



Hurricane Harvey Sedimentation Patterns in Buffalo Bayou, Houston, Texas

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ABSTRACT

Hurricane Harvey produced an extreme precipitation event over Houston, Texas from August 25–30, 2017. Harvey stalled out southwest of the Houston area from August 26–28 with many areas experiencing greater than $750 \text{ mm}^3\text{dy}^{-1}$ or the 1000 yr event return period. The resulting $11.1 \times 10^9 \text{ m}^3$ of runoff caused mobilization of large sediment volumes which has implications for future flood control in bayous and rivers. As of Spring 2019, roughly $102,000 \text{ m}^3$ of sediment has been removed along Buffalo Bayou, although most of the 1–3 m high sand bar flood deposits downstream of Addicks and Barker reservoirs remain untouched. Thick flood deposits from large storms decrease the bankfull volume capacity of rivers and bayous causing them to be more susceptible to flooding. Using pre and post Harvey satellite imagery and high-resolution digital elevation models, we determine areas of relative erosion and deposition along Buffalo Bayou from Addicks and Barker reservoirs to downtown Houston. Flood deposit sediment samples were collected from the Addicks and Barker dams to downtown Houston. These samples were then analyzed using a laser particle analyzer to investigate vertical and lateral grain size variations. By determining the first-order depositional patterns in Buffalo Bayou, we can determine sedimentation behavior downstream of Addicks and Barker reservoirs.