MR. STEWART’S WORK PRODUCT GOES TO WASHINGTON, D.C.

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Skagit River 3,115 Sq. Mi. Drainage Basin
WHO WAS JAMES E. STEWART

- Mr. Stewart was a hydrologist employed by the USGS Tacoma District Office sometime before 1918.

- His official title was “Assistant Engineer”.

- He authored the first “report” on the Skagit River in 1918 and sometime thereafter was transferred to Hawaii.
STEWART 1918 REPORT

- Report dealt with 1897, 1909 and 1917 flood events.
- Determined these flood events were 10 year events.
- 1897 flood 3 ft higher than 1909 at Concrete.
- 1909 flood 1.6 ft higher than 1917 and .6 ft. higher than 1897 flood at Sedro-Woolley.
The Stewart Report Appendix (1918) states:

The volumes expressed are “peak discharges”.

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[1] The Dalles
In 1922 Mr. Stewart returns to Tacoma USGS and is "detailed" to Skagit County for another flood study.

Skagit County pays Mr. Stewart directly making Mr. Stewart an "employee" or "agent" of Skagit County.

Skagit County owns Stewart’s 1923 work product not USGS.
According to Stewart’s handwritten field journal he began his study on Nov. 24, 1922.

He worked in the field 5 days in Nov., 9 days in Dec., 13 days in Jan., and 1 day in March for a total of 28 days in the field.
Sometime in mid-March 1923 Stewart left USGS and went to work for the West Penn Power Co. in Pittsburg, Pa.

His report that Skagit County bought and paid for was not delivered to Skagit until Oct. or Nov. 1923.
The first major *red flag* established for the 1923 report is the major difference in flood flows “estimated” at Concrete.

The differences are never addressed by Stewart or USGS, Corps or FEMA.

Major differences in peak discharge. Which one is nearly correct?

### Comparison of 1918 and 1923 Flood Flows Concrete WA.

<table>
<thead>
<tr>
<th>Flood year</th>
<th>1918 Report</th>
<th>1923 Report</th>
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</thead>
<tbody>
<tr>
<td>1897</td>
<td>205,000 cfs</td>
<td>275,000 cfs</td>
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<tr>
<td>1909</td>
<td>185,000 cfs</td>
<td>260,000 cfs</td>
</tr>
<tr>
<td>1917</td>
<td>175,000 cfs</td>
<td>220,000 cfs</td>
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</table>
STEWART 1923 REPORT

- Document shows Stewart in Pitts. by 3/17/23.
- Stewart’s handwritten notes (HWN) do not support his findings in his field notebook (FN).
- i.e. The FN records the level of the Skagit in the 1921 flood at the Sauk as being 2.8 feet above the 1909 flood. The HWN show the 1921 flood as being only 10.8 inches higher than the 1909 flood.
At Hamilton the FN records a notation taken from a local newspaper article which stated that the 1909 flood was 4” higher than the 1897 flood. The HWN come very close to documenting this having the difference between the 1909 and 1897 flood as 3.6 inches with the 1909 flood being the higher of the two. The HWN further state that the 1921 flood was 3.6 inches higher than the 1909 flood and 7.2 inches higher than the 1897 flood.

Although probably accurate based on local newspaper accounts of the 1921 flood it would appear to contradict all his other estimates.

These and many other discrepancies between the FN and the HWN have never been addressed by USGS, the Corps or FEMA.
Stewart Report Rejected by Skagit and Corps of Engineers

One year after the submission of the Stewart Report at a public hearing in November 1924, Colonel Barden, Corps of Engineers, stated the following:

“I would like to emphasize the point that Mr. Knapp brought out in his paper, that before any really scientific plan can be prepared for the protection of this valley from floods, it is necessary to have more authoritative information than we now have as to the amount of water carried by the river in time of floods. . . . The information that was collected by Mr. Stewart and given in his report to the committee was excellent so far as the data that he had to work upon permitted, but that data was necessarily more or less inaccurate.” (Source: Public Hearing Transcript, Corps of Engineers, November, 1924)

(1) Mr. Knapp was the Skagit County Engineer who worked closely with Mr. Stewart.
Stewart 1923 Report “Things To Do”

- At the end of Stewarts FN he had a several page long list of “Things To Do”. Among them were to interview the following people:

Stewart 1923 Report “Things To Do”

- Study Baker Lake storage.
- Enlarge 1909, 1914, 1917 and 1921 flood crests to 1861 size and find discharge acreage at Concrete.
- Investigate saddle at Concrete to see if any indication that recent flood passed through there.
- Define limits of floods of 1856, 1897, 1909, 1917, 1921.
- Study possibility of River Control by dams.
- Send for Taylors flood report.
- Get all data concerning floods and damages from newspapers.
- The last two are most important and show that at best Stewart’s Report has to be considered incomplete.
Capt. Harry Taylor, Corps of Engineers, was in charge of the Seattle District during the 1896 and 1897 floods.

Just 23 days after the 1897 flood he authored a flood report that stated the 1897 flood at Sedro-Woolley was 1.6 feet above 1896 flood event. Stewart Report says the difference was only 1.2 inches above 1896 so he clearly never reviewed Taylor’s report.

Begs the question, who has more creditability, a Capt in the U.S. Army who observed both flood events, or an engineer who observed none of the flood events?
Stewart Report

- Stewart has 1921 flood as the third largest behind the 1897 and 1909 flood events although his FN and HWN do not.
- Had he reviewed the local newspaper articles and interviewed Charlie Moses he would have found the 12/22/21 Courier Times article which documents from several sources, including Charlie Moses, that the 1921 flood was indeed the largest flood event., not 1897 or 1909. (Source: 12/22/21 Courier Times)
Local History Does Not Support 1923 Stewart Report

- Had Mr. Stewart reviewed all the local newspaper articles he would have found the following Concrete Herald article describing the 1921 flood which echoed the Courier Times Article:

FLOOD WAS HIGHEST IN SKAGIT COUNTY HISTORY

Old timers in the Skagit valley, who have seen all the floods in the Skagit valley since the early 80’s say that the recent flood carried a greater volume of water than any previous flood since the county was settled, surpassing even the famous high water of 1897. The fact that the river did not reach marks set in former years at some points in the upper valley is accounted for by the widening of the river since that time. In all places where the banks of the river have remained unchanged the 1921 mark is considerably above that of any previous flood known to settlers. 

(Source: Concrete Herald 12/31/21 C.H.)
Local History Does Not Support 1923 Stewart Report

Had Stewart reviewed all the local newspaper articles he would have been able to compare the 1909 flood with the 1921 flood.

along the Skagit. Burlington had about one foot of water in some of the streets, and there were many buildings over the town that were not even surrounded by water. Neither the

Thursday was a great day in Burlington and many talked of camping on the heights Tuesday night, but the change came about noon, the water went down rapidly and Burlington has perhaps received less damage than any other town on the Skagit.

Source: Burlington Journal 12/3/09
Local History Does Not Support 1923
Stewart Report

1921 December Flood

Monday night, December 12, the dikes east and southeast of Burlington broke. Tuesday morning at six o’clock the flood water covered Fairhaven Avenue, and in part the residence districts of the city. At this time the entire lowlands lying east, west, south and in part northwest of Burlington were inundated. The depth of water is on relative, the lamentable fact being that the area of low lands covered with water was wide-spread. That certain spots

Source: Burlington Journal 12/16/21

Clearly the 1921 flood was more serious than the 1909 flood event.
# USGS Proposed Revisions

## Concrete Flood Flow Calculations

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<td>400,000</td>
<td>?</td>
<td>500,000</td>
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<td>275,000</td>
<td>230,000</td>
<td>?</td>
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<tr>
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<td>260,000</td>
<td>220,000</td>
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<td>190,000</td>
<td>225,000</td>
<td>?</td>
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(Sources: Stewart 1918 & 1923 Reports; Proposed Revision of Skagit River Flood Peaks, H.C. Riggs & W.H. Robinson, 11/16/50; Skagit River near Concrete, Wash. – Verification Study by F.J. Flynn and M.A. Benson, 8/52; Skagit River near Sedro-Woolley, Wash., Proposed revisions of historical flood peaks, F. L. Hidaka, 1/12/54; Skagit River Flood Peaks, Memorandum of Review by G. L. Bodhaine, USGS, 5/13/54)

[1] All USGS calculations are based on Stewart's estimated flood heights.

[2] Given Mr. Hidaka's computations for Sedro-Woolley it is assumed all his flows for Concrete would have been less than Stewart's 1923 calculations.
## USGS PROPOSED REVISIONS

### SEDRO-WOOLLEY FLOOD FLOW CALCULATIONS

<table>
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<tr>
<th>Year</th>
<th>Stewart</th>
<th>USGS[1]</th>
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<tr>
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<td>1918</td>
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<td>157,000</td>
<td>195,000</td>
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<tr>
<td>1921</td>
<td>210,000</td>
<td>170,000</td>
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</table>

(Sources: Stewart 1918 & 1923 Reports; Proposed Revision of Skagit River Flood Peaks, H.C. Riggs & W.H. Robinson, 11/16/50; Skagit River near Sedro-Woolley, Wash., Proposed revisions of historical flood peaks, F. L. Hidaka, 1/12/54; Skagit River Flood Peaks, Memorandum of Review by G. L. Bodhaine, USGS, 5/13/54)
Influence of Stewart’s Work Product on FEMA FIS

<table>
<thead>
<tr>
<th>Recurrence</th>
<th>WITH STEWART 1923</th>
<th>WITHOUT STEWART</th>
<th>WITH STEWART 1918</th>
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<td></td>
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<tr>
<td>500</td>
<td>423,000</td>
<td>348,000</td>
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</tr>
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(Source: Unregulated columns and Regulated With Stewart column, Corps of Engineers, Seattle District, 2003, all other regulated columns interpolated estimates)

All figures rounded to the nearest 1,000.
WHY STEWART FIGURES ARE QUESTIONABLE

- Field notebook conflicts with handwritten notes which both conflict with final report.
- Stewart Report was incomplete thus creating fatal flaws.
- 1897 figures conflict with Corps observed water levels.
- Flood heights conflict with local history.
- Stewart took three estimated flood heights from approximately 1 mile upstream and transposed them to within 1/10th of a foot downstream to The Dalles gage.
- Skagit County bought and paid for the Stewart Report and paid Mr. Stewart directly. USGS had no right to publish anything.
WHY STEWART FIGURES ARE QUESTIONABLE

- “Stewart’s study of historical floods in the Skagit River basin had, by today’s standards short-comings, simplifications, incomplete documentation, no known photographic documentation, and took decades to review and complete the evaluation of flood hydrology for the Skagit River near Concrete.”  
  (Source: Review & Comments, "Draft Evaluation of Flood Peaks Estimated by USGS" by Robert D. Jarrett, Ph.D., USGS, National Research Program, 2/14/05)

- Given all of the evidence presented herein is this the kind of “data” that the federal government relies on to administer the NFIP (FEMA) or build flood control projects with (Corps), or tries to pass off as “scientific data” (USGS)?