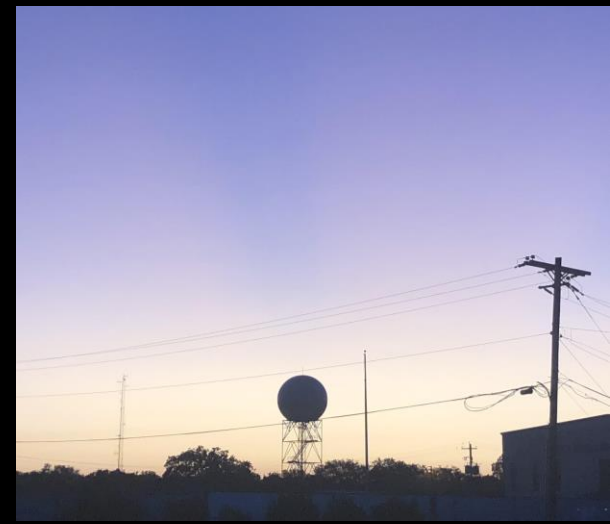


# NWS Houston, Texas 2019 Annual SE TX Regional Climate Summary *Year in Review*

**Produced by Jimmy Fowler, Josh Lichter, Charles Roeseler, and Nikki Hathaway**



# Cover Page Photo Credit

*The photographs used on the cover of this Annual SE TX Regional Climate Summary, were all taken within the HGX County Warning area during each month of the year. The top left picture on row one starts January and then from left to right we move through the calendar year with the last photograph on the bottom right representing December. NWS Houston Galveston was given permission by the following photographers to use these pictures.*

<b>Month</b>	<b>Photographer</b>
January	Katie French
February	Josh Lichter
March	Nikki Hathaway
April	Nikki Hathaway
May	Nikki Hathaway
June	Nikki Hathaway
July	Scott Overpeck
August	Dan Reilly
September	Tim Cady
October	Nikki Hathaway
November	Tim Cady
December	Jimmy Fowler



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# Site References

Site Identifier	City
IAH	City of Houston
GLS	City of Galveston
CLL	College Station
HOU	Houston Hobby
UTS	Huntsville
CXO	Conroe
DWH	Tomball
SGR	Sugar Land
LVJ	Pearland
HGX	National Weather Service Houston
LBX	Angleton
PSX	Palacios

## Climate Definitions

**Low Min:** *The lowest minimum temperature recorded within a day.*

**High Min:** *The warmest minimum temperature recorded within a day.*

**Low Max:** *The coldest maximum temperature recorded within a day.*

**High Max:** *The warmest maximum temperature recorded within a day.*

**Daily Rainfall:** *The highest rainfall value measured within a day.*

Note: Climate data is PRELIMINARY (unofficial). CERTIFIED (official) climate data is available from the [National Centers for Environmental Information \(NCEI\)](#).



# Significant Annual Statistics - Temperature

Annual Average Temperatures		
City of College Station	69.8°F	22 <sup>nd</sup> Warmest
City of Houston	71.0°F	17 <sup>th</sup> Warmest
Houston-Hobby	71.8°F	8 <sup>th</sup> Warmest
City of Galveston	72.5°F	7 <sup>th</sup> Warmest

## Highest Max Temperatures

City of College Station	102°F	August 14 <sup>th</sup>
City of Houston	103°F	August 13 <sup>th</sup>
Houston-Hobby	100°F	August 11 <sup>th</sup> – 14 <sup>th</sup>
City of Galveston	98°F	August 14 <sup>th</sup>

## Lowest Max Temperatures

City of College Station	35°F	March 4 <sup>th</sup>
City of Houston	43°F	March 4 <sup>th</sup>
Houston-Hobby	45°F	March 4 <sup>th</sup>
City of Galveston	48°F	November 12 <sup>th</sup>

## Highest Min Temperatures

City of College Station	82°F	June 22 <sup>nd</sup>
City of Houston	83°F	June 23 <sup>rd</sup>
Houston-Hobby	83°F	July 12 <sup>th</sup>
City of Galveston	86°F	August 8 <sup>th</sup> , 12 <sup>th</sup> , & 18 <sup>th</sup>

## Lowest Min Temperatures

City of College Station	26°F	March 5 <sup>th</sup>
City of Houston	30°F	January 24 <sup>th</sup> , March 5 <sup>th</sup> , & November 13 <sup>th</sup>
Houston-Hobby	31°F	March 5 <sup>th</sup>
City of Galveston	35°F	March 5 <sup>th</sup> & November 13 <sup>th</sup>



# Significant Annual Statistics - Precipitation

Annual Total Precipitation		
<b>City of College Station</b>	36.29"	26 <sup>th</sup> Driest
<b>City of Houston</b>	51.93"	41 <sup>st</sup> Wettest
<b>Houston-Hobby</b>	55.11"	30 <sup>th</sup> Wettest
<b>City of Galveston</b>	59.23"	21 <sup>st</sup> Wettest

Greatest One Day Total		
<b>City of College Station</b>	2.81"	May 3rd
<b>City of Houston</b>	9.21"	September 19 <sup>th</sup>
<b>Houston-Hobby</b>	4.67"	September 17 <sup>th</sup>
<b>City of Galveston</b>	6.81"	September 19 <sup>th</sup>

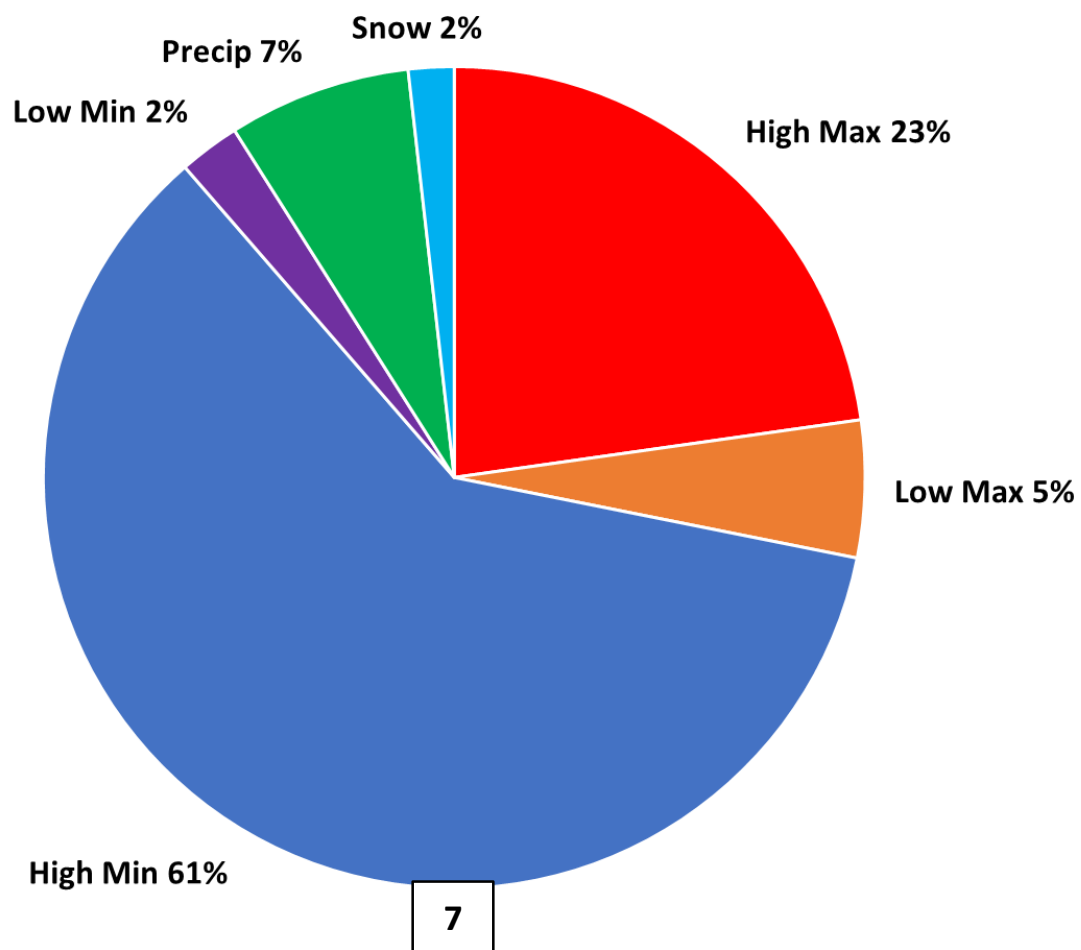
Wettest Month		
<b>City of College Station</b>	7.90"	May
<b>City of Houston</b>	14.95"	September
<b>Houston-Hobby</b>	11.48"	September
<b>City of Galveston</b>	18.06"	September



# Significant Annual Statistics - Records

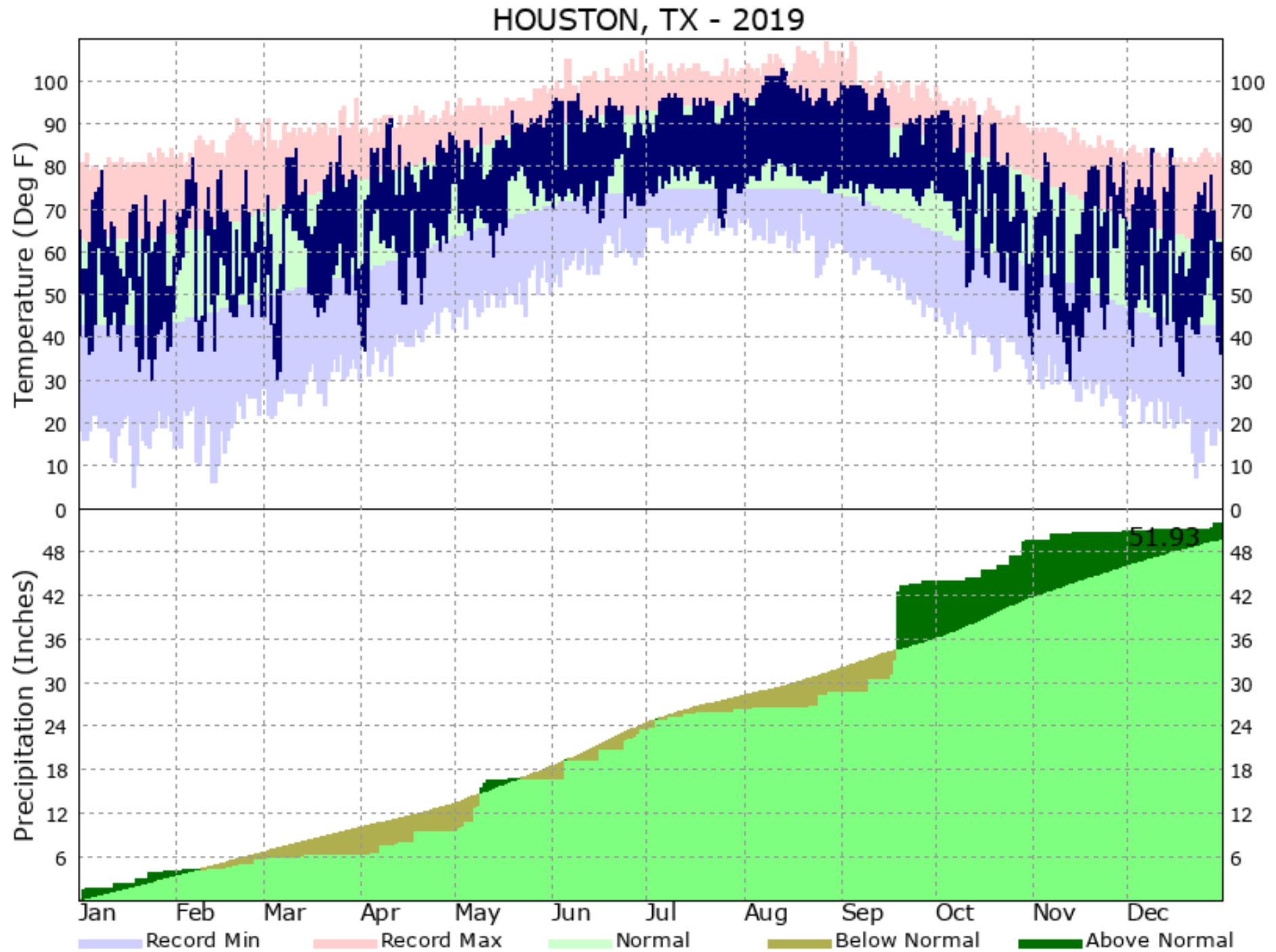
Record	High Max Temperature	Low Max Temperature	High Min Temperature	Low Min Temperature	Precipitation	Snowfall	Total
City of College Station	2	4	13	0	2	0	21
City of Houston	6	3	17	3	2	1 (Hail)	32
Houston-Hobby	9	2	34	0	5	2	52
City of Galveston	21	0	37	1	3	0	62
<b>Total</b>	<b>38</b>	<b>9</b>	<b>101</b>	<b>4</b>	<b>12</b>	<b>3</b>	<b>167</b>

Percentage of Types of Records



# Annual Statistics: City of Houston

The graph below represents the year of 2019 temperature and precipitation data for the City of Houston.

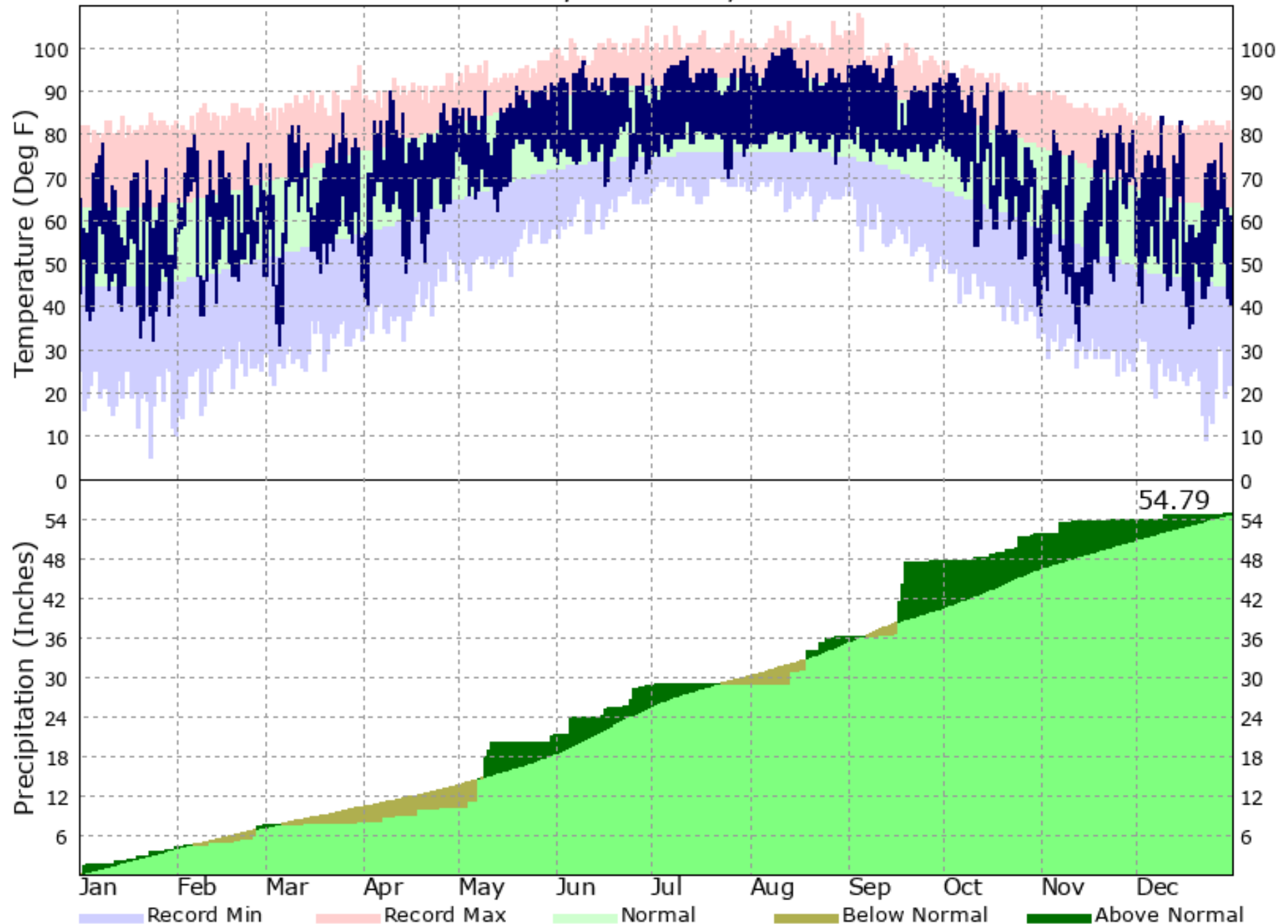




# Annual Statistics: Houston Hobby

The graph below represents the year of 2019 temperature and precipitation data for the Houston Hobby.

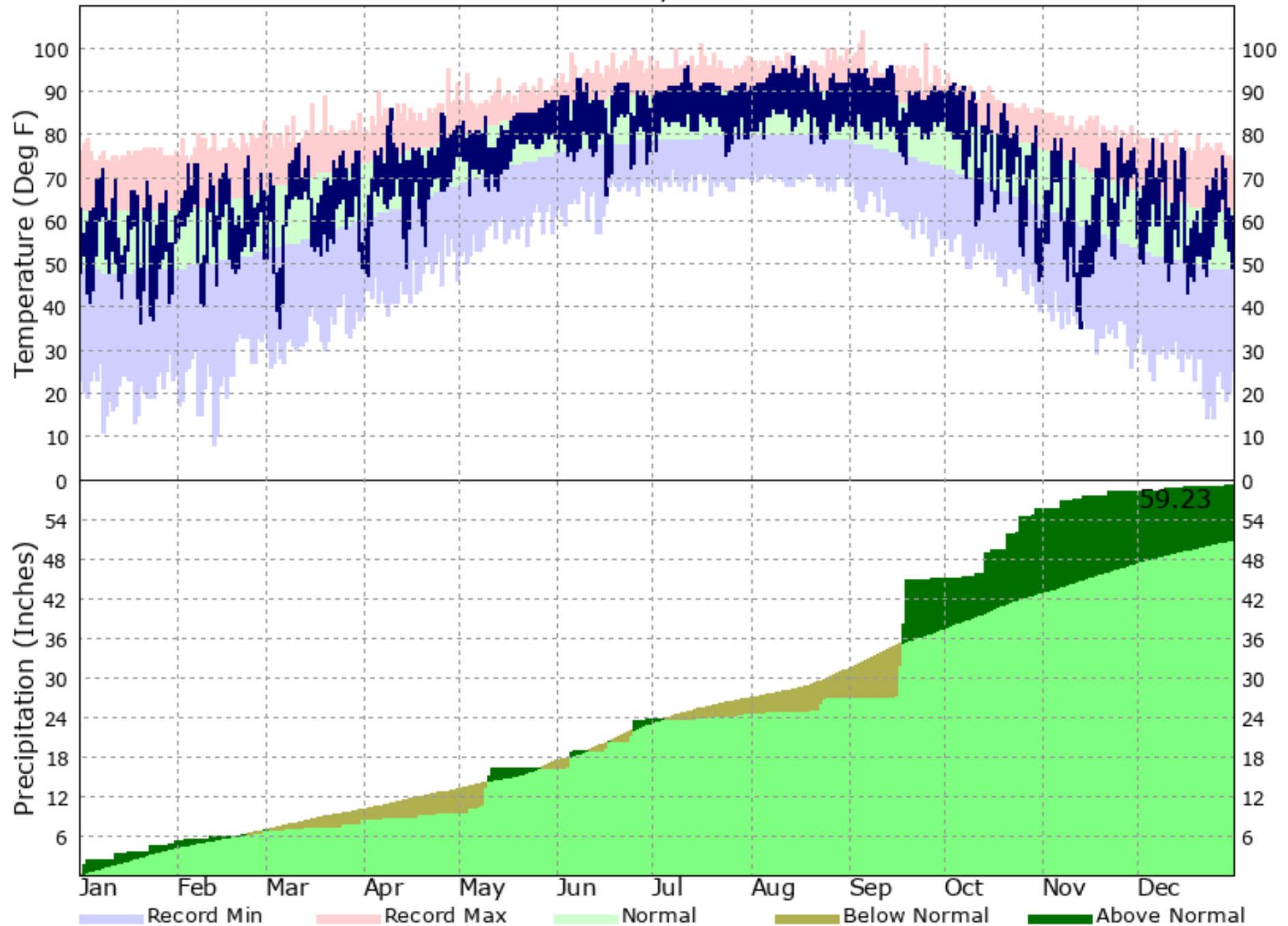
HOUSTON/HOBBY AP, TX - 2019



# Annual Statistics: City of Galveston

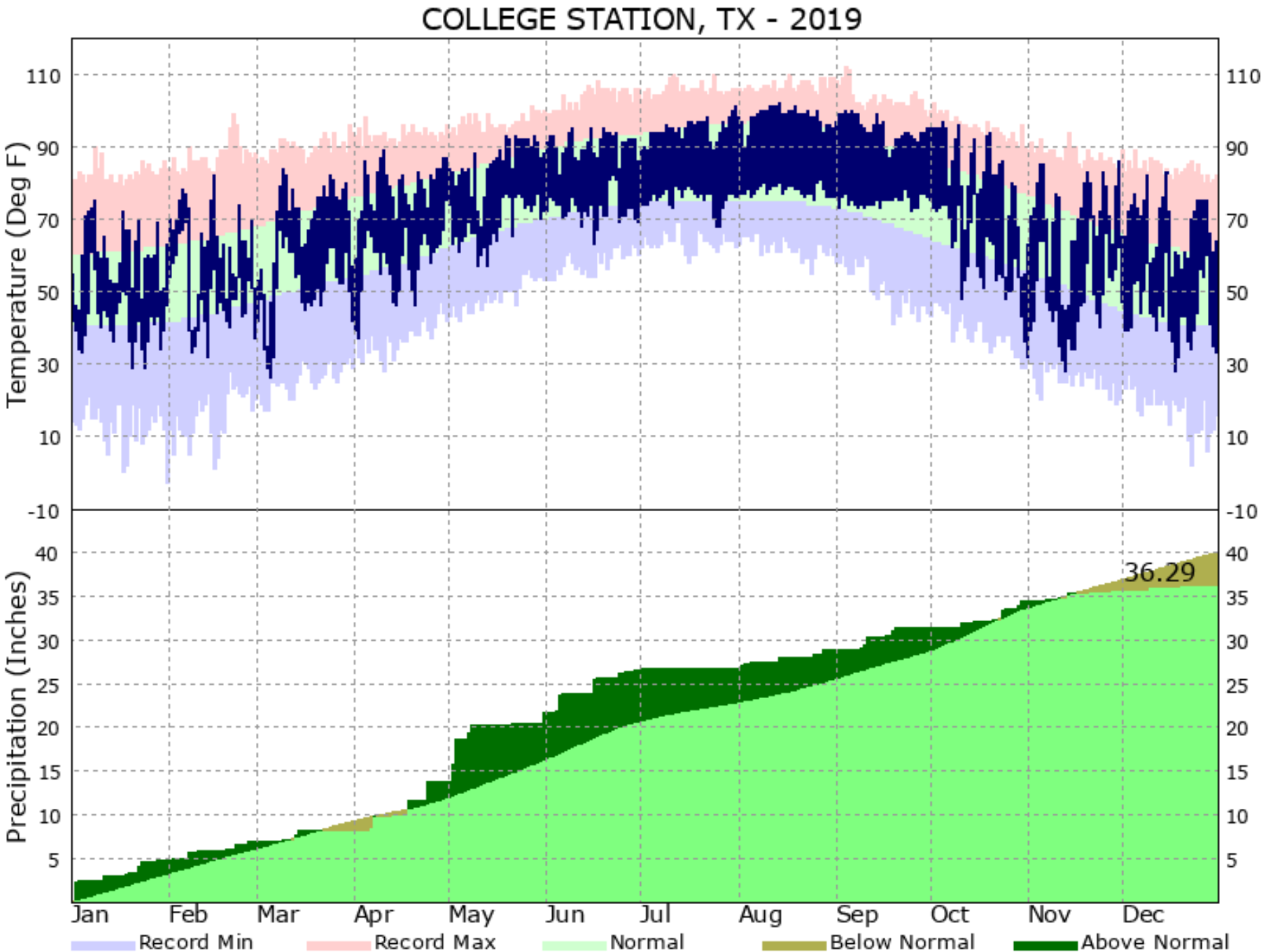
*The graph below represents the year of 2019 temperature and precipitation data for the City of Galveston.*

GALVESTON, TX - 2019



# Annual Statistics: City of College Station

*The graph below represents the year of 2019 temperature and precipitation data for the City of College Station.*



# January

**. . . Abnormally Wet January . . .**

*A combination of cold fronts and coastal troughs brought above normal monthly rainfall to SE TX throughout the month of January. On the contrary, average temperatures remained near normal. A total of only three daily records were broken across the primary climate sites throughout the month, with one being a snowfall record.*

Site	Average Temp (F)	Average High Temp (F)	Average Low Temp (F)	Normal Average Temp (F)	Departure From Normal (F)	Maximum Temperature (F)	Minimum Temperature (F)
Galveston (GLS)	55.2	62.1	48.4	55.2	0.0	72 on January 8th	36 on January 20th
Houston Hobby (HOU)	54.5	63.9	45.0	54.1	+0.4	78 on January 8th	32 on January 24th
City of Houston (IAH)	53.4	64.1	42.7	53.1	+0.3	79 on January 8th	30 on January 24th
College Station (CLL)	50.6	60.2	41.0	51.1	-0.6	75 on January 8th	29 on January 20 & 24th

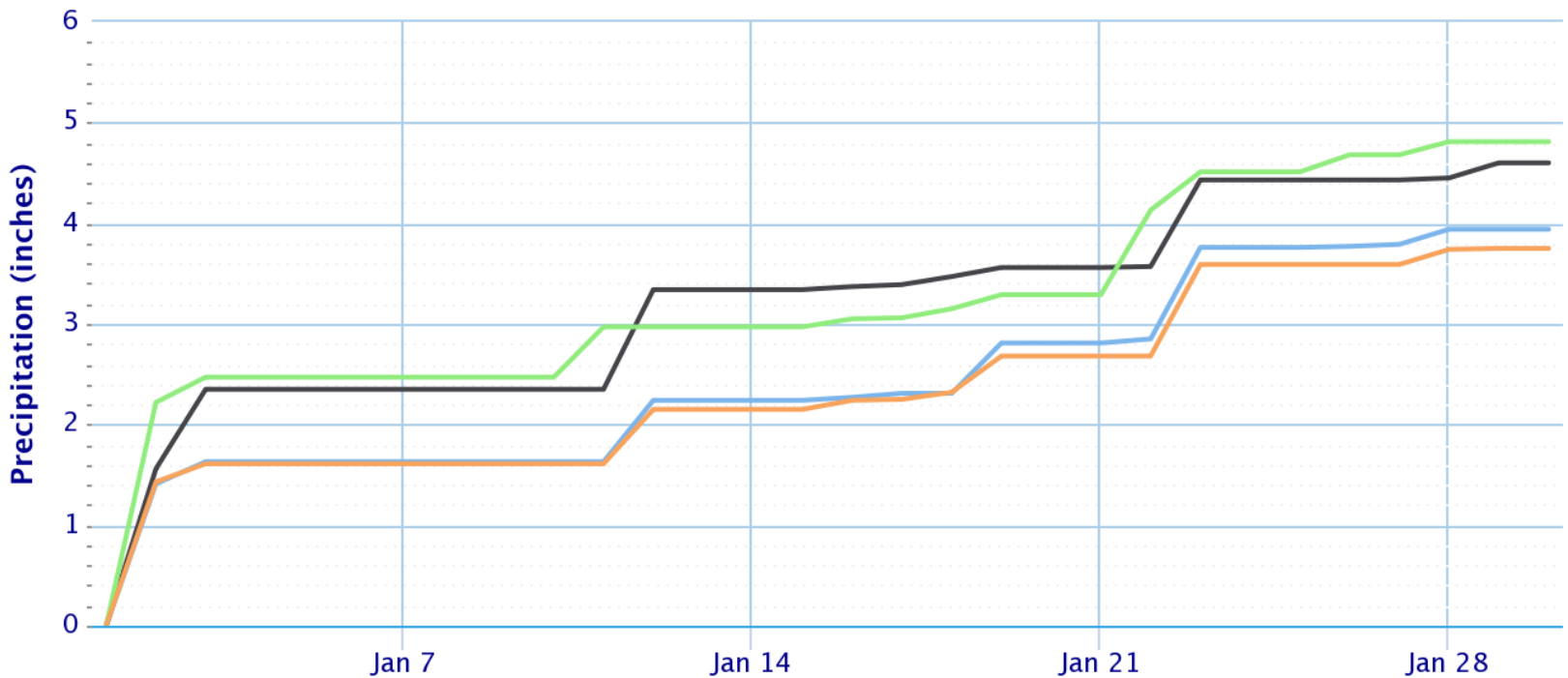


# January

Site	Total Precipitation (in.)	Departure from Normal (in.)	Number of Thunder Days	Maximum Daily Precipitation (in./date)
Galveston (GLS)	5.12	+0.92	3	1.56 Jan. 2nd
Houston Hobby (HOU)	4.16	+0.29	3	1.43 Jan. 2nd
City of Houston (IAH)	4.08	+0.70	3	1.41 Jan. 2nd
College Station (CLL)	4.83	+1.59	3	2.22 Jan. 2nd

## Accumulated Precipitation

Green/black diamonds represent subsequent/missing values



(Click to hide/show lines)

- Houston Area, TX (ThreadEx):Precip    — Galveston Area, TX (ThreadEx):Precip
- College Station Area, TX (ThreadEx):Precip    — HOUSTON WILLIAM P HOBBY AP, TX:Precip



# February

## *. . . A Foggy February. . .*

*In summary, the month of February was grey and soupy as overcast skies and fog dominated the weather pattern with a few clear and sunny sky days scattered in between. A combination of cold fronts followed up with coastal troughs and warm fronts kept most of SE TX in a rather warm and moist regime. Sea fog was the main weather hazard that reduced visibilities especially along the coast. Additionally, a few strong cold fronts swept through the region which brought showers and thunderstorms, as well as isolated hail and ice pellets. Overall, a total of 7 daily records were set across the four primary climate sites.*

Site	Average Temp (F)	Average High Temp (F)	Average Low Temp (F)	Normal Average Temp (F)	Departure From Normal (F)	Maximum Temperature (F)	Minimum Temperature (F)
Galveston (GLS)	60.3	66.1	54.5	57.6	+2.7	75 on Feb. 23rd	40 on Feb. 9th
Houston Hobby (HOU)	60.2	67.5	52.9	57.3	+2.9	80 on Feb. 6th	38 on Feb. 8th & 9th
City of Houston (IAH)	59.7	67.7	51.7	56.4	+3.3	82 on Feb. 6th	37 on Feb. 9th & 13th
College Station (CLL)	55.7	63.4	48.0	54.6	+1.1	82 on Feb. 15th	32 on Feb. 13th

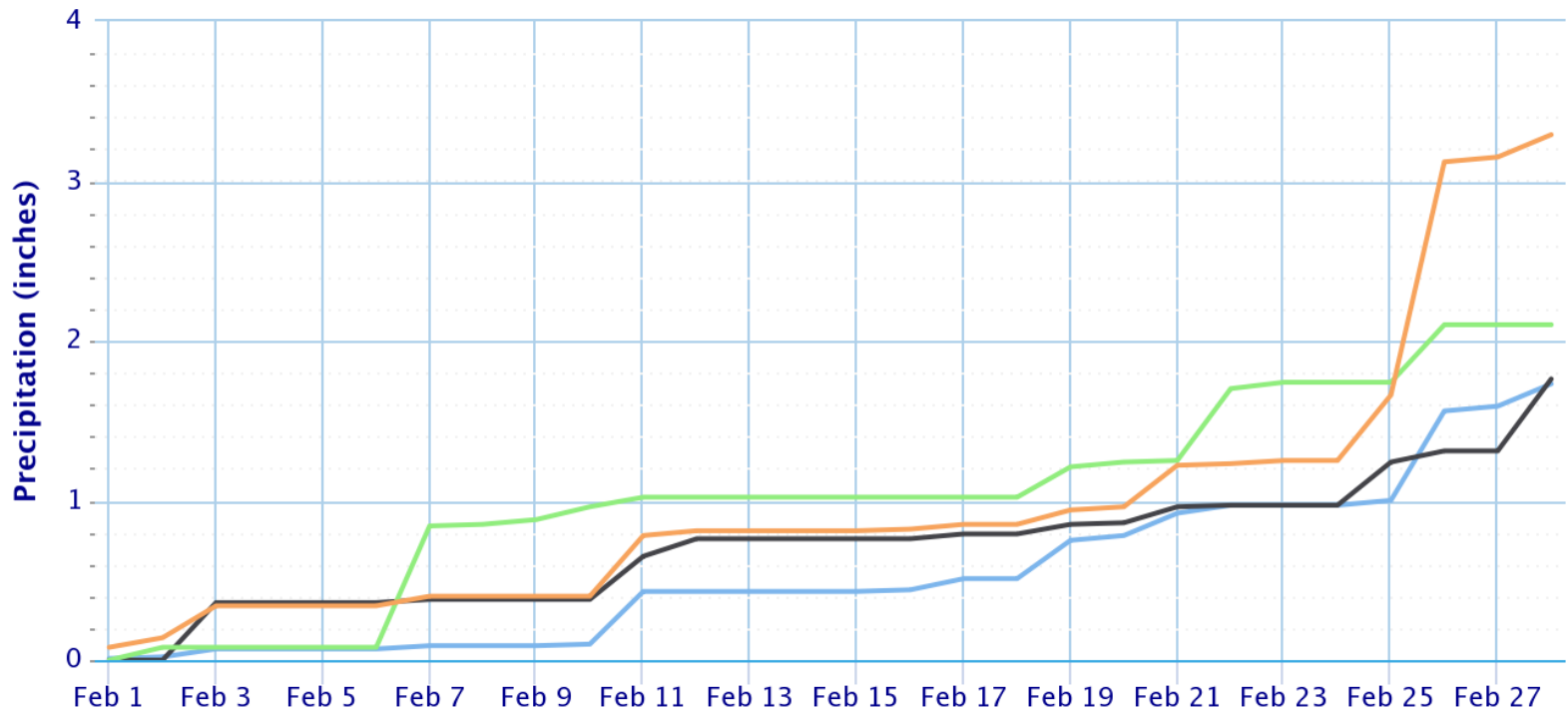


# February

Site	Total Precipitation (in.)	Departure from Normal (in.)	Number of Thunder Days	Maximum Daily Precipitation (in./date)
Galveston (GLS)	1.76	-0.81	5	0.52 Jan. 31- Feb. 1st
Houston Hobby (HOU)	3.29	0.08	4	1.46 Feb. 26th
City of Houston (IAH)	1.73	-1.47	3	0.56 Feb. 26th
College Station (CLL)	2.10	-0.75	3	0.76 Feb. 7th

## Accumulated Precipitation

Green/black diamonds represent subsequent/missing values



(Click to hide/show lines)

— Houston Area, TX (ThreadEx):Precip   
 — Galveston Area, TX (ThreadEx):Precip  
— College Station Area, TX (ThreadEx):Precip   
 — HOUSTON WILLIAM P HOBBY AP, TX:Precip



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# March

**... Very Dry March ...**

*In summary, the month of March was very dry, and filled with ample hours of sunshine. As a result, monthly rainfall totals were well below normal by about 1.5-3 inches area wide. This allowed abnormally dry and moderate drought conditions to also expand across portions of SE TX. Average monthly temperatures were only slightly below normal. Overall, a total of 3 daily records were set across the primary climate sites.*

Site	Average Temp (F)	Average High Temp (F)	Average Low Temp (F)	Normal Average Temp (F)	Departure From Normal (F)	Maximum Temperature (F)	Minimum Temperature (F)
Galveston (GLS)	62.7	68.6	56.9	63.4	-0.7	78 on Mar. 11th	35 on Mar. 5th
Houston Hobby (HOU)	63.2	71.4	55.0	63.3	-0.1	85 on Mar. 25th	31 on Mar. 5th
City of Houston (IAH)	62.0	72.1	51.9	62.7	-0.7	87 on Mar. 25th	30 on Mar. 5th
College Station (CLL)	59.9	69.5	50.3	61.4	-1.5	84 on Mar. 9th	26 on Mar. 5th



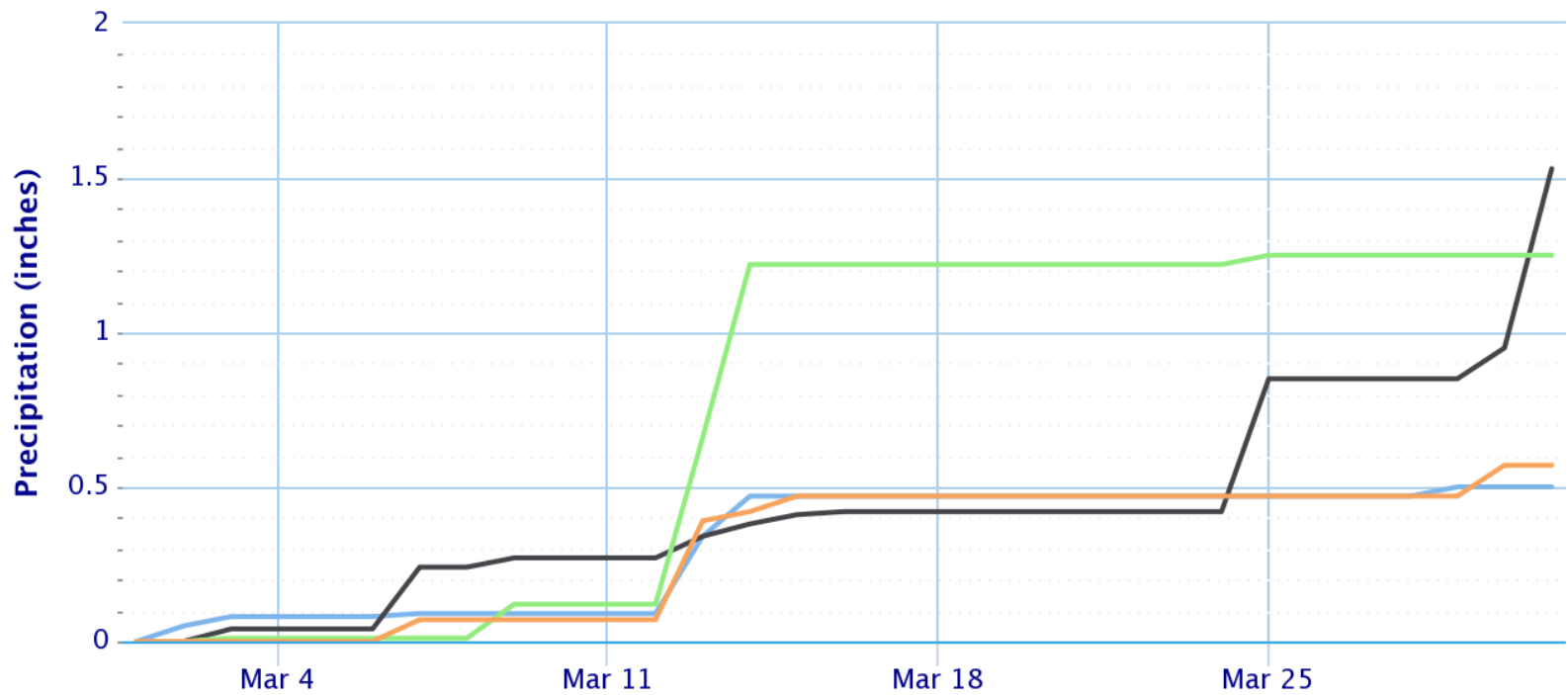


# March

Site	Total Precipitation (in.)	Departure from Normal (in.)	Number of Thunder Days	Maximum Daily Precipitation (in./date)
Galveston (GLS)	1.53	-1.63	3	0.58 Mar. 31st
Houston Hobby (HOU)	0.54	-2.66	1	0.32 Mar. 13th
City of Houston (IAH)	0.50	-2.91	1	0.25 Mar. 13th
College Station (CLL)	1.25	-1.92	2	0.56 Mar. 14th

## Accumulated Precipitation

Green/black diamonds represent subsequent/missing values



(Click to hide/show lines)

- Houston Area, TX (ThreadEx):Precip
- Galveston Area, TX (ThreadEx):Precip
- College Station Area, TX (ThreadEx):Precip
- HOUSTON WILLIAM P HOBBY AP, TX:Precip



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# April

## *. . . A Very Active April . . .*

*Spring conditions arrived in the month of April, and with that, so did the severe weather. There were five confirmed tornadoes that occurred across the forecast area throughout the month, specifically impacting Brazos, Walker, Madison, Montgomery and Houston counties. In addition, above normal monthly rainfall totals occurred mostly along and north of I-10, with below normal monthly rainfall totals to the south. Temperatures on average hovered around normal. Overall, a total of ten daily records were set across the primary climate sites.*

Site	Average Temp (F)	Average High Temp (F)	Average Low Temp (F)	Normal Average Temp (F)	Departure From Normal (F)	Maximum Temperature (F)	Minimum Temperature (F)
Galveston (GLS)	70.1	76.3	63.8	70.1	0.0	86 on April 9th	47 on April 2nd
Houston Hobby (HOU)	70.3	79.7	60.9	69.7	0.5	90 on April 9th	40 on April 2nd
City of Houston (IAH)	69.7	80.1	59.2	69.5	0.2	91 on April 10th	37 on April 2nd
College Station (CLL)	68.2	78.8	57.6	68.5	-0.3	89 on April 10th	37 on April 2nd

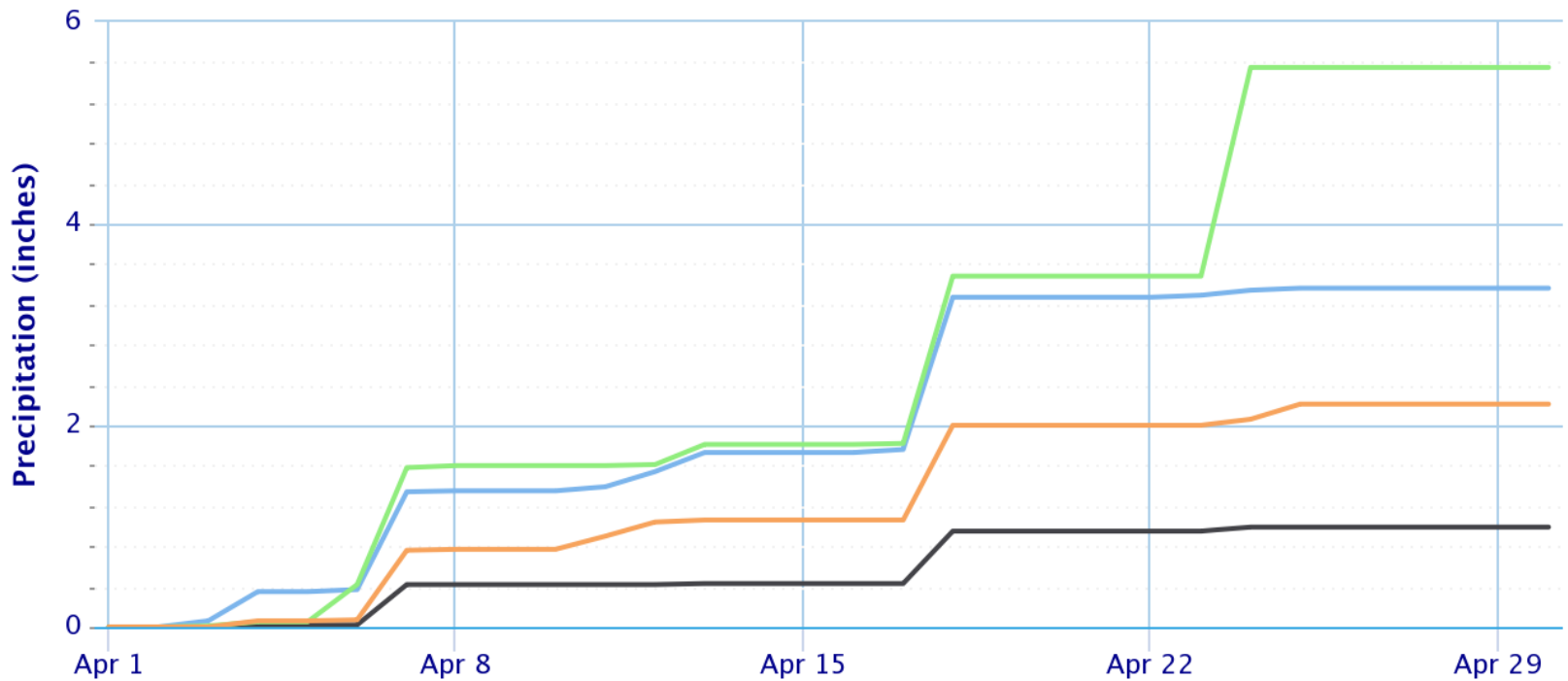


# April

Site	Total Precipitation (in.)	Departure from Normal (in.)	Number of Thunder Days	Maximum Daily Precipitation (in./date)
Galveston (GLS)	0.99	-2.06	3	0.58 April 1st
Houston Hobby (HOU)	2.21	-1.04	7	0.94 April 18th
City of Houston (IAH)	3.36	0.05	6	1.51 April 18th
College Station (CLL)	5.55	2.89	6	2.07 April 24th

## Accumulated Precipitation

Green/black diamonds represent subsequent/missing values



(Click to hide/show lines)

- Houston Area, TX (ThreadEx):Precip
- Galveston Area, TX (ThreadEx):Precip
- College Station Area, TX (ThreadEx):Precip
- HOUSTON WILLIAM P HOBBY AP, TX:Precip



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# April's Severe Weather - Tornadoes

## Tornado - Weches Houston County, TX

<b>Date</b>	April 13, 2019
<b>Time (Local)</b>	1256 PM CDT
<b>EF Rating</b>	EF-3
<b>Est. Peak Winds</b>	140 MPH
<b>Path Length</b>	15 mi
<b>Max Width</b>	800 yd
<b>Injuries/Deaths</b>	0/1

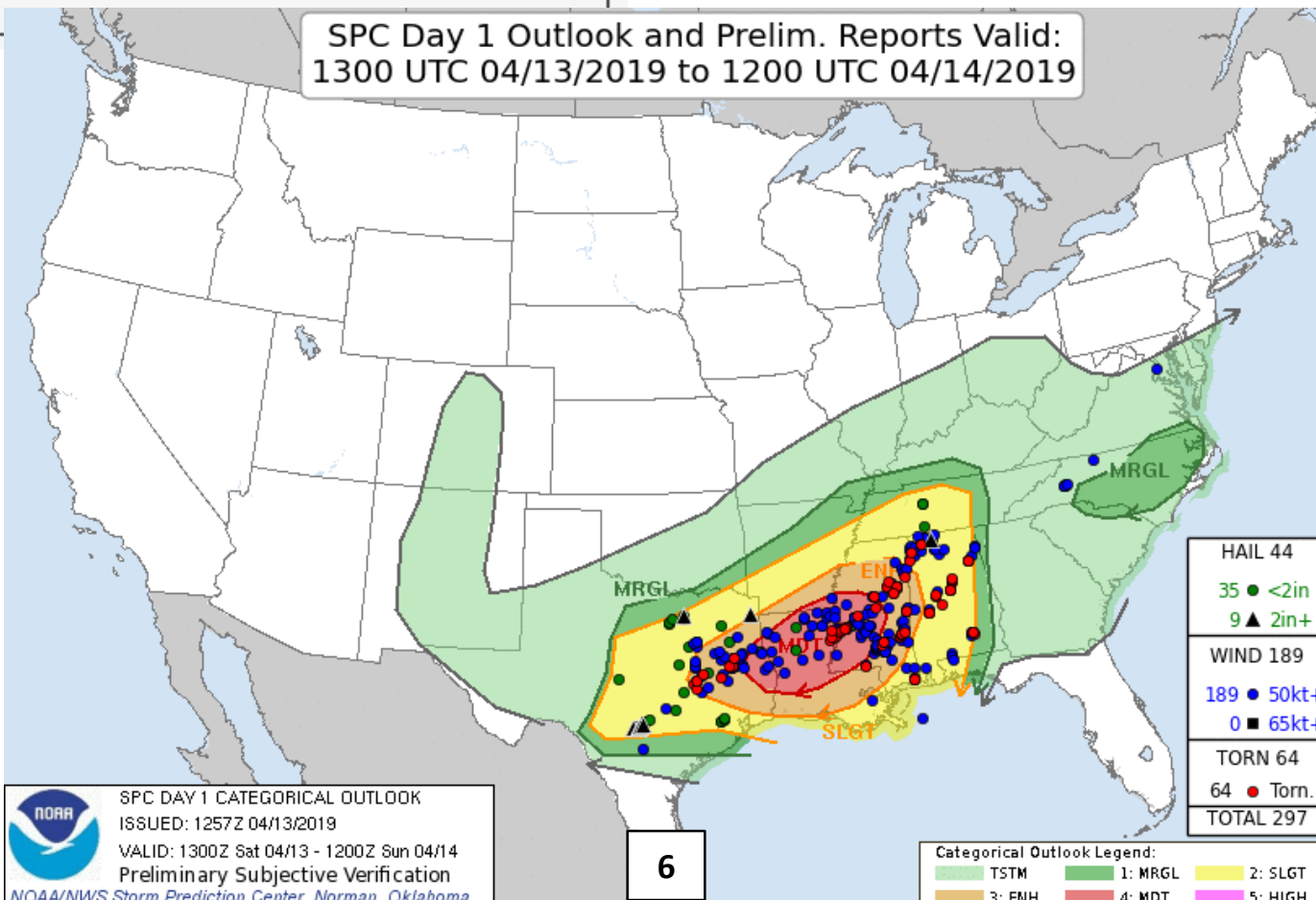
### Summary:

Tornado touched down in Houston County northeast of Crockett and tracked for 15 miles to the county line. A new tornado began just inside Cherokee County. Most of the damage was snapped pines, indicative of EF-1 damage but much more severe damage was found in an area just northeast of Weches. There, a double-wide trailer and its frame were thrown over 150 yards and destroyed. A female occupant within the trailer was killed.



**Severe Thunderstorm Watch # 52 - Valid from 1000 AM until 300 PM CDT**  
NOAA/NWS/Storm Prediction Center Updated: 20190413/2001 UTC

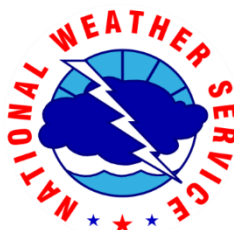
SPC Day 1 Outlook and Prelim. Reports Valid:  
1300 UTC 04/13/2019 to 1200 UTC 04/14/2019



<b>HAIL 44</b>
35 ● <2in
9 ▲ 2in+
<b>WIND 189</b>
189 ● 50kt+
0 ■ 65kt+
<b>TORN 64</b>
64 ● Torn.
<b>TOTAL 297</b>

Categorical Outlook Legend:				
1: TSTM	2: MRGL	3: SLGT	4: ENH	5: HIGH

NOAA SPC DAY 1 CATEGORICAL OUTLOOK  
ISSUED: 1257Z 04/13/2019  
VALID: 1300Z Sat 04/13 - 1200Z Sun 04/14  
Preliminary Subjective Verification  
NOAA/NWS Storm Prediction Center, Norman, Oklahoma



# April's Severe Weather - Tornadoes

## Tornado - Tadmor Houston County, TX

<b>Date</b>	April 13, 2019
<b>Time (Local)</b>	1133 AM CDT
<b>EF Rating</b>	EF-1
<b>Est. Peak Winds</b>	90 MPH
<b>Path Length</b>	0.3 mi
<b>Max Width</b>	75 yd
<b>Injuries/Deaths</b>	4/0

### Summary:

Tornado damage was found along County Road 1175, with trees snapped and uprooted along a path parallel to the road. Near the end of the path, the tornado destroyed a double-wide trailer home and pushed it into a wooded area. Four occupants in the home were injured, but as of April 14th, were released from the hospital.



EF-1 Tornado: Kennard Area near Tadmor

## Tornado - Lovelady Houston County, TX

<b>Date</b>	April 13, 2019
<b>Time (Local)</b>	1223 PM CDT
<b>EF Rating</b>	EF-2
<b>Est. Peak Winds</b>	130 MPH
<b>Path Length</b>	3.9 mi
<b>Max Width</b>	100 yd
<b>Injuries/Deaths</b>	0/0

### Summary:

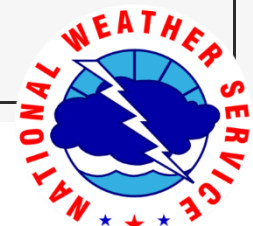
Tornado produced intermittent damage along its track, taking a metal roof off of a home where it touched down. The most severe damage was on the northeast end of the track where trees were stripped of limbs, vehicles were tossed and stacked on one another, and a double-wide trailer home was destroyed.



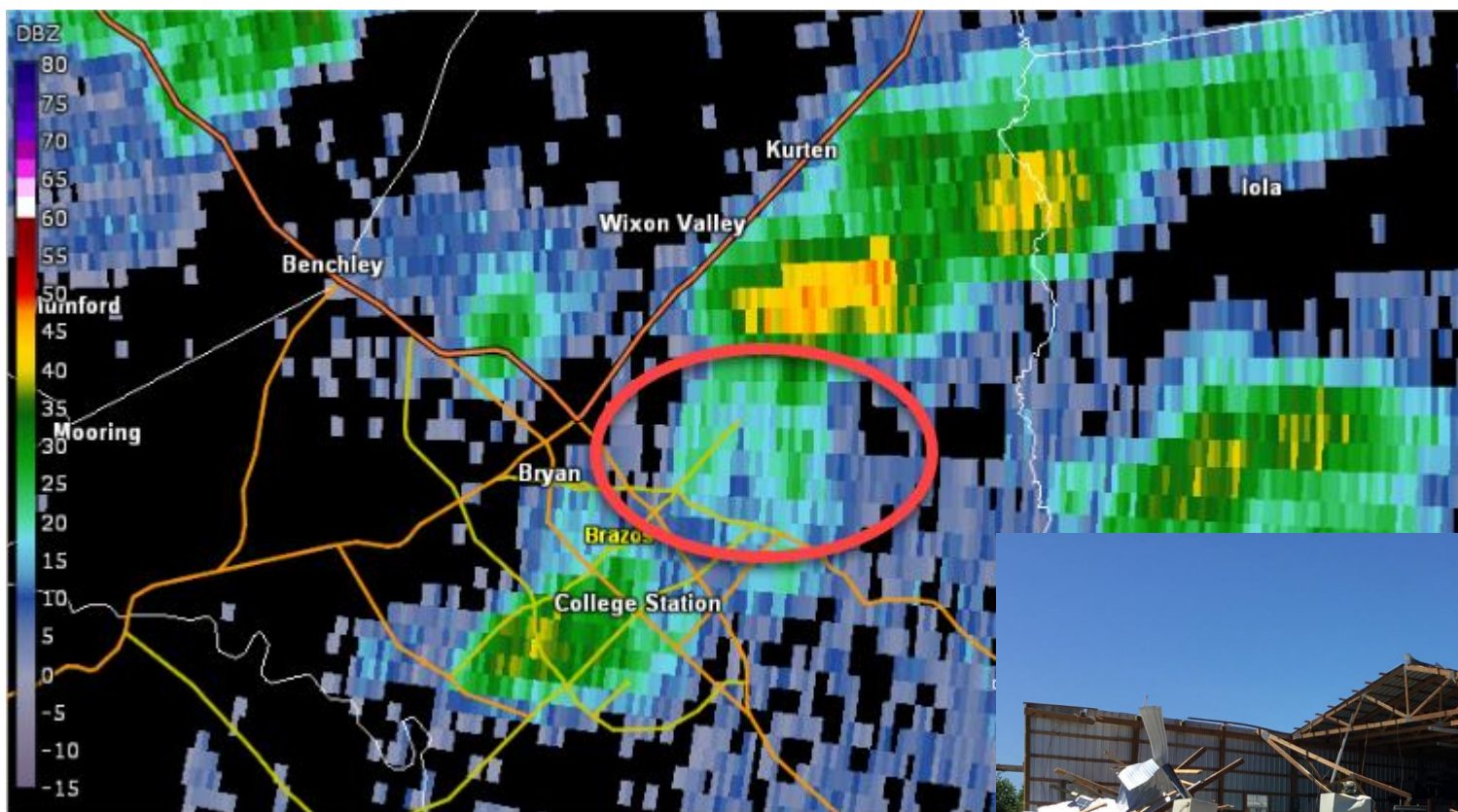
EF-2 Tornado: Lovelady Area



All photos were captured during an official NWS Houston/Galveston storm survey.



# April's Severe Weather - Tornadoes



EF-2 Tornado: Bryan Area

## Tornado - 4E Bryan BRAZOS COUNTY, TEXAS

<b>Date</b>	April 24, 2019
<b>Time (Local)</b>	4:42 PM
<b>EF Rating</b>	EF-2
<b>Est. Peak Winds</b>	120
<b>Path Length</b>	1.6 miles
<b>Max Width</b>	100 yards
<b>Injuries/Deaths</b>	1/0

### Summary:

Damage survey found that a tornado touched down about 4 miles east of Bryan, Texas along Farm to Market Road 1179 at around 442pm CDT. It caused damage to one house and four commercial buildings and warehouses. There was one injury to a male inside one of the warehouses. The tornado then tracked north-northwest towards another warehouse building with tree damage along its path before dissipating near Merka Drive east of Old Reliance Road around 447pm CDT. Damage to the warehouses and commercial buildings was rated EF-2 with other damage ranging from EF-0 to EF-1. Start time and end times of the tornado were based on eyewitness reports and time matched with radar data.



All photos were captured during an official NWS Houston/Galveston storm survey.



# May

**... Abnormally Warm and Wet May ...**

*Ample rainfall and warm temperatures set a total of twenty two daily records across the primary climate sites through out the month of May. Above normal monthly rainfall totals kept drought to a minimum area wide. Weak El Niño conditions were also noted and an El Niño Advisory was in effect throughout the month.*

Site	Average Temp (F)	Average High Temp (F)	Average Low Temp (F)	Normal Average Temp (F)	Departure From Normal (F)	Maximum Temperature (F)	Minimum Temperature (F)
Galveston (GLS)	78.6	82.9	74.3	77.6	1.0	88 on May 30th & 31st	66 on May 4th
Houston Hobby (HOU)	79.2	86.1	72.2	78.0	2.2	92 on May 30th	62 on May 13th
City of Houston (IAH)	78.6	86.5	70.7	76.9	1.7	93 on May 19th & 31st	59 on May 13th
College Station (CLL)	77.1	85.7	68.6	76.2	0.9	93 on April 22th & 28th	57 on May 10th & 13th

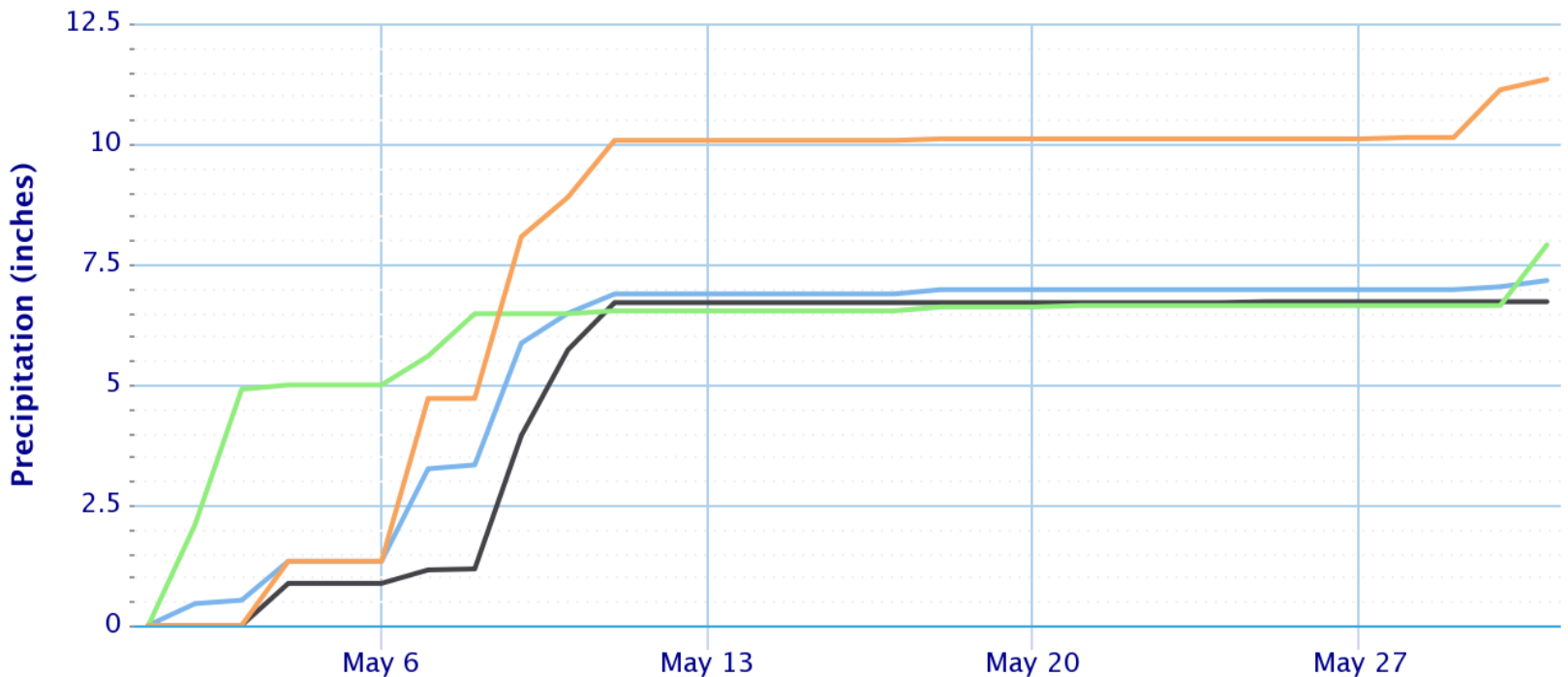


# May

Site	Total Precipitation (in.)	Departure from Normal (in.)	Number of Thunder Days	Maximum Daily Precipitation (in./date)
Galveston (GLS)	6.72	2.40	7	2.77 May 9th
Houston Hobby (HOU)	11.05	6.30	8	3.38 May 7th
City of Houston (IAH)	7.16	2.07	8	2.53 May 9th
College Station (CLL)	7.90	3.57	8	2.81 May 3rd

## Accumulated Precipitation

Green/black diamonds represent subsequent/missing values



(Click to hide/show lines)

- Houston Area, TX (ThreadEx):Precip
- Galveston Area, TX (ThreadEx):Precip
- College Station Area, TX (ThreadEx):Precip
- HOUSTON WILLIAM P HOBBY AP, TX:Precip



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# June

**... Another Hot and Wet June in SE TX. . .**

*Hot temperatures and above normal rainy conditions helped to set a total of seventeen daily records across the primary climate sites throughout the month of June, including a rare hail event at Intercontinental Airport. Above normal monthly rainfall totals kept drought to a minimum area wide. El Niño conditions also continued throughout the month of June.*

Site	Average Temp (F)	Average High Temp (F)	Average Low Temp (F)	Normal Average Temp (F)	Departure From Normal (F)	Maximum Temperature (F)	Minimum Temperature (F)
Galveston (GLS)	83.1	88.7	77.5	82.9	+0.2	93 on June 7th and 8th	66 on June 16th
Houston Hobby (HOU)	83.3	91.3	75.3	82.0	+1.3	97 on June 9th	68 on June 16th
City of Houston (IAH)	82.7	91.8	73.5	82.4	+0.3	97 on June 9th	67 on June 16th
College Station (CLL)	81.6	90.6	72.6	81.0	-0.6	95 on June 15th and 19th	63 on June 16th

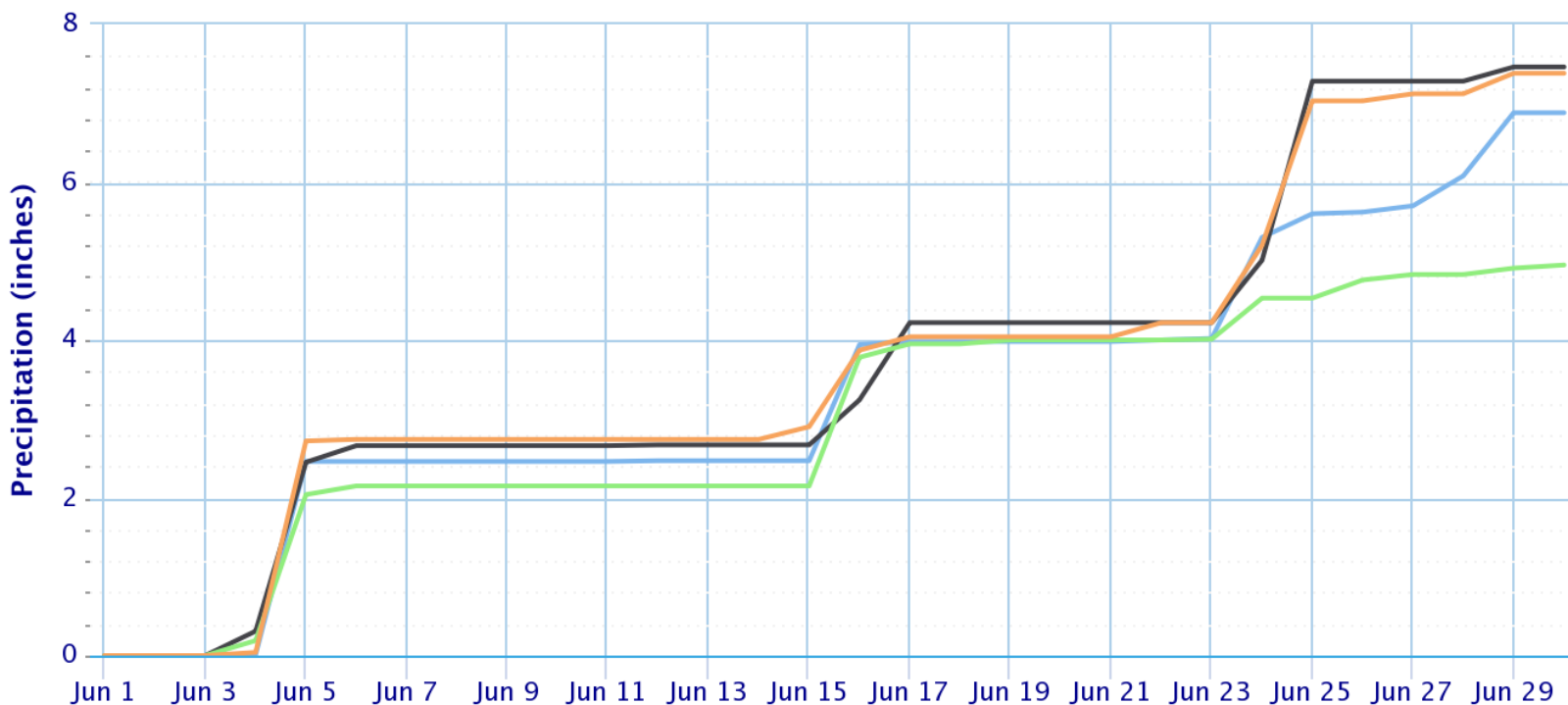


# June

Site	Total Precipitation (in.)	Departure from Normal (in.)	Number of Thunder Days	Maximum Daily Precipitation (in./date)
Galveston (GLS)	7.46	1.77	8	2.77 June 25th
Houston Hobby (HOU)	7.13	0.03	13	2.68 June 5th
City of Houston (IAH)	6.88	0.95	11	2.45 June 5th
College Station (CLL)	4.95	0.50	9	1.85 June 5th

## Accumulated Precipitation

Green/black diamonds represent subsequent/missing values



(Click to hide/show lines)

- Houston Area, TX (ThreadEx):Precip
- Galveston Area, TX (ThreadEx):Precip
- College Station Area, TX (ThreadEx):Precip
- HOUSTON WILLIAM P HOBBY AP, TX:Precip



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# July

**.. An Abnormally Dry and Warm July across SE TX. . .**

*Another record breaking month with a total of twenty daily records broken across the primary climate sites. July also brought the arrival of an abnormally early cold front to the region. The City of Galveston set its 6<sup>th</sup> warmest July on record, while Houston Hobby came in 8<sup>th</sup> warmest. El Niño conditions also came to an end this month, with ENSO-Neutral conditions taking back over.*

Site	Average Temp (F)	Average High Temp (F)	Average Low Temp (F)	Normal Average Temp (F)	Departure From Normal (F)	Maximum Temperature (F)	Minimum Temperature (F)
Galveston (GLS)	86.2	91.1	91.4	84.5	+1.7	96 on July 12th	75 on July 24th
Houston Hobby (HOU)	85.7	93.7	77.8	83.9	+1.9	98 on July 12th and 30th	70 on July 25th
City of Houston (IAH)	84.9	94.1	75.7	84.4	+0.5	97 on July 29th and 30th	66 on July 25th
College Station (CLL)	85.1	94.7	75.4	84.8	+0.3	101 on July 31st	68 on July 25th and 26th

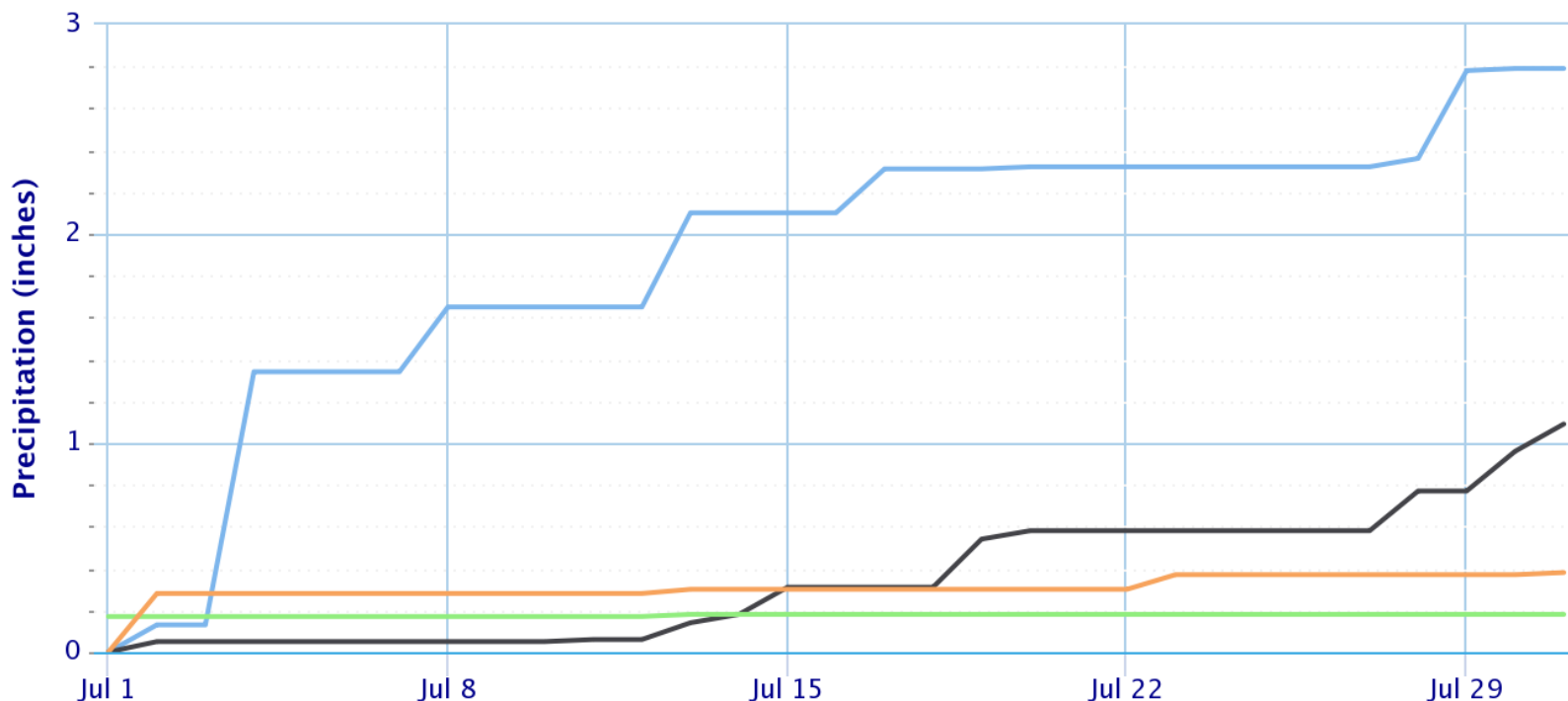


# July

Site	Total Precipitation (in.)	Departure from Normal (in.)	Number of Thunder Days	Maximum Daily Precipitation (in./date)
Galveston (GLS)	1.09	-2.71	9	0.23 July 19th
Houston Hobby (HOU)	0.38	-4.28	15	0.28 July 2nd
City of Houston (IAH)	2.79	-1.0	12	1.21 July 4th
College Station (CLL)	0.18	-1.96	6	0.17 July 1st

## Accumulated Precipitation

Green/black diamonds represent subsequent/missing values



(Click to hide/show lines)

- Houston Area, TX (ThreadEx):Precip
- Galveston Area, TX (ThreadEx):Precip
- College Station Area, TX (ThreadEx):Precip
- HOUSTON WILLIAM P HOBBY AP, TX:Precip



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# August

**... Abnormally Dry August leads to the Development of Moderate Drought in Portions of Southeast Texas. . .**

*August continued the abnormally warm trend summer with twenty three daily records broken across the primary climate sites. High pressure remained over most of Texas throughout the month resulting in another month with mostly below normal precipitation. The continued dry conditions has lead to the development of Moderate Drought along the western portion of the region. There were a few severe thunderstorms during the month of August, including one that went through the City of Houston on August 28<sup>th</sup>. This storm knocked down a tree in Montrose and produced building damage in portions on Pasadena and Downtown Houston. The tropics remained fairly quiet through the first portion of the month, however three storms were named in the Atlantic within the last 10 days of the month, including Hurricane Dorian that strengthened into a Category 5 Hurricane.*

Site	Average Temp (F)	Average High Temp (F)	Average Low Temp (F)	Normal Average Temp (F)	Departure From Normal (F)	Maximum Temperature (F)	Minimum Temperature (F)
Galveston (GLS)	87.8	93.0	82.6	85.0	+2.8	98 on August 14 <sup>th</sup>	78 on August 24 <sup>th</sup>
Houston Hobby (HOU)	86.7	95.0	78.5	84.2	+2.5	100 on August 12 <sup>th</sup> , 13 <sup>th</sup> , and 14 <sup>th</sup>	73 on August 28 <sup>th</sup>
City of Houston (IAH)	87.6	97.5	77.8	84.6	+3.0	103 on August 13 <sup>th</sup>	74 on August 28 <sup>th</sup> and 29 <sup>th</sup>
College Station (CLL)	88.0	98.3	77.7	85.3	+2.7	102 on August 14 <sup>th</sup>	75 on August 25 <sup>th</sup>

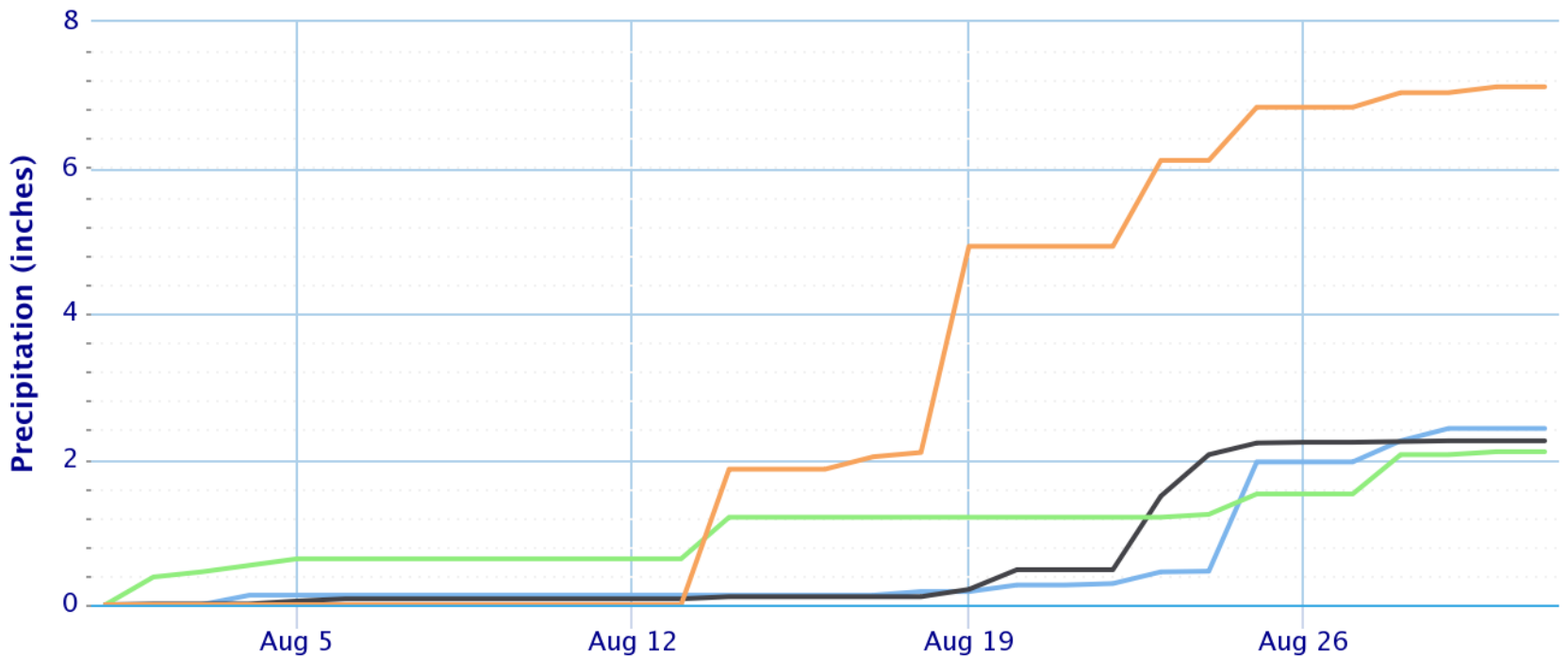


# August

Site	Total Precipitation (in.)	Departure from Normal (in.)	Number of Thunder Days	Maximum Daily Precipitation (in./date)
Galveston (GLS)	2.25	-2.14	9	1.01 August 23 <sup>rd</sup>
Houston Hobby (HOU)	7.11	+2.05	15	2.83 August 19 <sup>th</sup>
City of Houston (IAH)	2.42	-1.34	11	1.50 August 25 <sup>th</sup>
College Station (CLL)	2.10	-0.58	9	0.57 August 14 <sup>th</sup>

## Accumulated Precipitation

Green/black diamonds represent subsequent/missing values



(Click to hide/show lines)

- Houston Area, TX (ThreadEx):Precip
- Galveston Area, TX (ThreadEx):Precip
- College Station Area, TX (ThreadEx):Precip
- HOUSTON WILLIAM P HOBBY AP, TX:Precip



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# September

**... Abnormally warm temperatures continued with extreme rainfall brought on by Tropical Storm Imelda. . .**

*September continued the abnormally warm temperatures with twenty three daily temperature records broken across the primary climate sites. Initially drought conditions expanded across the entire area for the start of the month, but then extreme rainfall from Tropical Storm Imelda helped to reverse the dry conditions across the eastern and southern portions of the region. Imelda's extreme rainfall brought flash flooding to portions of Chambers, Liberty, Montgomery, Harris, Galveston, Matagorda, and Brazoria counties. After Imelda, the abnormally dry and hot conditions continued for the rest of the month.*

Site	Average Temp (F)	Average High Temp (F)	Average Low Temp (F)	Normal Average Temp (F)	Departure From Normal (F)	Maximum Temperature (F)	Minimum Temperature (F)
Galveston (GLS)	86.0	91.2	80.8	81.6	+4.4	96 on Sept. 14 <sup>th</sup>	73 on Sept. 19 <sup>th</sup>
Houston Hobby (HOU)	84.4	92.1	76.7	80.1	+4.3	98 on Sept. 14 <sup>th</sup>	74 on Sept. 25 <sup>th</sup> & 26 <sup>th</sup>
City of Houston (IAH)	83.9	93.1	74.6	79.9	+4.0	100 on Sept. 1 <sup>st</sup>	71 on Sept. 8 <sup>th</sup> & 26 <sup>th</sup>
College Station (CLL)	84.9	94.9	74.8	80.0	+4.9	100 on Sept. 4 <sup>th</sup> & 6 <sup>th</sup>	72 on Sept. 25 <sup>th</sup>

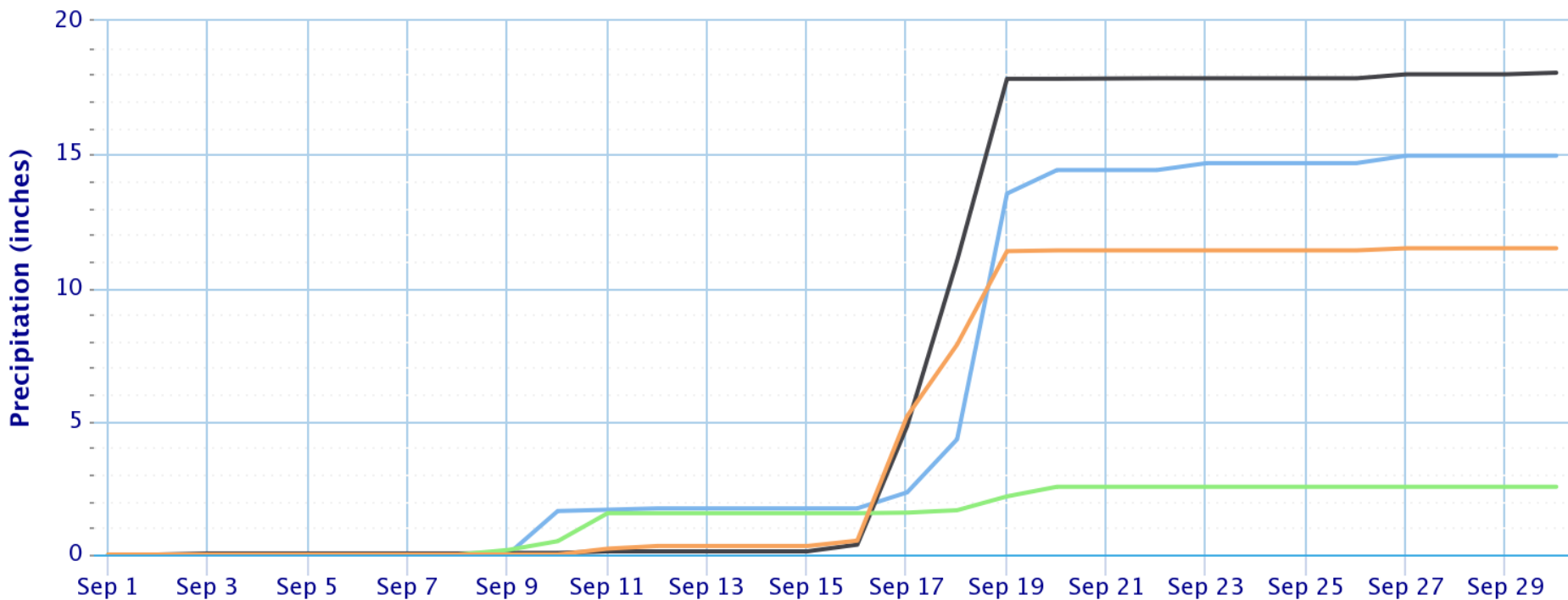


# September

Site	Total Precipitation (in.)	Departure from Normal (in.)	Number of Thunder Days	Maximum Daily Precipitation (in./date)
Galveston (GLS)	18.06	+12.03	11	6.81 September 19th
Houston Hobby (HOU)	11.48	+6.27	7	4.67 September 17th
City of Houston (IAH)	14.95	+10.83	8	9.21 September 19th
College Station (CLL)	2.54	-0.64	6	1.08 September 11th

## Accumulated Precipitation

Green/black diamonds represent subsequent/missing values



(Click to hide/show lines)

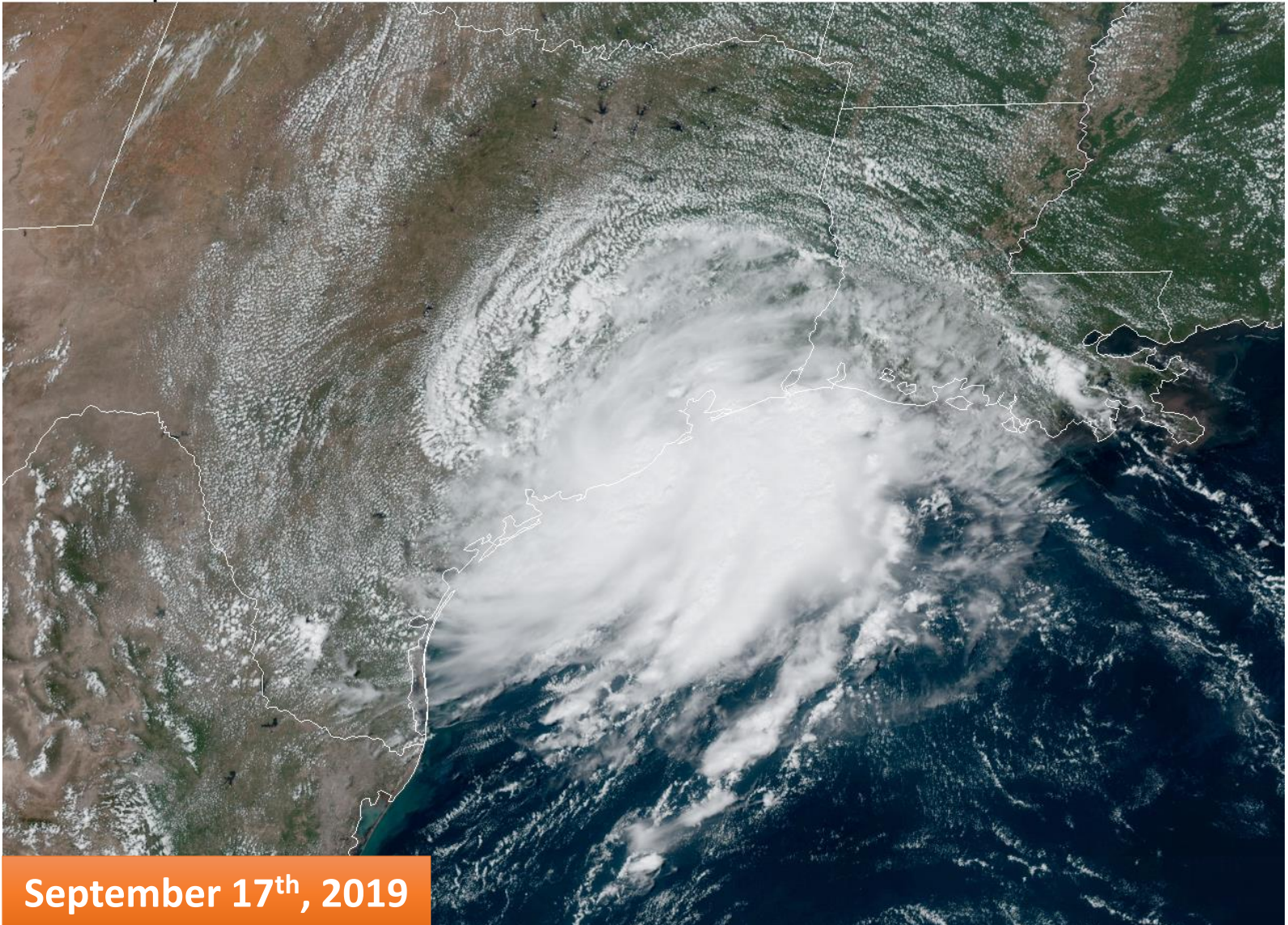
- Houston Area, TX (ThreadEx):Precip
- Galveston Area, TX (ThreadEx):Precip
- College Station Area, TX (ThreadEx):Precip
- HOUSTON WILLIAM P HOBBY AP, TX:Precip





# Tropical Storm Imelda

17 Sep 2019 18:01Z NOAA/NESDIS/STAR GOES-East ABI GEOCOLOR



On September 17<sup>th</sup>, an area of low pressure over the northwestern Gulf of Mexico organized becoming Tropical Depression Eleven around 12 PM CDT. By 12:45 PM CDT, the National Hurricane Center issued an update to strengthen the system into Tropical Storm Imelda. At approximately 1:30 PM CDT that afternoon, Imelda made landfall near Freeport, Texas with a minimum central pressure of 1005 millibars (29.68 inches of mercury). This system was not long lasting and quickly weakened after landfall, becoming a tropical depression by 7 PM that evening.

# Tropical Storm Imelda

## Imelda Storm Total Rainfall

Tuesday 7 AM to Thursday 7 PM QPE

Weather Forecast Office  
Houston/Galveston TX  
Issued Sep 19, 2019 9:19 PM CDT



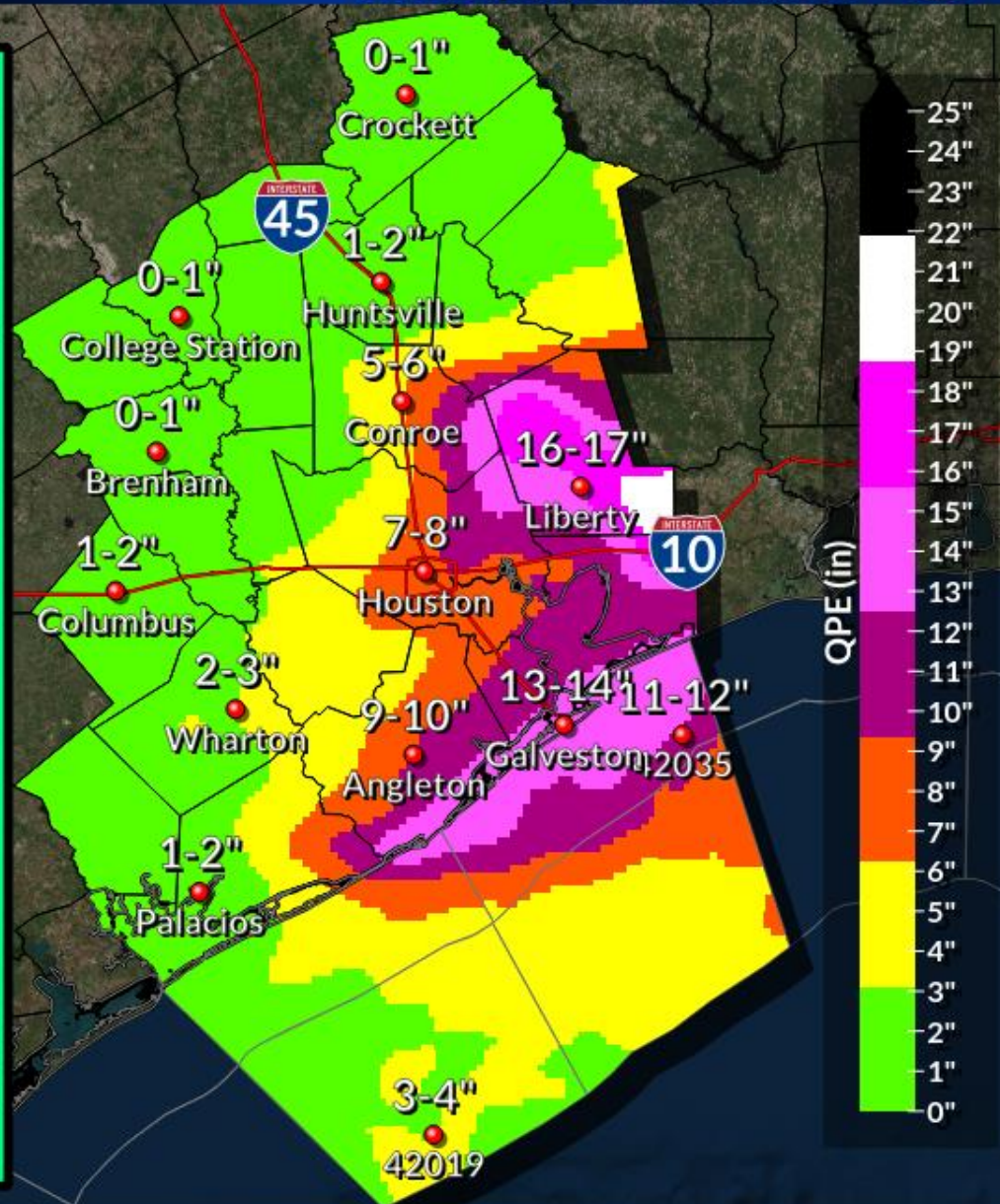
This is a 60 hour precipitation estimate (surface observations, radar, satellite) of Imelda's total rainfall which lead to catastrophic flooding across our southeastern forecast area.

Many Harris County rain gauges reported greater than 15 inch totals (locally 25 inches) from Conroe in Montgomery County southeastward into eastern Harris County (north and east Houston metro), Liberty and Chambers Counties. Most of the highest 24 hour rain totals fell today at between 10 to 15 inches when a near west-to-east storm feeder band very slowly sagged southward through this area. Many common hourly rainfall rates were on the order of 4 to 6 inches.

At 4 PM, Bush-Intercontinental Airport (which was shut down) recorded an all-time September daily rainfall record of 9.20 inches (City of Houston).

Many of the hardest hit areas during Harvey were impacted during this event; generally those communities from eastern Houston east on I-10 into Liberty, Chambers and Jefferson Counties.

An extreme rain amount of 43.15 inches (unofficial) occurred near Fannett, Texas in Jefferson County near the Chambers County line.



@NWSHouston

[weather.gov/hgx](http://weather.gov/hgx)

***A tornado also occurred associated with a band of thunderstorms within Tropical Storm Imelda. An EF-1 tornado with maximum sustained winds of 90 MPH was on the ground for about 3 miles near Highlands, TX. It brought down large tree branches, snapped tree trunks, and damaged a few structures.***



# Tropical Storm Imelda

## Highest Storm Total Rainfall Amounts

City/Town	County	Rainfall (inches)
NW Winnie	Chambers	40.79
WNW Devers	Liberty	36.26
E Hankamer	Chambers	33.15
SE Roman Forest	Harris	29.72
Splendora	Montgomery	27.04
Sargent	Matagorda	23.06
SE Cut And Shoot	Montgomery	22.84
N Huffman	Harris	22.52

City/Town	County	Rainfall (inches)
SW Porter	Harris	21.35
NE Crosby	Harris	20.76
NNW Dayton	Harris	19.99
N Daisetta	Liberty	18.86
SE Galveston Scholes Field	Galveston	17.72
SSW Kingwood	Harris	17.68
SSE Anahuac	Chambers	17.08
SW Porter Heights	Harris	16.60

## Lowest Sea Level Pressure Observations

City	Min Pressure (MB)	Date/ Time (UTC)	Max Sustained (KT)	Date/ Time (UTC)
High Island	997.97	17/1115	135/028	17/2035
Brazos 451 Oil Platform	1005.08	17/1315	180/020	17/1335
Angleton	1007.11	17/1930	200/018	17/2230

## Maximum Observed Water Level

City	County	Water Level (FT)	Datum	Date/Time (UTC)
Manchester	Harris	3.50	MHHW	19/1948
Eagle Point	Galveston	2.22	MHHW	17/0312
Galveston Pier	Galveston	2.08	MHHW	16/2324

Source – NWS Houston/Galveston Post Storm Report Imelda:  
<https://forecast.weather.gov/product.php?site=NWS&issuedby=HGX&product=PSH&glossary=1>



# October

*. . . Near Normal Transition Month between Summer and Winter . . .*

*Multiple cold fronts through the month brought an end to the unseasonably warm weather resulting in a near normal month across the region. There were still 17 temperature records set this month, 16 of which were either record high maximum or high minimum temperatures. During the month on October there was some pockets of D3-Extreme Drought conditions that emerged in portions of the northern and western portions of the region. However, precipitation brought through with frontal passages improved drought conditions at the end of the month. The first surge of winter-like temperatures occurred on Halloween as a moderate cold front pushed through Southeast Texas with temperatures dropping into the low 40s or upper 30s Halloween evening.*

Site	Average Temp (F)	Average High Temp (F)	Average Low Temp (F)	Normal Average Temp (F)	Departure From Normal (F)	Maximum Temperature (F)	Minimum Temperature (F)
Galveston (GLS)	75.5	81.9	80.8	74.3	+1.2	92 on Oct. 4 <sup>th</sup>	46 on Oct. 31 <sup>st</sup>
Houston Hobby (HOU)	73.3	82.5	64.1	72.1	+1.3	94 on Oct. 4 <sup>th</sup> & 5 <sup>th</sup>	40 on Oct. 31 <sup>st</sup>
City of Houston (IAH)	71.8	81.9	61.6	71.5	+0.3	93 on Oct. 3 <sup>rd</sup> , 4 <sup>th</sup> & 5 <sup>th</sup>	40 on Oct 31 <sup>st</sup>
College Station (CLL)	71.3	82.3	60.4	70.8	+0.5	97 on Oct. 5 <sup>th</sup>	36 on Oct. 31 <sup>st</sup>

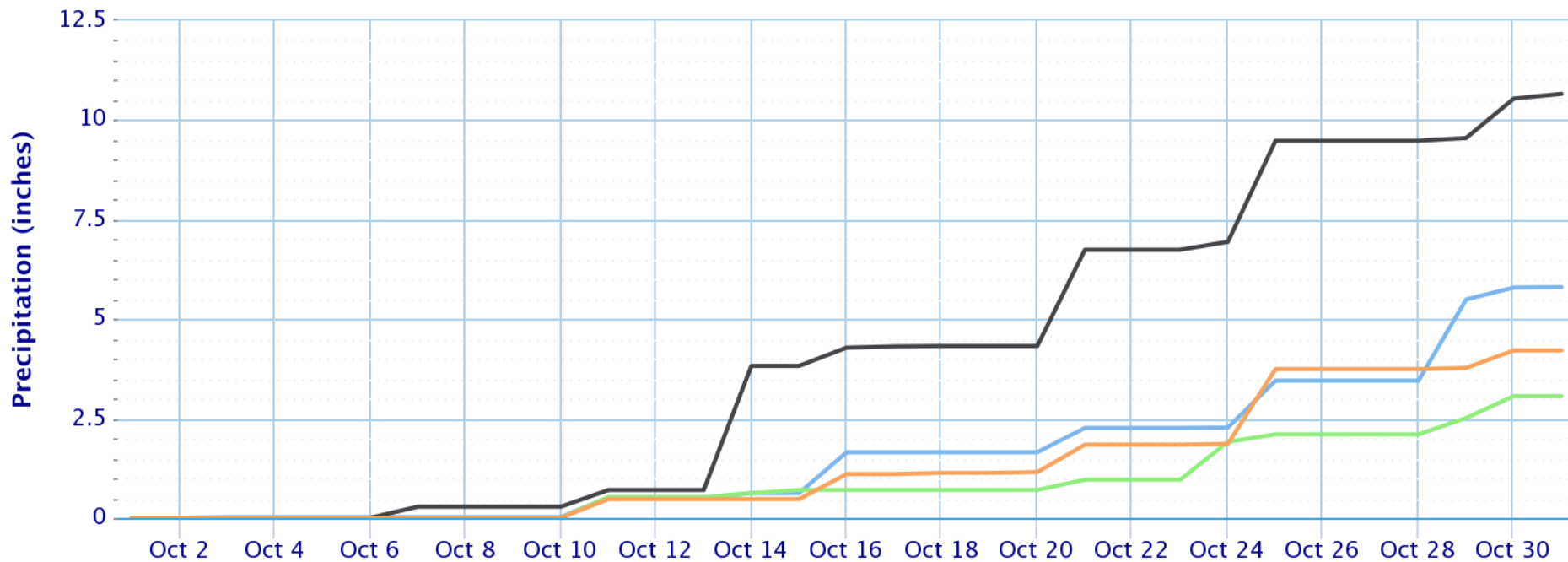


# October

Site	Total Precipitation (in.)	Departure from Normal (in.)	Number of Thunder Days	Maximum Daily Precipitation (in./date)	
Galveston (GLS)	10.66	+5.14	7	3.12	14 <sup>th</sup>
Houston Hobby (HOU)	4.21	-1.78	3	1.88	25 <sup>th</sup>
City of Houston (IAH)	5.80	+0.10	11	2.04	29 <sup>th</sup>
College Station (CLL)	3.06	-1.85	4	0.95	24 <sup>th</sup>

## Accumulated Precipitation

Green/black diamonds represent subsequent/missing values



(Click to hide/show lines)

- Houston Area, TX (ThreadEx):Precip
- Galveston Area, TX (ThreadEx):Precip
- College Station Area, TX (ThreadEx):Precip
- HOUSTON WILLIAM P HOBBY AP, TX:Precip



# November

*. . . Cool and Dry November. . .*

***Multiple cold fronts pushed through southeast Texas through the month of November creating a bit of a temperature rollercoaster. High temperatures climbed into the low to mid 80s ahead of a cold front passage, then would dip down into the low 30s or even upper 20s after the cold front. November ended up being near normal overall because of these drastic temperature swings. While these fronts brought cooler air with them, they generally lacked in the precipitation department. Almost the entire region, besides a few isolated spots west of Houston, ended up having a below normal month for precipitation. The region overall was about two to four inches below average. The winter outlook shows that southeast Texas will have better odds of a warmer and drier winter than normal with ENSO-Neutral conditions prevailing.***

Site	Average Temp (F)	Average High Temp (F)	Average Low Temp (F)	Normal Average Temp (F)	Departure From Normal (F)	Maximum Temperature (F)	Minimum Temperature (F)
Galveston (GLS)	62.7	69.3	56.1	65.1	-2.4	79 on Nov. 7 <sup>th</sup> & 26 <sup>th</sup>	35 on Nov. 13 <sup>th</sup>
Houston Hobby (HOU)	61.1	70.6	51.7	63.2	-2.1	82 on Nov. 26 <sup>th</sup>	32 on Nov. 13 <sup>th</sup>
City of Houston (IAH)	60.0	70.5	49.5	62.3	-2.3	83 on Nov. 5 <sup>th</sup>	30 on Nov. 13 <sup>th</sup>
College Station (CLL)	58.9	70.8	46.9	60.8	-1.9	86 on Nov 30 <sup>th</sup>	28 on Nov. 13 <sup>th</sup>

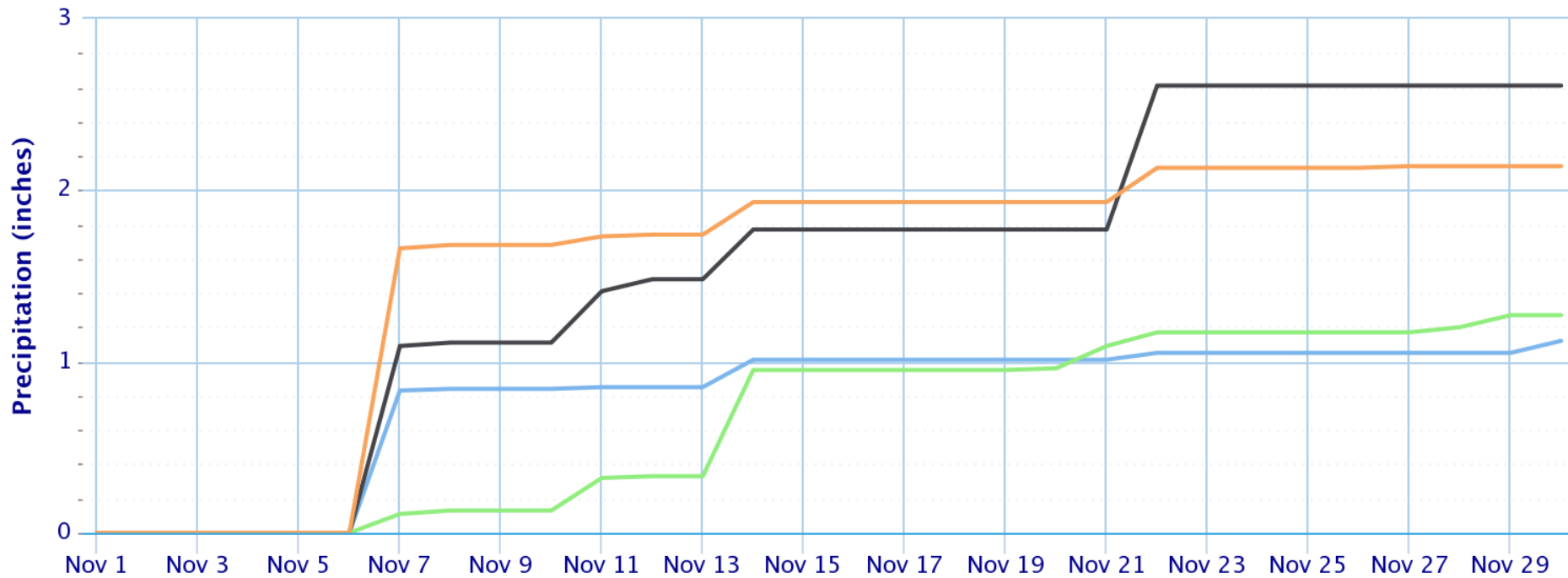


# November

Site	Total Precipitation (in.)	Departure from Normal (in.)	Number of Thunder Days	Maximum Daily Precipitation (in./date)
Galveston (GLS)	2.61	-1.90	1	1.09 7 <sup>th</sup>
Houston Hobby (HOU)	2.14	-2.18	1	1.66 7 <sup>th</sup>
City of Houston (IAH)	1.12	-3.22	1	0.83 7 <sup>th</sup>
College Station (CLL)	1.27	-1.95	1	0.62 14 <sup>th</sup>

## Accumulated Precipitation

Green/black diamonds represent subsequent/missing values



(Click to hide/show lines)

- Houston Area, TX (ThreadEx):Precip    — Galveston Area, TX (ThreadEx):Precip
- College Station Area, TX (ThreadEx):Precip    — HOUSTON WILLIAM P HOBBY AP, TX:Precip



# December

*... Warm and Very Dry December leading to Expanding Drought Conditions. . .*

*High pressure dominated the weather across Southeast Texas for the month of December with a few cold fronts passing through bringing showers and thunderstorms. However, a majority of these showers and thunderstorms were light and scattered in nature. This led to a much below normal month for precipitation with most of the region getting less than inch of rain total for the entire month, which is about two to three inches below normal. These dry conditions led to an expansion of the drought conditions across the region. The dry conditions combined with high pressure also led to a warmer than average December with much of the region being around three to four degrees above normal.*

Site	Average Temp (F)	Average High Temp (F)	Average Low Temp (F)	Normal Average Temp (F)	Departure From Normal (F)	Maximum Temperature (F)	Minimum Temperature (F)
Galveston (GLS)	61.2	68.2	54.3	57.3	+3.9	79 on Dec. 6 <sup>th</sup>	43 on Dec. 17 <sup>th</sup>
Houston Hobby (HOU)	59.0	69.3	48.7	55.6	+3.4	84 on Dec. 9 <sup>th</sup>	35 on Dec. 18 <sup>th</sup>
City of Houston (IAH)	57.6	69.5	45.8	54.4	+3.2	84 on Dec. 9 <sup>th</sup> & 15 <sup>th</sup>	31 on Dec. 19 <sup>th</sup>
College Station (CLL)	56.0	68.4	43.6	52.2	+3.8	83 on Dec. 15 <sup>th</sup>	28 on Dec. 18 <sup>th</sup>



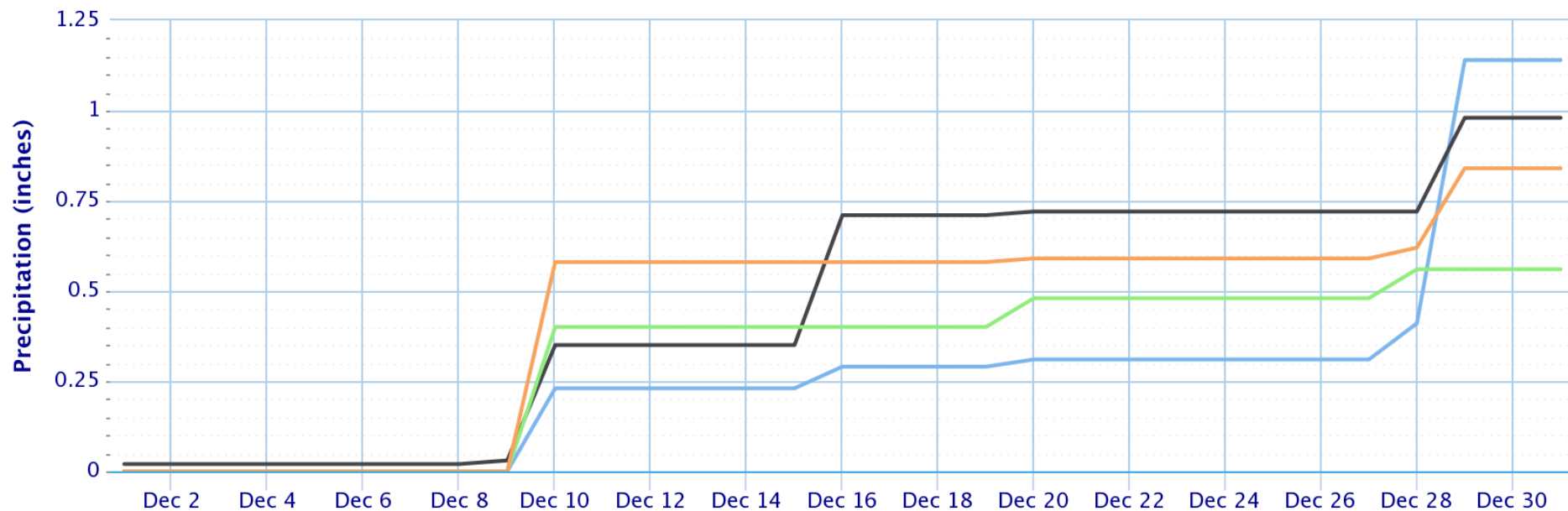


# December

Site	Total Precipitation (in.)	Departure from Normal (in.)	Number of Thunder Days	Maximum Daily Precipitation (in./date)
Galveston (GLS)	0.98	-2.54	1	0.36 16 <sup>th</sup>
Houston Hobby (HOU)	0.84	-3.19	1	0.58 10 <sup>th</sup>
City of Houston (IAH)	1.14	-2.60	2	0.73 29 <sup>th</sup>
College Station (CLL)	0.56	-2.67	0	0.40 10 <sup>th</sup>

## Accumulated Precipitation

Green/black diamonds represent subsequent/missing values



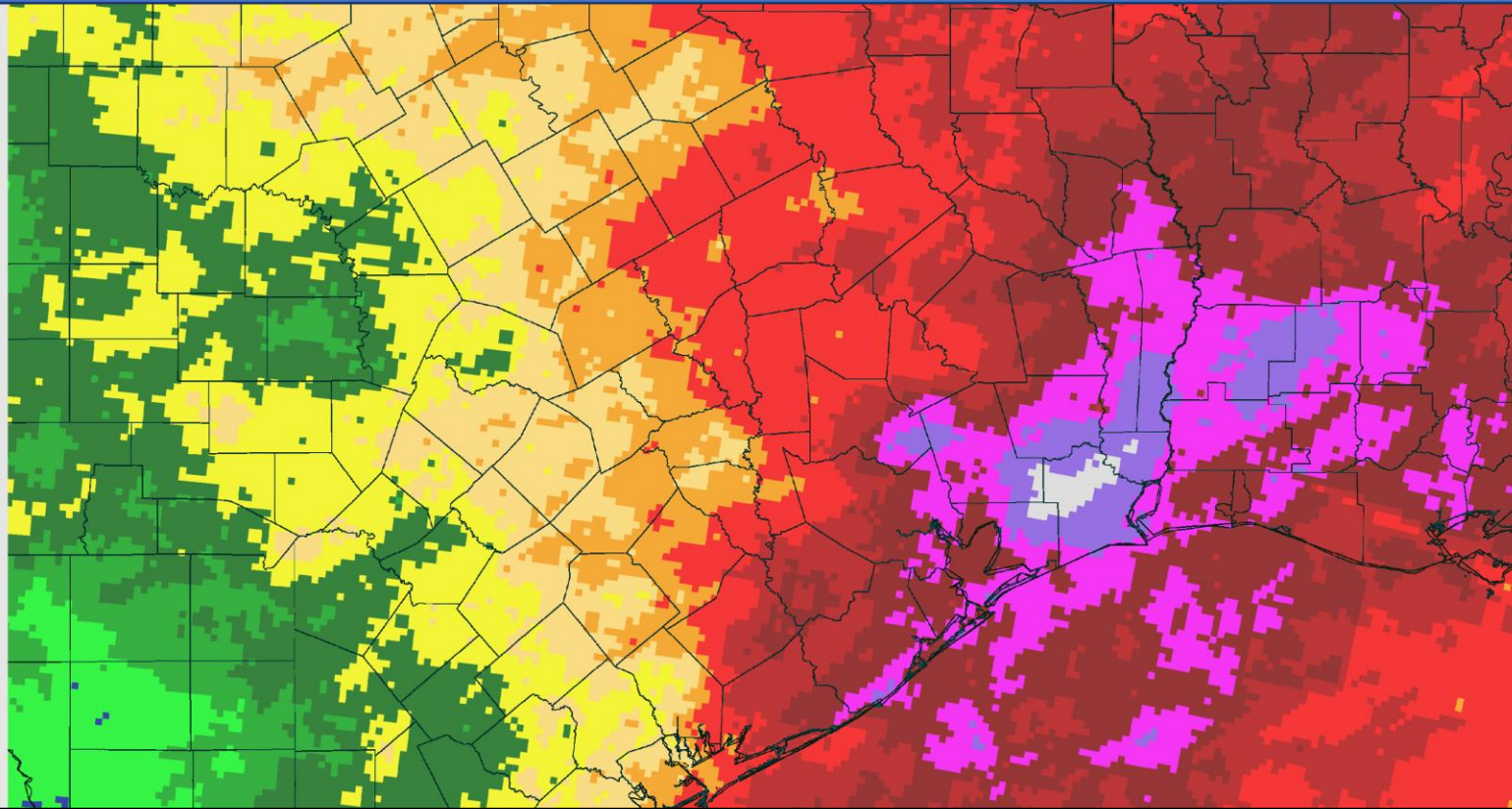
(Click to hide/show lines)

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 — Galveston Area, TX (ThreadEx):Precip   
 — College Station Area, TX (ThreadEx):Precip  
— HOUSTON WILLIAM P HOBBY AP, TX:Precip

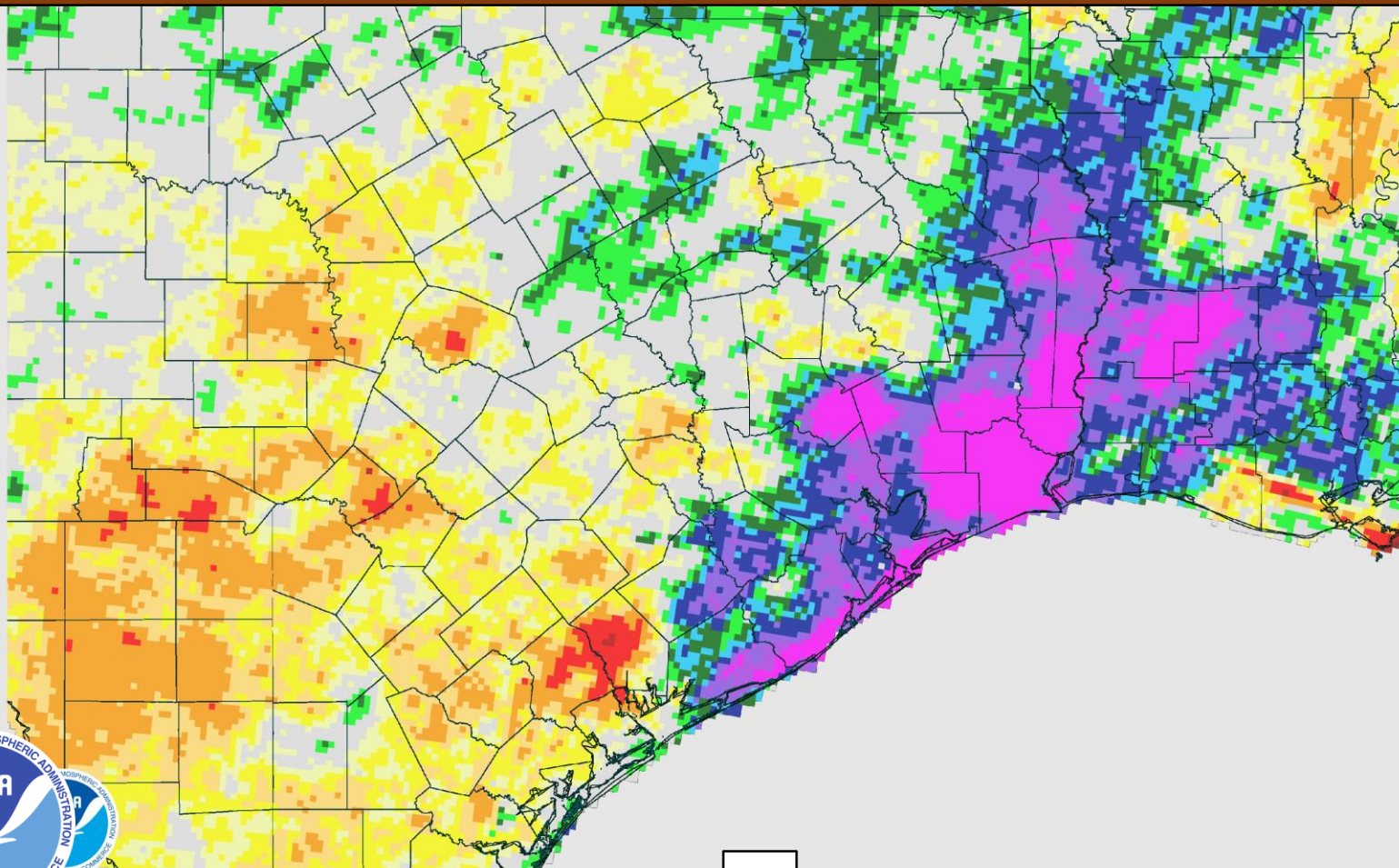


# 2019 Annual Precipitation Images

## Total Precipitation



## Departure from Normal



# Climate Primary Site History

## Galveston (GLS)

*Records for Galveston are from observations at the following locations: 67-69 Strand (April 1, 1871 - Aug 31, 1874); 23rd and the Strand (Sep 1, 1874 - July 29, 1878), 1.75 miles WSW of the previous location; the Custom House at Bath Street and the Strand (July 30, 1878 - May 8, 1882); Colorado and Sante Fe Railroad Building at 25th and the Strand (May 9, 1882 - March 14, 1883); back to the Custom House which later became the Cotton Exchange Building (March 15, 1883 - June 24, 1898), about a 1/3 of a mile E of the previous Custom House location; The Levy Building at 2223 Market Street (June 25, 1898 - Nov 26, 1900); the Trust Building at Tremont and Post Office Streets (Nov 27, 1900 - June 24, 1946), one-quarter mile south of the Levy Building; the U.S. Post Office Building at 601 Rosenberg (June 25, 1946 - 1994); Scholes Field (January 1995 to present).*

## Houston Hobby (HOU)

*Records are based upon observations beginning in August 1931.*

## City of Houston (IAH)

*Records for the City of Houston are from observations at the following locations: Cotton Station from July 1881 through September 1909, Stewart Building at Preston and Fannin from September 1909 through February 1926, Shell Building at Texas and Fannin from March 1926 through August 1938, Federal Building at Franklin and Fannin from August 1938 through May 1969, Intercontinental Airport from June 1969 to the present .*

## College Station (CLL)

*Records from 1893 through July 1951 are based on observations taken at the Texas Agriculture Experiment COOP Station main farm located 6 miles southwest of College Station. Records from August 1951 through the present are based on observations taken at Easterwood field. Normal temperatures are calculated from 1981 to 2000 period.*

