

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



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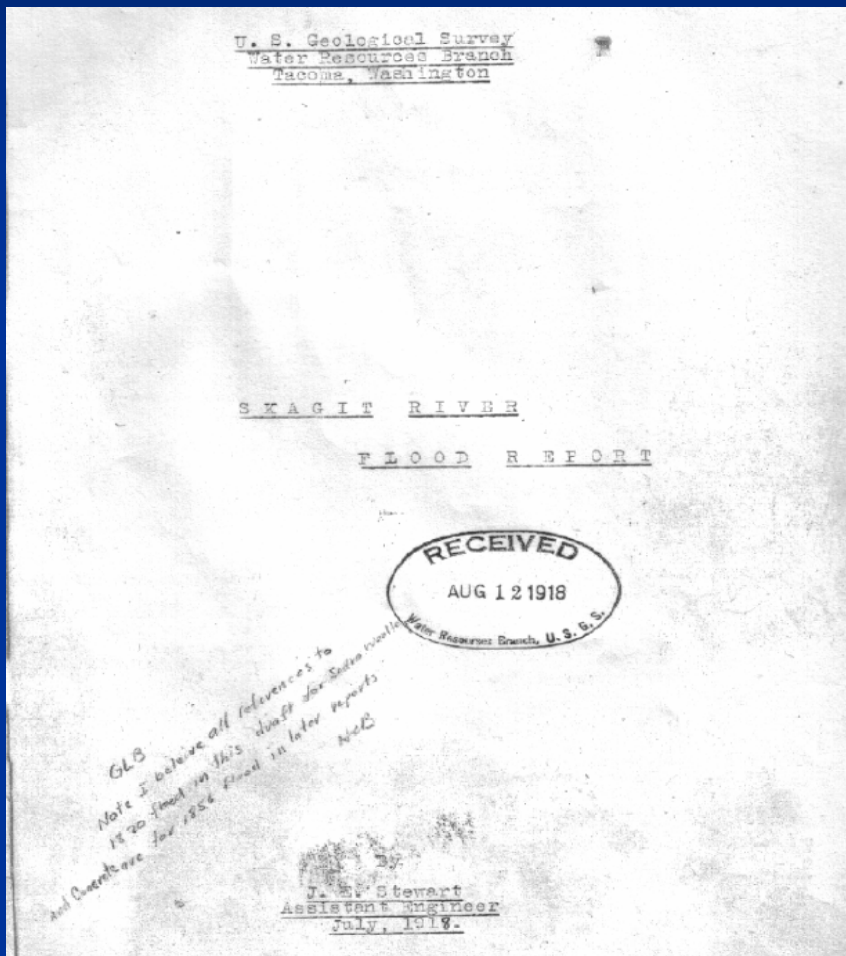
Skagit River 3,115 Sq. Mi. Drainage Basin



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.

STEWART 1918 REPORT

YEAR	CONCRETE ^[1]	SEDRO-WOOLLEY
1897	205,000 cfs	171,000 cfs
1909	185,000 cfs	169,000 cfs
1917	175,000 cfs	157,000 cfs

Stewart Report Appendix (1918)

The volumes expressed are “peak discharges”.

^[1] The Dalles

STEWART RETURNS

November 16, 1922.

Mr. Frank Gilkey,
County Engineer of Skagit County,
Mount Vernon, Washington.

Dear Sir:

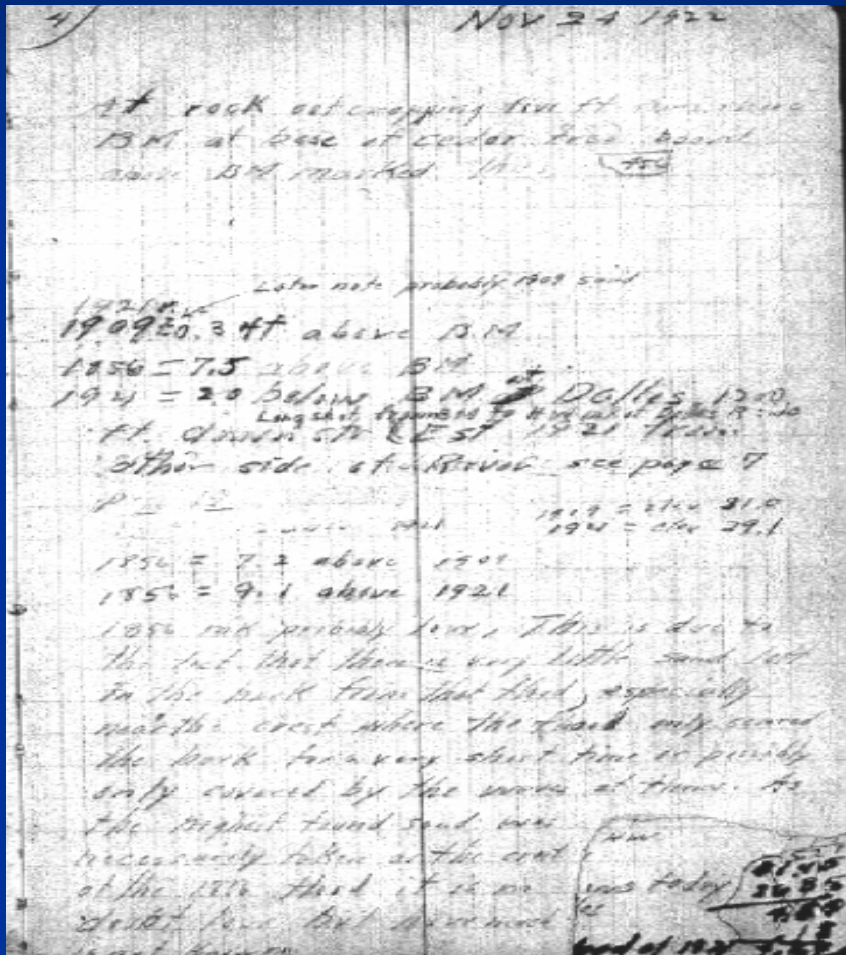
In reply to your letter of November 14, advising me that the Board of County Commissioners had passed a resolution authorizing a survey of Skagit River flood conditions:

At the instance of Judge Brawley a committee of citizens, of which Mr. H. L. Willis was chairman, visited this office October 26 and asked what could be done in determining the volume of flow in Skagit River during the December 1921 flood and the magnitude of that flood when compared to past floods. The committee was told that a recent curtailment of funds used in cooperative water resources investigations carried on by this office made it impossible for us to bear any part of the expense of this survey. Inasmuch as this office has considerable information regarding past floods, however, an offer was made to the committee to detail one of our engineers to the work provided the county would pay his salary, expense, and other cost incident to the work. I explained that it was not possible for more than one man to be spared from our organization but suggested that either your office or local engineers and surveyors could be utilized in furnishing assistance to the man detailed from this office. Even with one man taken from our organization, it will be necessary to employ temporary help here in the office to offset the loss of the man's services.

Fortunately Mr. James E. Stewart, an engineer from this office, is exceptionally well qualified for flood studies. In fact he has collected considerable information regarding early floods in the Skagit Basin. He was formerly employed here, then transferred to Hawaii where he had charge of water resources investigation and has just recently returned.

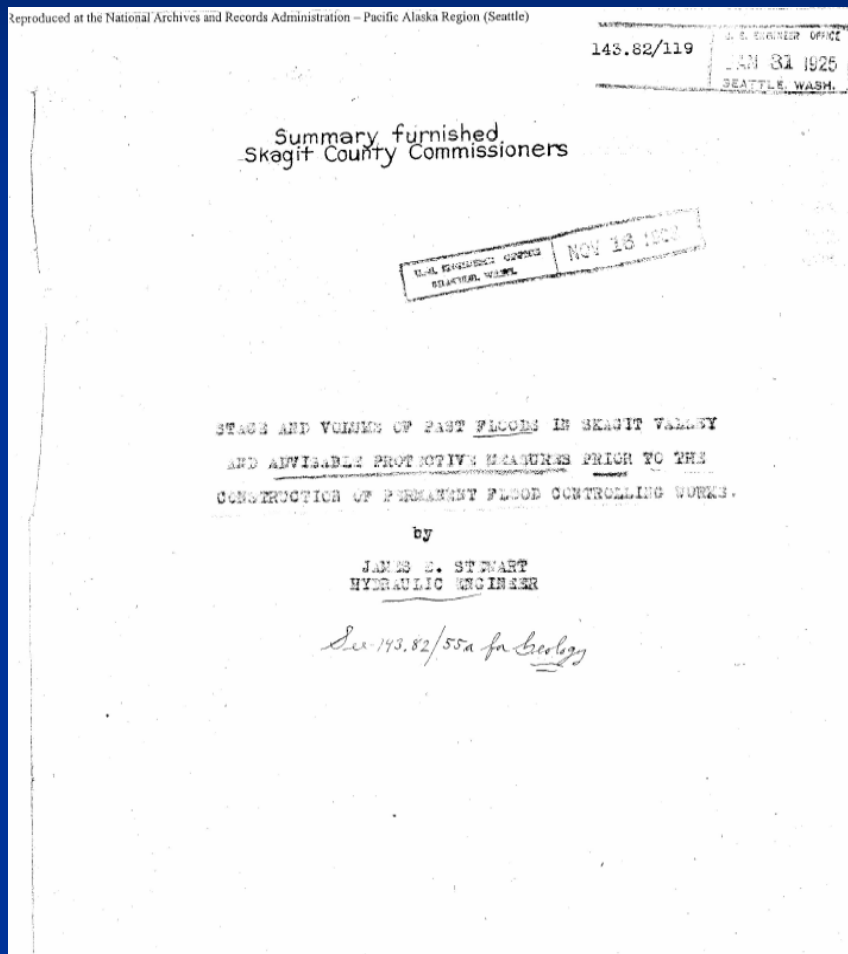
- In 1922 Mr. Stewart returns to Tacoma USGS and is “detailed” to Skagit County for another flood study.
- Skagit County pays Mr. Stewart directly making Mr. Stewart an “employee” or “agent” of Skagit County.
- Skagit County owns Stewart’s 1923 work product not USGS.

STEWART 1923 REPORT



- 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.

STEWART 1923 REPORT



- 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.

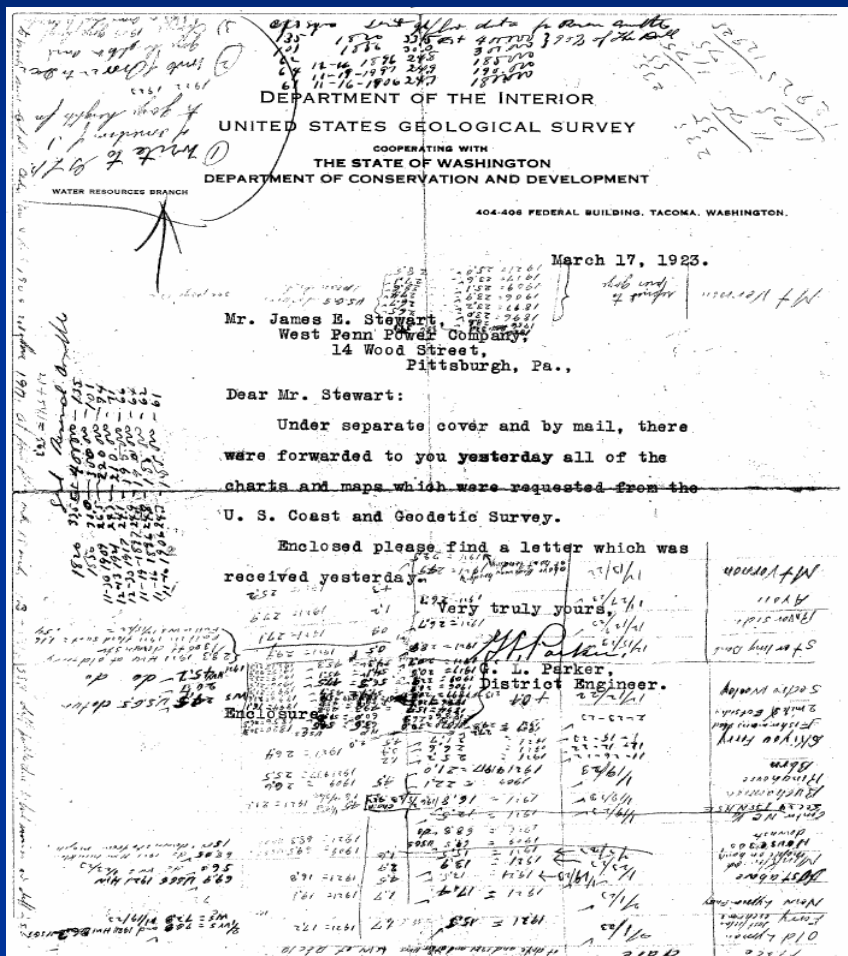
1918 vs. 1923 STEWART REPORT

Comparison of 1918 and 1923 Flood Flows Concrete WA.

Flood year	1918 Report	1923 Report
1897	205,000 cfs	275,000 cfs
1909	185,000 cfs	260,000 cfs
1917	175,000 cfs	220,000 cfs

- 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?

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.

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 ⁽¹⁾ 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:
- Sauk and Vicinity: S. B. Ellison and E.G. Ellison on Sauk River 1½ miles above mouth have all floods. Probably E.G. best and marks at his place. These marks indicate Sauk alone probably-possibly some backwater from Skagit. Hank Stafford at Sauk can possibly give 1897 flood. Algy Parker ½ mile downstream from Sauk left side can probably give 1897 flood. Old Mrs. Wainright or Harry Wainright may have 1897 HW. City of Seattle J.B. Dodge 1400 Alaska, Skagit River Development. J.M. Waters box 102 Rockport. Ed O’Brien Marblemount RFP 2 miles this side of Marblemount. Alec Stafford Hamilton. Stafford in town Rockport ranch on other side of river. Martin Rockport 5 miles up. Lyman Martin Indian Bacon Creek. **Charlie Moses Indian Bacon Creek, good man.** William Nubey ½ way Rockport Marblemount. Ed Presentine Rockport. Harry Wainright Sauk. Jimmy Jones 2 miles below Rockport Indian. Johnny Towne Bennet Bros Store, 6 miles not Darrington. Skagit Boom at Van Horn Indian with Napoleon. (pgs 142 & 143)

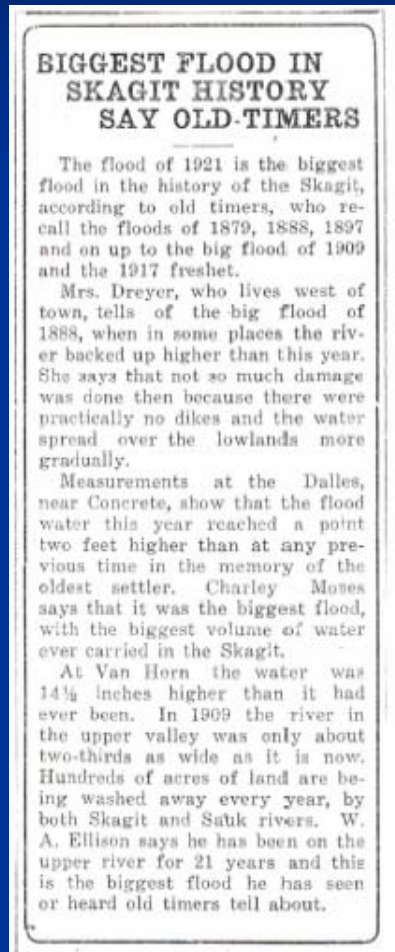
Stewart 1923 Report “Things To Do”

- 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.

1897 Taylor Flood Report

- 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?

Local History Does Not Support 1923 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.

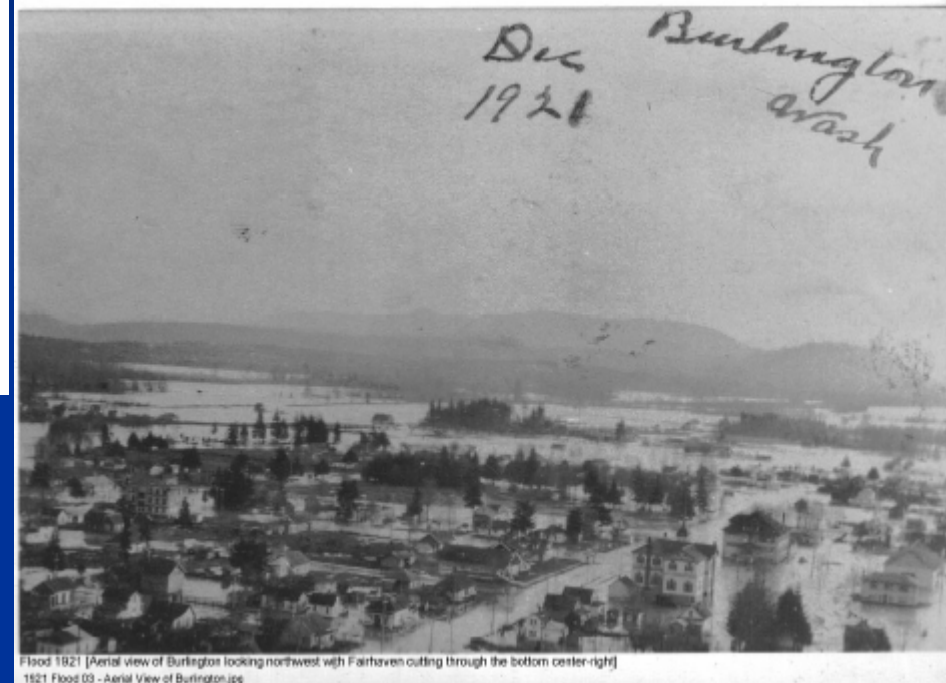
Source: Burlington Journal 12/3/09

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						
	STEWART		USGS ^[1]			
Year	1918	1923	Riggs 1950	Benson 1952	Hidaka ^[2] 1954	Bodhaine 1954
1815		500,000	400,000		?	500,000
1856		350,000	280,000		?	340,000
1897	205,000	275,000	230,000		?	265,000
1909	185,000	260,000	220,000		?	240,000
1917	175,000	220,000	210,000		200,000	205,000
1921		240,000	190,000	225,000	?	225,000

(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						
	STEWART		USGS ^[1]			
Year	1918	1923	Riggs	Benson	Hidaka	Bodhaine
1815		400,000	330,000		370,000	400,000
1856		300,000	230,000		260,000	290,000
1896		185,000	170,000		145,000	165,000
1897	171,000	190,000	170,000		145,000	170,000
1906		180,000	160,000		140,000	165,000
1909	169,000	220,000	190,000		175,000	200,000
1917	157,000	195,000	160,000			195,000
1921		210,000	170,000			210,000

(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

FLOOD FLOW CFS RECURRENCE LEVELS ¹¹						
	WITH STEWART 1923		WITHOUT STEWART		WITH STEWART 1918	
Recurrence	Unregulated	Regulated	Unregulated	Regulated	Unregulated	Regulated
10	163,000	124,000	147,000	112,000	153,000	116,000
50	248,000	185,000	210,000	157,000	222,000	165,000
75	274,000	205,000	228,000	171,000	242,000	181,000
100	293,000	221,000	241,000	182,000	257,000	194,000
250	362,000	279,000	288,000	222,000	308,000	237,000
500	423,000	348,000	327,000	269,000	353,000	290,000

(Source: Unregulated columns and Regulated With Stewart column, Corps of Engineers, Seattle District, 2003, all other regulated columns interpolated estimates)

¹¹ 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)?