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[Idaho: Bruneau River]

Streamflow East Fork Bruneau River below Three Creek, near Three Creek, Idaho, at site of proposed diversion, 1956

by

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PURPOSE AND SCOPE

During the last five years public interest has increased in streamflow of East Fork Bruneau River in connection with proposals for its use in the reclamation of new lands. The district office has been pressed recently to bring record computations up to date and to make correlative or other studies specifically directed to the development of estimates of streamflow at or near a proposed irrigation diversion on the East Fork Bruneau River in T. 14 S., R. 11 E.

In order to obtain current discharge near the mouth of East Fork, the gaging station East Fork Bruneau River near Hot Spring was reactiviated in 1949 after a record lapse of more than 30 years. This gaging station is located at Winter Camp Ranch 20 miles southeast of Hot Spring, Idaho. Beginning in 1953, special efforts have been made to establish and collect streamflow records from a representative group of gaging stations in the East Fork and adjoining basins. Reconnaissance examinations and spot measurements have been made at a number of points and a few gaging stations established (5 in Idaho and 1 in Nevada). A more complete inventory of the water resources of these basins is needed to determine dependable water supplies available for further irrigation uses. Additional streamflow records would provide information, also, concerning the sources of the water now being used on downstream

projects. The factual data now available within the East Fork basin have been brought together in this report. The discharge records collected, 1953-56, are used in serving both for direct application and as the basis of a correlation study to estimate discharge for earlier years.

Present irrigation uses and existing water rights from Bruneau River and its tributaries are described in existing reports (Johnson, 1947; Barton and Stoddard, 1954). Diversions of water from East Fork Bruneau River upstream from the proposed diversion point are substantial. The water diverted is applied to pasture lands and to land used for the growth of hay or forage crops. These irrigation uses, together with incident wastes and return flows, affect the streamflow at the diversion point and have augured against successful comparisons or correlations based on discharge data collected upstream within the irrigated section. Further, an intermountain diversion from Deadwood Creek to Cedar Creek Reservoir (no discharge record available) complicates such correlation. The opportunity for correlation with discharge data collected downstream on the same water course is much better as intervening irrigation uses are small.

Somewhat similar upstream uses exist in the upper parts of the neighboring basins of Salmon Falls Creek and Goose Creek above gaging stations at San Jacinto, Nevada, and near Oakley, Idaho, respectively. Discharge records at these stations are longer than those at the Winter Camp Ranch gaging station on East Fork Bruneau River. The purchase and change in status of lands and water rights

in Nevada above San Jacinto may have altered the regimen of Salmon Falls Creek. No new development has been reported from Upper Goose Creek which would further affect streamflow at the measuring station. Trial correlations of the Salmon Falls and Goose Creek records with those from the gaging station East Fork Bruneau River near Hot Spring, at Winter Camp Ranch, were not very satisfactory. However, these long-term records in nearby basins are believed pertinent to this study in that they indicate the general trend of runoff in the area and may be a guide to long-term expectancy on the East Fork. These records provide a general reference to the variations in streamflow experienced during the 34-year period, 1915-48, when no record was collected at the station on East Fork Bruneau River near Hot Spring, at Winter Camp Ranch.

ACTUAL DISCHARGE RECORD AVAILABLE

The streamflow data available within the basin of East Fork Bruneau River as of September 30, 1956, show discharge at three general locations. An upper group of gaging stations represents a crosscut of main stem and tributary creeks, seven to ten miles upstream from the proposed irrigation diversion. A main stem record near the diversion point (two gage locations) is the only discharge record directly applicable to the subject location. A gaging station record on the main stem, some 30 miles downstream from the subject location, has been used as a basis for extending the discharge records at the site of the proposed diversion.

The upper group of stations (four in all) was established in December 1912 and operated intermittently through June 1916. Some 24 complete months of concurrent record were collected (see pages 279-281, Water-Supply Paper 1317, for individual station summaries, and appendix of this report for combination or total discharge of the four streams).

Actual discharge records applicable to the subject location are limited to recent collections, 1953-56. On request of the State Department of Reclamation discharge measurements were started May 28, 1953, at the John Salls Ranch about 2 miles downstream. Staff gage and measuring bridge were installed June 12, 1953, and arrangements made for readings by local resident, who was unable to promise more than intermittent observations. During the period June 1953 to September 1955 regular station measurement trips were continued, although it became apparent that gage observations were not sufficiently

continuous to permit computations of daily discharges for many complete months. In all, 29 discharge measurements were obtained. Processing and analysis of the discharge measurements and available readings at the Salls Ranch station have resulted in the completion of 11 months of the 27-month period of operation and listing of discharges for days when discharge measurements or gage readings were made during the other 16 months. Means for the 11 months completed are shown in table 1 (page 15) and prints of forms 9-192a are included in appendix (item 3) to show the daily detail available (parts of 1953, 1954, and 1955). The need for a recorder-equipped gaging station on this remote stream resulted in the establishment of a substitute station 2-1/2 miles upstream and about one-half mile above the proposed diversion point. The structures were built according to U. S. Geological Survey plans by the applicant for State license, who also provided a temporary road approach to the station site. Record collection by the Geological Survey began August 30, 1955, with operation being financed under the Idaho Cooperative stream-gaging program as a substitute for the Salls Ranch measurement. Monthly discharge for the first year at the recorder site are shown in table 1. Prints of forms 9-192a showing daily discharge are included in the appendix (item 3).

The gaging station East Fork Bruneau River near Hot Spring (at Winter Camp Ranch), was established in September 1910. The record was discontinued in March 1915 and resumed in December 1948. The 12 complete years of record, although not continuous, are of longer term than the other East Fork station records and are very important

to the analysis made in this report. The entire record is summarized in table 2 of this memorandum (page 16), and prints of forms 9-192a for water years 1951-56 are included in the appendix (item 4).

The following reference list of gaging stations in the East Fork Bruneau River basin shows the names of the individual stations, period of record, location, and drainage area.

Upper group of main stem and tributary creeks, 7 to 10 miles above subject location

East Fork Bruneau River near Three Creek: December 1912 to June 1914 and March to June 1916; upstream from Three Creek, in sec. 7, T. 16 S., R. 11 E.; drainage area, 62 square miles.

Three Creek near Three Creek: December 1912 to June 1914 and March to June 1916; downstream from Deer Creek, in sec. 27, T. 15 S., R. 11 E.; drainage area, 45 square miles.

Cherry Creek near Three Creek: December 1912 to June 1914 and March to June 1916; upstream from school house, in sec. 32, T. 15 S., R. 11 E.; drainage area, 22 square miles.

Deadwood Creek near Three Creek: December 1912 to June 1914 and March to June 1916; in sec. 19, T. 15 S., R. 12 E.; drainage area, 22 square miles.

Main stem station records at and near subject location

East Fork Bruneau River below Three Creek, near Three Creek: September 1955 to September 1956 (recorder station); 1/2 mile above proposed diversion, in sec. 31, T. 14 S., R. 11 E.; drainage area, 210 square miles. Fragmentary records May 1953 to September 1955 collected at Salls Ranch, 2 miles below proposed diversion, in sec. 13, T. 14 S., R. 10 E.; assumed to be equivalent.

Inventory station record about 30 miles below subject location

East Fork Bruneau River near Hot Spring: September 1910 to November 1914, February to March 1915, and January 1949 to date; at Winter Camp Ranch, in sec. 16, T. 10 S., R. 8 E.; drainage area, 620 square miles.

LOCATION OF THE BASIN

The Bruneau River, an important tributary of the middle Snake River, enters Snake River from the south at the C. J. Strike hydroelectric power reservoir in the vicinity of Grand View, Idaho. The principal tributaries of Bruneau River are Sheep Creek, Jarbidge River, East Fork Bruneau River, and Little Valley Creek. This report deals with the water supply of East Fork Bruneau River which, locally, is often called Clover Creek. The East Fork enters the main stem of Bruneau River from the east at a point some 25 miles upstream and southeast of Bruneau, Idaho.

The headwaters of the East Fork Bruneau basin extend across the state line into Nevada. The elevation of the more productive area upstream from the Idaho State line is more than 6,000 feet. A group of small tributaries from the headwater area join together some six miles northwesterly from Three Creek (post office). Thence, downstream, the East Fork is in canyon section and courses north and northwesterly to the main Bruneau, about parallel to the Jarbidge River.

A sketch map of Bruneau River and Salmon Falls Creek basins in Idaho and Nevada was compiled in 1953 for use in studying streamflow data deficiencies. This sketch map has been adapted to show the general location and configuration of the Bruneau and neighboring basins and, also, the location of gaging stations referred in the preceding chapter. (See item 1 in appendix.) Topographic mapping has been extended recently to cover a narrow strip along Snake River. The new quadrangle sheets do not extend southward of latitude 42°45'. Accordingly, accurate maps are available for the lower reach of the Bruneau River but not for the East Fork basin.

TOPOGRAPHIC AND GEOLOGIC FORMS

Topographic mapping of the basin of the East Fork of Bruneau River is not available in the form of quadrangle sheets. Sectional aeronautical charts show approximate contouring at 1,000-foot intervals. A general idea of the land forms was obtained by observing what could be seen from the two principal roads crossing the basin from east to west and north to south. One of these is the stage road that crosses the headwater tributaries via Three Creek (P.O.). The other is the desert road most frequently used in approaching the basin from Grand View or Bruneau. This road follows upstream and southward on the east side of the river to the Clover C. C. C. Camp crossing and thence up the west side to a junction with the stage road.

The headwater tributaries appear to drop rather steeply from the higher elevations along the state line to the separate valleys where the presently irrigated lands of the stockmen are located. These irrigated lands look to be reasonably flat although the stream courses indicate a strong northward gradient. The ridges intervening between the rather narrow tributary valleys descend to the flats rather steeply but are of rounded topographic forms with only occasional rock outcrops. Farther upstream the slopes are steeper although not rugged and the valleys are more constricted. Downstream the tributary valleys join through broad swampy flats which in turn converge into a single rock-bound canyon section shortly below the confluence of the several water courses. The canyon section becomes progressively deeper as the river falls some 1,300 feet to the point of entry to the main Bruneau about 35 miles downstream. The land forms

on either side of the canyon are generally rolling, being rougher along the margins near the canyon rim. These desert areas probably slope transversely to the north, but much less steeply than does the river. Three or four river ranch holdings lie along the canyon bottom in the 35-mile reach.

The general geologic map of Idaho shows the formations in the extreme headwater area of the East Fork basin to be silicic volcanics. About at the confluence of the small tributary valleys the formation merges into Snake River basalt which underlies the bulk of the basin area. The Payette formation is indicated in the area bordering the East Fork basin on the north. The soil mantle appears to be generally continuous except for the canyon walls and the eroded bordering margins, as judged from the native vegetation.

From the broader view, the headwater areas of the Owyhee, Bruneau, and Salmon Falls basins in Oregon and Nevada adjoin the basins of Harney Lake and Humboldt River. The mountain ranges on the watershed boundaries trend north and south. The Steens mountain range on the west rises behind the Owyhee Ridge. The Santa Rosa, Tuscarora, and Independence ranges and Jarbidge mountains are on the south. At the lower elevations in Idaho, the watershed boundaries dividing the Bruneau basin from the Salmon Falls Creek on the east and the Owyhee on the west are not as sharply defined except in the Silver City area. In the lower section, the principal features of the Bruneau water courses are the many miles of deep and narrow canyons. The areal extent of the desert lands bordering these canyons is impressive, also, as viewed from the vantage of the two principal roads crossing the basin.

HYDROLOGIC FEATURES

Average precipitation in the Bruneau basin varies with altitude and orographic influences and ranges at least from 7 inches to 22 inches per year. A somewhat less tangible factor which should be mentioned in considering precipitation patterns is that cloud seeding has been practiced on adjacent watersheds in connection with the Owyhee, Salmon Falls, and Oakley projects. The Weather Bureau reports show the following precipitation for points within or adjacent to the subject basin:

Reporting station	Annual normal
Grand View	7.66"
Hollister	9.35"
Three Creek	13.67"
Jarbidge	21.70"

A review of the monthly normals for these stations suggests to the writer that April, May, and June rainfall may represent a larger component of the annual precipitation than is the usual case in southern Idaho. Only a small part of the precipitation contributes to streamflow. The remainder is chargeable to evaporation, plant use, and deep infiltration. The larger proportion of the annual precipitation falling in April, May, and June should tend to reduce irrigation requirements of the upper valley lands during the earlier months of the growing season. The pattern of flow of the East Fork at the proposed diversion downstream would be affected accordingly.

The Idaho water rights above the subject diversion point serve lands in T. 15 S., R. 10 and 11 E., and T. 16 S., R. 11 E. Irrigated pasture and hay lands have thus been maintained. The intermountain

diversion ditch from Deadwood Creek to Cedar Creek Reservoir is a direct draft on the runoff from the East Fork watershed above the river diversion now proposed (see reference, p. 2). The use of this intermountain ditch began in 1920, according to the Idaho Department of Reclamation. Its point of diversion from Deadwood Creek is recorded as in the SW 1/4 sec. 22, T. 15 S., R. 12 E. Below the proposed river diversion from the East Fork, application of water to hay and pasture lands within the canyon section is confined to several ranch tracts in the bottom of the canyon; however, no acreage figure is available as to the extent of these lands.

The suitability of the waters of the East Fork of Bruneau River for irrigation use has not been tested specifically by the Geological Survey. The Agricultural Experiment Station of the University of Idaho has made a general study of the characteristics of irrigation waters in Idaho (Jensen, 1948-49), utilizing the discharge records at selected gaging stations. Bruneau River below Hot Springs was one of the stations at which chemical analyses of samples were made. These analyses show some deterioration of the quality in the low-water season when the streamflow is largely from springs and other ground-water outflow. From these published analyses Mr. H. A. Swenson1/ has computed certain of the chemical properties, bearing on suitability of the Bruneau River water for irrigation use. His tabulations for the river water and Hot Springs upstream are included in the appendix (item 6). More specific information on the quality of the streamflow of the East Fork at the proposed diversion site would be useful in studies of project feasibility.

1/ H. A. Swenson, District Chemist, U. S. Geological Survey, Portland, Oregon; by letter.

The watershed cover consists largely of sagebrush, other types of brush, and native grasses. There is but little forest growth, even at the higher elevations. Some aspen grow in the draws near the foothills and the water courses are fringed with heavy growth of willows. In connection with "re-seeding" projects of the Grazing Service, sagebrush has been removed from several substantial tracts on the higher areas. These "re-seeded" range lands are not irrigated. In brief, the culture of the watershed area may be described as principally cattle and sheep range with areas of pasture and hay lands adjacent to the streams.

The proposed irrigation diversion is a short distance downstream from the confluence of the headwater tributaries near the upper end of the canyon section about six miles northwesterly from Three Creek (P. O.). Extension of the water record at this point has been made by correlation with the longer record available at the "near Hot Spring" gaging station 30 miles downstream on the same water course at Winter Camp Ranch.

CORRELATION METHODS

Estimates of discharge for East Fork Bruneau River below Three Creek, near Three Creek, are from a correlation based on the plotting of concurrent monthly mean discharge. Although only 25 months of concurrent record were available, the correlation as shown on form 9-279K in the appendix (item 5) appears to be reasonably reliable.

In the initial comparison between the corresponding monthly mean discharges of East Fork Bruneau River near Hot Spring (at Winter Camp Ranch) vs East Fork Bruneau River below Three Creek, near Three Creek, three separate and approximately parallel relation curves were drawn to average seasonal plottings August to March, April to May, and June to July. The paucity of points available to represent each of the several seasons suggested turning to the single relation curve technique and consideration of applying monthly adjustments rather than individual seasonal curves.

The correlation curve (form 9-279K) in the appendix shows that without seasonal adjustment the enveloping lines that include two-thirds of the points are 0.041 log units apart. Thus, percentage-wise, the standard error of estimate is 10 percent and two-thirds of the monthly estimates should fall within 10 percent of the true discharge.

To determine if monthly adjustments could be used to improve the correlation, the median of the monthly departures for each calendar month (only one to three plottings for any month) were determined. These were plotted chronologically and a smoothed correction graph drawn. The results in terms of log units are:

Oct.	+0.01	Jan.	0.00	Apr.	+0.03	July	+0.01
Nov.	-.03	Feb.	-.03	May	+.02	Aug.	+.06
Dec.	.00	Mar.	-.03	June	-.04	Sept.	-.07

Because of the small number of plottings defining the departures for the individual months, application of monthly adjustments was not warranted. Accordingly the discharge estimates presented in this memorandum were taken directly from the correlation curve without monthly adjustment. Monthly discharge for East Fork Bruneau River near Hot Spring was applied to obtain monthly discharge estimates for the corresponding months at the Three Creek station as listed in table 3. These were combined with the available record at the station (see table 1) to compute annual discharge figures as shown in table 4.

The discharge extension as provided by this preliminary correlation is from 25 months to 148 months. The monthly mean discharges range from 2 to 248 cfs with 14 monthly means exceeding 100 cfs. The definition of the correlation curve above 100 cfs discharge is not supported by actual record plottings of monthly mean discharges as none has been experienced at the dependent and independent gaging station during the period of parallel operation. Plotting of concurrent discharges recorded May 25-29, 1956 (5-day means, 131 vs 165), suggests that the curve extension is conservative in that the estimated discharge at the Three Creek station taken from this curve may tend to be too low at high discharges.

When longer discharge records have been collected at the East Fork stations near Hot Spring and Three Creek, a more reliable relation can be developed. Thus the estimates made in this report should be considered preliminary and subject to revision.

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RESULTS OBTAINED

The following discharge data represent flow at the proposed irrigation diversion site on East Fork Bruneau River.

Table 1

East Fork Bruneau River below Three Creek, near Three Creek, Idaho
(monthly mean and annual discharge)

Water year	Oct. cfs	Nov. cfs	Dec. cfs	Jan. cfs	Feb. cfs	Mar. cfs	Apr. cfs	May cfs	June cfs	July cfs	Aug. cfs	Sept. cfs	Annual total acre-feet
1953									67.8	9.06	-	4.10	---
1954	-	-	8.56	9.37	11.6	11.8	15.1	9.05	-	-	-	-	---
1955	-	-	-	-	-	-	14.9	20.0	-	-	-	2.25	---
1956	4.60	7.05	8.97	11.1	10.4	21.3	41.6	86.4	50.6	7.57	5.75	4.87	15,760
1957	7.65	-	-	-	-	-	-	-	-	-	-	-	---

Note.- Discharge shown prior to September 1955 were collected at Salls Ranch in sec. 13, T. 14 S., R. 10 E., about 2 miles below diversion site; ensuing records were collected at recorder station in sec. 31, T. 14 S., R. 11 E., about 1/2 mile above diversion site.

The following discharge data for the gaging station East Fork Bruneau River near Hot Spring, Idaho, were collected at Winter Camp Ranch in sec. 16, T. 10 S., R. 8 E., 30 miles downstream from the irrigation diversion site.

Table 2

East Fork Bruneau River near Hot Spring, Idaho
(monthly mean and annual discharge)

Water year	Oct. cfs	Nov. cfs	Dec. cfs	Jan. cfs	Feb. cfs	Mar. cfs	Apr. cfs	May cfs	June cfs	July cfs	Aug. cfs	Sept. cfs	Annual total acre-feet
1910												1.72	—
1911	5.55	7.53	9.52	38.4	25.1	136.	54.8	82.9	63.3	11.7	1.50	1.78	26,500
1912	5.23	8.31	8.00	15.7	20.7	17.8	84.0	220.	201.	36.9	18.7	14.3	39,300
1913	19.2	22.7	20.0	15.0	27.5	53.8	126.	129.	100.	48.0	14.6	9.23	35,300
1914	9.73	11.5	8.13	37.7	62.9	82.8	94.2	158.	70.9	21.8	7.93	7.58	34,500
1915	12.9	12.7			29.5	20.9							—
1949	9.7E	12.5E	11.7E	8.1	11.3	35.9	105.	149.	52.8	6.9	4.5	4.8	(24,960)
1950	16.8	15.2	11.9	18.3	12.4	22.7	93.3	143.	80.1	15.3	10.2	6.02	26,910
1951	11.3	15.7	17.4	12.3	34.0	27.7	76.1	112.	35.5	3.34	4.59	2.63	21,190
1952	5.64	9.32	7.54	7.8	10.8	18.0	115.	162.	77.2	20.7	7.77	6.74	27,080
1953	9.08	12.0	14.0	12.4	9.89	12.2	19.3	28.6	69.5	8.83	0.90	1.37	11,920
1954	4.13	7.70	8.76	9.8	12.7	12.2	13.6	9.91	13.6	0.58	0.00	0.00	5,576
1955	0.37	2.68	4.81	5.06	6.21	9.70	14.1	17.8	29.2	10.6	0.59	0.00	6,084
1956	1.32	5.61	9.34	12.4	11.5	24.7	40.3	75.4	53.3	5.24	1.71	1.27	14,640
1957	5.57	-	-	-	-	-	-	-	-	-	-	-	—

Records shown prior to April 1915 were from staff station; ensuing records are from recorder station at the same location.

"E" - Estimates October, November, December 1948, computed on basis discharge at stations on Bruneau River, inserted to complete water year.

The estimates of discharge shown in table 3 have been determined by correlation of the concurrent records available at the gaging stations separately summarized in table 1 and table 2. They represent the flow at the site of the proposed irrigation diversion on East Fork Bruneau River above Salls Ranch.

Table 3

East Fork Bruneau River below Three Creek, near Three Creek, Idaho
(estimated monthly mean discharges)

Water year	Oct. cfs	Nov. cfs	Dec. cfs	Jan. cfs	Feb. cfs	Mar. cfs	Apr. cfs	May cfs	June cfs	July cfs	Aug. cfs	Sept. cfs
1911	7.5	8.3	9.1	39.5	25.3	150.	57.5	89.0	67.0	11.4	4.7	5.0
1912	7.3	8.6	8.5	15.5	20.7	17.7	90.0	248.	22.6	37.9	18.6	14.1
1913	19.2	22.8	20.0	14.7	27.9	56.5	138.	142.	108.	50.0	14.4	9.0
1914	9.4	11.2	8.5	38.8	66.5	89.0	102.	175.	75.5	21.9	8.5	8.3
1915	12.6	12.4			30.1	21.0						
1949	(9.4)	(12.2)	(11.3)	8.5	11.0	36.7	114.	165.	55.5	8.1	6.9	7.1
1950	16.7	15.0	11.6	18.3	12.2	22.7	101.	158.	86.0	15.1	9.8	7.7
1951	11.0	15.5	17.2	12.1	34.8	28.2	81.5	122.	36.5	6.3	7.0	5.8
1952	7.5	9.0	8.3	8.4	10.5	17.8	126.	179.	82.5	20.7	8.4	8.0
1953	8.9	11.7	13.7	12.1	9.5	11.8	19.3	29.0	RC	RC	4.0	RC
1954	6.7	8.4	RC	RC	RC	RC	RC	RC	13.3	3.4	2.0E	2.0E
1955	2.9	5.8	7.1	7.2	7.8	9.3	RC	RC	29.6	10.2	3.4	RC
1956	RC	RC	RC	RC	RC	RC	RC	RC	RC	RC	RC	RC

"RC" designates months when record was collected (see earlier summary, table 1).

Combining the estimates of discharge (table 3) for months when no record was collected with the discharge data (table 1) for 24 months during 1953-56, annual totals may be obtained for 12 complete years, as shown in table 4.

Table 4

Annual discharge of East Fork Bruneau River below Three Creek, near Three Creek, Idaho
(based on actual record or correlative estimates as shown in Table 3)

Water year	Annual total acre-feet	Water year	Annual total acre-feet
1911	28,740	1951	22,750
1912	43,080	1952	29,400
1913	37,560	1953	12,100
1914	37,000	1954	6,081
1949	(26,970)	1955	7,256
1950	28,600	1956	15,760

The average annual net depletion of streamflow between the Three Creek station (proposed diversion point) and the Hot Spring station (Winter Camp Ranch), as indicated by annual discharge at these two stations for the twelve years shown in table 4, is 1,770 acre-feet. This depletion, computed from the differential in flow at the two gaging stations, includes evaporation, consumptive use, and channel losses and makes no allowance for surface or subsurface inflow. Furthermore, the users of these data should keep in mind that stream discharges obtained by correlation are not as reliable as discharges collected at the desired location by standard methods.

Year-to-Year Variations in Runoff

The 25 months of record, when combined with the 123 months of discharge estimates, provide complete coverage for four years 1911 to 1914 and eight years 1949 to 1956. These years probably do not represent average conditions. During the period 1915 to 1948, when no satisfactory basis exists on which to develop discharge estimates for East Fork Bruneau, the years 1915, 1926, 1930, 1931, 1934, 1939, and 1940 were years of short water supply on Salmon Falls Creek and Goose

Creek drainages. It is noted that 1954 and 1955, occurring during the period covered by record or estimate, were low years, also.

The 7-year average runoffs (1949-55) for Goose and Salmon Falls Creeks are 32,600 and 100,660 acre-feet, respectively. Using these averages as bases for comparison, the annual runoffs for individual years (1911 to 1955) have been tabulated in table 5. Percentage coefficients, computed for both Goose and Salmon Falls Creeks in terms of the 1949-55 average, are shown for the individual years of available record.

Table 5

Annual runoff divided by 7-year average 1949-55
(percentage coefficients for individual water years)

Water year	Goose Creek above Trapper Creek	Salmon Falls Creek near San Jacinto	Water year	Goose Creek above Trapper Creek	Salmon Falls Creek near San Jacinto
1911	--- percent	99 percent	1934	34 percent	33 percent
1912	179	153	1935	50	77
1913	120	108			
1914	160	131	1936	79	89
1915	63	54	1937	65	59
			1938	92	103
1916	129	107	1939	80	86
1917	NR	NR	1940	44	56
1918	NR	NR			
1919	NR	84	1941	58	58
1920	95	83	1942	146	154
			1943	137	169
1921	322	207	1944	92	117
1922	169	122	1945	105	129
1923	121	96			
1924	92	80	1946	124	102
1925	118	103	1947	66	66
			1948	73	89
1926	65	56	1949	113	115
1927	99	96	1950	94	115
1928	91	88			
1929	95	84	1951	149	138
1930	55	52	1952	143	155
			1953	102	80
1931	44	40	1954	48	44
1932	95	108	1955	51	54
1933	69	71			

NR - No record collected

For the East Fork of Bruneau River at the proposed diversion, the 7-year average discharge, based on discharge in table 4 (1949-55), is 19,020 acre-feet. Because of the differences in watershed characteristics and variations in upstream irrigation uses, the foregoing percentage figures cannot be applied to obtain flows which were available in East Fork Bruneau River during the intervening years. They do, however, serve as a general guide as to the frequency and severity of the short years as experienced over a long period of time on neighboring watersheds.

SUMMARY OF RESULTS

1. This report does not purport to offer any suggestion as to the sufficiency or insufficiency of the streamflow passing the proposed diversion site on East Fork Bruneau River to serve any specific project.

2. All streamflow records that represent the flow as applying to the diversion site are shown. Mean monthly discharges for all completed months of record are listed in table 1. Corresponding daily discharges with fragmental collections are shown in the appendix (items 2, 3, and 4).

3. Monthly mean discharges resulting from preliminary correlations as listed in table 3 represent the flow at the diversion site as well as at the gage site. They are less accurate than the discharge records as they have been developed by correlation with the flow at a downstream station.

4. Actual discharge records (table 1) and estimated records (table 3) are combined to obtain the annual discharges shown in table 4. These annual totals are presented as the probable discharge of East Fork Bruneau River at the proposed irrigation diversion site for the years shown.

5. The annual net loss or depletion in the stream between the proposed diversion point and the Winter Camp gaging station near Hot Spring (30-mile reach) may be approximated by subtracting the annual totals in table 2 from the totals for corresponding years as shown in table 4. The 12-year average depletion is 1,770 acre-feet.

6. The trend of the intervening channel losses with river stages is important to the accuracy of the correlation. Concurrent record collections during high years like 1921, 1942, 1943, and 1952 would clear up any uncertainty concerning the magnitude of channel losses at high river stages by providing definition of the correlation curve above 100 cfs. Further parallel records during ordinary years would refine the intermediate and lower ranges of the curve and increase the number of correlation plottings, which are recognized to be too few to support other than the preliminary type of information now presented.

7. The frequency of occurence of low-flow years (such as 1954 and 1955) is illustrated in a general way by the long-term percentage listings shown in table 5 for Goose and Salmon Falls creeks, which are computed from actual discharge records.

8. The information developed and presented regarding the streamflow passing the proposed irrigation diversion, although preliminary in nature, should be more representative than that which could have been deduced prior to the availability of the records collected near that point 1953-56.

REFERENCES

Geologic Map, State of Idaho (1947) by United States Geological Survey and Idaho Bureau of Mines and Geology; supplemented by Sectional Aeronautical charts (1954) prepared from several sources by United States Coast and Geodetic Survey. Also, Grazing District maps prepared from several sources by Bureau of Land Management.

Johnson, F. A., 1947, Water-Utilization possibilities in the upper Bruneau River basin, Idaho-Nevada: United States Geological Survey, open file report.

Compilation of Records of Surface Waters of the United States through September 30, 1950 - Part 13 - Snake River Basin (United States Geological Survey Water-Supply Paper 1317).

Barton and Stoddard, 1954, Available water supply for Blue Gulch Irrigation Project: Boise, Idaho, engineers -- unpublished report.

Jensen, Lewis, and Baker, 1951, Characteristics of irrigation waters in Idaho: published by University of Idaho as Research Bulletin 19.

Houston and Naphan, 1952, Consumptive use of water in irrigable areas of the Columbia River Basin in Nevada: U. S. Department of Agriculture, Soil Conservation Service, published as State bulletin.

ACKNOWLEDGMENTS

Boise district personnel of the Surface Water Branch of the Geological Survey participated in computations of current data, report outline, preparation of preliminary correlation curves, determination of estimated discharges, and typing. Acknowledgments for assistance are tendered to W. I. Travis, C. A. Thomas, C. L. Lawrence, and Doris Randall.

Mr. H. A. Swenson, district chemist of Quality of Water Branch of the Geological Survey furnished information on water analyses.

APPENDIX

Appended material referenced in this memorandum is included in the envelope pocket within the back cover.

57-83

East Fork Bruneau River and tributaries near Three Creek, Idaho

The group of four discharge records collected on the upper cross-cut, seven to ten miles upstream from proposed irrigation diversion site, have been combined for reference.

Month and year	Monthly mean cfs	Monthly acre-ft	Month and year	Monthly mean cfs	Monthly acre-ft
Dec. 1912	10.5	646	Jan. 1914	9.17	563
			Feb. 1914	14.9	827
Jan. 1913	8.05	494	Mar. 1914	46.7	2,870
Feb. 1913	8.65	481	Apr. 1914	108.7	6,480
Mar. 1913	24.1	1,480	May 1914	168.2	10,330
Apr. 1913	122.6	7,300	June 1914	62.1	3,700
May 1913	117.8	7,250			
June 1913	82.0	4,880			
July 1913	24.7	1,520			
Aug. 1913	13.7	842	Mar. 1916	32.6*	2,000*
Sept.1913	9.10	542	Apr. 1916	51.7	3,080
Oct. 1913	9.23	567	May 1916	69.2	4,260
Nov. 1913	9.78	582	June 1916	45.3	2,690
Dec. 1913	7.92	487			

*Deadwood Creek contribution during March 1916 estimated.

Combined discharges include the following individual station records as published in Water-Supply Paper 1317:

1. East Fork Bruneau River near Three Creek (P.O.), Idaho
2. Three Creek near Three Creek (P.O.), Idaho
3. Cherry Creek near Three Creek (P.O.), Idaho
4. Deadwood Creek near Three Creek (P.O.), Idaho

57-83

Quality of waters for irrigation, Bruneau River basin, Idaho
Bruneau River below Hot Springs

Composite period	Discharge cfs	Percent sodium	Sodium adsorption ratio SAR	Residual sodium carbonate epm	Specific conductance micromhos cm at 25°C	Classification
1948						
3/30-4/10	371	49	2.1	0.01	400	C2-S1
4/10-24	668	31	.7	0	150	C1-S1
4/24-5/15	707	26	.6	0	150	C1-S1
5/15-6/1	1,177	27	.5	0	100	C1-S1
6/1-22	1,060	34	.8	0	100	C1-S1
6/22-7/8	499	35	.8	.29	150	C1-S1
7/8-27	188	50	1.6	.66	200	C1-S1
7/27-8/12	106	53	1.9	.75	210	C1-S1
8/12-26	86	56	2.2	.99	280	C2-S1
8/26-9/9	74	59	2.5	.97	280	C2-S1
9/9-23	77	55	2.1	.91	260	C2-S1
9/23-10/7	90	57	2.2	.91	250	C2-S1
10/7-12/1	105	43	1.5	.69	250	C2-S1
12/1-1/26	108	43	1.5	.97	250	C2-S1
1949						
1/26-3/23	168	37	1.1	.26	200	C1-S1
3/23-5/2	1,184	26	.6	.37	100	C1-S1
5/2-11	1,519	25	.5	.26	130	C1-S1
5/11-25	2,132	22	.5	.13	110	C1-S1
5/25-6/6	1,558	21	.5	.07	120	C1-S1
6/6-22	860	27	.6	.05	100	C1-S1
6/22-7/8	372	38	1.0	.37	110	C1-S1
7/8-25	179	48	1.6	.62	200	C1-S1
7/25-8/10	111	53	1.9	.56	240	C1-S1
8/10-26	91	54	2.1	1.0	300	C2-S1
8/26-9/9	82	57	2.3	1.1	300	C2-S1
9/9-23	80	56	2.3	1.0	300	C2-S1
9/23-10/7	86	54	2.1	1.0	290	C2-S1
Average 1948-49	--	47	1.5	.50	200	C1-S1

57-83

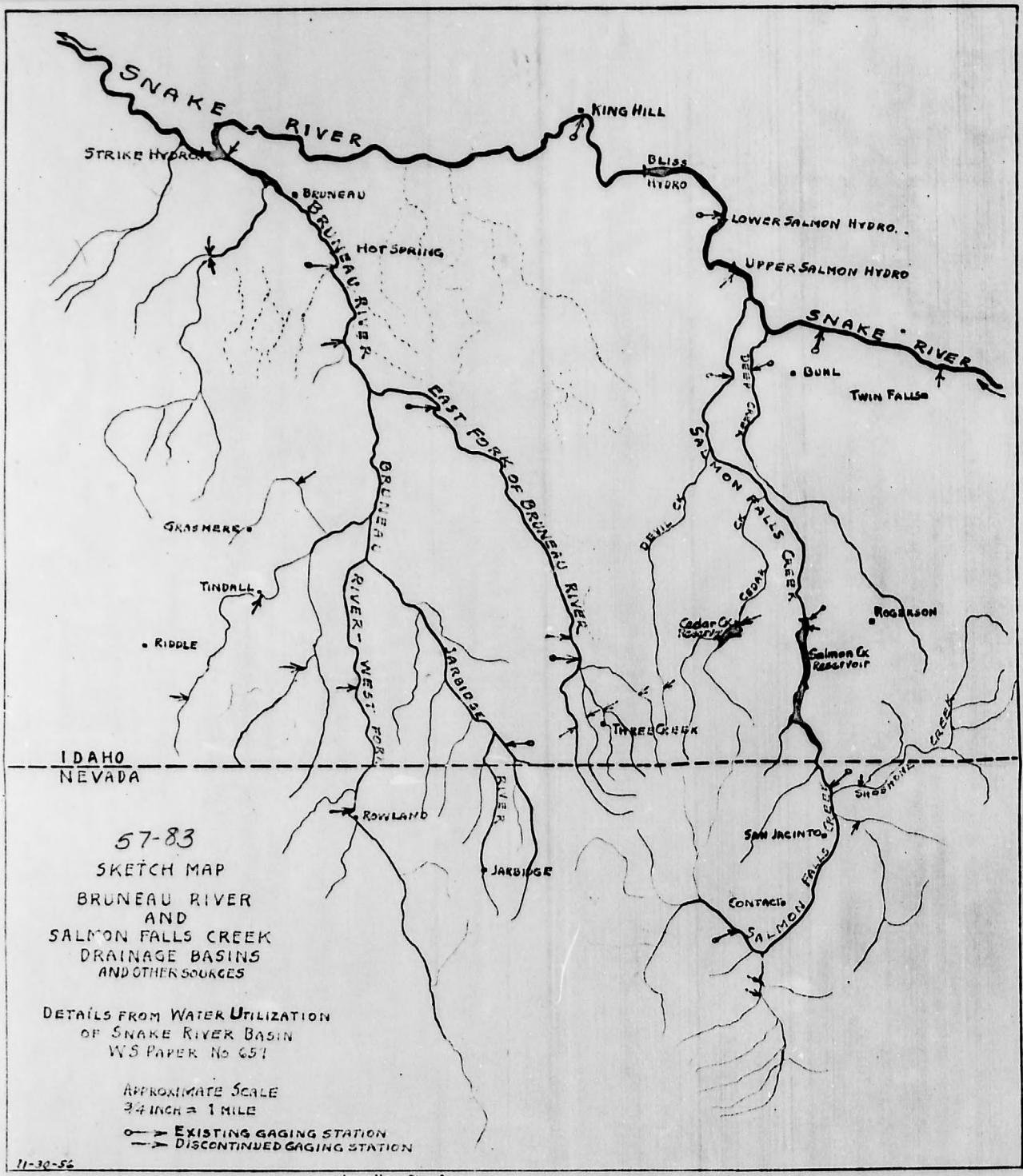
Quality of waters for irrigation, Bruneau River basin, Idaho
Bruneau Hot Springs

Composite period	Discharge cfs	Percent sodium	Sodium adsorption ratio SAR	Residual sodium carbonate epm	Specific conductance micromhos cm at 25°C	Classification
1948						
8/12	--	79	4.6	1.1	250	C2-S1
10/8	--	69	3.5	.89	300	C2-S1
Average 1948	--	73	3.9	.99	280	C2-S1

Note 1. C1-S1: Low salinity and low sodium water.
C2-S1: Medium salinity and low sodium water.

Note 2. Residual sodium carbonate: (a) less than 1.25 probably safe.
(b) 1.25 to 2.5 are marginal.
(c) 2.5 and over not suitable for irrigation use.

Note 3. Furnished by: H. A. Swenson, Quality of Water Branch, Geological Survey, Portland, Oregon.
Source of data: University of Idaho Bulletin 19.


SNAKE RIVER
KING HILL
STRIKE HYDRO
BRUNEAU
BLISS HYDRO
LOWER SALMON HYDRO.
HOT SPRING
BRUNEAU RIVER
UPPER SALMON HYDRO
SNAKE RIVER
BUHL
TWIN FALLS
DEEP CREEK
EAST FORK OF BRUNEAU RIVER
SALMON FALLS CREEK
DEVIL CK
CEDAR
GRASMERE
BRUNEAU RIVER-WEST FORK
TINDALL
ROGERSON
RIDDLE
Cedar Ck Reservoir
Salmon Ck Reservoir
JARBIDGE
THREE CREEK
IDAHO
NEVADA
SHOSHONE
ROWLAND
JARBIDGE RIVER
SAN JACINTO
CONTACT
SALMON FALLS CREEK
57-83
SKETCH MAP
BRUNEAU RIVER
AND
SALMON FALLS CREEK
DRAINAGE BASINS
AND OTHER SOURCES
DETAILS FROM WATER UTILIZATION
OF SNAKE RIVER BASIN
W.S PAPER No 651
APPROXIMATE SCALE
3/4 INCH = 1 MILE
EXISTING GAGING STATION
DISCONTINUED GAGING STATION
11-30-56

PRELIMINARY

CORRELATION RATING CURVE FOR (298) East Fk. Bruneau River, near Hot Spring, Idaho (independent)
(297.5) E.Fk. Bruneau R. below Three Creek, near Three Creek (dependent)

File No. (Washington / Field)

UNITED STATES DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY WATER RESOURCES DIVISION

1 Std deviation, Hot Spring = .016 log units

1 Std deviation, Three Creek = .018 log units

C.I. of 1 in correlation curve

Seasonal adjustment not warranted because of too few data

Unadjusted 1 Std error of estimate $= 0.035\sqrt{\frac{23}{17}} = .041$ log units

CODE

Oct.	Nov.	Dec.	Jan.
○	L	□	×
Feb.	**Mar.**	**Apr.**	**May**
○	L	□	×
June	**July**	**Aug.**	**Sept.**
○	△	□	×

Correlation Curve

Three Ck. 2 Std dev. = .082 log units

Hot Spring 2 Std. dev. = .133 log units

W. Hot Spring

Equal discharge

Equal discharge

10

100

Water year
Mean. Nos
Mean. not plotted
Max. G. H.
Min. G. H.
Plotted by
Checked by

Curve approved by:
Office Engineer.
District Engineer.
Date

13-298, Hot Spring 620 sq mi 3880 ft MONTHLY DISCHARGE IN CUBIC FEET PER SECOND

9-1106a. July 1937

Appendix - Item 3

Daily Gage Height, in Feet, and Discharge, in Second-Feet, of East Fork Bruneau River Creek, Part 1

At Salls Ranch, near Three Creek, Idaho for the Year Ending September 30, 1953.

Published as "East Fork Bruneau River below Three Creek, near Three Creek, Idaho".

Drainage Area ..... Square Miles. Water Stage Recorder ..... Ratio .....

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File Number { Washington 57-83
District 632

Used rating table dated 11-16-50

Gage Read to hundredths Once a Day by L Salls

Gage heights used to ~~be~~ as this between ..... and ..... feet, hundredths, ~~below~~ and ~~feet above these limits~~

Max. D. H. observed 3.18' at 2 p.m. on June 8.
Max. D. H. adopted 0.80 ft. on Sept 15, 16.
Min. D. H. 0.80 ft. on Sept 15, 16.

e Gage reading not representative of mean for the day; discharge estimated on basis of records for station at Winter Camp. a No gage-height record; discharge estimated on basis of records for station at Winter Camp.

DAY	OCTOBER Gage height	OCTOBER Discharge	NOVEMBER Gage height	NOVEMBER Discharge	DECEMBER Gage height	DECEMBER Discharge	JANUARY Gage height	JANUARY Discharge	FEBRUARY Gage height	FEBRUARY Discharge	MARCH Gage height	MARCH Discharge	APRIL Gage height	APRIL Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUGUST Gage height	AUGUST Discharge	SEPTEMBER Gage height	SEPTEMBER Discharge	DAY
1																	a60	23	1.64				a5		1
2																	a50	a20					a5		2
3																	a50	a15					1.06	5.2	3
4																	a60	13	1.38				a5		4
5																	a70	a13					1.00	4.0	5
6																	a100	12	1.34				1.00	4.0	6
7																	a100	a12					1.00	4.0	7
8																	3.17	120	a12				1.00	4.0	8
9																	a120	a11					1.00	4.0	9
10																	a110	11	1.29		1.08	5.2	1.00	4.0	10
11																	a100	11	1.30				0.99	3.8	11
12																	2.75	88	a10		0.80	1.1	0.99	3.8	12
13																	a90	a9					0.98	3.7	13
14																	2.70	84	1.22	88				a2	14
15																	2.68	83	a8				0.80	1.3	15
16																	a80	7.4	1.17				0.80	1.3	16
17																	a80	a7					1.02	4.4	17
18																	2.50	70	1.15	4.9			1.02	4.4	18
19																	2.40	63	1.14	6.7			1.02	4.4	19
20																	2.30	57	a6				1.04	4.8	20
21																	2.30	57	a6				1.04	4.8	21
22																	2.30	57	a7				1.04	4.8	22
23																	2.11	46	a7				1.04	4.8	23
24																	2.00	40	a6				1.04	4.8	24
25																	1.93	36	a6		1.07	4.8	1.04	4.8	25
26																	1.93	36	a5					a4.5	26
27																	1.95	38	1.08	5.2			1.00	4.0	27
28															2.09	44	1.52	e33	a5					a4	28
29																	1.48	e30	a4				1.00	4.0	29
30																	1.38	e26	a3					a4.5	30
31																									31
TOTAL																		2034		281.0				123.1	
Mean Second-feet or square mile																		67.8		9.06				4.10	
Run-off in inches																									
Run-off in acre-feet																		4,030		557				244	
Maximum																		120		23				5.2	
Minimum																		26		3				1.3	

Max. Discharge 120 Date Sept 15, 16.
Min. Discharge 1.3 Date Sept 15, 16.

CALENDAR YEAR

PERIOD YEAR 1952-53

QUARTER: First | Second | Third | Fourth
Computed ..... Checked ..... Date .....
W.L.S. 4/14/55
Ditch applied ..... Ditch checked ..... Date .....
J.E.C. 5/31/55
G.H. reqrd ..... G.H. checked ..... Date .....

Appendix - Item 3
Part 1

Daily Gage Height, in Feet, and Discharge, in Second-Feet, of EAST FORK BRUNEAU River

At Salls Ranch NR THREE CREEK, IDA. for the Year Ending September 30, 1954

Published as "East Fork Bruneau River below Three Creek, near Three Creek, Idaho".

Drainage Area ..... Square Miles. Water-Stage Recorder ..... Ratio .....

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

1953-54

File Number { Washington ..... / District 632

Used rating table dated 11-16-54 as shown

Gage Read to hundredths Once / Twice a Day by L. Salls.

Gage heights used to ~~half-tenths between ..... and ..... feet;~~ hundredths ~~below and tenths above these limits~~.

Day	October Gage height	October Discharge	November Gage height	November Discharge	December Gage height	December Discharge	January Gage height	January Discharge	February Gage height	February Discharge	March Gage height	March Discharge
1					1.30	[b] 8.0		[a] 9	2.21	[b] 12	1.34	[b] 10
2						[a] 8		[a] 9	1.67	[b] 12	1.30	[b] 9.5
3					1.46	[b] 7.5		[a] 9.5		[a] 11		[a] 8
4						[a] 8		[a] 9.5	1.69	[b] 11		[a] 8
5			1.21	8.1		[a] 8		[a] 9.5	1.59	[b] 11	1.26	[b] 7.5
6						[a] 9		[a] 9.5	1.59	[b] 12		[a] 8
7						[a] 8		[a] 9.5	1.54	[b] 12	1.32	[b] 9.0
8						[a] 8		[a] 9.5	1.60	[b] 12		[a] 11
9						[a] 9		[a] 8.5	1.61	[b] 11	1.38	13
10						[a] 9		[a] 8.5	1.40	[b] 11	1.30	11
11					1.40	[b] 8.5		[a] 8.5	1.30	11		[a] 10
12			1.20	7.8		[a] 10	1.67	[a][b] 8.0	1.30	11		[a] 10
13						[a] 10		[a] 8.5	1.40	14		[a] 11
14						[a] 9		[a] 8.5	1.37	13	1.88	[b] 14
15						[a] 10	1.69	[b] 8.5	1.35	12	1.64	[b] 15
16					1.36	[b] 10	1.61	[b] 9.0	1.36	13	1.59	[b] 14
17						[a] 10		[a] 10	1.30	11	1.40	14
18						[a] 11		[a] 9	1.48	[b] 11	1.18	[e] 13
19						[a] 11		[a] 9	1.50	[b] 12		[a] 13
20					1.48	[b] 11		[a] 9	1.34	12	1.18	[e] 13
21						[a] 10	1.25	[b] 9.6		[a] 12	1.40	14
22						[a] 8		[a] 10	1.30	11	1.36	13
23						[a] 6		[a] 11		[a] 11		[a] 13
24			1.30	9.0	1.58	[b] 5	1.31	[b] 9.0		[a] 12	1.38	13
25						[a] 4.5	1.31	[b] 8.5	1.38	[b] 11	1.38	13
26						[a] 6	1.45	[b] 8.5		[a] 12	1.38	13
27						[a] 8	2.09	[b] 9.0		[a] 11	1.38	13
28						[a] 9	2.09	[b] 10	1.34	[b] 11	1.38	13
29						[a] 9	2.21	[b] 11	—	—	1.40	14
30					1.28	[b] 8.5	2.21	[b] 12				[a] 13
31						[a] 8.5		[a] 12			1.38	13
Total						265.5		290.6		326		367.0
Mean						8.56		9.37		11.6		11.8
Second-feet per square mile												
Run-off in inches												
Run-off in acre-feet						527		576		647		728
Maximum						11		12		14		15
Minimum						4.5		8.0		11		7.5

Day	April Gage height	April Discharge	May Gage height	May Discharge	June Gage height	June Discharge	July Gage height	July Discharge	August Gage height	August Discharge	September Gage height	September Discharge
1	1.34	12	1.48	16								
2	1.34	12	1.50	17								
3	1.32	12	1.40	14								
4	1.30	11	1.40	14								
5		[a] 13		[a] 12								
6	1.38	13	1.30	11								
7	1.46	16	1.28	10								
8		[a] 15	1.10	6.0								
9	1.24	[e] 13		[a] 6								
10	1.24	[e] 13	1.10	6.0								
11		[a] 13		[a] 6					0.88 [19]	2.2		
12	1.24	[e] 13	1.06 [16]	5.2								
13	1.24	[e] 13		[a] 6								
14	1.38	13		7								
15	1.58	20		9								
16	1.60	21		9	1.77 [17]	28						
17	1.60	21		9								
18		[a] 22		9								
19		[a] 22		9								
20	1.60	21		8			0.79 [18]	1.2				
21		[a] 16		7								
22	1.40 [15]	14		6								
23	1.40	14		6							0.93 [20]	2.9
24	1.20	8.3		7								
25	1.14	6.9		8								
26		[a] 9		9								
27	1.34	12		8.5								
28	1.60	21		9								
29	1.64	23		10								
30	1.60	21		10								
31				[a] 11								
Total		454.2		280.7								
Mean		15.1		9.05								
Second-feet per square mile												
Run-off in inches												
Run-off in acre-feet		901		557								
Maximum		23		17								
Minimum		6.9		5.2								

Calendar Year

Period Year 1953-54

Quarter: Computed ..... Checked ..... Date .....

Fourth Quarter: Third Quarter: Second Quarter: First Quarter: Quadrant: G.H. corpied - JAS - 11-16-54; G.H. checked - JEC - 11-16-54; Date

Fourth Quarter: Third Quarter: Second Quarter: First Quarter: Quarter: Disch. applied - JEC - 4-14-54; Disch. checked; Date

Max. Disch., observed 1.12 (G.H. 2.21 on Jan. 29, 30, Feb. 1) ft. on Jan. 29, 30

Min. Disch., observed Not determined (backwater from ice) ft. on Daily 20

Max. G.H. 2.21 (G.H. 2.77 on Jan. 29, 30) ft. on Same

Min. G.H. Same ft. on

a - Gage reading not representative of mean for the day; discharge estimated on basis of records for station at Winter Camp. b - Stage-discharge relation affected by ice. c - No gage-height record; discharge estimated on basis of records for station at Winter Camp. d - Gage reading not representative of mean for the day; discharge estimated on basis of records for station at Winter Camp. e - Gage-height record; discharge estimated on basis of records for station at Winter Camp.

57-83

9-1962-a. July 1957

Appendix - Item 3

Daily Gage Height, in Feet, and Discharge, in Second-Feet, of East Fork Bruneau Part 1 River

At ~~Near~~ Salls Ranch, nr. Three Creek, Ida for the Year Ending September 30, 1955

Published as "East Fork Bruneau River below Three Creek, near Three Creek, Idaho."

Drainage Area ..... Square Miles. Water-Stage Recorder ..... Ratio .....

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

1954-55

File Number { Washington 57-83 / District 632

Used rating table dated 11-16-54 as shown.

Gage Read to hundredths. Once ~~Twice~~ a Day by L. Salls

Gage heights used to half tenths between ..... and ..... feet; hundredths below and tenths above these limits.

UNPUBLISHED RECORDS
SUBJECT TO REVISION

Day	October Gage height	October Discharge	November Gage height	November Discharge	December Gage height	December Discharge	January Gage height	January Discharge	February Gage height	February Discharge	March Gage height	March Discharge
1												
2												
3												
4												
5												
6							1.83	23) b 6.0				
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30			1.22	22) b 4.1							1.40	e 10
31											1.42	e 13
											1.42	e 16
											1.34	e 17
TOTAL												
Mean												
Second-feet per square mile												
Run-off in inches												
Run-off in acre-feet												
Maximum												
Minimum												

Day	April Gage height	April Discharge	May Gage height	May Discharge	June Gage height	June Discharge	July Gage height	July Discharge	August Gage height	August Discharge	September Gage height	September Discharge
1	1.40	24) 16	1.40	16								
2	1.42	16	1.62	24								
3	1.44	17	1.70	28								
4	1.32	19	1.62	24								
5	1.40	16		a 20								
6	1.36	14	1.44	17								
7	1.36	14		a 17	1.70	28	1.11	27) 7.4				
8	1.34	14	1.48	18								
9	1.30	12		a 16					0.94	28) 3.7		
10	1.30	12		a 17								
11	1.38	15		a 15								
12	1.40	16		a 13							0.74	29) 1.3
13	1.40	16	1.12	26) 7.6								
14	1.38	15		a 8								
15	1.34	14		a 12								
16	1.34	14		a 15								
17	1.32	13	1.58	22								
18	1.38	15	1.60	23								
19	1.40	16		a 18								
20	1.48	18		a 13								
21	1.44	17		a 10								
22	1.40	16		a 11								
23	1.38	15		a 18								
24	1.38	15		a 30								
25	1.38	15	1.90	38								
26	1.38	15		a 39								
27	1.40	25) 16		a 36								
28	1.38	15		a 28								
29	1.36	14		a 24								
30	1.34	14		a 20								
31				a 21								
TOTAL	448		618.6									
Mean	14.9		20.0									
Second-feet per square mile												
Run-off in inches												
Run-off in acre-feet	889		1,230									
Maximum	18		39									
Minimum	12		7.6									

CALENDAR YEAR 1954

PERIOD YEAR 1954-55

Max. Discharge Not determined. (G. H. ..... ft. at ..... a.m.)

Min. Discharge ..... (G. H. ..... ft. on .....)

a - No gage-height record, discharge estimated as Per "2".

b - Stage-discharge relation affected by ice.

e - Gage reading not representative of mean for the day, discharge estimated on basis of records for station at Winter Camp.

See sheet for station 3 miles upstream.

Computed ..... Checked ..... Date .....

Ditch. applied ..... Ditch. checked ..... Date .....

G. H. copied ..... G. H. checked ..... Date .....

U. S. GOVERNMENT PRINTING OFFICE 16—55218-1

9-192-a. July 1937

Appendix – Item 3 Part 2

Daily Gage Height, in Feet, and Discharge, in Second-Feet, of East Fork Bruneau below Three Creek River ~~Creek~~

At Near Three Creek, Idaho for the Year Ending September 30, 1955

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File Number { Washington 57-83
District 632

Used rating table dated 6-7-56

Drainage Area 210 approx. Square Miles. Water-Stage Recorder Stevens A-35 Ratio 1 : 6

Gage ~~Read to~~ attended ~~Once Twice a Day~~ by USGS Engineers

Gage heights used to ~~half tenths between~~ ... and ... feet, hundredths, ~~below and tenths above these limits~~

UNPUBLISHED RECORDS SUBJECT TO REVISION

Day	October		November		December		January		February		March	
	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
Total												
Mean												
Second-feet per square mile												
Run-off in inches												
Run-off in acre-feet												
Maximum												
Minimum												

Day	April		May		June		July		August		September	
	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
1											2.50	3.4
2											2.50	3.4
3											2.50	3.4
4											2.50	3.4
5											2.50	3.4
6											2.50	3.4
7											2.45	2.6
8											2.36	1.5
9											2.39	1.9
10											2.38	1.8
11											2.35	1.4
12											2.34	1.3
13											2.34[3]	1.9
14											2.35	1.4
15											2.39	1.9
16											2.38	1.8
17											2.36	1.5
18											2.43	2.4
19											2.43	2.4
20											2.44	2.5
21											2.44	2.5
22											2.48	2.7
23											2.57	2.2
24											2.54	1.9
25											2.53	1.8
26											2.55	2.0
27											2.55	2.0
28											2.56	2.1
29											2.56	2.1
30											2.56	2.1
31												
Total									(2.50)[1] 2.49	.34 .32		67.5
Mean												2.25
Second-feet per square mile												
Run-off in inches												
Run-off in acre-feet												134
Maximum												2.4
Minimum												1.9

Max. Discharge Not determined Second (G. H. 2.32 ft. on Sept. 11, 12, 13)
Min. Discharge 1.1 Second (G. H. Some ft. on)

Calendar Year

Period Year

Fourth Quarter: Computed GEL 6-14-56; Checked MK 6-19-56; Date
Third Quarter:
Second Quarter:
First Quarter:

Fourth Quarter: Disch. applied GEL 6-21-56; Disch. checked MK 6-21-56; Date
Third Quarter:
Second Quarter:
First Quarter:

Fourth Quarter: G. H. copied; G. H. checked; Date
Third Quarter:
Second Quarter:
First Quarter:

U. S. GOVERNMENT PRINTING OFFICE 16—65518-1

9-192-a. July 1937

Daily Gage Height, in Feet, and Discharge, in Second-Feet, of East Fork Bruneau below Three Creek River Creek

At Near Three Creek, Idaho for the Year Ending September 30, 1956

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File Number { Washington 57-83. District 632

Used rating table dated 6-7-56

Drainage Area 210, approx. Square Miles. Water-Stage Recorder Stevens A-35 Ratio 1 : 6

Gage Read to attended Once Twice a Day by U.S.G.S. Engineers

Gage heights used to half-tenths between ... and ... feet; hundredths, below and tenths above these limits.

UNPUBLISHED RECORDS
SUBJECT TO REVISION

Day	October Gage height	October Discharge	November Gage height	November Discharge	December Gage height	December Discharge	January Gage height	January Discharge	February Gage height	February Discharge	March Gage height	March Discharge
1	2.58	2.2	2.92	6.7	2.95	8.4	2.99	9.5	3.00	9	3.05	12
2	2.59	2.2	2.92	6.7	2.95	8.7	2.94	9.7	3.05	10	3.18	13
3	2.59	2.1	2.92	6.7	2.99	8.5	2.98	10	3.11	11	3.05	13
4	2.61	2.2	2.92	6.7	3.01	8.2	2.94	10	3.14	11	2.97	14
5	2.64	2.5	2.92	6.7	2.93	8.0	2.95	11	3.16	11	2.97	14
6	2.67	2.8	2.92	6.7	2.97	9.5	2.93	10	3.15	11	3.06	12
7	2.69	2.9	2.92	6.7	2.96	9.2	2.94	11	3.16	11	2.97	11
8	2.73	3.4	2.92	6.7	2.94	9.0	2.95	10	3.17	11	2.91	12
9	2.77	3.9	2.93	7.0	2.93	8.7	3.01	10	3.17	10	3.04	12
10	2.79	4.2	2.93	7.0	2.93	8.7	2.94	10	3.19	11	3.01	11
11	2.80	4.2	2.95	7.0	2.93	9.0	2.92	10	3.23	11	3.02	9.5
12	2.82	4.6	2.92	6.5	2.97	10	2.93	11	3.27	11	2.99	9.5
13	2.83	4.8	2.91	6.0	2.99	9.0	2.94	11	3.42	11	3.01	11
14	2.83	4.8	2.92	5.0	2.96	8.0	2.94	11	3.27	10	2.99	10
15	2.84	5.0	2.83	4.5	2.92	8.0	3.06	16	3.29	9.5	3.01	10
16	2.84	5.0	2.94	5.5	2.92	8.5	3.05	15	3.24	9	3.07	11
17	2.85	5.2	2.96	6.5	2.93	8.5	2.98	13	3.27	10	3.26	13
18	2.85	5.2	2.98	8.2	2.90	8.7	2.95	12	3.32	9.5	3.13	18
19	2.86	5.4	3.04	9.7	2.92	9.2	2.96	12	3.30	9	3.17	23
20	2.89	6.1	3.03	9.7	2.96	10	2.97	13	3.33	9	3.32	33
21	2.86	5.4	2.98	8.4	2.93	9.5	2.98	13	3.42	9	3.39	38
22	2.86	5.4	2.94	7.4	2.94	9.7	2.99	13	3.40	10	3.37	36
23	2.86	5.4	2.93	7.4	2.94	9.7	3.04	13	3.35	11	3.38	37
24	2.85	5.2	2.92	7.2	2.94	9.7	3.11	12	3.31	11	3.34	34
25	2.86	5.4	2.93	7.4	2.93	9.5	3.19	11	3.28	11	3.40	39
26	2.87	5.6	2.92	7.4	2.98	9.2	3.03	11	3.28	11	3.45	43
27	2.90	6.3	2.93	7.7	3.09	9	3.05	10	3.24	11	3.39	38
28	2.90	6.3	2.92	7.4	3.08	9	3.06	9	3.22	12	3.33	33
29	2.89	6.1	2.91	7.4	3.03	9	2.97	10	3.14	11	3.30	31
30	2.90	6.3	2.92	7.7	2.94	9	2.95	10			3.27	30
31	2.91	6.5			2.98	9	2.98	8			3.26	29
Total		142.6		211.6		278.1		345.2		302.0		660.0
Mean		4.60		7.05		8.97		11.1		10.4		21.3
Second-feet per square mile												
Run-off in inches												
Run-off in acre-feet		283		420		552		685		599		1,310
Maximum		6.5		9.7		10		16		12		43
Minimum		2.1		4.5		8.0		8		9		9.5

Day	April Gage height	April Discharge	May Gage height	May Discharge	June Gage height	June Discharge	July Gage height	July Discharge	August Gage height	August Discharge	September Gage height	September Discharge
1	3.28	31	3.48	48	4.12	100	3.05	14	2.78	4.8	2.79	6.5
2	3.25	28	3.43	43	4.14	102	3.03	14	2.77	4.6	2.77	6.1
3	3.22	27	3.47	47	4.08	96	3.02	13	2.77	4.6	2.77	6.1
4	3.20	25	3.57	55	4.01	89	2.99	12	2.76	4.4	2.77	6.1
5	3.20	25	3.68	65	3.93	82	3.01	13	2.80	5.0	2.78	6.3
6	3.18	24	3.73	71	3.92	81	3.00	12	2.84	5.9	2.78	6.3
7	3.17	24	3.82	79	3.82	72	2.97	11	2.79	5.6	2.78	6.3
8	3.17	24	3.86	83	3.71	62	2.95	10	2.76	5.4	2.76	5.9
9	3.16	23	3.89	86	3.67	58	2.93	9.7	2.75	5.2	2.71	4.8
10	3.18	25	3.86	83	3.62	54	2.89	8.4	2.75	5.2	2.72	5.0
11	3.27	31	3.85	82	3.55	48	2.87	7.9	2.75	5.2	2.73	5.2
12	3.35	36	3.84	81	3.49	43	2.83	7.0	2.75	5.2	2.73	5.2
13	3.33	35	3.69	67	3.40	36	2.80	6.3	2.75	5.2	2.72	5.0
14	3.33	35	3.60	60	3.25	25	2.79	5.9	2.74	5.0	2.71	4.8
15	3.33	35	3.50	51	3.64	58	2.82	6.5	2.76	5.4	2.71	4.8
16	3.34	36	3.40	43	3.97	86	2.82	6.5	2.76	5.4	2.61	3.1
17	3.36	37	3.33	37	3.66	57	2.81	6.3	2.76	5.4	2.63	3.4
18	3.36	37	3.35	39	3.53	46	2.77	5.4	2.77	5.6	2.65	3.7
19	3.34	36	3.49	50	3.43	38	2.75	4.8	2.78	6.1	2.66	3.9
20	3.39	39	3.58	58	3.42	37	2.74	4.6	2.78	6.1	2.67	4.2
21	3.44	43	3.72	71	3.52	45	2.76	5.0	2.78	6.1	2.66	4.1
22	3.55	53	3.88	85	3.43	37	2.77	5.2	2.85	7.2	2.66	4.1
23	3.66	62	3.90	87	3.34	31	2.76	4.8	2.81	6.7	2.66	4.1
24	3.70	66	4.53	146	3.26	25	2.75	4.6	2.79	6.3	2.67	4.2
25	3.73	69	4.72	170	3.26	25	2.75	4.6	2.78	6.1	2.68	4.4
26	3.71	67	4.59	153	3.19	21	2.75	4.6	2.82	7.0	2.68	4.4
27	3.79	74	4.68	165	3.11	17	2.74	4.2	2.81	6.7	2.68	4.6
28	3.85	81	4.79	179	3.11	17	2.77	4.8	2.82	7.0	2.68	4.6
29	3.87	64	4.64	160	3.09	16	2.91	7.9	2.82	7.0	2.67	4.4
30	3.58	56	4.37	127	3.07	15	2.81	5.6	2.81	6.7	2.67	4.4
31			4.19	107			2.79	5.2	2.79	6.3		
Total		1,248		2,678		1519		234.8		178.4		146.0
Mean		41.6		86.4		50.6		7.57		5.75		4.87
Second-feet per square mile												
Run-off in inches												
Run-off in acre-feet		2,480		5,310		3,010		466		354		290
Maximum		81		179		102		14		7.2		6.5
Minimum		23		37		15		4.2		4.4		3.1

Total for Year 1955-56: 7,943.7 | Mean: 21.7 | Run-off in acre-feet: 15,759 | Maximum: 179 | Minimum: 2.1

Max. Discharge 185 Sec.-ft. at 6-7pm on May 28
Min. Discharge 2.0 Sec.-ft. on Oct. 3

Note. - Stage-discharge relation affected by ice Nov. 11-17, Dec. 3-5, 13-17, Dec. 26 to Jan. 3, Jan. 8-10, Jan. 23 to Mar. 3, Mar. 6, 7, 9-18.
Computed by subdividing the day.

Oct. 1 Mean G. H. 2.57 ft. on
Shift: Some ft. on
(G. H. 4.83 ft. on
(G. H. 2.58 ft. on

CALENDAR YEAR 1955

WATER YEAR 1955-56

Fourth: CWP
Third: CWP ARK 1/3/57
Second: CWP
First: CWP
Quarters: Computed
Checked
Date
Fourth: ARK
Third: SAGT, ARK, CWP 1/3/57
Second: SAGT
First: SAGT
Quarters: Disch. applied 6-14-56
Disch. checked
Date
Fourth: CWP ARK 1/3/57
Third: CWP
Second: CWP
First: CWP
Quarters: G.H. applied 6-14-56
G.H. checked
Date

9-192-a. July 1937

Appendix – Item 4

57-83

Daily Gage Height, in Feet, and Discharge, in Second-Feet, of East Fork Bruneau River, at Winter Camp Ranch nr. Hot Spring, Ida. for the Year Ending September 30, 1951

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES BRANCH

1950-51

File Number { Washington / District 97

Used rating table dated 2-2-50 as shown

Drainage Area 620 Square Miles. Water-Stage Recorder Stevens A-35 Ratio 1 : 6

Gage ~~Read by~~ attended ~~Once a Day by~~ U.S.G.S. Engineers

Gage heights used to ~~half-tenths between~~ and ~~feet~~ hundredths, ~~below and tenths above zero~~ limits

Max. Disch. 160 ft. per sec. on May 18 (G. H. 5.06 ft.) Max. G. H. Some ft. at on

Min. Disch. 0 ft. per sec. on Sept. 22 to Sept. 30 (G. H. 1.66 ft.) Min. G. H. 1.66 ft. on July 21.

Note – Stage-discharge relation affected by backwater from beaver dams July 27 to Aug. 18, Aug. 22 to Sept. 30; discharge estimated on basis of weather records and records for Bruneau River and other nearby streams. b Stage-discharge relation affected by ice.

Day	October Gage height	October Discharge	November Gage height	November Discharge	December Gage height	December Discharge	January Gage height	January Discharge	February Gage height	February Discharge	March Gage height	March Discharge
1	2.40	82	2.69	16	2.62	16	2.43	b 10	2.99	b 8	2.56	b 21
2	2.40	82	2.77	19	2.64	16	2.58	9	2.58	8	2.96	21
3	2.42	8.5	2.76	19	2.75	b 16	2.58	10	2.73	10	2.94	20
4	2.45	9.4	2.82	21	2.90	27	2.67	11	2.93	15	2.73	19
5	2.46	9.7	2.74	18	3.23	42	2.53	10	2.97	20	3.10	21
6	2.52	11	2.68	16	3.01	32	2.37	9	3.10	35	2.75	20
7	2.51	11	2.67	15	2.83	24	2.34	8	3.47	52	2.59	21
8	2.51	11	2.67	16	2.79	23	2.34	8	4.05	b 80	2.63	20
9	2.50	10	2.69	16	2.78	23	2.45	10	4.22	108	2.60	b 19
10	2.50	10	2.66	15	2.72	20	2.60	12	3.36	59	2.43	16
11	2.51	10	2.57	13	2.66	18	2.67	13	3.12	47	2.64	25
12	2.51	10	2.67	b 12	2.63	17	2.78	14	3.04	43	2.61	24
13	2.50	9.7	2.79	13	2.63	17	2.82	14	3.00	41	2.71	28
14	2.51	10	2.64	13	2.63	17	2.80	13	2.93	38	2.67	26
15	2.53	11	2.64	13	2.62	17	2.77	13	2.84	33	2.69	27
16	2.53	10	2.70	13	2.61	17	2.79	13	2.82	32	2.87	34
17	2.59	12	2.56	b 13	2.59	16	2.77	13	2.80	b 30	2.87	34
18	2.59	12	2.56	13	2.58	16	2.86	14	2.78	29	2.71	28
19	2.60	12	2.58	14	2.57	15	2.76	12	2.85	29	2.64	25
20	2.59	12	2.62	15	2.58	16	2.68	11	2.83	28	2.67	26
21	2.60	12	2.68	17	2.58	b 15	2.67	9	2.78	27	2.68	26
22	2.59	12	2.83	23	2.64	14	2.68	11	2.80	b 28	3.02	42
23	2.60	12	2.76	20	2.68	14	2.76	13	2.72	28	3.10	46
24	2.62	13	2.66	17	2.78	13	2.94	16	2.70	27	2.91	34
25	2.62	13	2.63	16	2.66	13	3.04	17	2.69	27	2.82	32
26	2.61	13	2.63	14	2.48	11	3.12	18	2.66	26	2.83	32
27	2.63	14	2.62	15	2.50	11	3.21	19	2.58	22	2.86	34
28	2.65	14	2.61	15	2.53	11	3.31	17	2.54	21	2.87	34
29	2.65	14	2.61	15	2.57	12	2.87	15			2.85	33
30	2.65	14	2.60	15	2.59	11	2.55	11			2.85	33
31	2.65	14			2.43	b 10	2.57	b 9			2.91	36
Total		350.7		472		540		382		951		859
Mean		11.3		15.7		17.4		12.3		34.0		27.7
Run-off in inches												
Run-off in acre-feet		696		936		1,070		758		1,890		1,700
Maximum		14		23		42		19		108		46
Minimum		8.2		12		10		8		8		16

Day	April Gage height	April Discharge	May Gage height	May Discharge	June Gage height	June Discharge	July Gage height	July Discharge	August Gage height	August Discharge	September Gage height	September Discharge
1	2.92	36	3.99	94	3.73	81	2.19	10	2.38	1.9	2.39	
2	2.91	36	4.07	98	3.63	75	2.13	8.5	2.38	1.8	2.40	
3	3.16	48	4.08	99	3.52	69	2.03	6.0	2.37	1.7	2.41	5
4	3.62	72	4.09	100	3.45	66	2.03	6.0	2.40	2.5	2.38	
5	3.41	61	4.05	97	3.33	59	2.02	5.8	2.37	4.0	2.34	
6	3.49	66	4.18	105	3.15	50	1.90	5.0	2.46	4.0	2.21	
7	3.60	72	4.23	108	3.06	46	1.92	4.8	2.51	4.0	2.06	
8	3.66	75	4.40	118	3.22	54	1.92	4.8	2.47	3.8	2.00	4
9	3.71	78	4.63	132	3.19	52	1.93	4.2	2.45	3.8	1.94	
10	3.75	80	4.58	129	3.09	47	1.92	4.8	2.43	3.8	2.09	
11	3.78	82	4.50	124	2.99	42	1.91	3.9	2.41	3.6	2.09	
12	3.89	88	4.48	123	2.92	38	1.91	3.9	2.39	3.6	2.06	
13	3.83	85	4.72	138	2.90	38	1.88	3.4	2.30	3.6	2.02	3
14	3.79	82	5.01	156	2.87	36	1.87	3.3	2.26	3.4	2.03	
15	3.83	84	4.73	139	2.80	32	1.91	3.9	2.31	3.4	2.06	
16	3.98	92	4.51	125	2.73	30	1.87	3.3	2.34	3.4	2.21	
17	4.04	96	4.34	115	2.63	26	1.83	2.7	2.37	3.2	2.20	
18	4.03	95	4.20	107	2.58	24	1.81	2.4	2.31	3.2	2.20	2
19	3.99	93	4.13	104	2.56	23	1.76	1.8	2.11	3.1	2.15	
20	3.95	91	4.21	108	2.51	21	1.69	1.1	2.10	3.0	2.07	
21	3.91	88	4.35	116	2.46	19	1.67	1.0	2.20	4.5	2.07	
22	3.88	87	4.42	120	2.47	20	1.72	1.4	2.34	7.0	2.06	
23	3.83	84	4.36	117	2.46	19	1.96	1.8	2.44	7.5	2.04	1
24	3.75	80	4.23	110	2.42	18	1.97	1.8	2.46	9.0	1.99	
25	3.64	73	4.20	108	2.39	16	1.89	1.0	2.54	8.5	1.89	
26	3.60	71	4.15	105	2.36	15	1.87	.9	2.53	8.0	1.84	
27	3.61	72	4.12	103	2.27	13	1.96	1.0	2.43	7.5	1.87	
28	3.59	70	4.00	96	2.28	13	1.99	1.5	2.37	7.0	1.86	0.8
29	3.50	66	3.91	91	2.20	13	2.18	1.8	2.38	6.5	1.85	
30	3.76	80	3.89	90	2.19	10	2.35	2.0	2.37	6.0	1.88	
31			3.79	83			2.43	2.0	2.37	6.0		
Total		2,283		3457		1,065		103.4		142.3		79.0
Mean		76.1		112		35.5		3.34		4.59		2.63
Run-off in inches												
Run-off in acre-feet		4,530		6,860		2,110		205		282		157
Maximum		96		156		81		10		9.0		–
Minimum		36		83		10		0.9		1.7		–

Calendar Year 1950	Year 1950-51
Total	10,684.4
Mean	29.3
Run-off in inches	
Run-off in acre-feet	21194
Maximum	156
Minimum	–

Quarter: First / Second / Third / Fourth — Computed — Checked — Date

Quarter: First / Second / Third / Fourth — Disch. applied — Disch. checked — Date

Quarter: First / Second / Third / Fourth — G. H. copied — G. H. checked — Date

Shift-ar

9-192-a. July 1937

Appendix - Item 4

Daily Gage Height, in Feet, and Discharge, in Second-Feet, of EAST FORK BRUNEAU River Creek

At WINTER CAMP RANCH NEAR HOT SPRING, IDAHO for the Year Ending September 30, 1952

Drainage Area 620 Square Miles. Water-Stage Recorder A-35 STEVENS Ratio 1 : 6

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES BRANCH

File Number { Washington 57-83
District 97

Used rating table dated 2-2-50

Gage heights used to [illegible] hundredths, [illegible]

Gage Read to Attended Once Twice a Day by USGS. Engineers.

Day	October Gage height	October Discharge	November Gage height	November Discharge	December Gage height	December Discharge	January Gage height	January Discharge	February Gage height	February Discharge	March Gage height	March Discharge
1	1.86 -.20	0.8	2.30 -.17	7.9	2.33 -.17	8.8	2.50	b 6	3.14	b 11	2.95	b 10
2	1.96 -.26	1.0	2.27	7.0	2.32	8.5	2.36	5	3.20	12	2.97	10
3	2.21 -.46	1.5	2.95	b 7.5	2.28 -.17	7.3	2.58	4	3.17	13	2.80	10
4	2.20 V	1.8	2.34	b 8.5	2.28	b 6.5	2.69	3	3.20	13	2.85	10
5	1.83 [31] -.05	1.8	2.36	9.7	2.32	6.5	2.72	4	3.13	12	2.99	10
6	1.93 -.07	2.8	2.32	8.5	2.37	7	2.73	6	3.01	11	2.84	10
7	2.02 -.10	3.7	2.32	8.5	2.57	6	2.82	7	2.91	11	2.92	10
8	2.02 -.10	3.7	2.32	8.5	2.29	5	2.87	7	2.88	10	3.02	10
9	2.05 -.13	3.7	2.31	8.2	2.18	4	2.93 [34]	7	2.89	10	2.96	10
10	2.10 -.15	4.2	2.32	8.5	2.19	4	2.91	7	2.85	11	2.94	10
11	2.11 -.17	4.0	2.34	9.1	2.48	5	2.82	8	2.84	11	2.90	11
12	2.11	4.0	2.38	10	2.55	7	2.87	8	2.89	11	2.72	11
13	2.12	4.2	2.39	11	2.57	9	2.90	8	2.73	11	2.73	11
14	2.13	4.4	2.45	12	2.58	9	2.94	8	2.64	11	2.62	11
15	2.22	6.0	(245) [32]	12	2.53	9	3.02	8	2.65	9	2.64	12
16	2.24	6.4	(250) [33]	14	2.46	9	3.05	8	2.90	11	2.78	12
17	2.24	6.4	2.22	6.0	2.52	9	3.00	7	2.94	13	2.61	12
18	2.26	6.8	2.26	b 5.5	2.57	9	3.07	6	2.94	12	2.49	12
19	2.26	6.8	2.29	b 6.5	2.54	9	3.03	5	2.83	11	2.48	12
20	2.26	6.8	2.35	9.4	2.53	9	3.08	7	2.86	10	2.52	12
21	2.27	7.0	2.46	13	2.51	9	3.07	10	2.92	10	2.56	12
22	2.27	7.0	2.44	12	2.57	9	3.06	9	2.72	10	2.48	13
23	2.27	7.0	2.40	11	2.57	8	2.98	9	2.80	10	2.48	b 15
24	2.31	8.2	2.42	b 10	2.60	7	3.03	10	2.86	10	2.46	18
25	2.32	8.5	2.38	10	2.61	6	3.10	10	2.86	10	2.68	27
26	2.34	9.1	2.31	8.2	2.50	5	3.16	10	2.84 [36]	10	2.70	28
27	2.37	10	2.39	11	2.56	6	3.19	11	2.89	10	2.74 [37]	30
28	2.37	10	2.31	8.2	2.66	8	3.19	11	2.91	10	2.93	38
29	2.35	9.4	2.35	9.4	2.71	10	3.11	11	3.01	b 10	3.25	54
30	2.34	9.1	2.32 -.17	8.5	2.73	10	2.97	11			3.33	58
31	2.33 -.17	8.8			2.68	b 8	3.06	b 10			3.14	49
Total		174.9		279.6		233.6		241		314		558
Mean		5.64		9.32		7.54		7.8		10.8		18.0
Second-feet per square mile												
Run-off in inches												
Run-off in acre-feet		347		555		463		478		623		1,110
Maximum		10		14		10		11		13		58
Minimum		0.8		5.5		4		3		9		10

Day	April Gage height	April Discharge	May Gage height	May Discharge	June Gage height	June Discharge	July Gage height	July Discharge	August Gage height	August Discharge	September Gage height	September Discharge
1	3.06	45	5.20 +.04	173		a 150	2.93 +.12	44	2.24 +.02	12	2.04 +.06	7.0
2	2.95	40	4.98 +.04	157		a 140	2.82 +.10	38	2.24 +.02	12	2.03	6.8
3	3.13	48	4.99 +.05	159	(4.34) [38] +.24	130	2.74 +.09	34	2.34 +.04	15	2.01	6.4
4	3.32	58	5.17 +.05	171	4.27 +.23	125	2.64 +.08	29	2.35 +.04	16	1.98 [39]	5.8
5	3.60	73	5.44 +.06	194	4.15 +.22	117	2.62 +.07	28	2.27 +.03	13	1.96	5.4
6	3.87	88	5.73 +.06	219	4.09 +.22	114	2.59 +.07	26	2.25 +.03	12	1.96	5.4
7	4.56	129	5.64 +.07	212	4.11 +.22	115	2.55 +.06	24	2.17 +.02	9.7	1.97	5.6
8	5.52	196	5.48 +.07	198	3.99 +.21	108	2.52 +.06	23	2.11 +.01	7.6	2.00	6.2
9	5.08	162	5.58 +.08	207	3.89 +.20	101	2.48 [39A] +.05	21	2.07	6.4	2.02	6.6
10	4.62	132	5.41 +.08	193	3.75 +.19	92	2.45 +.05	20	2.07 [40]	6.4	2.02	6.6
11	4.38	118	5.15 +.09	173	3.58 +.17	82	2.40 +.05	18	2.06	6.2	2.04	7.0
12	4.17	106	(4.83) +.09	150	3.60 +.17	83	2.46 +.05	20	2.05 [40A]	6.0	2.04	7.0
13	4.02	97	a 140	348 +.16	75	2.86 +.11	40	2.04 +.01	6.0	2.06	7.6	
14	4.04	98	160	3.35 +.15	68	2.83 +.10	38	2.04	6.0	2.08	8.2	
15	4.22	109	180	3.21 +.14	60	2.69 +.08	31	2.02 +.01	5.6	2.05	7.3	
16	4.50	125	160	3.08 +.13	52	2.54 +.06	24	2.02 +.02	5.8	2.05	7.3	
17	4.16	106	150	3.02 +.12	49	2.41 +.05	18	2.02	5.8	2.08 +.06	8.2	
18	4.06	100	140	2.90 +.11	42	2.35 +.04	16	2.10	7.6	2.07 +.07	8.2	
19	4.20	108	130	2.82 +.10	38	2.34 +.04	15	2.07 +.02	6.8	2.06	7.9	
20	4.47	123	130	2.73 +.09	33	2.36 +.04	16	2.03 +.03	6.2	2.05	7.6	
21	4.75	140	140	2.73 +.09	33	2.34 +.04	15	2.02	6.0	2.05	7.6	
22	4.48	124	170	2.80 +.10	37	2.31 +.03	14	2.03	6.2	2.05	7.6	
23	4.21	108	150	3.02 +.12	49	2.26 +.03	13	2.04 +.03	6.4	2.03	7.0	
24	4.17 [41]	106	130	2.99 +.12	46	2.23 +.02	12	2.03 +.04	6.4	1.94	6.2	
25	4.26	111	130	3.19 +.14	58	2.18 +.02	10	2.00	5.8	1.95	5.4	
26	4.45 +.01	123	130	3.36 +.15	68	2.13 +.01	8.2	2.02	6.2	1.94	5.2	
27	4.78 +.01	142	140	3.50 +.17	77	2.07 °	6.4	2.02 +.04	6.2	1.95	5.4	
28	5.02 +.02	159	160	3.35 +.15	68	2.14 +.01	8.5	2.00 +.05	6.0	1.98	6.0	
29	5.21 +.02	172	150	3.16 +.14	57	2.25 +.03	12	2.00	6.0	2.01	6.6	
30	5.44 +.03	191	150	2.97 +.12	46	2.21 +.02	11	2.03	6.6	2.03 +.07	7.0	
31			a 170			2.17 +.02	9.7	2.05 +.05	7.0			
Total		3437		5,016		2,315		642.8		240.9		202.1
Mean		115		162		77.2		20.7		7.77		6.74
Second-feet per square mile												
Run-off in inches												
Run-off in acre-feet		6,820		9,950		4,590		1,270		478		401
Maximum		196		219		150		44		16		8.2
Minimum		40		130		33		6.4		5.6		5.2

Paper supply exhausted; range 4.23-5.44

Max. Disch. 222 Sept. at 11pm. on May 6 (G. H. 5.77 ft. at 11am. on Apr. 8)
Min. Disch. 27 Sept. on Oct. 1 (G. H. 1.84 ft. on Oct. 5)

a No gage-height record; discharge estimated on basis of records for previous stage and records for Bruneau River near Hot Spring. b Stage-discharge relation affected by ice.
V Variable shift; correction during the day.

Shift: 106 5.76 1.20

CALENDAR YEAR 1951 — WATER YEAR 1951-52

10009.6	Total	174.9	279.6	233.6	241	314	558	3437	5,016	2,315	642.8	240.9	202.1	13,654.9
27.4	Mean	5.64	9.32	7.54	7.8	10.8	18.0	115	162	77.2	20.7	7.77	6.74	37.3
	Second-feet per square mile													
	Run-off in inches													
19857	Run-off in acre-feet	347	555	463	478	623	1,110	6,820	9,950	4,590	1,270	478	401	27,085
156	Maximum	10	14	10	11	13	58	196	219	150	44	16	8.2	219
	Minimum	0.8	5.5	4	3	9	10	40	130	33	6.4	5.6	5.2	0.8

Third Fourth — Second — First — Quarter — Corrected — Checked — Date — Fourth — Third — Second — First — Quarter — Disch. applied — Disch. checked — Date — Fourth — Third — Second — First — Quarter — G.H. applied — G.H. checked — Date

JEC Cole 12-17-53 — JEC Cole 12-16-53

Appendix - Item 4

57- 83

9-Hct-a. July 1937

Daily Gage Height, in Feet, and Discharge, in Second-Feet, of EAST FORK BRUNEAU River

Near HOT SPRING, IDAHO (at Winter Camp Ranch) for the Year Ending September 30, 1953

Drainage Area 620 Square Miles. Water-Stage Recorder Stevens A-35 Ratio 1 : 6

UNITED STATES
DEPARTMENT OF THE INTERIOR 1952-53
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File Number: Washington ____ District 97

Used rating table dated 3/10/54 as shown

Gage attended by U.S.G.S. Engineers

Gage heights used to hundredths

Day	Oct. Gage height	Oct. Discharge	Nov. Gage height	Nov. Discharge	Dec. Gage height	Dec. Discharge	Jan. Gage height	Jan. Discharge	Feb. Gage height	Feb. Discharge	Mar. Gage height	Mar. Discharge	Apr. Gage height	Apr. Discharge	May Gage height	May Discharge	June Gage height	June Discharge	July Gage height	July Discharge	Aug. Gage height	Aug. Discharge	Sept. Gage height	Sept. Discharge
1	2.04	7.5	2.16	11	2.32	13	2.54	15	2.11	9.6	2.25	12	2.20	14	2.37	20	3.15	56	2.49	25	1.57	.5	1.64	.9
2	2.04	7.5	2.16	11	2.35	15	2.48	14	2.10	9.3	2.26	11	2.20	14	2.34	19	3.06 [48]	52	2.44	23	1.58	.6	1.67	1.2
3	2.01	6.6	2.17	12	2.37	15	2.40	14	2.11	9.6	2.25	10	2.20	14	2.31	17	3.10	54	2.38	20	1.60	.7	1.74	1.9
4	2.03	7.2	2.14	11	2.40	14	2.36	14	2.12	10	2.10	10	2.20	14	2.32	18	3.34	66	2.35	19	1.68	1.3	1.76	2.1
5	2.03	7.2	2.15	11	2.50	14	2.36	13	2.12	10	2.22	11	2.20	14	2.33	18	3.36	67	2.32	18	1.70	1.5	1.75	2.0
6	2.05	7.8	2.17	12	2.56	14	2.31	12	2.14	11	2.15	11	2.21	14	2.21	13	3.88	95	2.24	14	1.73	1.9	1.72	1.7
7	2.06	8.1	2.18	12	2.59	15	2.32	13	2.15	11	2.17	11	2.25	16	2.14	11	3.84	92	2.24	14	1.74	2.0	1.69	1.4
8	2.06	8.1	2.19	12	2.55	15	2.32	14	2.19	12	2.15	11	2.29	17	2.08	8.7	4.29	119	2.18	12	1.67	1.3	1.70	1.5
9	2.07	8.4	2.21	13	2.55	14	2.24 [44]	14	2.13	10	2.17	12	2.25	16	2.11	9.6	4.30	120	2.14	11	1.67	1.3	1.72	1.7
10	2.07	8.4	2.15	11	2.57	14	2.24	14	2.28	10	2.20	14	2.26	16	2.32	18	4.12	109	2.13 [51]	10	1.69	1.4	1.72	1.7
11	2.06	8.1	2.16	11	2.48	15	2.35	17	2.24	9	2.22	15	2.25	16	2.48	25	4.02	103	2.12	10	1.68	1.3	1.70	1.5
12	2.06	8.1	2.24	14	2.50	16	2.23	14	2.20	9	2.22	15	2.19	13	2.47	25	3.81	91	2.12	10	1.65	1.0	1.70	1.5
13	2.05	7.8	2.24	14	2.48	16	2.21	13	2.22	10	2.20	14	2.18	12	2.44	23	3.73	86	2.11	9.6	1.61	.7	1.68	1.3
14	2.06	8.1	2.20	13	2.48	15	2.20	13	2.16	10	2.18	13	2.19	13	2.40	21	3.78	89	2.10	9.3	1.57	.5	1.65	1.1
15	2.07 [41A]	8.4	2.21	13	2.43	14	2.22	14	2.18	11	2.14	12	2.22	14	2.38	20	3.71	85	2.06	9.1	1.55	.4	1.63	.9
16	2.09	9.0	2.22	14	2.40	14	2.18	12	2.14	10	2.14	12	2.25	15	2.32	18	3.76	88	2.04	7.5	1.54	.3	1.71	1.6
17	2.12	10	2.21	13	2.36	14	2.21	13	2.17	10	2.17	13	2.24	15	2.32	18	3.70 [49]	84	1.98	5.9	1.51	.2	1.73	1.9
18	2.12	10	2.22	14	2.37	15	2.22	14	2.10	9.3	2.17	13	2.27	16	2.33	18	3.57	78	1.95	5.2	1.47	.2	1.61	.8
19	2.13	10	2.21	13	2.35	15	2.20	13	2.06 [45]	8	2.16 [46]	12	2.53	27	2.46	24	3.39	68	1.93	4.5	1.55	.4	1.56	.5
20	2.12	10	2.23	14	2.32	15	2.20	13	2.24	8	2.16	12	2.56	29	2.56	29	3.26	62	1.92	4.6	1.57	.5	1.53	.4
21	2.11	9.6	2.19	12	2.29	15	2.17	12	2.17	8	2.17	13	2.57	29	2.75	37	3.21	60	1.92	4.6	1.56	.4	1.51	.3
22	2.11	9.6	2.29	11	2.28	14	2.15	11	2.21	10	2.16	12	2.58	30	2.75	37	3.14	56	1.93	4.8	1.58	.5	1.51	.3
23	2.12	10	2.26	10	2.29	14	2.16	11	2.24	10	2.16	12	2.57 [47]	29	2.76	38	3.05 [50]	52	1.93	4.8	1.59	.6	1.62	.9
24	2.12 [42]	10	2.21	10	2.35	12	2.12	10	2.28	9	2.15	12	2.60	30	2.76	38	2.92	45	1.91	4.4	1.60	.6	1.68	1.4
25	2.13	10	2.26 [43]	13	2.06	7	2.13	10	2.34	9	2.15	12	2.57	29	2.84	42	2.84	42	1.89	4.0	1.63 [53]	.8	1.70	1.6
26	2.14	11	2.38	12	2.15	7	2.12	10	2.22	10	2.15	12	2.57	29	2.90	44	2.75	37	1.85	3.4	1.66	1.1	1.70	1.6
27	2.15	11	2.30	11	2.27	12	2.15	9.0	2.22	12	2.13	11	2.47	25	2.79	39	2.68	34	1.77 [52]	2.3	1.66	1.1	1.70	1.6
28	2.15	11	2.16	10	2.30	15	2.04	7.5	2.20	12	2.12	11	2.38	20	2.70	35	2.67	34	1.73	1.9	1.65	1.0	1.69	1.5
29	2.15	11	2.20	10	2.41	16	2.07	8.4			2.16	12	2.33	18	3.04	51	2.64	32	1.66	1.2	1.68	1.3	1.72 [54]	1.9
30	2.15	11	2.19	11	2.69	15	2.17	12			2.19	14	2.37	20	3.63	80	2.57	29	1.60	.7	1.67	1.2	1.76	2.3
31	2.16	11			2.67	15	2.12	10			2.21	14			3.44	71			1.60	.7	1.68	1.3		

Shifts noted on the sheet: Mar. +.02, +.03; Apr. +.03, +.02, +.01; Aug. +.01; Sept. +.01, 0, +.01.

	Calendar Year 1952	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Year 1952-53
Total	14,041.3	281.5	359	434	383.9	276.8	379	578	885.3	2,095	273.8	27.9	41.0	6,005.2
Mean	38.4	9.08	12.0	14.0	12.4	9.89	12.2	19.3	28.6	69.5	8.83	.90	1.37	16.5
Second-feet per square mile														
Run-off in inches														
Run-off in acre-feet	27,851	558	712	861	761	549	752	1,150	1,760	4,140	543	55	81	11,922
Maximum	219	11	14	16	17	12	15	30	80	120	25	2.0	2.3	120
Minimum	3	6.6	10	7	7.5	8	10	12	8.7	29	.7	.2	.3	.2

Max. Disch. 172 sec-ft at 4:30 pm on June 6 (G.H. 5.08 ft.) Max. G.H. Same ft. on Same

Min. Disch. 0.1 sec-ft on Aug. 18 (G.H. 1.44 ft.) shift -.01 Min. G.H. Same ft. on Same

Note: Stage-discharge relation affected by ice Nov. 22 to Jan. 11, Jan. 27, Feb. 10-17, Feb. 19 to Mar. 3, Mar. 5-9.

Quarter: Computed / Checked / Date — L.K. / W.I.T. / 7-23-54, 7-28-54

57-83

Appendix - Item 4

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

1953-54

File Number { Washington ..... District 97

Used rating table dated 3-10-54 as shown

Gage heights used to ~~half-tenths between~~ ..... and ..... feet; ~~hundredths below and tenths above those limits~~.

B-192-a. July 1937

Daily Gage Height, in Feet, and Discharge, in Second-Feet, of EAST FORK BRUNEAU River / Creek

Near HOT SPRING, IDAHO (at Winter Camp Ranch) for the Year Ending September 30, 1954

Drainage Area 620 Square Miles. Water-Stage Recorder Stevens A-35 Ratio 1 : 6

Gage Read to Attended Once / Twice a Day by U.S.G.S. Engineers

DAY	October		November		December		January		February		March	
	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
1	1.74	2.1	2.04	7.2	2.08	8.4	2.30	9	2.43	13	2.12	11
2	1.74	2.1	2.04	7.2	2.09	8.7	2.26	10	2.33	13	2.12	10
3	1.73	2.0	2.05	7.5	2.07	8.1	2.32	10	2.34	12	2.07	8
4	1.73	2.0	2.05	7.5	2.05	7.5	2.33	10	2.38	12	2.10	8
5	1.74	2.1	2.06	7.8	2.13	8	2.37	10	2.34	12	2.14	8
6	1.76	2.3	2.06	7.8	2.15	8	2.36	10	2.29	13	2.16	9
7	1.78	2.6	2.05	7.5	2.17	9	2.37	10	2.31	13	2.14	10
8	1.78	2.6	2.05	7.5	2.16	8	2.34	10	2.30	13	2.16	10
9	1.78	2.6	2.05	7.5	2.11	8	2.32	9	2.32	12	2.18	14
10	1.75	2.2	2.05	7.5	2.10	9	2.3	9	2.34	13	2.18	14
11	1.77	2.5	2.05	7.5	2.28	9	2.29	9	2.40	14	2.17	13
12	1.77	2.5	2.05	7.5	2.20	8	2.29	9	2.25	14	2.22	12
13	1.79	2.7	2.05	7.5	2.20	10	2.45	9	2.23	14	2.19	11
14	1.79	2.7	2.05	7.5	2.18	10	2.49	9	2.26	16	2.06	9.3
15	1.81	3.0	2.04	7.2	2.18	10	2.42	9	2.24	15	2.24	16
16	1.83	3.2	2.03	6.9	2.20	11	2.41	10	2.21	14	2.22	16
17	1.84	3.3	2.04	7.2	2.18	11	2.39	10	2.19	13	2.22	16
18	1.85	3.4	2.00	6.1	2.16	11	2.36	9	2.18	12	2.19	14
19	1.85	3.4	2.11	5.	2.19	12	2.35	9	2.19	13	2.17	14
20	1.88	3.9	2.14	6.	2.20	12	2.28	8	2.18	12	2.16	13
21	1.89	4.0	2.12	6.	2.19	12	2.36	9	2.19	12	2.17	14
22	2.00	6.3	2.12	8	2.27	9	2.35	10	2.18	12	2.16	13
23	1.96	5.9	2.13	8	2.27	7	2.32	11	2.16	12	2.16	13
24	2.02	6.6	2.11	9.3	2.18	5	2.36	11	2.15	12	2.14	12
25	2.04	7.2	2.13	10	2.13	4	2.31	9	2.14	11	2.14	12
26	2.06	7.8	2.15	11	2.13	5	2.35	9	2.15	12	2.15	13
27	2.05	7.5	2.14	10	2.25	7	2.33	9	2.14	11	2.17	14
28	2.04	7.2	2.10	9.0	2.25	9	2.38	10	2.14	11	2.18	14
29	2.04	7.2	2.07	8.1	2.28	9	2.41	11			2.15	13
30	2.05	7.5	2.07	8.1	2.25	9	2.33	13			2.14	12
31	2.05	7.5			2.27	9	2.56	13			2.14	12
Total		127.2		230.9		271.7		303		356		378.
Mean		4.13		7.70		8.76		9.8		12.7		12.
Second-feet per square mile												
Run-off in inches												
Run-off in acre-feet		254		458		539		601		706		750
Maximum		7.8		11		12		13		16		16
Minimum		2.0		5.		4		8		11		8

DAY	April		May		June		July		August		September	
	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
1	2.15	13	2.32	21	2.06	11	1.94	4.4				
2	2.12	12	2.29	20	2.07	12	1.89	3.4				
3	2.11	11	2.26	19	2.17	16	1.82	2.3				
4	2.10	11	2.20	16	2.17	16	1.76	1.5				
5	2.16	11	2.16	15	2.12	14	1.74	1.3				
6	2.12	12	2.14	14	2.09	12	1.74	1.3				
7	2.12	12	2.08	12	2.07	12	1.72	1.1				
8	2.16	13	2.04	11	2.17	15	1.69	0.8				
9	2.17	14	2.03	10	2.24	18	1.67	0.6				
10	2.17	14	1.99	9.0	2.32	21	1.64	0.4				
11	2.17	14	1.89	6.1	2.60	33	1.63	0.4	Dry.			
12	2.18	14	1.88	5.9	2.68	36	1.60	0.2				
13	2.17	14	1.89	6.1	2.42	24	1.57	0.2				
14	2.20	15	1.88	5.9	2.31	19	1.51	0.1				
15	2.20	15	1.95	7.8	2.24	16	1.47	0				
16	2.28	18	1.99	9.0	2.32	20	1.48	0.1				
17	2.27	19	1.98	8.7	2.31	19	1.46	0				
18	2.29	19	1.96	8.1	2.41	24	1.44	0				
19	2.30	19	1.94	7.5	2.30	19	1.44	0				
20	2.33	20	1.90	6.3	2.21	15	1.43	0				
21	2.32	20	1.89	6.1	2.12	10	1.42	0				
22	2.27	18	1.89	6.1	2.07	8.4	1.44	0				
23	2.18	14	1.86	5.5	1.98	5.5	1.47	0				
24	1.78	7.5	1.71	6.6	1.83	2.5	1.47	0			All Dry.	
25	1.87	4.8	1.96	8.1	1.72	1.1	1.45 Dry	0				
26	1.86	4.6	1.98	8.7	1.70	0.8	1.43 Dry	0				
27	1.95	6.9	1.96	8.1	1.69	0.8	1.42 Dry	0				
28	2.00	8.4	1.98	8.7	1.65	0.5		0				
29	2.09	11	2.02	10	1.77	2.1		0				
30	2.35	23	2.03	10	1.99	5.7		0				
31			2.05	11				0				
Total		409.2		307.3		409.4		18.1		0		0
Mean		13.6		9.91		13.6		.58		0		0
Second-feet per square mile												
Run-off in inches												
Run-off in acre-feet		810		610		812		36		0		0
Maximum		23		21		36		4.4		0		0
Minimum		4.6		5.5		0.5		0		0		0

Max Disch.	44
Min. Disch.	No flow for long periods during irrigation season.
Note	Stage-discharge relation affected by ice. Nov. 19-23, Dec. 5-17, Dec. 22 to Feb. 12, Mar 2-6, 12, 13
	Computed by subdividing the day.

Max. G. H. 3.03 (ice jam) on Dec. 22 at 6 a.m.
Min. G. H. 2.84 (ice) on June 11 at 11 p.m.
Shift +.06

CALENDAR YEAR 1953		WATER YEAR (1953-54)
5,561.2	Total	2,810.8
15.2	Mean	7.70
	Second-feet per square mile	
	Run-off in inches	
11,042	Run-off in acre-feet	5,576
120	Maximum	36
0.2	Minimum	0

Quarters: First — Second — Third — Fourth — Quarters — Computed — Checked — Date — 1-6-55

Quarters: First — Second — Third — Fourth — Quarters — Disch. applied — Disch. checked — Date — JEC — AL — 12/30/54

Quarters: First — Second — Third — Fourth — Quarters — G.H. applied — G.H. checked — Date — JEC — AL — 12/30/54

57-83

Appendix - Item 4

Daily Gage Height, in Feet, and Discharge, in Second-Feet, of East Fork Brundau River / Creek

At / Near Hot Spring, Idaho (at Winter Camp Ranch) for the Year Ending September 30, 1955

Drainage Area 620 Square Miles. Water-Stage Recorder Stevens A-35 Ratio 1 : 6

UNITED STATES
DEPARTMENT OF THE INTERIOR 1954-55
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File Number { Washington / District 97

Used rating table dated 3-10-54 Oct 1 to Dec 4; 6-7-56 Mar 23 to Sept 30

Gage heights used to ~~half-tenths between~~ and ~~tenths above these limits~~ feet / hundredths, ~~below and tenths above these limits~~

Gage ~~Read to~~ attended ~~Once / Twice a Day~~ by USGS Engineers

UNPUBLISHED RECORDS
SUBJECT TO REVISION

Day	October Gage height	October Discharge	November Gage height	November Discharge	December Gage height	December Discharge	January Gage height	January Discharge	February Gage height	February Discharge	March Gage height	March Discharge
1		0	1.74	2.0	1.83	3.4	2.44	6	2.65	5.5	2.68	8
2		0	1.75	2.1	1.83	3.4	2.41	6	2.66	5	2.69	8
3		0	1.73	1.9	1.90	4.6	2.40	5.5	2.63	5	2.78	8
4		0	1.75	2.2	1.97	6.1	2.44	5.5	2.51	4.5	2.68	7
5		0	1.75	2.2	1.99	6	2.41	5	2.50	4.5	2.55	6.5
6		0	1.77	2.5	2.01	6	2.44	5	2.60	4.5	2.36	7.5
7		0	1.78	2.6	1.96	5.5	2.48	4.5	2.68	5	2.51	9
8		0	1.74	2.1	2.08	5	2.54	4.5	2.73	6	2.64	9
9		0	1.71	1.7	2.01	5	2.59	4.5	2.74	6	2.80	9
10		0	1.76	2.3	1.93	5	2.60	4	2.70	5	2.93	9
11		0	1.77	2.5	1.98	4.5	2.65	4.5	2.58	5	2.79	9
12		0	1.78	2.6	1.97	4.5	2.68	5	2.56	5.5	2.70	9
13		0	1.79	2.7	1.98	5	2.65	5	2.52	5.5	2.68	8
14		0	1.79	2.7	1.98	5	2.60	5	2.57	6	2.59	8
15		0	1.80	2.8	1.95	5	2.55	5	2.64	6.5	2.60	7
16		0	1.79	2.7	2.02	5	2.60	5	2.70	7	2.41	7
17		0	1.80	2.8	1.96	4.5	2.62	5	2.76	7	2.35	8
18	dry	0	1.76	2.3	1.94	4	2.64	5	2.58	6.5	2.31	9
19	1.59	0.6	1.76	2.3	1.88	4	2.66	5	2.65	5.5	2.30	9
20	1.61	.8	1.78	2.7	1.89	4	2.67	5	2.55	6	2.48	8
21	1.62	.8	1.79	2.8	1.92	4.5	2.70	5	2.51	7	2.29	9
22	1.62	.8	1.80	3.0	1.96	4.5	2.70	5	2.55	7.5	2.15	10
23	1.55	.4	1.83	3.4	2.06	5	2.74	5	2.52	8	2.05	11
24	1.57	.5	1.83	3.4	2.15	5.5	2.78	5.5	2.52	8	2.07	11
25	1.56	.5	1.82	3.3	2.27	5.5	2.84	5.5	2.58	8	2.03	10
26	1.56	.5	1.82	3.3	2.34	5	2.84	5.5	2.63	8	2.02	9.7
27	1.62	.8	1.83	3.4	2.44	4.5	2.82	5.5	2.61	8	2.07	11
28	1.65	1.1	1.94	3.5	2.07	4	2.72	5	2.58	8	2.05	11
29	1.68	1.3	1.92	3.5	1.97	4.5	2.60	4.5	~	~	2.17	15
30	1.71	1.6	1.87	3.0	2.12	5	2.59	5			2.24	18
31	1.72	1.7			2.45	5.5	2.62	5.5			2.32	22
TOTAL		11.4		80.3		149.0		157.0		174.0		300.7
Mean		.37		2.68		4.81		5.06		6.21		9.70
Second-feet per square mile												
Run-off in inches												
Run-off in acre-feet		23		159		296		311		345		596
Maximum		1.7		3.5		6.1		6		8		22
Minimum		0		1.7		3.4		4		4.5		6.5

Day	April Gage height	April Discharge	May Gage height	May Discharge	June Gage height	June Discharge	July Gage height	July Discharge	August Gage height	August Discharge	September Gage height	September Discharge
1	2.26	19	2.14	14	2.28	20	2.41	25	1.89	5.4		
2	2.21	17	2.25	19	2.34	22	2.41	25	1.84	4.2		
3	2.20	16	2.32	22	2.32	22	2.32	21	1.80	3.4		
4	2.17	15	2.40	25	2.29	20	2.25	18	1.75	2.5		
5	2.10	13	2.31	21	2.29	20	2.21	16	1.67	1.5		
6	2.09	12	2.22	17	2.34	22	2.19	15	1.58	.7		
7	2.10	13	2.18	16	2.30	21	2.17	14	1.53	.4		
8	2.11	13	2.18	16	2.24	18	2.12	13	1.48	.2		
9	2.10	13	2.16	15	2.28	20	2.05	10	1.42	0		
10	2.09	12	2.14	14	2.37	24	2.02	9.1	1.40	0		
11	2.09	12	2.20	16	2.40	25	2.03	9.4	1.39	0		
12	2.11	13	2.21	17	2.44	26	2.05	10	1.37	0	W.L.S. dry	
13	2.10	13	2.15	14	2.51	30	2.12	13	1.35	0		
14	2.10	13	2.01	9.4	2.70	38	2.17	14		0		
15	2.09	12	1.91	6.4	2.75	41	2.12	13		0		
16	2.08	12	1.95	7.5	2.89	47	2.08	11		0		
17	2.08	12	2.07	11	3.52	77	2.03	9.4		0		
18	2.10	13	2.10	13	3.25	64	1.98	7.8		0		
19	2.11	13	2.31	21	2.95	50	1.92	6.2		0		
20	2.18	16	2.25	19	2.80	43	1.87	4.9		0		
21	2.22	17	2.17	15	2.65	36	1.83	4.0		0		
22	2.20	16	2.10	13	2.53	30	1.79	3.3		0		
23	2.18	16	2.03	10	2.41	25	1.76	2.7		0		
24	2.17	15	2.09	12	2.32	21	1.75	2.5		0		
25	2.15	14	2.28	20	2.27	19	1.74	2.4		0		
26	2.16	15	2.54	31	2.26	18	1.85	4.4		0		
27	2.16	15	2.57	32	2.25	18	2.14	13		0		
28	2.16	15	2.56	32	2.28	19	2.64	9.7		0		
29	2.15	14	2.48	29	2.31	20	2.30	8.4		0		
30	2.12	13	2.36	23	2.30	20	1.94	6.6		0		
31			2.30	21			1.92	6.2		0		
TOTAL		422		551.3		875		328.0		18.3		0
Mean		14.1		17.8		23.2		10.6		.59		0
Second-feet per square mile												
Run-off in inches												
Run-off in acre-feet		837		1,090		1,740		651		36		0
Maximum		19		32		77		25		5.4		
Minimum		12		6.4		19		24		0		0

CALENDAR YEAR 1954

	1954	WATER YEAR 1954-55
TOTAL	2,421.0	3,068.0
Mean	6.63	8.41
Second-feet per square mile		
Run-off in inches		
Run-off in acre-feet	4,803	6,084
Maximum	36	77
Minimum	0	0

Note - Stage-discharge relation affected by ice Nov. 28-30, Dec. 5 to Mar. 22.

Max. Disch. 83 cfs on Jan. 17 at 4 pm

Min. Disch. No flow for long periods during irrigation season

Some ice

Max. G. H. 3.64 ft. on

Min. G. H. ~ ft. on

6-13-56

6-11-56

6-7-56

Appendix – Item 4

9-192-n. July 1937

UNITED STATES
DEPARTMENT OF THE INTERIOR 1955-56
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File Number { Washington 57-83
District 97

Daily Gage Height, in Feet, and Discharge, in Second-Feet, of East Fork Bruneau River

Near Hot Spring, Idaho (at Winter Camp Ranch) for the Year Ending September 30, 1956

Used rating table dated 6-7-56

Drainage Area 620 Square Miles. Water-Stage Recorder Stevens A-35 Ratio 1 : 6

Gage Read to attended once a day by U.S.G.S. Engineers

Gage heights used to half tenths between and feet hundredths, below and tenths above these limits

UNPUBLISHED RECORDS SUBJECT TO REVISION

Day	December Gage height	December Discharge	January Gage height	January Discharge	February Gage height	February Discharge	March Gage height	March Discharge	April Gage height	April Discharge	May Gage height	May Discharge	June Gage height	June Discharge	July Gage height	July Discharge	August Gage height	August Discharge	September Gage height	September Discharge	Day
1		0	1.77	38	2.01	8	2.11	10	2.28	10	2.18	15	2.56	32	3.09	58	4.03	104	2.09	14	1.66	2.5	1.72	3.4	1
2		0	1.80	44	2.05	8	2.17	10	2.14	11	2.26	18	2.57	33	2.95	52	3.89	96	2.09	14	1.60	1.7	1.69	2.9	2
3		0	1.78	40	2.09	8	2.14	11	2.26	12	2.64	19	2.55	32	2.81	45	3.90	96	2.09	14	1.59	1.7	1.67	2.5	3
4		0	1.78	40	2.45	75	2.20	11	2.28	12	2.64	19	2.50	30	2.79	44	3.83	92	2.05	13	1.57	1.5	1.67	2.5	4
5		0	1.84	54	2.12	75	2.14	12	2.44	12	2.40	18	2.47	29	2.88	48	3.71	86	2.04	13	1.54	1.1	1.68	2.7	5
6		0	1.82	49	2.18	8	2.20	11	2.60	12	2.25	18	2.45	28	3.09	58	3.62	82	2.01	11	1.53	1.1	1.68	2.7	6
7	No flow 22-h 151-14	0	1.83	52	2.15	85	2.25	12	2.73	12	2.23	17	2.46	28	3.28	67	3.57	80	2.01	11	1.53	1.1	1.71	3.3	7
8	1.54	.8	1.85	56	2.14	85	2.13	11	2.71	12	2.21	17	2.37	24	3.43	75	3.44	73	1.97	10	1.49	.8	1.59	1.5	8
9	1.57	1.0	1.85	56	2.40	85	2.25	11	2.67	11	2.16	16	2.43	27	3.45	76	3.26	64	1.93	88	1.47	.6	1.50	.7	9
10	1.58	1.1	1.85	56	2.25	85	2.12	11	2.59	12	2.28	15	2.39	25	3.59	82	3.16	60	1.90	78	1.46	.6	1.47	.5	10
11	1.59	1.1	1.85	56	2.16	85	2.06	12	2.58	12	2.33	14	2.39	25	3.63	84	3.07	55	1.85	64	1.44	5	1.50	.7	11
12	1.61	1.3	1.91	5	2.06	9	2.08	13	2.65	12	2.44	13	2.45	28	3.55	79	2.97	51	1.81	56	1.47	.6	1.50	.7	12
13	1.58	1.1	1.92	4	2.74	95	2.06	12	2.67	12	2.32	14	2.61	35	3.53	78	2.86	46	1.76	44	1.53	1.1	1.56	1.1	13
14	1.56	.9	1.97	3.2	2.06	9	2.19	14	2.63	11	2.22	13	2.62	35	3.33	68	2.72	39	1.72	3.6	1.55	1.2	1.52	.8	14
15	1.55	.8	1.92	3.5	2.14	85	2.17	16	2.44	10	2.16	13	2.61	35	3.16	60	2.49	29	1.70	3.3	1.58	1.5	1.54	1.0	15
16	1.57	1.0	2.02	3.6	2.26	85	2.22	18	2.44	10	2.12	14	2.61	35	2.97	51	2.71	39	1.70	3.3	1.53	1.1	1.53	.9	16
17	1.57	1.0	2.08	4	2.28	95	2.26	16	2.37	10	2.27	14	2.61	35	2.84	45	3.57	80	1.65	2.4	1.52	1.0	1.53	.9	17
18	1.58	1.0	2.12	5	2.19	9	2.26	13	2.52	10	3.03	19	2.63	37	2.70	38	3.22	62	1.60	1.7	1.54	1.1	1.58	1.3	18
19	1.60	1.2	2.17	7	2.09	10	2.12	13	2.53	10	2.72	26	2.66	38	2.59	34	2.89	47	1.68	2.9	1.55	1.2	1.58	1.3	19
20	1.61	1.3	2.13	8	2.09	11	2.08	13	2.51	9.5	2.50	30	2.60	36	2.73	40	2.75	41	1.64	2.7	1.57	1.3	1.50	.7	20
21	1.64	1.7	2.15	7.5	2.09	11	2.12	14	2.58	10	2.56	32	2.57	35	2.89	47	2.67	37	1.62	2.0	1.58	1.5	1.42	.3	21
22	1.68	2.2	2.49	7	2.04	11	2.13	15	2.54	12	2.79	43	2.66	39	3.03	53	2.76	41	1.61	1.8	1.59	1.6	1.46	.5	22
23	1.68	2.2	2.51	7	2.07	13	2.15	16	2.54	13	2.76	41	2.84	46	3.38	70	2.74	40	1.57	1.5	1.60	1.7	1.50	.7	23
24	1.67	2.1	2.29	7	2.12	14	2.12	14	2.74	12	2.73	40	3.02	56	3.42	72	2.58	33	1.50	.8	1.63	2.1	1.49	.6	24
25	1.65	1.8	2.30	7	2.03	10	2.22	12	2.53	12	2.69	38	3.12	60	4.13	110	2.48	29	1.46	6	1.69	2.9	1.52	.8	25
26	1.66	2.0	1.99	7	1.98	9.4	2.30	12	2.44	12	2.71	39	3.24	66	4.51	133	2.37	25	1.43	.4	1.68	2.7	1.50	.6	26
27	1.68	2.2	2.00	7	2.11	9.5	2.44	11	2.37	13	2.79	43	3.22	65	4.55	135	2.32	23	1.40	.3	1.68	2.7	1.49	.6	27
28	1.70	2.5	1.98	7	2.10	9.5	2.36	10	2.33	14	2.77	42	3.35	72	4.53	134	2.25	20	1.38	.2	1.68	2.9	1.49	.6	28
29	1.73	3.1	1.95	7	2.20	9.5	2.18	11	2.22	14	2.69	38	3.45	76	4.68	144	2.13	16	1.38	.2	1.75	4.0	1.50	.6	29
30	1.77	3.8	2.01	7.5	2.33	9.5	2.03	11			2.61	35	3.24	65	4.59	137	2.07	13	1.39	.3	1.75	4.0	1.51	.7	30
31	1.77	3.8			2.06	9.5	2.20	9			2.59	34			4.28	119			1.57	2.0	1.73	3.6			31
Total		41.0		168.4		289.4		385		334.5		767		1209		2,336		1599		162.5		53.0		38.1	Total
Mean		1.32		5.61		9.34		12.4		11.5		24.7		403		754		533		5.24		1.71		1.27	Mean
Second-feet per square mile																									Second-feet per square mile
Run-off in inches																									Run-off in inches
Run-off in acre-feet		81		334		574		764		663		1,520		2400		4,630		3170		322		105		76	Run-off in acre-feet
Maximum		3.8		8		14		18		14		43		76		144		104		14		4.0		3.4	Maximum
Minimum		0		3.2		7.5		9		9.5		13		24		34		13		.2		.5		.3	Minimum

Max. Discharge 145 Min. Discharge No flow

Note. – Stage-discharge relation affected by ice Nov. 12 to Dec. 21, Dec. 25, Dec. 26 to Jan. 10, Jan. 14, 17-19, 25-29, Jan. 31 to Feb. 29, Mar. 10-15.

Cubic feet per second-day 4,770 Acre-feet 9,460

1955 3,326.1 6,595 77 0

1955-56 7,382.9 14,639 144 0