

Measuring Flooding with the Houston Fire Department

Report to the Houston Fire Department

For questions regarding this project, please contact:

Steven Perry
Dept. of Political Science
Rice University
steven.perry@rice.edu

Bob Stein
Dept. of Political Science
Rice University
stein@rice.edu

Project Summary:

Over the past decade, Houston has experience a dramatic increase in large scale flooding events. As part of a larger project to understand the locations and causes of urban flooding, researchers at Rice University, in conjunction with the Kinder Institute for Urban Research and the City of Houston, implemented a survey to identify locations of street and intersection flooding from municipal emergency response personnel.

A web survey was sent to members of the Houston Fire Department between September 12th and October 4th, 2018. During this period, 201 HFD officers from 88 stations accessed and completed the survey. As part of the survey, each officer was shown a map of their local service area and asked to indicate all of the locations of street and intersection flooding they remember encountering in the last three to four years. In total, 1,383 flooding location coordinates were collected.

I. Introduction:

Over the past decade, Houston has experience a dramatic increase in large scale flooding events. Between 2015 and 2017, three 500-year flood events resulted in substantial property damage, the loss of more than 50 lives, and over 500,000 requests for federal disaster assistance. In addition to these large scale events, smaller floods have also significantly increased in frequency, and pose a significant impediment to the routine daily activity of citizens. As a result, practitioners and scholars alike have attempted to develop a greater understanding of the causes of Houston's flooding problem. However, significant data limitations on flooding locations have undermined this effort; without a comprehensive data collection effort to more accurately measure flooding, little systematic analysis on the causes of flooding or the effectiveness of potential mitigation strategies can be conducted.

Underscoring the Need for New Data: Problems with Current Measures

Traditional measures of street-level flooding are prone to severe self-selection biases. Policymakers and scholars alike have attempted to utilize 311 calls as a means of measuring and predicting locations of flooding. 311 is a commonly used tool for municipalities to collect information on non-emergency problems and citizen request for service; in Houston, citizens can call, use an app, or access the 311 system online to report everything from potholes and service interruption to locations of street flooding.

However, attempting to use 311 as a means of data collection for flooding incidents has unique challenges. Key to the limitations of the 311 system is the processes through which data is collected. When using 311, citizens only call to report a problem; thus, while data is collected on locations of reported flooding, this data makes areas in which no flooding occurred and areas in which flooding occurred but was not reported indistinguishable. Thus, in order for flooding to be accurately spatially measured using 311 calls, respondent propensity to self-select into reporting to 311 cannot be correlated geographically. However, such a requirement is pragmatically unlikely to be met: many factors that motivate individuals to engage in reporting activity, such as race and ethnicity, income, and home ownership or renting status each motivate geographic clustering. Those with lower incomes, renters, and those with lower levels of efficacy and trust in government are systematically located in different areas of a municipality than individuals with higher levels

of aggregate socioeconomic status. As a result, when compared to high SES areas, low SES areas are less likely to be represented as locations of flooding, independent of the areas actual risk of flooding. This geographic clustering can introduce systematic bias into 311 based measures of flooding. In addition, general data limitations and number of observations make drawing accurate estimates on flooding likelihood from 311 data difficult.

To overcome these limitations, some scholars have attempted to conduct surveys to measure citizen observations of flooding after specific rainfall events. However, these surveys are necessarily limited in scope: by only being in the field for a limited time, they are time bound to one large rainfall event; thus, the data they provide are limited to one specific event and have little generalizability outside of the context of specific incidents. In addition, as the surveys are developed and implemented post-event, they are retroactive in nature; as a result, data on flooding locations is based upon individual personal recall of flooding locations and effects, instead of directly measuring individual observations of flooding. Finally, these surveys are often logistically complex to develop and implement immediately after a storm event; this increases the time interval between the event and when data is measured.

Solving Data Limitations Using First Responders

To overcome these limitations, we collect data on street-level flooding in Houston by leveraging the experience and expertise of a novel source of information: officers of the Houston Fire Department.

Houston Fire Department officers have significant day-to-day experience with flood response. In addition to directly providing emergency medical and rescue services during large scale flooding events, HFD officers routinely traverse Houston during rainfall events. As part of their normal operations, HFD officers gain personal experience on locations of flooding around Houston. Officers know, for example, areas where cars normally stall during heavy rains, as well as potentially-flooded streets that need to be avoided when responding to a call.

In addition to their personal experience, there are several key advantages to using firefighters from the Houston Fire Department to collect information on the locations of street flooding. First, HFD

officers operate in specific and well-defined service areas that generally remain stable over time. This allows the officers at a station to develop both region-specific expertise as well as first-hand experience in responding to incidents in that area. Second, officers tend to remain at an assigned station for significant periods of time; this allows for the collection of longitudinal data and for locations of flooding to be generalizable to multiple or typical rainfall events in an area rather than restricted to one event. Third, HFD firefighters respond to incidents across Houston without being subject to the same self-selection biases limiting 311 reports of flooding.

II. Measuring Flooding with the Houston Fire Department:

A survey was sent to members of the Houston Fire Department between September 12th and October 4th, 2018. As part of the survey, each officer was shown a map of their local service area and asked to indicate all of the locations of street and intersection flooding they remember encountering in the last three to four years. Each respondent could indicate up to seventeen locations of flooding; the latitude and longitude coordinates of each individuated location were recorded for analysis.

HFD Senior Captain George Nicasio served as our primary point of contact for the project and distribution of the survey to stations. On the advice of Captain Nicasio, we elected to survey the leadership at each station rather than each individual officer. This allowed officers to collaborate in order to provide the most accurate locations of flooding in each station's immediate service area.

While the survey was open, 201 officers from 88 stations accessed and completed the survey. This represents a 100% station response rate, as each of the 88 surveyed stations had at least one individual complete the survey. As part of the survey design, we targeted between six and ten officers completing the survey at each station; from this target, the 201 total submissions represents a 28.6% estimated response rate. Approximately 66% of stations had either two or three responses. About 20%, or 18 stations, had only one respondent. 11 stations, or about 12.5% of all stations sampled, had four or more responses.

In total, 1,383 latitude and longitude coordinates were collected; the full spatial distribution of these flooding locations is shown in Figure 1. As expected, the reported locations occur throughout HFD’s service area.

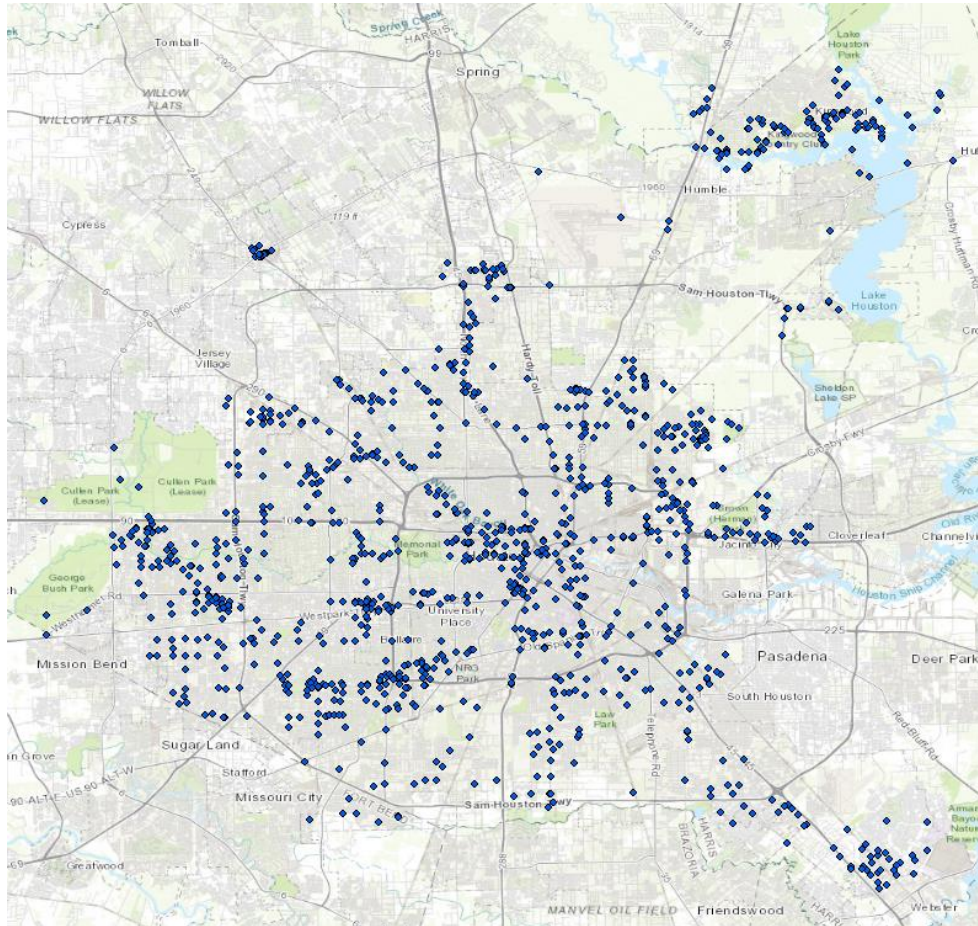


Figure 1: Spatial Location of HFD Flooding Reports

In addition, we asked each officer to indicate how significant a problem flooding was in their specific service area. The distribution of these responses is shown in Figure 2. Only 26 officers (13%) indicated that flooding in their service area was either insignificant or very insignificant. In contrast, almost half (48.3%) indicated that flooding was either a significant or very significant problem in their response area.

Distribution of Flood Severity

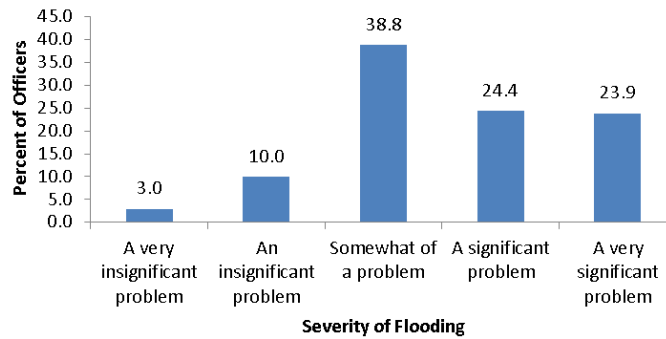


Figure 2: Distribution of Flood Severity

The spatial location of these measures is shown in Figure 3. As expected, clusters of significant flooding occur in areas with well-established histories of flooding, such as Meyerland. Other ‘hot spots’ of flooding activity include Midtown, Westchase, and areas along significant bayous.

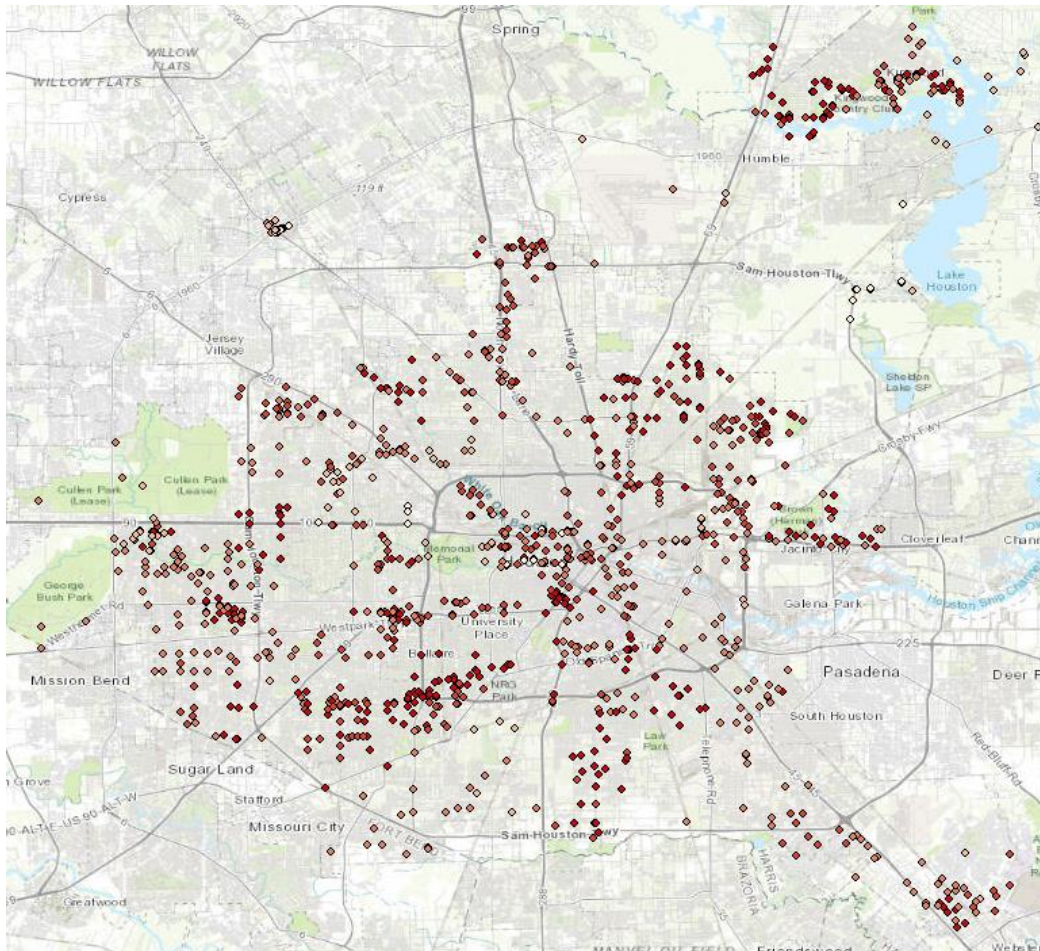


Figure 3: Spatial Locations of HFD Reports by Flood Severity

Analysis of Locations of Flooding: Comparing HFD Reports to 311 Calls

In order to verify the accuracy of these locations, as well as to identify areas in which HFD-provided data can provide additional insight not found in contemporary flooding data, we perform comparative spatial analysis between HFD’s locations of flooding and citizen reports of flooding generated through the 311 system. The spatial distribution of each of these two measures of flooding is shown in Figure 4

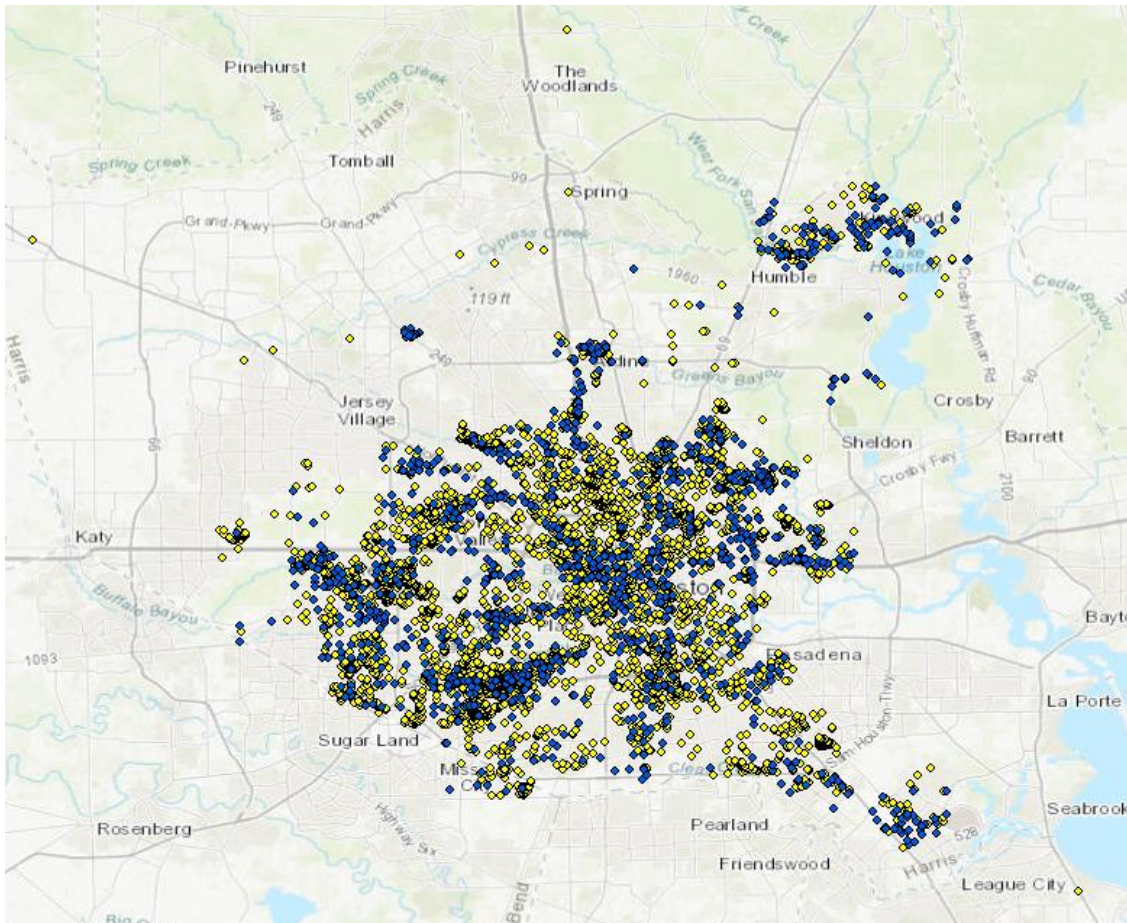


Figure 4: Spatial Distribution of HFD and 311 Flooding Reports

To compare the similarities between 311 and HFD reports of flooding, we first examine the distance between each individual report of street flooding; this is done through a two-stage process: First, we geolocate the latitude and longitude coordinates of each flood-related 311 report during the 2015 Memorial Day and 2016 Tax Day floods that is located within HFD’s service area.

Second, we calculate the Euclidean distance between each 311 report and its nearest HFD flooding location.

As shown in Figure 5, on average, there is 2030 ft. (or 0.384 of a mile) distance between each 311 call and its nearest HFD report of flooding. The median distance is 1,486 ft., indicating that an equal number of 311 calls had distances less than and greater than 1,486 ft. The lowest observed distance is 11.99 ft., or approximately four yards; the highest distance is 15,700 ft., or approximately 2.97 miles. Approximately 92.4% of 311 reports were within one mile of a HFD flooding report; 35% of calls were within 1,000 ft. Only 88 311 reports, or 1.32%, were within 100 ft. of an HFD reported flooding location.

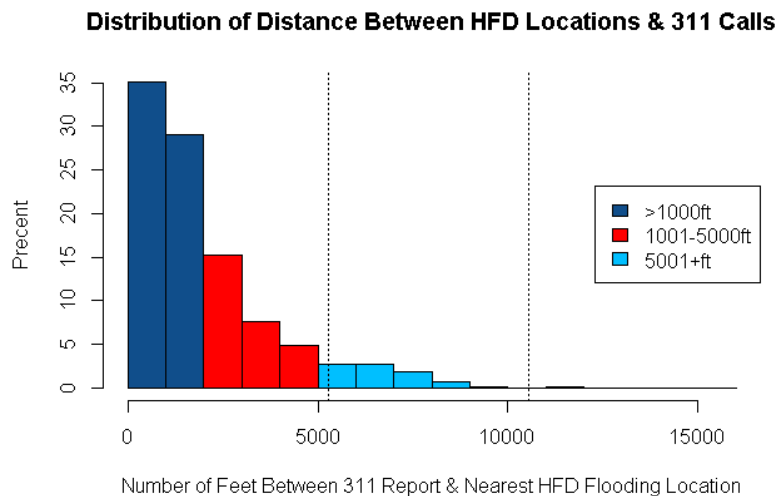


Figure 5: Distribution of Distance between HFD Locations & 311 Calls

In addition to examining the spatial distance between 311 calls and HFD reports of flooding, we performed statistical analysis to determine the relationship between the two measures of flooding. Specifically, we find that HFD calls and 311 reports of flooding have a highly significant and strongly positive correlation: areas with higher levels of 311 calls have, on average, higher levels of HFD-reported flooding.

Block Group Analysis

To gain additional traction on the relationship between citizen and HFD reports of flooding, we perform statistical analysis based upon the number of 311 and HFD flooding reports in each census

block group. Using census block groups allows us to examine the specific effects of characteristics in a geopolitical area that is both localized and temporally stable.

The majority of block groups (67.4%) had no HFD flooding reports; 17% of block groups had one HFD flooding location, while only 13.5% of block groups had between one and five locations of flooding. 8 block groups, or less than 0.5% of block groups had ten or more reports of flooding.

As expected, 311 calls portrayed significantly more variance in the number of reports per block group but are substantively similar. Almost 40% of block groups had no 311 reports of flooding, while more than half (51.4%) had between one and ten 311 reports. 2.4% of block groups had 30 or more 311 reports; only seven block groups had 70 or more 311 calls.

To more completely understand the relationship between these measures, we preform statistical analysis on the number of 311 and HFD flooding reports in each block group. As shown in Figure 6, there is a statically significant and positive relationship between the two measures. A block group with no HFD flooding reports is estimated to average 2.95 311 flooding reports. For each HFD call in the block group, the estimated number of 311 calls increases by 1.54. Thus, a block group with 5 HFD reports of flooding is estimated to have 10.67 311 flooding reports.

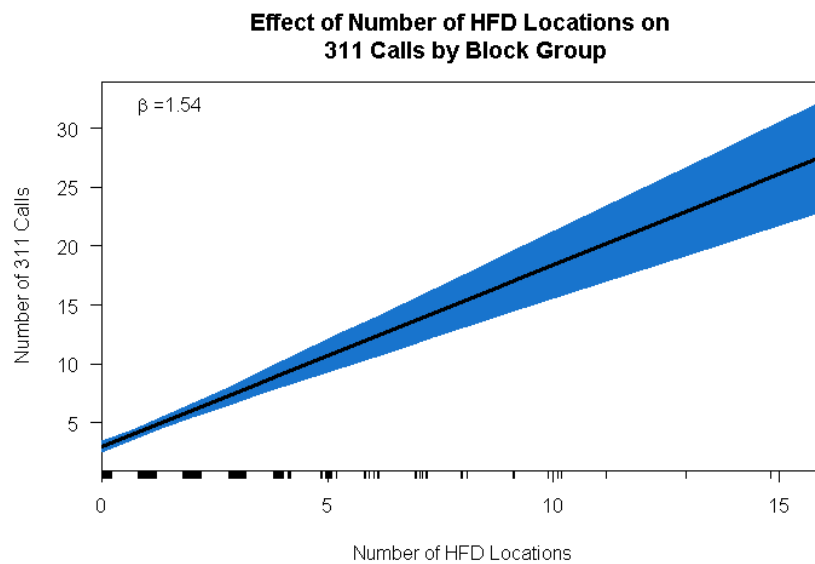


Figure 6: Effect of Number of HFD Locations on 311 Calls

Appendix A: Officer Comments

After participating in the survey, officers were provided an opportunity to provide any comments they had about the project or flooding in Houston. There responses are included below.

Officer Comments
ambulance and chiefs car cant leave the station after heavy rain. due to driveway slope (Station 28)
Drains system is inadequate in size and needs to be checked for trash build up at the street level grates where water enters. Also the flat terrain and concrete does not allow the water to run off fast enough. Some areas need drains put in where water pulls especially on Telephone at Griggs and Old Spanish Trail around Delafield. Once the Bayou becomes overwhelmed, the small street drains then begin to back flow with flood waters, causing more local flooding and adding to the problem. (Station 40)
City will never be able to fix the flooding problem!!
Fire station 26 has flooded 3 times in a 2 year time frame starting October 31st 2015 Fire station 26 has flooded at least 5 times since tropical storm Allison.
Areas that flood seem to be consistently in the same neighborhoods with little being done for prevention. (Station 46)
During Harvey we responded to multiple trapped occupants along 45 feeder between Scott and Cullen however the rainwater was able to almost completely recede after initial band. Anything along MacGregor around Bayou and the immediate neighborhoods is definitely a flood risk. (Station 25)
Station 45 becomes an island and cannot respond as we cannot get off McCarty Road due to flooding. May consider a relocation of station 45.
Houston floods.
The locations noted on the maps do not cover all the areas that flood in this territory. A good portion of the streets in this entire territory flood relatively easily with a heavy rain. The houses do not always get water in them but the streets become impassable for most vehicles. (Station 35)
<p>Except for elevated areas of West Sam Houston Parkway South, the whole territory of Station 69(1102 W. Sam Houston Pkwy S.) has been flooded/under water. Areas directly both North, South, and adjacent to Buffalo bayou are affected most.</p> <p>During Hurricane Harvey, all roads and bridges crossing Buffalo Bayou and within Station 69's territory were impassable. The first bayou crossing to open up nearest to Station was S. Piney Point just South of Memorial and North of Westheimer.</p> <p>There was one major problem encountered during and after hurricane Harvey. Station 69 was being dispatched to calls North of Buffalo Bayou but was unable to cross Buffalo Bayou in the immediate area. The only way to cross the Bayou was W. Loop S.(610). Either crossing would be ineffective due to the extended response time. We notified OEC(Office of Emergency Communication) that we could not cross Buffalo Bayou, yet we continued to be dispatched to</p>

calls North of the Bayou and unable to reach the dispatched location.
Lots of street flooding in sta045 response area. A couple of bayou's with small bridges to cross also pose an issue.
Majority of the neighborhood roads are impassible (Station 70)
Drainage ditches and bayous on the southwest side of town have been neglected for years. The bayou that is west of Westhemier is clogged with debris and fallen trees. This the same bayou that runs along 610 and Memorial. It is kept clear and there was a kayak launch point until recently. It was washed away during Harvey or the year before. (Station 60)
From first hand knowledge from one of the guys that was here during Harvey. The areas indicated are the Only areas that flooded during the storm. (Station 105)
The flooding indicated is during heavy rains. Harvey was an exception to the rule. During Harvey, 85% of our territory flooded. (Station 44)
THE MAIN AREAS OF FLOODING IN THE STATION 83 TERRITORY IN DOWN RICHMOND FROM THE BELTWAY WEST. THIS ALSO EFFECTS THE SIDE STREETS INCLUDING BREEZEWOOD WHERE STATION 83 IS LOCATED.
ran out of maps. didi not get to west mt. Houston @ 45 or west mt Houston and sweet water and sount on sweet water. water during Harvey would have been mid door area on engine 74. (Station 74)
ALL AREA AROUND STATION WAS FLOODED IN HARVEY NO WAY TO ACCESS ANYTHING FROM STATION (Station 39)
Around 43rd and Oak Forest always floods on fast, hard rain. Rosslyn and Judiway has a low area that holds high water when it rains for a while. All around the brickhouse gully has problems when the ground gets saturated. (Station 13)
The area immediately around station 31 does not appear to suffer from major flooding. However, Crosstimbers (our main access thoroughfare) floods quickly and easily right in front of the station and up and down the street for a few blocks. Subsequently, the units get locked into the station and cant get out to help the public.
Side street flooding occurs in this area due to illegal dumping in ditches causing back up of drainage. (Station 67)
Most of Station 43s territory floods.
Usually when it floods we are not able to leave the station because of how bad hartsook floods, so there are likely other areas in our territory we are not aware of as flood prone. During Harvey our whole territory had major flooding due to the bayou and ditches around the area. (Station 52)
Every bayou in 56's territory has the potential to rapidly overflow causing flooding in the surrounding areas.
Need more exac and rescue boats (Station 96)
for Kingwood flooding its basically is all close to the San Jacinto river (Station 102)
chimney rock and west orem.
Ditches in Settegast are usually filled with heavy trash and overgrown, natural flow is impeded, it is the residential streets that are most prone to severe flooding. (Station 43)
From my understanding The Villages of Bunker Hill has the ability to reduce flooding in our area, but due to politics, they are not allowing modifications to the Bayou.
Our whole area flooded last year during Harvey. It would help if you could defined what flooding youâ€™re speaking of. Routine flooding or any flooding including Harvey etc.

THE PRIMARY AREA THAT FLOODS DURING A HEAVY THUNDERSTORM IS FROM WESTVIEW SOUTH TO I-10. THIS AREA FLOOD QUICKLY BUT ALSO DRAINS QUICKLY. THE WATER REACHES DEPTHS OF 6-12 INCHES IN A 30 MINUTE HEAVY RAIN. I BELIEVE THERE IS A DRAINAGE PROJECT BEING WORKED ON FOR THIS AREA. I WAS ALSO TOLD IT IS SEVERAL YEARS OLD AND GETS PUT ON HOLD FREQUENTLY. (Station 49)
Flooding in front of station 35 Causes delayed respnse
During Hurricane Harvey, we could easily drive to the station via Hwy 290 and exit Bingle. The immediate area around the fire station was high and dry in all directions x 1000'. (Station 50)
Station 21 has significant flooding in our primary response area. During steady rains we have had sparse availability of major roads surrounding the station usually recedes quickly except during Harvey.
LOT OF OUR RESCUES WERE IN RISING WATER WITH INTERMITANT LAND IN BETWEEN. WE COULD HAVE BENIFITED WITH SMALLER LIGHTER ALUMINUM BOATS TO PULL BY HAND OVER LAND OR SWALLOW WATER TO DEEPER WATER.SWIFT CURRENT ENCOUNTERED BY LAKE HOUSTON SHORELINE WITH SLOW OR STILL WATER AWAY FROM SHORELINE. SMALLER BOAT BOWS WERE PLACED AT FRONT DOOR OF MANY HOMES AND FLOOD VICTUMS STEPED FROM STAIRCASES INTO BOAT. (Station 65)
I ve seen water twice in 10 years cover the parking lot at station 5 were we had to move vehicles into the fire station.
On Bay Area BLVD, the intersection of Bay Area BLVD and Saturn Lane floods all the way to the front of fire station 72. On the corner of the intersection are a series of apartments that goes all the way down to Space Center BLVD. Bay Area BLVD and Space Center BLVD also floods. This will prevent any fire truck (72,71,94) from being able to respond to these apartments in the event of an apartment fire, given the current limitation of the guidelines, policy and procedure, based on the way fire trucks are currently being made and purchased with the intakes and the computers being mounted on the bottom of fire trucks. Never should a fire truck be so vulnerable to 6 inches of water.
Station 13 is next to the bayou and did not flood as mush as expected in the surrounding area.
all of kingwood south of kingwood drive floods as well as some streets north of kingwood drive.
Houston will continue to flood because nothing has been done to the drainage system throughout this city. City keeps building and the water has no where else to go. Any little rain fall we have for an hour the city starts to flood.
I am not sure of the reasoning or purpose of the excavation near I-45 @ knobcrest, but I believe that this project has helped relieve some of the flooding in the Greenspoint area. I've noticed since the beginning of the project that the flooding has been less.
Our response is prone to significant flooding. (Station 21)
I think this study is great if it is used to actually contribute to the reduction of flooding. That being said as more development is being done in Houston, it doesn't matter how much money the city, county or state throw at this problem it will never fix the issue. The geography/topography of this region will not allow for the area "not to flood". The more ground that is eaten up with concrete the worse the issue will get. This is a hydraulics problem and the current bayou system is not equipped to supplement the larger quantities of water that are being

dumped in this region along with the continued development of the greater Houston area. No amount of retention ponds no matter how deep will fix this problem.
Fire Station 26 has flooded out 3 times in the past 5 years. Harvey, The memorial day floods, and the tax day flood. Water as high as 18 inches had gotten in to the station. All of Dixie Drive from Telephone to Mykawa has been under several feet of water as well as numerous streets in the surrounding neighborhoods.
The area around Maury @ Brooks experiences significant street flooding with only minimal rain. This appears to be a drainage issue that has developed recently. (Station 9)
Most of this was Harvey. However Dunham road floods almost always
Kingwoods major problem is due to the lack of dredging in the Lake Houston and San Jacinto. Before annexation of Kingwood the lake and river were dredged biannually. After annexation the dredging did no occur. So buildup of silt over 20 years has caused increased flooding. 20 years ago the water was 20 feet deep under eastex bridge by Hamblen road. Now there are visible sand bars there.
No real bad flooding areas in our territory. Mostly in the bayou areas north of Westheimer. (Station 83)
The most consistent area of flooding in the 28 years that I have worked in the Mid-Town/Downtown area is on Elgin at Austin (in front of Station 7). In the past 8 years the flooding in that area has progressively been deeper and faster.
The more development the more flooding there will be, no dirt for the water to soak into.
I believe Houston needs to seriously consider new permeable road surface materials in areas where applicable such as large square acreage parking lots. There is just too much existing and ever increasing impervious surface area being added to the cities runoff and already stressed drainage system.
Downtown and Midtown is spuratic
Need to ne better equipped as first responders regarding PPE. (Station 2)
i forgot to add I-45 @ W. Mount Houston area and Sweetwater from West Rd to Canino. (Station 84)
Speaking with a member who has worked in this area for 9 years, he stated that he hasn't encountered any real issues with street flooding (Harvey excluded). On the maps I couldn't figure out a way to remove the red marker and indicate that we have no issues with street flooding in the immediate area surrounding station 3.
drainage on 610 feeder between Woodway and SanFilipe is an issue drainage on I10 feeder between Bingle and Gessner west bound is an issue. East bound is fine. Silber Rd from feeder to Westview has drainage issues.
Our territory has a major bayou with expensive homes lining the area surrounding the bayou. It floods during major storms but not during average rainfalls. (Station 69)
Flooding in this territory is minimal and almost all of the areas that hold water are passable. these areas also drain relatively quickly as most of the main drags have been redone. (Station 67)
The flooding will continue as long as there are corrupt politicians spending money on "pet projects". Houston has plenty of revenue to make this simple fix. Spending and mismanagement is the problem. The citizens and the first responders just need to plan for and prepare for future loss.

During Harvey as well as many of the other heavy down-pour rains we've had (Independence Day flood, Tax Day Flood, and Memorial Day Flood) Alameda Genoa Rd from Orem to Gulf Freeway was under 2 feet+ water. Fuqua St. from Gulf Freeway to Telephone Rd was under water. Telephone Rd from Fuqua to South of Beltway 8 was under water, Mykawa Rd was submerged from south of Beltway 8 to Airport Blvd. Blackhawk St. was submerged from Fuqua to Lettie St. along with almost all of the adjacent residential streets in that area. Beltway 8 feeder on both eastbound and westbound sides were submerged from Blackhawk to S. Wayside Dr. Monroe Rd. was underwater from Alameda Genoa to Pan Air and from Fuqua to Beltway 8. All the subdivisions south of Fuqua from Kingspoint to Telephone were flooded and required boats to evacuate citizens. The residential area in the vicinity of Radio Rd. between Scranton and Ledge going east up to Clearwood were inundated with water. During Harvey there was a point where almost all roads in Fire station 61's still alarm area were completely impassible and water depths exceeded the level for safe fire apparatus operations.

Probably one quarter to half the streets, maybe more, in our first in territory (Station 16) floods when we have a substantial amount of rain in a short period of time. We are not even able to leave our to make runs when this happens because of flooding right outside the station.

I was in charge of the area command for the Meyerland area for all 3 of the floods, Tax day, Memorial and Harvey. I have detailed information on streets that flooded, levels of water in the houses, high water vehicle routes and boat launching sites. If any of this information can be used please contact me. (Station 21)

If it rains for constantly for more than an hour or so we can expect street flooding and high water is certain areas in our response area and surrounding areas along the bayou running from the Addickâ€™s reservoir in the ENERGY CORRIDOR.

most of Kingwood was flooded after the dam was opened.

The areas surround the station sustained the most damage, as well near the freeways. In general, areas where there was less grassland sustained significant amounts of water. (Station 58)

Harvey was an usual flood event, during previous flood events, only saw house flooding along the river. With Harvey we saw server flooding of homes along the lake. Our Station was isolated due to street flooding from additional resources and supplies. (Station 65)

I am unfamiliar with the flooding in Station 11s response area because I have only recently transferred to this new assignment as of May 2018 and have not experienced any flooding yet.

Most of Station 37s territory was under water during Hurricane Harvey, and tax day floods as well. Only difference was Harvey water just was higher.

The area around station 6 has significant flooding. The are is located mainly between buffalo bayou and White Oak bayou.

Older neighborhoods have localized street flooding during heavy rains. Runoff from new neighborhoods collects in and around older ones due to elevation changes. localized flooding seems to be increasing each year within the residential neighborhoods.

Street flooding is very much dependent on the amount of rain. Obviously, the closer to the bayous and other water right of ways, is more prevalent to flooding. Many streets and intersections flood in our area, but it truly depends on the amount of rain.

The city needs to update and improve the drainage system.

STREET FLOODING IN OUR RESPONSE AREA IS A COMMON OCCURENCE AND PROBLEM. WE ARE ESSENTIALLY FLOODED INTO OUR STATION DUE TO PROXIMITY TO THE BAYOU THAT RUNS NEXT TO OUR STATION. WE HAVE

FLOODED THE LAST THREE YEARS AND SEVERAL TIMES BEFORE THAT. (Station 68)

everything east of mesa, the street flood with very little rain. the neighborhoods off Tidwell, will flood, with heavy rainfall. (Station 32)

It appears to me the flooding problem is getting worse here in Clear Lake. (Station 94)

have not had but only one flooding event

While a lot of attention has been placed on Hurricane Harvey being an "Unprecedented flooding event" or a "Thousand year Flood that could not have been predicted", the inability to predict unprecedented flooding does not negate the city's failure to be prepared for substantial flooding in general. The City of Houston has dealt with major flooding, year after year and decade after decade, yet the 4th largest city in America had only 6 rescue boats during Harvey's onslaught. The fire department and police department were both caught unprepared, understaffed, underfunded, and ill equipped. Not because each department was unable to predict Harvey's devastation, but because the priorities of the City of Houston's leadership (read: "mayor") have been misaligned for the last two administrations. Any city with a long history of major flooding, choosing to spend money on extemporaneous wants rather than life safety needs, is unconscionable. Sadly, 107 families had to pay the price of policies based on political expedience rather than life safety.

Braeswood has extensive flooding in our district. (Station 82)