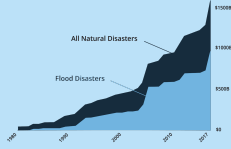


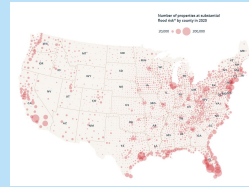
America's Flooding Problem

Get The Facts

	Issue	Fact	Graphic	Source												
1	Flooding is the most frequent and expensive natural disaster in America	It has cost US taxpayers more than \$850 billion since 2000, and is responsible for 2/3rds of the cost from all natural disasters.		https://www.ncdc.noaa.gov/billions/evenets/US/2000-2020												
2		America has experienced an urban flooding event once every 2-3 days for the past 25 years.		https://cdr.umd.edu/sites/cdr.umd.edu/files/resource_documents/COMPRESSEDurban-flooding-report-online-compressed-0319.pdf												
3	Flooding is personal		<p>Majority of Flood Victims are Uninsured</p> <p><small>NCEM Research Report, 2017, 2018, 2019</small></p> <table border="1" data-bbox="860 976 1104 1050"> <thead> <tr> <th>Hurricane</th> <th>Total Flood Loss</th> <th>Uninsured Residential Flood Loss</th> <th>% Of Total Discovered</th> </tr> </thead> <tbody> <tr> <td>IRMA</td> <td>\$20.28 BILLION</td> <td>\$20.00 BILLION</td> <td>89%</td> </tr> <tr> <td>HARVEY</td> <td>\$25.37 BILLION</td> <td>\$19.27 BILLION</td> <td>76%</td> </tr> </tbody> </table>	Hurricane	Total Flood Loss	Uninsured Residential Flood Loss	% Of Total Discovered	IRMA	\$20.28 BILLION	\$20.00 BILLION	89%	HARVEY	\$25.37 BILLION	\$19.27 BILLION	76%	https://www.fema.gov/flood-insurance/work-with-nfip/watermark-financial-statements https://investor.corelogic.com/pressreleases/corelogic-analysis-estimates-total-residential-insured-and-uninsured-flood-loss
Hurricane	Total Flood Loss	Uninsured Residential Flood Loss	% Of Total Discovered													
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HARVEY	\$25.37 BILLION	\$19.27 BILLION	76%													
4		For a majority of Americans, 2/3rds of their wealth is in their home-one flood can wipe out a lifetime of savings.		https://www.stlouisfed.org/on-the-economy/2018/october/who-equity-their-homes-who-doesnt												
5		For example, of overall damage from Hurricanes Irma and Harvey in 2017, an estimated 76% was uninsured.		https://investor.corelogic.com/pressreleases/corelogic-analysis-estimates-total-residential-insured-and-uninsured-flood-loss												
6		40% of small businesses never reopen their doors following a flooding disaster, and over 90% fail within two years.		https://www.fema.gov/media-library-data/1441212988001-1aa7fa978c5f999ed088dcaa815cb8cd/3a_BusinessInfographic-1.pdf												

7

The scale is immense



https://assets.firststreet.org/uploads/2020/06/first_street_foundation_first_national_flood_risk_assessment.pdf

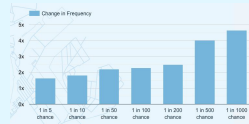
8

99% of US Counties are impacted by Flooding.

<https://www.fema.gov/data-visualization/historical-flood-risk-and-costs>

9

There's more water and more storms coming our way.



<https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2019GL083235>

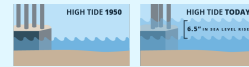
10

We know that rainstorms are getting more intense. For the US South and East, that has resulted in up to 70% more heavy downpours each year.

<https://www.sciencedirect.com/science/article/pii/S2212096315000054>

11

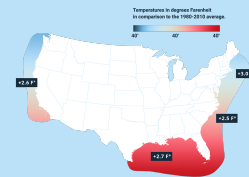
The ocean has risen 6.5 inches nationally since 1950.



<https://sealevelrise.org/forecast/>

12

Higher sea surface temperatures mean bigger, slower and wetter hurricanes.



<https://floodfactor.com/environmental-changes>

13

The sea's surface temperature is 1.5° F warmer than it was in 1950.

<https://www.epa.gov/climate-indicators/climate-change-indicators-us-and-global-temperature>

14

Higher ocean surface temperatures fuel hurricanes and offshore storms with more water and power, so these systems can reach further inland and further north, be more intense, and last longer.

https://ar5-syr.ipcc.ch/topic_futurechanges.php

15 **Impervious surfaces act as flood highways, increasing the frequency and severity of flooding.**

Extensive urban and suburban development has dramatically decreased natural drainage, creating excess runoff, increasing flood risk for millions of Americans, and providing expensive lessons in poor urban design.



<https://pubs.usgs.gov/fs/fs07603/>

<http://www.diva-portal.org/smash/get/diva2:1067287/FULLTEXT01.pdf>

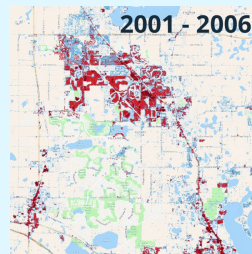
https://www3.epa.gov/npdes/pubs/usw_a.pdf

16

Some cities have retention standards or impact fees that provide for more pipe capacity so that neighbors aren't put in harm's way with excess runoff. However, most cities don't.

<https://www.brookings.edu/blog/the-avenue/2019/09/03/another-summer-of-flooding-should-be-a-wake-up-call-to-re-design-our-communities/>

17



<https://doi.org/10.3133/fs20123020>

18 **And somehow, we're still building in floodplains.**

New homes are being built in places that already flood and impervious surfaces continue to expand without offset requirements, helping to create a network of flood highways that direct water right where we don't want it - into your home.

<https://www.tandfonline.com/doi/figure/10.1080/01431161.2018.1516318>

<https://www.kinderudp.org/#/datasetCatalog/zbn96g5x658z>

<https://www.governing.com/topics/transportation-infrastructure/gov-flood-zone-floodplain-development-homes-zoning.html>

19

Amazingly, across the US populations in floodplains are growing faster than populations outside of them - the Miami-Fort Lauderdale-West Palm Beach, Fla. added 181,000 people to its floodplain from 2000 to 2016.

<https://www.governing.com/gov-data/census/flood-plains-zone-local-population-growth-data.html>

20 **Our national flood standards... are we building on shaky foundations?**

We've been designing to a "100-year flood" standard since 1973.

<https://fivethirtyeight.com/features/its-time-to-ditch-the-concept-of-100-year-floods/>

21

However, when we routinely see 50% of houses flooding outside the 100 year floodplain, you have to wonder did we pick the right standard?

<https://www.houstonchronicle.com/news/article/In-Harvey-s-deluge-most-damaged-homes-were-12794820.php>

22

For example, in Holland, where more than 60% of the population lives below sea level, they design everything to a 10,000 year standard for populated areas - no flood insurance required anywhere.

<https://ehs.unu.edu/blog/5-facts/5-facts-about-dutch-flood-risk-management.html>

<https://www.nytimes.com/2012/11/15/world/europe/netherlands-sets-model-of-flood-prevention.html>

<https://www.cbsnews.com/news/sea-change-how-the-dutch-confront-the-rise-of-the-oceans/>

23

The term "100-year flood" was coined in 1973, in a meeting of real estate lobbies and the Army Corps of Engineers (USACE).

<https://fivethirtyeight.com/features/its-time-to-ditch-the-concept-of-100-year-floods/>

24

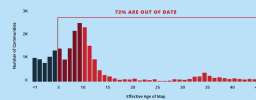
For example, Japan and the Netherlands use 1 in 10,000-year protection for coastal works and densely populated areas

<https://www.iwr.usace.army.mil/Portals/70/docs/iwrreports/2011-R-08.pdf>

<https://www.geonode-geofirrlab.org/documents/1381>

25 **FEMA flood maps miss 6 million Americans.**

Yet FEMA flood maps are fundamentally wrong – 75% are out of date, 40% of the country has never been mapped.



<https://medium.com/firststreet/fema-flood-maps-and-limitations-ea06bf103c4d>

<https://floodfactor.com/>

<https://help.floodfactor.com/hc/en-us/articles/360048256493-Understand-the-differences-between-FEMA-flood-zones>

<https://www.floodpanel.com/new-study-greatly-expands-us-flood-zone/>

<https://e360.yale.edu/digest/41-million-americans-live-in-flood-zones-three-times-the-fema-estimate-finds-new-study>

26

They identify 6 million Americans who are at substantial risk but who were not included in FEMA flood zones.

https://assets.firststreet.org/uploads/2020/06/first_street_foundation_first_national_flood_risk_assessment.pdf

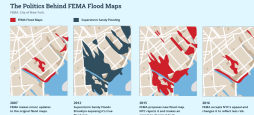
27

Take, for example, Hurricane Irma in 2017: of the 3.3 million households in the most affected counties, only 14% had flood insurance.

<https://www.marketwatch.com/story/only-14-of-the-3-million-households-hit-by-irma-have-flood-insurance-2017-09-12>

28

Political interests can compromise the accuracy of FEMA maps.

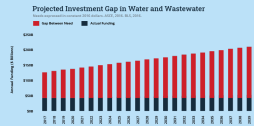


<https://msc.fema.gov/portal/search?AddressQuery=Canarsie#searchresultsanchor>

<https://fas.org/sgp/crs/natsec/R45185.pdf>

29

Our water infrastructure wasn't built for today and it definitely isn't ready for tomorrow



http://thevalueofwater.org/sites/default/files/Economic%20Impact%20of%20Investing%20in%20Water%20Infrastructure_VOW_FINAL_pages.pdf

30

In 2017, the American Society of Civil Engineers gave the United States a D+ on its Infrastructure Report Card.



<https://www.infrastructurereportcard.org/americas-grades/>

31

Our dams and levees are old too, the average age of an American levee is 50 years with a lifespan of 50-80 years.

<https://levees.sec.usace.army.mil/#/>

<https://www.infrastructurereportcard.org/wp-content/uploads/2017/01/Levees-Final.pdf>

32

Not good enough considering the more than \$1.3 trillion in US property they protect from flooding.

<https://www.infrastructurereportcard.org/wp-content/uploads/2017/01/Levees-Final.pdf>

