

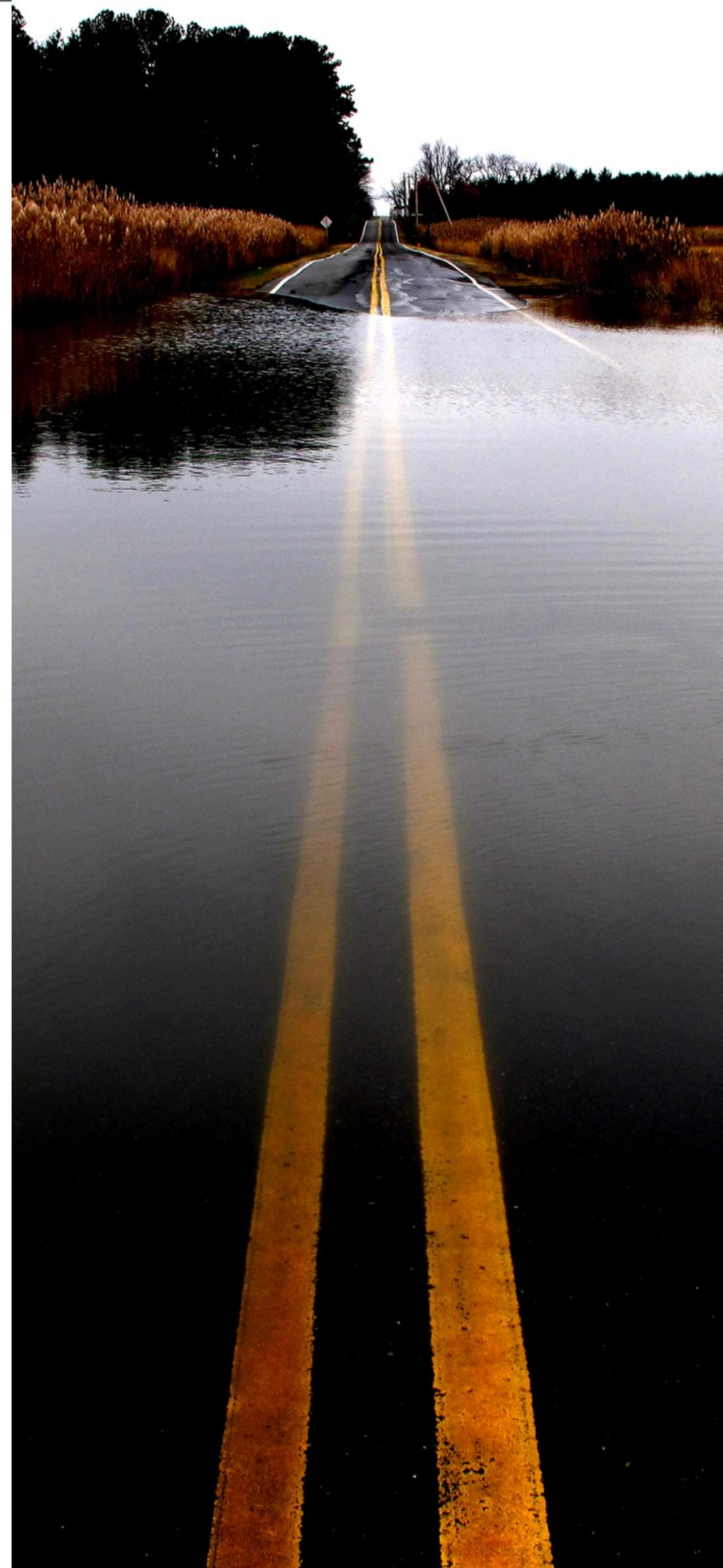
Advisory Committee on Data for Evidence Building (ACDEB) Meeting | April 23, 2021

## Communicating climate change risk through the use of US Government open data



A nonprofit formed to communicate risks from climate change to individual Americans - starting with flood risk.

We recognize an urgent need for consistent, property-level, publicly-available flood risk information for the entire United States.

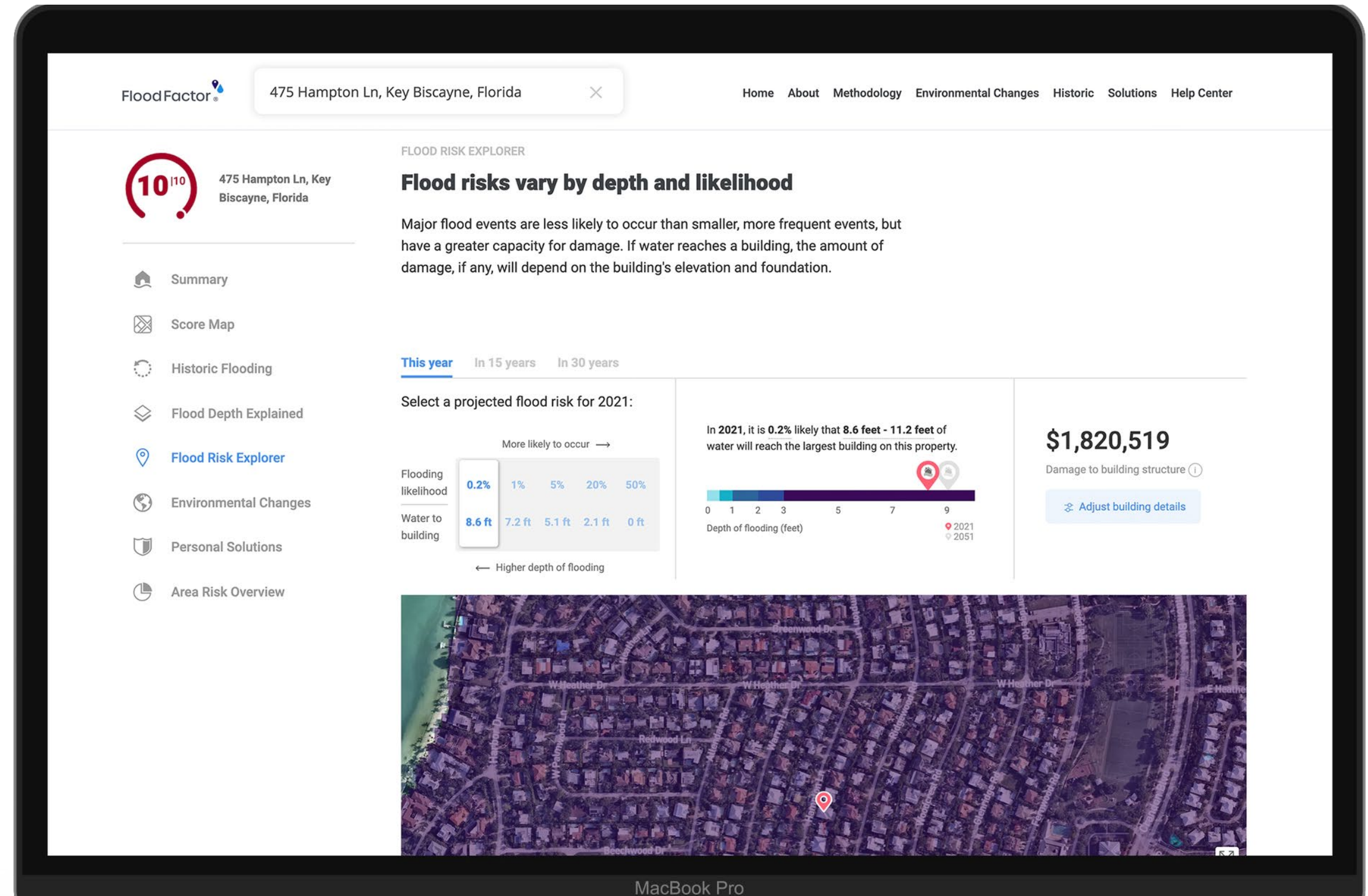


By democratizing this scientific, peer-reviewed flood risk data, First Street empowers Americans to protect their most valuable asset – their homes.

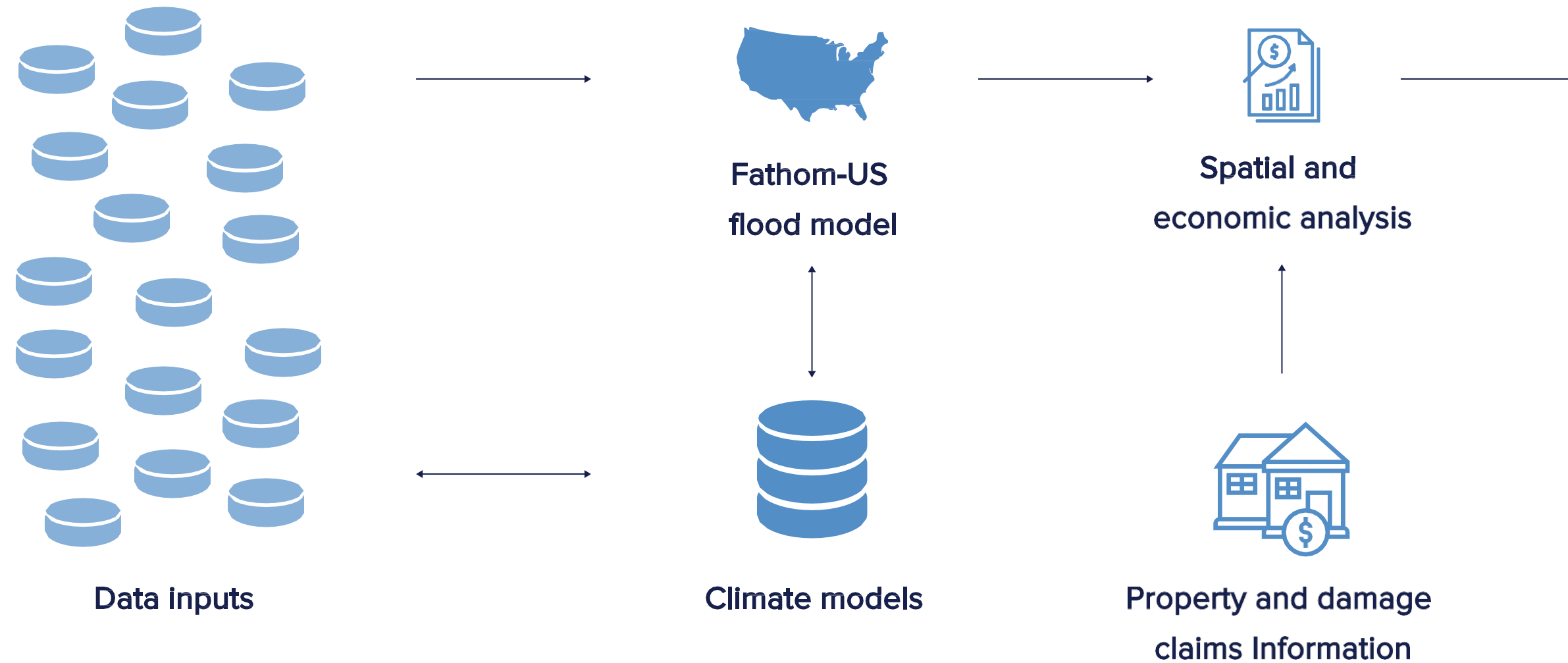
First Street built an expert team to develop the first comprehensive, publicly available flood risk assessment for each of 140M properties in the contiguous US.

# FloodFactor.com

Starting with the end product first, we will then discuss how we got here, using US Government open data as our foundation.



# Challenge: Distill many different data sources into easily consumable information.



## FloodFactor®

Every property in CONUS gets 2 numbers

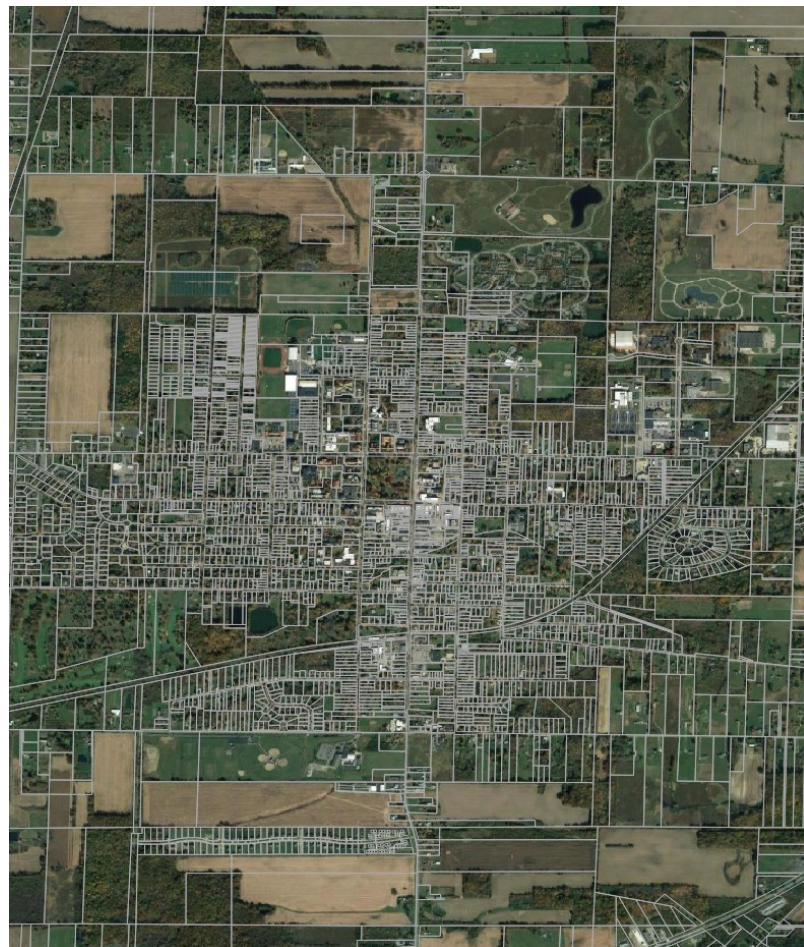
1. Risk Score 1-10
2. Expected Losses \$

Used by:

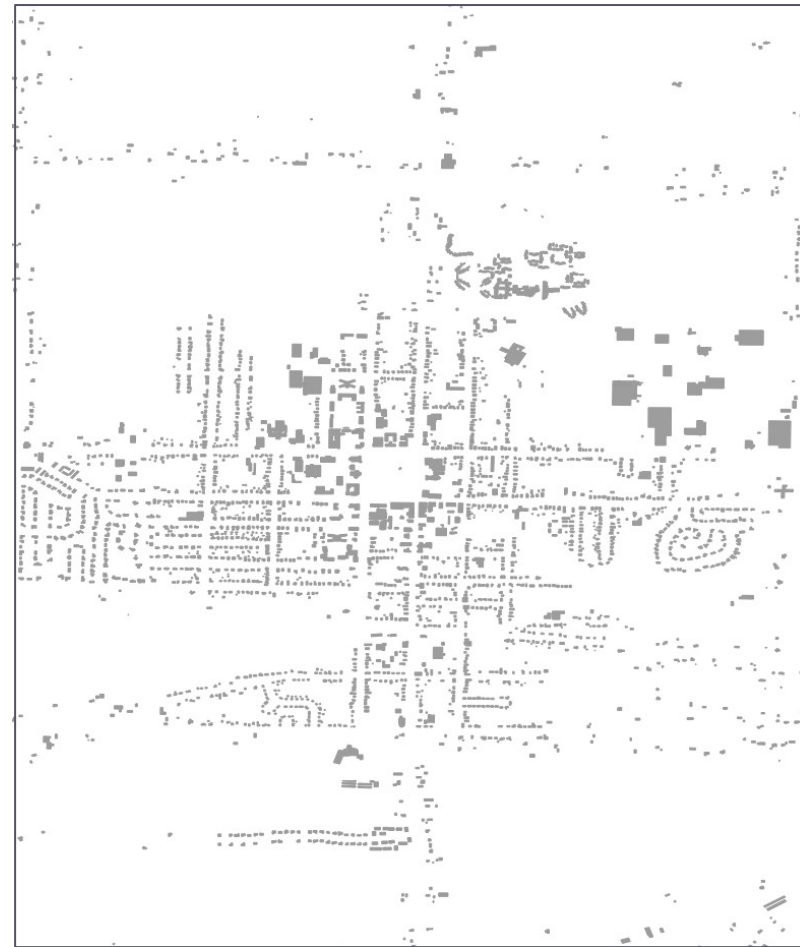
- Individuals
- Governments
- Businesses

We began by modeling every major flood type, incorporated climate change projections, and then mapped that risk onto every property in the US, using open and transparent methods.

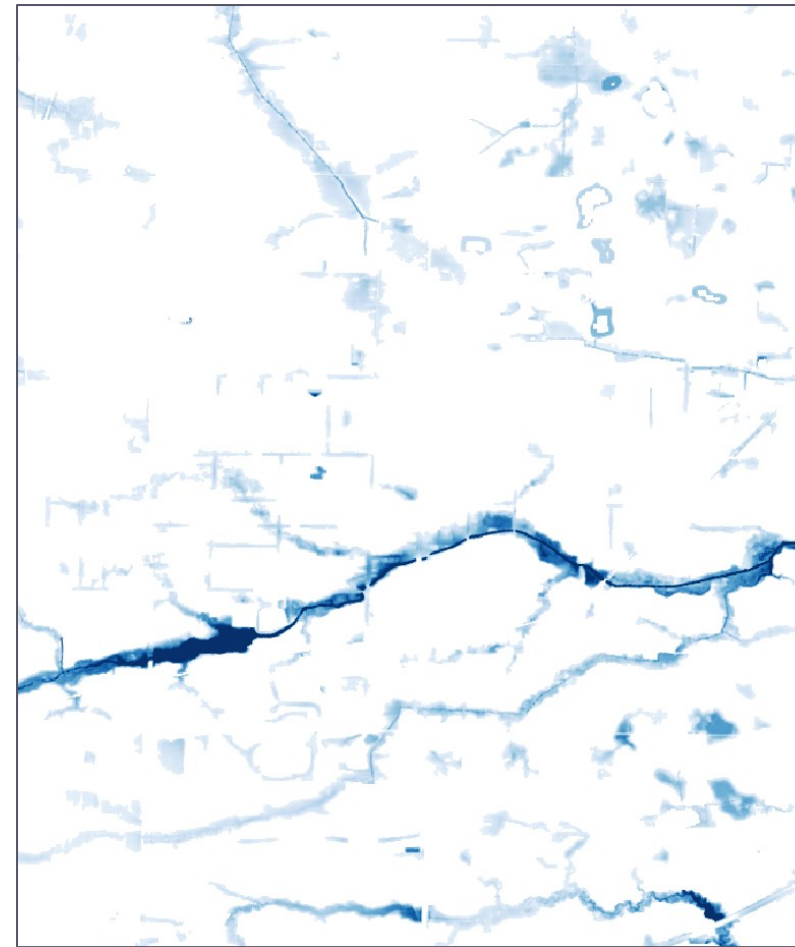
Parcel data



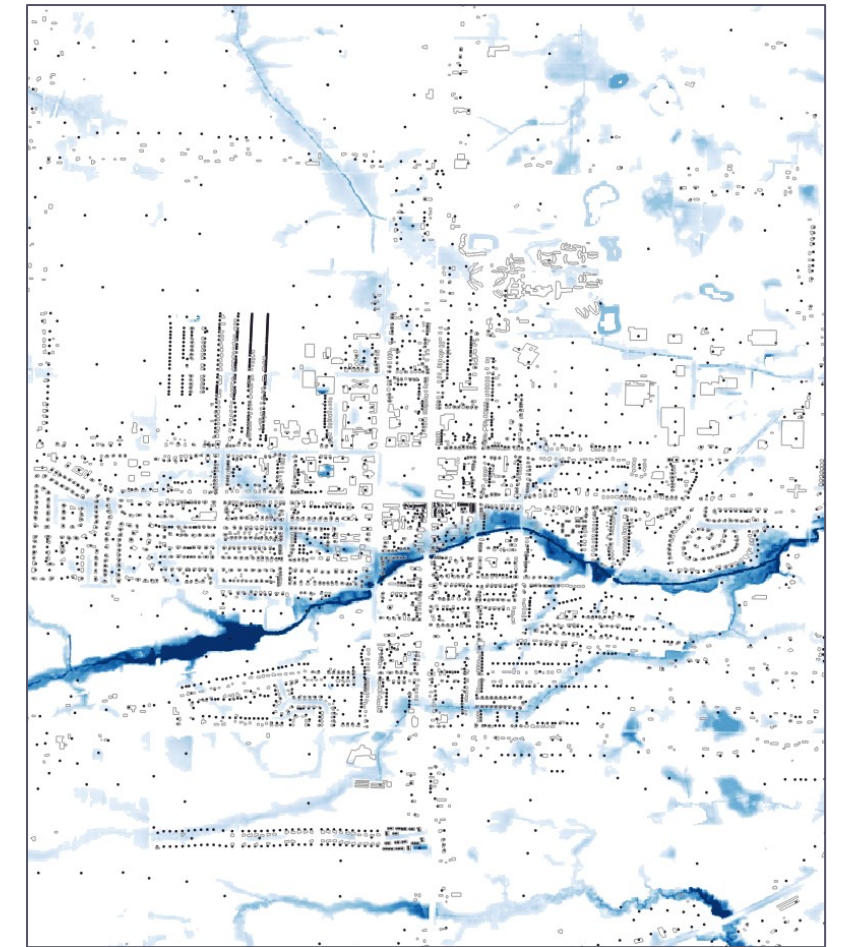
Building footprints



Hazard layer



Max depth



Edge of building footprint or depth at property centroid.

# Average annual loss

Combining the damage caused by flooding events with their probability, we then turn the damage estimates into average annual losses based on the value of the home and the likelihood of flooding under the full range of scenarios.

## Annualized calculations

0.2% chance of 36 inches of water to the building, minus 24 inches to the FFE leaves 12 inches of water inside the home which would cause 30% total structure damage to the \$300,000 building = \$90,000

$$0.2\% * \$90,000 = \$180$$

1% chance of 30 inches of water to the building, minus 24 inches to the FFE leaves 6 inches of water inside the home which would cause 10% total structure damage to the \$300,000 building = \$30,000

$$1\% * \$30,000 = \$300$$

10% chance of 25 inches of water to the building, minus 24 inches to the FFE leaves 1 inch of water in the home which would cause 5% structure damage to the \$300,000 building = \$15,000

$$10\% * \$15,000 = \$1,500$$

20% chance of 18 inch of water to the building, minus 24 inches to the FFE leaves 0 water in the home which would cause \$0 damage.

$$20\% * \$0 = \$0$$

$$\$180 + \$300 + \$1,500 = \$1,980$$

Average annual loss

*\*Note we calculate all probabilities not just the listed ones here*



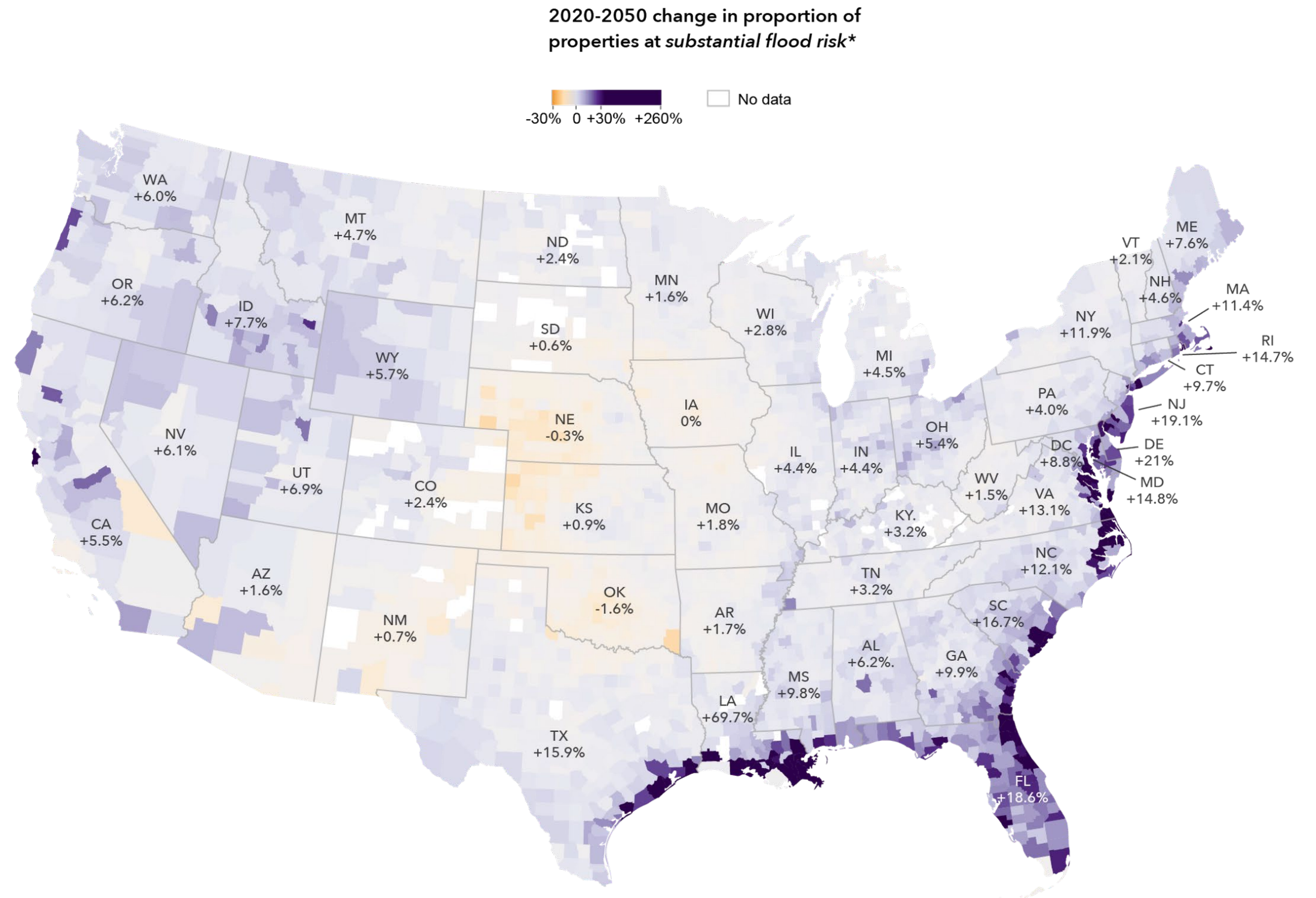
24 inches first floor elevation.  
No damage inside the home below 24 inches.

## Current and future flood risk.

Overall, our model shows 14.6 M properties with 1% or greater annual risk in 2020, with an additional 1.6 M properties having >1% by 2050.

The AAL for the 5.7 M properties that have any flood risk and an expected loss is \$3,548, which totals to **\$20.3 billion in 2020.**

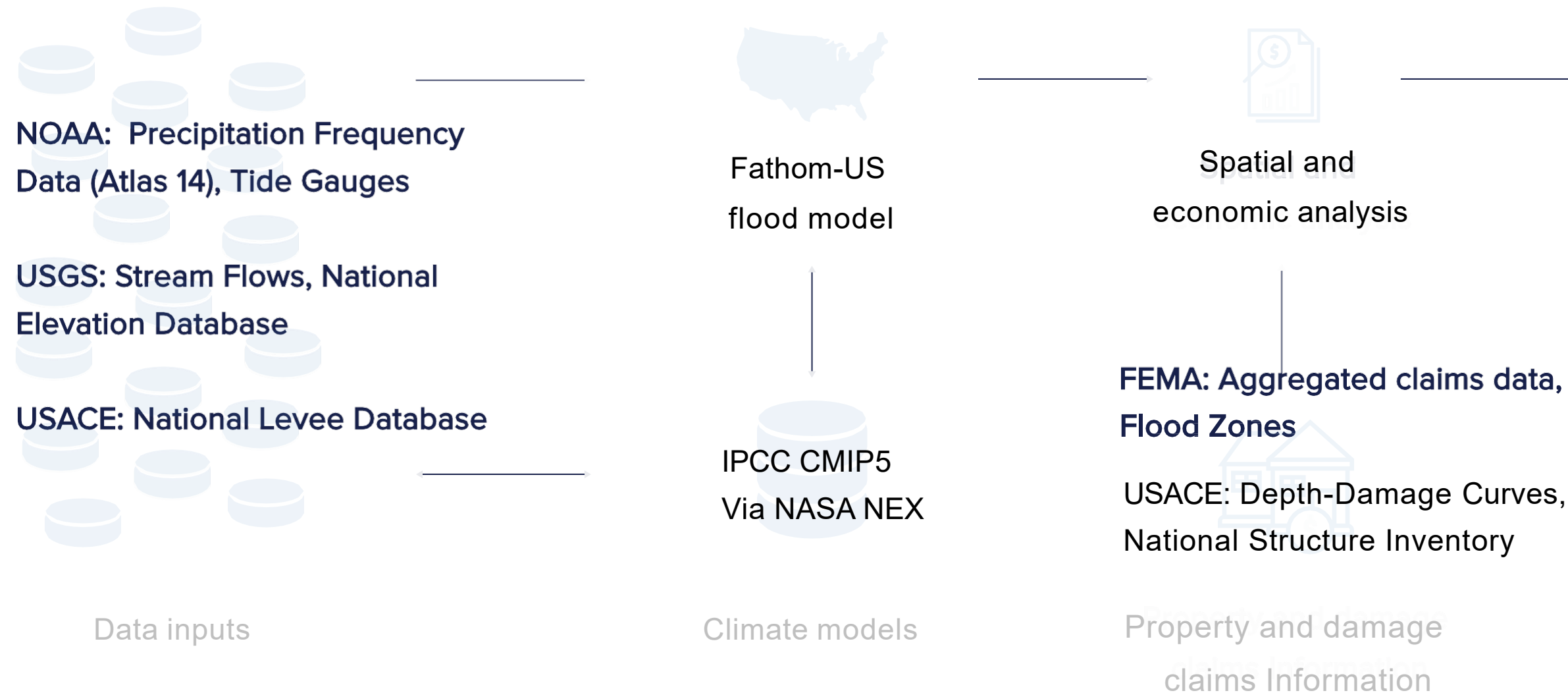
30 years into the future, the estimated AAL increases to \$5,913 per property totaling **\$34.0 billion in 2050.**



\* Substantial risk is calculated as inundation 1 cm or more to the building in the 100 return period (1% annual risk)

# U.S. Government open data makes this value chain possible.

Challenge: Finding and using all these data from many sources!



## FloodFactor®

- 1 MINIMAL Flood Factor
- 2 MINOR Flood Factor
- 3 MODERATE Flood Factor
- 4 MODERATE Flood Factor
- 5 MAJOR Flood Factor
- 6 MAJOR Flood Factor
- 7 SEVERE Flood Factor
- 8 SEVERE Flood Factor
- 9 EXTREME Flood Factor
- 10 EXTREME Flood Factor

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**These outputs are useful to Government Agencies**

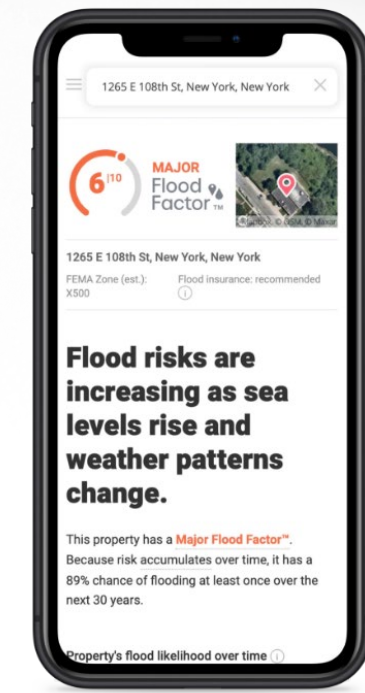
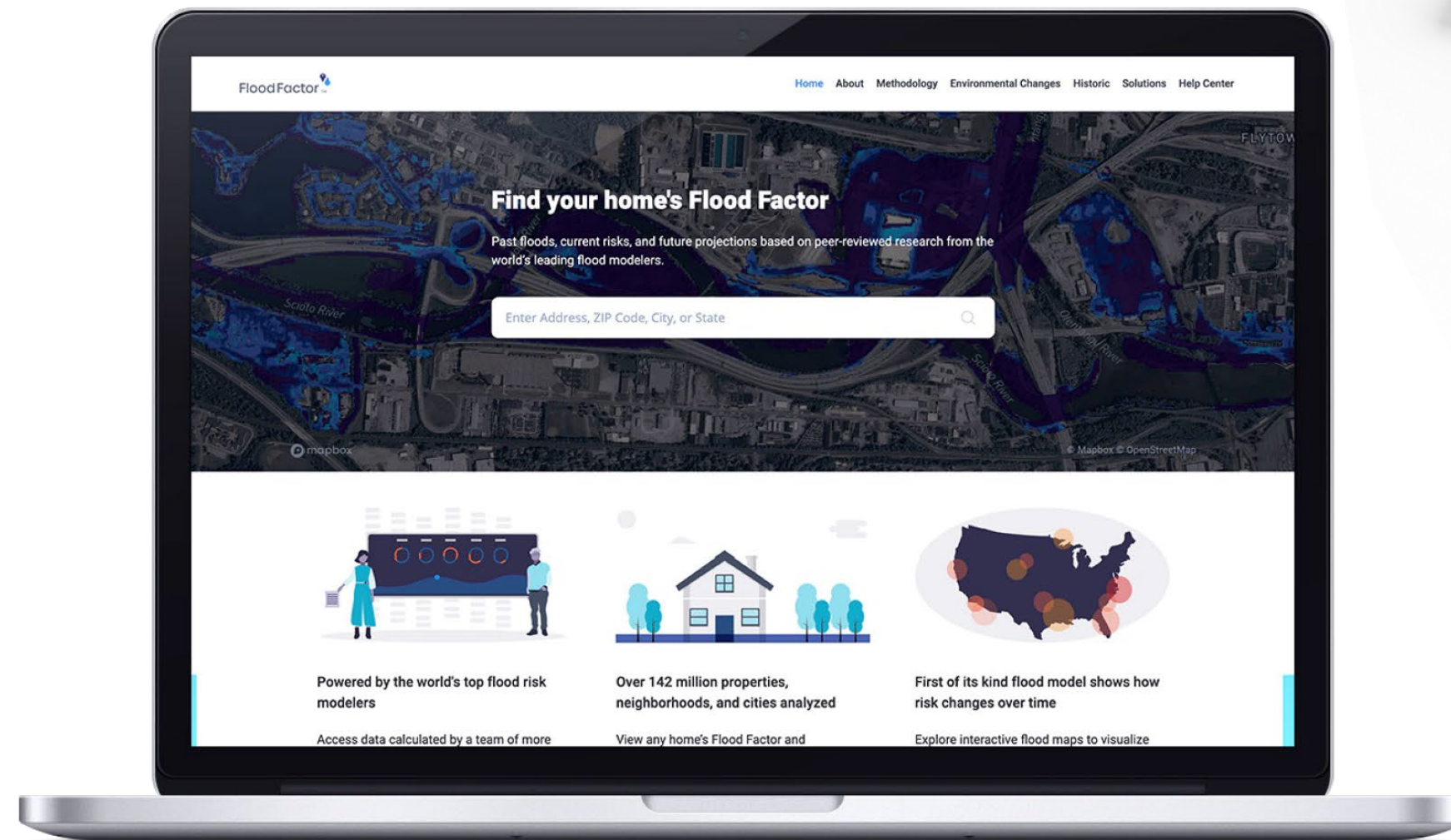
1. Risk Score 1-10
2. Expected Losses \$



# Can the data's value to commercial users underwrite the costs of data democratization?

Highlight on our nonprofit's business model: we distribute data freely to the public, and pay for it by selling commercial licenses to industry.

[Freely available w/noncommercial license from AWS here.](#)

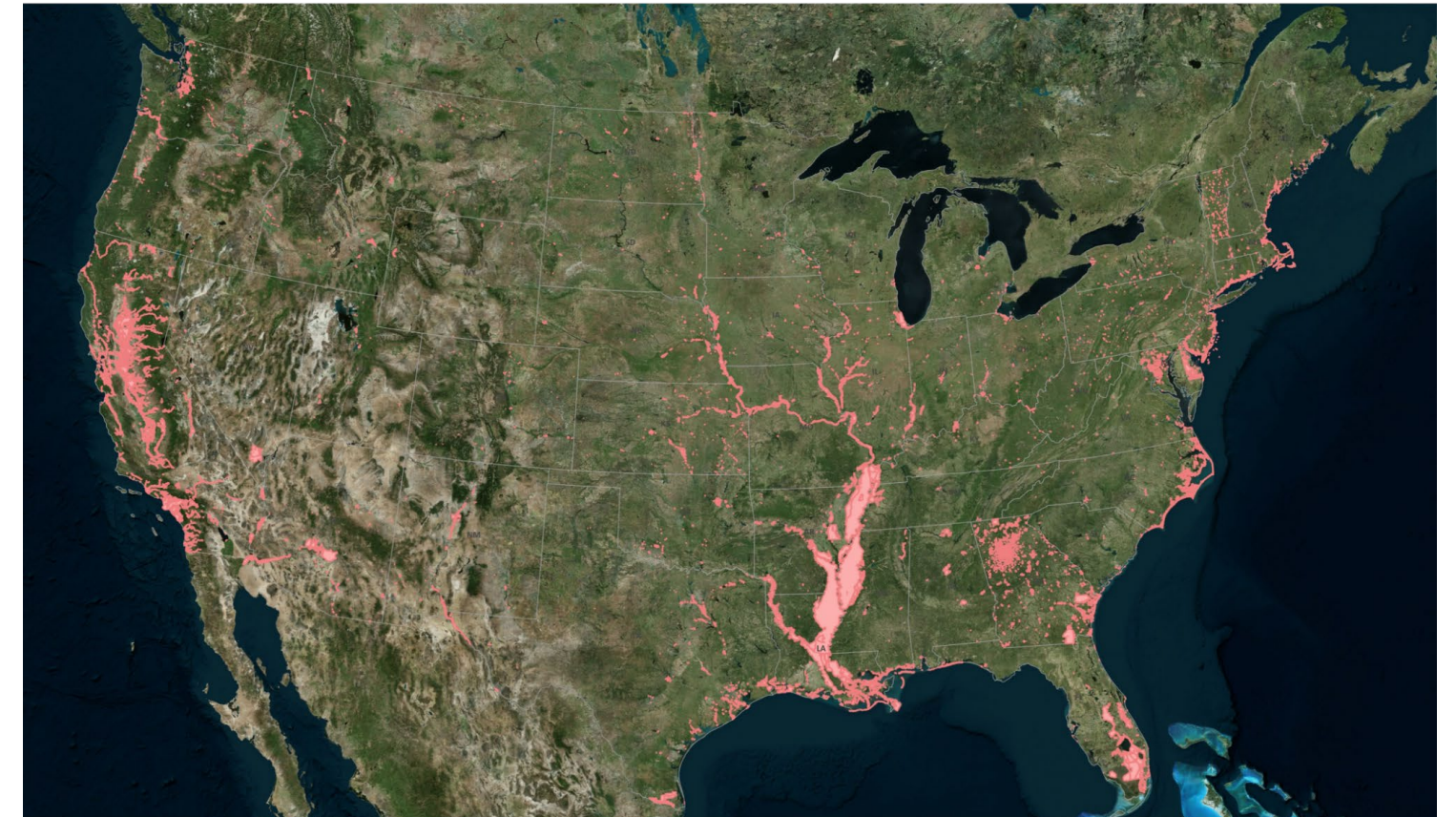


## Our Biggest Data Challenges:

- 1. No common, secure mechanism for sharing of property-level risk, water, and flooding data for research**
  - a. Governments, Industry, Academics could all use one to promote a common understanding of climate change impacts
  - b. Establish a Data Commons? Exchange? Marketplace? Trust?
- 2. No secure access to individual flood claims data for research**
  - a. A challenge for FEMA due to privacy concerns, and industry also has concerns about sharing of proprietary information
  - b. Impacts the accuracy of economic estimates and thus usefulness
- 3. No single source for Flood Adaptation features**
  - a. 23,000+ Flood Adaptations from 850+ Unique Data Sources were amassed manually (now, how do we share this collection?)
- 4. Assembling similar data for our Wildfire Risk Product now**
  - a. Need additional data sources for an even more complex risk

### Nationwide areas of protection

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Thank you.