

404 Federal Building,
Tacoma, Washington.
August 22, 1935.

Mr. T. H. Judd,
Skagit River Camp,
Rockport, Washington.

Dear Mr. Judd:

In regard to the Skagit Flood data, I have worked up the discharge for Skagit River at three points: Reflector Bar, the Dalles (near Concrete) and Sedro Woolley. Your letters of May 25 and June 1 and the map of the camp site were of considerable assistance in working up the data at these points.

The data I have previously furnished you are somewhat in error as to dates and heights of certain floods. It would be well, therefore, to consider all previous data superseded in reading this letter.

The maximum flood which has occurred in the last few thousand years had a discharge of about 120,000 second-feet at Reflector Bar. This estimate of discharge may be in error as much as 20 percent. For engineering purposes it would be necessary to plan on handling 145,000 second-feet at that point, and about 155,000 at the Power Camp.

The flood of December 12, 1921 had a discharge of 63,000 second-feet at Reflector Bar. The estimate of discharge is believed to be within 10 percent of correct. The maximum possible estimate for the 1921 flood would, therefore, be 70,000 second-feet at Reflector Bar and 75,000 second-feet at the Power Camp.

The figures above indicate that the maximum flood may be slightly more than double the discharge of the 1921 flood. The discharge figures given in this letter are based on the stage reached by the highest waves. This was necessary because the wave crests made the marks left by the old floods. The discharges that I have given are therefore in excess of what would be computed by using the mean of waves and surges (the U. S. G. S. method). For the 1921 flood, I believe Mr. Parker is expecting to publish 57,000 second-feet or 6,000 second-feet less than I have given. There are certain arguments for both systems of computing flood discharges. Personally, I am of the opinion that the true peak discharge would be very nearly a mean of the

discharge obtained by the two different methods of obtaining gage heights.

The stage of the maximum floods at the Power Camp are very important to the U. S. Geological Survey and to the City of Seattle. The importance to the Survey lies in its value in drawing up a rating curve and its importance as regards the safety of the recording station. The importance to the City of Seattle is due to its bearing on the safety of the Camp and Power house. My study of your topographic map at Meshalem and your notes concerning trees and soil cover over flood deposits would lead me to believe that the flood of 1814 did not entirely cover the bench at the Power Camp.

I believe that there is one more effort which is well worth making in trying to determine the extreme flood stages. You will note on the camp site map, about 500 feet below the recorder site, there are two high spots, one on each side of the head of the 1921 secondary channel. On the south side the elevation of the highest point is slightly over 496 feet, while on the north side the elevation must be slightly under 501 feet. Further north, between houses No. 208 and 217, there is a high spot at an elevation of around 504 or 505 feet. I believe that the flood of 1814 reached a stage of 501 at the mouth of secondary channel referred to. If it did reach a stage of 501, then it covered the two high spots on each side of the channel, and the edge of the flood water would have been somewhere in the neighborhood of house No. 220. Unless there has been grading or a great deal of traffic, it may be possible to determine the height reached by the flood of 1814 in the vicinity of house No. 220. Above the crest reached by the flood of 1814, the covering on the wash gravel and boulders should be about as you described it in your letter of June 1. Below the crest of that flood, however, there should be very little soil cover, over the fresh sand, gravel and boulders. The deposits from wind action may have pretty well obscured the 1814 high water mark, however.

The flood of 1855 probably reached a stage of 498 or 499. The small high spot on the north side of the 1921 secondary channels should therefore have protruded above the 1855 water surface. If so, possibly the height reached by that flood can be determined at that point.

The original gage at the Power Camp was upstream from the railroad bridge leading to the new power house. The height of the flood of the 1909 and 1917 floods were known at that gage. The height of the floods of 1855 and 1814 can be determined from the rating curve.

For a study of the effects of a maximum flood at the Power house and camp, a profile of the 1814 flood should be drawn from the old gaging station in the mouth of the canyon to the lower end of the camp.

I believe I can do this if you can furnish me the following data:

1. The distance which the old gaging station was above the present railroad bridge. I presume if nothing else of the station remains, the anchorage tree on the east bank still stands.
2. Heights of 1821 flood at your present gages No. 3 and 4.
3. Heights of 1814 and 1856 floods at the mouth of the secondary channel (500 feet below the recorder station).

Thanking you for your former assistance and hoping the data submitted is of value, I am

Yours very truly,

James E. Stewart.