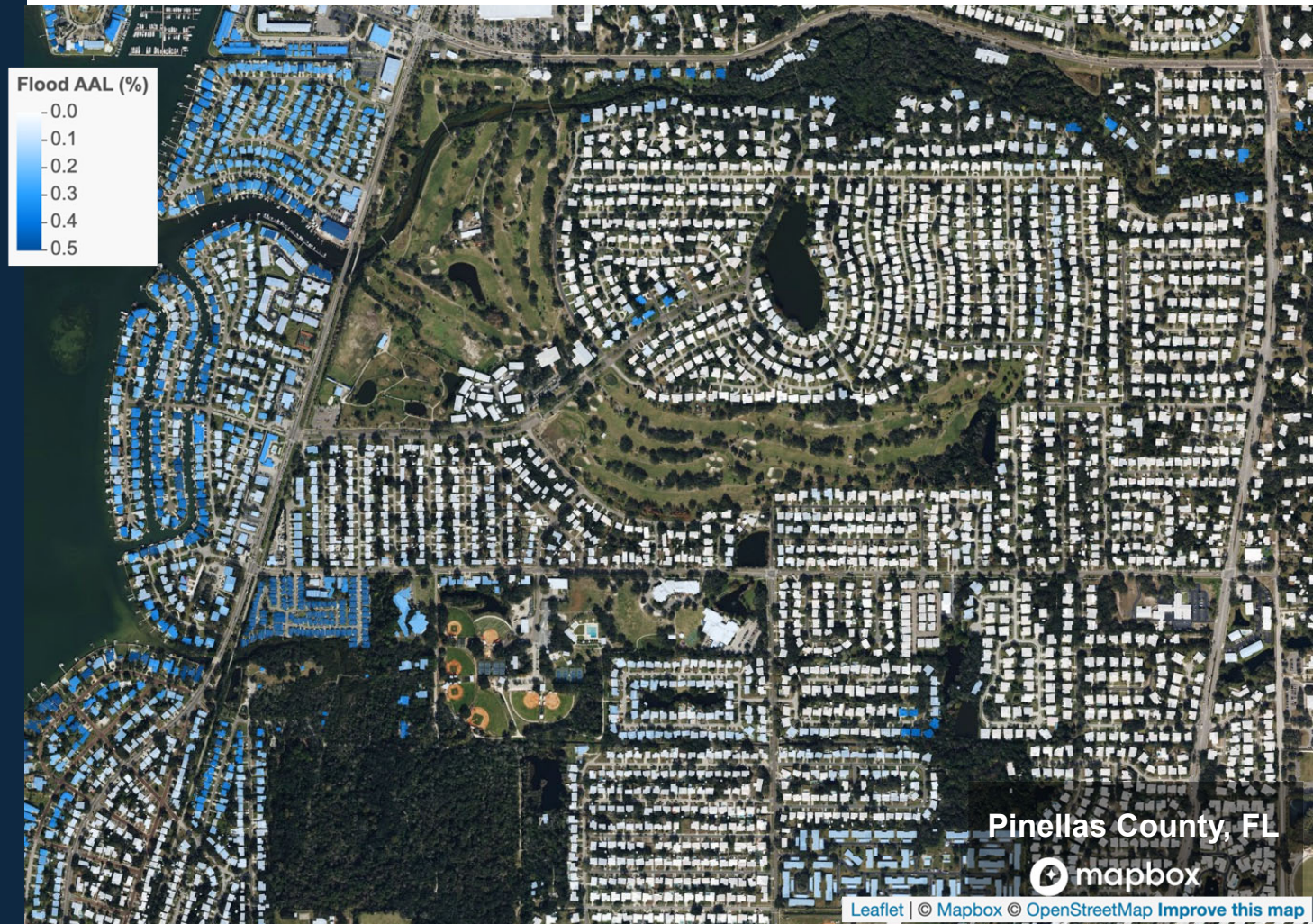
Event Frequencies (Return Periods)
Annual Average Loss (AAL)
100-year (1 in 100 probability)
200-year (1 in 200 probability)
500-year (1 in 500 probability)

Climate Scenarios
SSP1-2.6 (Sustainability)
SSP2-4.5 (Middle of the Road)
SSP5-8.5 (Business as Usual)

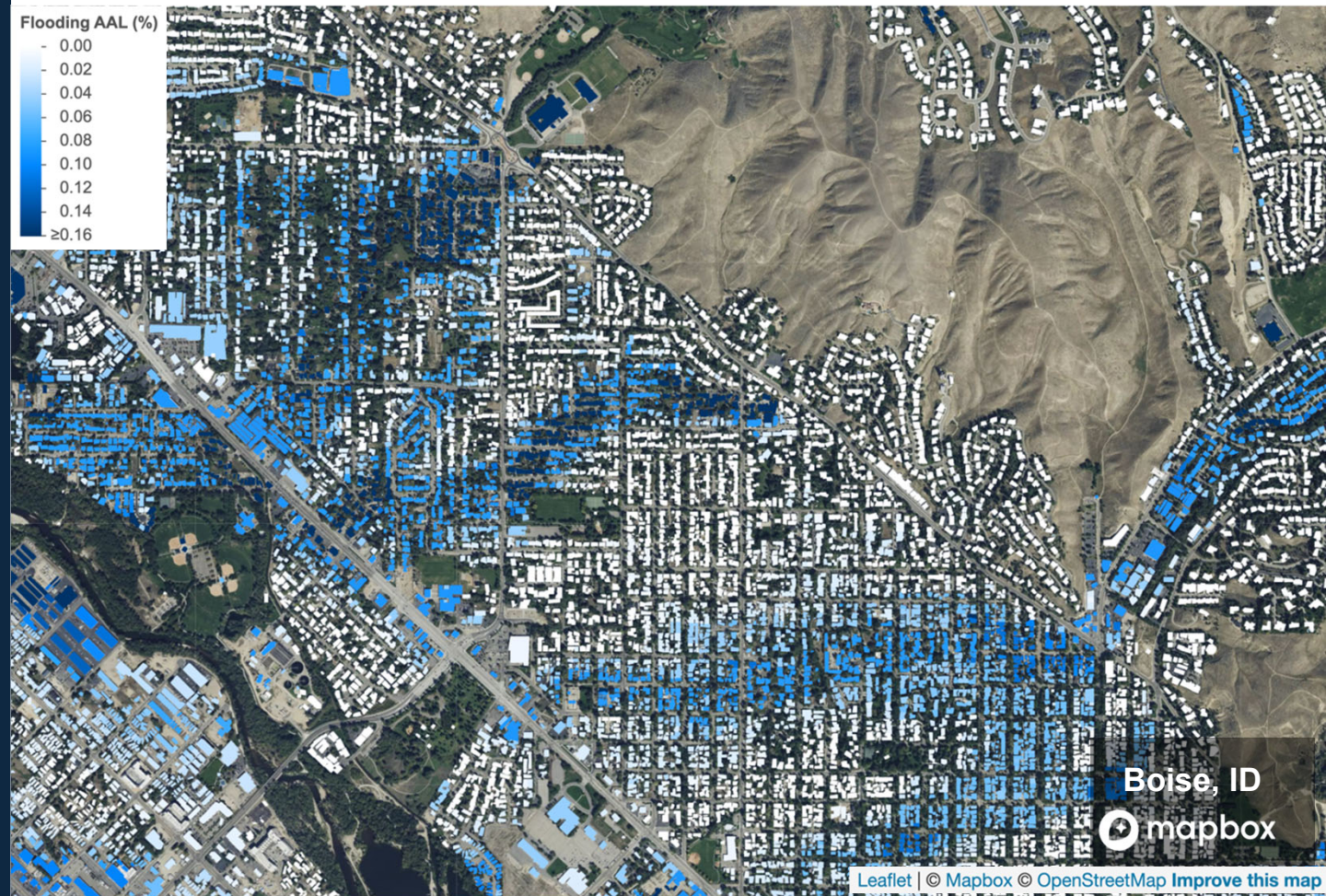
Metrics
Property Value-at-Risk
GDP Impairment
Heating Degree Days
Cooling Degree Days
Worker Productivity
Excess Mortality
Scores

Climate Projections
Every 5 years from 2020 to 2060

- Overlay hazard layers with building footprints using damage functions

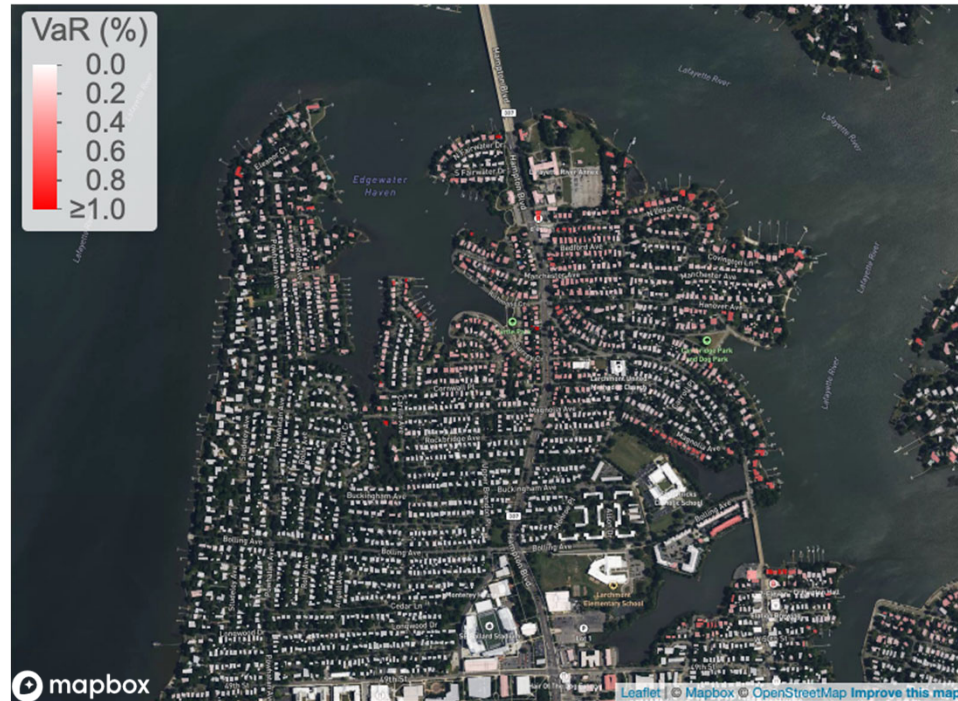


- Overlay hazard layers with building footprints using damage functions

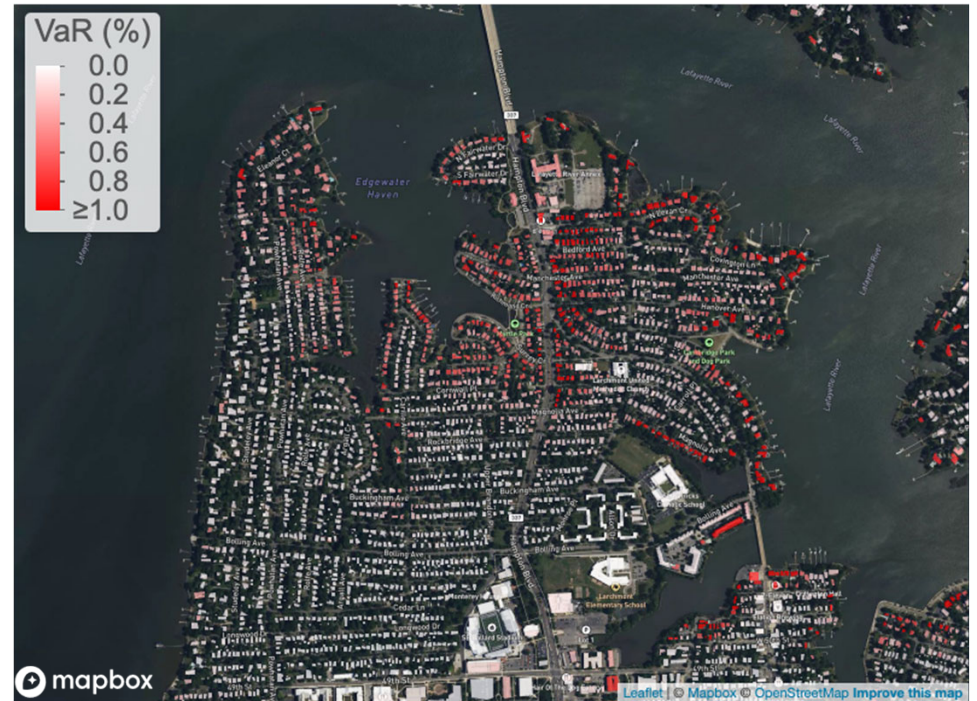


Climate conditioning: projections forward in time

2020: Annual AAL (%)

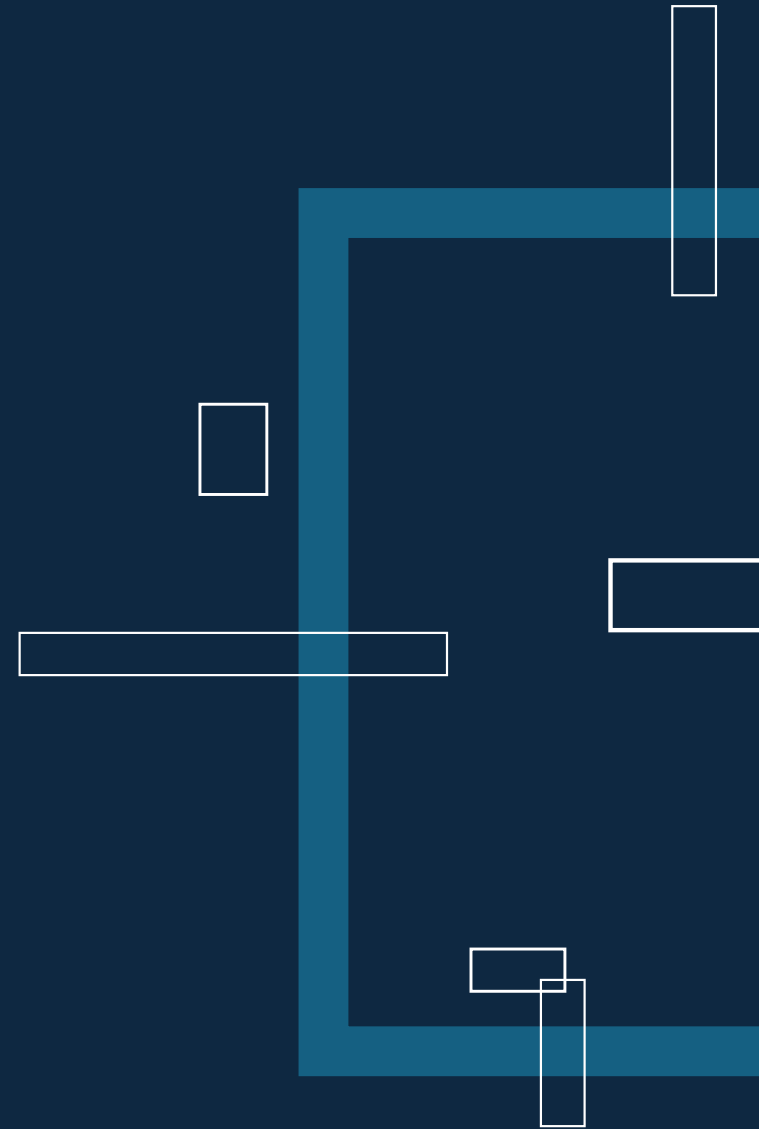


2050: Annual AAL (%)



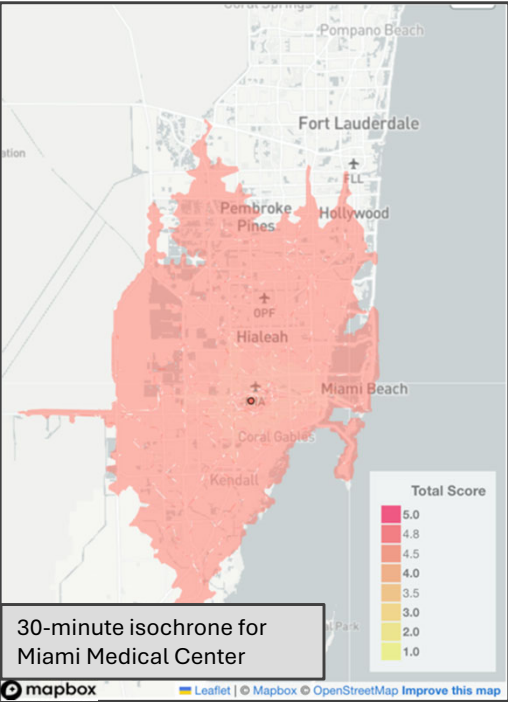
Source: ICE Climate

How do we use building level estimates to assess risk for municipal bond issuers?

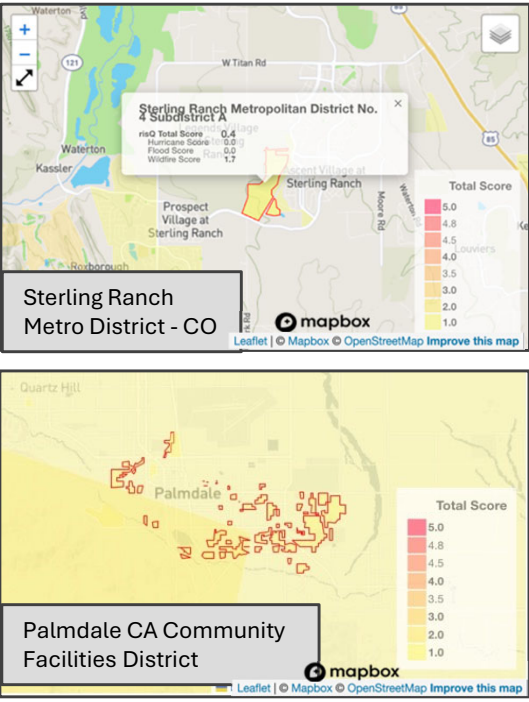


The ICE Muni Geospatial Library

Obligated revenue-generating assets



Special assessment & ad valorem tax bases

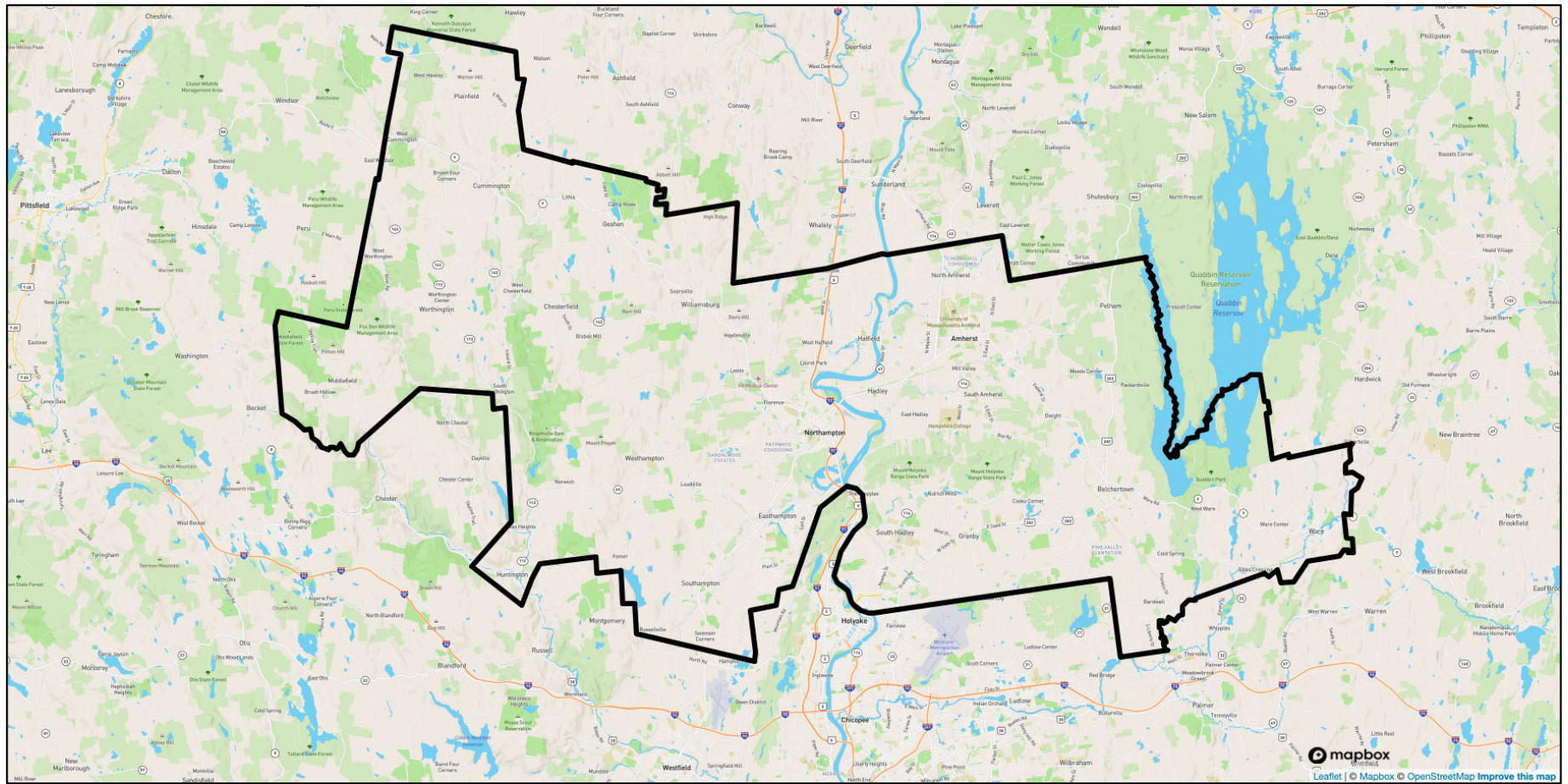


Critical infrastructure service areas



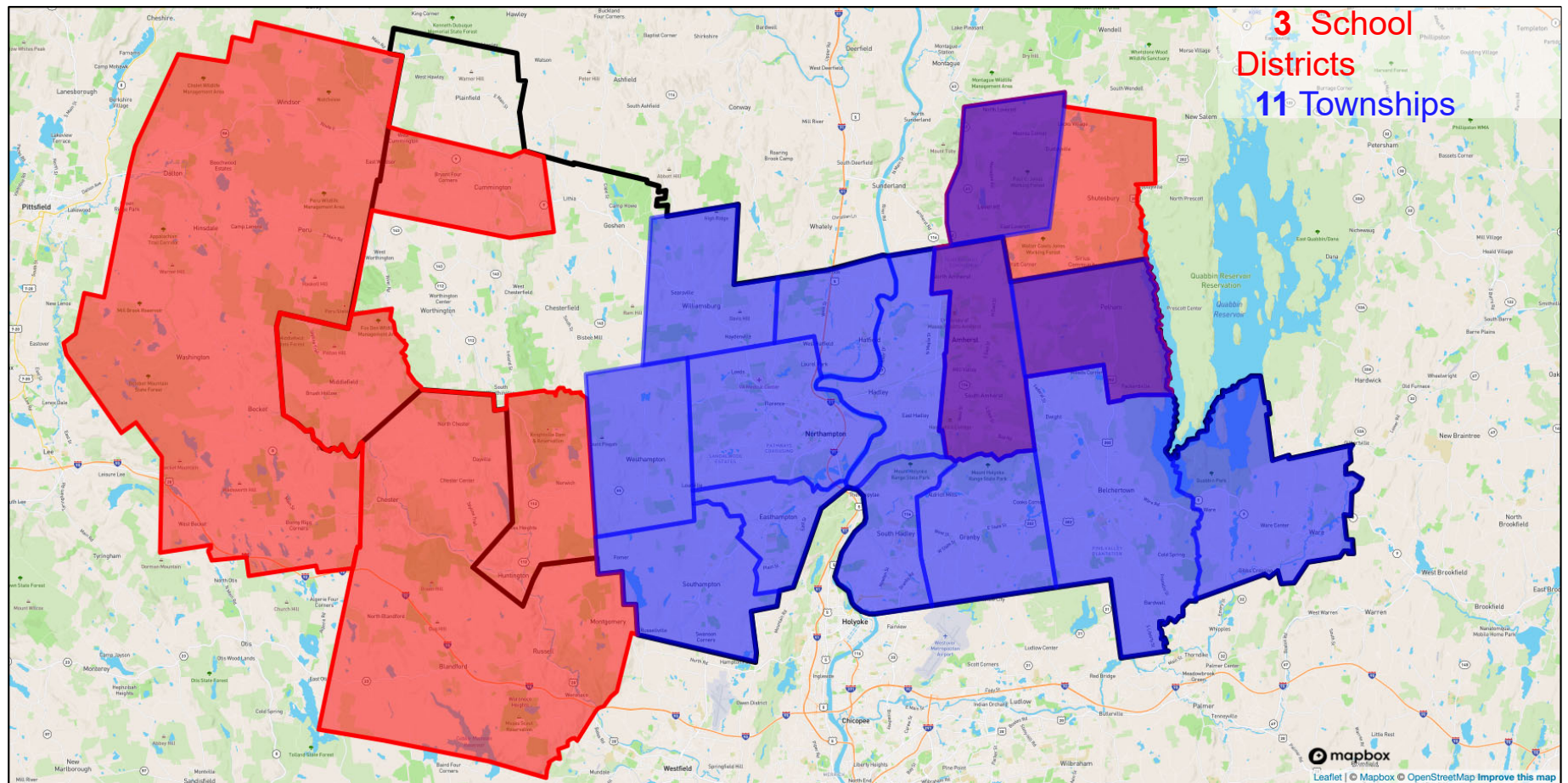
Source: ICE Climate

A geospatial view of municipal debt



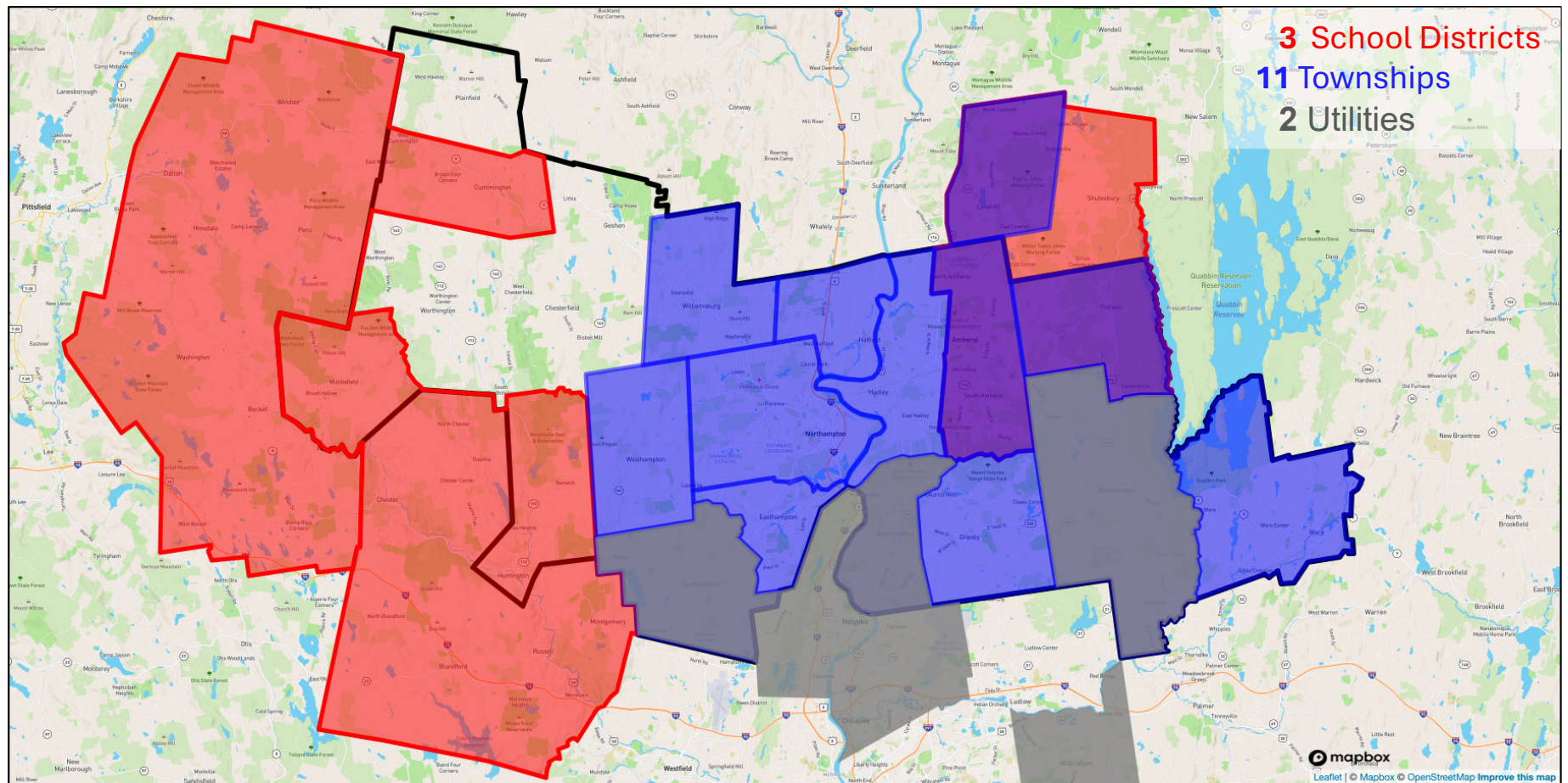
Source: ICE Climate

A geospatial view of municipal debt



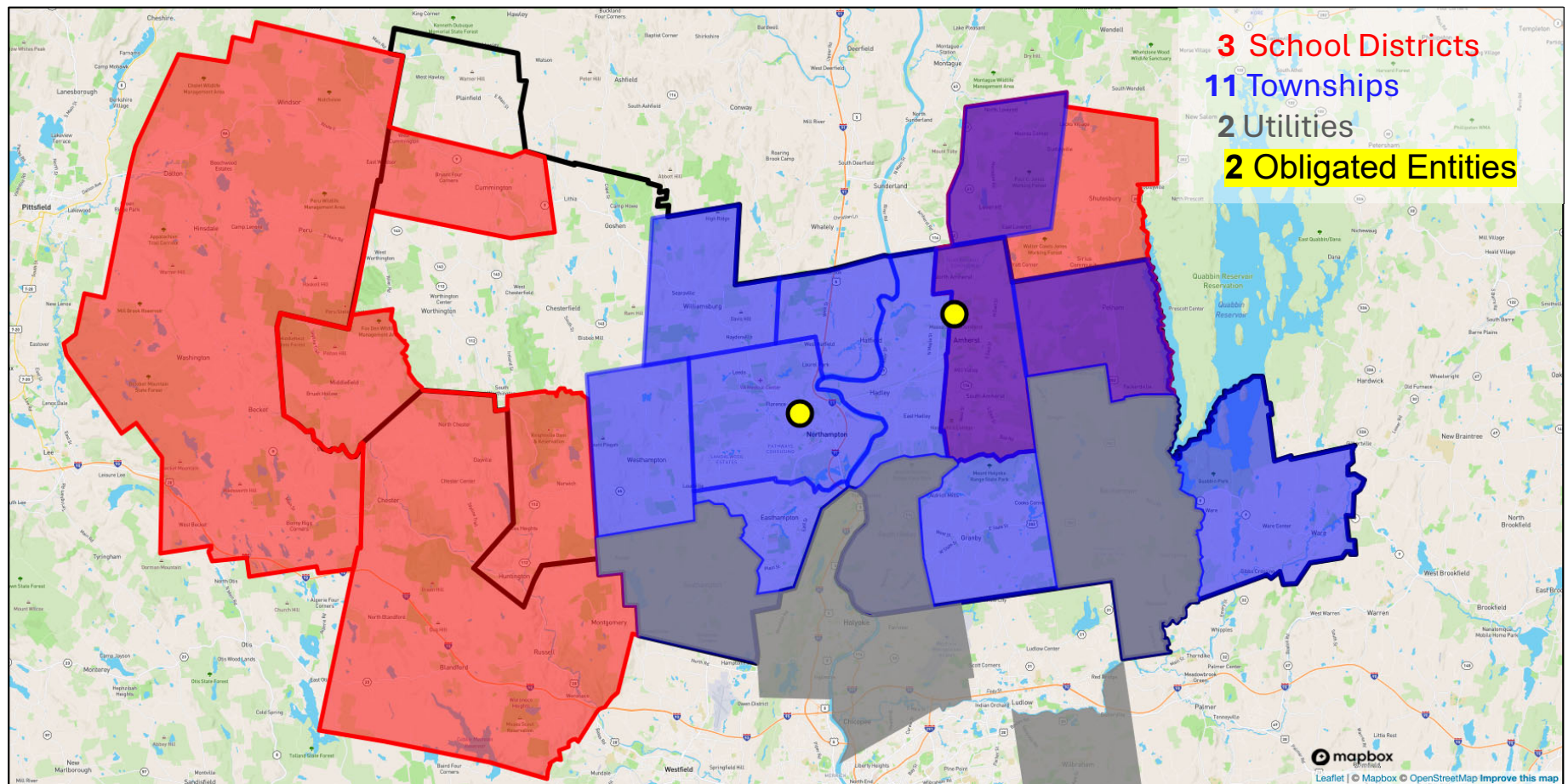
Source: ICE Climate

A geospatial view of municipal debt



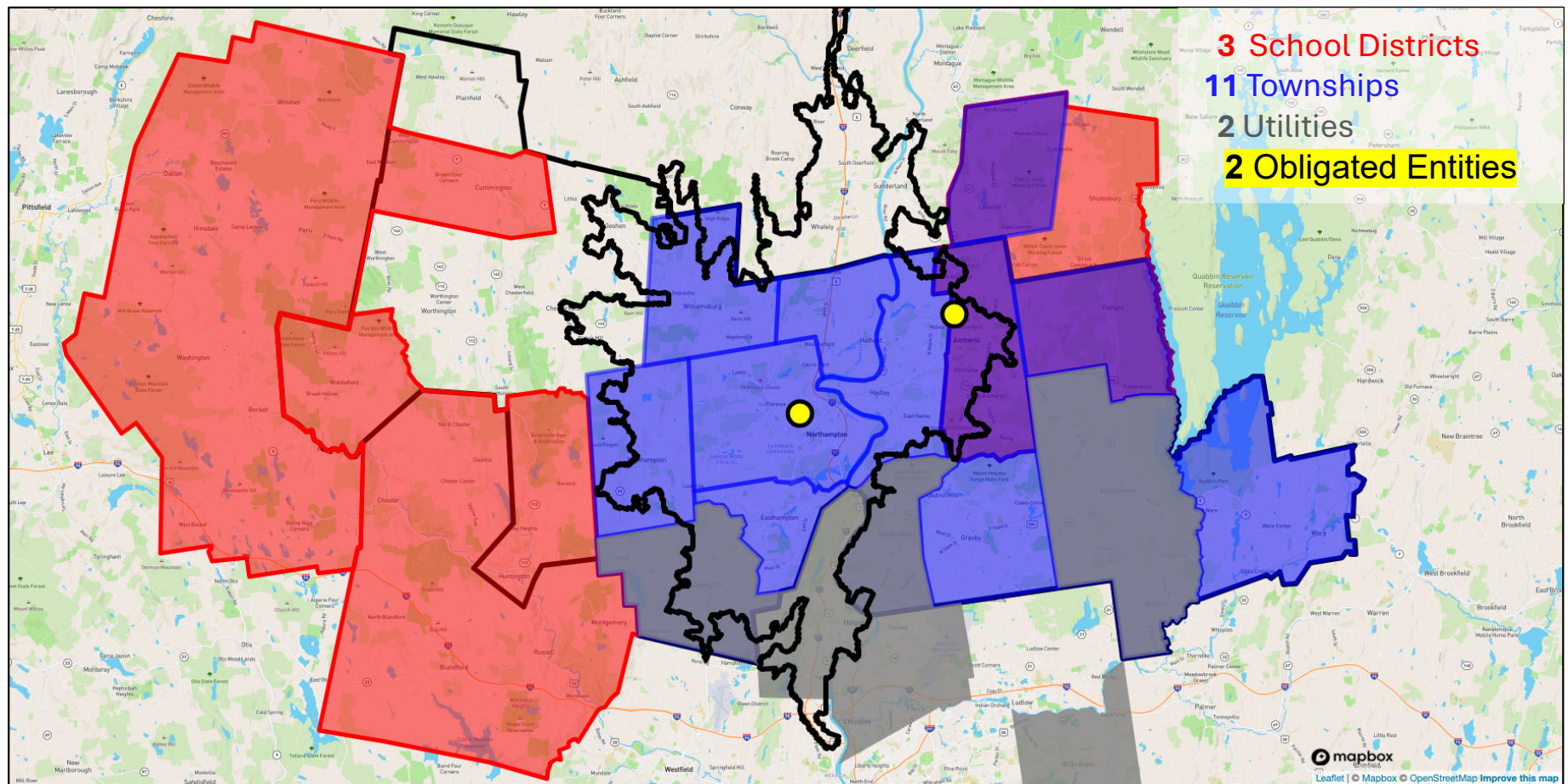
Source: ICE Climate

A geospatial view of municipal debt



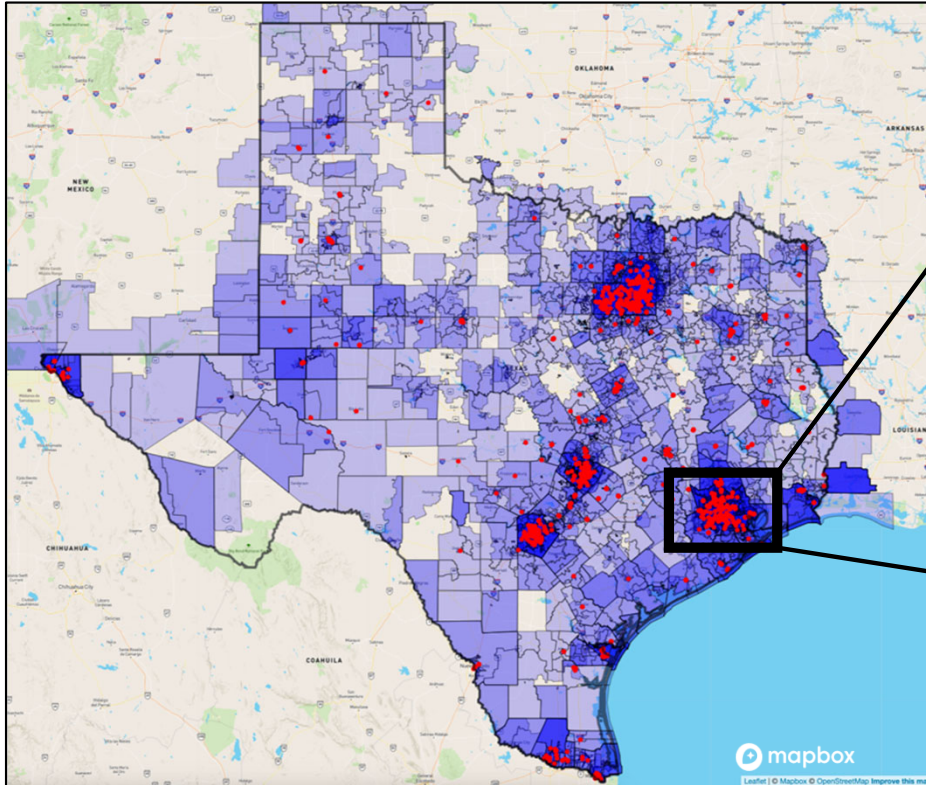
Source: ICE Climate

A geospatial view of municipal debt



Source: ICE Climate

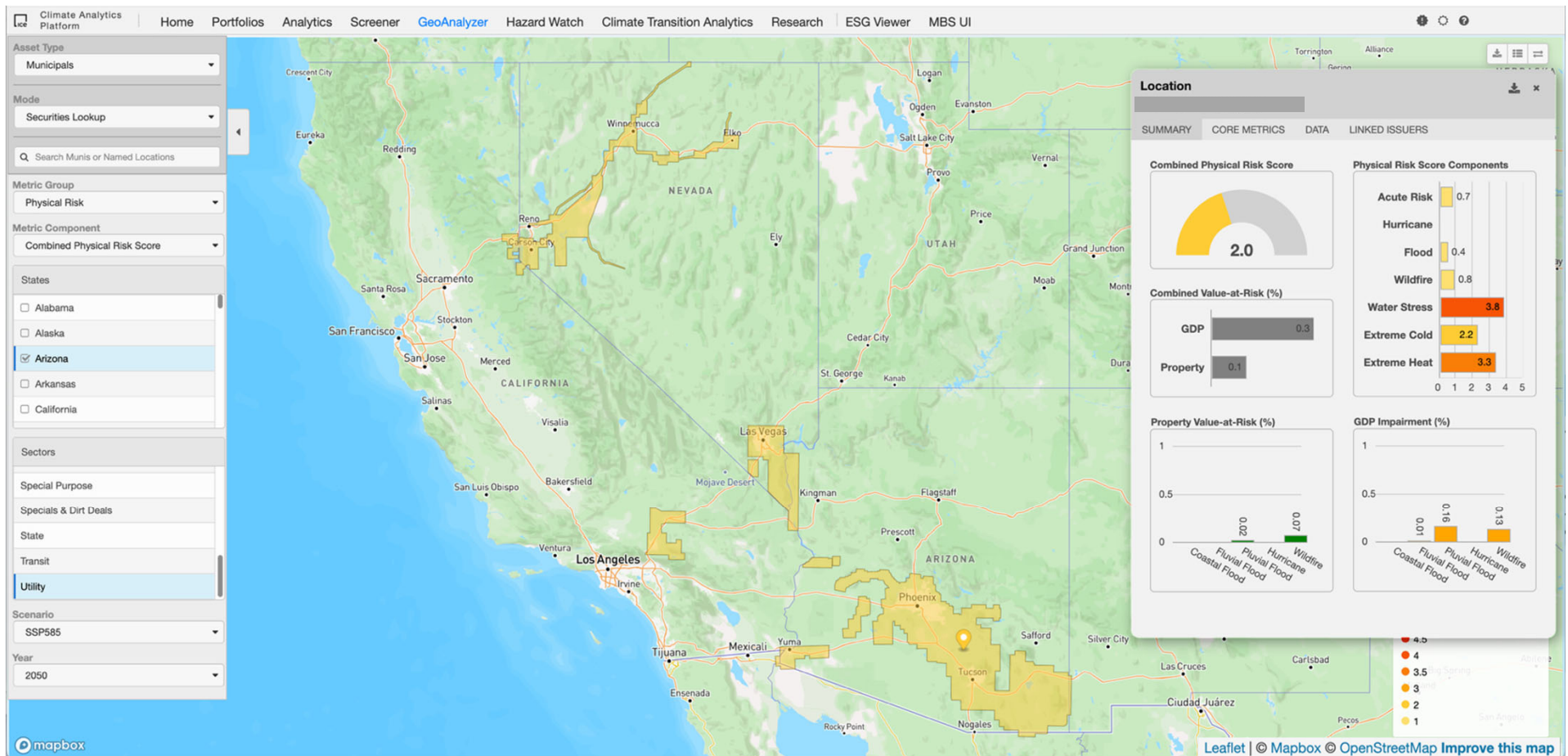
A geospatial view of municipal debt



Source: ICE Climate

- Locations linked to over **940,000 outstanding securities**
- More than **100,000 locations in total** (counties, school districts, towns, census tracts)
- **Weekly new issuer coverage** and security level geotagging

An example



Source: ICE Climate; for illustrative purposes only

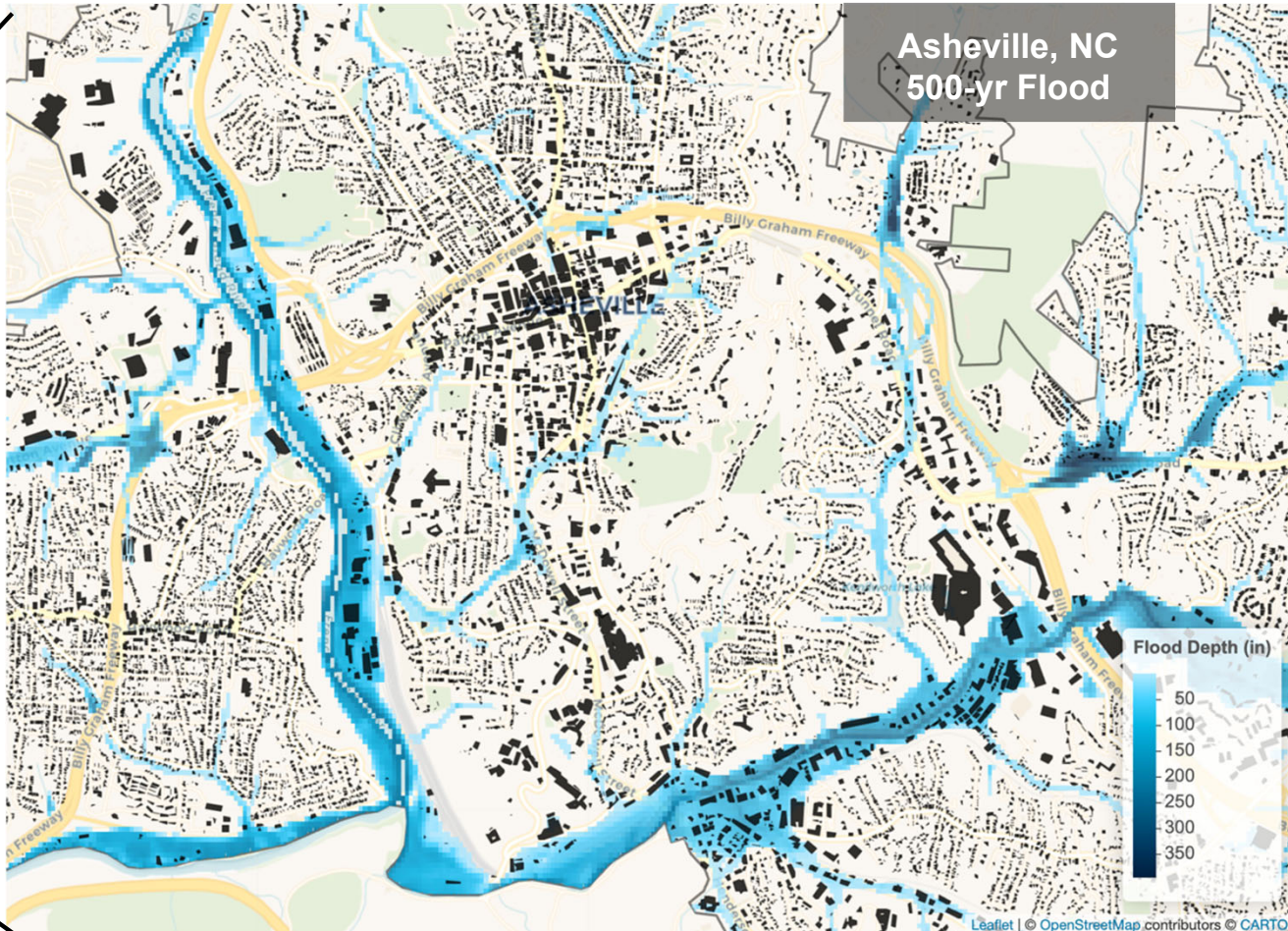
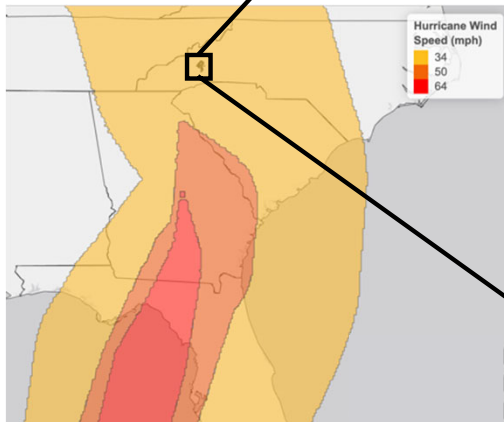
Hurricane Helene 2024

Flood Score: 0.9

Annual Property VaR: 0.07%

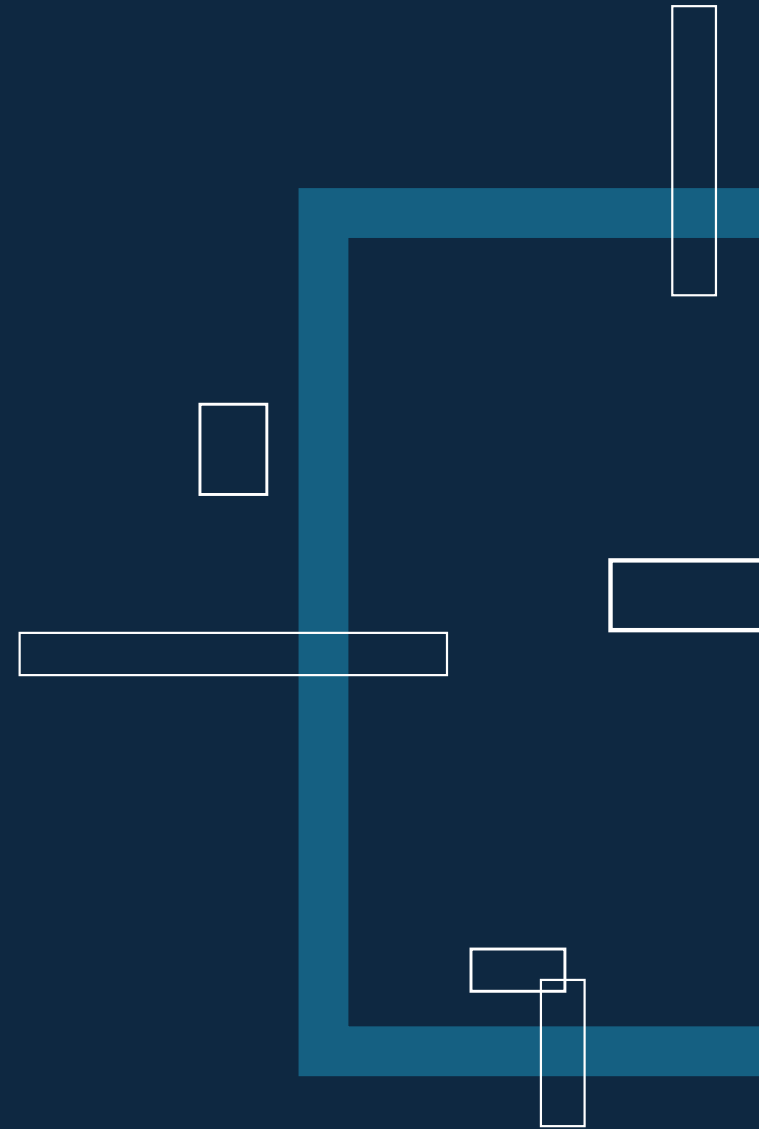
100-yr Property VaR: 1.30%

500-yr Property VaR: 2.04%



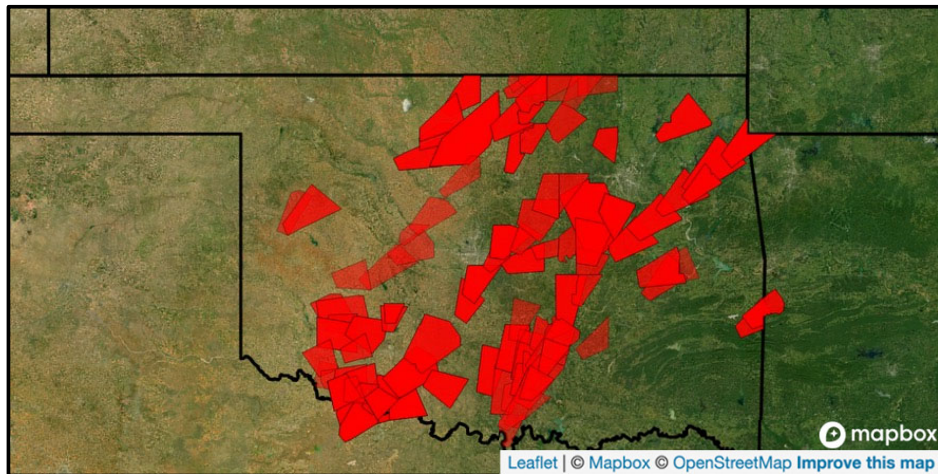
Source: ICE Climate

Hazard Watch: How we equip asset managers to respond to climate driven events

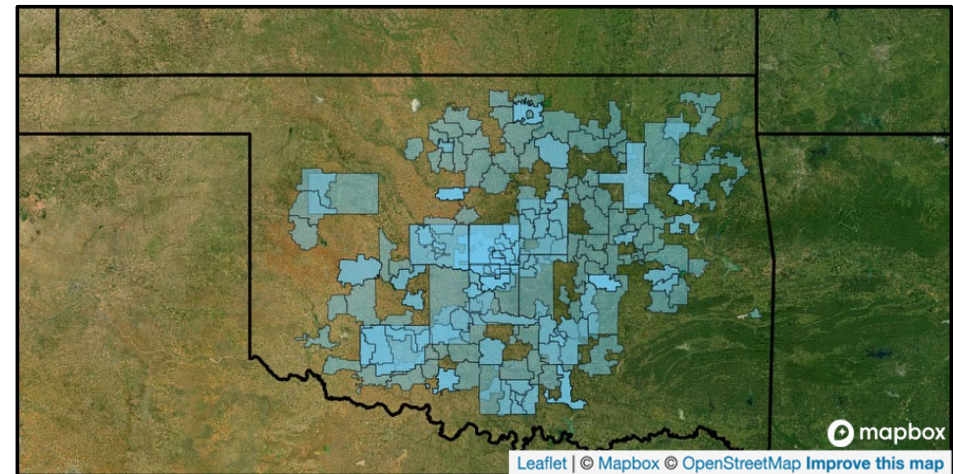


Extreme weather event exposure

April 2024 Tornado Swarm



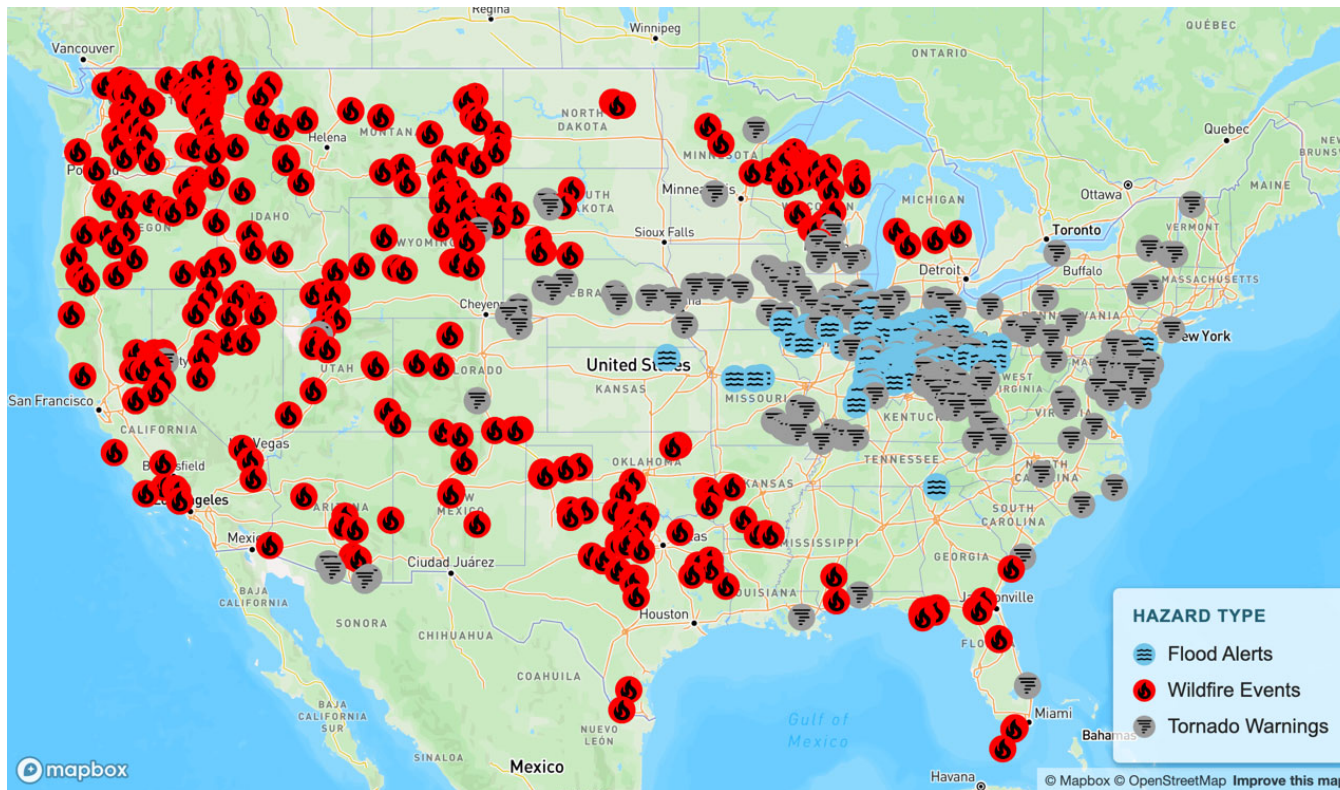
Municipal Bond Obligors



Source: ICE Climate

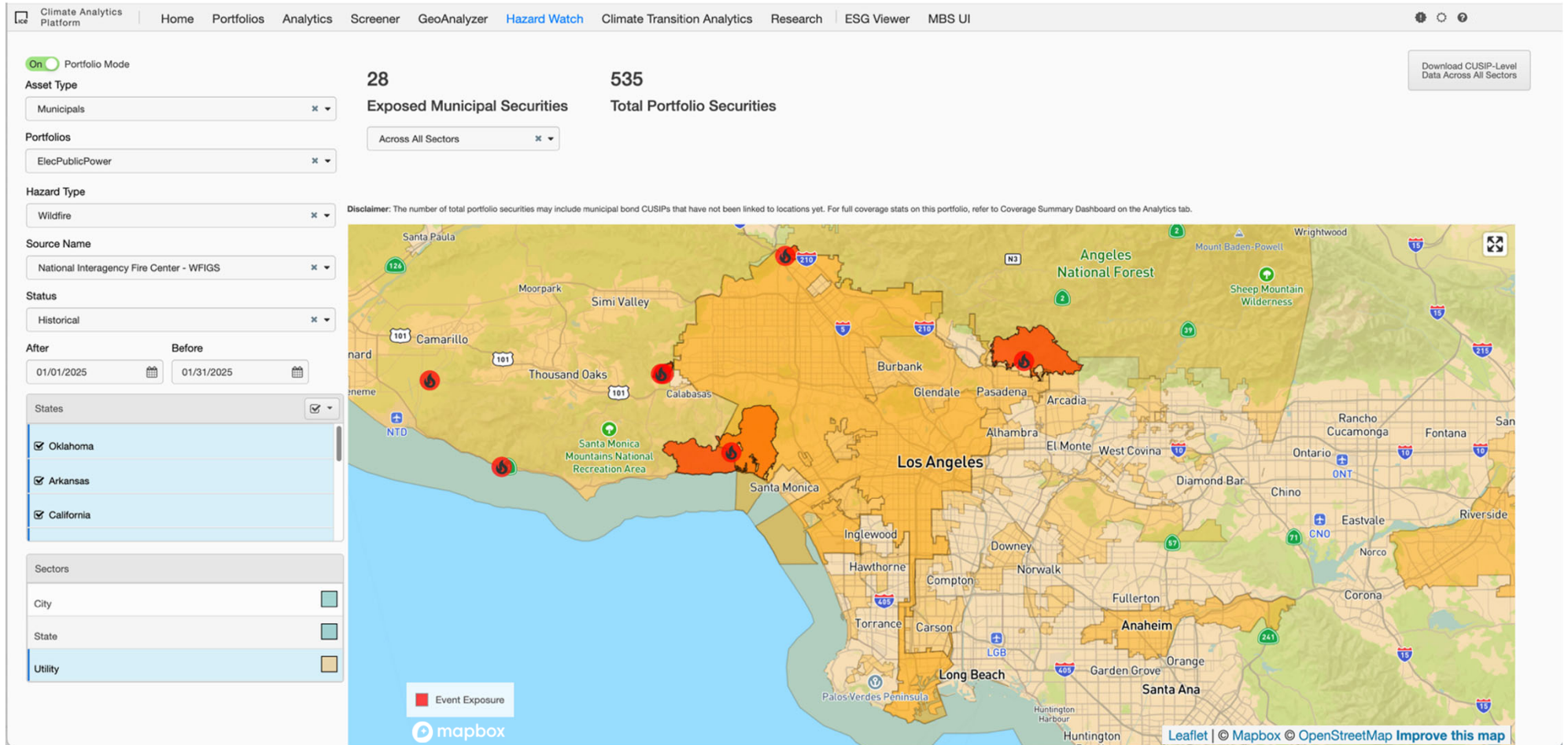
Hazard Watch events (August 2026)

376 | 11K+ | \$70 B | 101 | 18K+ | \$108B
WILDFIRE EVENTS SECURITIES EXPOSED FLOOD ALERTS SECURITIES EXPOSED



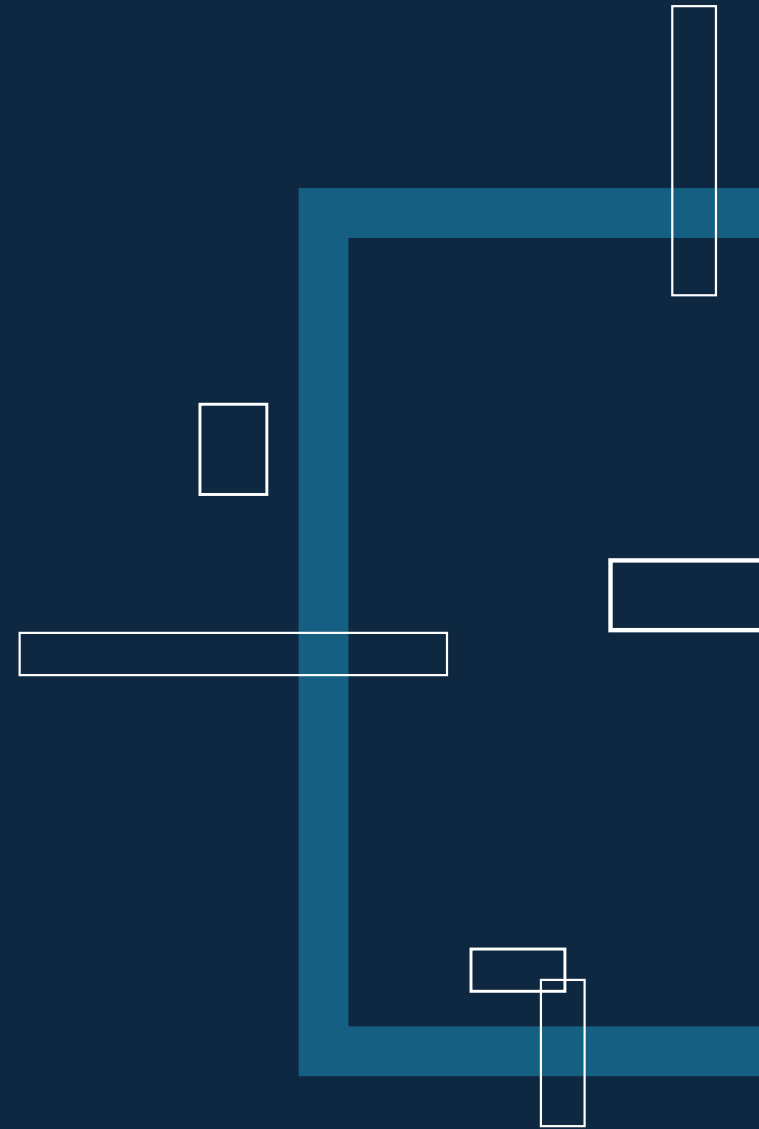
Hazard events monitored across the United States by ICE Hazard Watch in August 2026. Source: ICE Climate, as of 08/31/2026.

Extreme weather event exposure ("Hazard Watch")



Source: ICE Climate; for illustrative purposes only

The financial impact of increased extreme weather events on households



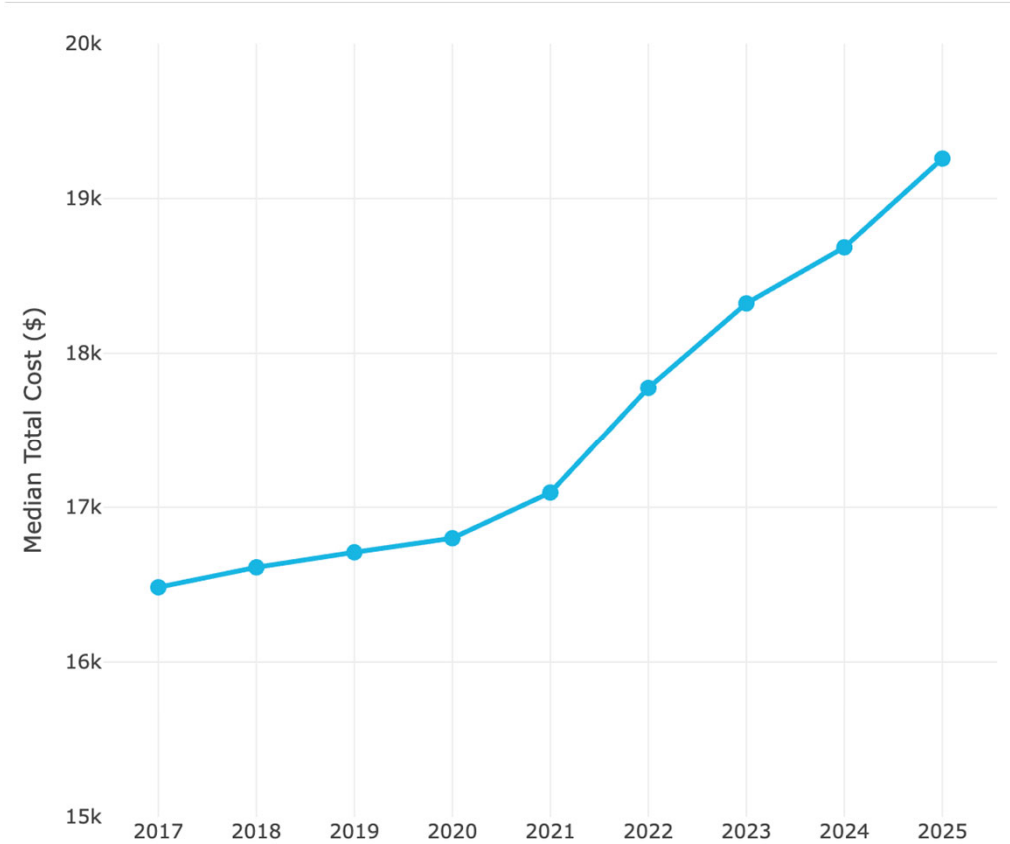
Homeowners have location-specific costs and risks

- Physical climate hazards
- Principle & interest payments
- Property taxes
- Insurance premiums
- Utility bills (water and energy)



These can change **geographically, year-by-year and month-by-month** – depending on local and state policy, home heating fuel sources, utility service rates, local weather patterns and climate risk.

A fixed-rate mortgage does not mean fixed housing costs



- For the average homeowner that bought in 2017 with a fixed rate mortgage, housing costs are estimated to have increased by 17%
- Variable costs have grown by 40% from 2017 to 2025
- By the end of 2025, half of costs are variable (insurance, property tax, and utilities)

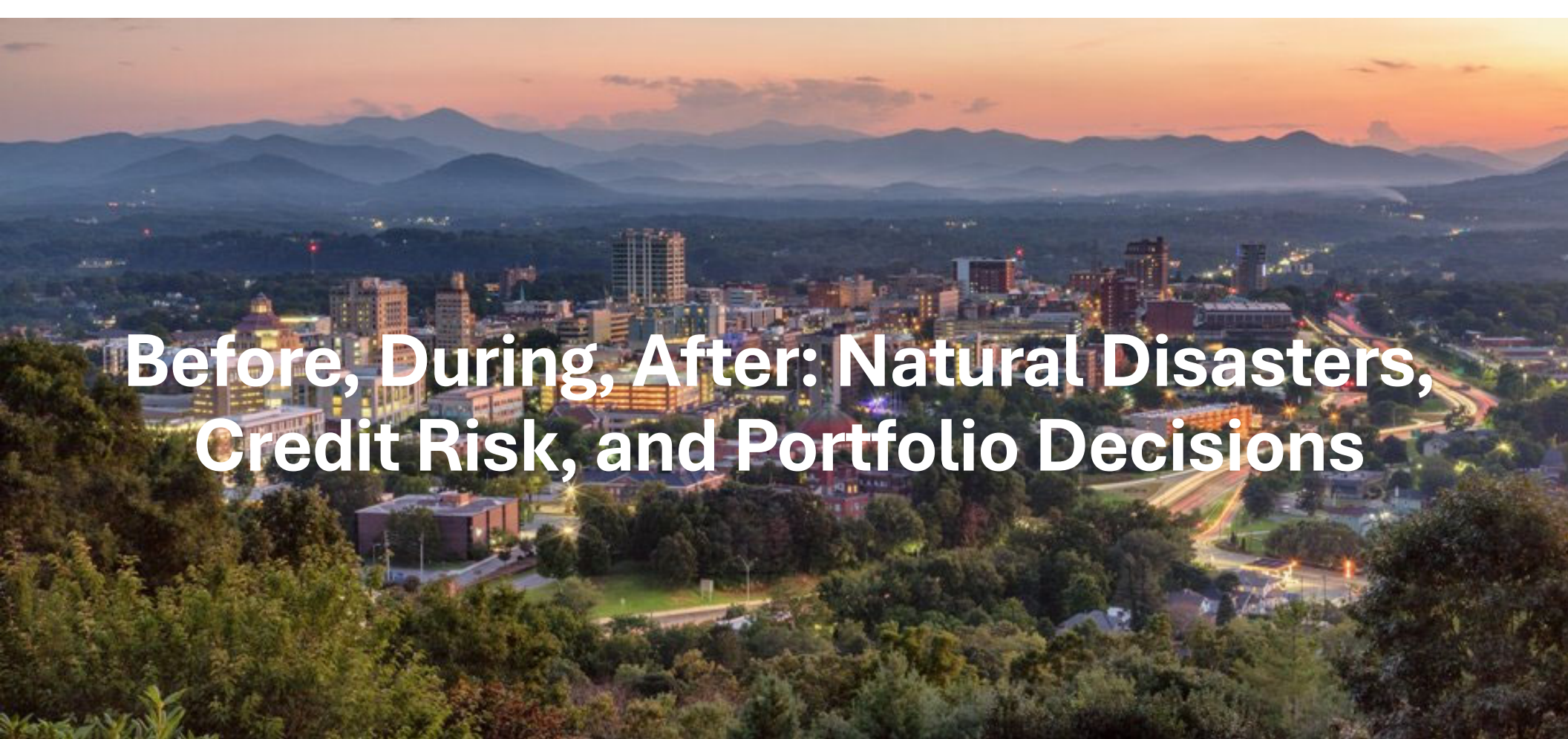
Source: ICE Climate

Takeaways

- ❑ ICE Climate builds datasets that link **location-specific information about financial assets** to securities
- ❑ Physical climate risk, near real-time hazard exposure, home affordability (including energy cost estimates), and obligor-specific socioeconomic, health, environmental, demographic, employment, and education data
- ❑ These datasets help enable asset managers and investors to identify assets with high climate risk or affordability-burdened customer bases, compare the exposure of one asset against another, and understand overall portfolio exposure.

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QUESTIONS?



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