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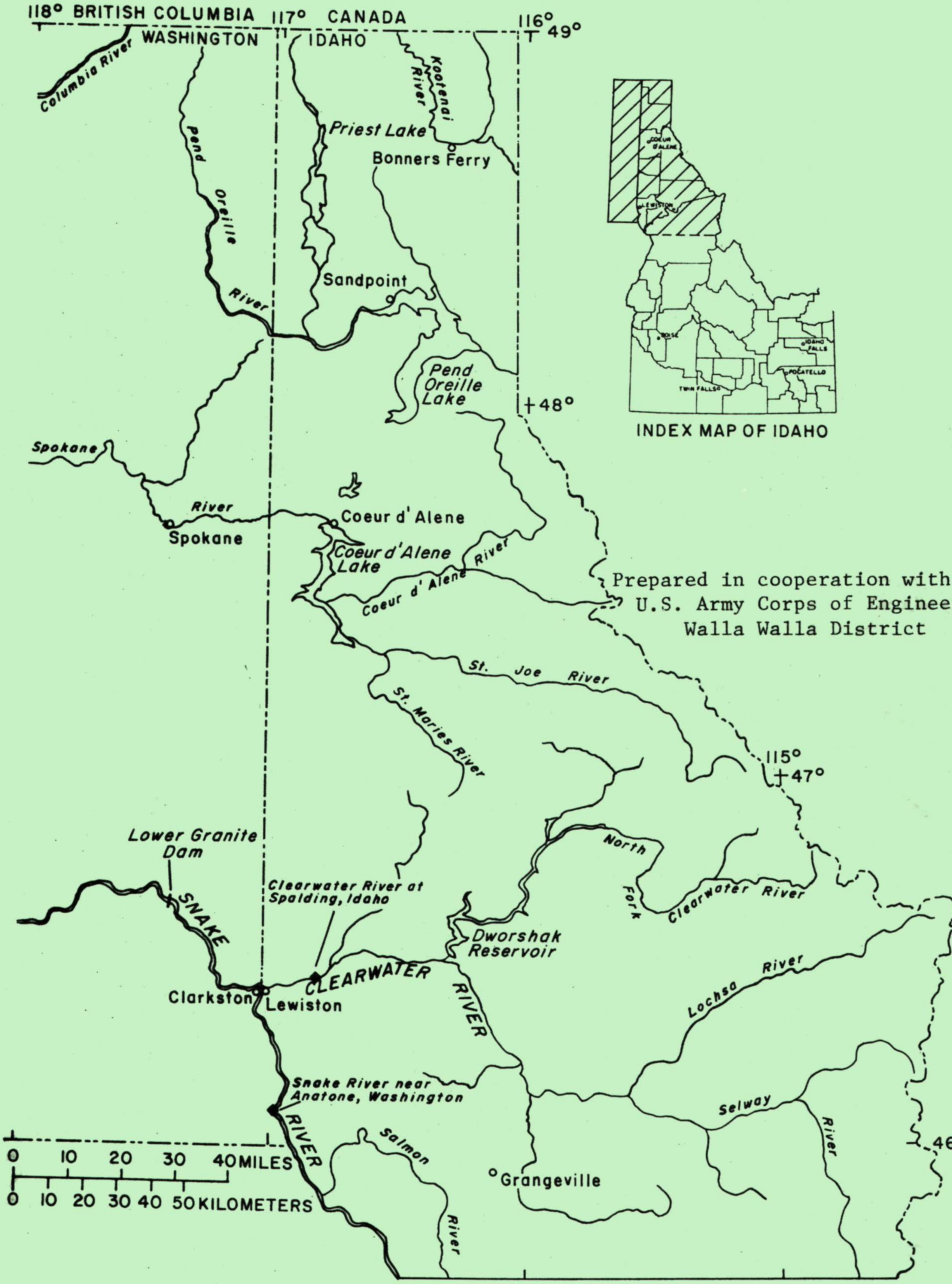
August 1976 through July 1978



Prepared in cooperation with the
U.S. Army Corps of Engineers
Walla Walla District

UNITED STATES DEPARTMENT OF THE INTERIOR
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August 1976 through July 1978

By
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Prepared in cooperation with the
U.S. Army Corps of Engineers,
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FIFTH BASIC-DATA REPORT

Boise, Idaho
1979

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CONVERSION FACTORS

The following conversion table is included for the convenience of those who prefer to use International System (SI) units rather than inch-pound units. To assist readers of this report, many of the measurements reported herein are given in both units. The factors listed below are presented as an aid to conversion from one system of units to another. Chemical data for concentrations are given in milligrams per liter (mg/L), which are (within the range of values presented) numerically equal to parts per million.

Multiply inch-pound unit	By	To obtain SI unit
	Length	
inch (in)	25.4	millimeter (mm)
foot (ft)	.3048	meter (m)
	Volume	
cubic yard (yd^3)	0.7646	cubic meter (m^3)
acre-foot (acre-ft) (m^3)	1233	cubic meter (m^3)
	Flow	
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)
	Mass	
ton (short)	0.9072	tonne (t)
pound (lb avoirdupois)	.4536	kilogram (kg)
	Mass Per Unit Volume	
pound per cubic foot (lb/ft^3)	16.02	kilogram per cubic meter (kg/m^3)

INTRODUCTION

Impoundment of water in the Snake River and Clearwater River arms behind Lower Granite Dam (see cover map) began in June 1975. At this time, Lower Granite Reservoir and Lock facilities, constructed by the USACE (U.S. Army Corps of Engineers), Walla Walla District, became operational. Construction and operation of this facility necessitated collection of hydrologic data that did not exist prior to construction. The USACE requested the USGS (U.S. Geological Survey) to collect hydraulic- and channel-geometry data and describe sediment-transport characteristics, beginning in the spring of 1972.

This report summarizes information collected during August 1976 through July 1978 and is the fifth in a series of reports designed to release hydrologic data on a timely basis. Although some of the data were collected during the late summer and fall periods (August through December) of 1976 and 1977, most were collected during the spring runoff periods of 1977 and 1978. Therefore, for convenience, data contained in this report will be referred to as the 1977-78 data. Because this is primarily a basic-data report, no interpretation of the data is provided.

This report presents tables of selected data collected and computations compiled since the 1976 report (Seitz, 1976). Most of the tabular data are also presented on graphs. Some of the graphs show plots of data since 1972; others show plots of only the 1977-78 data.

Relatively minor amounts of bedload were transported during the 1977 drought period. Therefore, regular scheduled sampling of the bedload was impractical. Only two bedload samples were collected from the Clearwater River in 1977. The resultant data are included in tables 10, 12, and 14, and figure 6. All bedload data in this report should be considered tentative, pending completion of sampler-calibration studies and possible adjustment of the data to correct for sampler efficiency.

An analysis of the middle Snake River streamflow record was made during 1977. The streamflow rating for the Snake River near Anatone, Washington, gage was found to be in error at high stages. The streamflow record for water years 1974 and 1975 was revised and published with 1976 water-year data (Water Resources Data for Idaho, Water Year 1976). The revised Snake River near Anatone streamflow rating was used to recompute the sediment-discharge rating curve (fig. 3).

This study program is funded by the USACE through a cooperative agreement with the USGS. All field work, laboratory analysis, and compilation of data are being conducted by the USGS.

Data collection is scheduled to terminate at the end of the 1979 runoff season. A reanalysis of all data collected since the start of the program will correct all provisional records since 1972, including the 1974, 1975, and 1976 years for the Snake River near Anatone station.

STUDY OBJECTIVES

Study objectives were decided jointly by the USGS and the USACE. Data-collection sites were established at the USGS gaging stations Snake River near Anatone, Washington (station number 13334300), and Clearwater River at Spalding, Idaho (station number 13342500). Streamflow data for these stations are published in annual water-resources data reports for Idaho (see U.S. Geological Survey, 1977).

Primary objectives of the continuing study are to define, for the above two stations, the suspended- and bedload-sediment-transport rates as a function of stream discharge, and the size distributions of suspended and bedload sediment as a function of sediment-transport rate.

INSTRUMENTATION AND DATA COLLECTION

Streamflow gage heights were documented at 15-minute time increments with digital-punch tape recorders. Computer scanning of punched tapes enabled printouts of daily maximum, minimum, and mean gage heights, as well as hourly and daily mean values of discharge. Stream water temperatures were recorded on a continuous-trace thermograph at the Clearwater River station, and on a digital-punch tape recorder at the Snake River station. All measurements of stream-channel processes were made from cableways. Frequent discharge measurements confirmed stable gage height-discharge relations for both rivers and indicated little or no channel scour during periods of high streamflow.

Either P-61 or P-63 suspended-sediment samplers (Guy and Norman, 1970) were used to collect point- and depth-integrated water samples for analysis of suspended-sediment concentration, size distribution, and spatial distribution. Bedload samplers of the Helley-Smith type (Helley and Smith, 1971) were used to collect bedload samples that enabled determination of transport rate, size distribution, and spatial distribution. The bedload sampler used in 1977-78 incorporated a 6-in (150-mm) square orifice in a geometric scale-up of the standard Helley-Smith design. It was internally weighted to about 165 lbs (75 kgs), which allowed a streamlined design and increased stability. For each date of bedload-data collection, samples were collected at about 20 equally spaced cross-channel locations. Sampling duration was 60 seconds at each location. For sieving purposes, bedload-sediment samples were individually tagged, air dried, and composited into one sample per traverse. Size distribution was determined by the weight percentage of each size fraction retained on sieves that had incremental mesh-size openings differing by a factor of $\sqrt{2}$, or 1.414.

Concentrations of dissolved residue are presented in this report.

EXPLANATION OF TABLES AND GRAPHS

Relations of Hydraulic Geometry and Channel Geometry to Values of Streamflow

Relations of hydraulic and channel parameters to values of stream discharge for the Snake and Clearwater Rivers are shown in figures 1 and 2, respectively. Relations of width, depth, and velocity follow the procedure of at-a-station curves of hydraulic geometry (Leopold and Maddock, 1953). Flow area is the product of mean depth and surface width. Gage height is added to provide a current rating curve. Flow-frequency information is provided by the recurrence-interval curve. The Snake River flow frequency is influenced by upstream flow regulation. The Clearwater River flow frequency is for the period prior to the effects of Dworshak Dam on the North Fork Clearwater River. Curves of water-surface slope show increasing values of slope with increasing discharge. Both sampling sections are located in relatively flat reaches of river. Increasing river stages promote a tendency toward uniform energy gradient, and the effects of these flat reaches are increasingly drowned as river stages increase.

Values of Streamflow, 1977-78

Values of daily mean discharge for the Snake and Clearwater Rivers are listed in tables 1 and 2, respectively. These values are from provisional records and are subject to minor revisions.

Suspended-Sediment-Transport Data

Values of instantaneous discharge, water temperature, and suspended-sediment concentration for the Snake and Clearwater Rivers are listed in tables 3 and 4, respectively. Suspended-sediment load, in tons per day, is computed as:

Load = 0.0027 x Concentration (mg/L) x Discharge (ft^3/s).

Minor computational differences may result from the use of unrounded numbers in computations of load.

Relations of suspended-sediment load to stream discharge for the Snake and Clearwater Rivers are shown in figures 3 and 4, respectively. Data points are identified by year of collection. A tendency toward a scatter of points plotted in figure 4 reflects both the effects of minor precipitation events, possibly on frozen ground, at times of low streamflow, and the removal of an upstream bridge in the spring of 1973.

Curves shown on the figures were developed by a group-average method with a smooth curve drawn between the points. Curves were not drawn below 20,000 ft^3/s (566 m^3/s) for figure 3 and 15,000 ft^3/s (425 m^3/s) for figure 4. Data scatter below these discharges is great, and daily sediment loads are not published at low stream discharges. The curves are considered to be valid fits to the data.

Bedload-Sediment-Transport Data

Values of instantaneous discharge and bedload-transport rate for the Snake and Clearwater Rivers are listed in tables 5 and 6, respectively. Values taken from the hydraulic- and channel-geometry data given in figures 1 and 2 are also included to facilitate further computations.

Figures 5 and 6 illustrate the data of tables 5 and 6. Each data point on figures 5 and 6 represents the average of up to 40 individual bedload samples and thus is a mean value relatively free of influence from spatial and temporal variability factors. The curved-line relation shown as "from W. W. Emmett, 1976," in figure 6 was determined in the manner suggested by Bagnold (1966). The Snake and Clearwater Rivers have about the same size and distribution of bed material and showed identical transport to stream-energy relations (Bagnold, 1966). However, armoring of the streambed is more persistent in the Snake River than in the Clearwater River, and transport of bedload is at a lesser efficiency in the Snake River than in the Clearwater River (Emmett, oral commun., 1975). Accordingly, the relation on figure 5 for the Snake River has been modified from Emmett (1976) for use in the present report for computations of bedload quantities by retaining the shape of the curve but shifting the graphic location to the right.

Cross-Channel Variability in Velocity, Depth, and Sediment Transport

Figures 7 and 8 for the Snake and Clearwater Rivers, respectively, typify the cross-channel variability in velocity, depth, and suspended-sediment load for a relatively high flow event on May 19, 1972. The relative magnitude of bedload transport for 1973 and 1974 indicate the cross-channel distribution of bedload. Almost all bedload transport occurs within a part of the channel occupying only about half of the total width of channel. The 1976 and 1977-78 bedload data were not plotted on either figure 7 or 8 because samples were not analyzed as individuals; each traverse of the stream cross section was composited and treated as one sample for size-analysis determinations.

Suspended-Sediment Particle-Size Distribution

Data on the suspended-sediment particle-size distribution in the Snake and Clearwater Rivers at different dates are listed in tables 7 and 8, respectively. These same data for the two rivers, for selected dates, are plotted in figures 9 and 10, respectively. For 1978, particle-size distributions for the Snake River show that about 90 percent of the material by weight was finer than sand (0.062 mm) at the beginning of the runoff season (4-29-78) and changed to material 71 percent finer than sand at the end of the runoff season (6-20-78). For the Clearwater River, 96 percent of the material by weight was finer than sand (0.062 mm) at the beginning of the runoff season (4-28-78) and changed to 29 percent finer than sand at the end of the runoff season (6-14-78).

Bedload-Sediment Particle-Size Distribution

Data for the size distribution of bedload sediment in the Snake and Clearwater Rivers are listed in tables 9 and 10, respectively. Data shown represent a composite analysis of all cross-channel location samples collected on a given date. The data in tables 9 and 10 are composited for the year and are shown graphically on figures 11 and 12, respectively. Both the "percent finer" and "percent retained" relations shown in figures 11 and 12 illustrate a bimodal size distribution of bedload material. Dominant modes occur for the finer sized material at the medium- to coarse-sand fractions and for the larger sized material at the very coarse gravel to small cobble fractions.

Summary data of the bedload particle-size distribution, shown as functions of the discharge and bedload-transport rate for each date of bedload sampling, are listed in tables 11 and 12, for the Snake and Clearwater Rivers, respectively. The particle sizes are listed in the tables as 16, 35, 50, 65, and 84 percent finer by weight. The term D_{50} thus denotes median particle size; and, for either river, the median size is within the range of one or the other of the dominant modes. From figures 11 and 12, the median particle size for the 1978 composited data is in the range of gravel for the Snake River and in the range of sand for the Clearwater River.

Mesh size of the bedload-sampler collection chamber is 0.2 mm. Thus, particles smaller than this size are likely to escape from the sampler. This factor probably alters the size distribution of bedload only slightly, because most smaller particles would be in suspension, rather than in the bedload.

Annual Sediment Discharge

Computations of daily suspended- and bedload-sediment transport can be made by ranking values of daily mean stream discharge (tables 1 and 2) by magnitude of discharge and multiplying these values by the amount of sediment in tons per day (see figs. 3-6) for the corresponding value of discharge. Annual sediment transport is obtained by accumulating the daily sediment values. As only the highest stream discharges are effective in transporting sediment, the ranking and computation of data need not include most of the days of record.

Values of daily mean stream discharge are ranked in tables 13 and 14 for the Snake and Clearwater Rivers, respectively. The accumulative percentage of time (flow duration) that each magnitude of discharge is equaled or exceeded is also shown on the tables. Table 13 was prepared using streamflow data above a base of 23,000 ft^3/s (651 m^3/s) for water year 1977 and 31,000 ft^3/s (878 m^3/s) for water year 1978. Table 14 was prepared using data above a base of 16,200 ft^3/s (459 m^3/s) for water year 1977 and 19,000 ft^3/s (538 m^3/s) for water year 1978. Values of suspended- and bedload-sediment transport are derived using the group-average curves shown on figures 3 and 4 and the relations shown on figures 5 and 6. These values are then transferred to tables 13 and 14 and accumulated according to the streamflow-duration data. The ratio of quantities of bedload to suspended load is also included in tables 13 and 14.

Curves of accumulative sediment transport as a function of time for suspended sediment in the Snake and Clearwater Rivers are shown in figures 13 and 14, respectively. Similar curves for bedload sediment for these same rivers are shown in figures 15 and 16, respectively. Annual loads from figures 13-16 are not directly comparable because different relations were used in 1973, 1974, and 1975. However, the significance of high-water events are clearly defined. For example, as illustrated in figure 13 for the Snake River, more suspended sediment was transported in the single high day (0.27 percent of time) for 1974 than was transported in all of 1973.

The data are sufficient to indicate that large quantities of sediment are transported by the Clearwater and Snake Rivers in the Lewiston, Idaho, area. The combined 1978 totals show approximately 1,200,000 tons (1,100,000 t) of sediment passed the Lewiston area. Assuming a unit weight of about 100 lb/ft^3 (1,600 kg/m^3), this represents about 890,000 yd^3 (680,000 m^3) of sediment.

Figure 17 illustrates the ratio of bedload to suspended load as a function of percentage of time. In 1972, bedload at the highest flows, which occur about 2 or less percent of the time, was only 1 to 2 percent of suspended load, but this ratio increased at lesser flows such that during the year, bedload amounted to 4 to 5 percent of suspended load (see Emmett and Seitz, 1973). In 1973, bedload at the highest flows was 9 to 10 percent of suspended load, but the ratio decreased as the flow decreased so that, as in the previous year, bedload represented only about 4 to 5 percent of suspended load (see Emmett and Seitz, 1974). The 1974 and 1975 data for both rivers are consistent and indicate that bedload amounts to about 4 percent of suspended load (see Seitz, 1975). The 1976 data indicate that for the Snake River, bedload represented about 9 percent of suspended load, and data for the Clearwater River indicated that bedload represented about 4 percent of suspended load (see Seitz, 1976). Bedload in the Snake River during 1978 represented about 6 percent of suspended load at high flows. However, as flows decreased, the ratio also decreased, so that bedload represented about 4 to 5 percent of suspended load. Bedload in the Clearwater River during 1978, as in previous years, represented about 4 percent of suspended load at all flow rates.

Bed-Material Size Distribution

Figures 18 and 19 illustrate size-distribution curves of bed material in 1972 for the Snake and Clearwater Rivers, respectively. For each river, data are included for a pebble count of bed-surface material; a sieve analysis of a cubic foot of bed material with the coarsest armoring particles discarded; and a sieve analysis of a cubic foot of bed material with all particles greater than 64 mm discarded. Data are generally similar between rivers and indicate that the median bed-surface particle size is about 64 mm, and the median size of the material underlying this armor is about 22 mm.

Figure 20 illustrates the size distribution by sieve analysis of bed material recovered from the walls of an open trench that was dug (1972) in the river channel at the confluence of the two rivers. All material recovered was used in the analysis. These data indicate that median particle size decreases somewhat with depth below the streambed surface, but equally large particles were found at a 2-ft (0.6-m) depth as at a 1-ft (0.3-m) depth. Median particle size is about 32 mm.

Figures 18 through 20 illustrate a bimodal distribution of bed-material size in that a large sand fraction (0.5 to 1.0 mm) was present in all samples. Sandbar deposits are numerous along both rivers, and sediment of this size is dominant in many of the bedload samples. Size distribution of material in these sandbar deposits is shown in figure 21.

Figure 20 reflects the sand-size particle distribution shown in figure 21 and shows that 40 percent of the material is coarser than 45 mm. Because of this, figure 20 may reasonably portray the size distribution of bed material for both rivers.

Comparison curves of bedload and bed-material particle-size distributions are shown in figure 22. The 1978 curve is a compromise representative of the bedload size-distribution curves of figures 11 and 12. As suggested in figure 22, the size of material in transport during 1978 contained more sand-size material than occurs on the streambed, but less sand-size material than transported during 1975.

Dissolved Residue

Tables 15 and 16 are tabulations for the Snake and Clearwater Rivers, respectively, of values for instantaneous discharge, dissolved-residue concentration, and dissolved-residue load in tons per day, computed as:

Load = Discharge (ft^3/sec) x Concentration (mg/L) x .0027.

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Table 1. Values of daily mean discharge,
January through July 1977, Snake River near Anatone, Washington
(Values are in cubic feet per second)

Day	Jan.	Feb.	Mar.	Apr.	May	June	July
1	21,100	21,000	17,000	19,600	24,500	22,100	15,800
2	21,900	18,800	15,800	15,900	26,200	25,400	15,500
3	25,600	19,300	16,100	15,700	32,900	25,700	15,600
4	23,800	19,200	16,900	14,400	26,500	25,100	15,500
5	22,500	19,100	17,800	14,700	23,400	27,600	14,800
6	22,600	18,800	19,100	15,500	21,000	31,000	14,300
7	24,000	19,800	17,800	16,600	17,000	36,000	14,600
8	23,400	20,400	18,400	18,300	15,500	35,400	13,800
9	23,700	20,100	17,400	20,000	15,100	35,400	13,400
10	23,500	18,100	20,700	20,600	15,400	29,100	13,000
11	24,600	16,900	20,200	22,300	18,500	26,800	12,600
12	24,400	15,600	18,000	22,600	20,000	28,600	13,600
13	22,100	14,800	17,100	21,300	17,900	27,900	14,500
14	20,400	15,200	20,400	20,400	18,200	26,100	13,800
15	19,500	15,200	20,600	19,600	19,200	25,700	11,000
16	20,300	15,400	20,000	16,600	18,800	24,900	10,700
17	23,300	15,600	18,900	15,200	18,600	22,400	10,600
18	25,700	20,600	19,500	15,100	19,200	21,200	11,400
19	24,100	15,200	19,300	15,500	19,600	20,100	10,500
20	22,500	13,900	20,300	14,400	18,700	19,300	11,600
21	22,000	13,700	18,200	14,200	18,400	23,400	11,600
22	21,900	16,000	17,700	15,900	18,600	22,000	12,500
23	20,500	15,500	15,300	16,100	19,000	21,700	13,200
24	21,100	15,500	16,200	17,000	20,900	20,500	11,200
25	23,000	17,000	18,300	18,900	22,600	21,000	11,000
26	23,200	16,900	18,000	25,100	23,300	17,200	11,900
27	21,400	15,400	18,700	25,900	22,900	15,000	13,100
28	21,200	15,400	21,300	26,600	22,700	20,400	14,200
29	21,600	-	24,300	26,700	22,300	17,900	11,400
30	19,100	-	21,100	25,700	21,400	16,600	10,600
31	18,600	-	18,600	-	20,700	-	10,400

Table 1. Values of daily mean discharge,
January through July 1978, Snake River near Anatone, Washington
(Continued)[1]
(Values are in cubic feet per second)

Day	Jan.	Feb.	Mar.	Apr.	May	June	July
1	29,500	23,800	32,800	66,400	76,600	54,800	61,600
2	26,900	23,700	30,600	72,900	76,700	53,900	57,900
3	26,500	22,700	29,500	68,300	80,500	54,100	56,300
4	26,500	23,500	28,500	64,400	80,500	57,600	58,400
5	27,600	21,500	26,800	58,600	79,300	67,500	60,000
6	27,300	23,000	26,800	53,400	76,900	75,400	56,300
7	26,000	26,700	30,300	51,300	74,100	83,000	55,200
8	24,700	35,800	31,500	49,900	71,000	90,100	53,700
9	25,400	35,000	33,500	48,800	66,000	93,000	54,400
10	28,000	35,100	37,100	48,000	67,400	91,500	57,400
11	28,300	35,600	38,100	48,200	71,400	85,100	52,700
12	26,800	35,200	37,700	48,700	69,000	79,100	52,400
13	30,400	31,000	37,000	48,100	67,100	77,600	47,600
14	30,300	33,300	35,000	46,000	65,800	76,200	44,400
15	29,700	31,600	38,200	46,300	69,900	75,700	38,200
16	30,500	32,700	36,900	46,300	76,200	74,700	34,800
17	31,300	31,000	31,900	47,200	75,200	70,900	34,200
18	32,700	28,800	31,900	50,300	70,700	66,400	33,100
19	34,700	27,300	31,300	49,400	66,000	66,300	32,000
20	33,900	24,600	34,700	49,200	60,500	67,500	31,100
21	33,200	26,400	40,500	49,800	60,500	68,000	27,800
22	29,100	25,800	44,200	49,800	64,800	66,000	26,200
23	28,300	23,500	48,100	49,300	64,800	65,300	25,200
24	32,000	24,700	50,100	48,600	65,100	65,200	25,100
25	29,400	25,700	50,600	47,400	64,100	63,200	25,900
26	28,400	24,800	50,200	48,800	60,200	63,300	24,100
27	27,900	29,500	50,700	63,700	56,700	62,300	23,700
28	22,700	31,500	52,300	84,100	53,900	61,500	24,200
29	20,400	-	54,600	80,400	54,300	62,000	25,700
30	22,200	-	57,700	77,800	56,300	62,800	23,100
31	22,700	-	60,200	-	56,200	-	21,500

[1]Provisional records, subject to revision

Table 2. Values of daily mean discharge,
January through July 1977, Clearwater River at Spalding, Idaho
(Values are in cubic feet per second)

Day	Jan.	Feb.	Mar.	Apr.	May	June	July
1	3,790	9,060	3,370	4,250	23,100	23,000	9,590
2	4,530	9,030	4,590	4,330	28,200	26,000	9,480
3	11,100	8,990	9,690	4,230	28,500	23,900	5,980
4	11,200	11,100	9,340	4,060	24,200	16,000	4,400
5	11,400	8,890	5,000	4,400	20,200	17,000	8,150
6	11,400	6,810	3,250	5,780	17,300	20,600	9,100
7	11,300	5,840	4,350	7,560	15,500	22,400	9,520
8	11,400	8,820	5,270	9,960	14,900	19,300	9,380
9	4,950	8,540	10,000	13,000	15,600	17,800	9,130
10	5,870	8,780	12,500	13,700	16,900	14,400	8,260
11	8,920	9,060	6,710	11,700	20,000	12,900	8,920
12	9,270	5,000	3,810	10,600	18,800	12,400	8,780
13	7,450	3,420	3,740	10,600	17,400	11,600	8,680
14	9,960	5,950	3,690	10,800	18,400	11,100	9,130
15	5,810	5,110	3,570	9,960	17,900	10,800	7,490
16	4,280	4,640	3,390	9,730	15,900	10,400	4,720
17	5,410	7,520	3,320	10,200	15,500	9,520	3,170
18	7,350	9,170	3,350	9,630	16,400	8,850	5,690
19	7,770	5,030	3,370	9,340	15,900	8,290	6,840
20	8,990	3,350	3,400	9,170	16,200	7,880	7,700
21	7,800	3,400	3,370	8,990	15,700	7,800	7,560
22	4,590	3,740	3,340	9,410	15,600	9,030	7,280
23	3,260	5,270	3,400	11,100	20,800	9,030	6,520
24	7,730	9,730	3,960	14,800	25,600	8,610	8,330
25	9,380	5,220	4,300	19,800	26,700	7,170	6,740
26	12,200	3,370	4,280	24,300	26,100	6,900	6,650
27	12,100	3,320	4,250	23,900	23,100	6,520	7,940
28	12,100	3,280	5,060	21,500	16,600	8,610	7,450
29	4,400	-	4,920	20,900	15,700	8,820	7,310
30	2,420	-	4,460	21,100	14,400	9,340	4,380
31	5,620	-	4,200	-	18,100	-	2,930

Table 2. Values of daily mean discharge,
January through July 1978, Clearwater River at Spalding, Idaho
(Continued)[1]
(Values are in cubic feet per second)

Day	Jan.	Feb.	Mar.	Apr.	May	June	July
1	15,100	16,200	21,300	37,100	30,400	28,700	23,000
2	13,500	16,500	19,900	37,300	32,100	29,600	20,400
3	13,400	17,400	18,700	32,700	30,700	35,100	22,800
4	15,300	18,500	18,300	27,400	28,900	40,600	25,700
5	16,200	19,000	19,300	24,400	26,200	46,500	29,300
6	16,900	23,800	20,300	22,400	23,500	51,900	25,400
7	17,100	24,500	19,500	22,100	22,000	53,100	23,500
8	16,700	24,500	19,800	21,200	21,100	53,200	22,100
9	19,600	22,700	24,200	19,300	20,900	52,600	19,200
10	19,700	21,300	26,100	18,200	23,600	54,000	19,600
11	18,700	20,200	24,000	18,500	31,700	53,900	19,100
12	18,300	19,200	23,800	19,700	31,100	43,200	17,200
13	18,200	17,900	23,200	18,200	28,200	33,800	15,200
14	18,300	17,400	21,900	17,400	29,700	37,600	14,300
15	18,800	17,500	21,100	17,100	34,600	37,600	13,400
16	19,100	17,200	20,500	17,400	38,000	34,600	12,800
17	19,900	16,200	20,000	18,200	36,300	31,000	13,100
18	21,400	16,400	20,600	16,600	32,300	30,200	12,700
19	20,500	16,500	21,700	15,800	30,100	31,700	12,000
20	20,500	17,100	22,500	16,400	30,100	31,600	11,500
21	20,100	18,000	23,300	18,000	31,900	30,500	10,500
22	20,400	17,500	24,800	17,400	39,900	29,500	8,500
23	19,400	17,300	26,900	16,800	40,600	29,800	7,230
24	18,100	17,500	30,000	15,900	37,400	27,100	8,210
25	17,400	18,600	29,500	15,400	35,000	28,100	8,170
26	17,400	21,300	28,300	17,100	31,700	34,500	7,480
27	17,400	22,500	29,000	28,500	29,100	28,600	7,600
28	16,900	22,400	31,500	29,900	28,800	27,400	8,170
29	17,000	-	34,400	29,600	31,100	28,400	7,160
30	16,800	-	32,600	27,900	31,600	28,800	6,600
31	16,400	-	36,300	-	29,500	-	6,480

[1]Provisional records, subject to revision

Table 3. Summary of suspended-sediment data, Snake River at Anatone, Washington

Date	Gage height (ft)	Discharge (ft^3/s)	Water temperature (°C)	Sediment concentration (mg/L)	Sediment load (tons/d)
08-11-76	5.69	23,100	22.5	5	312
09-15-76	6.28	26,400	20.0	4	285
10-22-76	5.19	20,500	13.0	4	221
11-17-76	4.96	19,200	10.0	2	104
12-15-76	6.48	27,800	6.5	4	300
01-12-77	4.96	19,100	5.0	4	206
02-16-77	3.96	15,200	6.0	3	123
03-16-77	5.10	19,900	6.5	4	215
04-13-77	5.08	20,700	11.0	12	671
04-19-77	3.97	14,700	10.5	8	318
04-25-77	4.68	18,400	8.0	12	596
05-03-77	6.44	28,000	12.0	15	1,130
06-09-77	7.31	33,000	20.0	29	2,580
07-26-77	2.89	11,200	29.5	6	181

Table 3. Summary of suspended-sediment data, Snake River at Anatone, Washington (Continued)

Date	Gage height (ft)	Discharge (ft^3/s)	Water temperature (°C)	Sediment concentration (mg/L)	Sediment load (tons/d)
08-23-77	2.23	8,350	21.0	5	113
09-22-77	3.54	13,700	16.0	5	185
10-20-77	3.79	14,800	14.5	4	160
01-25-78	6.50	28,300	3.5	3	229
02-15-78	8.51	41,800	8.0	6	677
04-04-78	11.10	62,900	8.5	22	3,740
04-05-78	10.49	57,900	8.5	20	3,130
04-29-78	13.03	80,300	12.0	111	24,100
05-02-78	12.63	76,700	12.0	42	8,700
05-03-78	13.08	80,700	12.0	50	10,900
05-16-78	12.62	76,600	11.0	66	13,600
05-17-78	12.45	75,000	11.0	125	25,300
06-07-78	13.09	80,800	16.0	89	19,400
06-13-78	12.10	71,900	13.5	82	15,900
06-14-78	12.05	71,400	14.5	58	11,200
06-20-78	11.54	66,900	16.5	29	5,240

Table 4. Summary of suspended-sediment data, Clearwater River at Spalding, Idaho

Date	Gage height (ft)	Discharge (ft^3/s)	Water temperature (°C)	Sediment concentration (mg/L)	Sediment load (tons/d)
08-04-76	4.28	6,020	16.5	13	211
09-17-76	3.66	4,340	14.5	1	11.7
10-21-76	3.64	4,210	4.0	2	22.7
11-17-76	5.36	9,700	9.5	2	52.4
12-16-76	3.42	3,750	1.5	2	20.2
01-13-77	3.70	4,430	1.5	6	71.8
02-17-77	3.37	4,020	3.0	2	21.7
03-16-77	3.24	3,310	6.0	4	35.7
04-14-77	5.64	11,000	7.0	9	267
04-19-77	5.25	9,280	9.0	6	150
04-26-77	8.41	23,900	10.0	29	1,870
05-04-77	8.44	24,000	9.5	11	713
05-16-77	6.85	15,800	9.5	3	128
07-25-77	4.39	6,620	19.5	2	35.7

Table 4. Summary of suspended-sediment data, Clearwater River at Spalding, Idaho (Continued)

Date	Gage height (ft)	Discharge (ft^3/s)	Water temperature (°C)	Sediment concentration (mg/L)	Sediment load (tons/d)
09-21-77	5.50	10,400	15.0	36	1,010
10-19-77	3.86	4,710	11.0	1	12.7
11-16-77	4.24	5,780	5.0	6	93.6
12-14-77	8.95	27,000	5.0	426	31,100
02-16-78	7.16	17,400	4.0	2	94.0
03-22-78	8.63	25,300	12.5	11	751
04-28-78	9.33	29,700	8.5	67	5,370
05-03-78	9.55	31,200	10.0	10	842
05-15-78	10.44	37,500	8.5	19	1,920
05-17-78	10.50	37,900	6.5	19	1,940
06-05-78	11.98	49,800	10.0	35	4,710
06-06-78	12.56	55,000	10.0	46	6,830
06-08-78	12.60	55,400	9.5	23	3,440
06-12-78	10.43	37,400	10.5	11	1,110
06-14-78	10.76	39,900	11.0	14	1,510
06-19-78	9.71	32,400	14.5	5	437

Table 5. Summary of hydraulic-geometry and bedload-transport data, Snake River near Anatone, Washington

Date	Discharge (ft^3/s)	Hydraulic geometry				Bedload	
		Width (ft)	Depth (ft)	Velocity (ft/s)	Slope (ft/ft)	Unit [(lb/s)/ft]	Total (tons/d)
04-04-78	65,200	585	14.3	7.8	0.00087	0.099	2,500
04-05-78	57,400	580	13.8	7.4	.00082	.063	1,570
04-29-78	80,300	605	15.3	8.8	.00098	.101	2,640
05-02-78	76,700	600	15.1	8.6	.00094	.076	1,960
05-03-78	80,700	605	15.3	8.8	.00098	.073	1,900
05-16-78	76,800	600	15.1	8.6	.00094	.033	850
05-17-78	75,300	600	15.0	8.5	.00094	.059	1,530
06-07-78	81,900	610	15.4	8.8	.00098	.012	310
06-13-78	73,000	600	14.9	8.3	.00092	.015	400
06-20-78	63,800	580	14.2	7.8	.00086	.022	550

Table 6. Summary of hydraulic-geometry and bedload-transport data, Clearwater River at Spalding, Idaho

Date	Discharge (ft^3/s)	Hydraulic geometry				Bedload	
		Width (ft)	Depth (ft)	Velocity (ft/s)	Slope (ft/ft)	Unit [(lb/s)/ft]	Total (tons/d)
04-26-77	23,900	440	12.8	4.25	0.000183	0.006	112
05-04-77	24,000	440	12.8	4.25	.000184	.002	38
03-24-78	30,500	445	13.4	5.10	.000223	.003	51
04-28-78	29,900	444	13.3	5.00	.000218	.003	59
05-15-78	37,300	453	14.2	5.90	.000262	.006	130
05-17-78	38,000	454	14.3	5.95	.000266	.007	130
06-05-78	50,000	460	15.7	6.95	.000330	.011	220
06-06-78	55,800	463	16.3	7.20	.000360	.012	230
06-08-78	52,700	461	16.0	7.19	.000346	.011	220
06-12-78	37,300	453	14.2	5.90	.000262	.012	230
06-14-78	39,700	455	14.5	6.10	.000275	.020	400
06-19-78	32,700	447	13.7	5.35	.000235	.007	140

Table 7. Suspended-sediment particle-size distribution, Snake River near Anatone, Washington

Sieve size (mm)		Percent finer, by weight				
	Date------------------	08-11-76	09-15-76	10-22-76	11-17-76	12-15-76
	Discharge (ft³/s)-----	23,100	26,400	20,500	19,200	27,800
	Concentration (mg/L)--	5	4	4	2	4
1.0						
.50		100	100			
.25		95	99			100
.125		90	94	100	100	93
.062		83	82	94	96	84
.031						
.016						
.008						
.004						
.002						

Table 7. Suspended-sediment particle-size distribution, Snake River near Anatone, Washington (Continued)

Sieve size (mm)		Percent finer, by weight				
	Date	01-12-77	02-16-77	03-16-77	04-13-77	04-19-77
	Discharge (ft^3/s)	19,100	15,200	19,900	20,700	14,700
	Concentration (mg/L)	4	3	4	12	8
1.0						
.50						
.25						
.125		100	100	100	100	100
.062		96	97	92	98	95
.031						
.016						
.008						
.004						
.002						

Table 7. Suspended-sediment particle-size distribution, Snake River near Anatone, Washington (Continued)

Sieve size (mm)		Percent finer, by weight				
	Date------------------	04-25-77	05-03-77	06-09-77	07-26-77	08-23-77
	Discharge (ft^3/s)-----	18,400	28,000	33,000	11,200	8,350
	Concentration (mg/L)--	12	15	29	6	5
1.0						
.50			100	100	100	
.25			98	99	96	100
.125		100	91	94	93	98
.062		94	82	85	86	58
.031						
.016						
.008						
.004						
.002						

Table 7. Suspended-sediment particle-size distribution, Snake River near Anatone, Washington (Continued)

Sieve size (mm)		Percent finer, by weight				
	Date------------------	09-22-77	10-20-77	01-25-78	02-15-78	04-04-78
	Discharge (ft^3/s)-----	13,700	14,800	28,300	41,800	62,900
	Concentration (mg/L)--	5	4	3	6	22
1.0						
.50		100	100			100
.25		97	98			98
.125		93	93	100	100	94
.062		79	78	94	96	89
.031						
.016						
.008						
.004						
.002						

Table 7. Suspended-sediment particle-size distribution, Snake River near Anatone, Washington (Continued)

Sieve size (mm)		Percent finer, by weight				
	Date------------------	04-05-78	04-29-78	05-02-78	05-03-78	05-16-78
	Discharge (ft^3/s)-----	57,900	80,300	76,700	80,700	76,600
	Concentration (mg/L)--	20	111	42	50	66
2.0					100	
1.0					99	
.50		100	100	100	98	100
.25		99	99	98	94	96
.125		96	96	92	85	84
.062		92	92	84	77	66
.031			76	76	68	54
.016			56	63	56	42
.008			38	51	45	33
.004			25	43	37	27
.002			16	33	31	21

Table 7. Suspended-sediment particle-size distribution, Snake River near Anatone, Washington (Continued)

Sieve size (mm)		Percent finer, by weight				
	Date	05-17-78	06-07-78	06-13-78	06-14-78	06-20-78
	Discharge (ft^3/s)	75,000	80,800	71,900	71,400	66,900
	Concentration (mg/L)	125	89	82	58	29
1.0		100	100		100	100
.50		99	98	100	98	99
.25		96	89	95	92	95
.125		78	69	86	78	82
.062		60	56	75	66	71
.031		50	45	63	54	
.016		40	32	48	40	
.008		31	22	33	28	
.004		24	15	22	18	
.002		19	10	13	12	

Table 8. Suspended-sediment particle-size distribution, Clearwater River at Spalding, Idaho

Sieve size (mm)		Percent finer, by weight				
	Date ------------------	08-04-76	09-17-76	10-21-76	11-17-76	12-16-76
	Discharge (ft^3/s)-----	6,020	4,340	4,210	9,700	3,750
	Concentration (mg/L)--	13	1	2	2	2
1.0						
.50				100		
.25		100		94	100	
.125		99	100	86	92	100
.062		99	93	70	82	94
.031						
.016						
.008						
.004						
.002						

Table 8. Suspended-sediment particle-size distribution, Clearwater River at Spalding, Idaho (Continued)

		Percent finer, by weight				
Sieve size (mm)	Date------------------	01-13-77	02-17-77	03-16-77	04-14-77	04-19-77
	Discharge (ft^3/s)----	4,430	4,020	3,310	11,000	9,280
	Concentration (mg/L)-	6	2	4	9	6
1.0						
.50						
.25						100
.125		100	100	100	100	94
.062		98	95	94	95	92
.031						
.016						
.008						
.004						
.002						

Table 8. Suspended-sediment particle-size distribution, Clearwater River at Spalding, Idaho (Continued)

Sieve size (mm)		Percent finer, by weight			
	Date	04-26-77	05-04-77	05-16-77	07-25-77
	Discharge (ft^3/s)	23,900	24,000	15,800	6,620
	Concentration (mg/L)	29	11	3	2
1.0		100	100		
.50		98	96		
.25		85	84	100	
.125		74	76	81	100
.062		64	68	73	88
.031					
.016					
.008					
.004					
.002					

Table 8. Suspended-sediment particle-size distribution, Clearwater River at Spalding, Idaho (Continued)

Sieve size (mm)	Percent finer, by weight				
Date	09-21-77	10-19-77	11-16-77	12-14-77	02-16-78
Discharge (ft^3/s)	10,400	4,710	5,780	27,000	17,400
Concentration (mg/L)	36	1	6	426	2
1.0					
.50					
.25				100	
.125	100	100		99	100
.062	99	78	100	98	98
.031				92	
.016				76	
.008				62	
.004				48	
.002				36	

Table 8. Suspended-sediment particle-size distribution, Clearwater River at Spalding, Idaho (Continued)

Sieve size (mm)		Percent finer, by weight				
	Date-------------------	03-22-78	04-28-78	05-03-78	05-15-78	05-17-78
	Discharge (ft^3/s)-----	25,300	29,700	31,200	37,500	37,900
	Concentration (mg/L)--	11	67	10	19	19
1.0					100	100
.50				100	98	96
.25		100	100	96	88	87
.125		98	98	87	68	76
.062		94	96	80	54	67
.031			88			
.016			73			
.008			58			
.004			48			
.002			39			

Table 8. Suspended-sediment particle-size distribution, Clearwater River at Spalding, Idaho (Continued)

Sieve size (mm)		Percent finer, by weight					
	Date------------------	06-05-78	06-06-78	06-08-78	06-12-78	06-14-78	06-19-78
	Discharge (ft^3/s)-----	49,800	55,000	55,400	37,400	39,900	32,400
	Concentration (mg/L)--	35	46	23	11	14	5
2.0				100			
1.0		100	100	99	100	100	
.50		95	94	93	94	86	100
.25		75	72	72	66	52	83
.125		54	49	53	47	34	70
.062		43	42	43	39	29	58
.031							
.016							
.008							
.004							
.002							

Table 9. Bedload particle-size distribution,
Snake River near Anatone, Washington

Sieve size (mm)		Percent finer, by weight				
	Date----------------------	04-04-78	04-05-78	04-29-78	05-02-78	05-03-78
	Discharge (ft^3/s)---------	65,200	57,400	80,300	76,700	80,700
	Transport rate (tons/d)---	2,499	1,574	2,640	1,960	1,898
128						
90		100.00	100.00	100.00	100.00	100.00
64		86.30	77.55	67.16	69.48	71.90
45		70.81	63.61	52.91	59.59	55.87
32		57.47	50.76	41.01	48.88	51.34
22.6		39.25	37.47	32.09	40.25	46.83
16		29.38	29.49	27.85	36.31	42.18
11.3		23.97	23.10	24.72	33.68	39.43
8.0		22.15	20.00	22.94	33.03	37.97
5.7		21.30	18.49	21.74	32.82	37.07
4.0		20.89	18.08	21.05	32.66	36.56
2.8		20.46	17.79	20.37	32.44	36.01
2.0		20.00	17.40	19.84	32.20	35.43
1.4		19.37	16.77	19.19	31.91	34.62
1.0		18.49	15.82	18.39	31.06	33.41
.71		17.10	14.09	17.02	28.81	30.83
.50		13.89	10.12	12.90	14.87	23.10
.35		6.11	3.79	5.66	5.92	8.92
.25		1.35	.84	1.54	1.20	2.15
.18		.17	.13	.37	.14	.37
.12		.08	.09	.18	.08	.14
.09		.06	.07	.12	.05	.08
.06		.04	.05	.08	.04	.05
Pan		.00	.00	.00	.00	.00

Table 9. Bedload particle-size distribution,
Snake River near Anatone, Washington (Continued)

Sieve size (mm)		Percent finer, by weight				
	Date----------------------	05-16-78	05-17-78	06-07-78	06-13-78	06-20-78
	Discharge (ft^3/s)---------	76,800	75,300	81,900	73,000	63,800
	Transport rate (tons/d)---	846	1,533	314	398	549
128						
90		100.00	100.00			100.00
64		72.70	72.03	100.00		90.44
45		63.49	62.61	85.79		90.44
32		55.82	54.74	83.90		83.52
22.6		52.99	45.68	83.90	100.00	80.39
16		51.68	43.16	83.90	99.15	78.75
11.3		50.91	41.73	83.90	98.96	77.39
8.0		50.60	40.50	83.90	98.26	75.64
5.7		50.31	39.05	83.90	97.28	74.55
4.0		50.06	37.58	83.90	96.08	73.31
2.8		49.69	35.47	83.90	94.42	71.40
2.0		49.16	33.15	83.90	92.72	68.99
1.4		48.29	30.32	83.90	90.74	65.17
1.0		46.83	27.44	82.30	89.00	62.63
.71		41.81	24.31	80.41	85.81	57.41
.50		25.41	18.25	70.31	61.49	31.97
.35		12.44	7.08	40.09	28.08	14.40
.25		3.51	2.00	12.89	6.29	2.49
.18		.70	.41	4.39	1.84	.34
.12		.30	.16	1.70	.77	.22
.09		.18	.09	.77	.43	.14
.06		.10	.06	.38	.25	.09
Pan		.00	.00	.00	.00	.00

Table 10. Bedload particle-size distribution, Clearwater River at Spalding, Idaho

Sieve size (mm)		Percent finer, by weight					
	Date	04-26-77	05-04-77	03-24-78	04-28-78	05-15-78	05-17-78
	Discharge (ft^3/s)	23,900	24,000	30,500	29,900	37,300	38,000
	Transport rate (tons/d)	112	38.2	51.4	59.4	127	131
128							
90							
64							
45							100.00
32							95.33
22.6							93.79
16							93.74
11.3							93.59
8.0							92.11
5.7							91.97
4.0							91.83
2.8							91.61
2.0							91.46
1.4				100.00	100.00	100.00	91.34
1.0				96.70	99.32	99.19	90.56
.71		100.00	100.00	92.58	93.14	94.86	86.43
.50		81.97	77.46	63.56	50.60	66.74	52.99
.35				29.86	22.38	29.65	21.30
.25		8.93	5.96	7.49	6.77	7.71	5.43
.18				1.11	.70	.67	.45
.12		.64	.33	.55	.26	.32	.24
.09				.32	.18	.24	.17
.06		.32	.15	.15	.13	.21	.12
Pan		.00	.00	.00	.00	.00	.00

Table 10. Bedload particle-size distribution, Clearwater River at Spalding, Idaho (Continued)

Sieve size (mm)		Percent finer, by weight					
	Date	06-05-78	06-06-78	06-08-78	06-12-78	06-14-78	06-19-78
	Discharge (ft^3/s)	50,000	55,800	52,700	37,300	39,700	32,700
	Transport rate (tons/d)	221	230	221	234	403	136
128							
90							
64						100.00	
45				100.00		91.88	
32			100.00	90.18		91.88	100.00
22.6		100.00	98.72	90.18		91.88	96.82
16		97.74	98.72	89.33		90.77	95.66
11.3		96.31	98.72	88.25		90.77	95.24
8.0		94.87	98.72	87.87		90.77	95.24
5.7		94.48	98.72	87.70		90.77	95.24
4.0		94.13	98.72	87.54		90.77	95.24
2.8		93.78	98.72	87.39		90.77	95.24
2.0		93.53	98.72	87.39		90.77	95.24
1.4		93.33	98.72	87.39	100.00	90.77	95.24
1.0		92.75	97.90	86.78	99.36	90.26	94.64
.71		89.12	95.34	83.95	95.93	82.62	87.97
.50		58.31	74.12	62.43	53.44	30.12	42.12
.35		26.11	34.76	28.21	20.28	11.29	15.04
.25		6.49	9.10	6.83	3.31	2.26	3.02
.18		1.24	1.90	.84	.33	.20	.25
.12		.55	.75	.34	.20	.12	.14
.09		.34	.45	.22	.12	.08	.06
.06		.20	.29	.15	.06	.04	.02
Pan		.00	.00	.00	.00	.00	.00

Table 11. Summary data of bedload particle-size distribution, Snake River near Anatone, Washington

Date	Discharge (ft^3/s)	Transport rate (tons/d)	Particle size (mm), at percent finer than				
			D_{16}	D_{35}	D_{50}	D_{65}	D_{84}
04-04-78	65,200	2,499	0.68	20.0	28.0	39.0	60.0
04-05-78	57,400	1,574	1.5	21.0	32.0	47.0	72.0
04-29-78	80,300	2,640	.68	26.0	43.0	60.0	83.0
05-02-78	76,700	1,960	.50	15.0	33.0	56.0	83.0
05-03-78	80,700	1,898	.41	2.0	27.0	66.0	83.0
05-16-78	76,800	846	.41	.58	3.1	49.0	80.0
05-17-78	75,300	1,533	.45	1.7	28.0	51.0	83.0
06-07-78	81,900	314	.26	.33	.39	.46	35.0
06-13-78	73,000	398	.30	.38	.45	.52	.70
06-20-78	63,800	549	.40	.51	.57	1.3	33.0

Table 12. Summary data of bedload particle-size distribution, Clearwater River at Spalding, Idaho

Date	Discharge (ft^3/s)	Transport rate (tons/d)	Particle size (mm), at percent finer than				
			D_{16}	D_{35}	D_{50}	D_{65}	D_{84}
04-26-77	23,900	112	0.27	0.32	0.36	0.41	0.52
05-04-77	24,000	38.2	.28	.32	.37	.43	.54
03-24-78	30,500	51.4	.29	.37	.44	.51	.64
04-28-78	29,900	59.4	.32	.39	.44	.49	.57
05-15-78	37,300	127	.29	.38	.44	.50	.54
05-17-78	38,000	131	.32	.42	.49	.51	.66
06-05-78	50,000	221	.30	.39	.46	.53	.66
06-06-78	55,800	230	.28	.35	.40	.46	.54
06-08-78	52,700	221	.29	.37	.43	.52	.73
06-12-78	37,300	234	.33	.41	.48	.55	.65
06-14-78	39,700	403	.39	.52	.58	.64	.73
06-19-78	32,700	136	.36	.47	.52	.58	.68

Table 13. Values of accumulative suspended- and bedload-sediment transport, 1977-78 water years, Snake River near Anatone, Washington

Daily mean discharge (ft^3/s)	Number of days	Accumulative percentage of time	Suspended sediment (tons/d)	Accumulative suspended sediment (tons)	Bedload sediment (tons/d)	Accumulative bedload sediment (tons)	Ratio bedload/ suspended load (percent)
			Water Year 1977				
36,000	1	0.27	1,570	1,570	80	80	5.10
35,400	2	.82	1,500	4,570	77	234	5.12
32,900	1	1.10	1,200	5,790	68	302	5.22
31,000	1	1.37	1,025	6,815	50	352	5.17
29,100	1	1.64	863	7,678	40	392	5.11
28,600	1	1.92	825	8,503	38	430	5.06
27,900	1	2.19	773	9,276	34	464	5.00
27,600	1	2.47	752	10,028	33	497	4.96
26,800	1	2.74	698	10,726	29	526	4.90
26,700	1	3.01	690	11,416	28	554	4.85
26,600	1	3.29	684	12,100	28	582	4.81
26,500	1	3.56	678	12,778	28	610	4.77
26,200	1	3.84	658	13,436	26	636	4.73
26,100	1	4.11	652	14,088	26	662	4.70
25,900	1	4.38	639	14,727	24	686	4.66
25,700	4	5.48	627	17,235	24	782	4.54
25,600	1	5.75	621	17,856	23	805	4.51
25,400	1	6.03	609	18,465	22	827	4.48
25,100	2	6.58	591	19,647	20	867	4.41
24,900	1	6.85	579	20,226	20	887	4.39
24,600	1	7.12	561	20,787	18	905	4.35
24,500	1	7.40	555	21,342	18	923	4.32
24,400	1	7.67	549	21,891	18	941	4.30
24,300	1	7.95	543	22,434	17	958	4.27
24,100	1	8.22	531	22,965	16	974	4.24

Table 13. Values of accumulative suspended- and bedload-sediment transport, 1977-78 water years, Snake River near Anatone, Washington (Continued)

Daily mean discharge (ft^3/s)	Number of days	Accumulative Percentage of time	Suspended sediment (tons/d)	Accumulative suspended sediment (tons)	Bedload sediment (tons/d)	Accumulative bedload sediment (tons)	Ratio bedload/ suspended load (percent)
24,000	1	8.49	525	23,490	16	990	4.21
23,800	1	8.77	514	24,004	15	1,005	4.19
23,700	1	9.04	508	24,512	15	1,020	4.16
23,500	1	9.31	498	25,010	14	1,034	4.13
23,400	3	10.14	492	26,486	14	1,076	4.06
23,300	1	10.41	486	26,972	14	1,090	4.04
23,200	1	10.68	481	27,453	14	1,104	4.02
23,000	1	10.96	470	27,923	13	1,117	4.00
Water Year 1978							
93,000	1	.27	23,700	23,700	1,470	1,470	6.20
91,500	1	.55	22,600	46,300	1,370	2,840	6.13
90,100	1	.82	21,700	68,000	1,290	4,130	6.07
85,100	1	1.10	18,200	86,200	986	5,116	5.94
84,100	1	1.37	17,600	103,800	926	6,042	5.82
83,000	1	1.64	16,900	120,700	860	6,902	5.72
80,500	2	2.19	15,400	151,500	710	8,322	5.49
80,400	1	2.47	15,300	166,800	704	9,026	5.41
79,300	1	2.74	14,700	181,500	638	9,664	5.32
79,100	1	3.01	14,600	196,100	626	10,290	5.25
77,800	1	3.29	14,000	210,100	546	10,836	5.16
77,600	1	3.56	13,900	224,000	532	11,368	5.08
76,900	1	3.84	13,600	237,600	481	11,849	4.99
76,700	1	4.11	13,400	251,000	463	12,312	4.91
76,600	1	4.38	13,400	264,400	454	12,766	4.83

Table 13. Values of accumulative suspended- and bedload-sediment transport, 1977-78 water years, Snake River near Anatone, Washington (Continued)

Daily mean discharge (ft^3/s)	Number of days	Accumulative Percentage of time	Suspended sediment (tons/d)	Accumulative suspended sediment (tons)	Bedload sediment (tons/d)	Accumulative bedload sediment (tons)	Ratio bedload/ suspended load (percent)
76,200	2	4.93	13,200	290,800	418	13,602	4.68
75,700	1	5.21	12,900	303,700	370	13,972	4.60
75,400	1	5.47	12,800	316,500	340	14,312	4.52
75,200	1	5.75	12,700	329,200	320	14,632	4.44
74,700	1	6.03	12,400	341,600	298	14,930	4.37
74,100	1	6.30	12,100	353,700	296	15,226	4.30
72,900	1	6.58	11,500	365,200	290	15,516	4.25
71,400	1	6.85	10,800	376,000	282	15,798	4.20
71,000	1	7.12	10,600	386,600	280	16,078	4.16
70,900	1	7.40	10,500	397,100	280	16,358	4.12
70,700	1	7.67	10,400	407,500	278	16,636	4.08
69,900	1	7.95	10,000	417,500	274	16,910	4.05
69,000	1	8.22	9,640	427,140	270	17,180	4.02
68,300	1	8.49	9,360	436,500	266	17,446	4.00
68,000	1	8.77	9,240	445,740	265	17,711	3.97
67,500	2	9.31	9,060	463,860	262	18,235	3.93
67,400	1	9.59	9,020	472,880	262	18,497	3.91
67,100	1	9.86	8,910	481,790	260	18,757	3.89
66,400	2	10.41	8,660	499,110	257	19,271	3.86
66,300	1	10.68	8,620	507,730	256	19,527	3.85
66,000	3	11.51	8,520	533,290	255	20,292	3.81
65,800	1	11.78	8,450	541,740	254	20,546	3.79
65,300	1	12.05	8,280	550,020	252	20,798	3.78
65,200	1	12.33	8,240	558,260	251	21,049	3.77
65,100	1	12.60	8,200	566,460	250	21,299	3.76
64,800	2	13.15	8,100	582,660	249	21,797	3.74
64,400	1	13.42	7,960	590,620	247	22,044	3.73

Table 13. Values of accumulative suspended- and bedload-sediment transport, 1977-78 water years, Snake River near Anatone, Washington (Continued)

Daily mean discharge (ft^3/s)	Number of days	Accumulative percentage of time	Suspended sediment (tons/d)	Accumulative suspended sediment (tons)	Bedload sediment (tons/d)	Accumulative bedload sediment (tons)	Ratio bedload/ suspended load (percent)
64,100	1	13.70	7,860	598,480	246	22,290	3.72
63,700	1	13.97	7,720	606,200	244	22,534	3.72
63,300	1	14.25	7,580	613,780	242	22,776	3.71
63,200	1	14.52	7,540	621,320	241	23,017	3.70
62,800	1	14.79	7,400	628,720	239	23,256	3.70
62,300	1	15.07	7,220	635,940	236	23,492	3.69
62,000	1	15.34	7,120	643,060	235	23,727	3.69
61,600	1	15.62	6,990	650,050	233	23,960	3.69
61,500	1	15.89	6,960	657,010	232	24,192	3.68
60,500	2	16.44	6,625	670,260	226	24,644	3.68
60,200	2	16.99	6,520	683,300	224	25,092	3.67
60,000	1	17.26	6,460	689,760	223	25,315	3.67
58,600	1	17.53	6,000	695,760	215	25,530	3.67
58,400	1	17.80	5,930	701,690	213	25,743	3.67
57,900	1	18.08	5,770	707,460	210	25,953	3.67
57,600	1	18.63	5,680	713,140	208	26,370	3.70
57,400	1	18.90	5,610	718,750	207	26,577	3.70
56,700	1	19.18	5,400	724,150	202	26,779	3.70
56,300	3	20.00	5,290	740,020	199	27,376	3.70
56,200	1	20.27	5,260	745,280	198	27,574	3.70
55,200	1	20.55	4,980	750,260	191	27,765	3.70
54,800	1	20.82	4,880	755,140	189	27,954	3.70
54,600	1	21.10	4,830	759,970	187	28,141	3.70
54,400	1	21.37	4,780	764,750	186	28,327	3.70
54,300	1	21.64	4,760	769,510	185	28,512	3.71
54,100	1	21.92	4,900	774,410	184	28,696	3.71
53,900	2	22.47	4,660	783,730	182	29,060	3.71
53,700	1	22.74	4,610	788,340	181	29,241	3.71
53,400	1	23.01	4,540	792,880	179	29,420	3.71

Table 13. Values of accumulative suspended- and bedload-sediment transport, 1977-78 water years, Snake River near Anatone, Washington (Continued)

Daily mean discharge (ft^3/s)	Number of days	Accumulative percentage of time	Suspended sediment (tons/d)	Accumulative suspended sediment (tons)	Bedload sediment (tons/d)	Accumulative bedload sediment (tons)	Ratio bedload/ suspended load (percent)
52,700	1	23.29	4,380	797,260	174	29,594	3.71
52,400	1	23.56	4,310	801,570	172	29,766	3.71
52,300	1	23.84	4,290	805,860	171	29,937	3.71
51,300	1	24.11	4,070	809,930	164	30,101	3.72
50,700	1	24.38	3,950	813,880	160	30,261	3.72
50,600	1	24.66	3,930	817,810	159	30,420	3.72
50,300	1	24.93	3,860	821,670	157	30,577	3.72
50,200	1	25.21	3,840	825,510	156	30,733	3.72
50,100	1	25.48	3,820	829,330	156	30,889	3.72
49,900	1	25.75	3,780	833,110	154	31,043	3.73
49,800	2	26.30	3,760	840,630	154	31,351	3.73
49,400	1	26.58	3,690	844,320	151	31,502	3.73
49,300	1	26.85	3,670	847,990	150	31,652	3.73
49,200	1	27.12	3,650	851,640	149	31,801	3.73
48,800	2	27.67	3,570	858,780	147	32,095	3.74
48,700	1	27.94	3,560	862,340	146	32,241	3.74
48,600	1	28.22	3,540	865,880	146	32,387	3.74
48,200	1	28.49	3,470	869,350	143	32,530	3.74
48,100	2	29.04	3,450	876,250	143	32,816	3.75
48,000	1	29.31	3,430	879,680	142	32,958	3.75
47,600	1	29.58	3,360	883,040	140	33,098	3.75
47,400	1	29.86	3,320	886,360	138	33,236	3.75
47,200	1	30.14	3,290	889,650	137	33,373	3.75
46,300	2	30.68	3,120	895,890	132	33,637	3.75
46,000	1	30.96	3,070	898,960	130	33,767	3.76
44,400	1	31.23	2,800	901,760	122	33,889	3.76
44,200	1	31.51	2,760	904,520	121	34,010	3.76
40,500	1	31.78	2,180	906,700	102	34,112	3.76
38,200	2	32.33	1,850	910,400	91	34,294	3.77

Table 13. Values of accumulative suspended- and bedload-sediment transport, 1977-78 water years, Snake River near Anatone, Washington (Continued)

Daily mean discharge (ft^3/s)	Number of days	Accumulative percentage of time	Suspended sediment (tons/d)	Accumulative suspended sediment (tons)	Bedload sediment (tons/d)	Accumulative bedload sediment (tons)	Ratio bedload/suspended load (percent)
38,100	1	32.60	1,830	912,230	90	34,384	3.77
37,700	1	32.88	1,780	914,010	88	34,472	3.77
37,100	1	33.15	1,700	915,710	86	34,558	3.77
37,000	1	33.42	1,690	917,400	85	34,643	3.78
36,900	1	33.69	1,680	919,080	84	34,727	3.78
35,800	1	33.96	1,550	920,630	79	34,806	3.78
35,600	1	34.23	1,520	922,150	78	34,884	3.78
35,200	1	34.50	1,470	923,620	76	34,960	3.79
35,100	1	34.77	1,460	925,080	76	35,036	3.79
35,000	2	35.32	1,450	927,980	75	35,186	3.79
34,800	1	35.59	1,430	929,410	74	35,260	3.79
34,700	2	36.14	1,420	932,250	73	35,406	3.80
34,200	1	36.41	1,370	933,620	70	35,476	3.80
33,900	1	36.68	1,330	934,950	68	35,544	3.80
33,500	1	36.95	1,280	936,230	65	35,609	3.80
33,300	1	37.22	1,260	937,490	64	35,673	3.81
33,200	1	37.49	1,250	938,740	63	35,736	3.81
33,100	1	37.76	1,240	939,980	63	35,799	3.81
32,800	1	38.03	1,210	941,190	61	35,860	3.81
32,700	2	38.58	1,200	943,590	60	35,980	3.81
32,000	2	39.13	1,120	945,830	56	36,092	3.82
31,900	2	39.68	1,120	948,070	55	36,202	3.82
31,600	1	39.95	1,080	949,150	54	36,256	3.82
31,500	2	40.50	1,080	951,310	53	36,362	3.82
31,300	2	41.05	1,060	953,430	52	36,466	3.82
31,100	1	41.32	1,040	954,470	51	36,517	3.83
31,000	2	41.87	1,025	956,520	50	36,617	3.83

Table 14. Values of accumulative suspended- and bedload-sediment transport, 1977-78 water years, Clearwater River at Spalding, Idaho

Daily mean discharge (ft^3/s)	Number of days	Accumulative percentage of time	Suspended sediment (tons/d)	Accumulative suspended sediment (tons)	Bedload sediment (tons/d)	Accumulative bedload sediment (tons)	Ratio bedload/ suspended load (percent)
			Water Year 1977				
28,500	1	0.27	1,540	1,540	50	50	3.25
28,200	1	.55	1,500	3,040	49	99	3.26
26,700	1	.82	1,360	4,400	40	139	3.16
26,100	1	1.10	1,300	5,700	38	177	3.11
26,000	1	1.37	1,290	6,990	38	215	3.08
25,600	1	1.64	1,250	8,240	36	251	3.05
24,300	1	1.92	1,140	9,380	31	282	3.01
24,200	1	2.19	1,130	10,510	31	313	2.98
23,900	2	2.74	1,100	12,710	30	373	2.93
23,100	2	3.29	1,040	14,790	26	425	2.87
23,000	1	3.56	1,030	15,820	26	451	2.85
22,400	1	3.84	985	16,805	24	475	2.83
21,500	1	4.11	910	17,715	20	495	2.79
21,100	1	4.38	888	18,603	18	513	2.76
20,900	1	4.66	876	19,479	18	531	2.73
20,800	1	4.93	866	20,345	17	548	2.69
20,600	1	5.21	852	21,197	17	565	2.67
20,200	1	5.48	824	22,021	16	581	2.64
20,000	1	5.75	810	22,831	15	596	2.61
19,800	1	6.03	796	23,627	14	610	2.58
18,800	1	6.30	727	24,354	12	622	2.55
18,400	1	6.57	701	25,055	11	633	2.53
18,100	1	6.85	682	25,737	10	643	2.50
17,800	1	7.12	662	26,399	10	653	2.47
17,400	1	7.40	636	27,035	9	662	2.45
17,300	1	7.67	630	27,665	9	671	2.43

Table 14. Values of accumulative suspended- and bedload-sediment transport, 1977-78 water years, Clearwater River at Spalding, Idaho (Continued)

Daily mean discharge (ft^3/s)	Number of days	Accumulative percentage of time	Suspended sediment (tons/d)	Accumulative suspended sediment (tons)	Bedload sediment (tons/d)	Accumulative bedload sediment (tons)	Ratio bedload/ suspended load (percent)
17,000	1	7.95	610	28,275	8	679	2.40
16,900	1	8.22	604	28,879	8	687	2.38
16,600	1	8.49	586	29,465	7	694	2.36
16,400	1	8.77	574	30,039	7	701	2.33
16,200	1	9.04	562	30,601	6	707	2.31
			Water Year 1978				
54,000	1	.27	6,310	6,310	230	230	3.65
53,900	1	.55	6,280	12,590	230	460	3.65
53,200	1	.82	6,090	18,680	226	686	3.67
53,100	1	1.10	6,060	24,740	226	912	3.69
52,600	1	1.37	5,920	30,660	223	1,135	3.70
51,900	1	1.64	5,720	36,380	218	1,353	3.72
46,500	1	1.92	4,420	40,800	184	1,537	3.77
43,200	1	2.19	3,710	44,510	158	1,695	3.81
40,600	2	2.74	3,220	50,950	137	1,969	3.86
39,900	1	3.01	3,090	54,040	131	2,100	3.89
38,000	1	3.29	2,790	56,830	116	2,216	3.90
37,600	2	3.84	2,730	62,290	114	2,444	3.92
37,400	1	4.11	2,700	64,990	111	2,555	3.93
37,300	1	4.38	2,680	67,670	110	2,665	3.94
37,100	1	4.66	2,660	70,330	109	2,774	3.94
36,300	2	5.21	2,540	75,410	102	2,978	3.95
35,100	1	5.48	2,360	77,770	94	3,072	3.95
35,000	1	5.75	2,350	80,120	93	3,165	3.95
34,600	2	6.30	2,290	84,700	90	3,345	3.95
34,500	1	6.58	2,280	86,980	90	3,435	3.95
34,400	1	6.85	2,270	89,250	89	3,524	3.95

Table 14. Values of accumulative suspended- and bedload-sediment transport, 1977-78 water years, Clearwater River at Spalding, Idaho (Continued)

Daily mean discharge (ft^3/s)	Number of days	Accumulative percentage of time	Suspended sediment (tons/d)	Accumulative suspended sediment (tons)	Bedload sediment (tons/d)	Accumulative bedload sediment (tons)	Ratio bedload/ suspended load (percent)
33,800	1	7.12	2,180	91,430	85	3,609	3.95
32,700	1	7.40	2,040	93,470	77	3,686	3.94
32,600	1	7.67	2,030	95,500	76	3,762	3.94
32,300	1	7.95	1,990	97,490	74	3,836	3.93
32,100	1	8.22	1,960	99,450	73	3,909	3.93
31,900	1	8.49	1,940	101,390	71	3,980	3.93
31,700	3	9.31	1,910	107,120	70	4,190	3.91
31,600	2	9.86	1,900	110,920	70	4,330	3.90
31,500	1	10.14	1,890	112,810	69	4,399	3.90
31,100	2	10.68	1,840	116,490	67	4,533	3.89
31,000	1	10.96	1,830	118,320	66	4,599	3.89
30,700	1	11.23	1,790	120,110	64	4,663	3.88
30,500	1	11.51	1,770	121,880	63	4,726	3.88
30,400	1	11.78	1,760	123,640	62	4,788	3.87
30,200	1	12.05	1,730	125,370	61	4,849	3.87
30,100	2	12.60	1,720	128,810	61	4,971	3.86
30,000	1	12.88	1,710	130,520	60	5,031	3.85
29,900	1	13.15	1,700	132,220	59	5,090	3.85
29,800	1	13.42	1,690	133,910	59	5,149	3.85
29,700	1	13.70	1,680	135,590	58	5,207	3.84
29,600	2	14.25	1,670	138,930	58	5,323	3.83
29,500	3	15.07	1,660	143,910	57	5,494	3.82
29,300	1	15.34	1,630	145,540	56	5,550	3.81
29,100	1	15.62	1,610	147,150	55	5,605	3.81
29,000	1	15.89	1,600	148,750	54	5,659	3.80
28,900	1	16.16	1,590	150,340	53	5,712	3.80
28,800	2	16.71	1,580	153,500	53	5,818	3.79
28,700	1	16.99	1,570	155,070	52	5,870	3.79

Table 14. Values of accumulative suspended- and bedload-sediment transport, 1977-78 water years, Clearwater River at Spalding, Idaho (Continued)

Daily mean discharge (ft^3/s)	Number of days	Accumulative percentage of time	Suspended sediment (tons/d)	Accumulative suspended sediment (tons)	Bedload sediment (tons/d)	Accumulative bedload sediment (tons)	Ratio bedload/ suspended load (percent)
28,600	1	17.26	1,560	156,630	52	5,922	3.78
28,500	1	17.53	1,540	158,170	51	5,973	3.78
28,400	1	17.81	1,530	159,700	50	6,023	3.77
28,300	1	18.08	1,520	161,220	50	6,073	3.77
28,200	1	18.36	1,510	162,730	49	6,122	3.76
28,100	1	18.63	1,500	164,230	49	6,171	3.76
27,900	1	18.90	1,480	165,710	48	6,219	3.75
27,400	2	19.45	1,430	168,570	45	6,309	3.74
27,100	1	19.73	1,400	169,970	44	6,353	3.74
26,900	1	20.00	1,380	171,350	42	6,395	3.73
26,200	1	20.27	1,310	172,660	39	6,434	3.73
26,100	1	20.55	1,300	173,960	38	6,472	3.72
25,700	1	20.82	1,260	175,220	37	6,509	3.71
25,400	1	21.10	1,240	176,460	36	6,545	3.71
24,800	1	21.37	1,180	177,640	33	6,578	3.70
24,500	2	21.92	1,160	179,960	32	6,642	3.69
24,400	1	22.19	1,150	181,110	32	6,674	3.69
24,200	1	22.47	1,130	182,240	31	6,705	3.68
24,000	1	22.74	1,110	183,350	30	6,735	3.67
23,800	2	23.29	1,090	185,530	29	6,793	3.66
23,600	1	23.56	1,080	186,610	28	6,821	3.66
23,500	2	24.11	1,070	188,750	28	6,877	3.64
23,300	1	24.38	1,050	189,800	27	6,904	3.64
23,200	1	24.66	1,050	190,850	27	6,931	3.63
23,000	1	24.93	1,030	191,880	26	6,957	3.63
22,800	1	25.21	1,020	192,900	25	6,982	3.62
22,700	1	25.48	1,010	193,910	25	7,007	3.61
22,500	2	26.02	992	195,894	24	7,055	3.60
22,400	2	26.57	985	197,864	24	7,103	3.59

Table 14. Values of accumulative suspended- and bedload-sediment transport, 1977-78 water years, Clearwater River at Spalding, Idaho (Continued)

Daily mean discharge (ft^3/s)	Number of days	Accumulative percentage of time of time	Suspended sediment (tons/d)	Accumulative suspended sediment (tons)	Bedload sediment (tons/d)	Accumulative bedload sediment (tons)	Ratio bedload/suspended load (percent)
22,100	2	27.12	962	199,788	22	7,147	3.58
22,000	1	27.39	955	200,743	22	7,169	3.57
21,900	1	27.68	948	201,691	22	7,191	3.57
21,700	1	27.94	932	202,623	21	7,212	3.56
21,400	1	28.21	910	203,533	20	7,232	3.55
21,300	3	29.04	902	206,239	19	7,289	3.53
21,200	1	29.31	895	207,134	19	7,308	3.53
21,100	2	29.86	888	208,910	18	7,344	3.52
20,900	1	30.13	873	209,783	18	7,362	3.51
20,600	1	30.40	852	210,635	17	7,379	3.50
20,500	3	31.22	845	213,170	16	7,427	3.48
20,400	2	31.77	838	214,846	16	7,459	3.47
20,300	1	32.04	831	215,677	16	7,475	3.47
20,200	1	32.31	824	216,501	16	7,491	3.46
20,100	1	32.58	817	217,318	15	7,506	3.45
20,000	1	32.85	810	218,128	15	7,521	3.45
19,900	2	33.40	803	219,734	15	7,551	3.44
19,800	1	33.67	796	220,530	14	7,565	3.43
19,700	2	34.22	789	222,108	14	7,593	3.42
19,600	2	34.77	782	223,672	14	7,621	3.41
19,500	1	35.04	775	224,447	14	7,635	3.40
19,400	1	35.31	768	225,215	13	7,648	3.40
19,300	2	35.86	761	226,737	13	7,674	3.38
19,200	2	36.41	754	228,245	12	7,698	3.37
19,100	2	36.96	747	229,739	12	7,722	3.36
19,000	1	37.23	740	230,479	12	7,734	3.36

Table 15. Summary of dissolved-residue data, Snake River near Anatone, Washington

Date	Discharge (ft^3/s)	Dissolved residue (mg/L)	Dissolved residue (tons/d)
08-11-76	23,100	151	9,420
09-15-76	26,400	214	15,300
10-22-76	20,500	225	12,500
11-17-76	19,200	212	11,000
12-15-76	27,800	288	21,600
01-12-77	19,100	268	13,800
02-16-77	15,200	249	10,200
03-16-77	19,900	270	14,500
04-13-77	20,700	217	12,100
04-19-77	14,700	195	7,740
04-25-77	18,400	149	7,400
05-03-77	28,000	153	11,600
05-11-77	16,500	121	5,390
06-09-77	33,000	112	9,980
07-26-77	11,200	191	5,780
08-23-77	8,350	230	5,190
09-22-77	13,700	221	8,170
10-20-77	14,800	264	10,600
11-17-77	18,000	240	11,700
12-15-77	41,800	157	17,700
01-25-78	28,300	236	18,000
02-15-78	31,800	229	19,700
03-22-78	44,200	136	16,200
04-05-78	57,900	129	20,200
04-20-78	49,200	117	15,500
04-29-78	80,300	129	28,000
05-02-78	76,700	114	23,600
05-03-78	80,700	114	24,800
05-16-78	76,600	93	19,200
05-17-78	75,000	97	19,600
05-24-78	63,400	87	14,900
06-07-78	80,800	67	14,600
06-13-78	71,900	82	15,900
06-14-78	71,400	75	14,500
06-20-78	66,900	79	14,300
07-20-78	31,200	103	8,680

Table 16. Summary of dissolved-residue data, Clearwater River at Spalding, Idaho

Date	Discharge (ft^3/s)	Dissolved residue (mg/L)	Dissolved residue (tons/d)
04-19-77	9,280	30	752
04-26-77	23,900	22	1,420
05-04-77	24,000	23	1,490
05-16-77	15,800	22	939
11-16-77	5,780	30	468
12-14-77	27,000	64	4,670
01-26-78	17,500	37	1,750
02-16-78	17,400	44	2,070
03-22-78	25,300	29	1,980
04-19-78	16,100	29	1,260
04-28-78	29,700	46	3,690
05-03-78	31,200	20	1,680
05-15-78	37,500	21	2,130
05-17-78	37,900	25	2,560
05-25-78	33,900	28	2,560
06-05-78	49,800	20	2,690
06-06-78	55,000	15	2,230
06-08-78	55,400	13	1,940
06-12-78	37,400	16	1,620
06-14-78	39,900	21	2,260
06-19-78	32,300	18	1,570
07-20-78	11,900	26	578

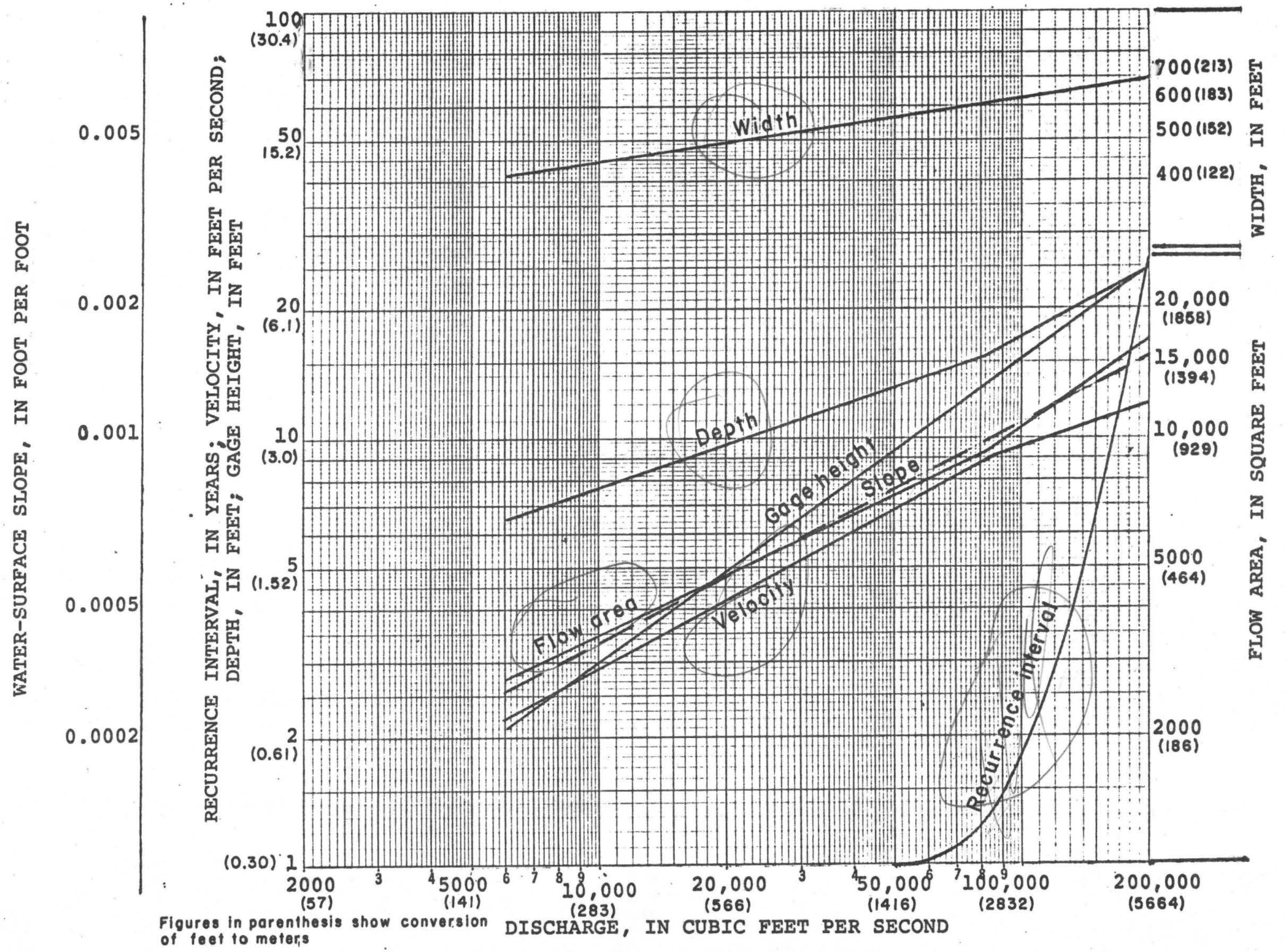

Figure 1.--At-a-station data of hydraulic and channel geometry, Snake River near Anatone, Washington.

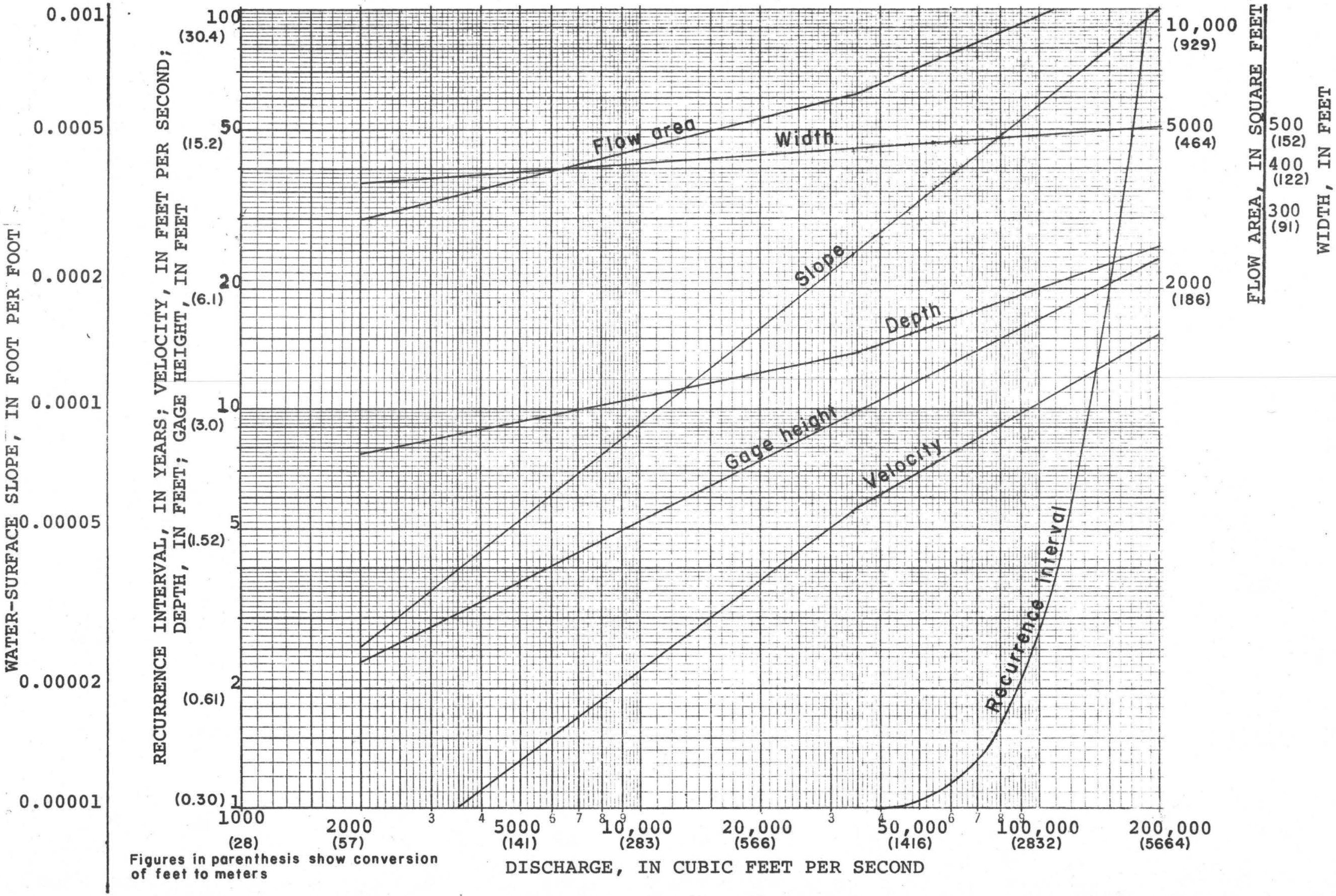

Figure 2.--At-a-station data of hydraulic and channel geometry, Clearwater River at Spalding, Idaho.

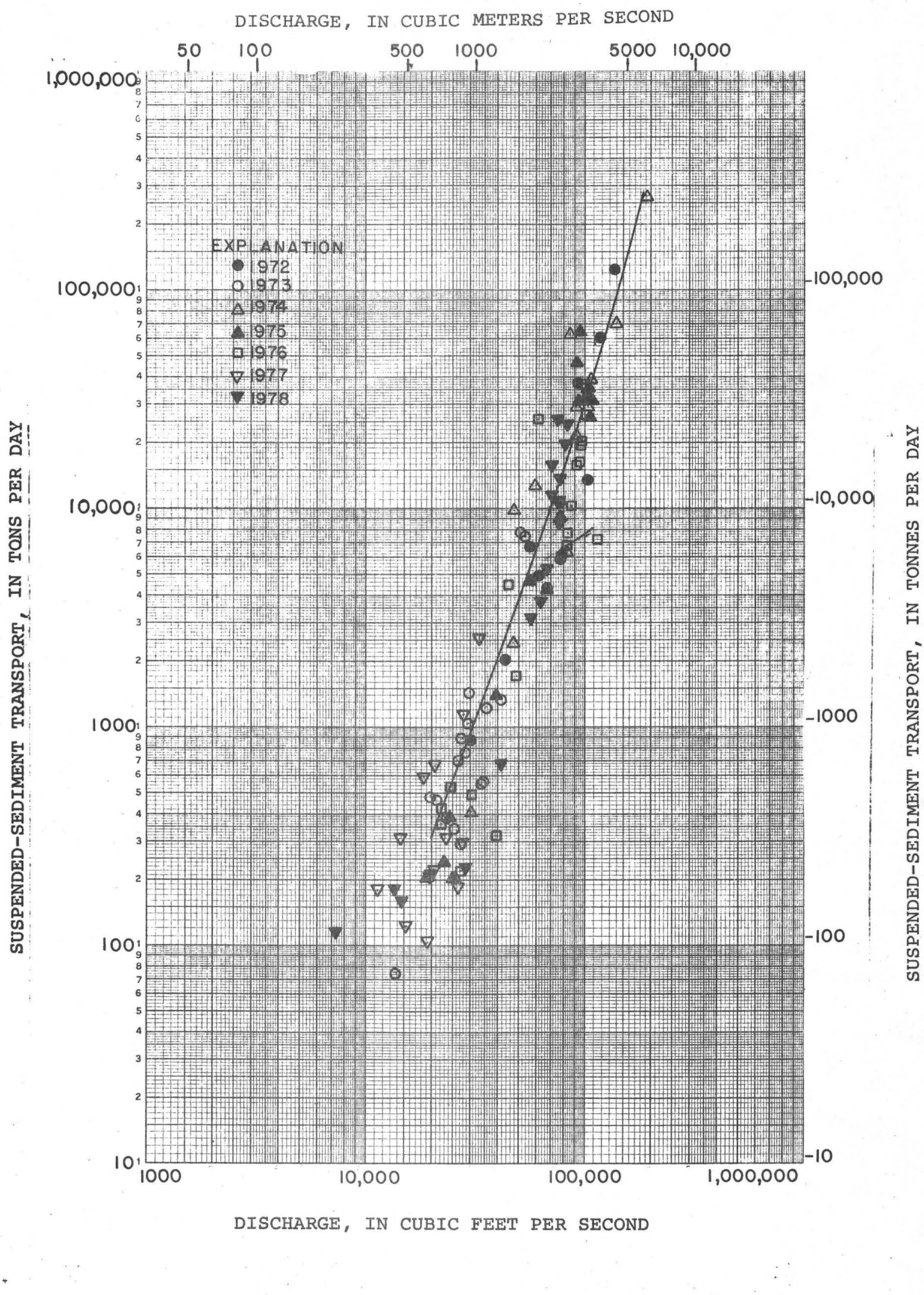

Figure 3.--Suspended-sediment transport as a function of stream discharge, Snake River near Anatone, Washington.

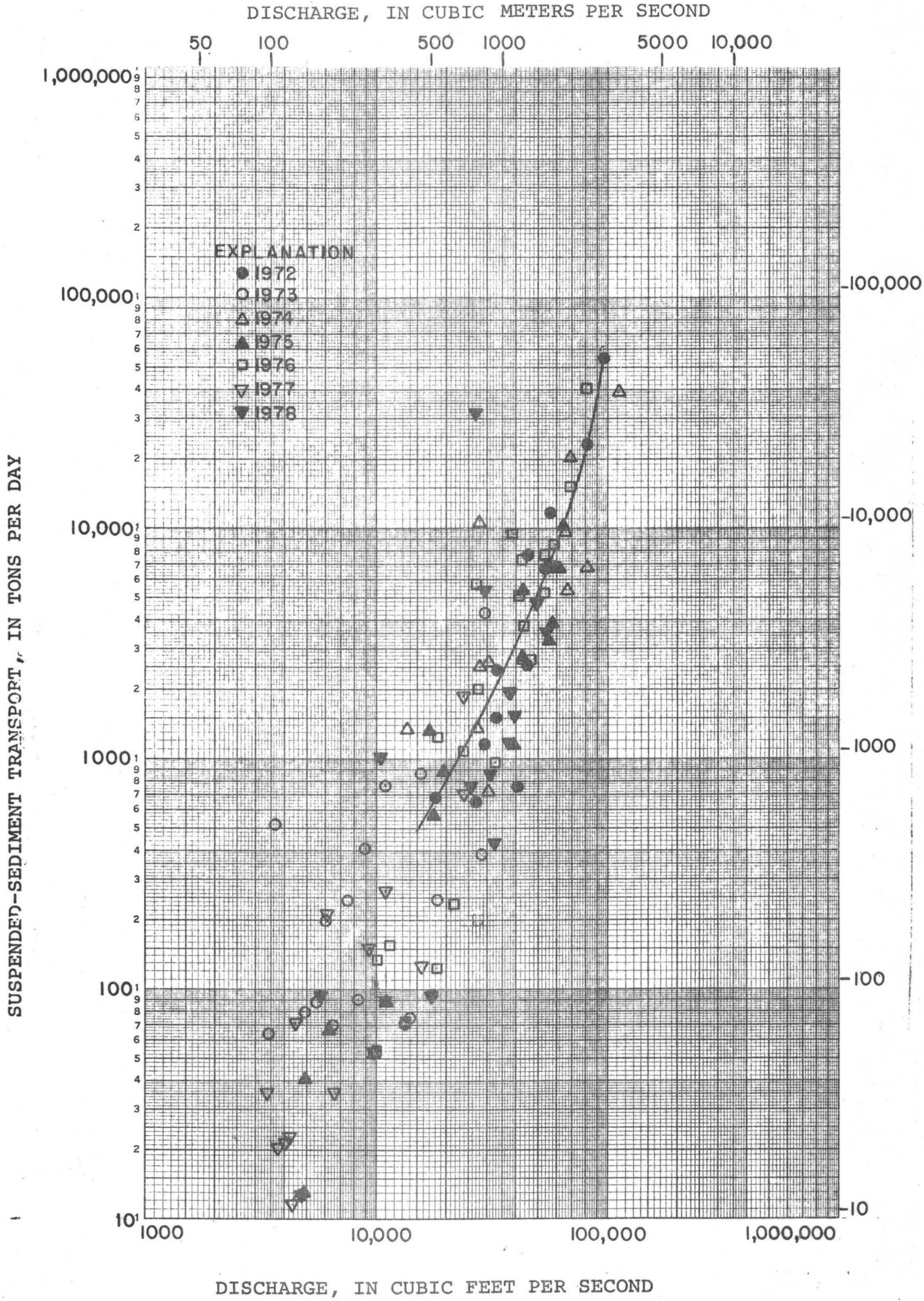

Figure 4.--Suspended-sediment transport as a function of stream discharge, Clearwater River at Spalding, Idaho.

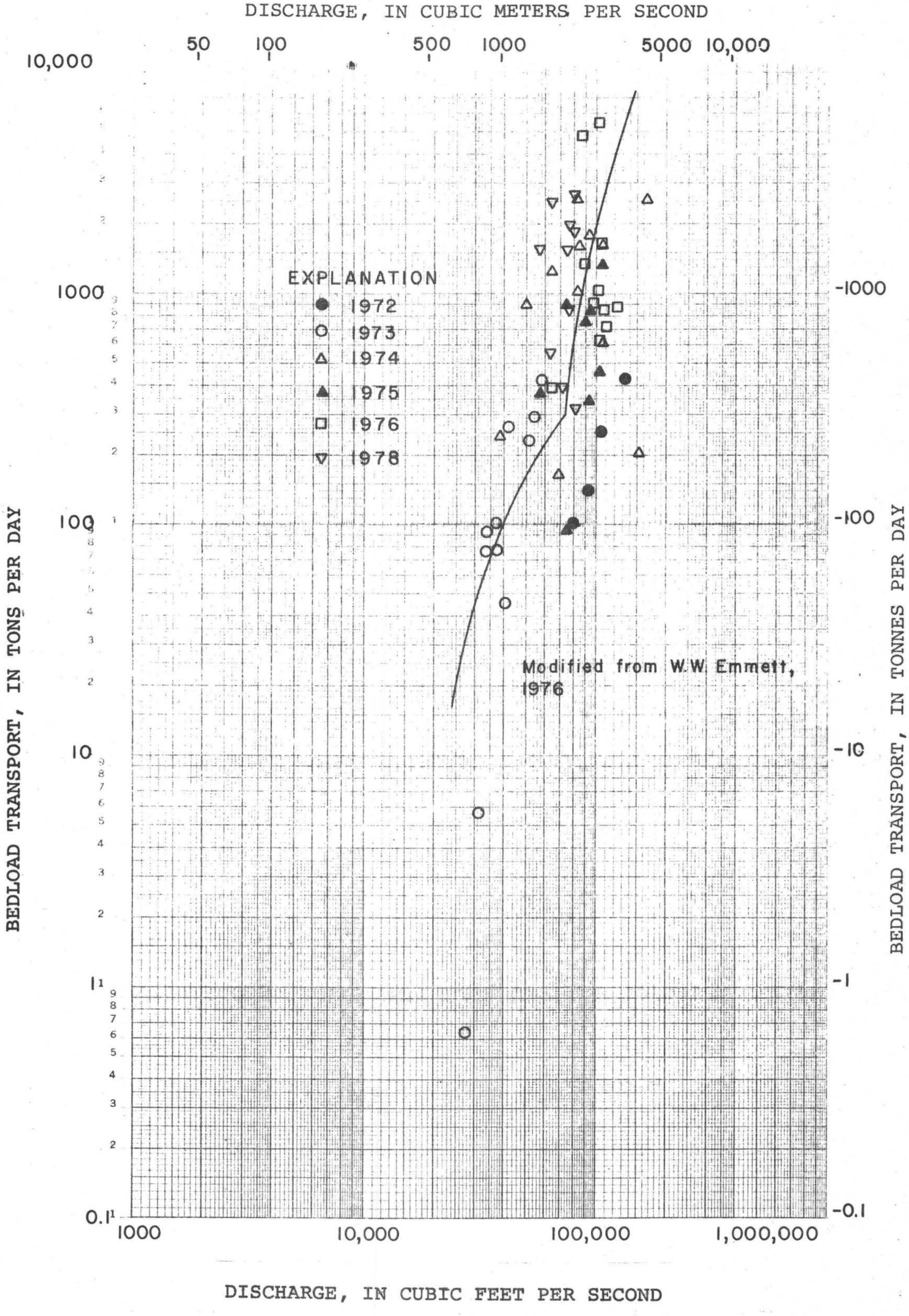

Figure 5.--Bedload-sediment transport as a function of stream discharge, Snake River near Anatone, Washington.

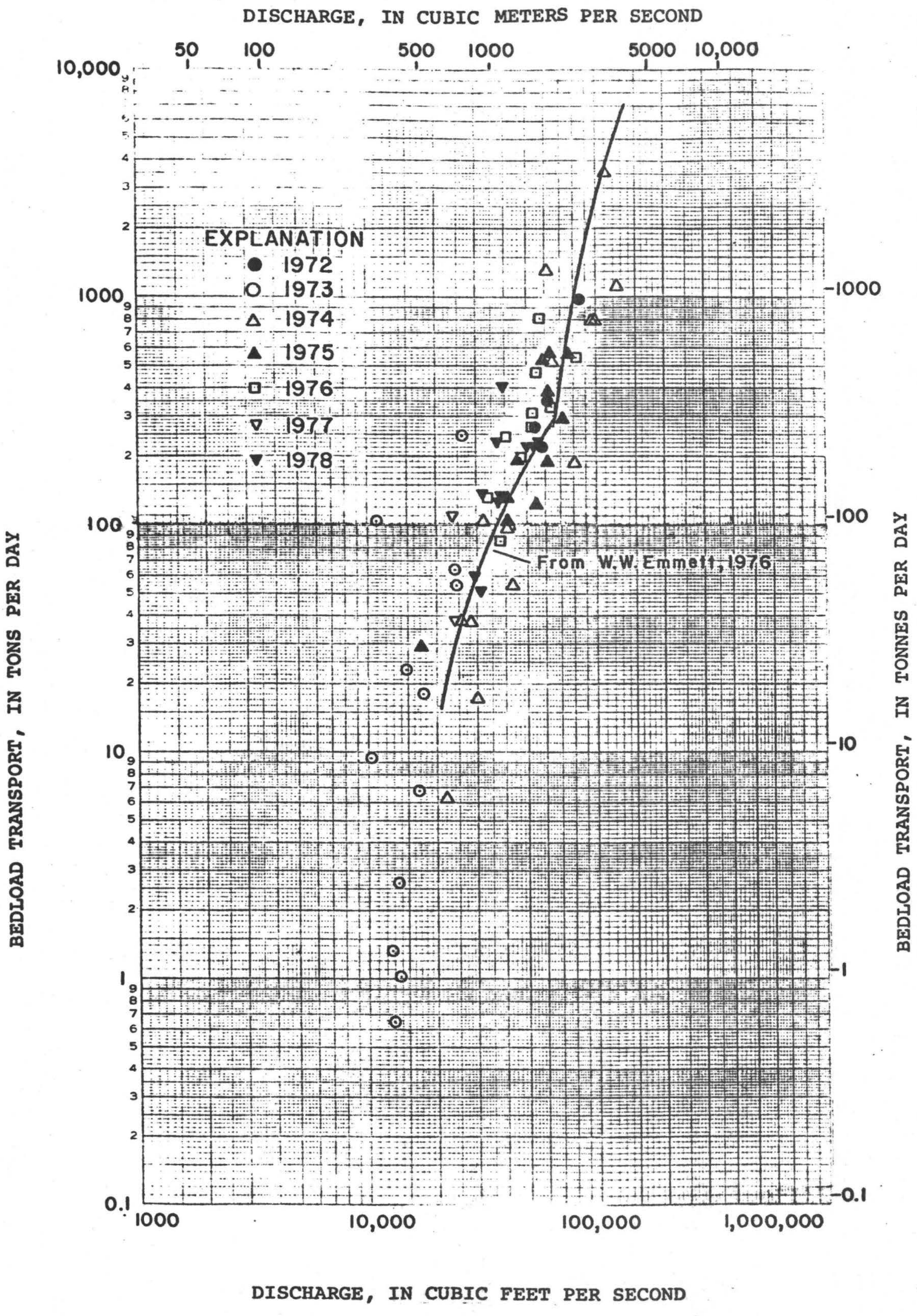

Figure 6.--Bedload-sediment transport as a function of stream discharge, Clearwater River at Spalding, Idaho.

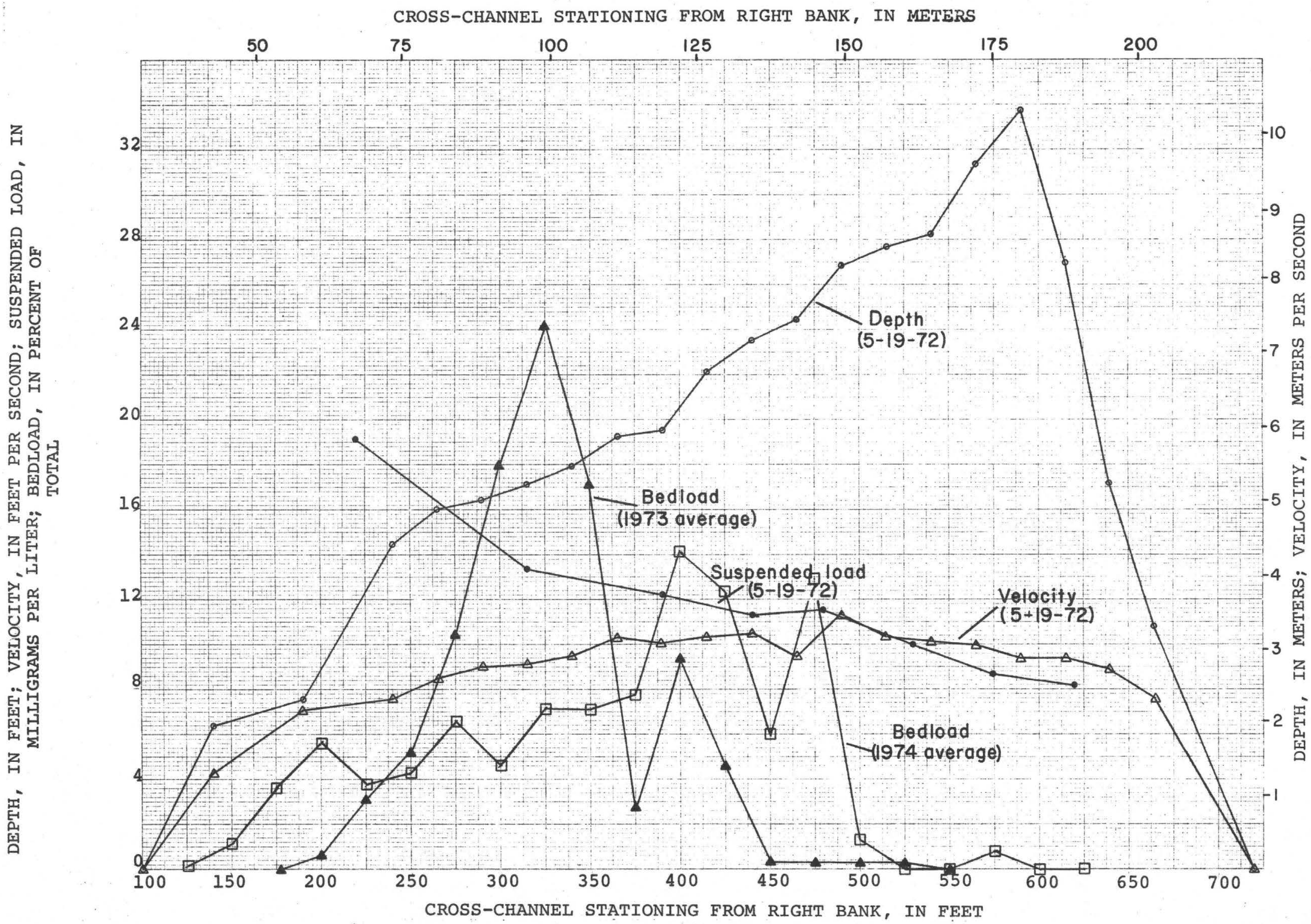

Figure 7.--Cross-channel variability in bedload, suspended load, depth, and velocity; Snake River near Anatone, Washington.

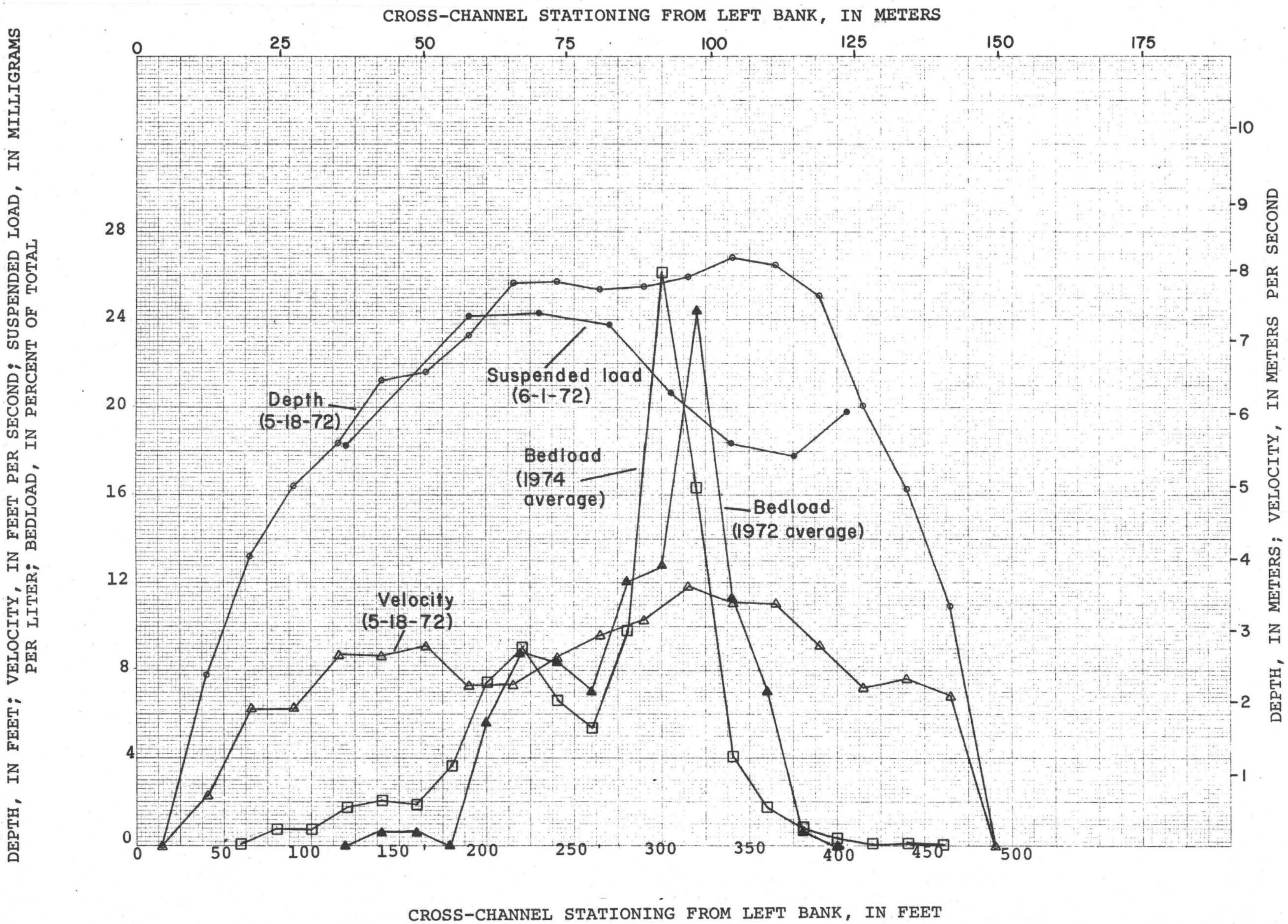

Figure 8.--Cross-channel variability in bedload, suspended load, depth, and velocity; Clearwater River at Spalding, Idaho.

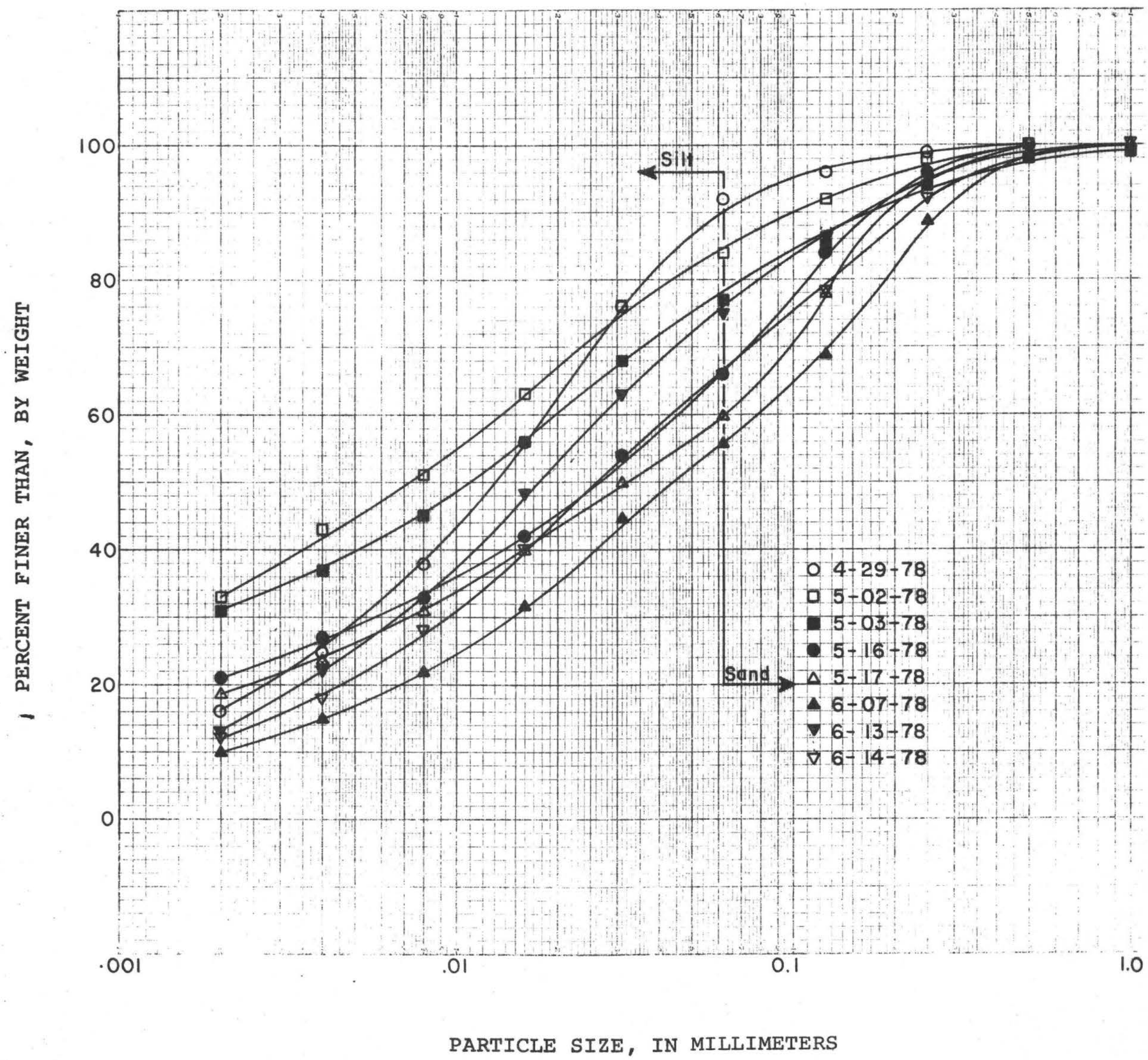

Figure 9.--Particle-size distribution of suspended sediment, Snake River near Anatone, Washington.

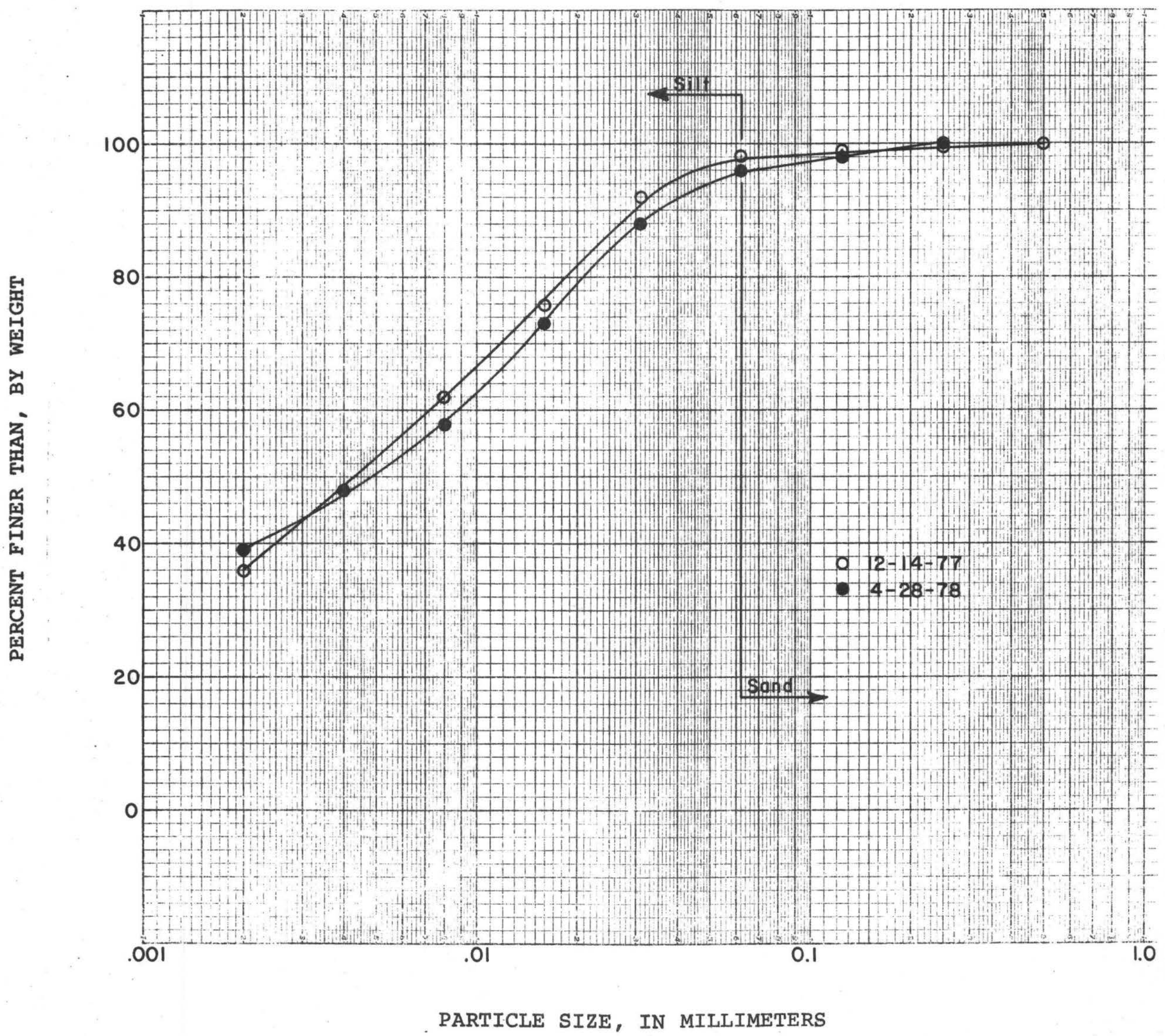

Figure 10--Particle-size distribution of suspended sediment, Clearwater River at Spalding, Idaho.

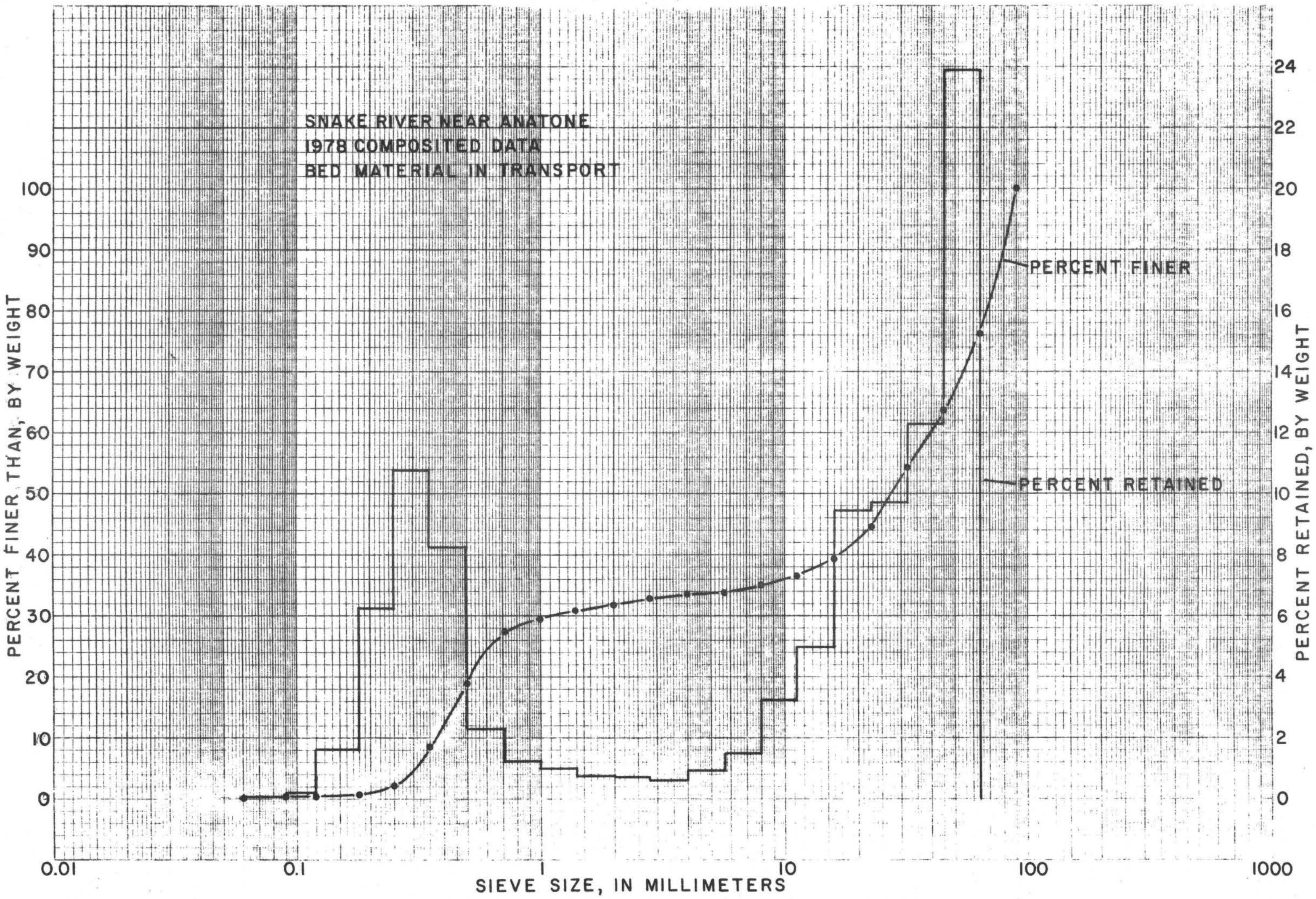

FIGURE 11.--Size distribution of bed material in transport (bedload), Snake River near Anatone, Washington, 1978 composited data.

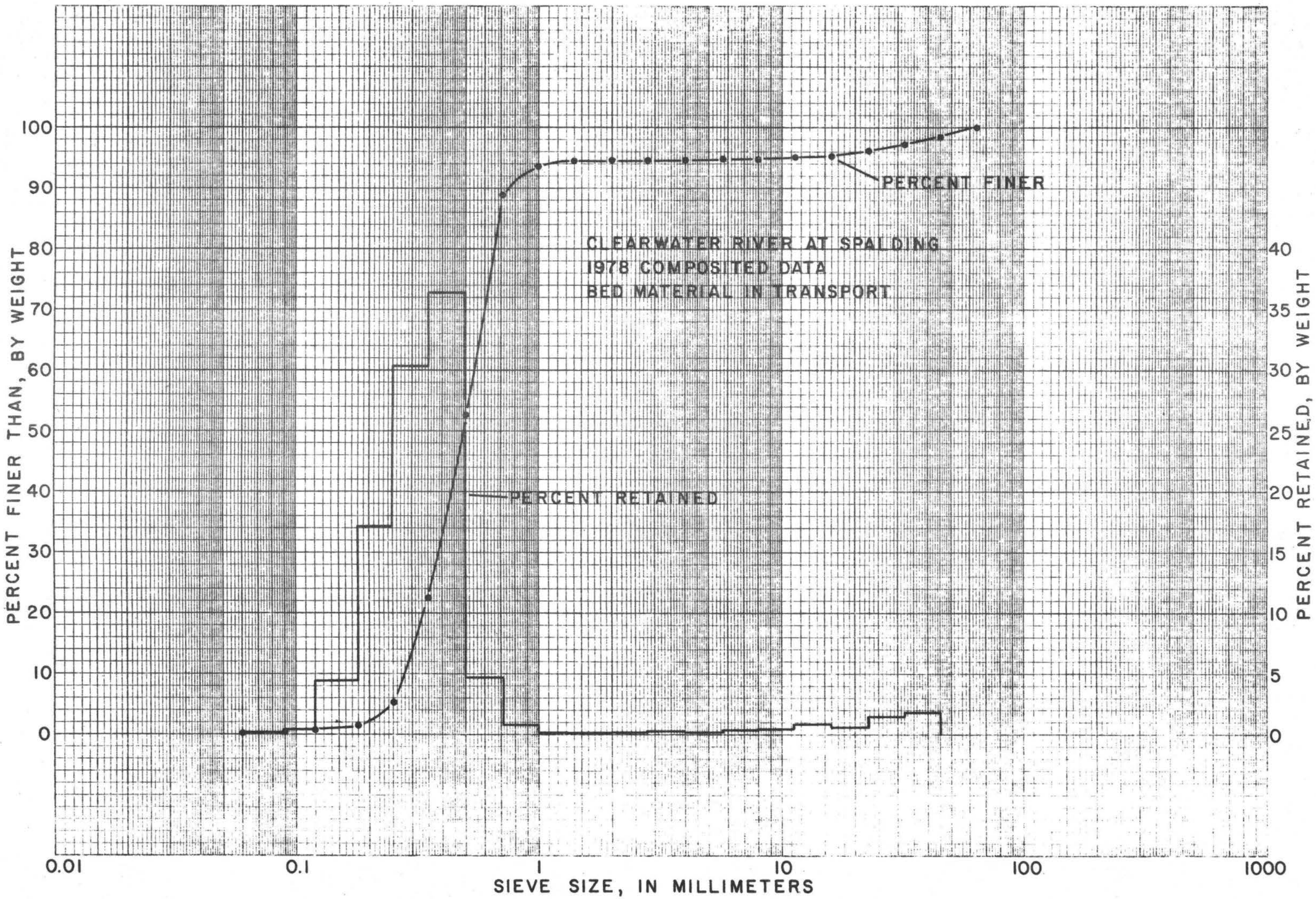

Figure 12.--Size distribution of bed material in transport (bedload), Clearwater River at Spalding, Idaho, 1978 composited data.

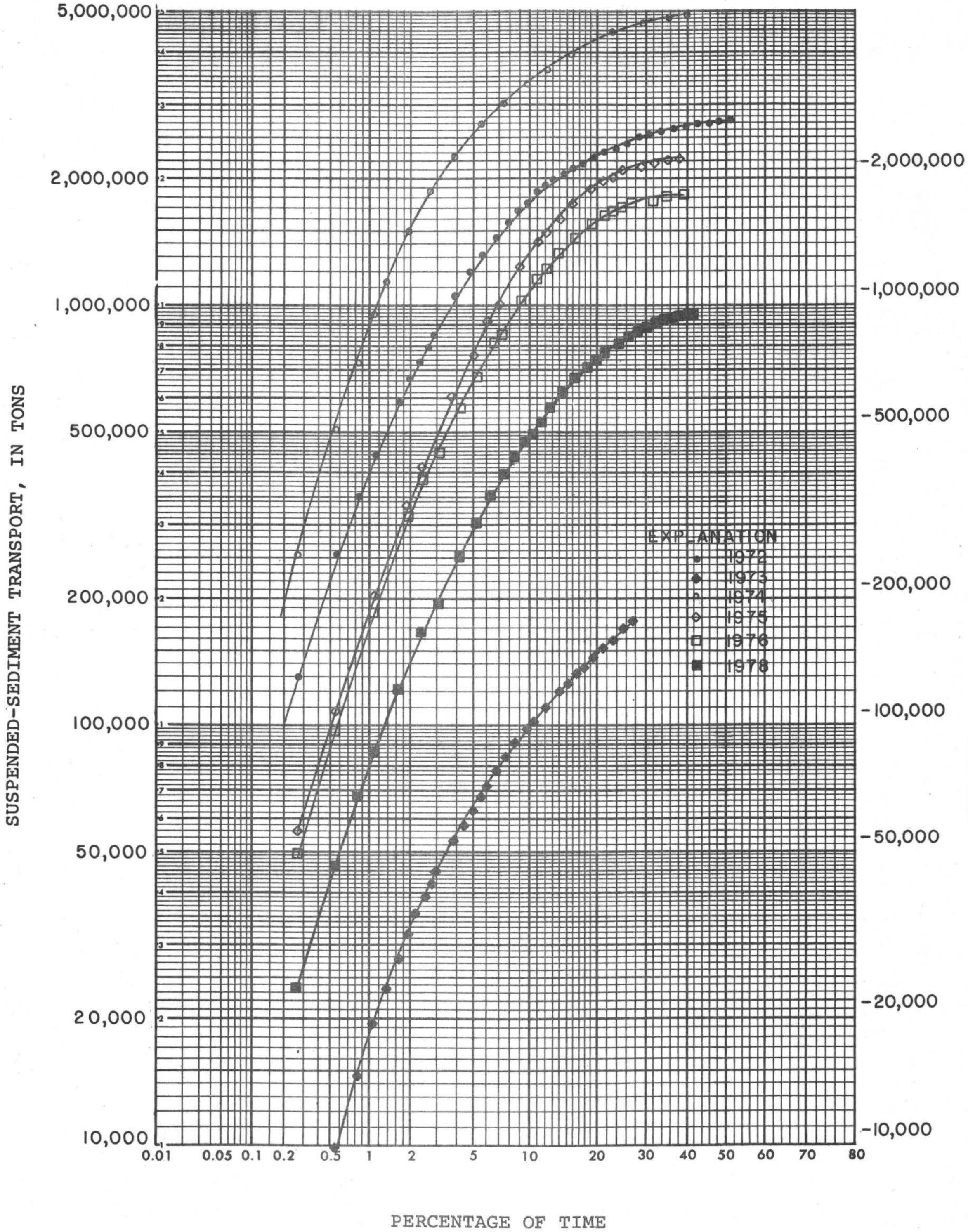

Figure 13.--Accumulative suspended-sediment transport as a function of time, Snake River near Anatone, Washington.

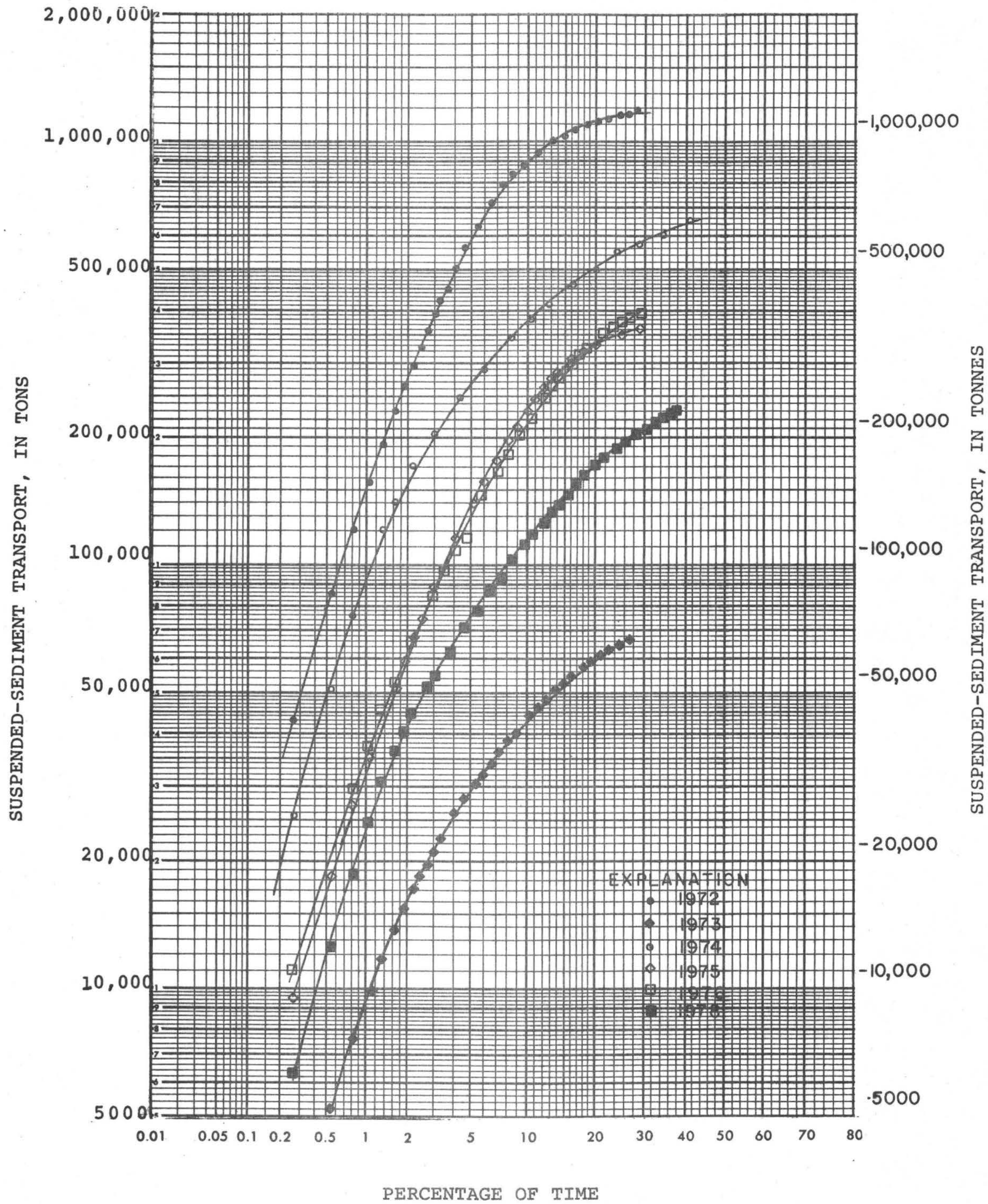

Figure 14.--Accumulative suspended-sediment transport as a function of time, Clearwater River at Spalding, Idaho.

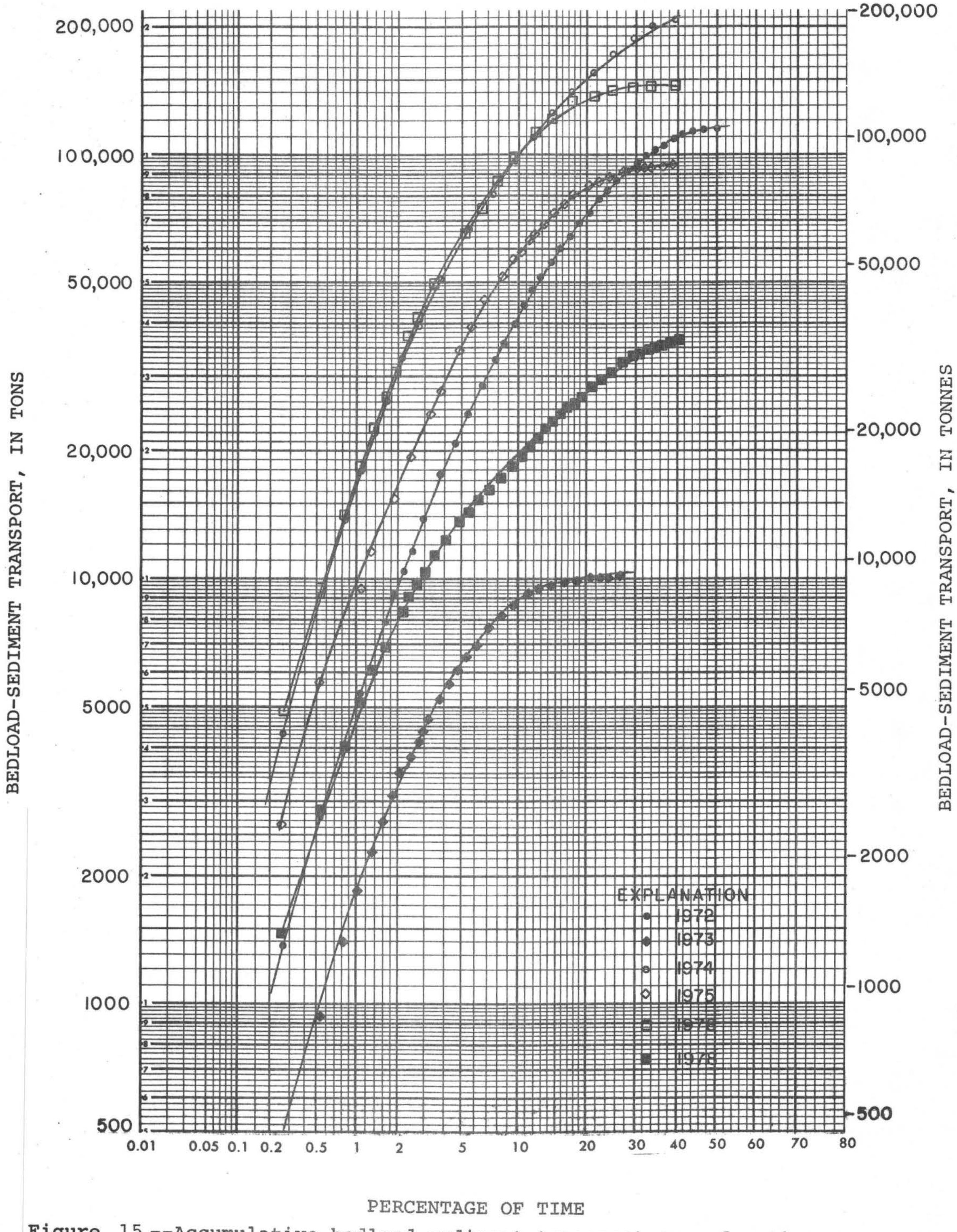

Figure 15.--Accumulative bedload-sediment transport as a function of time, Snake River near Anatone, Washington.

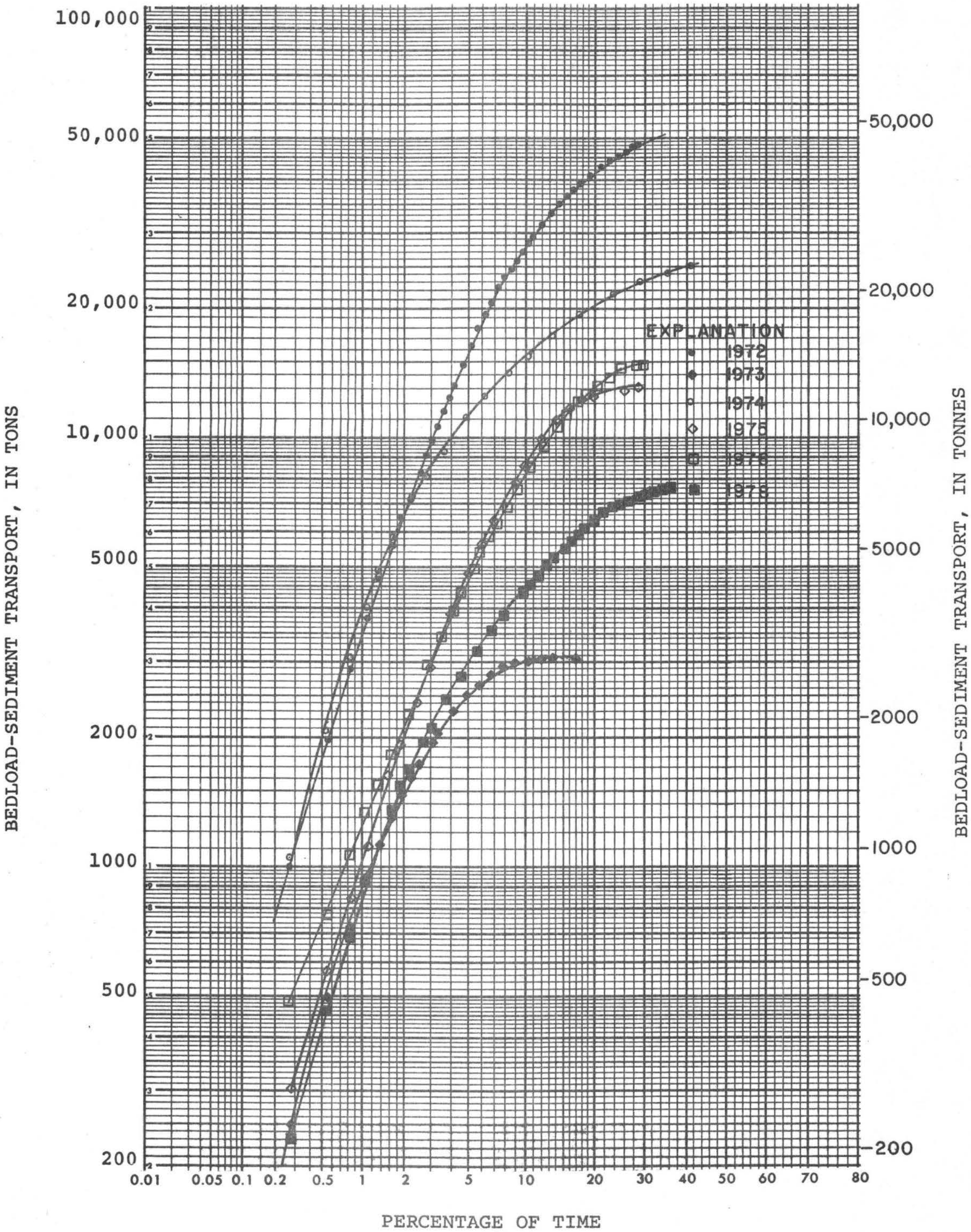

Figure 16.--Accumulative bedload-sediment transport as a function of time, Clearwater River at Spalding, Idaho.

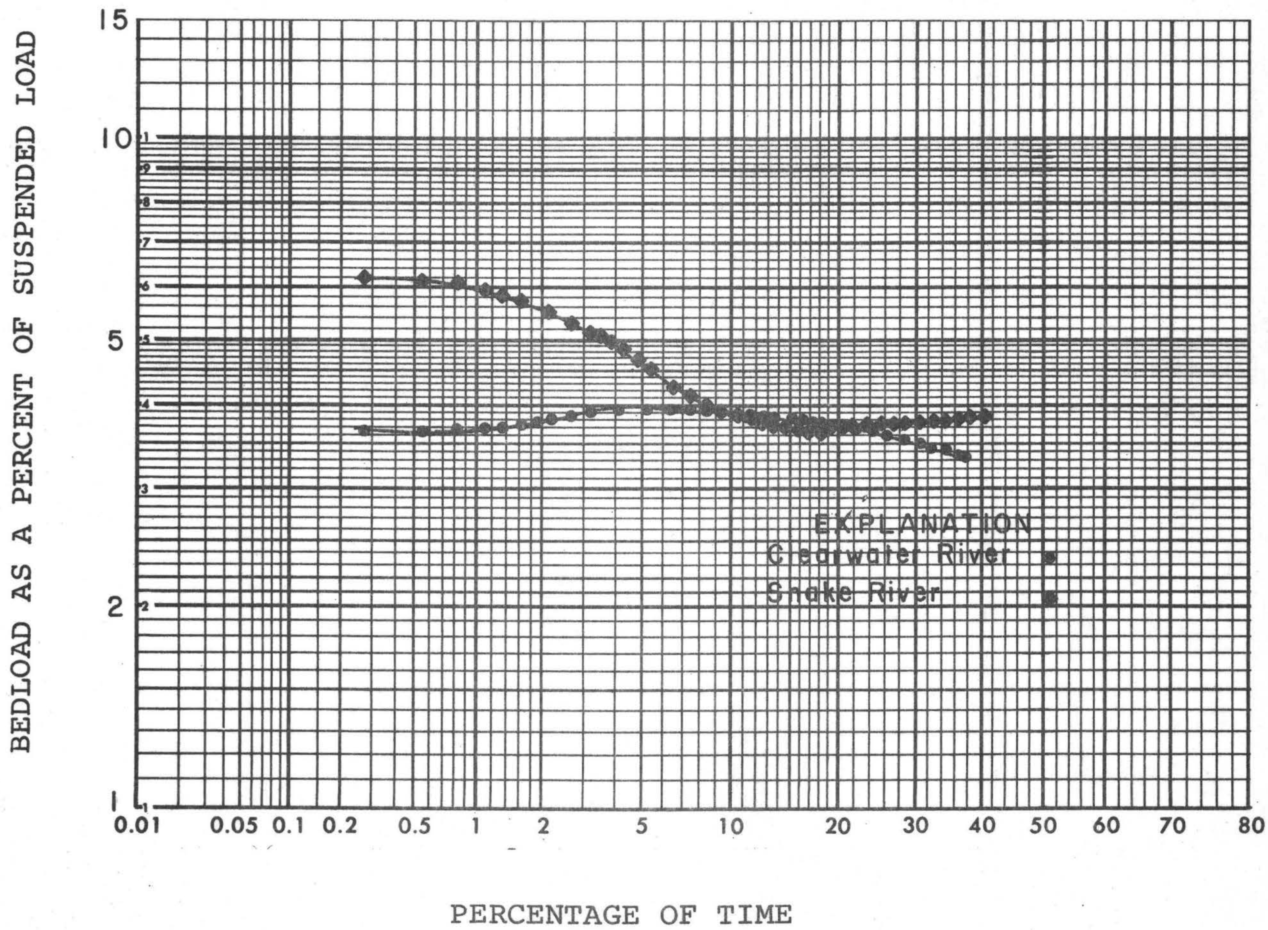

Figure 17.--Ratio of bedload to suspended load as a function of time, 1978.

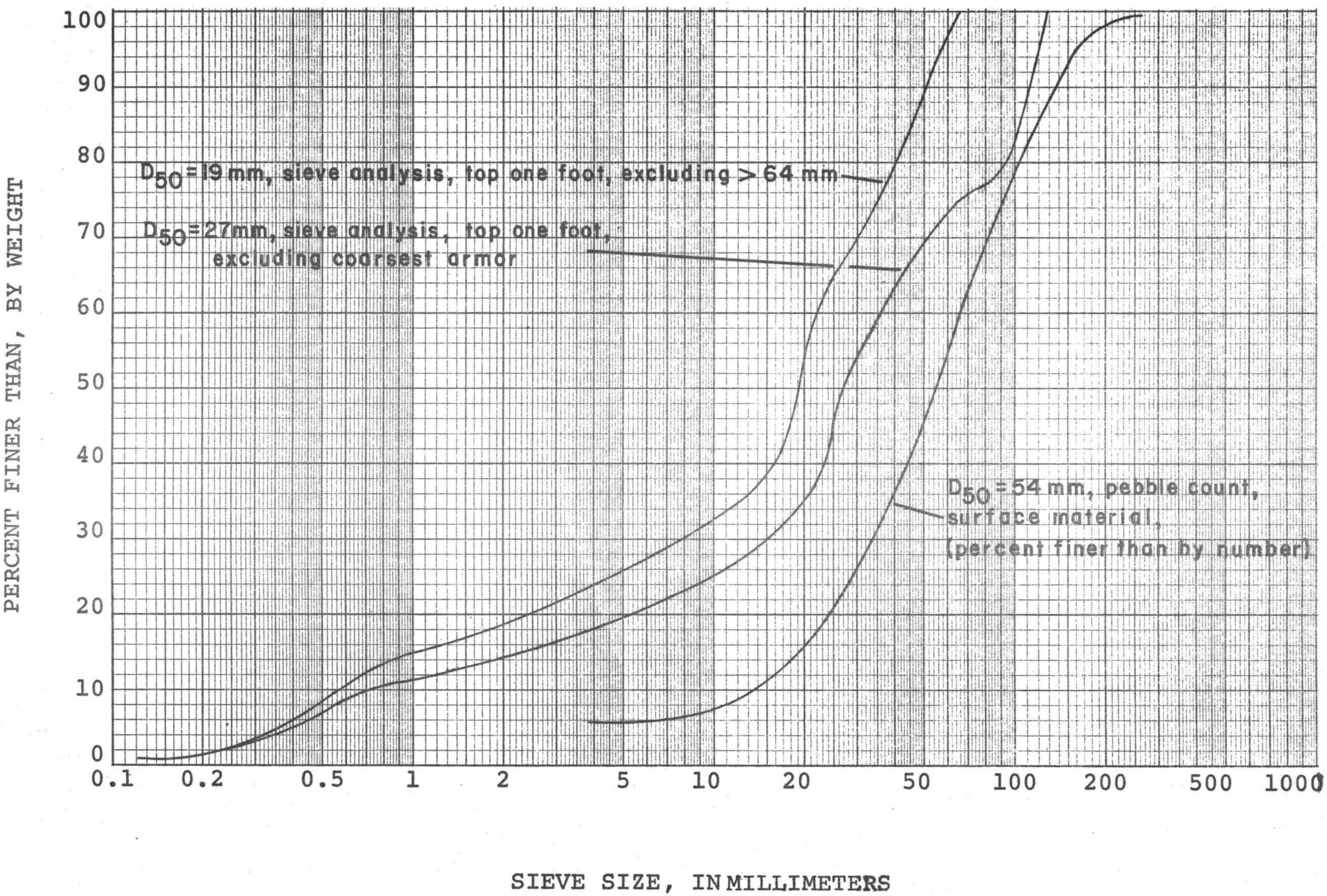

Figure 18.--Particle-size distribution curves of bed material, Snake River near Lewiston, Idaho, 1972.

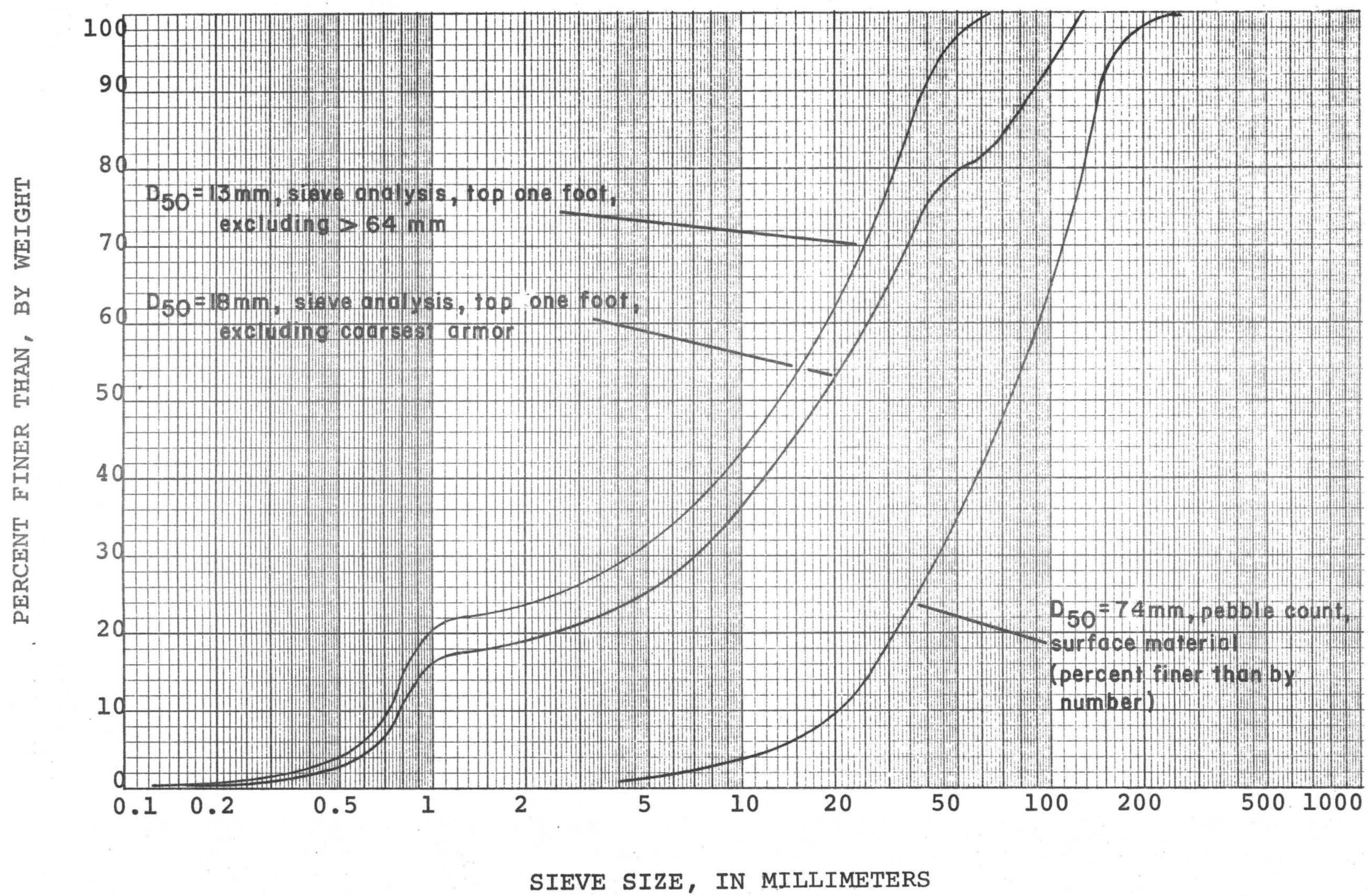

Figure 19.--Particle-size distribution curves of bed material, Clearwater River near Lewiston, Idaho, 1972.

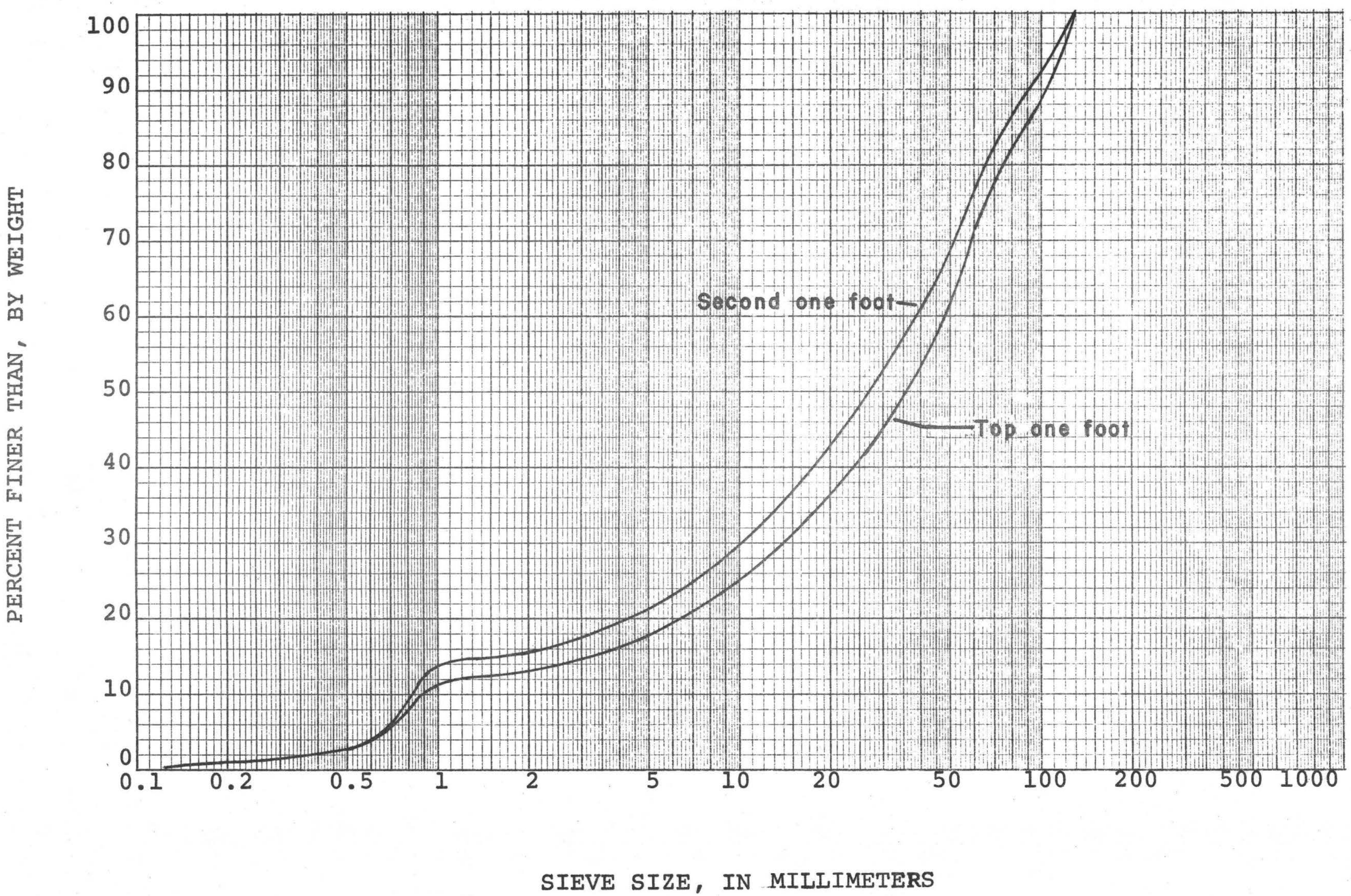

Figure 20.--Particle-size distribution curves of bed material, confluence of Snake and Clearwater Rivers at Lewiston, Idaho, 1972.

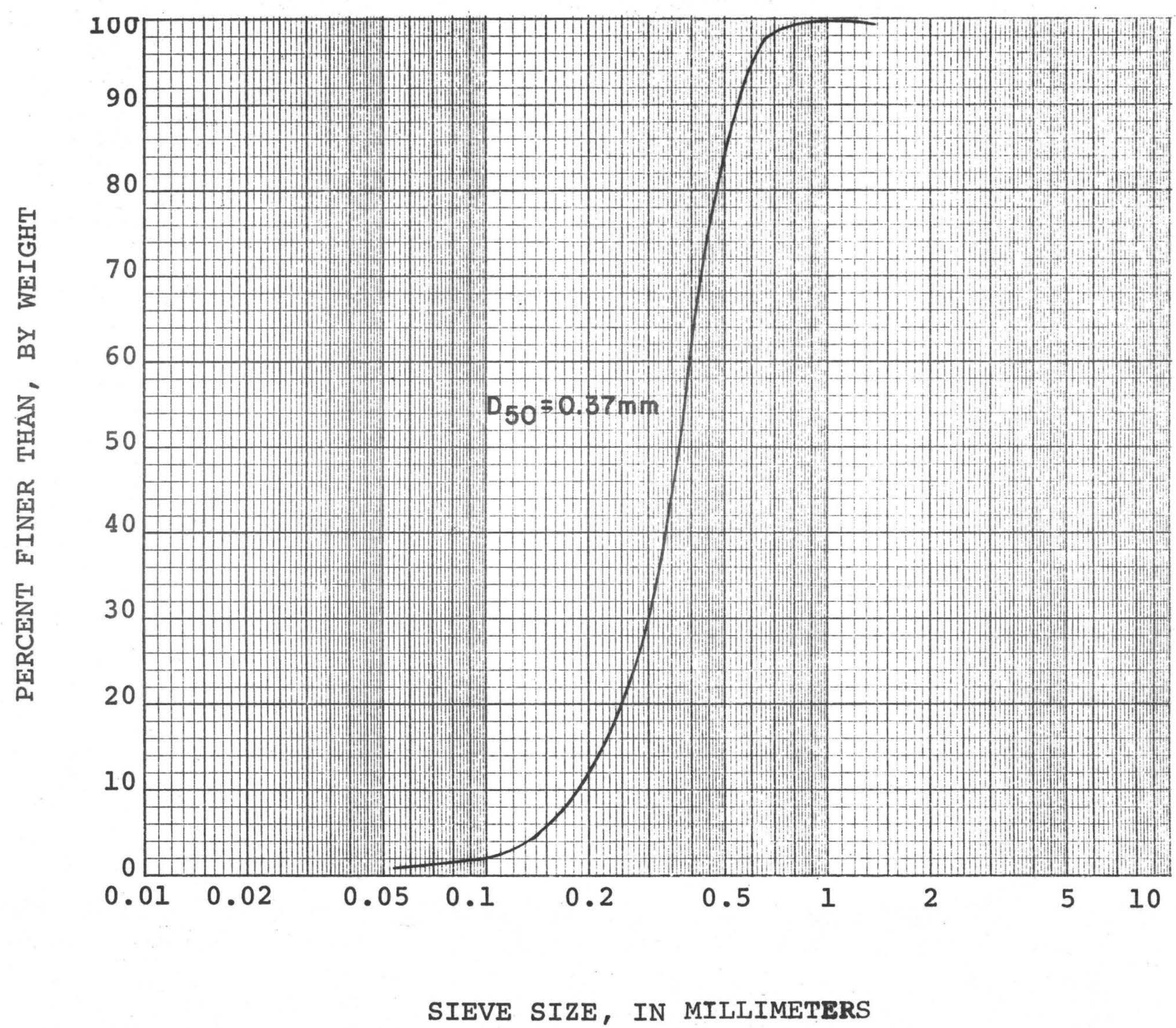

Figure 21 .--Particle-size distribution curves of sandbar deposits, Snake and Clearwater Rivers near Lewiston, Idaho, 1972.

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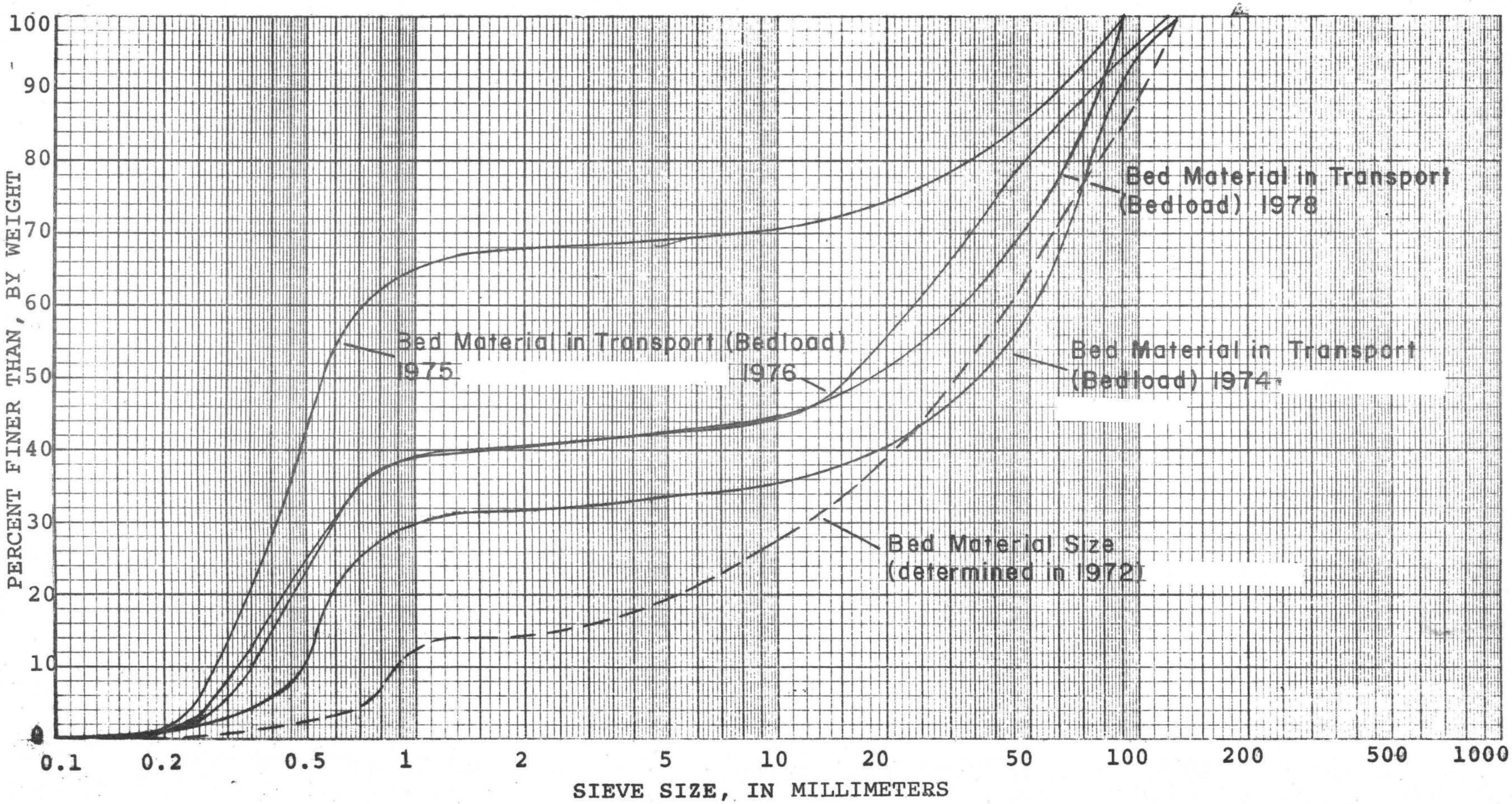

Figure 22.--Comparison of bedload and bed-material particle-size distributions, Snake and Clearwater Rivers in vicinity of Lewiston, Idaho.