

U.S.

Five Reasons Houston Is Especially Vulnerable to Flooding

Storms can easily drench the Texas city, with its 800 miles of creeks and bayous—and burgeoning developments



First responders escorted a woman out of a flooded Houston highway on Jan. 18. Incidents of high water have occurred more frequently in the city, exacerbated by its drainage systems, geography and developments. PHOTO: ELIZABETH CONLEY/ASSOCIATED PRESS

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As many cities in the South and along the Atlantic and Gulf coasts have grown in recent decades, they have also become much more prone to flooding. Now, as Hurricane Harvey bears down on Texas' Gulf Coast, Houston's vulnerability is highlighted, as the city's 800 miles of creeks and bayous—and its burgeoning developments—make storms a particular threat.

1. Houston's geography makes rising waters particularly dangerous

The city is low-lying and most of the soil is clay, which drains poorly, said Samuel Brody, director of the Texas A&M University's Institute for Sustainable Coastal Communities in Galveston. That is in contrast to Miami which has sandy, porous soils. In Houston, "the underlying physical conditions play a role in exacerbating the impacts of floods," Mr. Brody said.

2. A recent construction boom has impeded drainage

Large-scale developments—such as apartment and office complexes, shopping malls and roads—have added vast stretches of pavement to the Houston area. These expanses of concrete and asphalt inhibit drainage and worsen flooding, as, when heavy downpours hit, the rain flows into other neighborhoods rather than into the soil.

3. Flood protections have had trouble keeping pace with development

While flood protections have been strengthened in the region in recent years, local officials have been perpetually trying to catch up in newly developed areas where the effects of higher water levels are less known. Lax building regulations in the area also have allowed subdivisions to be built where flooding was inevitable, experts have said.

4. Building regulations haven't taken into account historic flooding levels

New buildings erected in Houston are required to be built at 12 inches above 100-year-flooding levels—meaning there is a 1% chance of that the area will be inundated within a single year. Harris County, Texas—in which Houston is located—requires new buildings to be built at 18 inches above 100-year flood levels. But recent flooding in some parts of Harris County, reached 250-year- and 500-year-flooding levels, and Mr. Brody notes that almost half of insured flood claims are outside the flood plain boundaries.

5. Drainage systems are largely obsolete

The region is also weighed down by its outdated drainage systems. Its network of channels was built beginning in the early 20th Century to sustain only a 10-year flood, a milder—but more likely—event. Local officials have worked to widen existing drainage channels, but retrofitting them to a 25-year-flooding level is costly.

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