Harvey An ‘Unprecedented’ Disaster, Could Unload 25 Trillion Gallons Of Water

As I sit in my house in Houston, TX, I try to wrap my mind around the staggering numbers seen thus far by Harvey. Estimates are that up to 25 trillion gallons of water could fall on the state of Texas as a result of this historic storm.

Harvey has forced scientists outside of their comfort zone and into a realm of theoretical, given the unprecedented rainfall totals. Experts will commonly discuss the need to build architectural structures to withstand one hundred year floods or one thousand year floods. These numbers are based historical records and probability distributions.

When determining the anticipated severity of a 100-year flood, scientists determine the 1% annual exceedance probability. Probability distribution functions are built on stream gauge data from around the United States, measuring stream flow under normal and extreme conditions. This builds a normal distribution, from which scientists can determine the upper 1% probability. Since the 1% probability flood has a 1 in one hundred chance of occurring, scientists deem this the one hundred year flood. A 500-year flood would have a 0.2% chance of occurring in any given year.

When dealing with the extreme ends of the probability distribution function, there are errors in calibrating the magnitude and likelihood of a scenario. This is because there are simply fewer data points supporting the extreme flooding and extreme drought conditions. Measurements and data will center around the mean and thus extreme variations from the mean become less reliable.

That is why scientists find themselves largely in uncharted territory with flooding from Hurricane Harvey. Estimates are that up to 50 inches of rain could fall in parts of Texas over the course of a few days. That is larger than the entire year’s average rainfall in Houston.

To put into perspective, the estimated total rainfall in Texas as a result of Harvey, at 25 trillion gallons of water would equal rainfall over the entire United States of

0.38 inches.

Below is a table of every state in the United States and Washington D.C. along with how much water would cover each state if the equivalent Harvey rainfall fell in the state.

State	Ranking	Area (Cubic M)	Harvey Rainfall Across State (In)
Alaska	1	1,717,854,000,000	2.2
Texas	2	695,621,000,000	5.4
California	3	423,970,000,000	8.8
Montana	4	380,838,000,000	9.8
New Mexico	5	314,915,000,000	11.8
Arizona	6	295,254,000,000	12.6
Nevada	7	286,351,000,000	13.0
Colorado	8	269,601,000,000	13.8
Oregon	9	254,805,000,000	14.6
Wyoming	10	253,336,000,000	14.7
Michigan	11	250,494,000,000	14.9
Minnesota	12	225,171,000,000	16.5
Utah	13	219,887,000,000	16.9
Idaho	14	216,446,000,000	17.2
Kansas	15	213,096,000,000	17.5
Nebraska	16	200,356,000,000	18.6
South Dakota	17	199,742,000,000	18.7
Washington	18	184,665,000,000	20.2
North Dakota	19	183,112,000,000	20.3
Oklahoma	20	181,035,000,000	20.6
Missouri	21	180,533,000,000	20.6
Florida	22	170,304,000,000	21.9
Wisconsin	23	169,639,000,000	22.0
Georgia	24	153,909,000,000	24.2
Illinois	25	149,998,000,000	24.8
Iowa	26	145,743,000,000	25.6

New York	27	141,299,000,000	26.4
North Carolina	28	139,389,000,000	26.7
Arkansas	29	137,732,000,000	27.1
Alabama	30	135,765,000,000	27.4
Louisiana	31	134,264,000,000	27.7
Mississippi	32	125,434,000,000	29.7
Pennsylvania	33	119,283,000,000	31.2
Ohio	34	116,096,000,000	32.1
Virginia	35	110,785,000,000	33.6
Tennessee	36	109,151,000,000	34.1
Kentucky	37	104,659,000,000	35.6
Indiana	38	94,321,000,000	39.5
Maine	39	91,646,000,000	40.7
South Carolina	40	82,932,000,000	44.9
West Virginia	41	62,755,000,000	59.4
Maryland	42	32,133,000,000	115.9
Hawaii	43	28,311,000,000	131.6
Massachusetts	44	27,336,000,000	136.3
Vermont	45	24,901,000,000	149.6
New Hampshire	46	24,216,000,000	153.9
New Jersey	47	22,588,000,000	164.9
Connecticut	48	14,357,000,000	259.5
Delaware	49	6,447,000,000	577.9
Rhode Island	50	4,002,000,000	931.0
District of Columbia	51	176,750,000	21,079.5

At the end of this historic storm it will surely be ranked as one of the largest natural disasters to hit the United States.

Trevor Nace is a geologist, Forbes contributor, founder of Science Trends, and adventurer. Follow his journey @trevornace. Contact Trevor at trevornace@gmail.com

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