JANUARY 2017 WEATHER SUMMARY
FOR THE CENTRAL CALIFORNIA INTERIOR

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The calendar year of 2017 began with a departing storm system, and weather became quiet by daybreak of New Year's Day. Dense fog in the San Joaquin Valley was basically absent for the first day, as well as during the next couple of days. Zonal, or westerly flow, was present over the region, so no significant area of high pressure allowed for development of fog during this period.

On the afternoon of the 3rd, a low pressure system brought the first measurable precipitation of the calendar year and generally started light. During the following evening and overnight hours, the precipitation increased, as more moisture streamed inland from the Pacific Ocean. The moisture did not include a significant source from the tropics, so rainfall rates generally did not exceed around 0.20 to 0.30 inch per hour, or more typical of wintertime storm systems. Around one to two inches of rain fell in the areas that received the most rainfall for the period beginning on the afternoon of the 3rd and ending in the morning of the 4th.

Dense fog briefly returned to some locations the San Joaquin Valley, such as Hanford and Fresno, by the morning of the 5th. Locations to the south, such as Kern County, were still getting rain that morning, so dense fog development was inhibited in these areas. Generally tranquil weather prevailed during the daytime of the 5th and again the following day with near average afternoon high temperatures. The night of the 6th into the morning of the 7th was relatively cold due to generally clear skies, and low temperatures fell below freezing in quite a few locations in the San Joaquin Valley. The next storm arrived by the morning of the 7th, and this was the first in a series of several systems over the next week.

On the 7th, rain fell in much of the region due to an atmospheric river, or a plume of warm, moist air that was concentrated on much of California. Temperatures began to rise a little with this system, as snow levels were initially around 7,500 feet and rose to above 9,000 feet by the evening. Rainfall amounts exceeded a half inch in many locations in the San Joaquin Valley and reached around two to three inches in the Sierra Nevada and adjacent foothills. The second system, also along with an atmospheric river, arrived on the 8th and brought similar or higher rainfall amounts; however, this time the snow levels rose to above 10,000 feet. The precipitation began by the afternoon and evening hours; however, the temperatures rose to well above average due to strong southerly winds ahead of the system. Quite a few locations reached record high temperatures, including both the daily minimum and maximum temperatures, especially in the Central Valley. High temperatures in the San Joaquin Valley reached well in the 70s, with the

warmest locations in the southern portions such as Hanford and Bakersfield. Most valley locations only had lows in the mid to upper 50s due to the warm nature of this system. Also, some gusty winds occurred in much of the Central Valley; the strongest winds were reported in Madera (38 mph gust) and Merced (31 mph gust), with even stronger gusts (around 45-50 mph) over the hills along the west side of the San Joaquin Valley. River and creek flooding began to occur late in the evening on the 8th and into the morning of the 9th. The Merced River at Pohono Bridge in Yosemite National Park had risen to above moderate flood stage during the late night hours of the 8th and into the early morning hours in the 9th. A mobile home park located along Willow Creek, including just to the south of Bass Lake, and the community of North Fork, were evacuated because of overflowing banks due to heavy rain combined with a release of water through the Crane Flat Dam at Bass Lake. In addition, there were water releases through Friant Dam from Millerton Lake, as the reservoir had filled significantly due to recent storms, including during the previous month. Fresno had already received its average rainfall for the entire month just before midnight on the 9th. An unsettled weather pattern continued for the next several days, or until the 13th.

By daybreak on the 9th, the atmospheric river moved to the southeast and exited the region, and cooler air had begun to settle in. However, the weather remained unsettled for much of the day. As the cooler air moved in during the morning hours, some lines of heavy showers and thunderstorms developed over Merced, Madera, and moved eastward into the foothills. Additional showers moved over the San Joaquin Valley later that morning and into the early afternoon. Snow continued to fall in the higher elevations of the Sierra Nevada while snow levels lowered to around 6,000 feet by the afternoon. The system that passed over the region on the 10th-11th was colder and lowered snow levels to around 5,000 feet, and it brought generally lesser amounts of precipitation compared to the previous one. However, rainfall associated with this system was falling on areas already experiencing flooding, and it was falling as runoff due to wet soils unable to absorb the additional rainfall. Some levees were reported broken or breached, especially in Merced County. Another, even colder, system brought additional rainfall and mountain snow on the 12th-13th. More thunderstorms developed on the afternoon of the 12th and produced local flooding in both the Sierra Nevada foothills and in the San Joaquin Valley as the airmass became unstable due to relatively cold air aloft. One thunderstorm produced a cold air funnel, including several miles south of Madera. On the evening of the 12th and into the 13th, the passes in Kern County received at least some light snow down to around 3,500 feet. However, locations to the north of Kern County had cleared out overnight and allowed for formation of fog and low stratus clouds to develop over the San Joaquin Valley for much of the day on the 13th. Low clouds also continued to persist over the Sierra Nevada that day. With this period of storm activity, almost every location received above average precipitation, even higher than the average total for the entire month.

Fog and low stratus clouds became the general rule over the San Joaquin Valley from the 14th until the 17th. High temperatures generally remained in the 40s to lower 50s in much of the valley during this period. Low temperatures were generally in the 40s when the low clouds persisted, except on the night of the 16th and morning of the 17th, when lows fell into the lower 30s due to more clearing. Locations in the mountains and desert were generally clear throughout the period with sunny skies and relatively warm days above the low clouds.

The next active weather event began on the 19th and continued until the 23rd due to a series of three storm systems. The first low pressure system arrived on the evening of the 18th and brought showers overnight over much of the region. The colder air due to the trough of low pressure arrived on the 19th, and the air was sufficiently unstable for thunderstorms to develop over the San Joaquin Valley and into the Sierra Nevada foothills during the afternoon. Some small hail was reported in the Sierra Nevada foothills. Some isolated thunderstorms moved over the west side of the San Joaquin Valley, including over Lemoore and Huron. The next system moved over the area during the afternoon and evening of the 20th, and the air was sufficiently unstable for thunderstorm development over the San Joaquin Valley. The thunderstorms produced small hail (mainly pea-sized) that covered the ground up to an inch deep in Fresno during the early evening hours. Snow levels fell to around 4,000 feet. Showers continued into the early morning hours of the 21st, and there was a brief break in shower activity in some areas. On the 22nd, the third system of the series arrived and brought additional precipitation to the region. The airmass was generally warmer on this day, due to a subtropical fetch of moisture, while snow levels to around 5,000 feet. In addition, strong and gusty southerly winds prevailed during the morning and afternoon hours of the 22nd, especially in the south end of the San Joaquin Valley and through the Grapevine pass along Interstate 5 in Kern County. Gusts at the CHP station at Grapevine reached over 60 miles per hour, and an automated station reported gusts over 100 miles per hour on Grapevine Peak, or above Interstate 5 to the east of the pass, during the late morning hours. On the 23rd, colder air arrived behind the system and was once again unstable enough for afternoon and evening showers and thunderstorms to develop over the region, including the San Joaquin Valley. The skies had finally cleared overnight, and temperatures fell to around freezing by the morning of the 24th in the San Joaquin Valley. Snow levels for much of this event were around 4,500 to 5,000 feet, except fell to around 3,000 feet when colder air behind each system arrived. Snow over the Sierra Nevada measured mainly from around two inches to over one foot in the highest elevations with each system for this event. Thus, snowfall for this entire event ranged from around six inches to over three feet.

As for the last week of the month, or the 25th through the 31st, high pressure built over the region, and temperatures began a warming trend. Dense fog development in the San Joaquin Valley became more widespread by the night of the 29th. Unfortunately, the fog was dense enough to cause numerous (over 50) vehicle collisions near Hanford and Lemoore during the morning of the 31st, including during the peak time of the morning commute. High temperatures reached

above average in the Sierra Nevada foothills, as well as the San Joaquin Valley and Kern County desert areas. However, morning low temperatures were around average to below average in the San Joaquin Valley during this last week of the month.

The month was overall warmer than average with much above average precipitation. Fresno had its third wettest January on record, while Bakersfield had its fifth wettest. Every reporting station in NWS Hanford's warning and forecast area received at least 200 percent of average precipitation (or more than double) for this month. Some locations, especially in the Sierra Nevada, reached above 400 percent of average in terms of accumulated precipitation. Many Sierra Nevada stations received anywhere from 20 to 36 inches of precipitation for the entire month. Total snowfall for the month exceeded well above 100 inches along the Sierra Nevada crest, or over 180 percent of average, despite some warm systems that produced heavy rainfall at elevations above the 8,000 foot level (and in some cases above 10,000 feet).

Table 1 - January 2017 Summary Statistics for ASOS locations

Location	Monthly Average Temp (deg F)	Departure From Average (deg F)	Total Monthly Precipitation (inches)	Departure From Normal (inches)
Bakersfield	50.1	+2.3	2.76	+1.60
Fresno	48.1	+1.5	5.50	+3.31
Hanford	47.9	+2.6	3.37	+1.33
Madera	48.2	+2.6	5.17	+2.72
Merced	46.2	+1.2	5.61	+3.00

Number of Days with Minimum Temperature of 32 Degrees or Lower

Bakersfield – 2 (Average: 5 days)
Fresno – 0 (Average: 6 days)

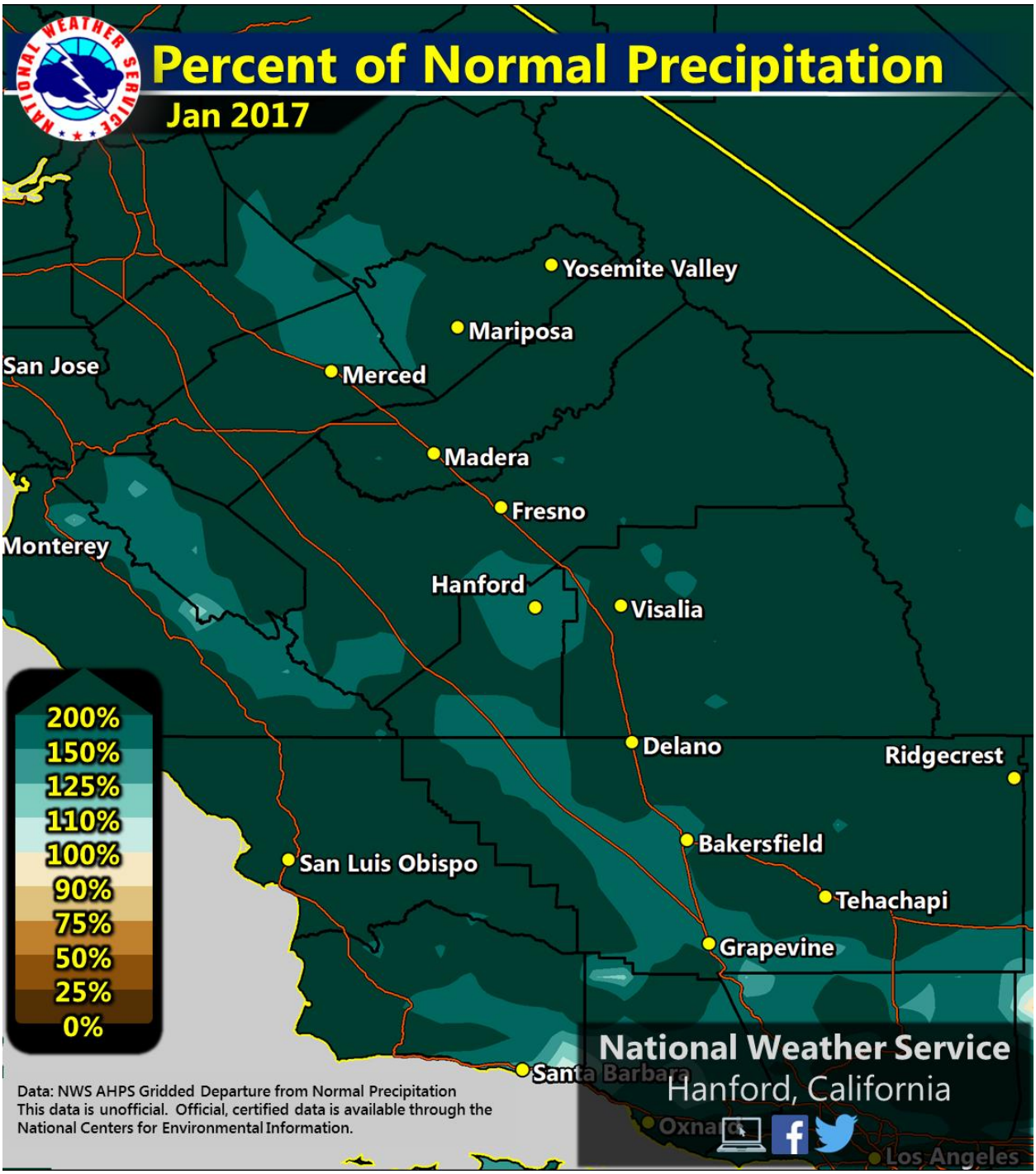
Temperature/Precipitation Rankings for January

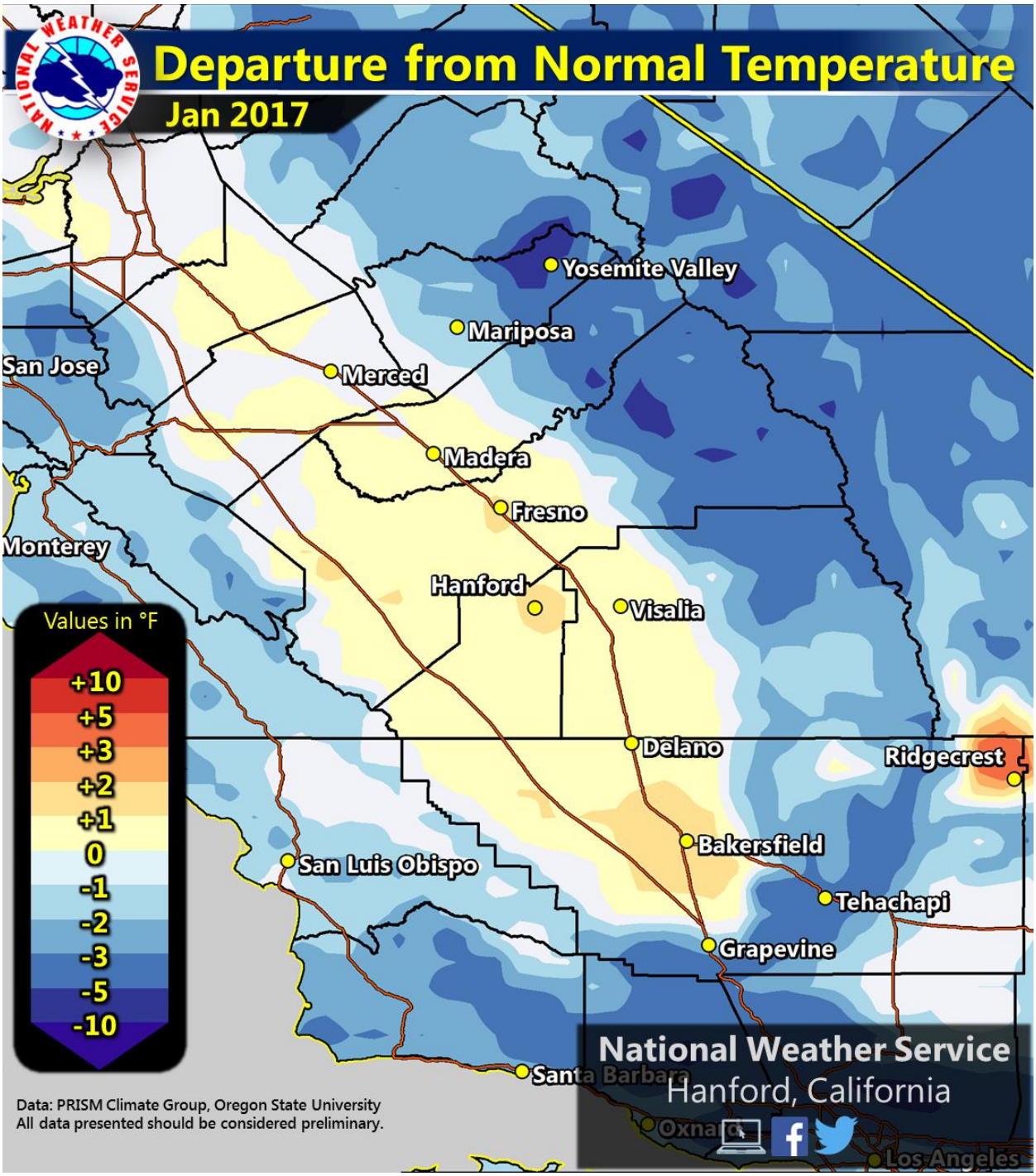
Bakersfield – 25th warmest January on record; 5th wettest January on record
Fresno – 35th warmest January on record; 3rd wettest January on record

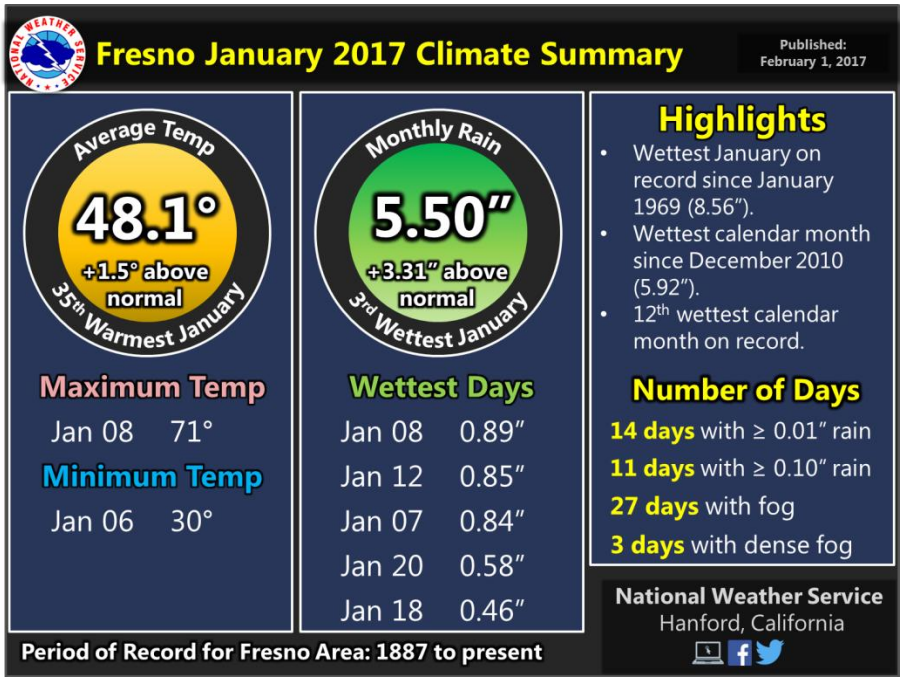
Top 10 Wettest Januarys on Record:

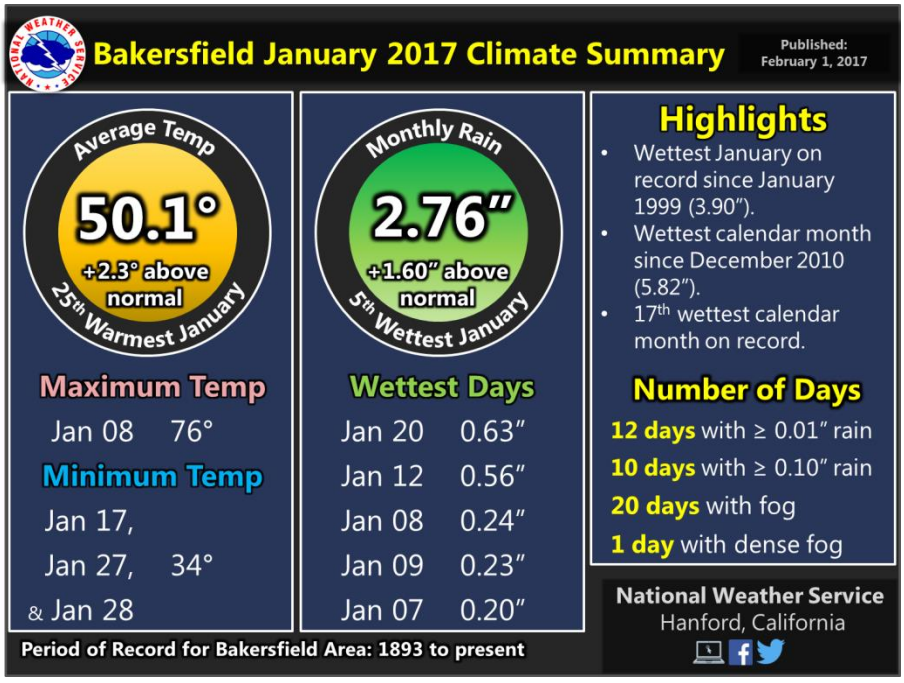
Bakersfield:
1. 3.90”/1999
2. 3.84”/1933
3. 3.24”/1914
4. 2.87”/1943
5. 2.76”/2017
6. 2.70”/1916
7. 2.60”/1980
8. 2.53”/1895
9. 2.51”/2005
10. 2.47”/1952

Fresno:
1. 8.56”/1969
2. 5.89”/1940
3. 5.50”/2017
4. 5.42”/1995
5. 5.18”/1993
6. 5.17”/1916
7. 5.14”/1983
8. 4.94”/1914
9. 4.44”/1909
10. 4.42”/2016


Percent of Normal Precipitation
Jan 2017
Yosemite Valley
Mariposa
San Jose
Merced
Madera
Fresno
Monterey
Hanford
Visalia
200%
150%
125%
110%
100%
90%
75%
50%
25%
0%
Delano
Ridgecrest
Bakersfield
San Luis Obispo
Tehachapi
Grapevine
Santa Barbara
Oxnard
Los Angeles
National Weather Service
Hanford, California
Data: NWS AHPS Gridded Departure from Normal Precipitation
This data is unofficial. Official, certified data is available through the
National Centers for Environmental Information.


Departure from Normal Temperature
Jan 2017
Yosemite Valley
Mariposa
San Jose
Merced
Madera
Fresno
Monterey
Hanford
Visalia
Values in °F
+10
+5
+3
+2
+1
0
-1
-2
-3
-5
-10
Delano
Ridgecrest
Bakersfield
San Luis Obispo
Tehachapi
Grapevine
Santa Barbara
Oxnard
Los Angeles
National Weather Service
Hanford, California
Data: PRISM Climate Group, Oregon State University
All data presented should be considered preliminary.


Fresno January 2017 Climate Summary
Published: February 1, 2017
Average Temp
48.1°
+1.5° above normal
35th Warmest January
Monthly Rain
5.50"
+3.31" above normal
3rd Wettest January
Highlights
• Wettest January on record since January 1969 (8.56").
• Wettest calendar month since December 2010 (5.92").
• 12th wettest calendar month on record.
Maximum Temp
Jan 08 71°
Minimum Temp
Jan 06 30°
Wettest Days
Jan 08 0.89"
Jan 12 0.85"
Jan 07 0.84"
Jan 20 0.58"
Jan 18 0.46"
Number of Days
14 days with ≥ 0.01" rain
11 days with ≥ 0.10" rain
27 days with fog
3 days with dense fog
Period of Record for Fresno Area: 1887 to present
National Weather Service
Hanford, California


Bakersfield January 2017 Climate Summary
Published: February 1, 2017
Average Temp
50.1°
+2.3° above normal
25th Warmest January
Monthly Rain
2.76"
+1.60" above normal
5th Wettest January
Highlights
• Wettest January on record since January 1999 (3.90").
• Wettest calendar month since December 2010 (5.82").
• 17th wettest calendar month on record.
Maximum Temp
Jan 08 76°
Minimum Temp
Jan 17, Jan 27, & Jan 28 34°
Wettest Days
Jan 20 0.63"
Jan 12 0.56"
Jan 08 0.24"
Jan 09 0.23"
Jan 07 0.20"
Number of Days
12 days with ≥ 0.01" rain
10 days with ≥ 0.10" rain
20 days with fog
1 day with dense fog
Period of Record for Bakersfield Area: 1893 to present
National Weather Service
Hanford, California