



# Raw Sewage Released by Hurricane Harvey

Reports indicate that **flooding caused by Hurricane Harvey spilled at least 31 million gallons of raw sewage in Texas, but likely spilled far more.**<sup>1</sup> That's the equivalent of **every person in Houston flushing a toilet seven times.**\* This pollution threatens human health.

## Pathogens in Sewage Threaten Human Health

Raw sewage contains many pathogens that can make people sick, including:<sup>2</sup>

- *E. coli*, *Salmonella*, *Shigella* and other bacteria that can cause diarrhea, pain, vomiting and/or fever,
- Hepatitis A virus,
- Viruses that cause flu symptoms, like echoviruses and coxsackie viruses, and
- Parasites such as giardia, roundworm, tapeworm, hookworm and whipworm.

Texas state officials are also concerned about *Vibrio vulnificus*, a bacterium found in the Gulf of Mexico that caused fatal infections in six victims of Hurricane Katrina.<sup>3</sup>

The EPA says, "From a public health perspective, it is prudent to presume that raw sewage and sludge contain pathogenic organisms."<sup>4</sup> Houston floodwater samples that were tested last week had highly elevated levels of coliform bacteria and *E. coli*.<sup>5</sup>

## Many Ways to Be Exposed to Raw Sewage

There are many ways in which people may be exposed to floodwater containing raw sewage:

- People who rely on water supplies, such as private wells, that have been contaminated by raw sewage can become sick by drinking or cooking with untreated water.
- People wading or swimming in sewage-tainted floodwaters may accidentally swallow some water.
- Pathogens in untreated sewage can enter the bloodstream through an open wound.<sup>6</sup>
- Household objects in homes that were flooded can also spread disease, because pathogens can stay alive on clothes, furniture and appliances until they are disinfected with bleach.<sup>7</sup>
- Eating food that has been in contact with contaminated water, or seafood that has been harvested from polluted bodies of water can also make people sick. Testing conducted in Galveston Bay has shown that fecal bacteria levels have started declining in the days since Harvey ended, but the Galveston Bay Foundation also notes that the floodwaters in Houston's bayous are still highly polluted.<sup>8</sup> This water has the potential to flow into the bay and contaminate shellfish in the coming weeks.

## Short-term Steps to Protect Health

Public health officials recommend that people:

- Throw out any food that has been contaminated by floodwater.<sup>9</sup>
- Disinfect with bleach any items that may have been soaked by floodwater.<sup>10</sup>
- Wash their hands after handling items that have been soaked by floodwaters.

In areas where drinking water sources have been infected with raw sewage, people should boil all water before cleaning with, cooking with, or drinking it. As of September 6th, 168 public water systems in Texas have boil-water notices.<sup>11</sup>

State officials will need to continue monitoring the shellfish harvesting areas in Galveston Bay and close them if fecal bacteria counts are too high.

## Long-term Steps to Protect Health

Though there may be little that could have slowed the releases of raw sewage during Hurricane Harvey, Houston often spills untreated sewage during smaller precipitation events and should take steps to address this problem.

Houston has a long, dirty history of sewer overflows. Most big storms over the last few years have resulted in raw sewage spilling out of the city's pipes.<sup>12</sup> The EPA estimates that Houston experiences an average of 840 sewer spills per year.<sup>13</sup> This comes out to 12 spills for every 100 miles of pipes, almost three times the national average.<sup>14</sup> Houston's sewage spills are typically due to leaks, corrosion or blockages in poorly maintained pipes. State authorities and the EPA have been aware of Houston's faulty sewage system for years. In response to the threat of a lawsuit for violating the Clean Water Act, Houston officials were negotiating with the EPA in 2016 to establish a timeline to upgrade the city's pipes.<sup>15</sup>

### For More Information, Contact:

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1. Texas Commission of Environmental Quality, *Tracking of Sanitary Sewer Overflows (SSOs) - Dataset 09.18.2017*, archived at <https://web.archive.org/web/20170919195804/https://www.tceq.texas.gov/assets/public/response/hurricanes/sso-ww.pdf>

2. Committee on the Use of Treated Municipal Wastewater Effluents and Sludge in the Production of Crops for Human Consumption, Water Science and Technology Board, Commission on Geosciences, Environment, and Resources, National Research Council, *Use of Reclaimed Water and Sludge in Food Crop Production* (Washington, D.C.: National Academy Press, 1996), 90. Available online at <https://www.nap.edu/read/5175/chapter/1>; and Centers for Disease Control and Prevention, *Shigella-Shigellosis*, accessed 8 September 2017 at <http://www.cdc.gov/shigella>.

3. Sheila Kaplan and Donald G. McNeil Jr., "Short Answers to Hard Questions About Health Threats From Hurricane Harvey," *The New York Times*, 31 August 2017, available at [www.nytimes.com/2017/08/31/health/hurricane-harvey-health.html?mcubz=1](http://www.nytimes.com/2017/08/31/health/hurricane-harvey-health.html?mcubz=1).

4. See note 2.

5. Susan Scutti, "Sewage, fecal bacteria in Hurricane Harvey floodwaters," CNN.com, 2 September 2017, available at <http://www.cnn.com/2017/09/01/health/houston-flood-water-contamination/index.html>.

6. Ibid.

7. Hayley Miller, "Here's What You Need to Do if Your House Was Flooded During Hurricane Harvey," *Huffington Post*, 1 September 2017, available at [www.huffingtonpost.com/entry/hurricane-harvey-return-home-guidelines\\_us\\_59a97e31e4b0354e4409e760](http://www.huffingtonpost.com/entry/hurricane-harvey-return-home-guidelines_us_59a97e31e4b0354e4409e760).

8. Galveston Bay Foundation, *How Has Harvey Impacted Water Quality?* accessed 8 September 2017, at <http://www.galvbay.org/news/how-has-harvey-impacted-water-quality>

9. See note 7.

10. Ibid.

11. Texas Commission on Environmental Quality, *EPA/TCEQ: Updated Status of Systems Affected by Harvey* (news release), 6 September 2017, available at [www.tceq.texas.gov/news/releases/09-06-status-of-systems-in-areas-affected-by-harvey](http://www.tceq.texas.gov/news/releases/09-06-status-of-systems-in-areas-affected-by-harvey).

12. Sara Jerome, "Houston Officials Say Sewage Overflows Are Unavoidable," *Water Online*, 6 November 2015, available at <https://www.wateronline.com/doc/houston-officials-say-sewage-overflows-are-unavoidable-0001>; and Mike Morris, "Sewer Spills Put City under EPA Scrutiny," *Houston Chronicle*, 27 August 2017, available at <http://www.houstonchronicle.com/news/houston-texas/houston/article/Sewer-spills-put-city-under-EPA-scrutiny-9188683.php#photo-10839017>.

13. Ibid. (Mike Morris).

14. Ibid.

15. Ibid.

\* Population of Houston, 2.3 million: U.S. Census Bureau, *2016 Population Estimate*; 1.6 gallons per toilet flush: EPA WaterSense, *National Efficiency Standards and Specifications for Residential and Commercial Water-Using Fixtures and Appliances* (factsheet).