SEPTEMBER 2020 WEATHER SUMMARY
FOR THE CENTRAL CALIFORNIA INTERIOR

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This month was generally warmer than average (Fig 2) with little precipitation (Fig 1) across the region. The San Joaquin Valley was mainly much warmer than average (Table 1), though triple digit heat was significantly less frequent than in August. Elsewhere, the month was warmer than average with below average precipitation due to infrequent moisture influxes from the tropics and a prevailing pattern of dry southwest flow aloft with periods of strong high pressure. This pattern was favorable for large wildfires to develop and continue to burn in the mountains for quite some time.

Table 1 – September 2020 Statistics
NWS Hanford, CA ASOS Sites

Location	Monthly Average Temp (deg F)	Departure from Average (deg F)	Temperature Rank	Total Monthly Precipitation (inches)	Departure from Normal (inches)	Precipitation Rank
Bakersfield	80.6	+3.6	10th warmest	0.00	-0.08	Lowest
Fresno	79.8	+3.6	6th warmest	T	-0.18	2nd Lowest
Hanford	76.7	+3.4	10th warmest	0.00	-0.17	Lowest
Madera	75.5	+2.8	20th warmest	T	-0.25	2nd Lowest
Merced	76.3	+4.4	7th warmest	0.00	-0.30	Lowest

Number of Days with Maximum Temperature of 100 Degrees or Above for September 2020 and Total for 2020 (May-September)

Bakersfield – September total: 4 (average 4); 2020 total so far: 49 (average 33)

Fresno – September total: 4 (average 4); 2020 total so far: 53 (average 37)

Hanford – September total: 4 (average 2); 2020 total so far: 46 (average 23)

Madera – September total: 4 (average 3); 2020 total so far: 40 (average 26)

Merced – September total: 4 (average 3); 2020 total so far: 32 (average 23)

September began with warmer than average temperatures, though daily highs remained in the mid to upper 90s in the San Joaquin Valley during the 1st through the 4th. Thus, highs were around 2-5 degrees above typical values in this area. Elsewhere, triple digit heat persisted in the Kern County desert during this period, with even hotter temperatures for the next several days.

Hot and dry conditions prevailed in Central California during the 5th through the 7th, or on Labor Day weekend. Daytime highs and morning lows reached record values at some locations in the Central Valley on these days. A high of 110 degrees was measured at Merced on the 7th, which tied for the hottest day in September on record (with two other days, Sep 8th, 1904 and Sep 19th, 1913). Morning low temperatures reached 80 degrees, or just below, on the 7th and 8th at both Bakersfield and Fresno. Humidity was very low over the higher terrain and led to rapid fire growth, as well as issuance of Red Flag Warnings over the mountain areas, on the 5th through the 8th.

The Sierra Nevada was especially primed for explosive fire growth in both Fresno and Madera Counties, or at Huntington lake, Shaver Lake, Auberry, and North Fork. The Creek Fire was discovered on the evening of the 4th to the southwest of Huntington Lake (along Big Creek) and rapidly grew to around 1,000 acres during the overnight hours into the morning of the 5th. The fire dramatically grew on the afternoon of the 5th to as much as 36,000 acres, and the smoke column developed its own thunderstorm with rotating updrafts. Lightning was detected again on the afternoon of the 6th above the fire, and this fire had burned over 70,000 acres by then. The fire continued its dramatic growth over the next few days, and the fire had burned about 135,000 acres by the evening of the 7th. By the 9th, the fire grew to a whopping 173,000 acres. This fire produced a tremendous amount of smoke and prevented daytime highs from reaching their full potential at many San Joaquin Valley locations.

On the 9th, high temperatures lowered by several degrees, and morning lows had returned to near average. However, daytime highs were still near to slightly above average, despite the persistent heavy smoke due to the Creek Fire and other surrounding wildfires over the region.

On the 10th through the 12th, temperatures rose to below average values with nighttime lows near or slightly below average. The wildfire smoke continued to thicken over the San Joaquin Valley and much of Central California and prevented much of the solar radiation from reaching the ground, while an atmospheric inversion layer remained over the Central Valley (An inversion layer is a temperature layer that warms with increasing height above the ground and acts as a lid to trap air in the lower levels of the atmosphere. This is a typically stable pattern with mainly sinking air. Inversion layers are common during the winter months and increase the likelihood of dense fog development, although inversions also develop in the summertime quite frequently. Usually warmer and drier air results in the summer). As a result, the San Joaquin Valley, the west side hills, and the lower Sierra Nevada foothills only warmed to as high as the lower to mid-80s during this period. Temperatures even lowered in the Kern County desert, but daily highs remained mainly in the 90s. The upper-level high pressure ridge briefly moved east of Central California, but dry conditions continued.

During the 13th and the next few days, temperatures began to warm closer to seasonal average values as high pressure built over the southwestern United States. The light winds and sinking air due to the high pressure allowed wildfire smoke over the Central Valley to increase and worsen air quality to unhealthy levels. The presence of the smoke prevented temperatures from warming significantly, so highs were near average or slightly above during this period.

On the 17th, mid and high clouds arrived due to a southwest flow aloft ahead of a low-pressure system approaching the Pacific Northwest. This southwest flow was more noticeable over the Sierra Nevada, including at the ongoing wildfires (such as the Creek and SQF Complex wildfires). As a result, temperatures began to lower; however, the smoke layer persisted over these areas for another couple of days, as well as the remainder of NWS Hanford's service area.

High pressure once again built over the region, so temperatures rose back to several degrees above average during the 20th through the 23rd. Many locations topped into the mid to upper 90s in the San Joaquin Valley and Kern County desert areas during this time. A downward trend in temperatures soon followed, but was brief.

On the 24th and 25th, a decrease in temperatures occurred due to a low-pressure system that passed mainly north of our area. However, it was sufficient to increase winds in the Kern County desert, as well as in the adjacent mountains during the night of the 23rd into the morning of the 24th and again on the evening of the 24th through the morning of the 25th below the passes and canyons. The strongest gusts reached around 45 miles per hour in these areas. Temperatures further decreased on the 25th to near to slightly below average with little change on the 26th.

Temperatures rose again on the 27th through the 30th; this time, highs reached well above normal values for this time of year. Triple digit heat returned to the San Joaquin Valley on the 29th, as highs reached around 100 to 103 degrees at quite a few locations. On that day, some record high temperatures were tied or broken, including at Hanford, Madera, and Merced. The culprit was a strong high-pressure system that built over much of the West Coast. For the final day of September, high temperatures remained above average, but were not as warm in the lower elevations and near the Sierra Nevada fires, as winds were generally weak and allowed smoke from the fires to flow westward and provide hazy skies. However, very warm temperatures and dry conditions prevailed where the smoke was not as thick.

Table 2 – Seasonal Precipitation for ASOS locations (ending on September 30th)

Location	**Since Jan 1st (inches)**	**Departure from Average (inches)**	**Since Jul 1st (inches)***	**Departure from Average (inches)**	**Since Oct 1st (inches)****	**Departure from Average (inches)**
Bakersfield	4.61	+0.10	T	-0.12	7.20	+0.73
Fresno	4.75	-3.28	T	-0.19	7.63	-3.87
Hanford	4.31	-2.66	0.00	-0.21	6.62	-3.48
Madera	3.76	-4.53	T	-0.29	6.02	-6.00
Merced	4.58	-4.41	0.00	-0.31	9.54	-2.96

* Rain Year 2020-2021: July 1st, 2020 thru Jun 30th, 2021, T = trace amount of precipitation

*Water Year 2019-2020: Oct 1st, 2019 thru Sep 30th, 2020

Table 3 – Warmest High Temperatures and Coolest Low Temperatures of the Month for ASOS locations				
Location	**High**	**Date(s)**	**Low**	**Date(s)**
Bakersfield	105	6th	60	11th
Fresno	106	7th	61	12th
Hanford	104	5th & 7th	53	12th & 23rd
Madera	107	6th & 7th	50	23rd
Merced	110	7th	52	23rd

Daily Records Set During September 2020

Bakersfield –

6th - Record high minimum temperature of 78 degrees set (old record of 77 degrees in 1975).
7th – Record high minimum temperature of 80 degrees set (old record of 78 degrees in 1977).
8th – Record high minimum temperature of 78 degrees tied (record also set in 1977).

Fresno –

5th – Record high maximum temperature of 105 degrees tied (record also set in 1984).
7th – Record high minimum temperature of 77 degrees set (old record of 73 degrees in 1998).
8th – Record high minimum temperature of 76 degrees set (old record of 74 degrees in 1998).
29th – Record high maximum temperature of 102 degrees tied (record also set in 1992).

Hanford –

29th – Record high maximum temperature of 102 degrees set (old record of 100 degrees in 1946).

Madera –

6th – Record high maximum temperature of 107 degrees tied (old record set for the date in 1950).
29th – Record high maximum temperature of 102 degrees set (old record of 101 degrees in 1992).

Merced –

7th – Record high maximum temperature of 110 degrees set (old record of 109 degrees set in 1904). Record high minimum temperature of 71 degrees reached (old record of 69 degrees in 1904).

Fig 1 – Departure from Average Temperature for September 2020

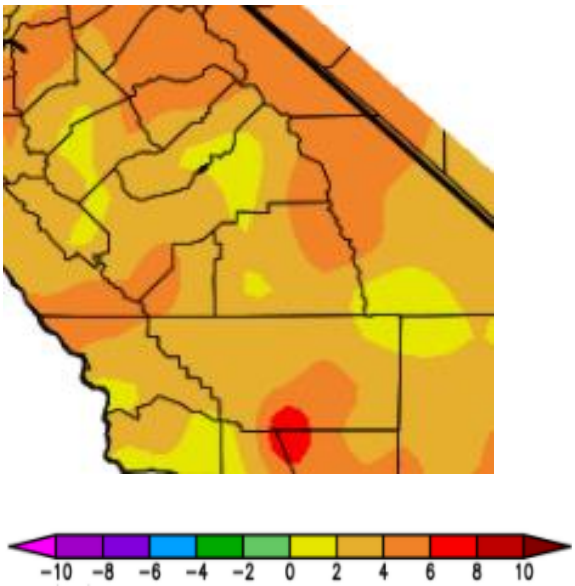
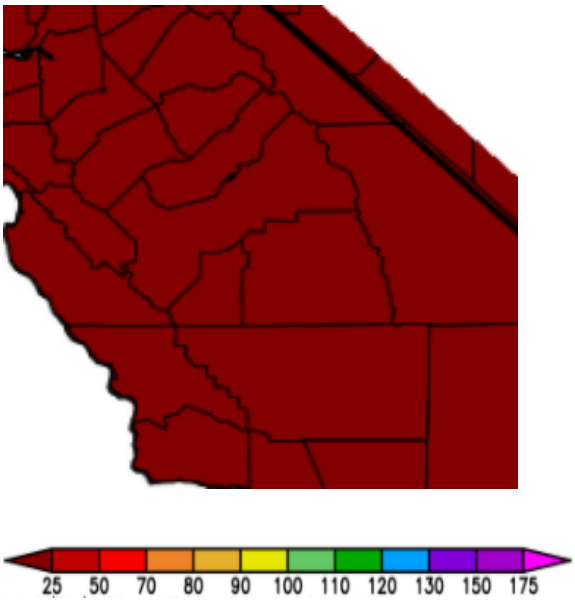


Fig 2 – Percent of Average Precipitation for September 2020



*Images above (i.e., Figures 1-2) courtesy of Western Region Climate Center