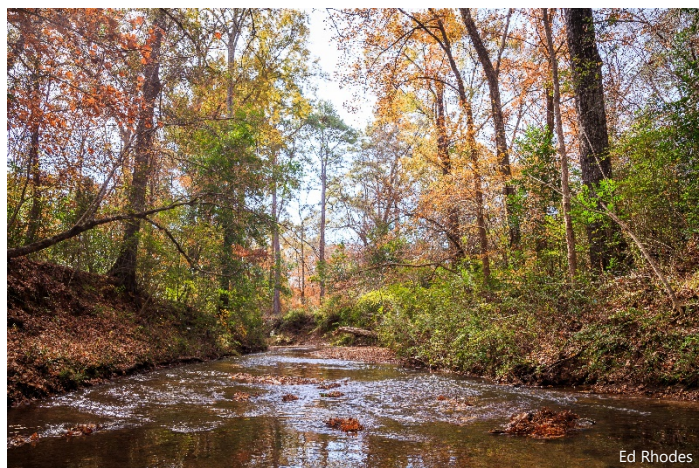


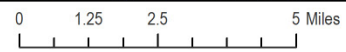
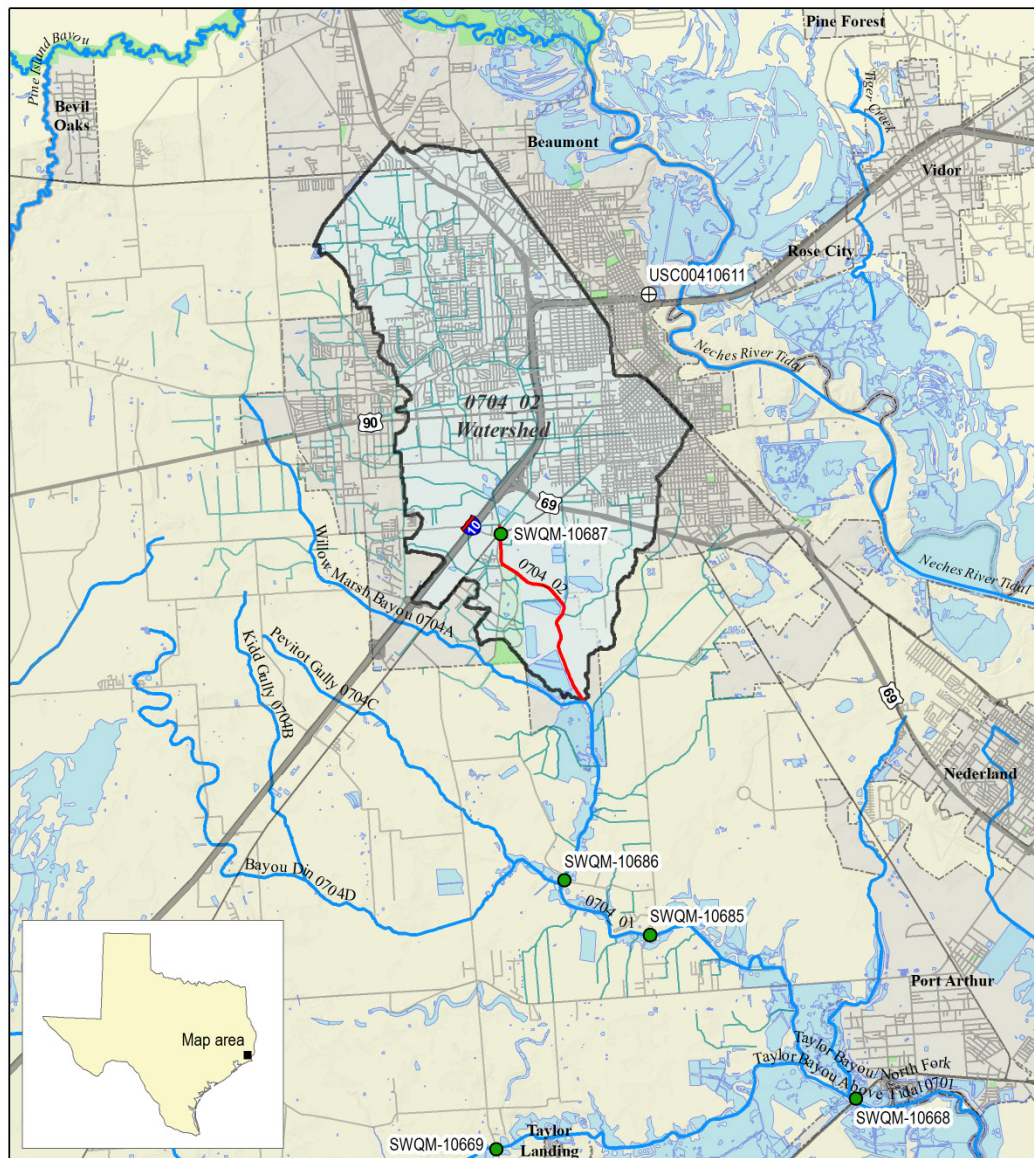
Hillebrandt Bayou Technical Support Document

Michael Schramm | Research Specialist
Lucas Gregory | Research Scientist
Texas Water Resources Institute

April 9, 2020



Hillebrandt Bayou (AU 0704_02) TMDL Watershed

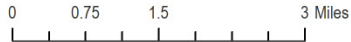
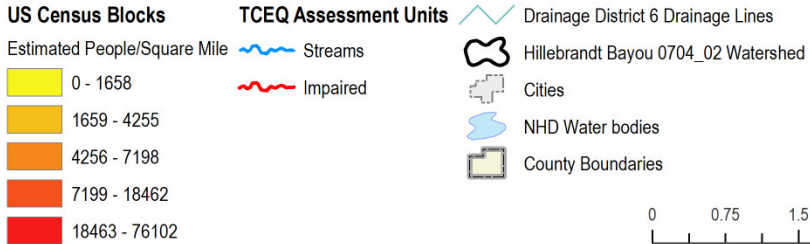
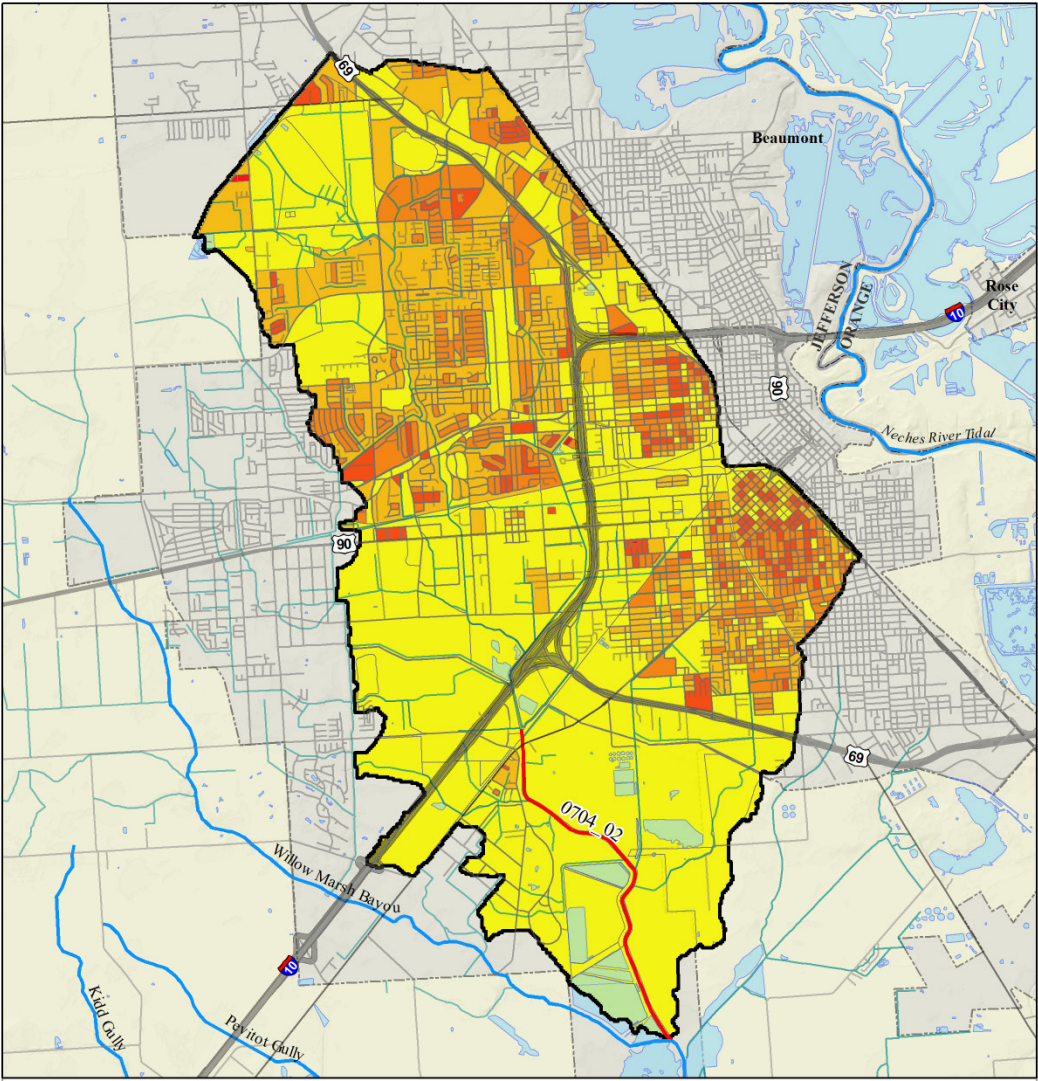


- TCEQ Assessment Units**
- Streams
 - Impaired
 - Drainage District 6 Drainage Lines
 - Hillebrandt Bayou AU 0704_02 Watershed
 - Parks
 - SWQM Monitoring Stations
 - NOAA Co-op Weather Station
 - Cities
 - NHD Water Bodies
 - County Boundaries



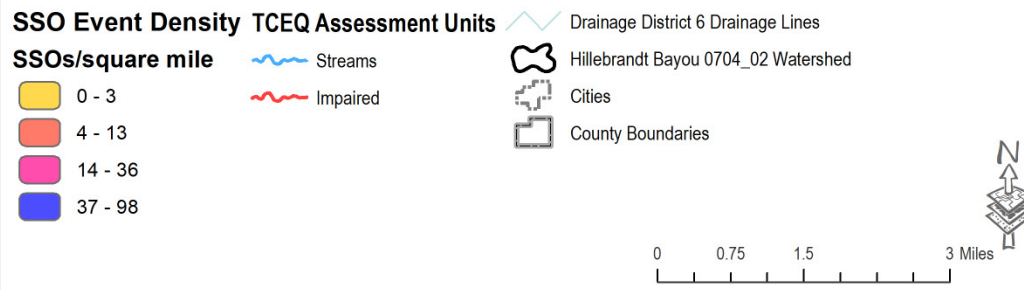
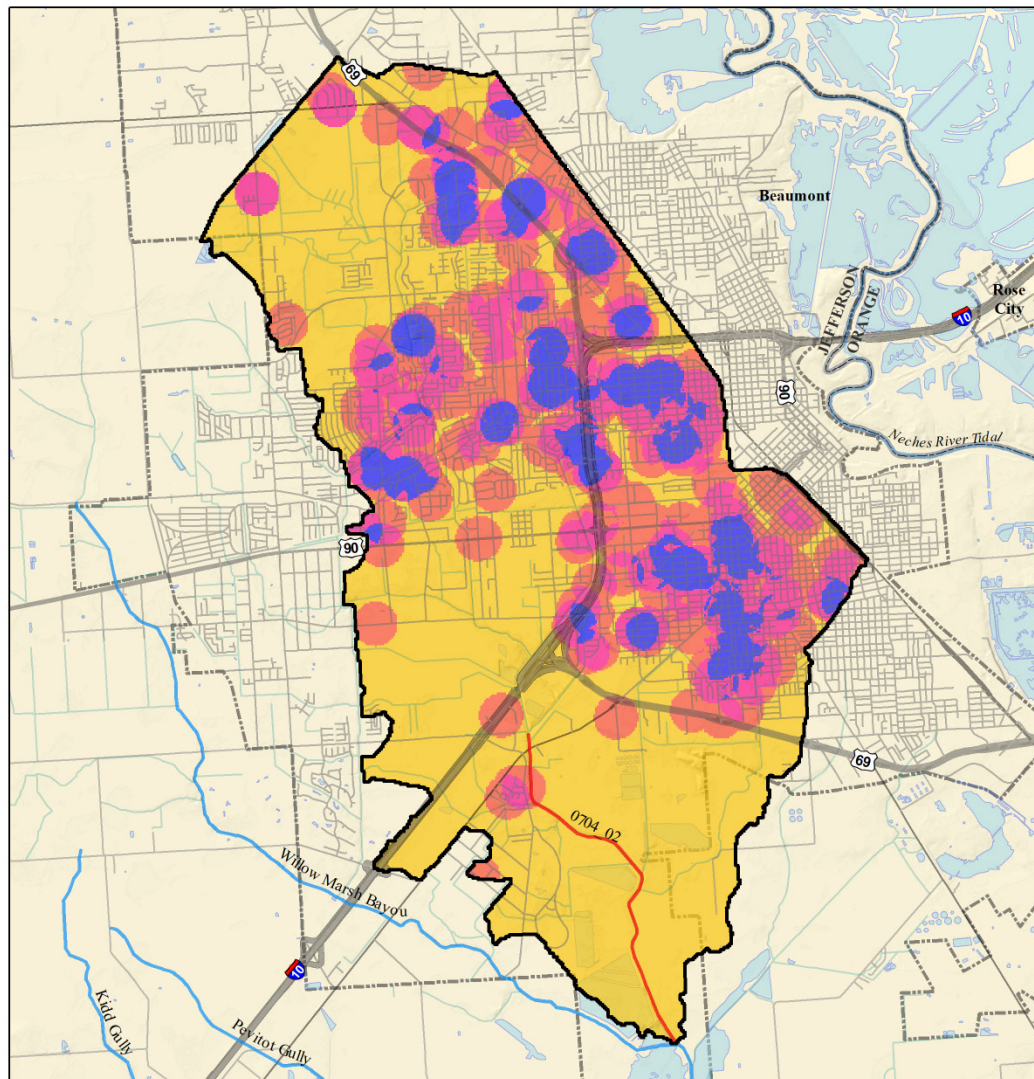
Population

- 2010 population 61,273 (estimated)
- 2017 population 97,617 (estimated)



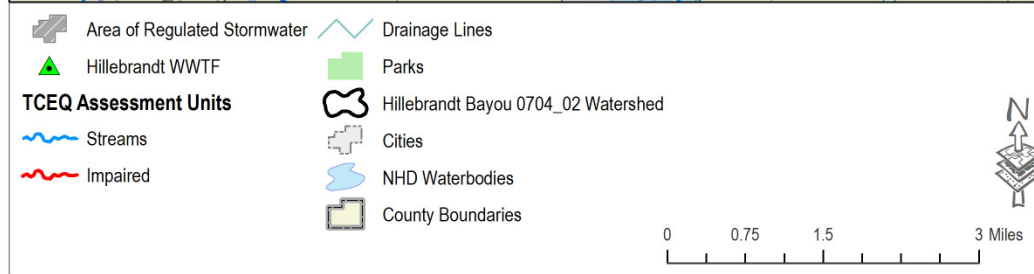
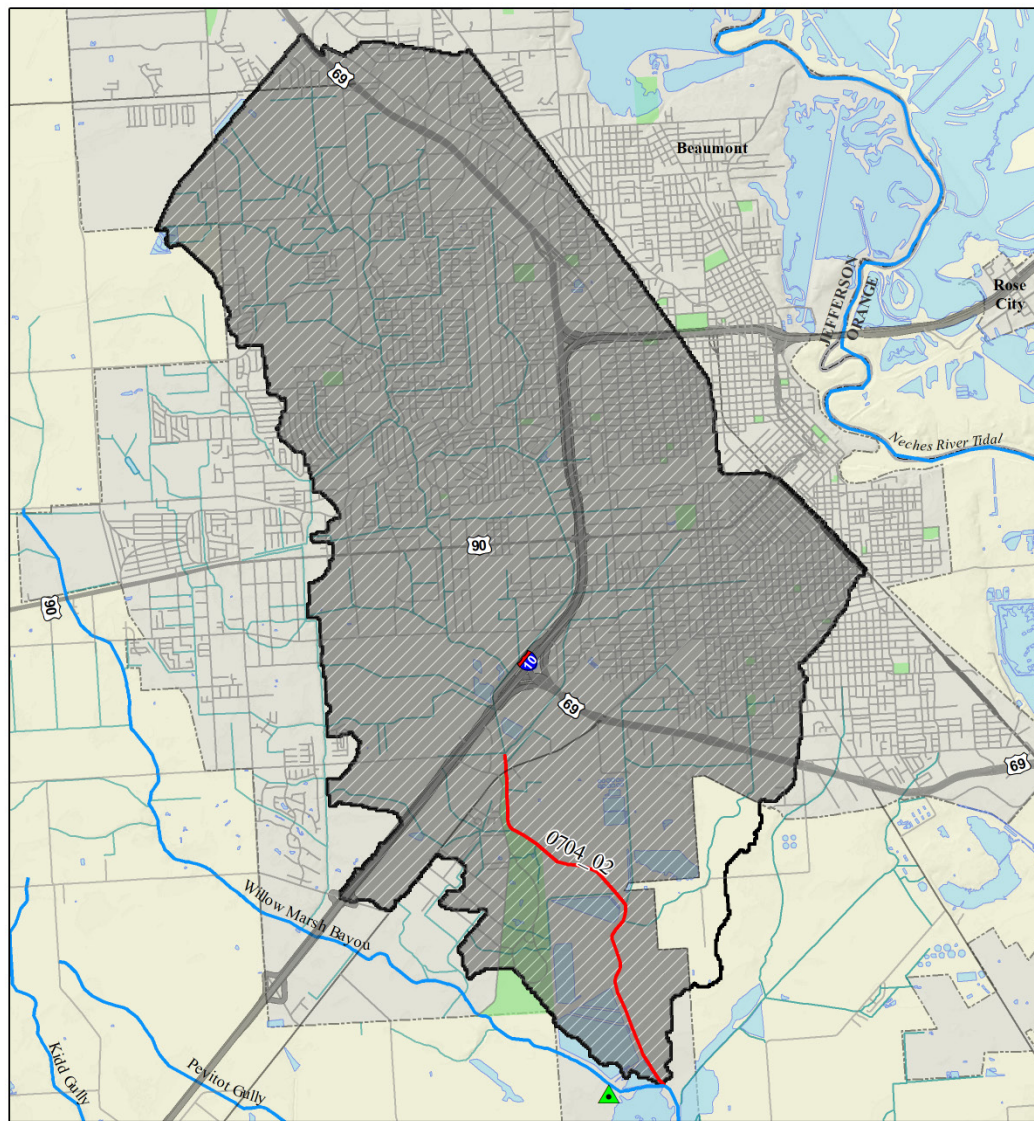
Hillebrandt Bayou SSOs

- 404 reported incidents from 2005-2018

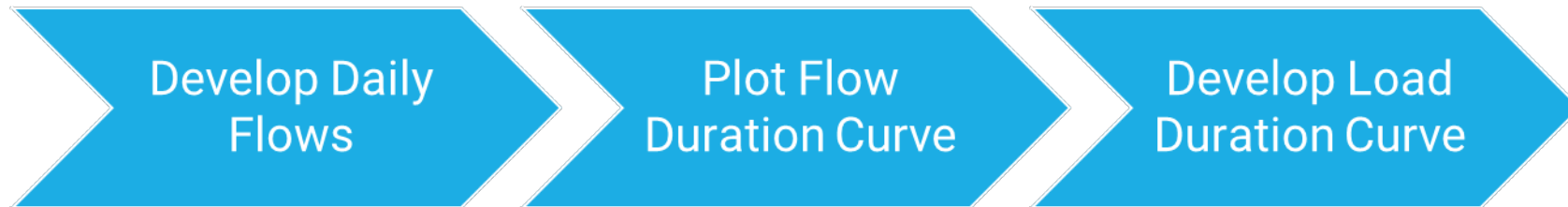


Permitted Stormwater Area

- 35 square miles or 97% of the watershed



General Process for Developing Load Duration Curves



- Identify location of interest
- Use USGS daily streamflows if available
- Estimate daily streamflows using Drainage Area Ratio

- Calculate the percent exceedance for every daily mean streamflow value
- Plot flow values against the exceedance values

- Convert daily flow to allowable load (concentration times volume)
- Plot allowable load against exceedance values
- Overlay measured concentrations converted to daily loads

Hillebrandt Bayou Daily Flow

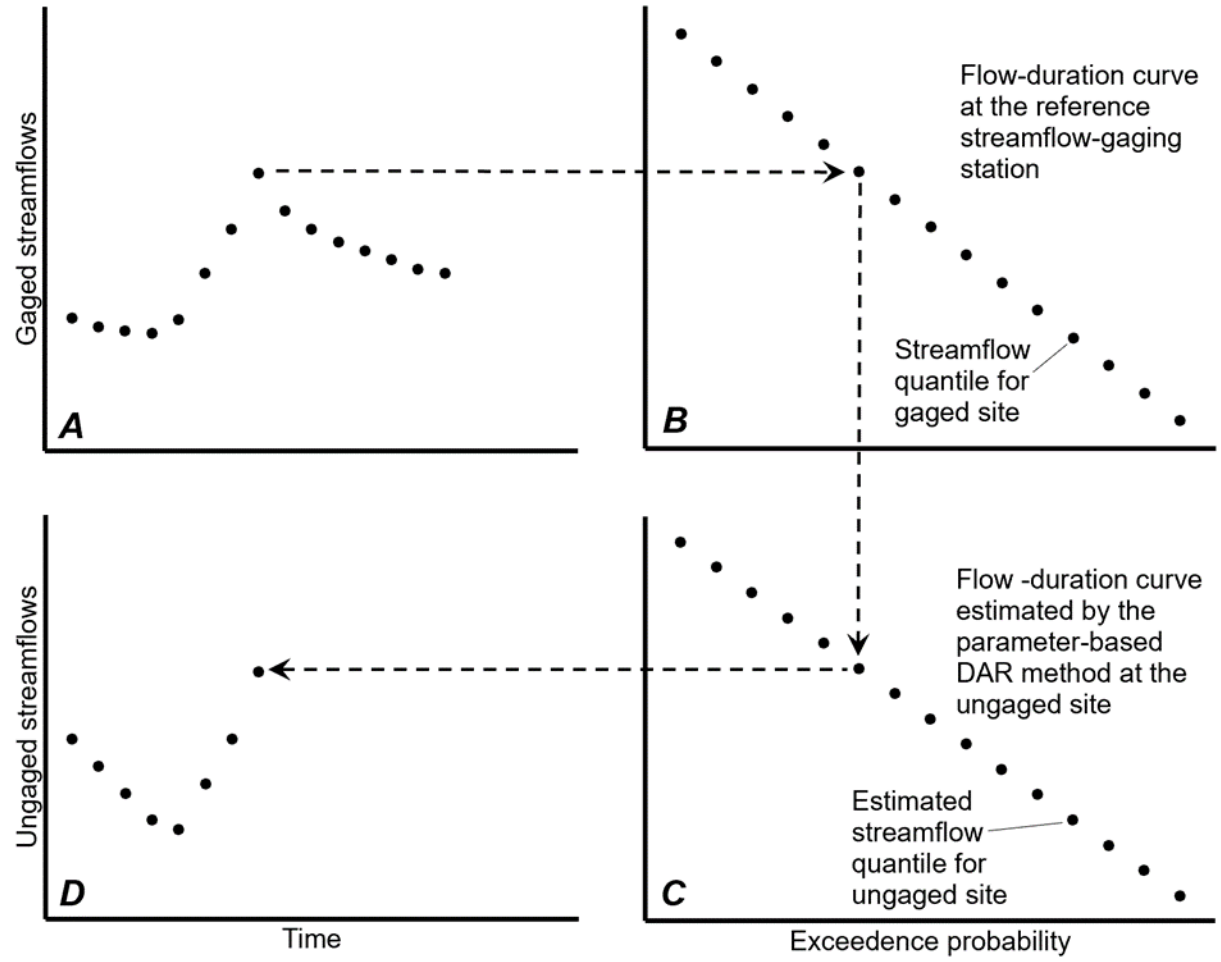
- No USGS stream gage to provide daily flows
- Drainage Area Ratio (DAR) method used to estimate the flow duration curve and daily streamflows
- Nearest streamgages are predominately rural watersheds, DAR modified to account for difference in land cover

Hillebrandt Bayou Daily Flow

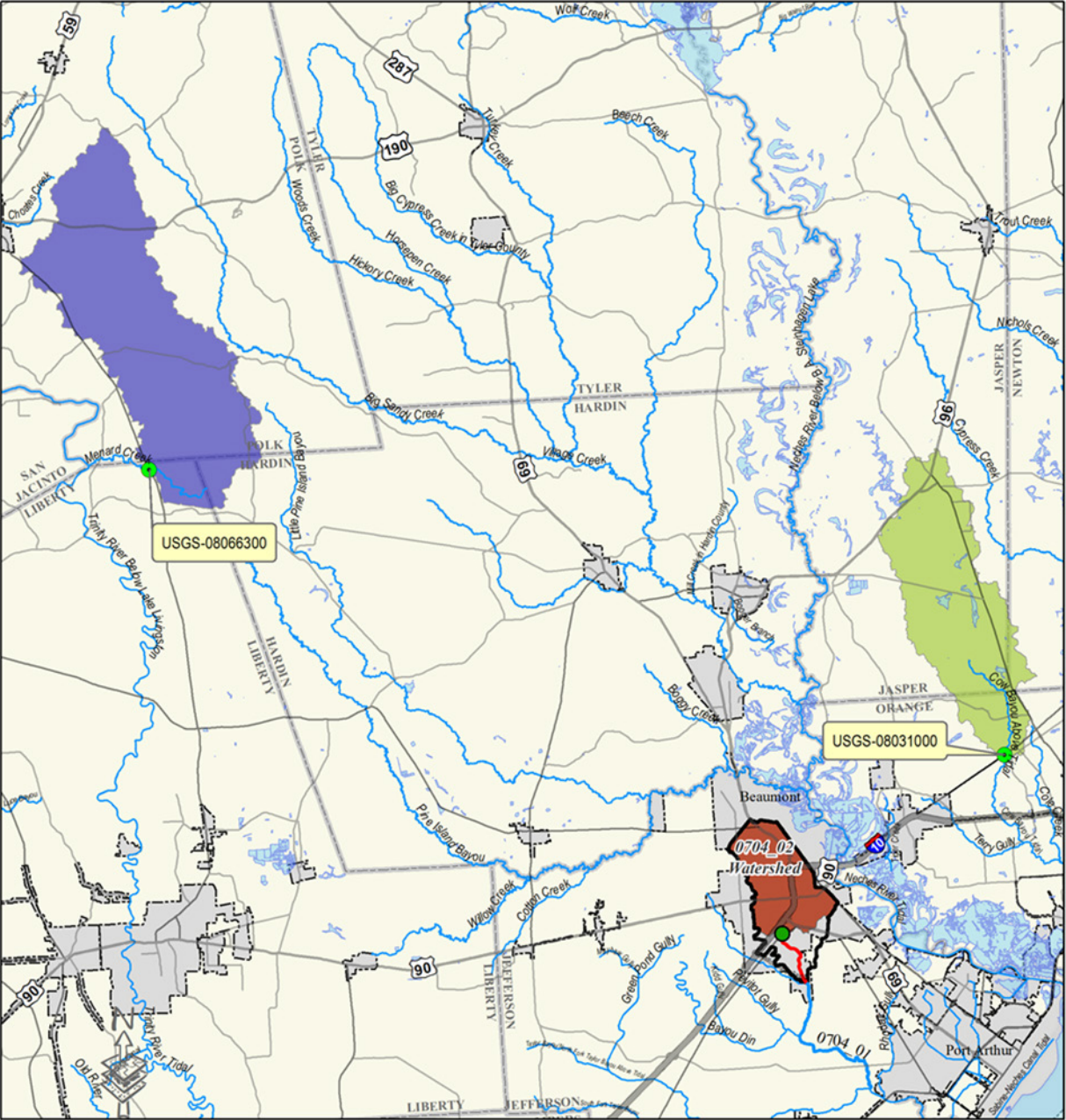
- Drainage Area Ratio – Daily streamflow in an ungaged basin equals the daily streamflow in a nearby gaged basin, multiplied by the ratio of the drainage areas.
- For example if the ungaged basin is half the size of the gaged basin, the daily streamflow is approximately half

Hillebrandt Bayou Daily Flow

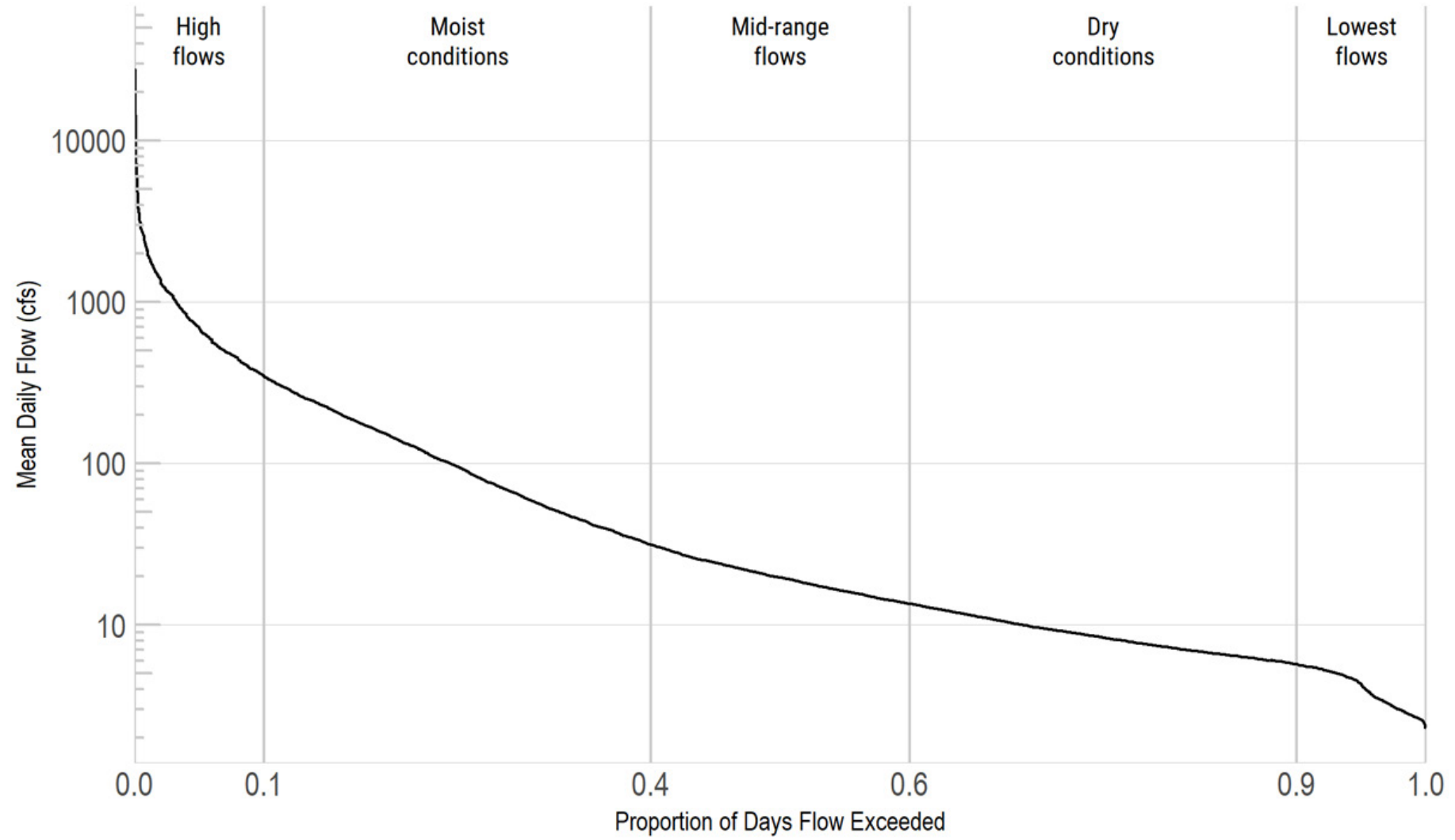
- Drainage Area Ratio – Assumes ungaged watershed has similar hydrology and land cover as gaged watershed.
- Additional terms and parameters for developed area ratio and wetland area ratio
- Parameter optimization used to weight developed area and wetland area terms
- Streamflows are corrected for permitted discharges



Hillebrandt Bayou Daily Flow

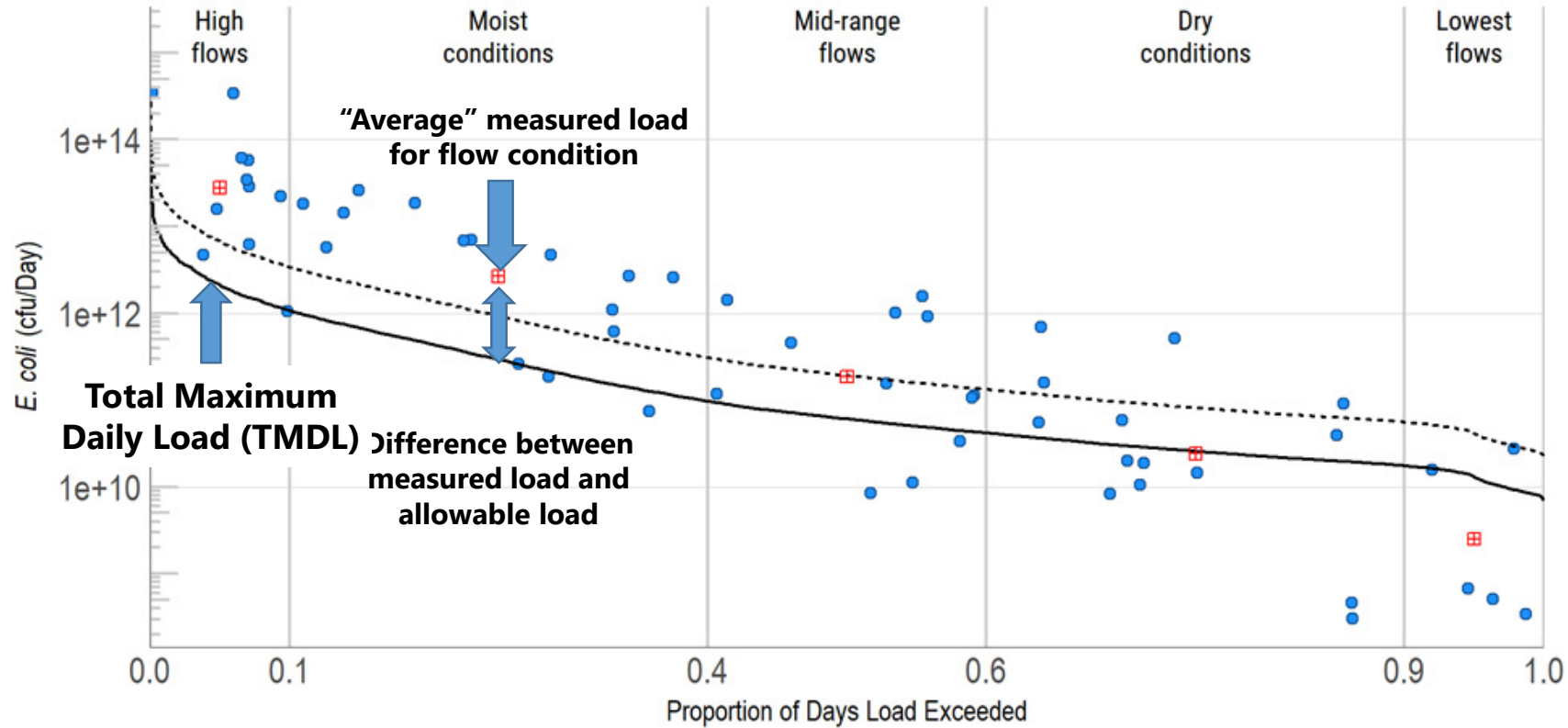


Flow Duration Curve AU 0704_02 - Station 10687



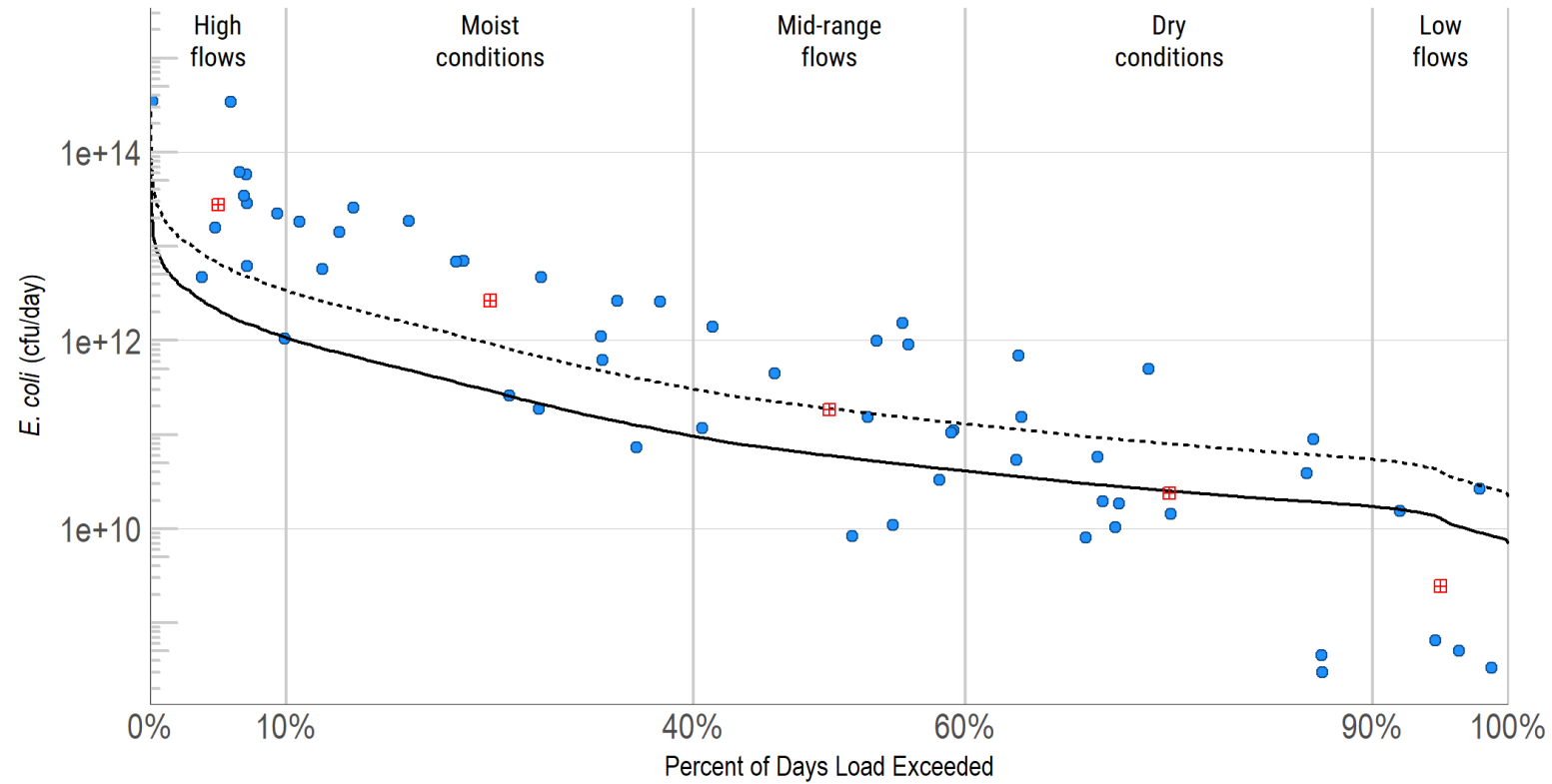
Hillebrandt Bayou Load Duration Curve

Load Duration Curve AU 0704_02 - Station 10687



- Geomean Criterion (126 cfu/100mL)
- Single Sample Criterion (399 cfu/100mL)
- Existing Geomean (cfu/day)
- Measurement Value (cfu/day)

Load Duration Curve – Hillebrandt Bayou



— Geomean Criterion (126 cfu/100mL) ■ Existing Geomean (cfu/day)
- - - Single Sample Criterion (399 cfu/100mL) ● Measurement Value (cfu/day)

Thank You!

Contact Info:

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Lucas Gregory – lfgregory@ag.tamu.edu