First Street Foundation Flood Model and Data Availability
First Street Foundation.

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

We provide property-level comprehensive flood risk estimates.

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

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

First Street build an expert team to develop the first comprehensive, publicly available flood risk assessment for each of 142M properties in the contiguous US.
FEMA flood maps are out of date.

According to the National Flood Insurance Reform Act of 1994, FEMA must review and update all flood maps every 5 years. Currently 75% are out of date and 11% date back to 70’s and 80’s and roughly 40% of the country has never been mapped.

First Street Foundation Flood Model and Data Availability | December 15, 2021

72% are out of date

Number of communities: 3K

Effective age of map
We will complement FEMA’s technical approach to solve this problem.

Until the total flood risk for every home in America is effectively calculated and communicated, property owners, buyers and renters will continue to suffer.

First Street Foundation has assembled a group of over 80 experts, scientists, economists and technologists to define flood risk and address this problem.

*Substantial risk is calculated as inundation 1 cm or more to the building in the 100-year return period (1% annual risk)*
We began by modeling every major flood type.
Determining a property's flood risk.

Parcel data

Building footprints

Hazard layer

Max depth

Edge of building footprint or depth at property centroid.
The ocean has risen 8.5 inches nationally since 1950 and is projected to rise another 4.5 inches by 2050. This increases tidal flooding and hurricane storm surge.

FEMA Flood maps only look at historical flooding events.

FEMA flood maps are created by calculating the frequency and impact of historic flooding events and do not account for any future environmental changes.

Sea levels

The atmosphere is 1.9 degrees (F) warmer than it was in 1950. It is projected to warm another 1.28 degrees (F) by 2050. This impacts the frequency and intensity of pluvial (precipitation) and fluvial (rivers) flooding.

Surface temperatures

The sea's surface temperature is 1.5 degrees (F) warmer than it was in 1950. It will rise another 0.5 degrees (F) by 2050. This impacts the intensity and geographic area hurricanes make landfall.
Adaptation database.

Over 23,000 features.

40 adaptation types (levees, seawalls, pumps, etc).

Green and grey infrastructure.

Post processing of hazard layers includes the effects of major infrastructure and adaptation features, with protection up to documented design standards (no dynamic operations).
Sources of input data.

Precipitation frequency
NOAA Atlas 14

River flows
USGS Stream Gauge data

Tide and surge data
NOAA Tide Gauges

Elevation data
USGS National Elevation Database supplemented with high res local datasets (e.g. lidar)

Climate forecasts
CMIP5 simulations (21 models, RCP 4.5)
Downscaled data from NASA NEX-GDDP

Historic
USGS High Water Mark data
NFIP flood claims
FEMA Individual Assistance claims

Hurricanes
Synthetic Hurricane Tracks from K. Emmanuel
NOAA IBTrACS Historical Hurricane tracks

Property info
Property boundaries from LightBox/DMP
Building footprints from MapBox and Microsoft
FEMA Flood Zone (estimated) from MassiveCert
Open, transparent methods and public data.

First Street’s detailed technical methodology is publicly available on our website, providing transparency to how we built our national flood model and define risk. Numerous National Reports discussing our model’s findings and are also freely available.

Sources:
- Technical Methodology
- National Report
- Flood Factor
Publicly available data

River flood near Beaumont, TX
First Street climate risk statistics.

The aggregated flood risk summary statistics datasets that we currently offer through the AWS platform are formatted as comma separated value (CSV) files organized by congressional district, county, and ZIP code.

<table>
<thead>
<tr>
<th>Count property</th>
<th>Total properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>count_fema_sfha</td>
<td>Number of properties in FEMA SFHA</td>
</tr>
<tr>
<td>pct_fema_sfha</td>
<td>Percent of properties in FEMA SFHA</td>
</tr>
<tr>
<td>count_fs_risk_2020_5</td>
<td>Number of properties flooded in the First Street return period 5 scenario for 2020</td>
</tr>
<tr>
<td>pct_fs_risk_2020_5</td>
<td>Percent of properties flooded in the First Street return period 5 scenario for 2020</td>
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<tr>
<td>count_fs_risk_2050_5</td>
<td>Number of properties flooded in the First Street return period 5 scenario for 2050</td>
</tr>
<tr>
<td>pct_fs_risk_2050_5</td>
<td>Percent of properties flooded in the First Street return period 5 scenario for 2050</td>
</tr>
<tr>
<td>count_fs_risk_2020_10</td>
<td>Number of properties flooded in the First Street return period 100 scenario for 2020</td>
</tr>
<tr>
<td>pct_fs_risk_2020_10</td>
<td>Percent of properties flooded in the First Street return period 100 scenario for 2020</td>
</tr>
<tr>
<td>count_fs_risk_2050_100</td>
<td>Number of properties flooded in the First Street return period 100 scenario for 2050</td>
</tr>
<tr>
<td>pct_fs_risk_2050_100</td>
<td>Percent of properties flooded in the First Street return period 100 scenario for 2050</td>
</tr>
<tr>
<td>count_fs_risk_2020_500</td>
<td>Number of properties flooded in the First Street return period 500 scenario for 2020</td>
</tr>
<tr>
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<td>Number of properties flooded in the First Street return period 1000 scenario for 2020</td>
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</tbody>
</table>

- **Count property** represents the number of properties with a specific flood risk score.
- **Total properties** includes the number of properties in FEMA SFHA and outside of FEMA SFHA.

**County level**

- **FEMA SFHA stats**
- **FSF scenarios**
- **FSF - FEMA comparison**
- **Flood Factor scores**

**Zip level**

- **Number of properties**
- **Percent of properties**
- **Average Flood Factor risk score**
- **Properties with risk score**

- **FSF scenarios**
- **FSF - FEMA comparison**
- **Flood Factor scores**

**Diagrams**

1. First Street Foundation Flood Model and Data Availability
   - First Street climate risk statistics.
   - The aggregated flood risk summary statistics datasets that we currently offer through the AWS platform are formatted as comma separated value (CSV) files organized by congressional district, county, and ZIP code.
Accessing First Street data on AWS.

1. Create a free AWS account [here](#).
2. Login
3. Go to the First Street Foundation [AWS S3 Bucket](#).
4. Open folder v1.0 (or other versions) to download available datasets.
ESRI Living Atlas of the World

Flood risk summary statistics available on Living Atlas

ESRI platform for hosting expertly curated and authoritative spatial data layers

Data layers already symbolized to instantly visualize meaning

Accessible across all ESRI products
  - Further symbolize, run analyses, download, etc.
River flood near Beaumont, TX

Paid data access
Available Data

Property-Level Flood Risk Statistics
- Access any property's Flood Factor®, risk summary, and how risks are evolving over time due to environmental changes
- Includes flood projections through 2051 for 5 return periods and 3 depth thresholds with ranges for uncertainty
- Risk information from modeled historic events
- Degree of protection from adaptation
- See data dictionary page for further details and sample data

Map Hazard Layers
- 3 meter resolution
- Historic storm extents, present risk, and risk in 30 years
- Available at the 2, 5, 20, 100, and 500-year return periods
- See data dictionary page for further details and sample data

Commercial AAL Data Reports
- Custom vulnerability reports
- Include
  - Depth of flooding
  - Structural damages in repair costs
  - Downtime in days closed
- Estimates available for the 2, 5, 20, 100, & 500-year return periods, and for the year 2021 & 2051
- See data dictionary page for further details and sample data
Using Our Data Access Page

1. Visit firststreet.org and navigate to our Paid Data Access page
2. Fill out pricing calculator for State or County of interest
3. Click request data and complete the data purchase request form
4. For a national dataset or custom partnership, follow link at bottom of page and submit a proposal

Calculate Pricing and Request Data

Pricing for property-level data is based on the geography, land use-type and data format. You can use the below calculator to get an estimate for pricing for your data needs.

Data is available at a state or county level. Please search for and select the state or county you are looking to purchase.

Commercial AAI reports are available as a separate purchase request. Please fill out our data request form and we will be in touch shortly.

**STEP 1: SEARCH FOR A STATE OR COUNTY**

![Search Bar](image)

**NEW HANOVER COUNTY, NC**

**STEP 2: SELECT OPTIONS FOR DATA REQUEST**

Please select the data format(s) you are interested in.

- Stats
- Hazard Layer

Stats refer to flood statistics provided at the individual property level in .CSV format. Hazards refer to 3m resolution flood hazard layers available in GeoTIFF format.

How often will you be using this data?

- One-Time
- Ongoing

One-time refers to a single-use data purchase. Ongoing refers to a multiple use data purchase over a 12 month term.

Where will you be using this data?

- Internal Analysis
- External Analysis
- Public Data Display

Internal analysis is for internal use only. External analysis users may share or display results of its analysis, but not First Street’s data. Public data display users may share First Street’s data with a third party or display publicly.

**Total Price: $1,710.00**

Looking for a national dataset or custom partnership? Click here to submit a proposal