

Term Project Update: Flooding in the Addicks Reservoir during Hurricane Harvey

When the Addicks Reservoir was constructed in the 1940's, the watershed was dominated by agricultural land use.¹ As development in the watershed increased, it began to encroach on the boundaries of the reservoir. US Army Corps of Engineers released a report following a record setting flood in March of 1992 warning that residents were unaware of the increased risk of flooding in developments near the reservoir.² The Corps proposed multiple options to reduce the risk, which were not pursued at the time.³ The watershed continued to develop rapidly between 1992 and 2011. This development is evident in the maps and table produced from the National Land Cover Database to the right and below. At the time of Hurricane Harvey, approximately 31,000 homes were located in the flood pools upstream of the reservoirs in Harris and Fort Bend Counties.⁴

Main Class	1992, %	2006, %	2011, %
Barren	1.4	0.5	0.9
Developed	15.0	41.7	43.3
Forest	12.8	6.5	6.2
Herbaceous	2.4	2.4	2.3
Planted/Cultivated	57.9	35.2	34.1
Shrubland	5.2	3.2	2.9
Water	0.3	0.2	0.5
Wetlands	5.0	9.2	10.0

The Corps normally manages levels in the Addicks Reservoirs through controlled releases into Buffalo Bayou.⁵ During the initial days of Hurricane Harvey, neighborhoods upstream of the Addicks Reservoir began to flood. On August 28th, 2017, rising reservoir levels resulted in uncontrolled releases on the north end of the dam.⁶ By August 29th, the Corps chose to start controlled releases to reduce the likelihood of further uncontrolled releases.⁷

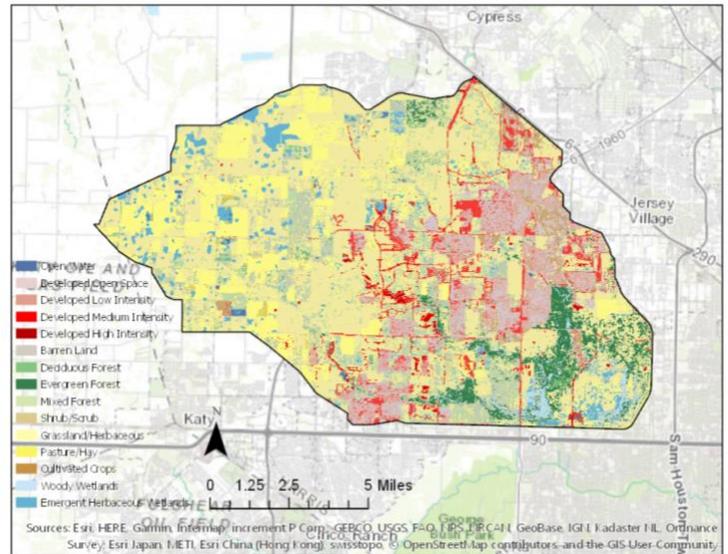


Figure 1: 1992 Land Cover for the Addicks Watershed

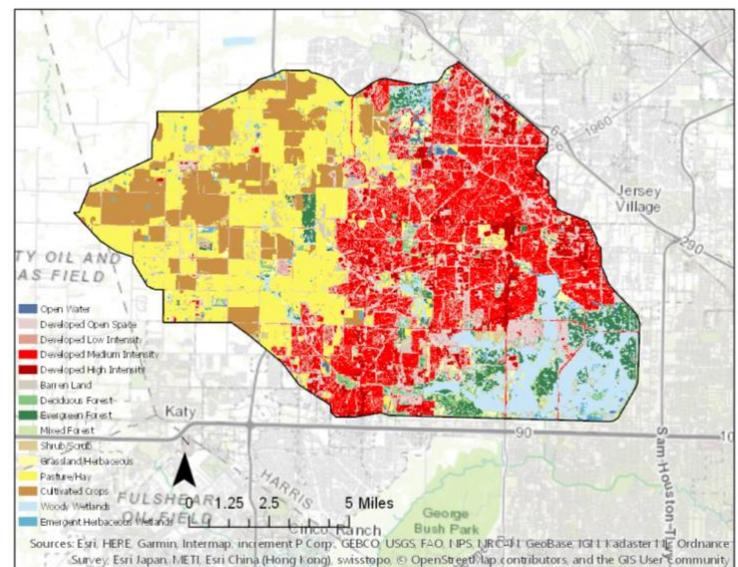


Figure 2: 2011 Land Cover for the Addicks Watershed

¹ Harris County Flood Control District, "Addicks Reservoir," <https://www.hcfdc.org/>
² Shilcutt, Katherine, and Roxanna Asgarian. "The Deliberate Flooding of West Houston." *Houstonia*, November 2017.
³ Lise Olsen. "Record reservoir flooding was predicted even before Harvey hit Houston." *Houston Chronicle*, February 22, 2018.
⁴ Lise Olsen. "Many Homeowners Unaware They Lived in Reservoir 'Flood Pools'." *Houston Chronicle*, September 28, 2017.
⁵ Harris County Flood Control District, "Flooding Impacts in Connection with the Reservoirs," <https://www.hcfdc.org/>
⁶ Harris County Flood Control District, "Flooding Impacts in Connection with the Reservoirs," <https://www.hcfdc.org/>
⁷ Shilcutt, Katherine, and Roxanna Asgarian. "The Deliberate Flooding of West Houston." *Houstonia*, November 2017.



Figure 3: Addicks Reservoir during Hurricane Harvey on August 29th, 2017 with reservoir level at 108.8 feet. The image on the right shows the Addicks Reservoir during normal operation at a height of 69.45 feet on April 26th, 2018.⁸

The reservoir reached its peak height of 109.09 feet on August 30th.⁹ A *Houston Chronicle* analysis of damage reports estimated 5,000 to 6,000 homes were flooded in the area upstream of Houston's Addicks Reservoir due to the filling of the reservoir.¹⁰

This project will examine flood inundation in the area surrounding the Addicks Reservoir during Hurricane Harvey. To accomplish this, I will use a digital elevation model from the USGS of the Addicks Watershed, as shown in the figure to the right. I will also use flowlines and catchments from the NHDPlus dataset. Using the DEM and the NHDPlus dataset, I will then produce an inundation map by calculating the height above nearest drainage. I will use data from the Harris County Flood Control District to determine the reservoir height during Hurricane Harvey. I plan to overlay this data with address points to estimate the number of homes flooded upstream of the Addicks Reservoir. Ultimately, I will compare my estimate of homes flooded upstream of the Addicks Reservoir to the estimate published by the *Houston Chronicle*.

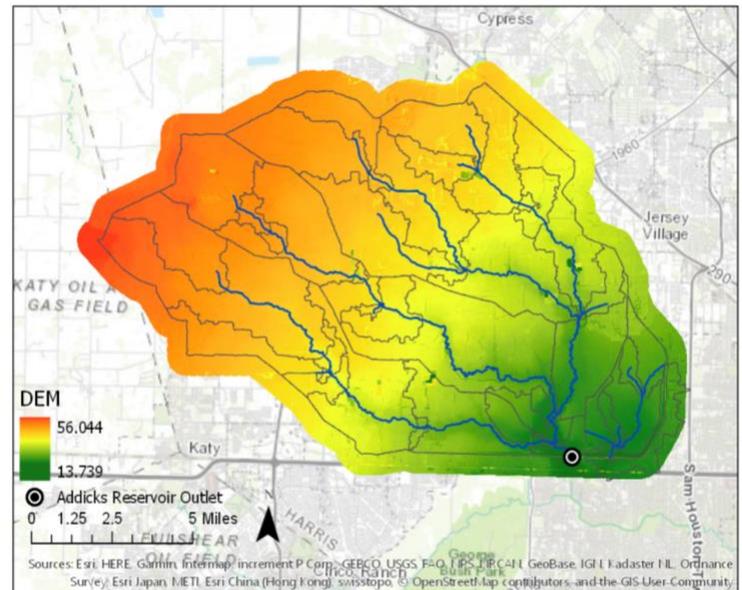


Figure 4: DEM and Flowlines in Addicks Watershed

⁸ "Hurricane Harvey Flooding at Addicks Reservoir, Houston TX." USGS: Science for a Changing World. <https://www.usgs.gov/>

⁹ "Hurricane Harvey Flooding at Addicks Reservoir, Houston TX." USGS: Science for a Changing World. <https://www.usgs.gov/>

¹⁰ Lise Olsen. "Record reservoir flooding was predicted even before Harvey hit Houston." *Houston Chronicle*, February 22, 2018.

Works Cited

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