

GLISA's evaluation of this tool is based on their experience as a potential user. This report is intended to help other users in the Great Lakes region better understand the tool and its potential applications.

Overview

The purpose of the First Street Foundation Flood Factor tool is to make flood risk information accessible, understandable, and usable by defining present and future flood risks at the property level. Information from this tool is meant to be used in conjunction with other available resources such as FEMA flood maps. The tool includes analysis of flooding due to rain, overbank flooding of rivers, tidal flooding, and storm surge.

Outputs

For a chosen location, the tool produces the flood factor rating of the location, flood risk for the present and future, and modeled historical flood events. The flood factor rating of a location is a number between one (minimal) and ten (extreme) that quantifies the risk based on the 30-year flood likelihood and the depth of flooding. The user can choose a location as small as a single property or as large as a state. With smaller locations, the flooding information is more specific, but also includes a general overview for the county and state in which the property is located.

Directions

- Navigate to the First Street Foundation Flood Factor website: www.floodfactor.com
- Enter an address, zip code, city, or state of interest
- View the displayed flood factor and flood risk data for the chosen address, zip code, city, or state of interest
- Note that exact outputs will vary by size of chosen location as information can be more specific on the property level than on the city or state level

For more guidance on how to use Flood Factor and interpret the results, please see our walkthrough video at: www.glisa.umich.edu/engagement/flood-factor/

Applications

Information found in the flood factor tool can be useful in many different applications. The tool is designed to be used by individuals, communities, government agencies, or any other groups to inform their decisions regarding flood risk mitigation. In the tool, there are suggested mitigation strategies that are based on cost and the size of the chosen location. For example, on the state level, there are options for larger scale green, grey, and resilience infrastructure.

Potential Limitations to Consider

- ❗ In the Great Lakes region, coastal flooding and storm surge are not currently factored into the flood risk assessment offered by the tool. Great Lakes coastal communities must consider uncertainty of future lake levels in their risk assessment.
- ❗ This tool was developed using downscaled climate projections that were not specifically designed for the Great Lakes region and [may not offer the best representation of our regional climate](#).
- ❗ Only one emissions scenario (RCP 4.5) is used when projecting precipitation changes. RCP 4.5 is an optimistic scenario for future greenhouse gases and represents a lesser amount of climate change compared to other scenarios (i.e., RCP 8.5).
- ❗ Overall, the tool is user-friendly and easy to navigate. However, some of the results can be difficult to interpret without guidance. For more guidance, please see GLISA tutorial video at: www.glisa.umich.edu/engagement/flood-factor/

Data Sources

To calculate the flood factor of a chosen property and to give relevant information relating to its flood risks, the First Street Flood Factor tool uses multiple different data sets.

Data	Source
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 resolution local datasets
Climate Projections	NASA Earth Exchange Global Daily Downscaled Projections (NEX-GDDP) based on 21 CMIP5 models using RCP 4.5
Historical Flood Data	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 Information	Property boundaries from LightBox/DMP Building footprints from MapBox and Microsoft Estimated FEMA Flood Zone from MassiveCert

Evaluation

The First Street Foundation National Flood Model and the Flood Factor tool were created by the First Street Foundation, a non-profit with a team of over 80 scientists, technologists, and analysts. The model is publicly available and peer reviewed. All of the methods used in the model have undergone review by expert academic panels and have been submitted to peer reviewed journals. When possible, data used in the model was validated against historic flood reports and government flood claims. Due to the large number of data sources used in this tool, GLISA has not independently verified the quality assurance and quality control (QA/QC) standards of each of them. Given the robust framework of expert review that went into the development of this tool, we consider the inputs to the model used by this tool to be thoroughly vetted and scientifically acceptable. GLISA recommends future versions of this tool incorporate higher quality regional climate projections and uncertainty related to Great Lakes water levels to improve its scientific credibility and increase the usability of its information in our region.

For more information on the tool's methodology: www.floodfactor.com/methodology