

NOTES ON THE RIVERS OF THE SACRAMENTO AND LOWER SAN JOAQUIN WATERSHEDS DURING THE MONTH OF DECEMBER, 1913.

By N. R. TAYLOR, Local Forecaster.

Sacramento watershed.—Practically every stream in this watershed averaged below the December normal stages. Until the beginning of the last decade the Sacramento River and most of the larger tributaries remained stationary at unusually low stages for the season. As a result of general rains over the entire watershed, which began between the 18th and 20th and continued until about the 26th, sharp rises occurred in all streams north of the American River, especially in the Sacramento between Knights Landing and Red Bluff. On the 22d the river at Red Bluff rose 6 feet, and during the 24 hours ending at 7 a. m. of the 23d there was a rise at Colusa from 3.6 to 15.3 feet. The crest of this rise reached Knights Landing on the morning of the 24th and Sacramento City during the evening of that date, resulting in rises of 5.8 and 4.8 feet, respectively, at the two points. On the 24th messages were sent to various points in Tehama and Colusa counties indicating the advisability of removing stock to higher ground. By the morning of the 26th the river at Colusa had reached a stage of 22.7 feet, followed by a gradual fall thence to the mouth of the American until the 30th.

General and, in many cases, heavy, warm rains set in over all sections of the Sacramento watershed on the 29th and 30th and extended to about the 6,500-foot level melting the most of the snow that had accumulated during the preceding month and the second decade in December. This condition resulted in heavy rises from the mouth of the Pit River to Red Bluff and justified the issuing of general flood warnings to all sections subject to overflow north of the mouth of the Feather, and advisory messages indicating heavy rises were sent to several points in the watershed of the Feather-Yuba. From 7 a. m. of the 30th to 4 p. m. of the 31st the river at Kennett rose from 2.1 to 26.6 feet, a rise of 24.5 feet in 33 hours. There was a rise of 13.2 and 6.2 feet, respectively, at Red Bluff and Colusa during the 24 hours ending at 7 a. m. of the 31st. Heavy rains in the Coast Range resulted in freshets in Stony, Cache, and Puta Creeks, especially Stony Creek, which reached a stage of 7.6 feet on the morning of the 31st.

At Oroville on the Feather and Marysville on the Yuba there were rises of 11.9 and 6.4 feet, respectively, during the 24 hours ending at 7 a. m. of the 31st. Lower down on the Feather, about a mile below the mouth of the Bear River, it rose 9.3 feet during the period mentioned above. The American at Folsom rose 10.6 feet during the 24 hours ending at 7 a. m. of the 31st.

By midnight of the 31st all streams in the Sacramento Valley north of the American were dangerously high and rising rapidly and the Sacramento from Red Bluff to Knights Landing was approaching the flood stage.

Lower San Joaquin watershed.—The general average of all streams in this watershed was slightly below the December normal. The rains in point of occurrence were practically coincident with those in the Sacramento Valley, but not so heavy. They resulted, however, in general though slight rises in all streams north of the Merced River. The greatest rises occurred in the Mokelumne, Cosumnes, and Calaveras rivers. Mormon Slough began running into Stockton Channel on the 17th and by the close of the month was carrying a stage of 6 feet. There were no dangerous freshets in any streams of the San Joaquin Valley during the month.

NOTES ON STREAMS OF THE UPPER SAN JOAQUIN WATERSHED.

By W. E. BONNETT, Local Forecaster.

Although the precipitation for December and for the season at the several stations in the upper San Joaquin watershed was considerably in excess of an average for the last seven years, it is interesting to note that there was practically no change in the stages of the streams until the close of the month. Rainfall in the higher foothills has been heavy and the snow cover in the mountains is substantial at the close of the year, but the run-off has been very small.

A moderate freshet was in progress at the end of December, but there was no near approach to flood stages in that month or in the first few days of January during which the rise continued. That the precipitation has been so abundant and the run-off so small is pleasing to irrigators, as the early snow by successive freezings and longer packing by its own weight yields a steadier and more lasting flow during the ensuing summer.

The Merced responded to the rains of the 22d to 26th with a moderate rise, and 1.1 feet, the highest stage at Merced Falls, was reached on the latter date. At Friant on the San Joaquin a moderate rise was just beginning on the 31st, and the range during the month was but one-half foot. However, a rise of 3.8 feet occurred at that point on January 1. The stage in the Kings was low and quite uniform until the last day of the month, when a rise of 2 feet brought the stage to 6.7 feet. There was a further rise to 8.8 feet at the Piedra station on January 1.