

# THE COURIER-TIMES

## REPORT OF ENGINEER GIVES A HISTORY OF SKAGIT RIVER FLOOD

James E. Stewart, government hydraulic engineer employed about two year ago by Skagit county to investigate flood conditions along the Skagit valley, has just submitted a report on his findings of the "stage and volume of past floods in Skagit valley and advisable protective measures prior to the construction of permanent flood controlling works."

The report is as comprehensive as possible going back to the floods told of by the Indians in 1815. It is too long to publish in detail, but this article will give some of the main ideas embodied in Mr. Stewarts findings.

"Since the arrival of the first white people about 1869," says Mr. Stewart, "there have been six Skagit river floods whose discharge has exceeded 175,000 second feet at Sedro-Woolley. All of these floods have occurred since No. 15, 1896. The number of floods that exceeded 175,000 second-feet at Sedro-Woolley prior to 1869 is unknown, but the occurrence of two great floods has been discovered. The exact dates of these early floods are not known, but their stages and volumes have been accurately determined.

"The maximum floods which have occurred in the past have had about twice the discharge of the flood of 1921. A flood about 1815 was nearly as maximum but there had been, prior to that time several floods approximately as large. This latter fact was determined at Reflector bar, where alternate layers of flood sand and charcoal were found. The flood sand could have been deposited only by floods approximately the maximum size; while the charcoal could have been left only by forest fires which occurred during the time

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intervening between the maximum floods."

Then follows data on the floods, taken at various places along the river. The data shows that the floods of 1921 was the second largest since 1856, in Sedro-Woolley, the 1909 flood reaching 26.5 feet on the gage and 1921 flood, 24.3 feet.

### May Expect Floods

The report states that maximum flood such as the one of about 1815 might cause loss of life in certain parts of the valley. Data shows that floods have occurred in 1896, 1897, 1906, 1909, 1917 and 1921. The problem of climatic conditions is being investigated in the hope that the study will throw some light on the frequency of certain sized floods in the past and future. In the light of knowledge of past floods it seems likely, says Mr. Stewart that floods like those of 1917 and 1921 may occur within the next five or six years.

Mr. Stewart says that the flood situation here is serious, but that Skagit county should not be stampeded into any sudden action in constructing expensive flood protection works. "Diking the present river or flood spirrway channels would have no value for a maximum flood except at an exceedingly high cost. Increasing the height of the proposed Ruby reservoir would be helpful but cause.

this alone would not remove the

"Cut-off channels, river improvement, drift barriers, and detention reservoirs combined would give protection against maximum floods, but they would be expensive. The writer will make several suggestions as to inexpensive measures that should be carried out in the near future. They may be briefly outlined as follows; install a flood warning system, delay diking off the Nookachamps district; protect certain danger zones removing drift from river channel below Hamilton and possibly near Lyman, and build protective dikes at Burlington and possibly Mt. Vernon; obtain additional hydrographic data; form a conservancy district."

Mr. Stewart gives data showing that rainfall for the two largest floods since data has been kept, is

much the same. At the Skagit power camp in 1909 for Nov. 28 and 29, the rainfall for the two days was 7.85 inches. At the Davis ranch on Dec. 11 and 12, 1921, the rainfall was 7.62 inches, while the maximum temperature in both cases was about 52 degrees. Data given by Mr. Stewart shows that dependence cannot be placed on thermometer readings as a flood indicator as long as there is snow in their vicinity.

### New Radio Warning

He says that while the telephone system might do to send warnings of floods the size of 1912, a flood like that of 1815 would wipe out all phones. Therefore he recommends radio stations as well as phones at various places including Darrington, the Davis ranch, Skagit power camp. These stations should be maintained with all the standard weather gauging equipment, and report during flood periods to some central station at Mt. Vernon.

While a maximum flood has not occurred for 100 years, Mr. Stewart says it might occur again, and a system of warning stations would prevent much loss of life and property, if a maximum flood ever did occur. Mr. Stewart recommends a delay in diking the Nookachamps district, as at present it acts as a storage reservoir during floods and has prevented much damage.

He recommends that drift below Hamilton be removed, as Hamilton will be in a dangerous position in case of a high flood. The Skagit river may be induced to stay in its present channel at Hamilton by removing all of the drift in the present river channel for a mile or more below the town.

Burlington, he says is in danger from any size flood, and should be encircled by a dike, as a correctly built dike around Burlington would protect it against all floods. Mt. Vernon, he says, is in danger from backwash and if this danger is great enough, dikes should be built. Mr. Stewart recommends a conservancy district, similar to that formed after the Dayton and Pueblo floods. This amount to forming a district in flood areas to pay for improvements as planned by competent engineers.

Mr. Stewart's report contains a mass of data collected at various places along the river, and urges that many more of these stations be established. He says the matter needs further study before any large flood prevention project is undertaken, but that there is always a danger of a repetition of floods.

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