

# **HYDROLOGIC DATA BRIEF FOR THE EDWARDS AQUIFER THROUGH JULY 2017**

Prepared by

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**Edwards Aquifer Authority**

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**UVALDE COUNTY RAINFALL (in inches) for 2017**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Monthly Rainfall (2017)	0.80	1.58	1.92	2.67	3.70	0.77	0.51					
1981-2010 Climate Normals	1.18	1.25	1.76	1.71	3.03	2.97	2.79	1.81	2.59	2.88	1.54	1.09
Difference	-0.38	0.33	0.16	0.96	0.67	-2.20	-2.28					

30-year Normal Average	24.60
Total for January - July 2017	11.95
30-year Normal Average January - July 2017	14.69
Total Difference for Year to Date	-2.74
Percent of 30-year Normal Average Year to Date	81%

Rainfall Data provided by National Weather Service (NWS) rainfall station located at Garner Field Airport.

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**MEDINA COUNTY RAINFALL (in inches) for 2017**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Monthly Rainfall (2017)	0.41	1.31	1.78	2.71	2.81	1.94	0.38					
1981-2010 Climate Normals	1.38	1.49	2.13	1.98	3.38	3.49	2.09	1.67	2.60	3.31	1.58	1.14
Difference	-0.97	-0.18	-0.35	0.73	-0.57	-1.55	-1.71					

30-year Normal Average	26.24
Total for January - July 2017	11.34
30-year Normal Average January - July 2017	15.94
Total Difference for Year to Date	-4.60
Percent of 30-year Normal Average Year to Date	71%

Rainfall Data provided by NWS rainfall station located at Hondo Municipal Airport.

**1981-2010 Climate Normals** are NCDC's latest three-decade averages of climatological variables, including temperature and precipitation. This new product replaces the 1971-2000 Climate Normals product, which remains available as historical data.

SOURCE: <https://www.ncdc.noaa.gov/cdo-web/datatools/normals>

## BEXAR COUNTY RAINFALL (in inches) for 2017

	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Monthly Rainfall (2017)	2.72	3.61	2.09	2.89	1.76	0.40	0.16					
1981-2010 Climate Normals	1.76	1.79	2.31	2.10	4.01	4.14	2.74	2.09	3.03	4.11	2.28	1.91
Difference	0.96	1.82	-0.22	0.79	-2.25	-3.74	-2.58					

30-year Normal Average	32.27
Total for January - July 2017	13.63
30-year Normal Average January - July 2017	18.85
Total Difference for Year to Date	-5.22
Percent of 30-year Normal Average Year to Date	72%

Rainfall Data provided by NWS rainfall station located at San Antonio International Airport.

## COMAL COUNTY RAINFALL (in inches) for 2017

	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Monthly Rainfall (2017)	2.78	2.33	3.30	4.40	2.50	1.98	0.25					
1981-2010 Climate Normals	1.86	2.02	2.66	2.28	3.97	4.78	2.62	1.95	3.09	4.25	2.87	2.27
Difference	0.92	0.31	0.64	2.12	-1.47	-2.80	-2.37					

30-year Normal Average	34.62
Total for January - July 2017	17.54
30-year Normal Average January - July 2017	20.19
Total Difference for Year to Date	-2.65
Percent of 30-year Normal Average Year to Date	87%

Rainfall Data provided by NWS rainfall station located at New Braunfels Municipal Airport.

**1981-2010 Climate Normals** are NCDC's latest three-decade averages of climatological variables, including temperature and precipitation. This new product replaces the 1971-2000 Climate Normals product, which remains available as historical data.

SOURCE: <https://www.ncdc.noaa.gov/cdo-web/datatools/normals>

## HAYS COUNTY RAINFALL (in inches) for 2017

	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Monthly Rainfall (2017)	2.46	2.66	3.04	6.54	2.20	0.99	0.00					
1981-2010 Climate Normals	2.06	1.92	2.48	2.72	4.13	4.64	2.50	2.19	3.42	4.33	3.05	2.29
Difference	0.40	0.74	0.56	3.82	-1.93	-3.65	-2.50					

30-year Normal Average	35.73
Total for January - July 2017	17.89
30-year Normal Average January - July 2017	20.45
Total Difference for Year to Date	-2.56
Percent of 30-year Normal Average Year to Date	87%

Rainfall Data provided by NWS rainfall station located in San Marcos.

Rainfall Data provided by EAA Gauge HA158 located about 0.25 miles west of Bobcat Stadium.  
NWS Rainfall Station at San Marcos Airport-out of service

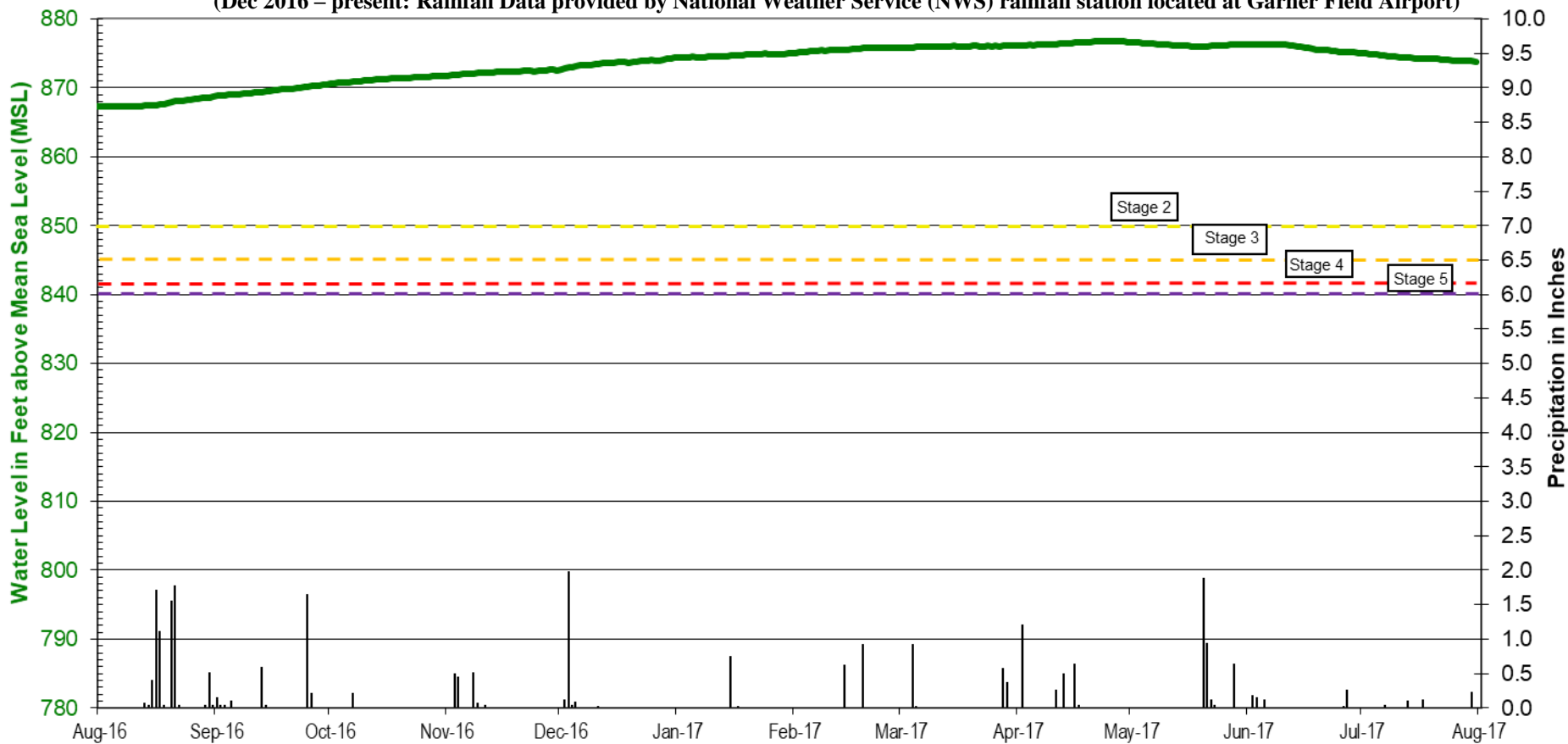
June 4, 2017: HA157 data substituted for HA158 due to technical issues at HA158

**1981-2010 Climate Normals** are NCDC's latest three-decade averages of climatological variables, including temperature and precipitation. This new product replaces the 1971-2000 Climate Normals product, which remains available as historical data.  
SOURCE: <https://www.ncdc.noaa.gov/cdo-web/datatools/normals>

# Hydrograph of the Uvalde County Index Well (J-27) and Precipitation at Uvalde

(Feb – Nov 2016: Rainfall Data provided by EAA Rain Gauge UV033 located 4.4 miles south of the City of Uvalde)

(Dec 2016 – present: Rainfall Data provided by National Weather Service (NWS) rainfall station located at Garner Field Airport)



Stage 1 - None  
 Stage 2 - Critical Period - 10-day avg. < 850' MSL  
 Stage 3 - Critical Period - 10-day avg. < 845' MSL  
 Stage 4 - Critical Period - 10-day avg. < 842' MSL  
 Stage 5 - Critical Period - 10-day avg. < 840' MSL

Date

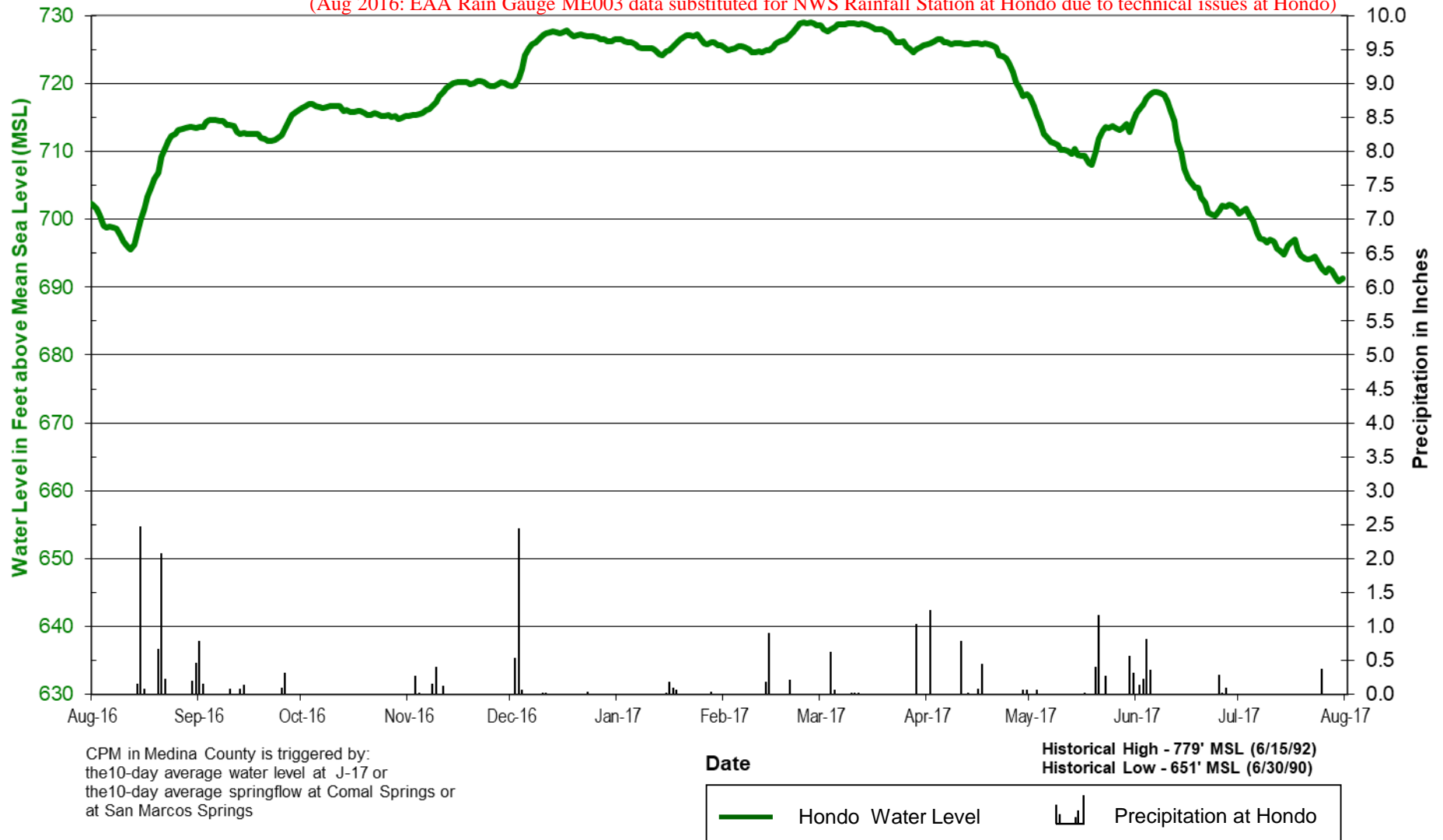
Historical High - 889' MSL (6/15/87)  
 Historical Low - 811' MSL (4/13/57)



# Hydrograph of the Medina County Hondo City Well and Precipitation at Hondo

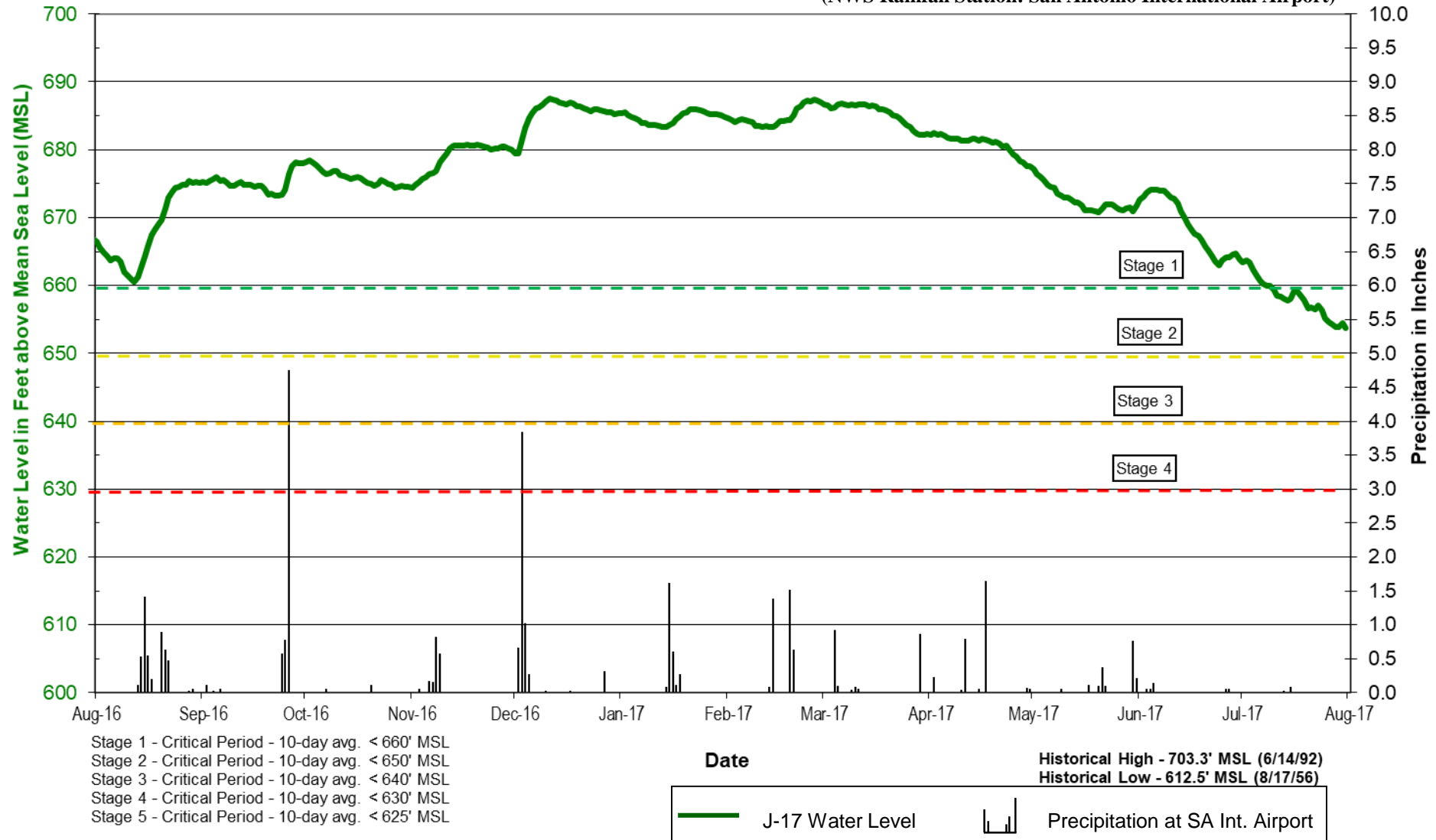
(NWS Rainfall Station: Hondo Municipal Airport)

(Aug 2016: EAA Rain Gauge ME003 data substituted for NWS Rainfall Station at Hondo due to technical issues at Hondo)



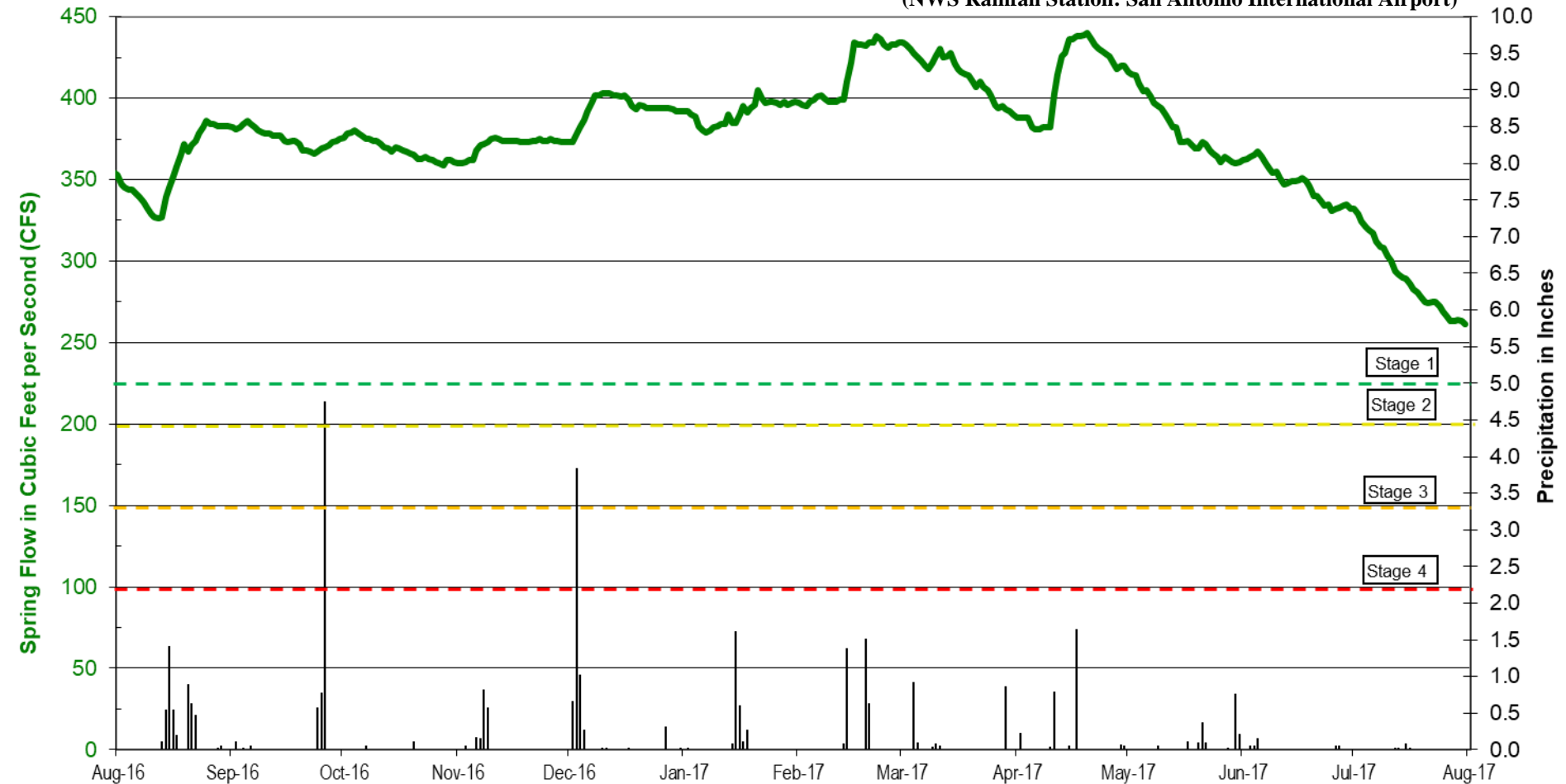
# Hydrograph of the Bexar County Index Well (J-17) and Precipitation at San Antonio

(NWS Rainfall Station: San Antonio International Airport)



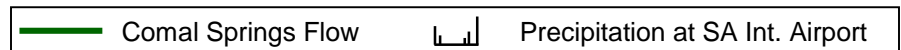
# Hydrograph of the Comal Springs Discharge and Precipitation at San Antonio

(NWS Rainfall Station: San Antonio International Airport)



Stage 1 - Critical Period - 10-day avg. < 225 cfs  
 Stage 2 - Critical Period - 10-day avg. < 200 cfs  
 Stage 3 - Critical Period - 10-day avg. < 150 cfs  
 Stage 4 - Critical Period - 10-day avg. < 100 cfs  
 Stage 5 - Critical Period - 10-day avg. < 45/40 cfs

Date



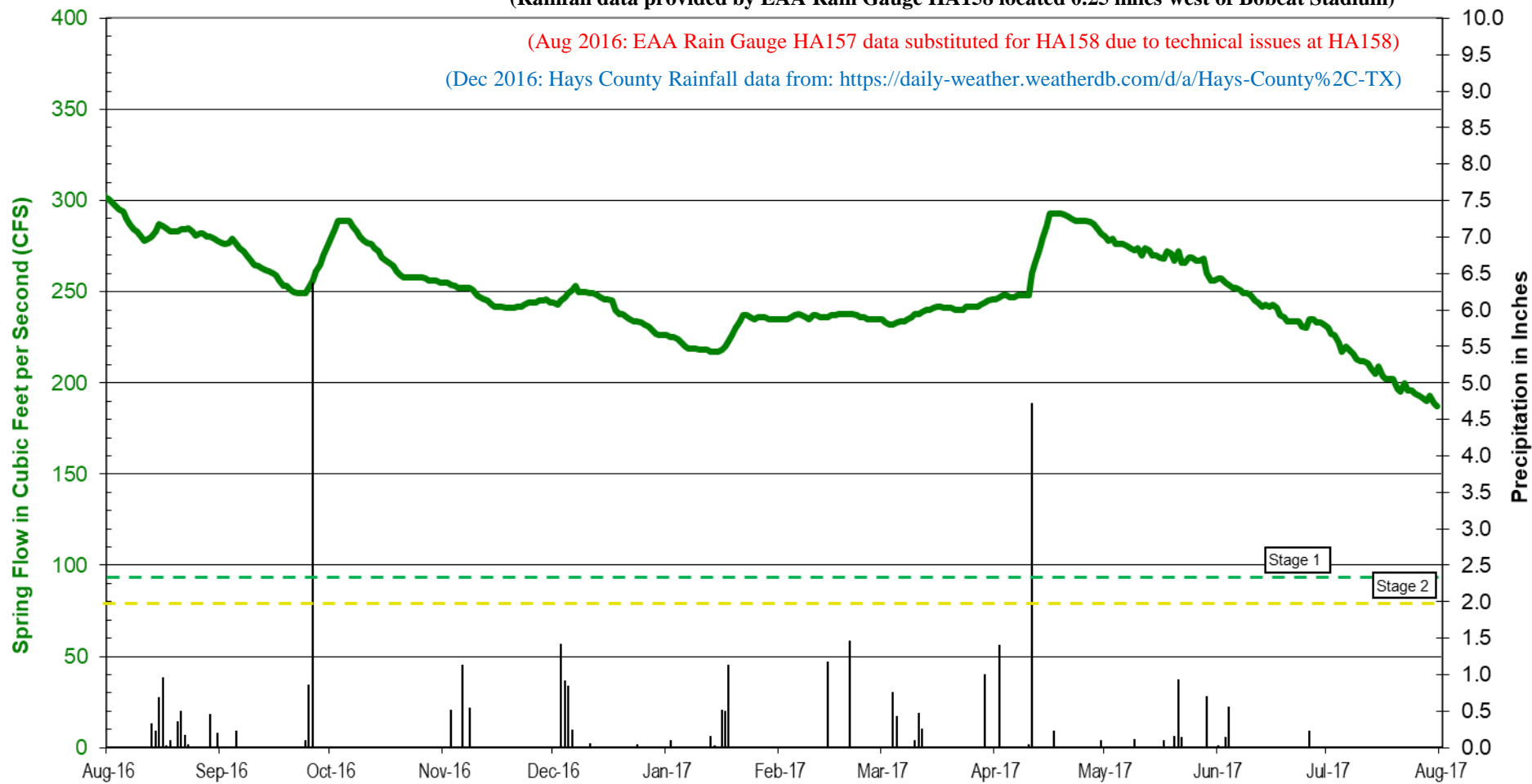


# Hydrograph of the San Marcos Springs Discharge and Precipitation at San Marcos

(Rainfall data provided by EAA Rain Gauge HA158 located 0.25 miles west of Bobcat Stadium)

(Aug 2016: EAA Rain Gauge HA157 data substituted for HA158 due to technical issues at HA158)

(Dec 2016: Hays County Rainfall data from: <https://daily-weather.weatherdb.com/d/a/Hays-County%2C-TX>)



Stage 1 - Critical Period - 10-day avg. < 96 cfs

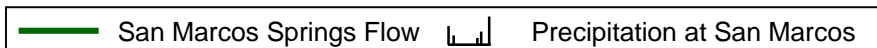
Stage 2 - Critical Period - 10-day avg. < 80 cfs

Stage 3 - None

Stage 4 - None

Stage 5 - None

Date

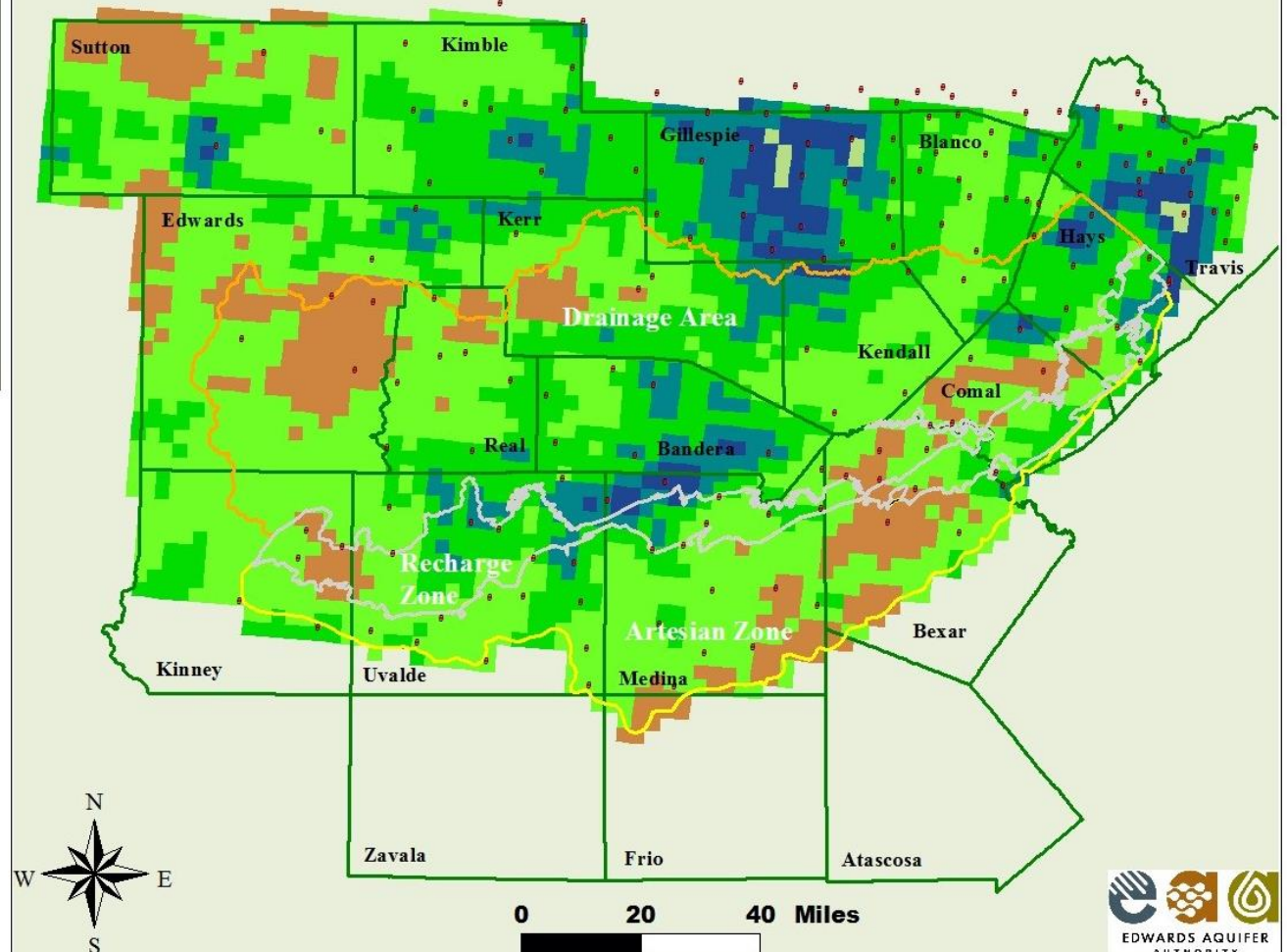


Calibrated 1 inch scale  
June 2017 Rainfall Totals

- Rain Gauge
- County Line
- Artesian Zone
- Drainage Area
- Recharge Zone

Rainfall Total (Inches)

- 5 - 6
- 4 - 5
- 3 - 4
- 2 - 3
- 1 - 2
- 0 - 1



## **Real-time Precipitation Gauging System and Hydrologic Data Collection**

The Edwards Aquifer Authority (EAA) operates 74 “real-time” precipitation gauges that record data on six-minute intervals and transmit these data to the EAA’s office via a radio-telemetry system. Rain gauges are located on the Edwards Aquifer Contributing Zone (Drainage Area), Recharge Zone, and Artesian Zone. Acquired data have many uses including aquifer recharge calculations, production of rainfall maps, and in a variety of research projects. The EAA also collects water level data from a series of aquifer monitor wells in the region, including two index wells: Well J-27, in Uvalde County and Well J-17, in Bexar County. Water level data from the Hondo City well in Medina County are also included in this data brief. Through a cooperative agreement with the U.S. Geological Survey, the EAA monitors the discharge at Comal Springs and San Marcos Springs.

## **Rainfall Evaluation – June 2017 Vieux & Associates Doppler Rainfall Map**

The calibrated June 2017 Rainfall Totals Map was prepared by Vieux & Associates for the EAA using NEXRAD Doppler Radar and the EAA’s precipitation gauge data. Calibrating the NEXRAD data with the EAA’s precipitation gauge data improves the accuracy of the precipitation maps and is calculated using a four-kilometer grid system. Rain gauge locations are indicated on the map.

June may be categorized as another dry month, as most areas received below “normal” rainfall. The most significant rainfall occurred in three main areas: (1) Central Travis County outside the EAA jurisdiction where between 3 and 6 inches was recorded; (2) Central to northern Gillespie County outside the Contributing Zone where between 3 and 6 inches was recorded; (3) from northern Uvalde into northwestern Medina and southern Bandera Counties where between 3 and 5 inches was recorded. The entire Contributing Zone received between 0 and 6 inches, the bulk of which occurred in the third main area described above. The Recharge Zone had amounts ranging between 0 – 3 inches in eastern counties to 2 – 5 inches in western counties. The Artesian Zone had recorded amounts of between 0 and 3 inches; the most occurring in eastern Uvalde and along the southern Comal County line from Bexar to Hays County where between 1 and 3 inches was recorded.

## Rain Evaluation – Precipitation Gauge Data – July 2017

July was another very dry month. Rain events, if they did occur, were spotty and few & far between as the region wound up with well below average rainfall. Hence, the July 2017 maximum monthly total rainfall amounts in the EAA's gauges ranged from 0.00 to 2.26 inches. The highest reported 24-hour rainfall events from the EAA's precipitation gauge network in July, by county, were as follows: Bandera, 0.80 inches; Bexar, 1.15 inches; Blanco, 0.09 inches; Comal, 0.22 inches; Edwards, 1.99 inches; Hays, 0.35 inches; Kendall, 1.19 inches; Kinney, 0.79 inches; Medina, 1.77 inches; Real, 1.59 inches; and Uvalde County, 1.01 inches. The highest 24-hour rain event recorded in the region was 1.99 inches of rain that occurred on July 31st at a gauge located on the east side of US377, about 1.25 miles northeast of the intersection of FM2630 & US377 in Edwards County (3.2 miles northeast of Rock Springs, Texas).

## Evaluation of July 2017 Aquifer Levels and Spring Discharge

Aquifer levels are a function of rainfall/recharge amounts, springflow, and aquifer demand throughout the region. The San Antonio Pool Index Well (J-17) *decreased* 10.1 feet to 653.8 feet above mean sea level (msl) while the City of Hondo Well *decreased* 10.3 feet to 691.2 feet msl. Likewise, the Uvalde Pool Well (J-27), *decreased* 1.3 feet to 873.8 feet msl.

The July daily average springflow for Comal Springs, in turn, *decreased* 71 cubic feet per second (cfs) to 261 cfs, which is 15 cfs *below* the July monthly average discharge of 276 cfs. Likewise, the daily average springflow for San Marcos Springs *decreased* 45 cfs to 187 cfs, which is at the monthly average discharge of 187 cfs for July. Please note that the discharge amounts are estimates and may be adjusted up or down as more direct flow measurements are obtained.

## Summary of Current Aquifer Levels and Spring Discharges – August 2017

The official daily high water level for the Uvalde Pool Index Well (J-27) was 873.7 ft. msl on Wednesday, August 2, 2017, which is 7.6 ft. *above* the J-27 August monthly average of 866.1 ft. msl. The daily high water level at the San Antonio Pool Index Well (J-17) was 652.9 ft. msl on August 2, 2017; 5.0 ft. *below* the J-17 August monthly average of 657.9 ft. msl. The daily average discharge at Comal Springs on Tuesday, August 1, 2017, was reported to be 258 cfs, 4 cfs *below* the August average of 262 cfs while the daily average discharge at San Marcos Springs on August 1, 2017 was reported to be 186 cfs, which is 14 cfs *above* the August average of 172 cfs. Please note that discharge values are estimates and may be adjusted up or down as more direct flow measurements are obtained.

## Summary of Current Regional Aquifer Conditions

July precipitation was way below normal as near record and record high temperatures prevailed across the Edwards Aquifer region. Thus, for the first time since autumn of 2015 the Edwards Aquifer System breached Critical Period thresholds in the San Antonio Pool and entered Stage 1 of Critical Period Management (CPM) on July 13, 2017. The U.S. Department of Agriculture - U.S. Drought Monitor indicated that most areas in the south had less than half an inch of rainfall in July while no or very little rain fell in south-central and north Texas. Abnormally dry to severe drought conditions exist in most of the panhandle in the north, and the Hill Country in the Austin-San Antonio area. However, with the record heat and below normal rainfall, still just under 25% of Texas is experiencing some form of seasonal drought condition.

The National Weather Service (NWS) Climate Prediction Center (CPC) reported that, “ENSO-neutral conditions are favored (~50 to 55% chance) into the Northern Hemisphere winter 2017-18.” Moreover, the NWS - Climate Prediction Center’s Three Month Outlook continues to forecast above normal temperatures, with above normal precipitation for south-central Texas into October 2017. Therefore, the US Seasonal Drought Outlook shows that where seasonal drought conditions exist (panhandle north Texas, Austin-San Antonio Hill Country), removal is likely across the State of Texas.