NWS FORM E-5 U.S. DEPARTMENT OF COMMERCE HYDROLOGIC SERVICE AREA:
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE **SAN JOAQUIN VALLEY - HANFORD , CA**

REPORT FOR:

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

MONTH: **DECEMBER** YEAR: **2016**

TO: Hydrometeorological Information Center, W/OH12x1
National Weather Service/Office of Hydrology
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SIGNATURE:
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(In Charge of Hydrologic Service Area)

DATE: January 6, 2017

When no flooding occurs, include miscellaneous river conditions, such as significant rises, record low stages, ice conditions, snow cover, droughts and hydrologic products issued (WSOM E-41).

X	An **X** inside this box indicates that no flooding occurred for the month within this hydrologic service area.

Five storm systems brought a generous amount of water into the central California interior this month, particularly over the eastern half of the HSA where precipitation averaged well above normal this December. A graphical map that depicts the percentage of normal precipitation this month across central California is provided at the end of this summary.

The first storm tapped into an abundance of subtropical moisture. Although its moisture plume was aimed primarily at northern California, the southern fringes of this atmospheric river brought copious precipitation to Merced County and Mariposa County from the 8th through the 11th. Considering the tropical origin of the air mass, snow levels remained above 9,000 feet during this period and only the highest peaks of the Sierra received snow. Three-day rain totals in the San Joaquin Valley ranged from only a few hundredths of an inch at the south end to nearly three quarters of an inch in Merced County. In the mountains, up to a half inch of rain fell in Kern County and Tulare County while the foothills and higher elevations of the Sierra from Fresno County northward tallied 1 to as much as 3 inches of precipitation.

The storm system that followed during the middle of the month also had a tropical moisture connection. Its atmospheric river targeted central and southern California from the 15th through the 16th . This storm delivered a substantial amount of rain to the eastern half of the HSA excluding the Kern County desert. Rain totals in the San Joaquin Valley ranged from less than a tenth of an inch at the south end and west side to nearly two inches on the east side. The foothills and mountains of the HSA fared quite well with 1 to 4 inch rain totals. Some locations in the Sierra below 8,000 feet received as much as 8 inches of rain. Above that elevation, precipitation fell as snow with accumulations of up to 3 feet in the high Sierra. Fortunately the bulk of this storm system's rain percolated readily into the ground and there were only a few instances of minor road flooding in the San Joaquin Valley, Sierra foothills and the Kern County mountains during the afternoon and evening hours of the 15th. Had it not been for extremely dry antecedent soil conditions, flooding would most certainly have been more problematic. Nonetheless, the storm's heavy rain produced quick rises along many small streams and rivers in the foothills and mountains. There was a threat of flooding on the upper Merced River in Yosemite National Park at the height of the storm. Fortunately, the upper Merced River did not flood and the forecast point at Pohono Bridge peaked 1.4 feet below flood stage during the early morning hours of the 16th. Farther south, rain over the Cedar Fire burn scar washed ash and debris into the Kern River from the 16th into the 17th. Although the Kern River remained within its banks, it did prompt the closure of a water treatment plant near the river due to concerns that heavy ash could clog water filters. Brisk downslope southwesterly winds associated with this storm system in the Kern County desert mitigated rain amounts below the passes even though a few automated precipitation gages picked up as much as a couple hundredths of an inch of rain.

The third storm system was a quick hitter, and it packed a wet wallop two days before Christmas. Unlike its predecessors, this storm had no tropical connection and instead originated in the Gulf of Alaska. Although

the wet weather it brought was welcome, it came at a most inopportune time for holiday motorists, especially in the valley and mountainous areas of Kern County. Heavy rain produced flooding in the Bakersfield area Christmas Eve and forced a few roads to close in the downtown area. The 0.91 inches of rain that deluged Meadows Field airport on the 23rd established a new 24-hour rainfall record on the 24th. Otherwise, the storm brought generous precipitation to much of the central California interior with totals ranging from a third of an inch to nearly two inches throughout the HSA. Meanwhile, wintry weather over the higher elevations created hazardous driving conditions and long travel delays. When much colder air moved in behind this storm, snow levels dropped as low as 2500 feet on Christmas Eve and forced the shutdown of Interstate 5 through the Grapevine and Highway 58 through Tehachapi Pass for a period of several hours. Actually, Interstate 5 through the Grapevine was closed on two separate occasions due to accumulating snow and ice. The first time was during the early morning hours of the 24th then again later that evening.

The last two storms were back to back storms that impacted the central California interior on the 30th and 31st. The first one originated off the coast of Northern Baja and brought an influx of tropical moisture into the southern half of the HSA. Measurable rain was confined to areas mainly south of Fresno County. The heaviest rain fall in a narrow swath from Tulare County southwestward into the valley and mountainous areas of Kern County on the 30th where a quarter of an inch to nearly seven tenths of an inch was observed. Bakersfield's Meadows Field airport set another daily rainfall record on December 30th with a total of 0.44 inches. The fifth and final storm of the month was colder and brought more widespread precipitation into the HSA on the 31st. Kern County received the lion's share of precipitation from this storm with up to eight tenths of an inch of rain, which included the Mojave desert. Cold air associated with this storm brought snow levels down to 2500 feet on New Year's Eve and snarled holiday traffic over the Kern County mountain passes. Interstate 5 over the Grapevine and highway 58 through Tehachapi pass closed for a few hours on New Year's eve due to snow and ice. By the time this storm exited east of the Golden State, it left a general 3 to 7 inch snow accumulation in the Kern County mountains with up to a foot of snow at Alta Sierra ski resort east of Glennville (elevation 5700 feet).

Wet weather wasn't the only highlight of the month. The cold air masses that followed these storms left many central Californians shivering. In the San Joaquin Valley, several mornings dawned frosty cold. Practically every morning from the 17th through the 29th fell below freezing outside of the urban areas of the San Joaquin Valley. A particularly harsh invasion of Arctic air on the 19th was followed by a hard freeze in the San Joaquin Valley during the early morning hours of the 20th. Sunrise temperatures were in the low to mid 20s throughout much of the San Joaquin Valley that morning. Thermometer readings bottomed out in the teens in the Kern County desert prior to daybreak on the 20th. Edwards Air Force Base got the Jack Frost Award with a minimum temperature of 4 degrees above zero! The month also had its share of very mild days, particularly during the first two weeks. Most afternoons between the 8th and 16th saw high temperatures in the 60s to lower 70s in the San Joaquin Valley with minimum temperatures in the mid 40s to lower 50s and daily averages that were a good 7 to 15 degrees above normal. Overall, December 2016 averaged slightly warmer than normal throughout the HSA.

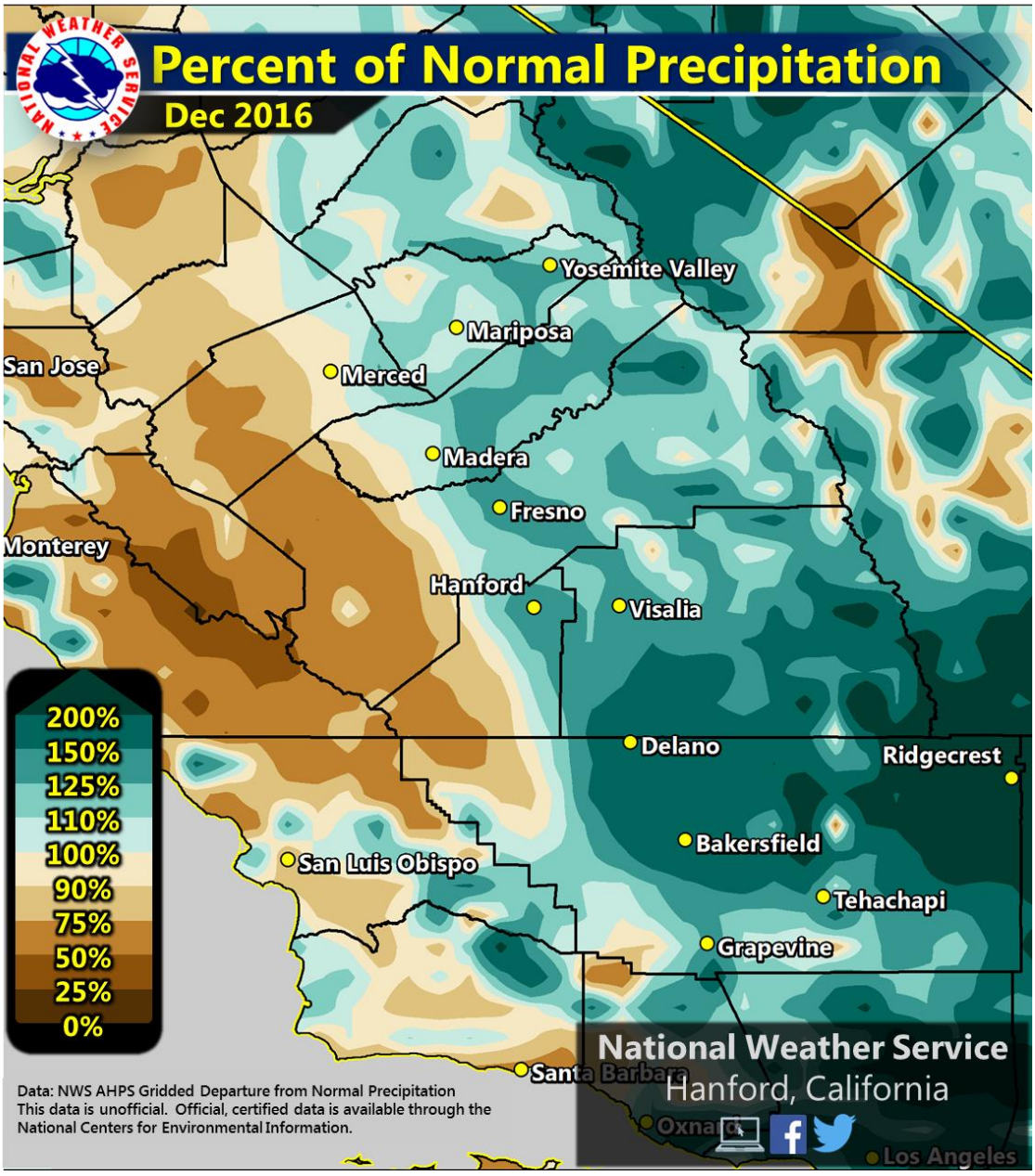
As 2016 drew to a close, most of the major reservoirs still had plenty of reserve space for water storage. Friant Dam and San Luis Reservoir had the most water in them with an average water capacity of 73 percent and 63 percent, respectively. The remaining reservoirs throughout the central California interior had much more room for water storage by the start of 2017, with an average water capacity of 32 percent of normal. There was an appreciable increase in the snowpack over the southern Sierra this month which averaged about 95 percent of normal by the start of the new year.

HYDROLOGIC PRODUCTS ISSUED THIS MONTH

Flash Flood Watch….Foothills and higher elevations of the Sierra	2145Z	13-DEC
Flood Warning….Merced River at Pohono Bridge	0346Z	14-DEC
Hydrologic Outlook….Flood/Flash Flood Potential for the foothills and higher elevations of the Sierra	1820Z	14-DEC
Urban/Small Stream Flood Advisory….Foothills of Mariposa/Madera counties	0152Z	15-DEC
Urban/Small Stream Flood Advisory….Sierra foothills north of Tulare County	0243Z	15-DEC
Urban/Small Stream Flood Advisory….Sierra foothills	0248Z	15-DEC
Flood Advisory….Foothills of Mariposa/Madera counties	0436Z	15-DEC
Urban/Small Stream Flood Advisory…Sierra foothills north of Tulare County	0551Z	15-DEC
Flash Flood Warning….Cedar Fire Burn Scar	0057Z	24-DEC
Small Stream Flood Advisory…Sierra foothills	0332Z	24-DEC
Arroyo/Small Stream Flood Advisory…Kern County Desert	0409Z	24-DEC
Urban/Small Stream Flood Advsory….Kern County portion of San Joaquin Valley	0600Z	24-DEC

Small Stream Flood Advisory…Tulare County foothills 0842Z 24-DEC
Areal Flood Advisory…San Joaquin Valley 2256Z 31-DEC

Note…numerous Flood/Flash Flood Statements were issued as follow up products
to the Flood/Flash Flood Warnings



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