Hydrology Methods and Effective Floodplain Management
2017 Spring TFMA

A Case Study of the Blanco River
Hays County, Texas

- Founded on the banks of the San Marcos River
- Among the oldest continuously inhabited sites in the Americas
- Population 60,000 plus
- Home to Texas State University and the Meadows Center for Water and the Environment.
- Notables
  - 2010, Business Week's "Best Places to Raise your Kids."
  - 2013 and 2014, Census Bureau, "Fastest-growing city in the United States."
  - 2013, Business Insider's "10 Most Exciting Small Cities In America"
“We’ve been busy!”

- 2012 – Edward Aquifer Recovery Implementation Program / Habitat Conservation Plan
- 2013 – Vision San Marcos: A River Runs Through Us
- 2013 – TRID MS4
- 2014 – WQ Protection Plan, first edition (HCP)
- 2014 – LID and Stormwater Technical Manual Updates
- 2016 – GBRA / USACE study
- 2016 – HUD Disaster Recovery Grant
- 2017 – Flood Insurance Study (preliminary)
- 2017 – Comprehensive Watershed Masterplan
- 2017 – Watershed Protection Plan (Meadows Center)
- 2017 – Land Development Code Rewrite: Environmental and Drainage

**Blanco River and San Marcos, Texas**

436 square miles

**USGS Gage at Kyle**
Flow Estimates at Kyle Gage

- June 1990: San Marcos FIS  154,630
- June 1993: Hays County FIS (unincorp)
- Feb 1998: Hays County Flood Ins. Study 134,880 (approximation)
- Sep 2005: Hays County Flood Ins. Study / 11,540
  - Flow Rates on Blanco based on study in 1990's
  - 1D Steady State Analysis
- Oct 2007: San Marcos Flood Protection Plan 154,800 / 15,203 (188,000)
  - New Flow Rates Estimated on Blanco
  - 1D Steady State Analysis
- Apr 2017: FEMA preliminary 153,000 / >30,000 (170,400)

Flood Frequency (return period)

- San Marcos FIS 1998/2005 FEMA
- Historical Floods
- Computed Frequency Curve (2007 FPP)
- HEC-HMS (2007 FPP)
- Flood Frequency (return period)
- Flow Rate (cfs)
- Percent Chance Exceedance
It’s never rained that much before! Right?

May 23-24, 2015

- 12 inches in less than 6 hours
- Exceeded 4 inches per hour
- Widespread 6-8 inches (Bandera, Kerr, Kendall, Blanco and far west portions of Comal and Hays)
- Maximum of 10 to 13 inches (Blanco and NE Kendall)
- Rain fell Saturday afternoon through early Sunday morning
- Blanco at Wimberley 5’ to 41’ rise (2100 to 0100)
- 5 feet every 15 minutes (2245 to 2345)
- 12 fatalities
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<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
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<td>June 1990</td>
<td>San Marcos FIS</td>
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**Flow Estimates at Kyle Gage**

- **June 1990: San Marcos FIS**
  - Flow Rate: 154,630
- **June 1993: Hays County FIS (unincorp)**
- **Feb 1998: Hays County Flood Ins. Study**
  - Flow Rate (regression eq): 124,680
- **Sep 2005: Hays County Flood Ins. Study**
  - Flow Rates on Blanco Based on Study in 1990’s
  - 1D Steady State Analysis
- **Oct 2007: San Marcos Flood Protection Plan**
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  - 1D Steady State Analysis
- **Apr 2017: FEMA preliminary**
  - Flow Rates
  - 153,000 / >30,000
  - 170,400

A shopping center is submerged in water in San Marcos on Sunday, May 24.
the Blanco river in Wimberley, Texas, Sunday May 24, 2015.
Flash flooding across the Hill Country May 23-24 dumped several inches of rain into the Blanco River, causing high-water damage in the Wimberley area and resulting in the rescue of a kayaker near San Marcos in Hays County.
Flood Ordinance Revisions
- No-Rise Floodplain
- Elevation (Freeboard)
- Adopt Flood Model
- Fill standards
- Compensatory Storage
- Materials Storage
- Access

Floodplain Buffer
**Flood Events**
- September 1952 - November 1985
- February 1955 - October 1996
- October 1959 - November 2001
- June 1961 - July 2002
- May 1970 - November 2004
- October 1976 - March 2007
- May 1977 - October 2013
- October 1978 - May 2015
- July 1979 - October 2015
- June 1981

**IH-35 at San Marcos River**

**1957 to Present Blanco River Flood Events**
Rainfall Historical Events

Blanco Gardens Overflow

Questions???

Break Time!

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Overflows Zones in Lower Blanco

Highlights:

• Executive Session in accordance with Section 551.074 of the Texas Government Code - Personnel Matters - to discuss and deliberate regarding the City Manager Vacancy.

SanmarcoTX.gov
Floodplain Ordinance History Highlights

- Driven by a series of events (nature and man-made)
- March 15, 1968
- May 25, 1970
- September 14, 1970
- December 28, 1970
- March 17, 1971
- August 31, 1971
- November 25, 1974 - First City Ordinance
- March 23, 1987 – Updated Ordinance
- April 13, 1987 – revised floodplain ordinance
- June 5, 2012 – established a new Chapter 39 entitled, “Flood Damage Prevention”
- XXI 2015 – various revisions: 100 year detention,
- 2016 – Floodplain ordinance revisions (Richard)

Blanco River floodwaters destroyed the Fischer Store Road bridge near Wimberley
• A Wimberley home that was torn off its foundation by the Memorial Day weekend flood.