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: **MARCH** YEAR: **2018**

TO: Hydrometeorological Information Center, W/OH12x1
National Weather Service/Office of Hydrology
1325 East-West Highway #7116
Silver Spring, MD 20910

SIGNATURE:
Kevin Durfee
(In Charge of Hydrologic Service Area)

DATE: April 2, 2018

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).

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

March, 2018 was extremely wet. It was also the first month of above normal precipitation across the entire HSA since February, 2017. Although the replenishment of water was certainly beneficial, it wasn't enough to completely erase the precipitation deficit of an otherwise severely dry winter and bring central California out of its drought. The maps below this summary are testimony to this fact and show an average precipitation deficit of 2 to as much as 15 inches throughout the central California interior since October 1st. As the end of the traditional wet season nears, much of the HSA has received less than 70 percent of its normal precipitation for the water year.

Nonetheless, it was a magnificent March, hydrologically, ending up as the 8th wettest on record in Bakersfield and the 10th wettest on record in Fresno. However, the proverbial quote that too much of a good thing usually is could not be farther from the truth this month. Yes, March, 2018's heavy rainfall produced flash flooding, washed out roads, water rescues on the San Joaquin River, mud slides, rock slides and debris flows over the higher terrain in addition to urban and small stream flooding from the 21st through the 22nd. A broad southwesterly flow aloft transported an atmospheric river of rich moisture-laden tropical air into the HSA during this period. A cold front that moved into this tropical air mass on the afternoon of the 22nd produced strong to locally severe thunderstorms in the San Joaquin Valley and adjacent foothills. Mild air associated with the atmospheric river raised snow levels as high as 9,000 feet during the height of the storm and the combination of heavy rain and melting snow over the higher elevations of the Sierra produced serious flooding in the foothills and in several locations of the San Joaquin Valley. Eastern Merced County and Mariposa County were areas of the HSA hardest hit by flooding where normally dry creeks turned into raging rivers in a matter of hours. As an example, Dry Creek near Snelling in eastern Merced County rose nearly 12 feet between 7 am PDT and 3 pm PDT on the 22nd with an increase in flow from 8 cfs in the morning to around 5400 cfs that afternoon.

Mud flows caused by 6 to 9 inches of rain in Mariposa County forced the closing of Highway 49 and flooded the communities of Mariposa and Catheys Valley in the vicinity of the Detwiler burn scar on the afternoon of the 22nd where two people were swept away by flood waters and presumed dead. Meanwhile, several roads became submerged by water in eastern Merced County on the 22nd as many small streams overflowed their banks. The severest flooding in Merced County occurred in the towns of Planada and Le Grange. Bear Creek at McKee Road and the Merced River at Pohono Bridge in Yosemite National Park crested approximately one foot below their respective flood stage during the evening of the 22nd. Farther south, heavy rain flooded several streets and a few underpasses in the northeast part of Fresno and in the city of Clovis. A few roads closed in the Bakersfield and Lamont areas due to flooding. By the time waters receded, the storm drenched the foothills and higher elevations with 3 to as much as 11 inches of rain. Up to 3 inches of rain soaked the San Joaquin Valley. In the Kern County mountains, up to 6 inches of rain caused a debris flow along State Route 223 near Highway 58 where several vehicles became stranded in mud. In the Sierra above 9,000 feet, snow fell to a depth of nearly 2.5 feet by the time precipitation diminished to flurries on the morning of the 23rd. Scattered thunderstorms lingered in the wake of this storm system on the 24th.

There were two other storms that brought generous precipitation into the HSA during the month. The first one originated In the Gulf of Alaska and it produced wintry weather over the mountains during the first four days of March. Up to 7 inches of rain fell from this storm in the Sierra below 6,000 feet. Meanwhile, up to 4 feet of snow accumulated over the higher elevations of the Sierra. However, as colder air infiltrated the HSA during the evening and overnight hours of March 3rd, rain ended as snow showers at elevations as low as 1,500 feet by the morning of the 4th and produced slick wintry travel in the Sierra foothills and through the Kern County mountain passes. Otherwise, rain totals of up to three quarters of an inch were observed in the Kern county mountains from this storm. In the San Joaquin Valley, 3-day rain totals ranged from a tenth of an inch to a half inch in Kern County and on the rain-shadowed west side to an inch or more over the northern half of the valley and the east side. Rain totals in the Kern County desert were mitigated by strong downslope winds where little more than a few hundredths of an inch fell. The only significant impact from this storm's heavy rainfall was the brief closure of Highway 49 in Mariposa County near Catheys Valley due to a mudslide.

The second storm came in three phases. A southwesterly flow of subtropical moisture occurred during the initial phase and primarily targeted the southern portion of the HSA on the 10th. Several waves of low pressure embedded in the strong southwesterly flow aloft characterized the second phase of this storm from the 12th through the 14th. Episodes of rain and high elevation snow during this period triggered mud slides in the vicinity of the Pier burn scar in Tulare County. Torrential rain closed a section of highway 190 east of Springville where a bridge became submerged by nearly 3 feet of water. Elsewhere, incidences of flooding occurred just east of Porterville and a section of Highway 178 west of Lake Isabella. Farther north, rock slides and mud slides closed Highway 41 near Fish Camp and a section of Highway 49 near the town of Bagby in Mariposa County. Snow levels gradually lowered during this period and ended up around 4500 feet by the evening of the 14th . The third and final phase of this storm occurred from the 16th through the 17th as upper level disturbances in the westerly flow aloft brought additional showers, isolated thunderstorms and mountain snow to the region. By the time wet weather ended, precipitation totals from this mid-month storm ranged from a quarter of an inch or less in the Kern County desert to nearly 3 inches in the foothills and mountains. Up to 6 inches of snow fell In the Tehachapi mountains above 5000 feet while higher elevations of the Sierra picked up as much as a foot of new snow.

Temperature-wise, March, 2018 averaged pretty close to normal. The last few days of the month were exceptionally warm with widespread 80-degree high temperatures in the San Joaquin Valley, lower foothills and the Kern County desert. In contrast, the normally coldest locations of the San Joaquin Valley were nipped by frost on the mornings of the 5th and 6th and again on the 17th, 18th and 19th. Although the highest elevations of the Sierra received a substantial amount of snow this month, the snowpack only averaged 50 percent of normal by the 1st of April. It's no surprise that the month's above normal precipitation produced a rise in water levels in all of the major reservoirs. As of April 1st, the water capacity of the reservoirs averaged around 60 percent of normal. That's an 8 percent increase since the end of February.

HYDROLOGIC PRODUCTS ISSUED THIS MONTH

Flash Flood Warnings*

Western Mariposa County and southern Tuolumne County	2136Z	13-MAR
Central Tulare County in the vicinity of the Pier burn scar	0058Z	14-MAR
Detwiler Burn Scar and the cities of Mariposa and Catheys Valley	2054Z	22-MAR
Detwiler Burn Scar, Mariposa, Catheys Valley…updated to Flash Flood Emergency!	2242Z	22-MAR
Pier Burn Scar in Tulare County	0003Z	23-MAR

*Note: Numerous Flash Flood Statements were issued as follow-ups to the initial Flash Flood Warnings.

Flood Warnings

Bear Creek @McKee Road in the city of Merced	0434Z	23-MAR

Flood/Flash Flood Watches

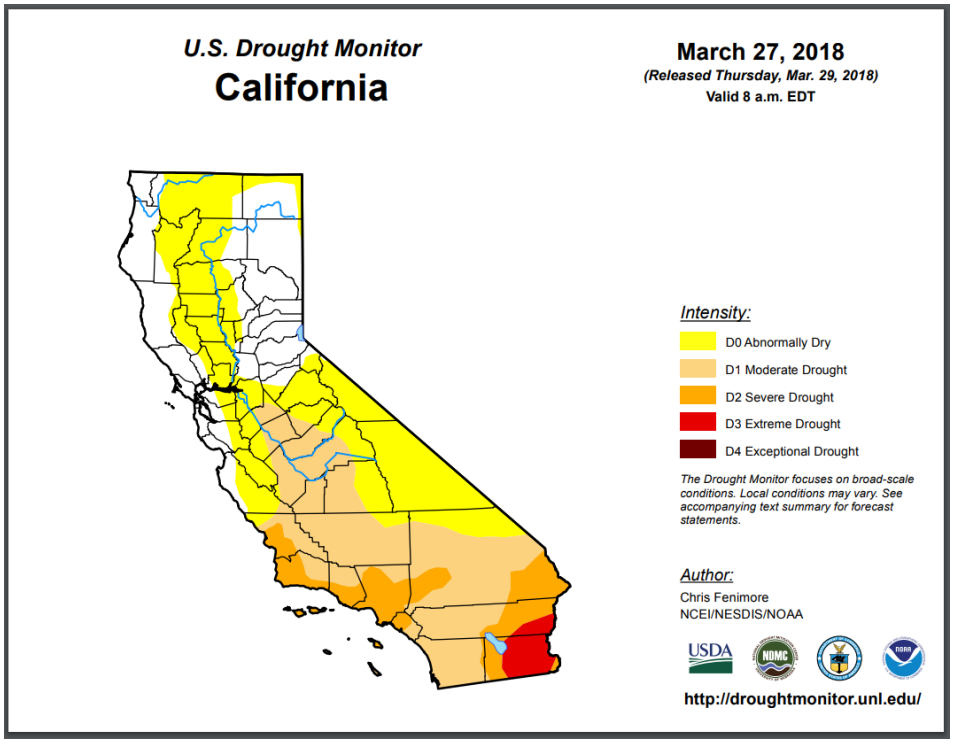
Flash Flood Watch…foothills and higher elevations of the Sierra	1656Z	19-MAR
Flash Flood Watch...extended for the foothills & higher elevations of the Sierra	0313Z	22-MAR

Flood Advisories

Flood Advisory for the Sierra foothills north of Tulare County	0742Z	02-MAR
Flood Advisory for the Sierra foothills north of Tulare County	1811Z	13-MAR
Flood Advisory for the Sierra foothills north of Tulare County	2112Z	13-MAR
Flood Advisory for the San Joaquin Valley and foothills of Fresno County	0018Z	15-MAR
Urban/Small Stream Flood Advisory for the San Joaquin Valley (Kern County, Tulare County)	0753Z	15-MAR
Flood Advisory for the south end of the San Joaquin Valley/Tehachapi mountains	0854Z	15-MAR
Flood Advisory for the San Joaquin Valley in Kern County	2049Z	21-MAR
Flood Advisory for the Kern County Desert	2120Z	21-MAR
Urban/Small Stream Flood Advisory for the San Joaquin Valley in Fresno County	1519Z	22-MAR
Small Stream Flood Advisory for Los Gatos Creek in southwest Fresno County	1641Z	22-MAR
Flood Advisory for the Sierra foothills north of Tulare County(Detwiler Burn Scar)	1901Z	22-MAR
Flood Advisory for Los Gatos Creek (extended)	2224Z	22-MAR
Flood Advisory for eastern Merced County and adjacent foothills	2227Z	22-MAR
Flood Advisory for the San Joaquin Valley in Fresno County and Madera County	0209Z	23-MAR
Urban/Small Stream Flood Advisory for the Kern County mountains	0404Z	23-MAR

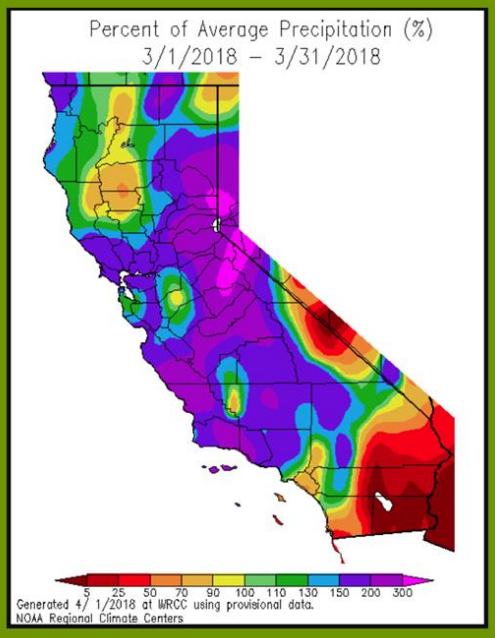
Hydrologic Statements

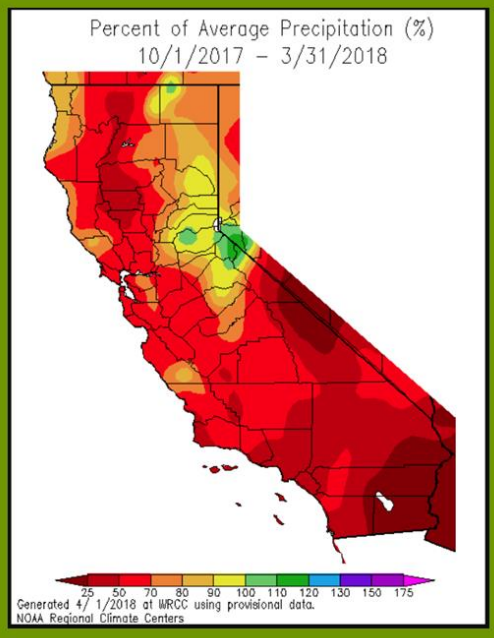
Bear Creek @McKee Road in the city of Merced	0409Z	22-MAR
Bear Creek @McKee Road in the city of Merced	0950Z	22-MAR
Bear Creek @McKee Road in the city of Merced	1603Z	22-MAR
Bear Creek @McKee Road in the city of Merced, Merced River @Pohono Bridge	2148Z	22-MAR
Bear Creek @McKee Road in the city of Merced	1552Z	23-MAR
Bear Creek @McKee Road in the city of Merced	2102Z	23-MAR
Bear Creek @McKee Road in the city of Merced	0221Z	24-MAR
Bear Creek @McKee Road in the city of Merced	1748Z	24-MAR



California Percentage of Normal Precipitation

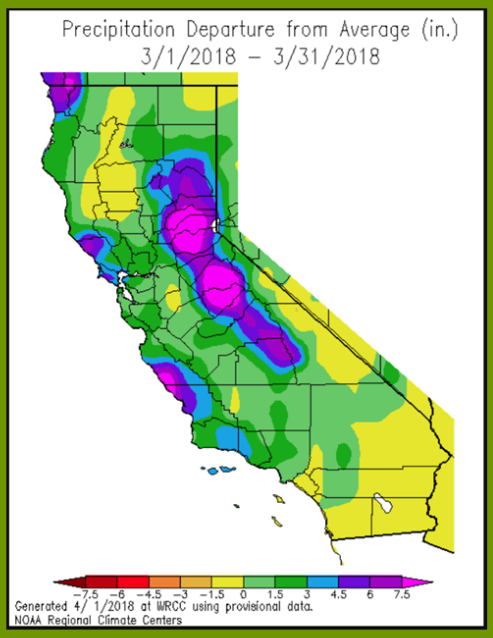
March, 2018 versus the Water Year so far

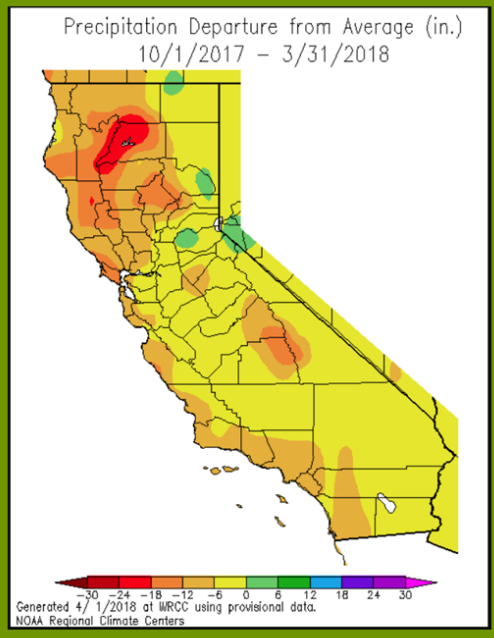




California Departure From Normal Precipitation

March, 2018 versus the Water Year so far





CC:

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