



FEMA



## Percent Annual Chance Data

The Federal Emergency Management Agency (FEMA) has broadened its delivery of flood hazard data to include a number of flood risk datasets. These flood risk datasets can help users to better understand the chances that a given structure located within the mapped floodplain may flood in any given year or over an extended period of time.

The Percent Annual Chance data is delivered to local officials during either the Flood Risk Review or Resilience Meetings as a part of the Flood Risk Database, prior to the preparation of preliminary FIRMs. The Percent Annual Chance data identifies the probability of flooding by comparing the water surface elevation, flood frequency, and ground elevation. The result is the percent chance in any given year that the location will be flooded. Additionally, the Percent 30-year Chance flood data identifies the likelihood that a given location will flood during a 30-year period, or roughly the average length of a home mortgage in the United States.

### Understanding Probability

While it is impossible to predict when the next flood will happen, or how severe it will be, engineers and scientists can utilize statistical data from past flooding events to estimate the probability or chance that a flood of a certain size will occur in the future. Probability is the extent to which it is likely to occur, however probability cannot determine with certainty when something will actually take place. For instance, flipping a coin has a 50% chance of coming up heads or tails. Flipping the coin twice would, according to the probability of potential outcomes, end up heads once and tails once. In reality though flipping a coin twice can end up heads twice or tails twice.

The percent annual chance data is generated by using multiple water surface elevations and their associated percent annual chance of exceedance (e.g. 0.2%, 1%, 2%, 4%, and 10%) and interpolating the percent annual chance of flooding at each cell based on that input coupled with the ground elevation at that point. The actual computation is done by interpolating the log-linear relationship between associated flood elevations at each point and the ground elevation (linear interpolation of the water surface elevation, log interpolation of the percent annual chance).

### Flood Risk Tools and Datasets Promote Understanding

In an effort to assist community officials in building a support base for hazard mitigation, sustainability and resiliency discussions within their communities, FEMA developed a variety of Flood Risk Tools. These tools are being prepared with the latest technology and provide a clearer picture of flood risk within a community.

These Flood Risk Tools will allow communities to better understand and plan for the natural hazard risks that they face. The information can be used to enhance mitigation plan content, increase risk communications capability and support mitigation activities to increase community resilience.

The mission of FEMA is to support communities in becoming more disaster resilient by *knowing* their risk, *planning* for that risk, *mitigating and communicating* these risks. Everyone can take steps to reduce their risk. Families, business owners and local economies benefit from hazard mitigation activities and may transfer their risk by obtaining flood insurance.

For more information on the natural hazard risk in your community, visit [www.riskmap6.com](http://www.riskmap6.com)

**RiskMAP**  
Increasing Resilience Together

Once the Percent Annual Chance data is generated, the Percent 30-year chance data is then created by utilizing a simple equation:

$$Probability = 1-(1-p)^n$$

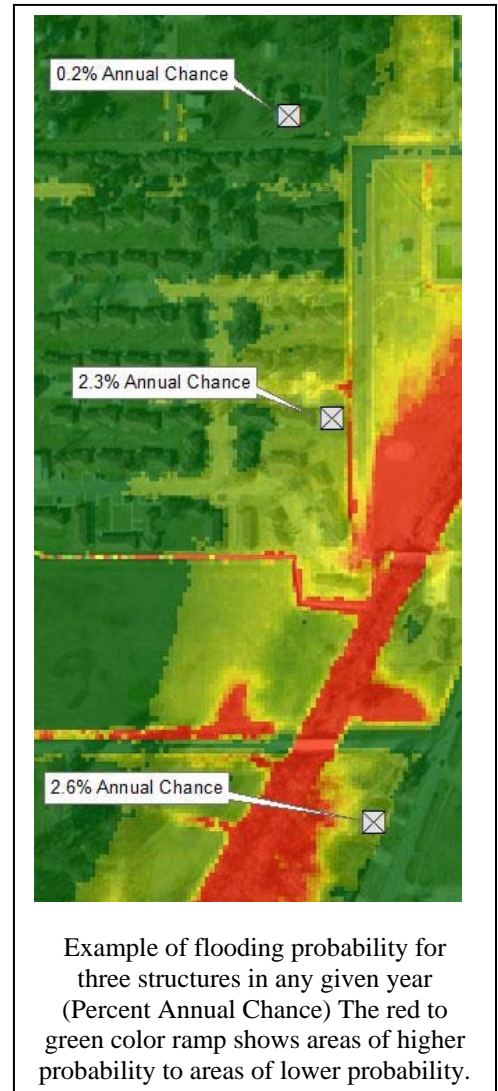
In this equation “p” is the percent annual chance of flooding value taken from the Percent Annual Chance data. The “n” is the number of years, which in this case is 30.

### Essential Information for Communities

Community officials and staff will find the Percent Annual Chance and Percent 30-year Chance datasets to be a valuable tool. Local community officials can utilize the information to enhance their mitigation planning, floodplain management, and flood risk awareness activities by zeroing in the areas most at risk. Furthermore, by incorporating this information into the processes and workflows used by officials and staff, new development can be located and designed so as to not exacerbate flooding. Meanwhile, existing development can be reexamined with an eye towards mitigation to reduce the risk. For homeowners, understanding the likelihood of flooding during the length of a home mortgage can help them make informed choices about financially protecting their property.

### More Information

For additional information visit [www.riskmap6.com/resources](http://www.riskmap6.com/resources) where you can find a Percent Annual Chance recipe card that will walk you through a simple GIS exercise using the data, or a more thorough PowerPoint presentation.



<b>How Else Can You Use This Data?</b>	
Elected Officials and Community Staff	<ul style="list-style-type: none"> <li>• Provide a visualization tool to help building permits and inspections staff explain flood risk to developers.</li> <li>• Assist with developing more stringent development/building codes.</li> <li>• Assist emergency response staff identify high risk areas.</li> <li>• Highlights areas of the community for outreach and education efforts.</li> </ul>
Community Planning Staff	<ul style="list-style-type: none"> <li>• Assist with mitigation prioritization activities and projects.</li> <li>• Assist with advanced recovery planning and disaster preparedness.</li> <li>• Depict high flood risk areas for future planning needs.</li> <li>• Assist with Capital Improvements planning by guiding infrastructure investment away from high risk areas.</li> </ul>
Engineering and Technical Staff	<ul style="list-style-type: none"> <li>• Data point for use in prioritizing mitigation projects.</li> <li>• Informs development decision making for risk prone infrastructure.</li> </ul>