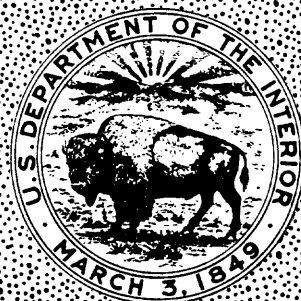


SEDIMENT DISCHARGE DATA FOR SELECTED SITES  
IN THE SUSITNA RIVER BASIN, ALASKA,  
OCTOBER 1982 TO FEBRUARY 1984

U.S. GEOLOGICAL SURVEY  
OPEN-FILE REPORT 85-157

Prepared in cooperation with the  
ALASKA POWER AUTHORITY



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

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by James M. Knott and Stephen W. Lipscomb

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Anchorage, Alaska

1985

UNITED STATES DEPARTMENT OF THE INTERIOR

WILLIAM P. CLARK, Secretary

GEOLOGICAL SURVEY

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## CONVERSION TABLE

| <u>Multiply</u>                            | <u>by</u>       | <u>to obtain</u>                           |
|--|-----------------|--|
| foot (ft)                                  | 0.3048          | meter (m)                                  |
| mile (mi)                                  | 1.609           | kilometer (km)                             |
| square mile (mi <sup>2</sup> )             | 2.590           | square kilometer (km <sup>2</sup> )        |
| acre-foot (acre-ft)                        | 1,233           | cubic meter (m <sup>3</sup> )              |
| foot per second (ft/s)                     | 0.3048          | meter per second (m/s)                     |
| cubic foot per second (ft <sup>3</sup> /s) | 0.02832         | cubic meter per second (m <sup>3</sup> /s) |
| ton, short                                 | 0.9072          | megagram (Mg)                              |
| ton per day (ton/d)                        | 0.9072          | megagram per day (Mg/d)                    |
| degree Fahrenheit (°F)                     | ° C=5/9 (°F-32) | degree Celsius (°C)                        |

Milligram per liter (mg/L) is a standard reporting unit for which no inch-pound equivalent is used.

# SEDIMENT DISCHARGE DATA FOR SELECTED SITES IN THE SUSITNA RIVER BASIN

ALASKA, OCTOBER 1982 TO FEBRUARY 1984

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By James M. Knott and Stephen W. Lipscomb

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## INTRODUCTION

The Susitna River is one of the major rivers in Alaska, ranking fifth in drainage area. The upper reaches of the river are being considered as potential sites for several dams and reservoirs that would be part of a large power-generation system in southcentral Alaska.

This report presents a summary of sediment and hydraulic data collected at six sites in the Susitna River basin in the area between the proposed damsites and Sunshine (fig. 1). The data were collected during the period October 1982 to February 1984 as part of a cooperative program between the Alaska Power Authority and the U.S. Geological Survey. Similar data for the 1981-82 water years are summarized in a previous report by Knott and Lipscomb (1983).

## DESCRIPTION OF AREA

The Susitna River basin (fig. 1) lies on the southern flank of the Alaska Range in southcentral Alaska. The basin, which has a drainage area of about 19,400 mi<sup>2</sup>, is a contrast of steep rugged mountains towering above wide valley lowlands. Altitudes range from 20,320 ft at Mt. McKinley to sea level where the Susitna River empties into Cook Inlet.

Tributaries to the Susitna River are commonly referred to as glacial or nonglacial streams. The nonglacial streams are noted for their clarity, even during intense summer rainstorms. Glacial streams are turbid throughout most of the open-water season (May through September). The Susitna River and its larger tributaries are all affected to some degree by glacial runoff.

## CLIMATE

The climate of the Susitna River basin is divided into two broad categories according to maps prepared by Searby (1968). The higher altitude parts of the basin are included in the Continental Zone, where diurnal and annual temperature variations are great. Mean annual temperature ranges from 15 to 25° F (Hartman and Johnson, 1978). The lowlands lie in the Transition Zone where temperatures are less variable than in the Continental Zone. Mean annual temperatures generally range from 25 to 35° F.

Mean annual precipitation of the basin ranges from less than 20 in. near the mouth of the Susitna River to more than 80 in. at higher altitudes (National Weather Service, 1972). Climatological records for the Talkeetna weather station are probably

representative of lowland areas. A summary of climatological data for this station (Selkregg, 1974) indicates that mean daily temperatures range from 38 to 62° F in summer, and from -9 to 18° F in winter; extremes range from -44 to 85° F. Annual precipitation averages 28 in., about 60 percent of which is rainfall.

#### DATA COLLECTION AND ANALYSIS

Beginning in 1981, systematic measurements of sediment discharge and hydraulic properties have been made to define the amount and distribution of sediment transported by the Susitna River and its major tributaries between Gold Creek and Sunshine (fig. 1). In 1981, data were collected at four sites in July, August, and September. Two of the sites were on the Susitna River, one at Gold Creek and the other at the Parks Highway crossing at Sunshine. The remaining two sites were located on major tributaries to the Susitna River, one each on the Chulitna and Talkeetna Rivers.

During 1982 the data-collection program was revised to obtain weekly samples during the open-water season (May to September). A new sampling site was established on the Susitna River, upstream of the Chulitna River confluence (Susitna River near Talkeetna). The stream-gaging station and the former program of monthly suspended-sediment sampling were continued at Gold Creek. A sixth site (Susitna River below Chulitna River near Talkeetna) was established during 1983 (fig. 1). At each site data collection included:

- 1) Suspended sediment samples
- 2) Bedload samples
- 3) Bed material samples
- 4) Water-discharge measurements
- 5) Measurements of channel geometry

Selected samples of suspended sediment, bedload, and bed material were analyzed for particle-size distribution. Streamflow characteristics were defined from data available for existing stream-gaging stations. At sampling sites that did not coincide with stream-gaging stations, sufficient discharge measurements were obtained to develop stage-discharge relations. All measurements were made from a boat; either a cableway or sextant was used to determine stationing along the measuring section.

Suspended-sediment samples were collected using a standard depth-integrating P-61 sampler (Guy and Norman, 1970). Two samples were obtained at each of five selected verticals in the stream cross section (at centroids of flow) and analyzed to determine average values of suspended-sediment concentration and the particle-size distribution of sediment in the water-sediment mixture. Both samples were generally composited to obtain one analysis. A few samples were analyzed for individual verticals. Samples of suspended sediment include those particles (usually finer than 2.0 mm) transported in the stream between the water surface and a point about 0.5 ft above the streambed.

Sediment transported within 0.3 ft of the streambed was sampled using a bedload sampler (Helley and Smith, 1971) designed for collecting coarse material (0.062-



76.2 mm). Sampling time, number of sampling points, stream width and depth, and weight of dry sediment were recorded as a basis for calculating bedload discharge. Trap efficiency of the sampler was assumed to be 1.0. Characteristics of the Helley-Smith sampler and procedures for its use have not yet been fully evaluated. In the interim, the Geological Survey follows a provisional method of obtaining samples at about 20 equally spaced verticals (U.S. Geological Survey, written comm., 1979) based largely on field tests by Emmett (1980).

A few bed-material samples were obtained at each site using a 6-inch diameter pipe dredge. At some sites, deep water and a swift current, armoring, and the presence of coarse particles on the streambed made sampling difficult. Although indicative of the sizes of particles present in the streambed (less than 128 mm), bed-material data presented in this report may not be representative of actual particle-size distributions. Samples were also obtained at the surface of bar and island areas at the site "Susitna River below Chulitna River near Talkeetna". These samples, obtained above the water surface, are representative of actual particle-size distributions.

Measurements of depth and width at sampling sections were usually made during bedload measurements. Depths were measured by sounding with the Helley-Smith sampler at 16 to 25 verticals in the cross section. Stream width was determined from station markings on cableways or from sextant readings. Average velocity was determined by dividing the rated discharge of the stream by the cross-sectional area.

## SEDIMENT DISCHARGE

### Sediment Transport

Sediment is transported in suspension, by rolling and bouncing along the streambed or as a combination of both. Suspended sediment, as the name implies, consists of particles which are transported in a stream while being held in suspension by the turbulent components of the flowing water. Coarse sediment that is transported on or near the streambed constitutes the bedload. Clay and silt particles usually are moved in suspension and gravel particles move on or near the streambed. Sand particles may be transported either as suspended load, as bedload, or both.

### Suspended-Sediment Concentration and Discharge

Suspended-sediment sampling for this study was initiated during the 1981 water year; data for the period October 1982 to October 1983 are listed in table 1. Suspended-sediment concentrations for the winter periods of 1982 and 1983 (October to April) when the rivers are lowest were typically less than 10 mg/L and were similar to those for earlier years (1980-81). During 1983, spring breakup occurred at all sampling sites in early May. Suspended-sediment concentrations through late May ranged from 90 mg/L for the Talkeetna River (station No. 15292700) to 622 mg/L for the Susitna River at Sunshine (station No. 15292780). The amount of sand-size material (0.062-2.0 mm) was large relative to the finer silt-clay fraction (0.062 mm) suggesting that sediment was supplied primarily from the erosion of stream channels by snowmelt.

Suspended-sediment concentrations at individual sampling sites are most variable during the summer (June to August). The larger concentrations typically occur during periods of storm runoff.

The Susitna River near Talkeetna (station No. 15292100) and the Talkeetna River are moderately affected by glacial runoff; glaciers cover 5 and 7 percent of their respective drainage areas. Sampled concentrations at these sites ranged from about 100 to 1,000 mg/L, and averaged about 500 mg/L during June to August 1983. Suspended-sediment discharge of the Susitna River averaged 38,000 ton/d or about three times that of the Talkeetna River.

The drainage area of the Chulitna River above the sampling site (2,580 mi<sup>2</sup>) is about 40 percent as large as the drainage area of the Susitna River near Talkeetna. Twenty-seven percent of the Chulitna River drainage area is covered by glaciers. Summer concentrations of suspended sediment in the Chulitna River are typically more than twice as high as those for either the Susitna or Talkeetna Rivers near Talkeetna.

Suspended-sediment data obtained at the sampling site designated Susitna River below Chulitna River near Talkeetna (station Nos. 15292439 and 15292440 for the right and left channels, respectively) are representative of the combined discharge of the Susitna River near Talkeetna and Chulitna River below canyon near Talkeetna (station No. 15292410). The site, about 1 mi below the confluence of the Chulitna and Susitna Rivers, includes two major channels separated by a stable, vegetated island, and several minor channels. At this site, the right channel (viewed looking downstream) of the Susitna River carries the entire flow of the Chulitna River, along with smaller but varying amounts of "crossover" flow from the Susitna's left channel. Suspended-sediment concentration and discharge for the right channel were typically several times higher than that of the left channel in the period June through August 1983.

Suspended-sediment concentrations for the Susitna River at Sunshine ranged from 381 to 2,840 mg/L from June through August 1983. Suspended sediment concentrations at this site represent the result of the mixing of the Chulitna, Susitna, and Talkeetna Rivers. Suspended-sediment discharge for the Susitna River at Sunshine agrees closely with the sum of sediment discharges for the Chulitna, Susitna, and Talkeetna Rivers.

Suspended-sediment concentrations and discharge usually decline during September and October as cooler weather reduces the melting rate of the glaciers. In 1983, no major storms occurred during this period and sampled concentrations of the sites at Susitna and Talkeetna Rivers near Talkeetna were less than 50 mg/L. Concentrations for the Chulitna River declined substantially below summer values but remained greater than 200 mg/L by early October.

#### Relation Between Suspended-Sediment Discharge and Water Discharge

A common method for analyzing sediment-transport characteristics at a site is to construct a graph of sediment discharge versus water discharge. This relation is generally illustrated by a plot on logarithmic paper and is referred to as a sedi-

ment-transport curve. Data for 1982 and 1983 were used to develop transport curves for the silt-clay and sand fractions of suspended sediment for the Susitna, Chulitna, and Talkeetna Rivers (figs. 2-6). Coefficients of determination ( $r^2$ ) were computed from a least-squares fit of log-transformed values to provide a measure of the variance of sediment discharge to water discharge. The transport curves for suspended sediment should be considered representative only for the period of open water (May to September). Particle-size data collected in winter periods (October to April) are too few to construct similar curves.

The transport curves of silt-clay material for all sampling sites showed a similar trend; that is, silt-clay discharge increased at roughly the same exponential rate relative to increases in water discharge. Exponents of water discharge,  $Q$ , in the relations (figs. 2-6) ranged from 2.92 to 3.08;  $r^2$  ranged from 0.68 to 0.94.

Transport curves for suspended sand indicate a larger variation in exponents than those for silt-clay material. Exponents of water discharge range from 2.13 for the Susitna River at Sunshine to 3.22 for the Susitna River near Talkeetna;  $r^2$  values range from 0.74 to 0.89.

The small number of data points obtained at the sampling site Susitna River below Chulitna River near Talkeetna during 1983 are considered insufficient to develop transport curves for estimating monthly or annual sediment yield. The proximity of the data points to established curves for Susitna River at Sunshine (fig. 5), however, suggests that transport relations at the sites are comparable.

Transport curves of total suspended-sediment discharge for winter periods (October to April) were prepared from recent historical data (figs. 7-11). Pre-1975 data were generally excluded from the analyses because of apparent differences in transport relations for several years following the extremely wet year of 1971. Transport curves of total suspended-sediment discharge for summer periods (May to September) were developed by combining curves for sand and silt-clay.

#### Bedload Discharge and Hydraulic Characteristics

The bedload and hydraulic data for the sampling sites "near Talkeetna" and the Susitna River at Sunshine are summarized in table 2. Bedload data are expressed both as transport rate in tons per day, and in terms of their particle size distribution in percent finer than the indicated sieve size.

Winter samples (through ice cover) of bedload were collected twice at all sites -- once during March 1983 and again during February 1984. Bedload discharges computed from samples collected during February and March probably indicate near-minimum rates of transport because these are the months of minimum streamflow. Bedload discharges of the Chulitna, Susitna, and Talkeetna Rivers near Talkeetna were extremely low, ranging from zero to about 2 ton/d. During February 1984, bedload discharge of the Susitna River increased to 52 ton/d at the site "below Chulitna River near Talkeetna" and to more than 200 ton/d at Sunshine. Bedload at all sites was predominantly sand during the winter, but significant amounts of gravel were detected at sampling sites on the Chulitna River and the Susitna River at Sunshine.

During the 1983 open-water period, bedload discharge of the Susitna River near Talkeetna ranged from 27 to 854 ton/d (table 2). During this same period, water discharge ranged from 10,700 to 39,100 ft<sup>3</sup>/s. The transported material generally consisted of large amounts of sand (80-99 percent) and minor amounts of gravel (1-20 percent). The percentage of gravel (2.0-64.0 mm) in transport increased dramatically (to 79 percent) during the high flow measurement of June 1, 1983. A similar occurrence of a high proportion of gravel during major storms was observed in June 1982 (Knott and Lipscomb, 1983).

Bedload discharge of the Chulitna River below the canyon ranged from 3,360 to 11,800 ton/d as water discharge ranged from 9,170 to 47,800 ft<sup>3</sup>/s. The particle-size distribution of bedload on the Chulitna River tended toward a higher percentage of sand than gravel; sand commonly constituted 50 to 60 percent of the bedload. The percentage of gravel increased during high flows, as it did for the Susitna River.

During the open-water period, bedload discharge of the Talkeetna River near Talkeetna ranged from 29 to 1,700 ton/d for flows ranging from 2,280 to 13,600 ft<sup>3</sup>/s. The particle sizes of bedload at this site were typically from 70 to 100 percent sand. The percentage of gravel exceeded that of sand only during the high flow of June 3, 1983.

Bedload discharge of the Susitna River at Sunshine ranged from 1,320 to 9,380 ton/d at flows ranging from 25,200 to 115,000 ft<sup>3</sup>/s. Sand and gravel fractions varied with season and water discharge. During May and June the bedload mixture was about 40 percent sand and 60 percent gravel. Later in the summer, the percentage of sand was generally greater than gravel, except during periods of high flow. The bedload was predominantly sand during winter measurements.

Channel cross sections for selected sites, with a corresponding plot of bedload discharge at individual sampling points, are shown on figures 12-16. In most cases maximum bedload movement occurs in the zone between the thalweg (maximum channel depth) and the mid-channel. Maximum stream velocities also occurred in this zone.

The volume of bedload material at individual sampling points was visually estimated and converted to equivalent weight during sampling. Individual samples were composited for sieve analyses. The estimated weights were used, together with the actual weight of the composited sample, to give an estimate of bedload for each sampling point. This method gives a qualitative approximation for the lateral distribution of bedload movement.

#### Relation Between Bedload Discharge and Water Discharge

A relation between bedload discharge and water discharge can be defined using similar methods as for suspended sediment. Log-transformed data and a least-squares analysis were used to obtain a best-fit line through the plotted points. Transport curves and corresponding equations describing the relations are shown in figures 17-26.

The line of best fit, computed by the least-squares method, provides a reasonable relation between bedload and water discharge for the Susitna River near Talkeetna

(fig. 17). The data points are reasonably distributed about the line, suggesting that increases in water discharge result in corresponding increases in sand and gravel discharge. Data for the other monitoring sites show considerably more scatter, indicating that bedload discharge is influenced by factors other than water discharge. The other factors may include glacial processes, availability of coarse material, and complex transport of sand as suspended load or bedload.

During periods when glacial or storm processes were dominant, the slope of the bedload to water discharge relation appeared similar to that for suspended-sand discharge. Transport curves developed from graphical comparisons between bedload and suspended-sand discharge were used when coefficients of determination ( $r^2$ ) for regression equations were unusually low (0.50 or less).

Cumulative curves of particle-size distribution (figs. 27-32) are useful for classifying sediment mixtures. The median diameter ( $D_{50}$ ) determined from these curves provides a single reference size for bedload or bed material. Histograms showing the percentage of individual groups of particle sizes are useful to indicate the abundance or deficiency of those sizes in the total mixture.

The particle-size distribution of bedload is similar for all sampling sites. During low flows the bedload is composed almost entirely of fine to medium sand (0.25 - 0.50 mm). As the flow increases the percentage of fine to medium sand remains large, but the total bedload is augmented by increasing amounts of medium to coarse gravel (8.0 - 32.0 mm). The Susitna River near Talkeetna transports small amounts of gravel only at the higher flows whereas the Susitna River at Sunshine and the Chulitna River transport gravel at all ranges of flow.

The sampling site on the Susitna River below the Chulitna River consists of two major channels. Sediment-transport characteristics of the right channel are similar to those for the Chulitna River, whereas characteristics of the left channel reflect those of the Susitna River above the confluence.

A noticeable characteristic of bedload particle-size distributions at all sampling sites is the general deficiency of material in the coarse sand to fine gravel size range (1.0 - 4.0 mm). Deficiency of these particles results in a bi-modal bedload size distribution. Pettijohn (1947, p. 41-45) notes that such a general deficiency in intermediate grain sizes (2.0 - 8.0 mm) has been reported by many authors.

Pettijohn suggests that particles in the intermediate size range are mechanically unstable and thus subject to rapid disintegration by abrasion. Other explanations suggest that bi-modal distributions are due to the dual nature of fluvial sediment transport (sediment transport as suspended load and as bedload).

#### BED-MATERIAL DATA

Bed-material samples that would be representative of the sediment present in submerged parts of the channels were extremely difficult to obtain because the rivers were too deep and swift for direct access to streambeds. Samples considered representative of particles finer than 128 mm were obtained at Chulitna River below canyon near Talkeetna, Susitna River below Chulitna River near Talkeetna, and at

most sampling points at Susitna River at Sunshine. A few representative samples were obtained at the Talkeetna River and Susitna River near Talkeetna sites. Most samples obtained at the latter sites consisted of a few coarse particles. Bed-material data for 1983 are listed in table 3.

#### ESTIMATED SEDIMENT YIELD

The sediment yield from a drainage basin is commonly expressed in terms of weight (short or metric tons) or volume (acre-feet or cubic meters). Sediment yields may be estimated by different methods, depending on the amount and type of available data. If daily records of streamflow are available, but sediment discharge has been measured only infrequently, the method most commonly used requires defining a relation between instantaneous sediment discharge and water discharge and applying this relation to daily values of water discharge. This method was used initially to estimate sediment yield for this study.

At some sites, however, a single sediment-transport curve could not be applied for the open-water period because of seasonal changes in the amount and particle-size distribution of sediment for given water discharges. At the "Chulitna River below canyon" site, the scatter of bedload-discharge data was such that even the definition of a bedload-water discharge relation is subject to individual interpretation. Thus, several alternative methods were selected to estimate sediment yield for the 1983 water year.

Suspended-sediment yield was estimated using the Colby-shift control method (Colby, 1956). According to Colby, part of the scatter of sediment data in sediment transport relations is due to random or very short-term fluctuations in concentration, particularly the concentration of the coarse sediments. Part of the scatter may be due to an actual change that may persist for days, weeks, or seasons. It is assumed that most of the observed scatter is due to seasonal changes and complex mixing of sediment produced from glacial melt and storm runoff, and Colby's method would result in more accurate estimates.

Colby suggests that if a change in the relation between water and sediment discharge persists for several days or more, the transport curve should be shifted to pass through or near each individual measurement. The method is subjective because judgment is used to decide whether the measurement is representative of an actual change or of a random fluctuation. An important advantage in using this method is that the accuracy of fit of the transport curve is of small importance.

Bedload yield also was estimated using the Colby shift-control method. At sites for which the scatter in bedload-discharge data was extreme, the initial transport curve was constructed based on transport curves of suspended sand. Sediment-transport curves were constructed for silt-clay, sand, and gravel components for both suspended sediment and bedload discharge measurements.

Estimated sediment yields for the 1983 water year are given in table 4. Total sediment yields (sum of bedload and suspended sediment yield) for the sites near Talkeetna ranged from 1.2 million tons for the Talkeetna River to 9.4 million tons for the Chulitna River. The Susitna River near Talkeetna, which has a drainage

area larger than the Chulitna and Talkeetna Rivers combined, transported only 3.5 million tons. Total sediment transported past the three sites "near Talkeetna" (14.1 million tons) agrees closely with that estimated for the Susitna River at Sunshine (14.3 million tons). Bedload estimates, however, indicate that the amount of coarse sand and gravel transported past the Sunshine site was only about 60 percent of the amount transported past the upper sites.

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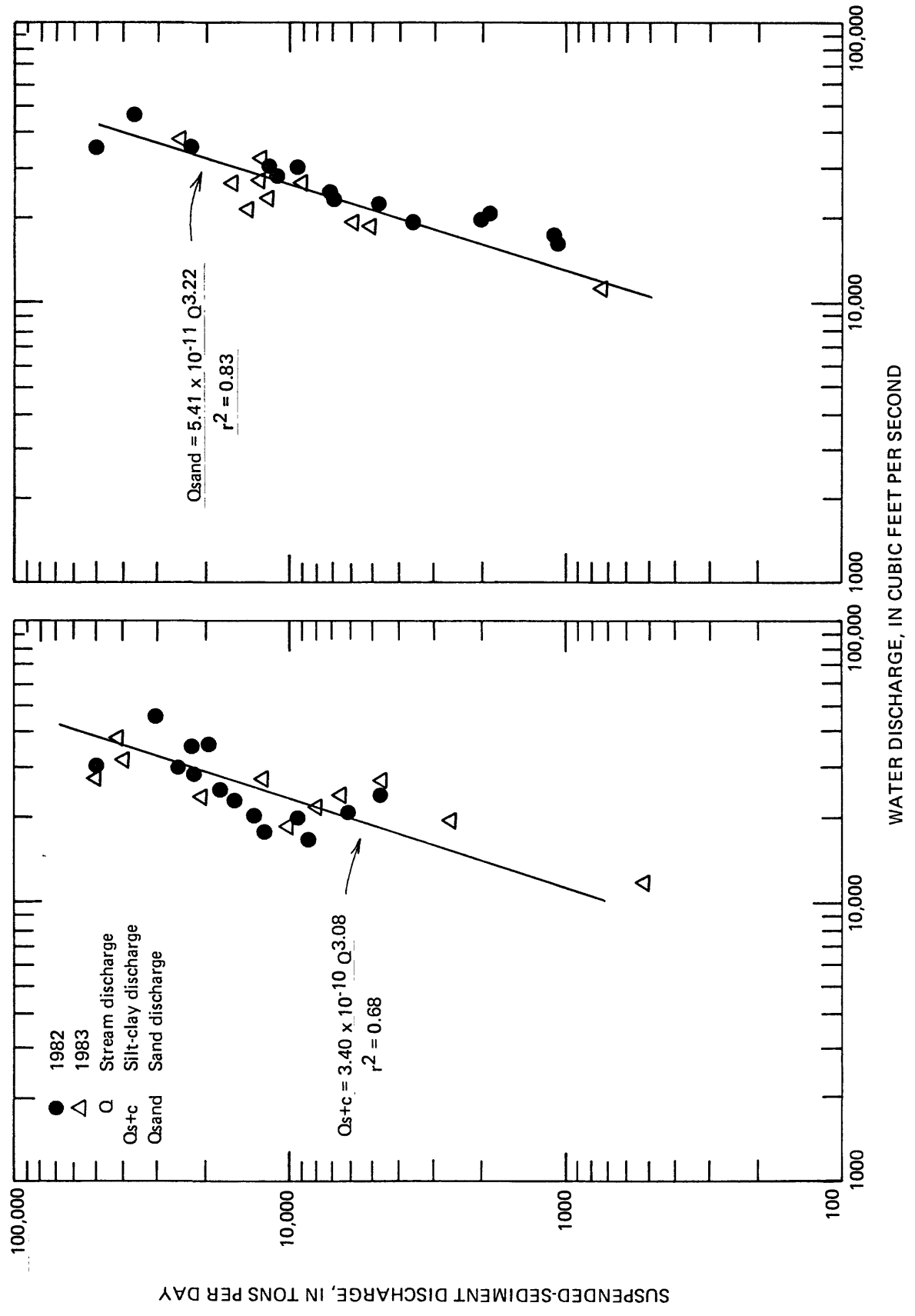


Figure 2.--Sediment-transport curves of suspended silt-clay and sand discharge for Susitna River near Talkeetna, May to September, 1982 and 1983.



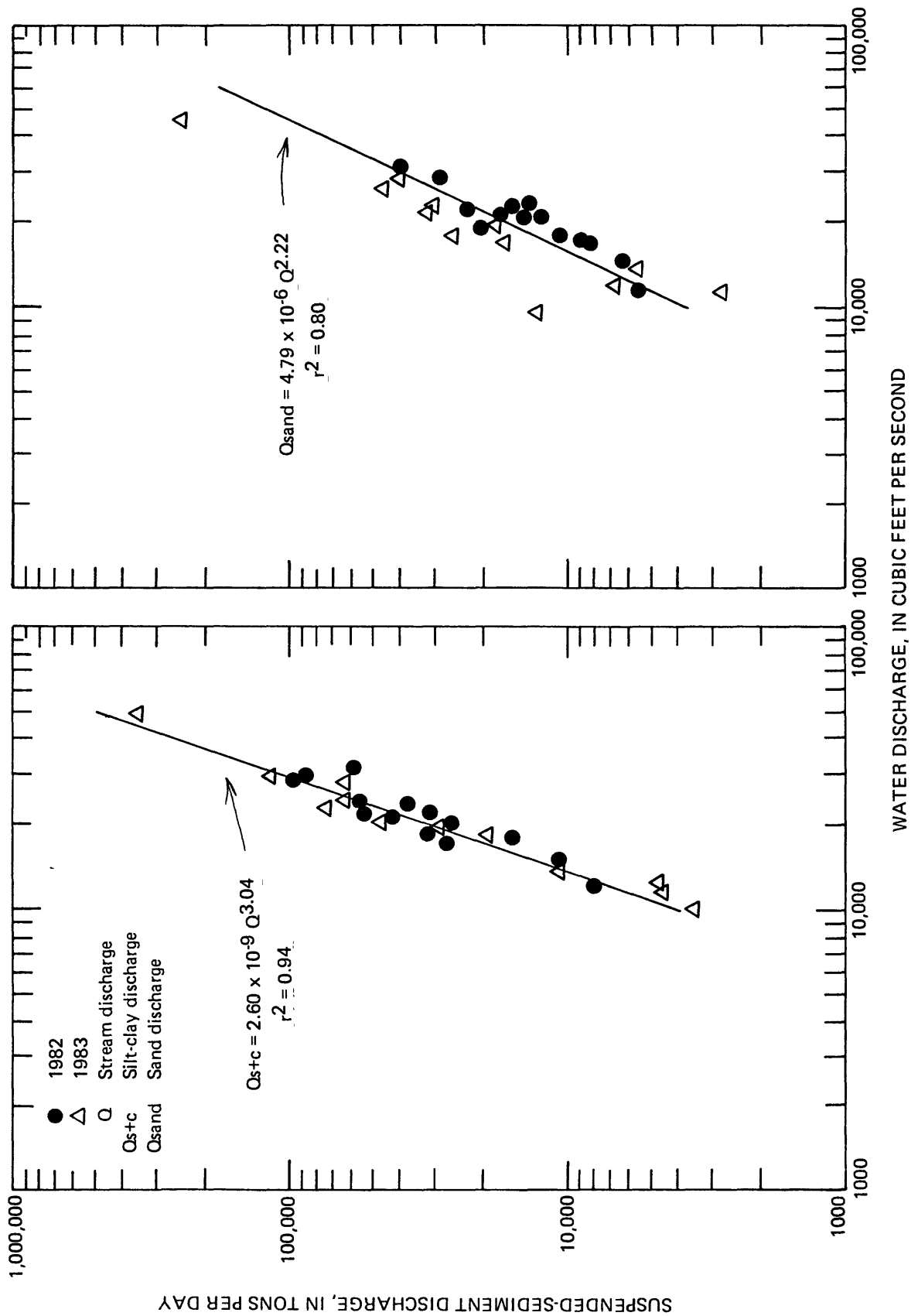


Figure 3.--Sediment-transport curves of suspended silt-clay and sand discharge for Chulitna River below canyon near Talkeetna, May to September, 1982 and 1983.

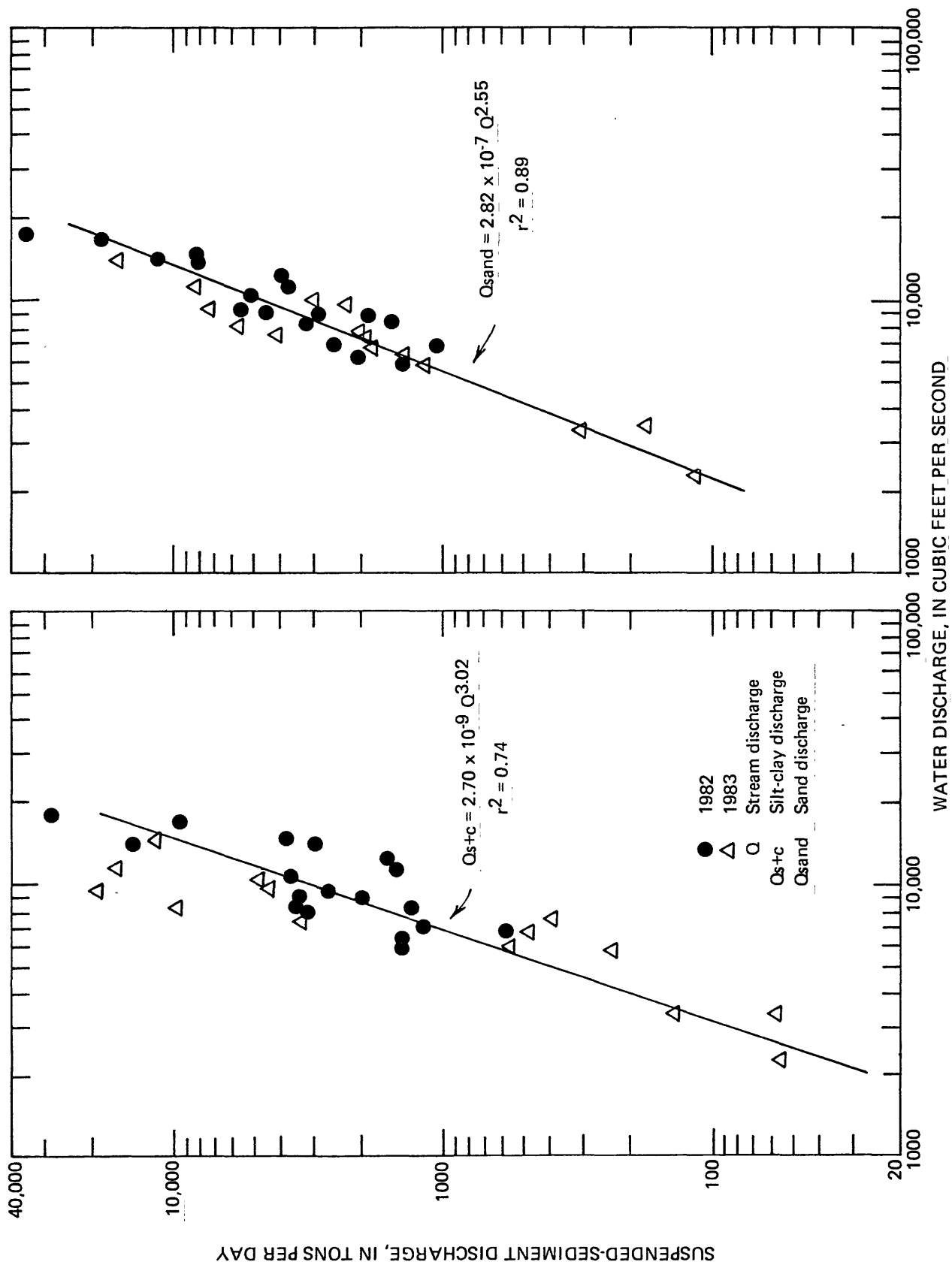


Figure 4.--Sediment-transport curves of suspended silt-clay and sand discharge for Talkeetna River near Talkeetna, May to September, 1982 and 1983.

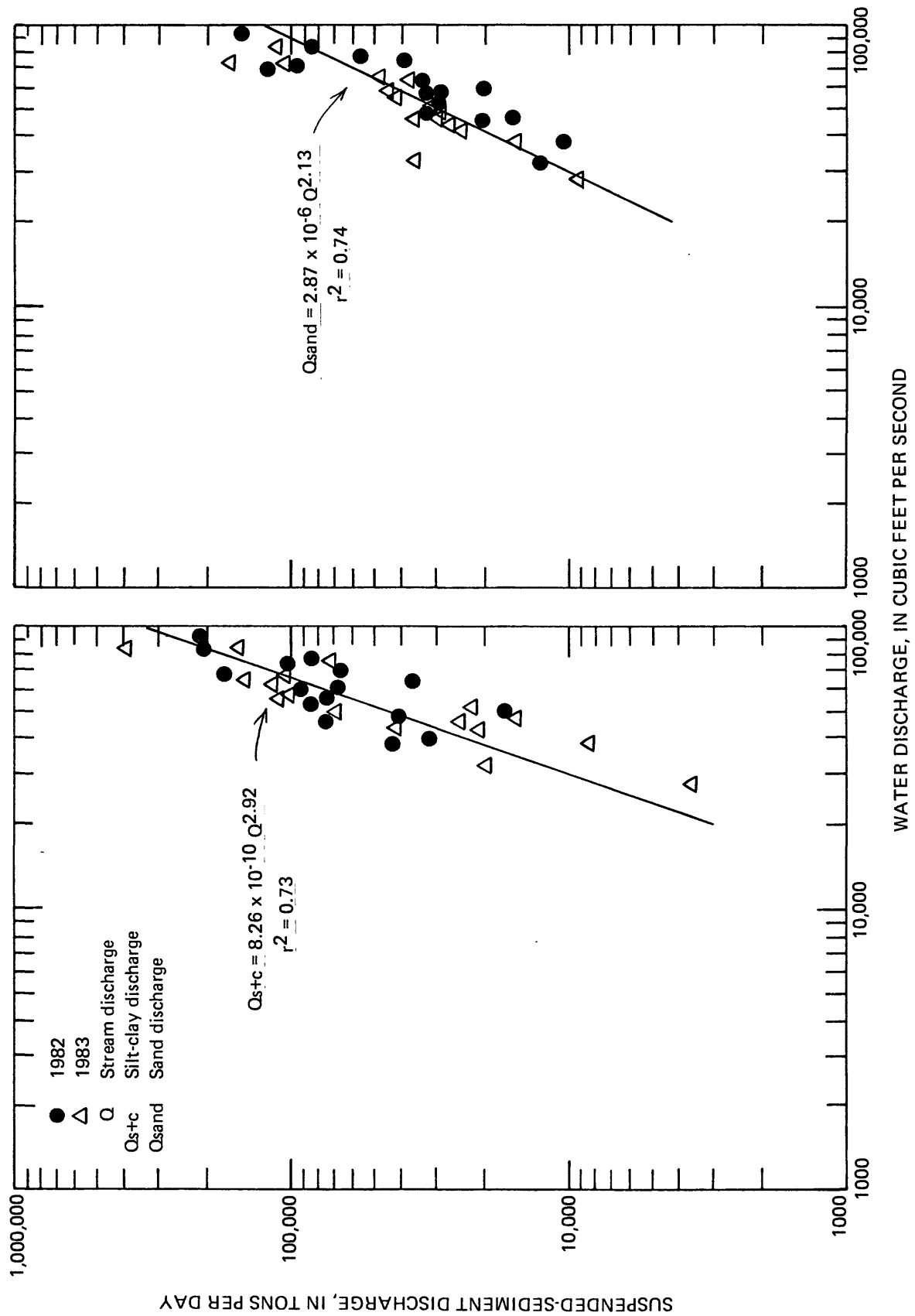


Figure 5.--Sediment-transport curves of suspended silt-clay and sand discharge for Susitna River at Sunshine, May to September, 1982 and 1983.

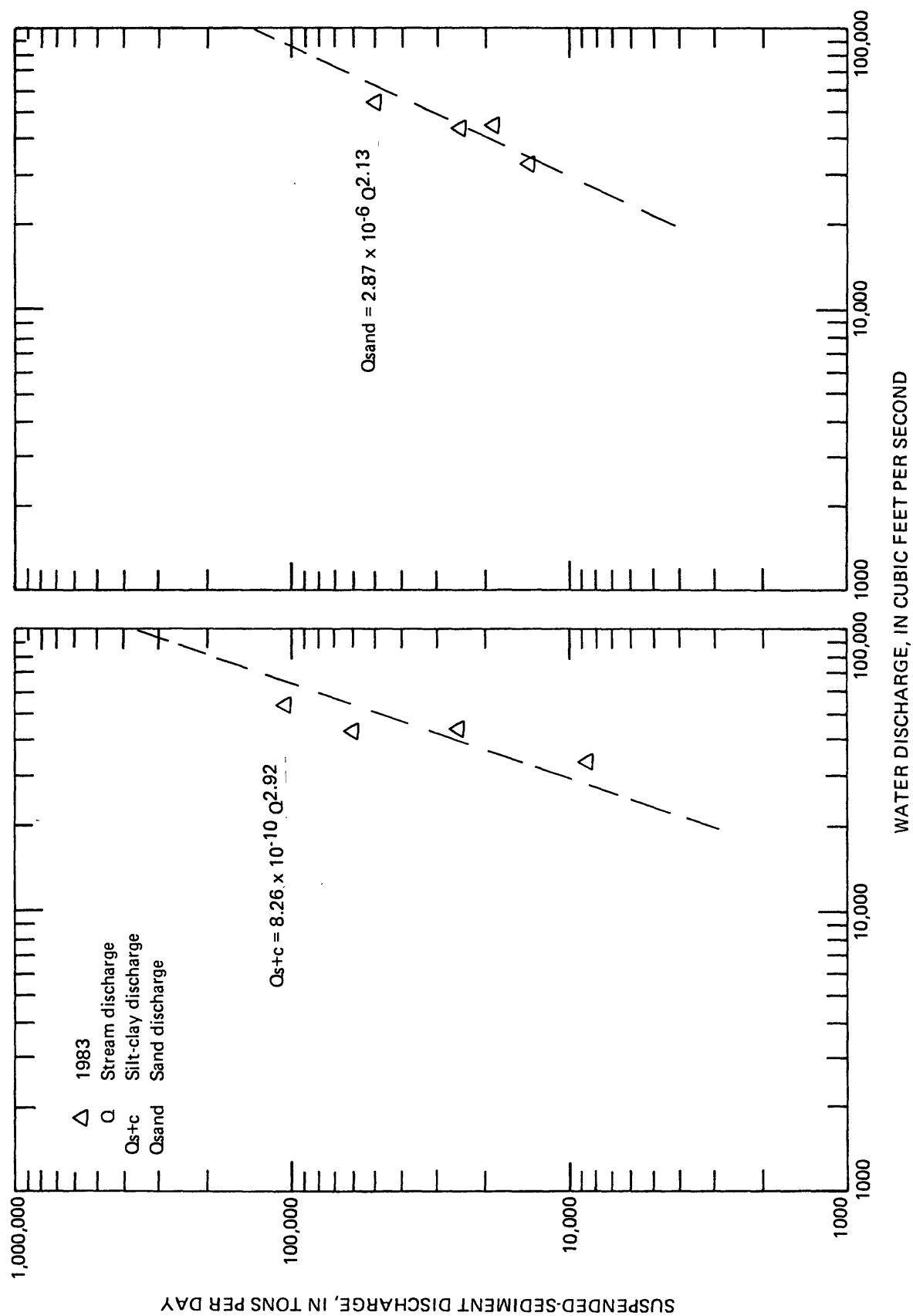


Figure 6.--Suspended silt-clay and sand discharge versus water discharge for Susitna River below Chulitna River near Talkeetna (sum of right and left channels), May to September 1983. Dashed lines correspond to transport curves established for Susitna River at Sunshine, May to September, 1982 and 1983.

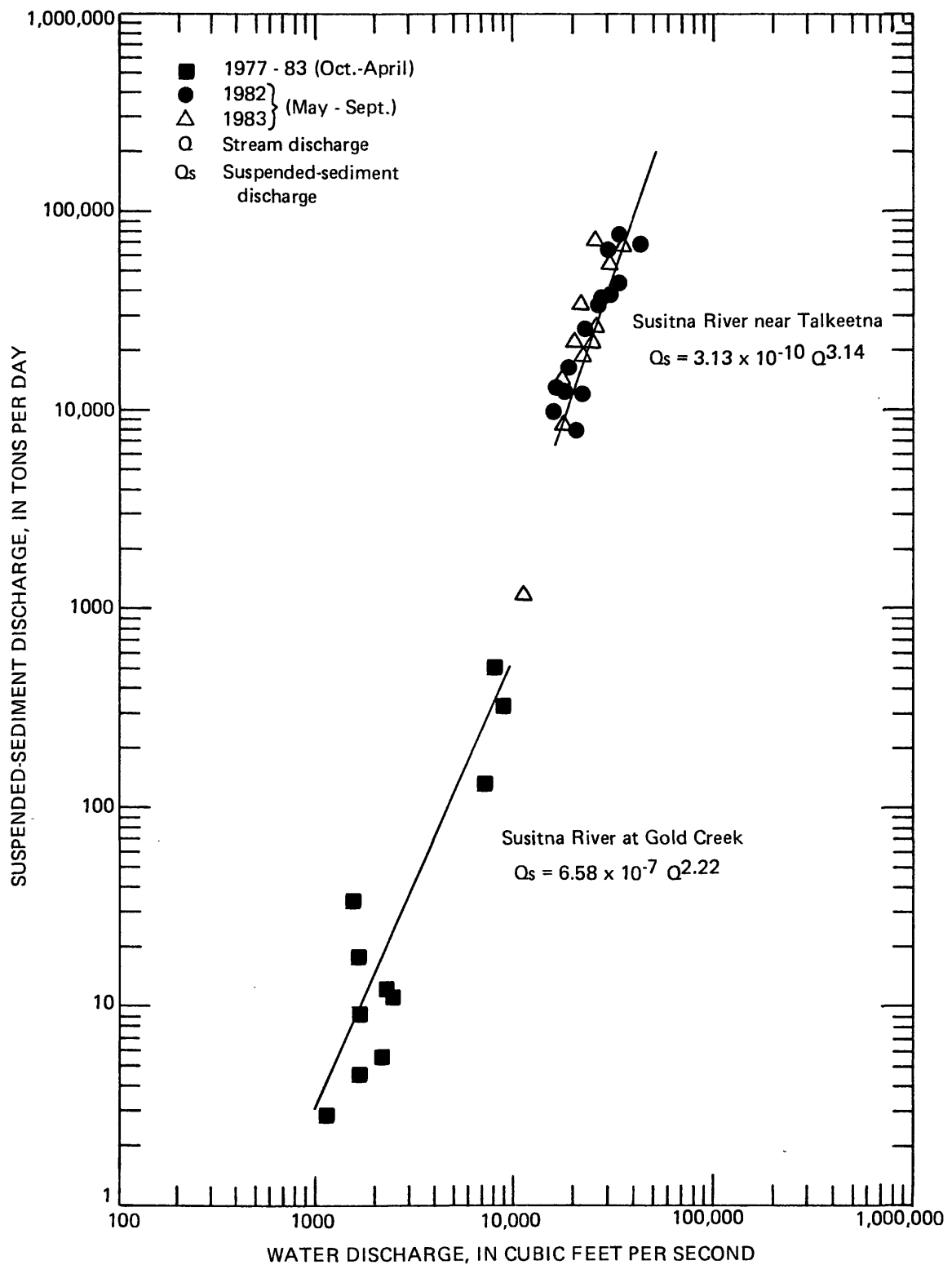


Figure 7.--Relation between suspended-sediment discharge and water discharge for Susitna River near Talkeetna (May to September, 1982 and 1983) and Susitna River at Gold Creek (October to April, 1977 through 1983).

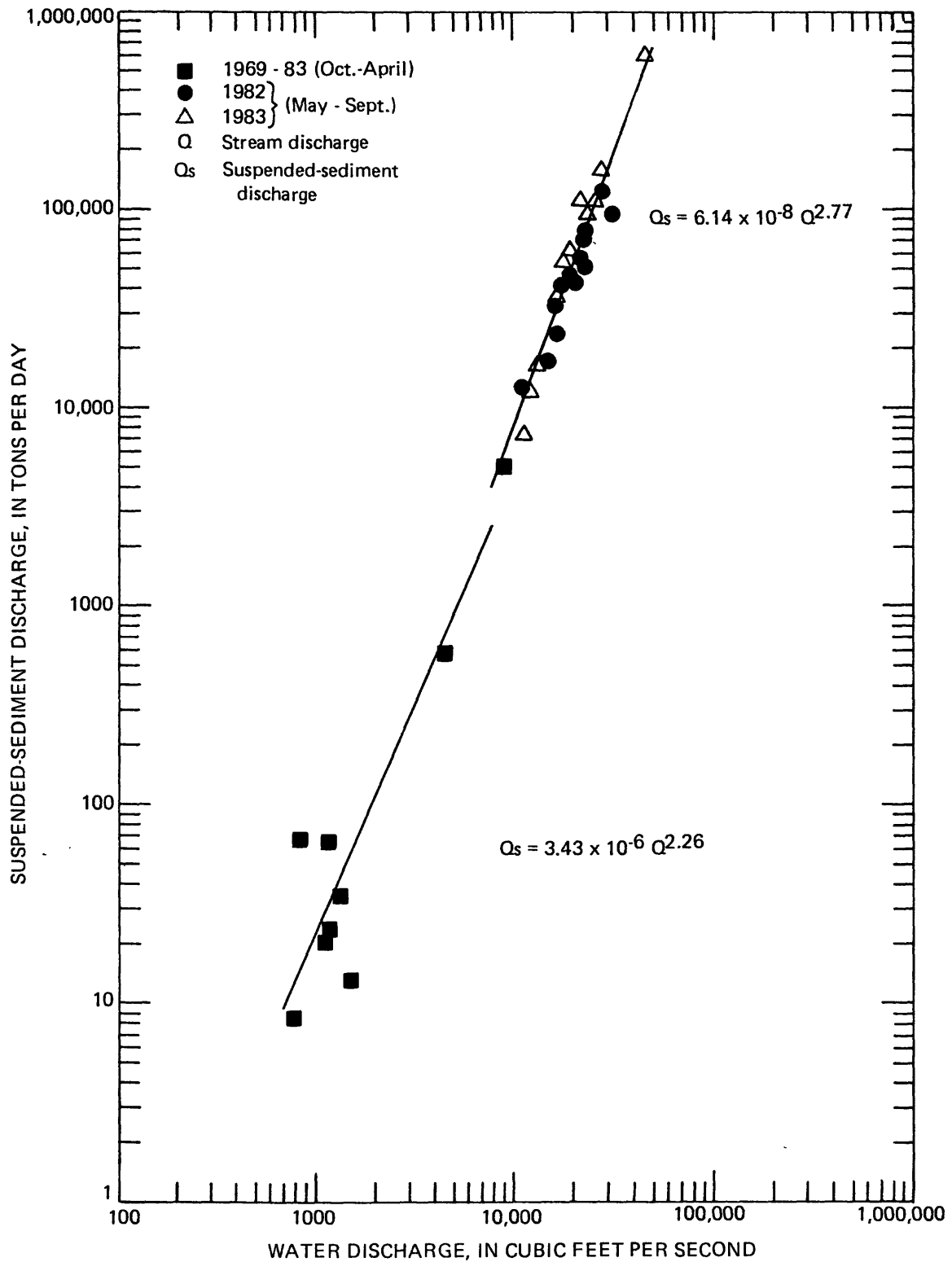


Figure 8.--Relation between suspended-sediment discharge and water discharge for Chulitna River below canyon near Talkeetna, May to September, 1982 and 1983 and October to April, 1969 through 1983.

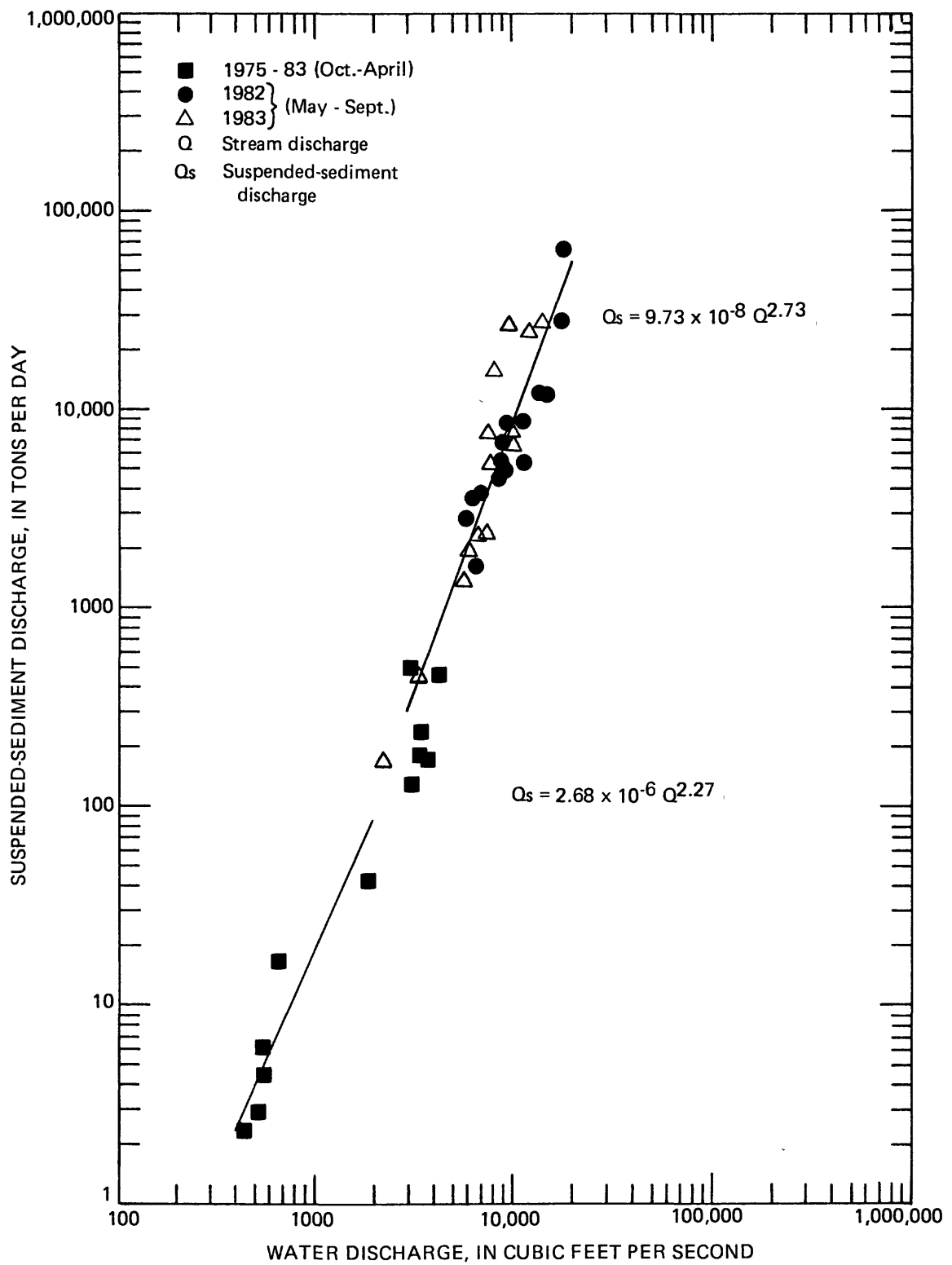


Figure 9.--Relation between suspended-sediment discharge and water discharge for Talkeetna River near Talkeetna, May to September, 1982 and 1983 and October to April, 1975 through 1983.

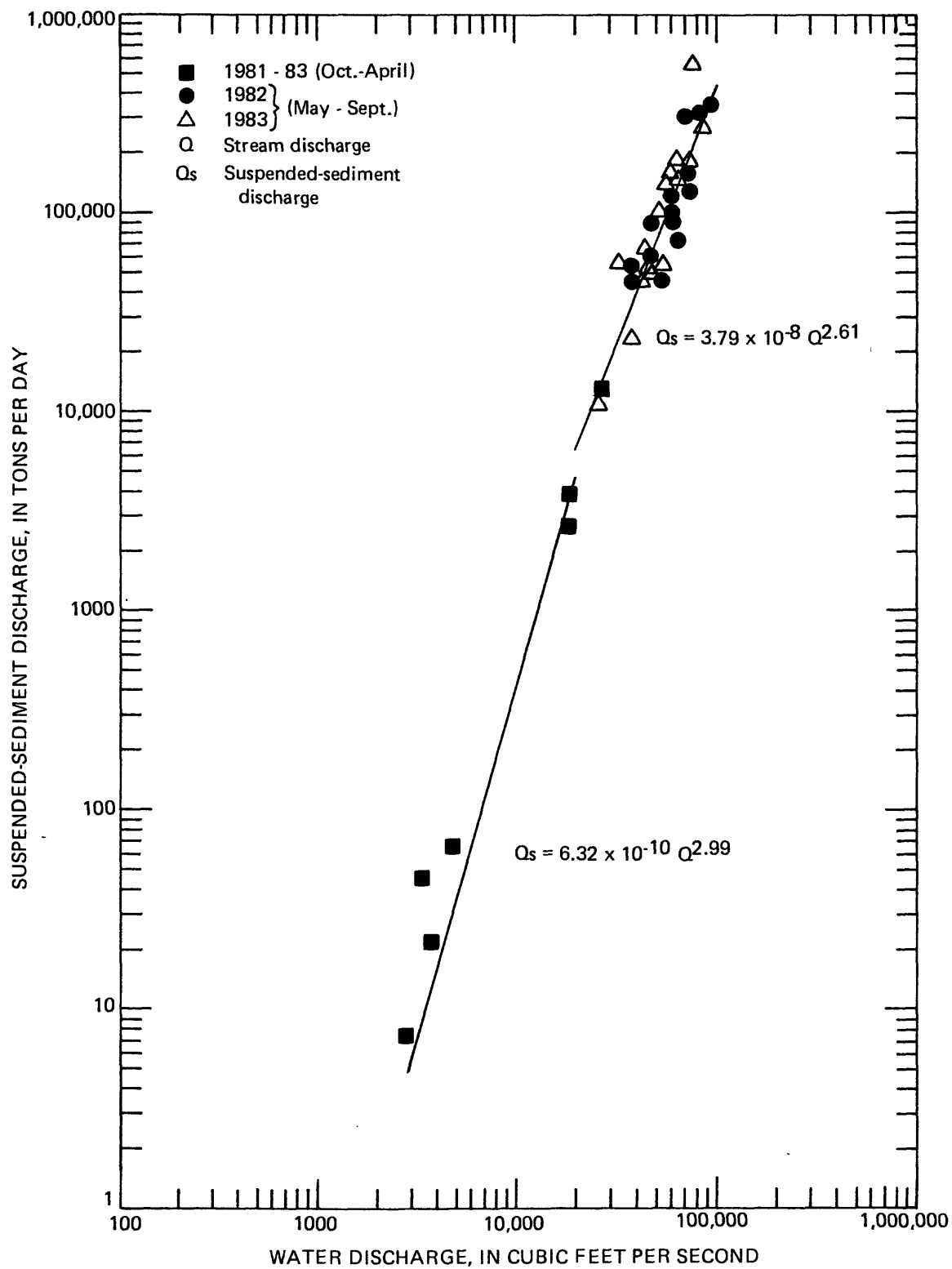


Figure 10.--Relation between suspended-sediment discharge and water discharge for Susitna River at Sunshine, May to September, 1982 and 1983 and October to April, 1981 through 1983.



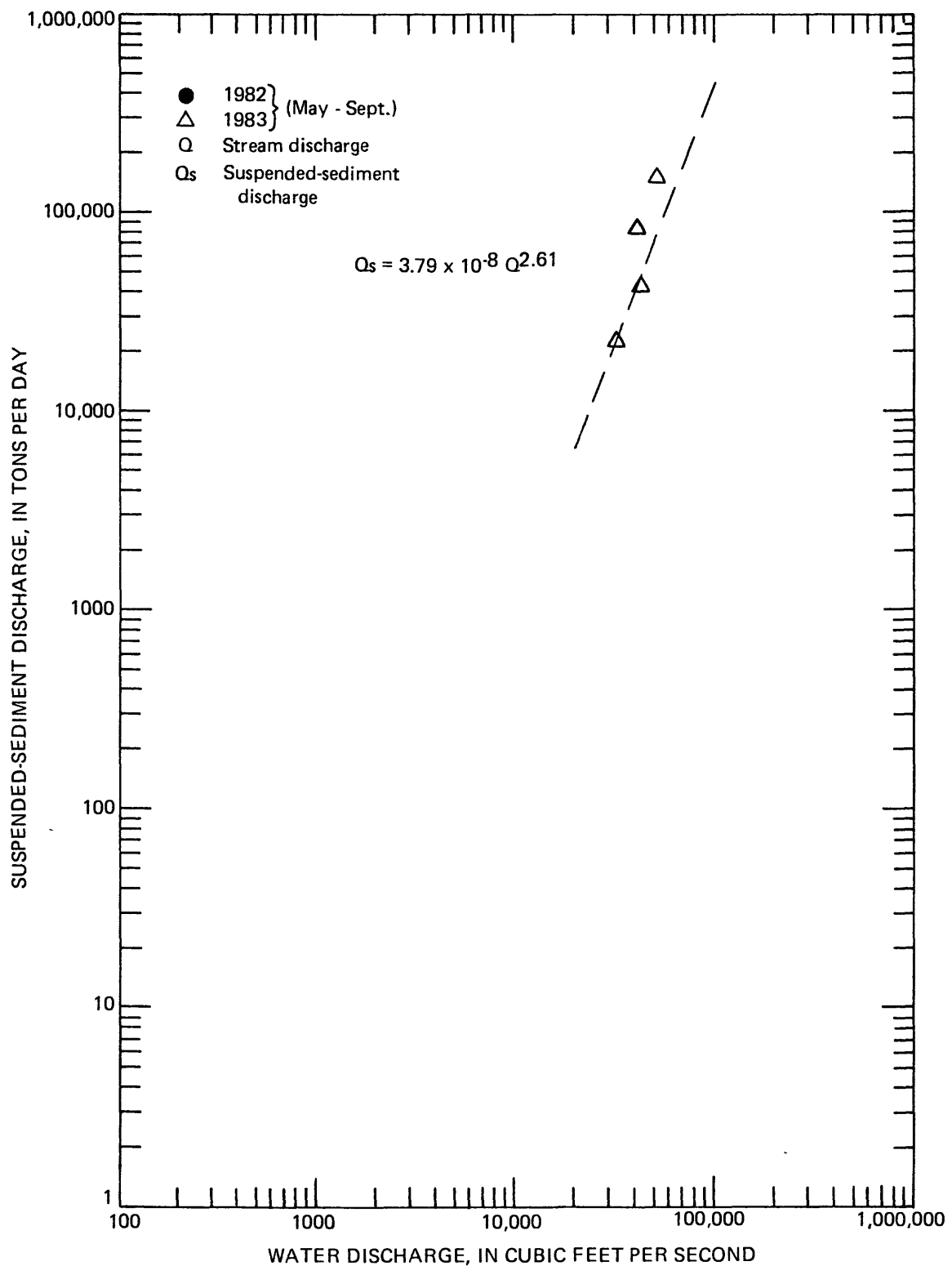


Figure 11.--Suspended-sediment discharge versus water discharge for Susitna River below Chulitna River near Talkeetna (sum of right and left channels), May to September 1983. Dashed line corresponds to transport curve established for Susitna River at Sunshine, May to September, 1983.

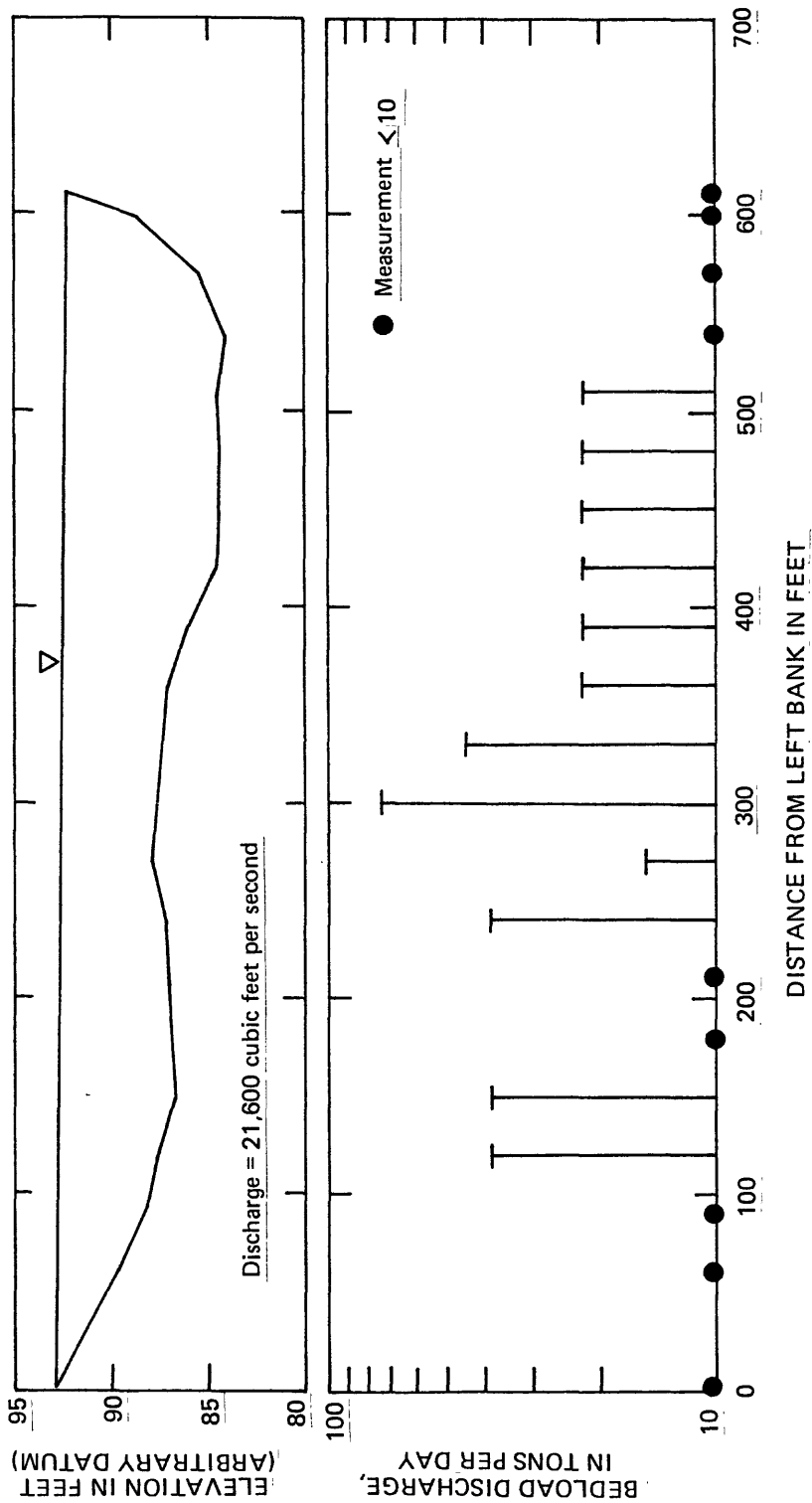


Figure 12a.--Cross section and distribution of bedload discharge, Susitna River near Talkeetna, May 19, 1983.

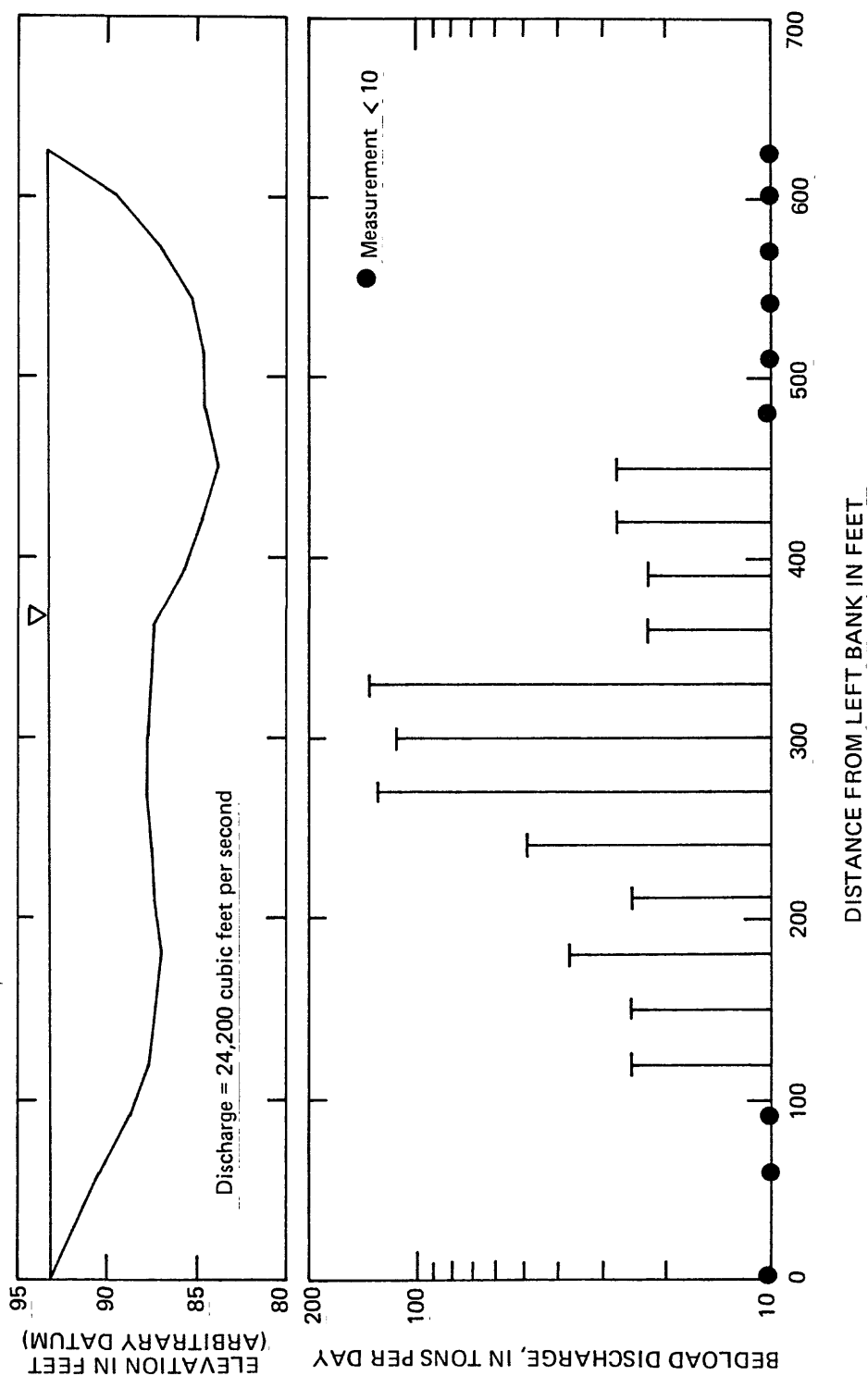


Figure 12b.--Cross section and distribution of bedload discharge, Susitna River near Talkeetna, June 8, 1983.

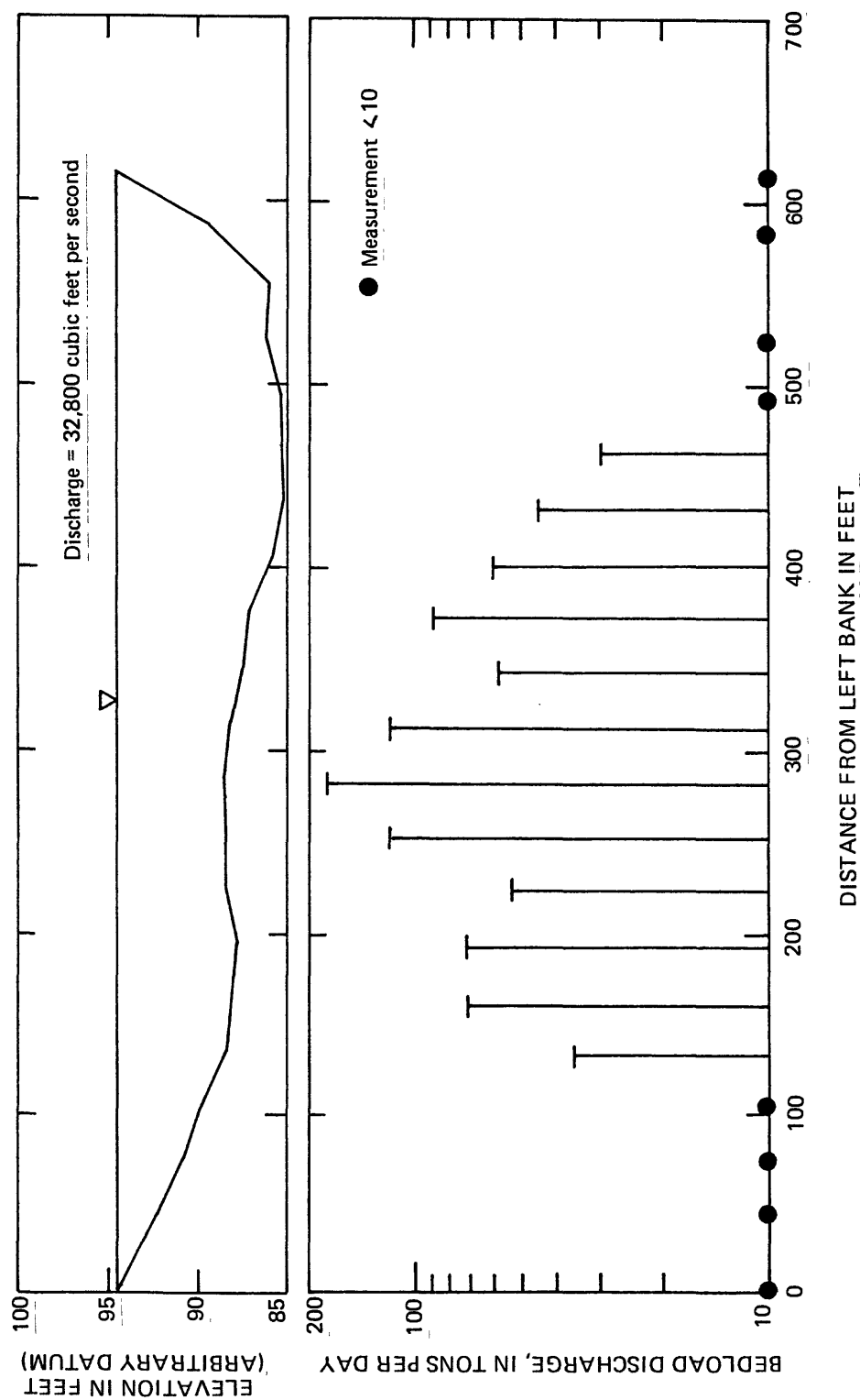


Figure 12c.--Cross section and distribution of bedload discharge, Susitna River near Talkeetna, August 11, 1983.

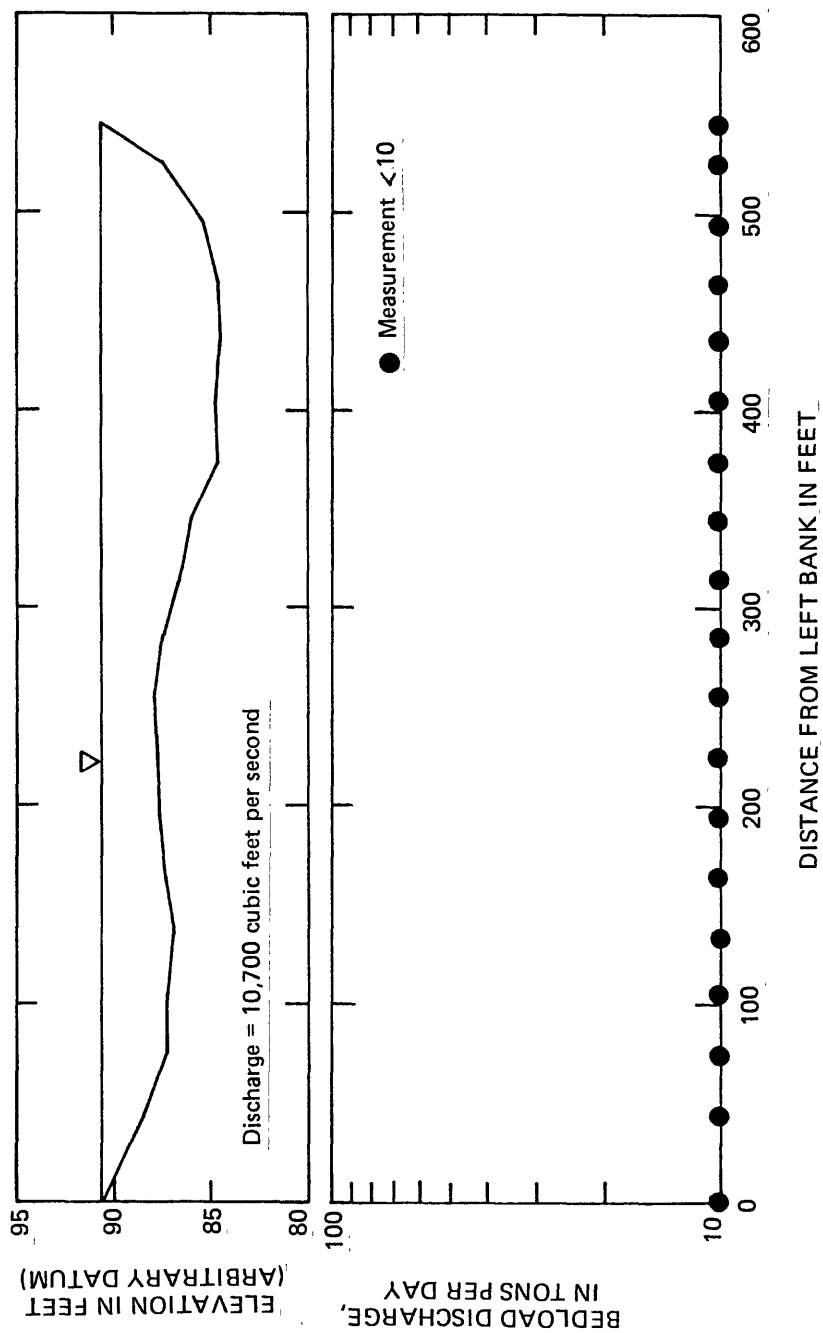


Figure 12d.--Cross section and distribution of bedload discharge, Susitna River near Talkeetna, October 6, 1983.

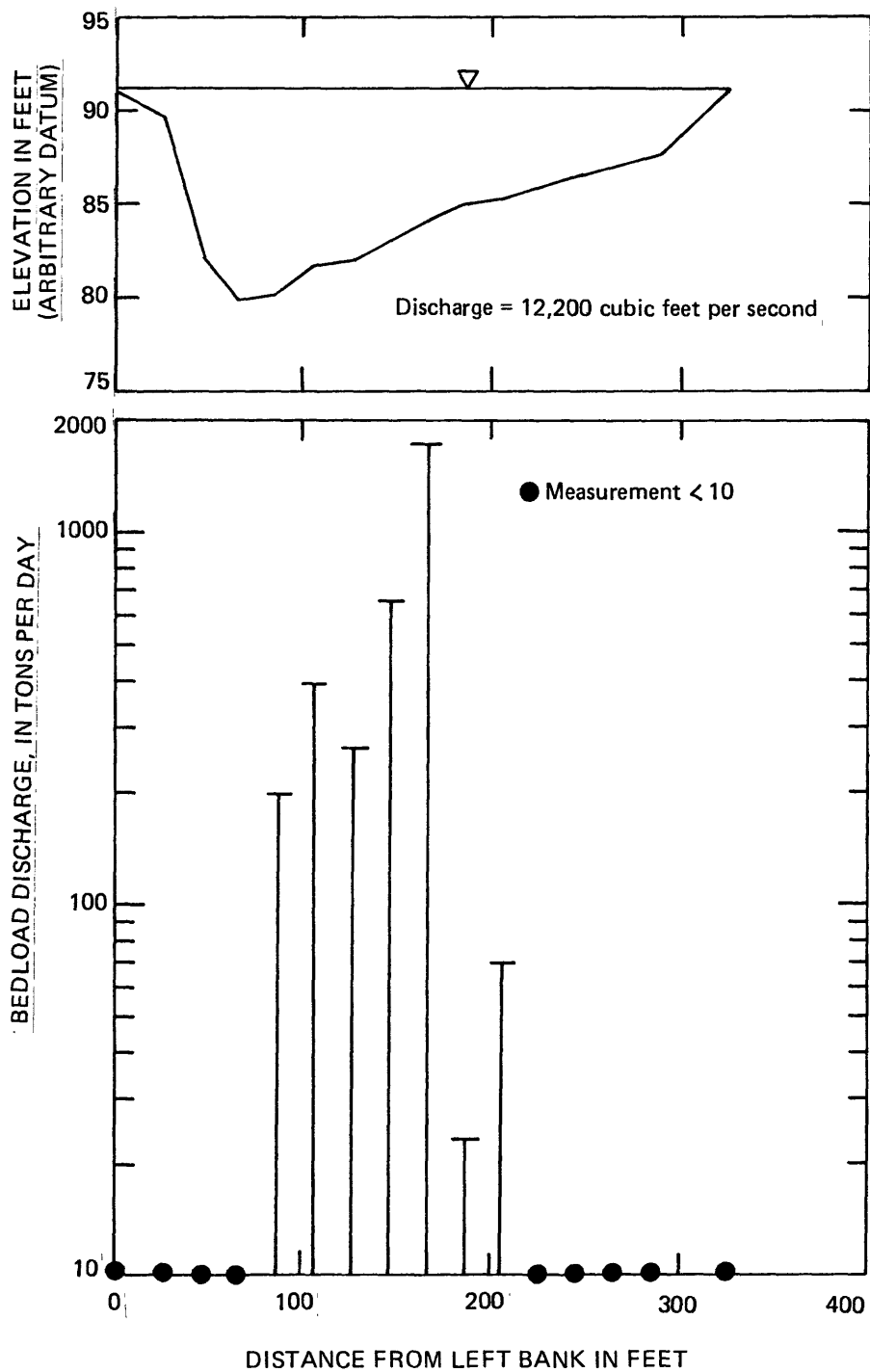


Figure 13a.--Cross section and distribution of bedload discharge, Chulitna River below canyon near Talkeetna, May 19, 1983.

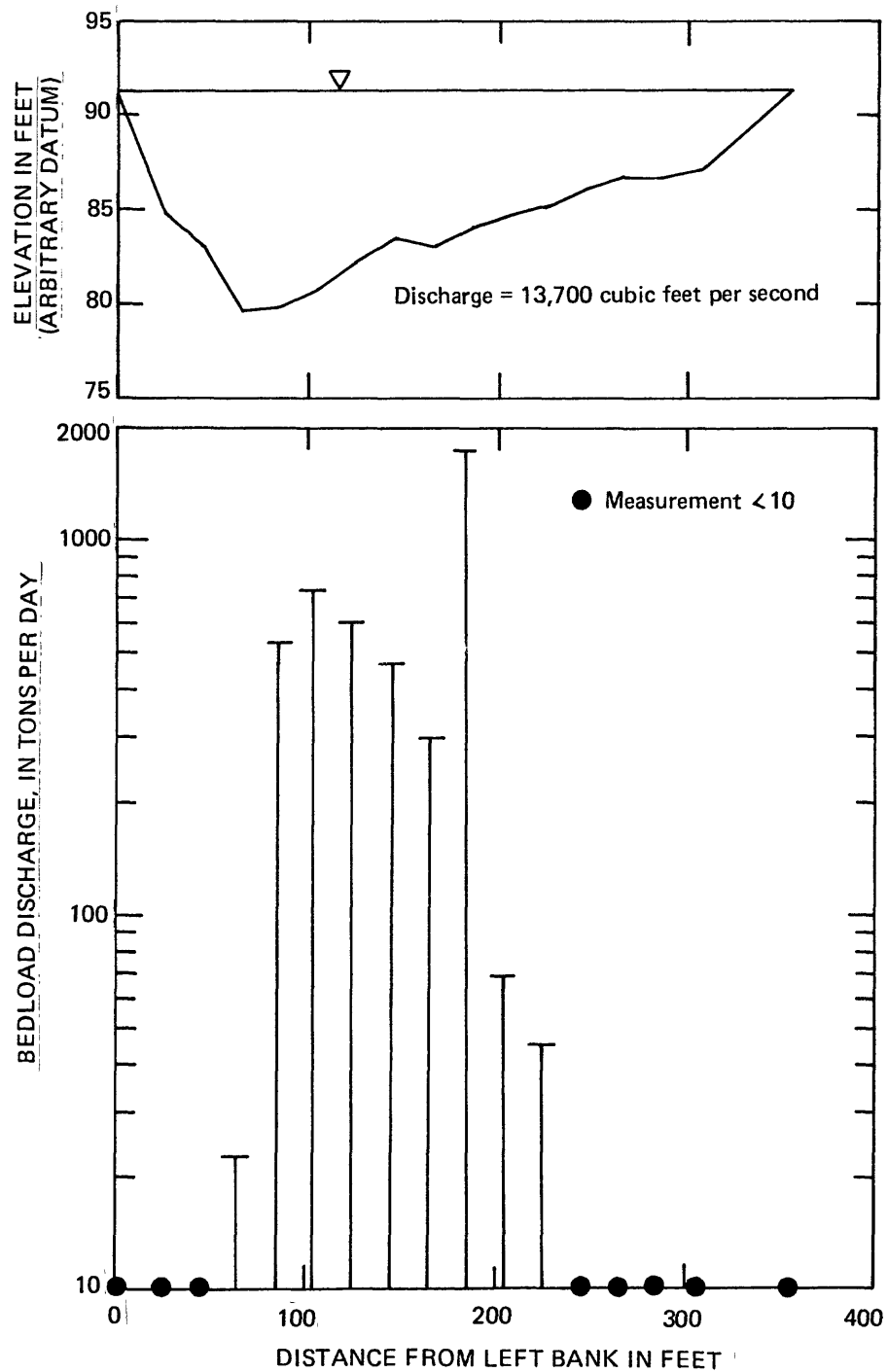


Figure 13b.--Cross section and distribution of bedload discharge, Chulitna River below canyon near Talkeetna, June 9, 1983.

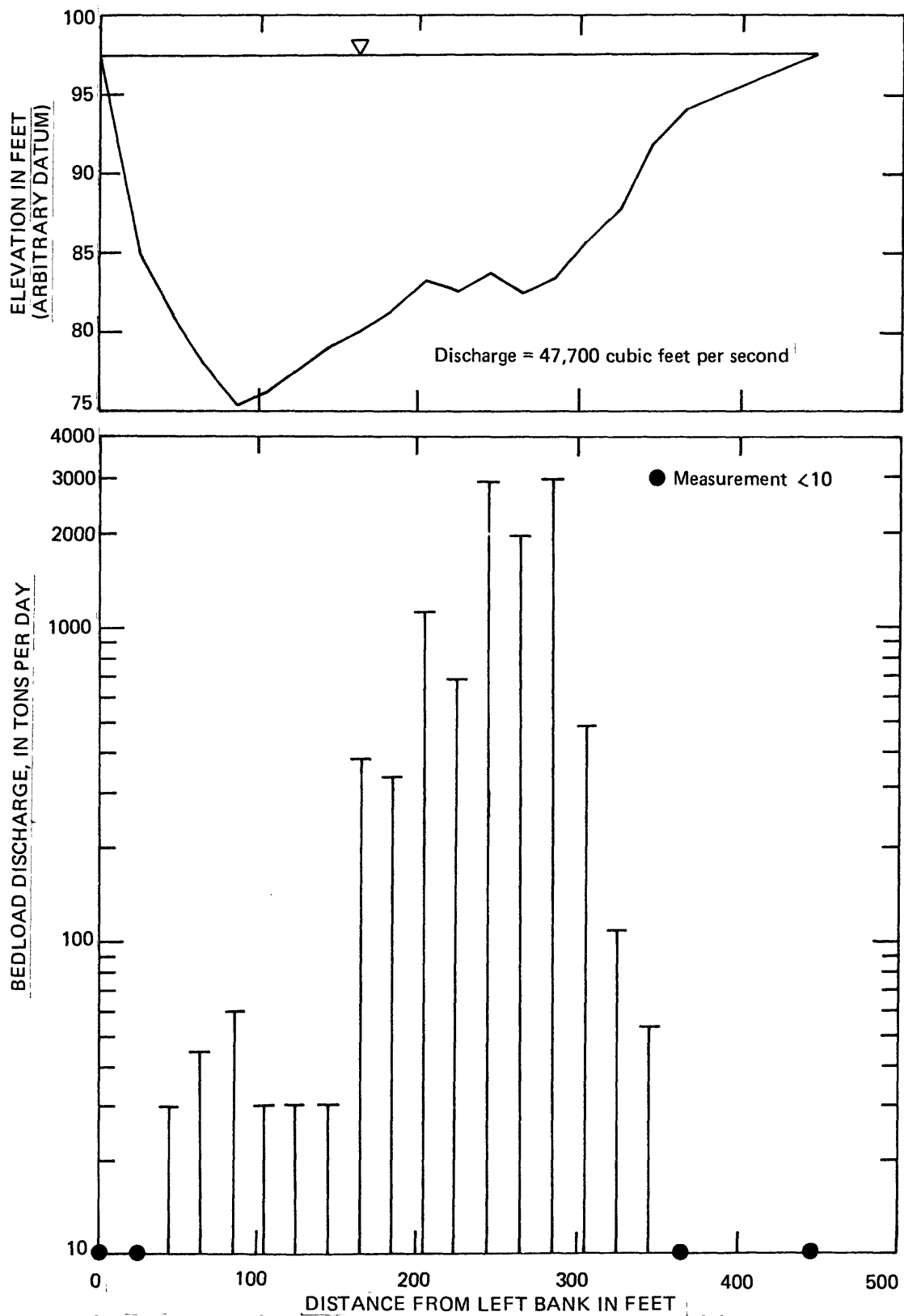


Figure 13c.--Cross section and distribution of bedload discharge, Chulitna River below canyon near Talkeetna, August 9, 1983.



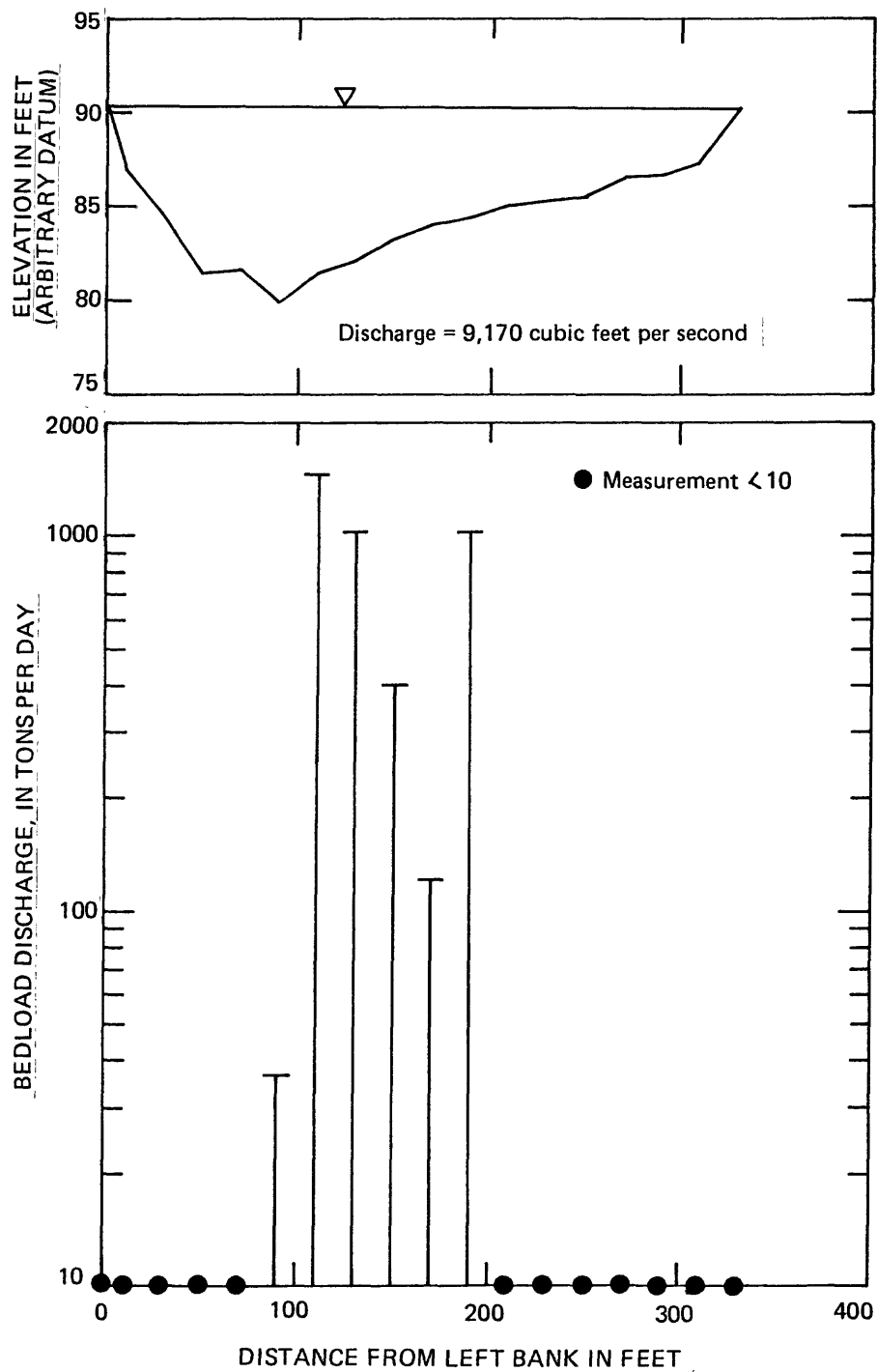


Figure 13d.--Cross section and distribution of bedload discharge, Chulitna River below canyon near Talkeetna, October 5, 1983.

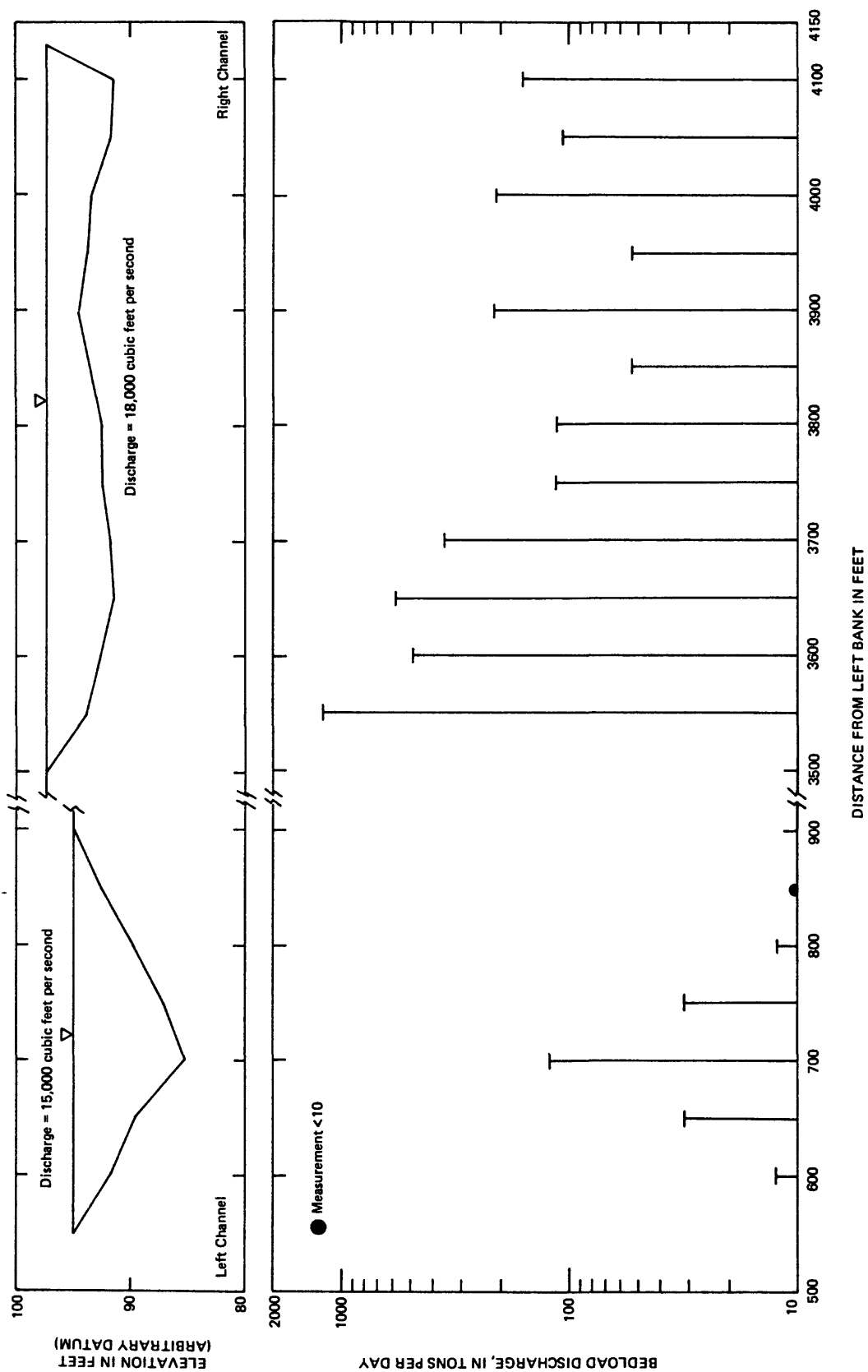


Figure 14a.--Cross section and distribution of bedload discharge, Susitna River below Chulitna River near Talkeetna, May 20, 1983.

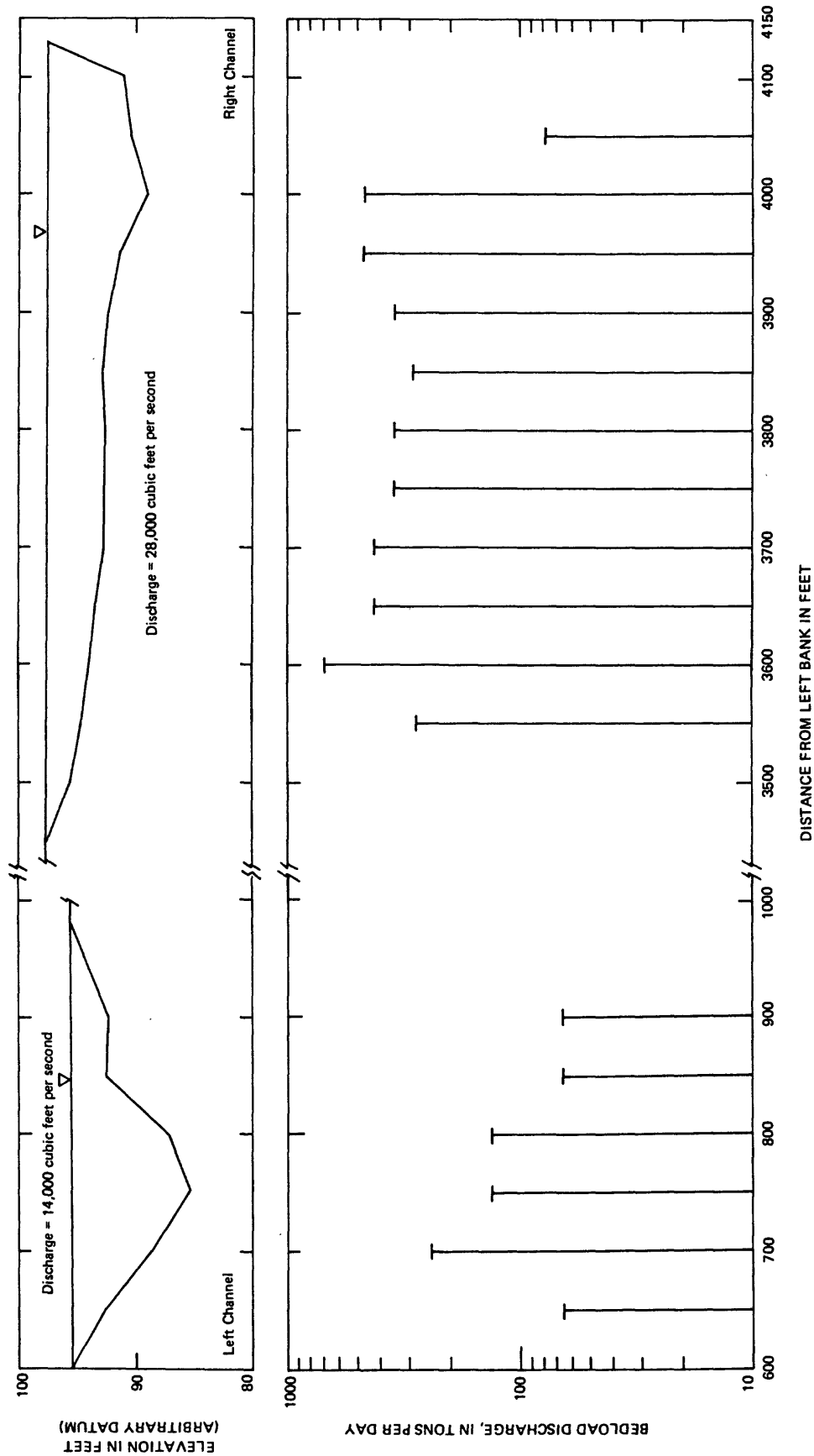


Figure 14b.--Cross section and distribution of bedload discharge, Susitna River below Chulitna River near Talkeetna, July 19, 1983.

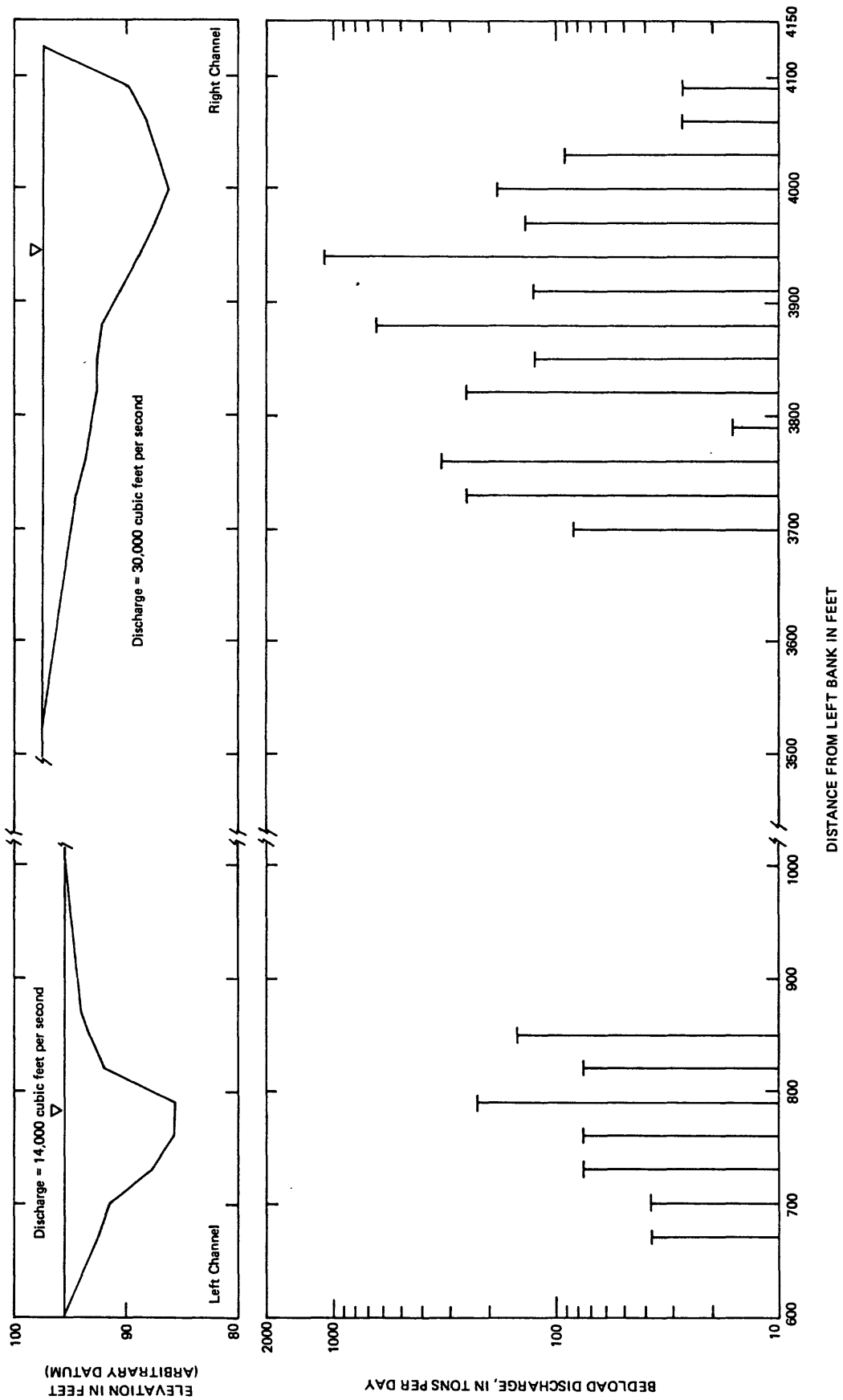


Figure 14c.--Cross section and distribution of bedload discharge, Susitna River below Chulitna River near Talkeetna, August 30, 1983.

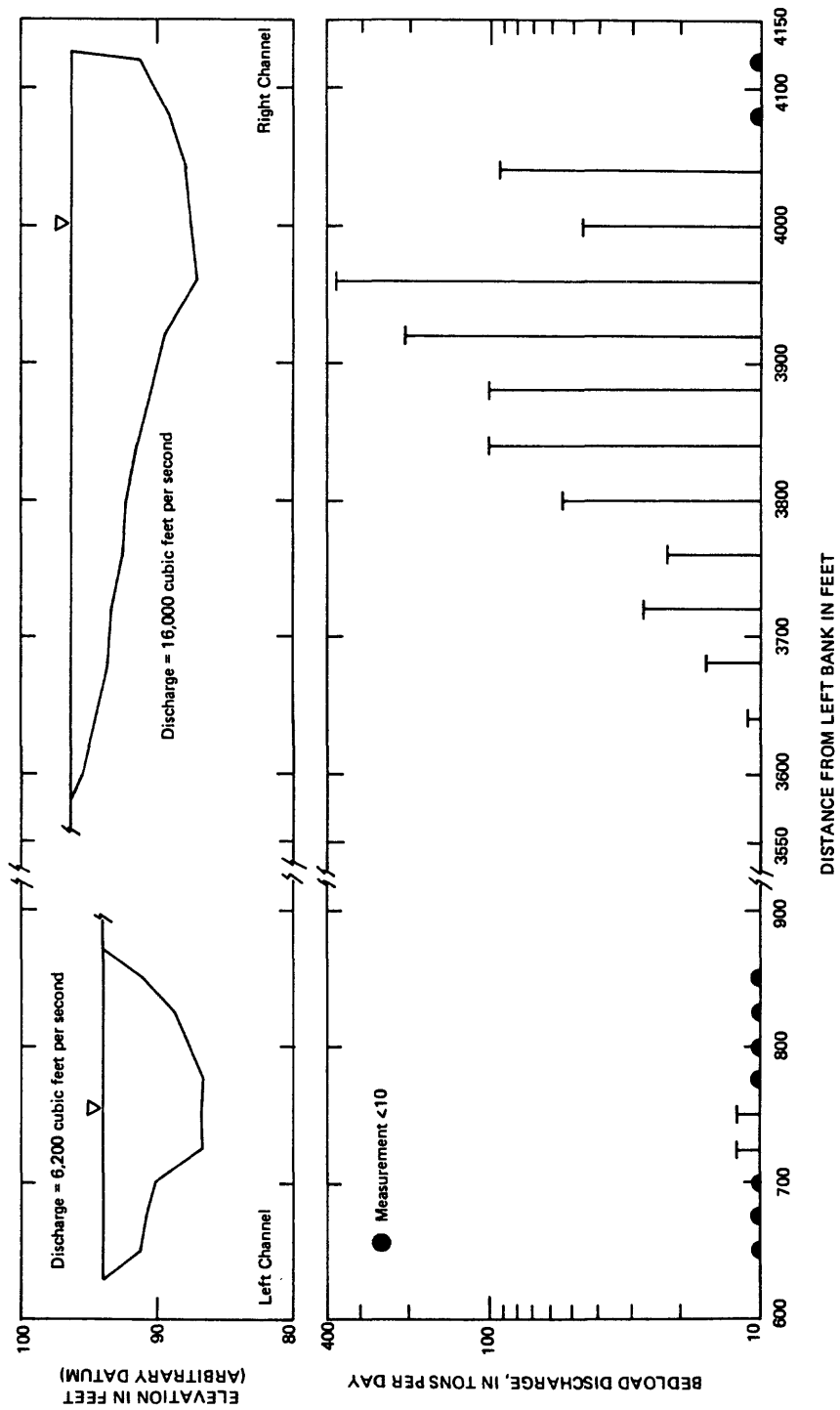


Figure 14d.--Cross section and distribution of bedload discharge, Susitna River below Chulitna River near Talkeetna, October 5, 1983.

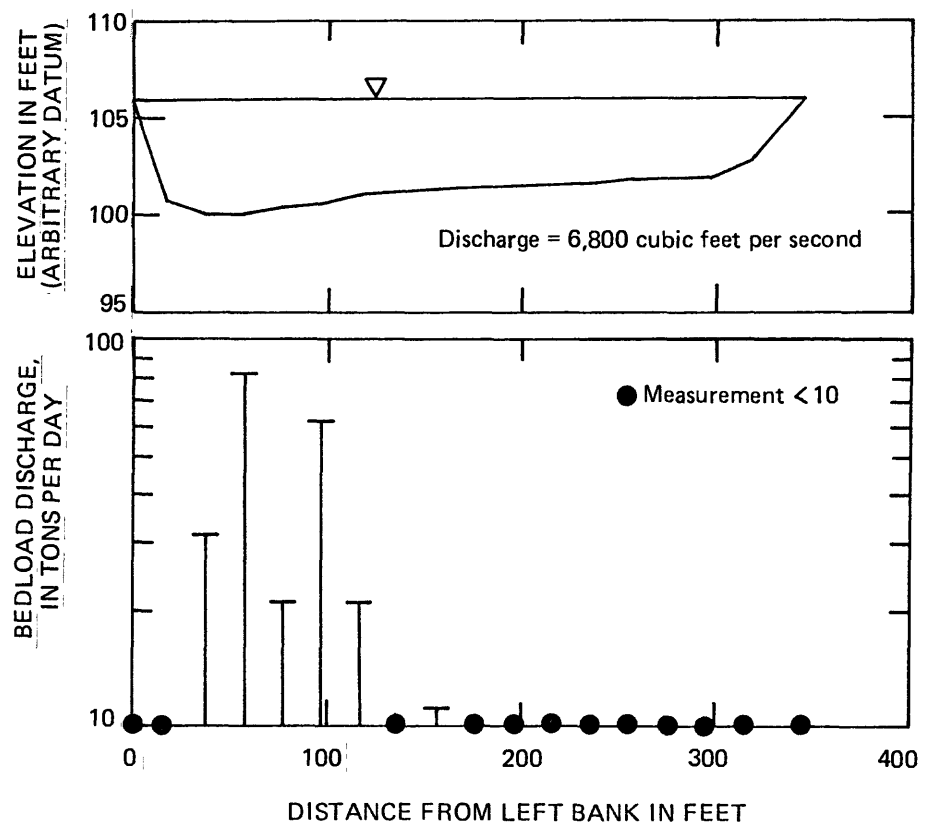


Figure 15a.--Cross section and distribution of bedload discharge, Talkeetna River near Talkeetna, May 23, 1983.

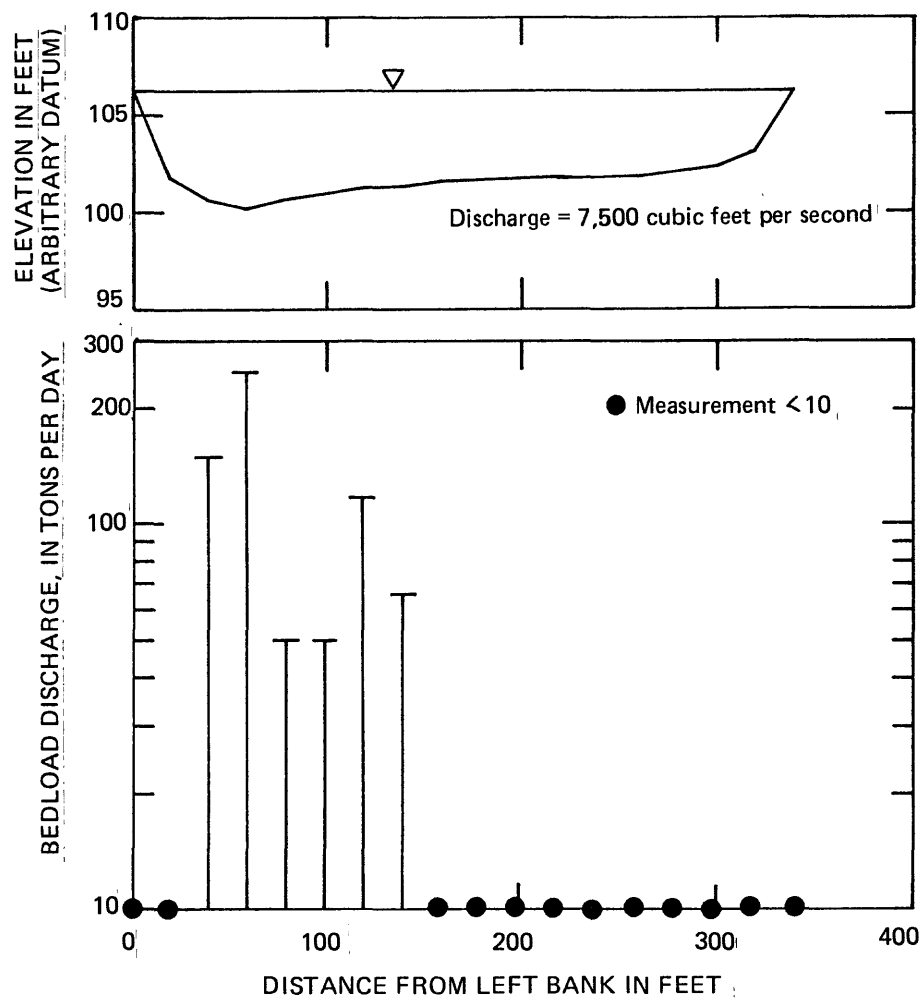


Figure 15b.--Cross section and distribution of bedload discharge, Talkeetna River near Talkeetna, June 9, 1983.

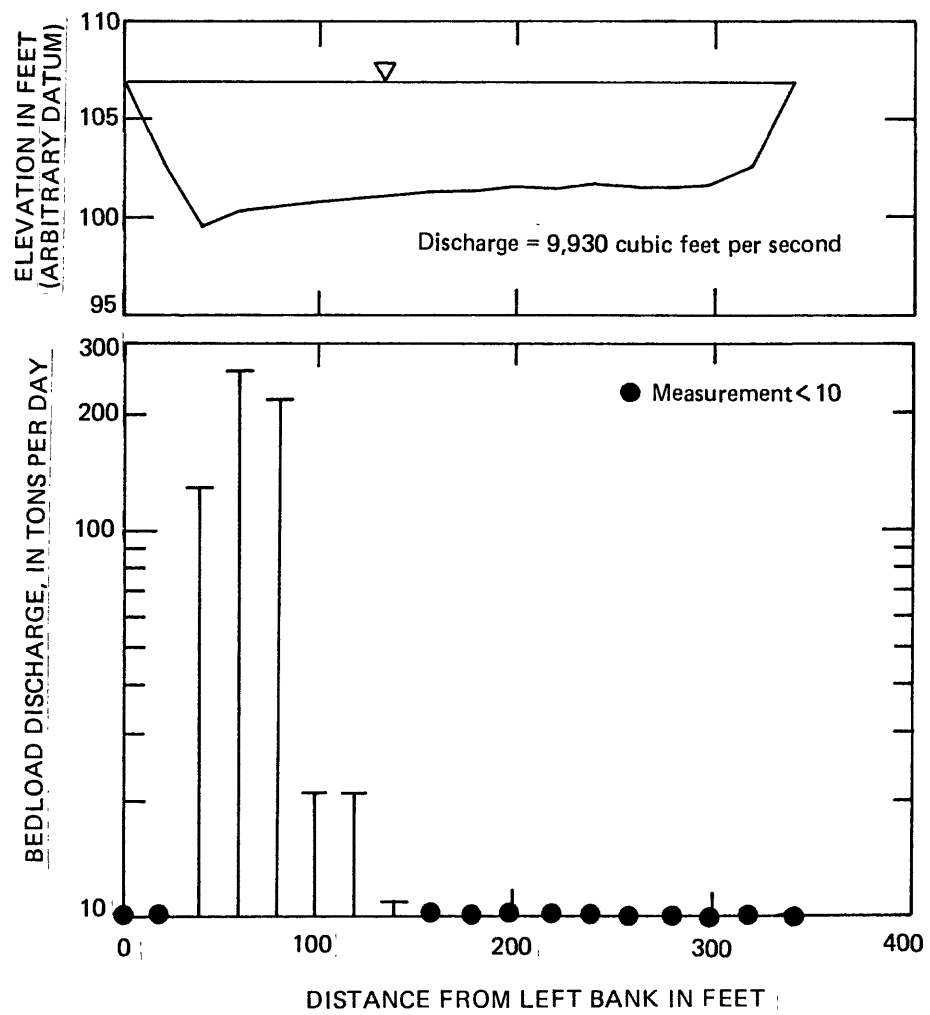


Figure 15c.--Cross section and distribution of bedload discharge, Talkeetna River near Talkeetna, August 11, 1983.



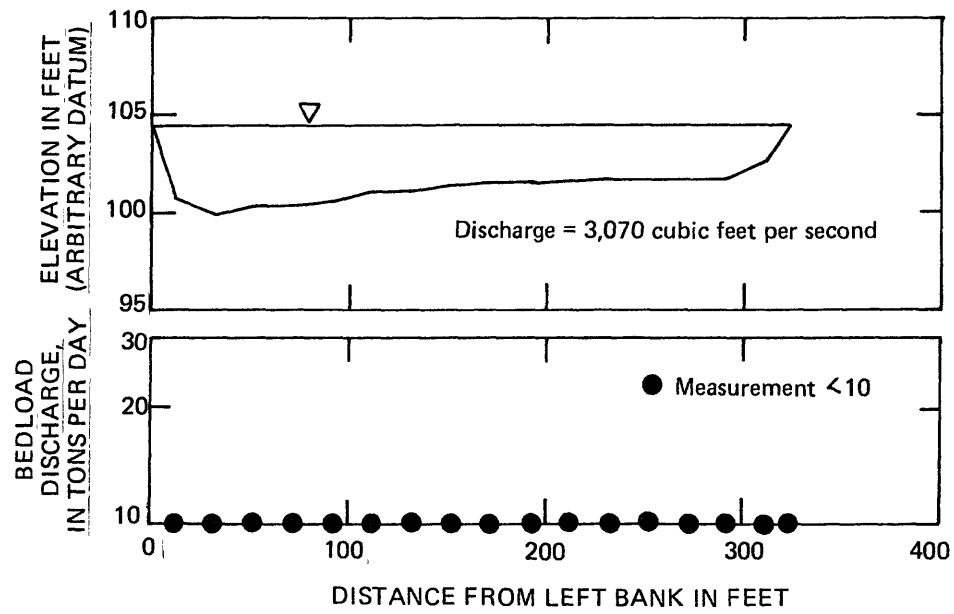


Figure 15d.--Cross section and distribution of bedload discharge, Talkeetna River near Talkeetna, October 7, 1983.

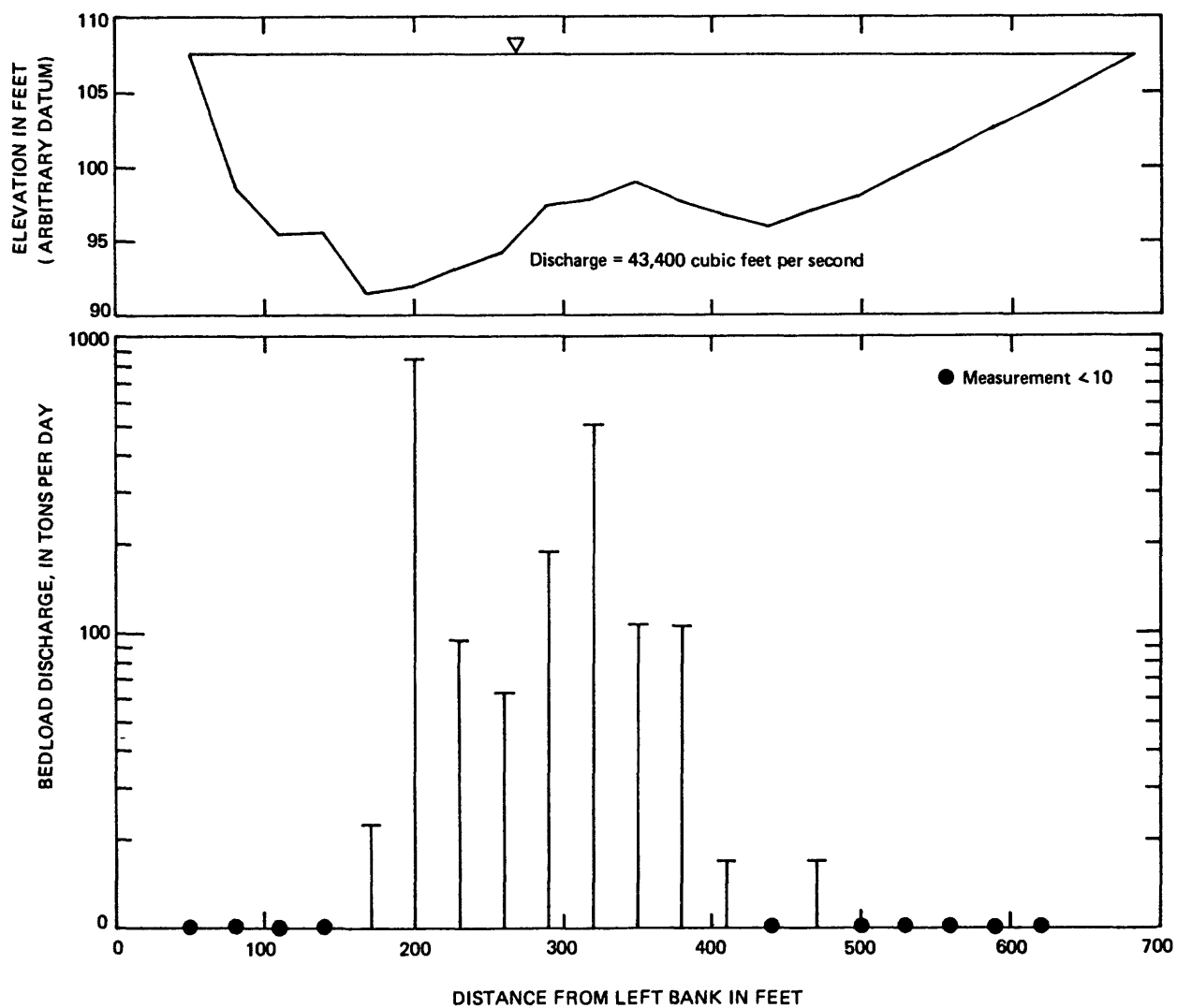


Figure 16a.--Cross section and distribution of bedload discharge, Susitna River at Sunshine, May 18, 1983.

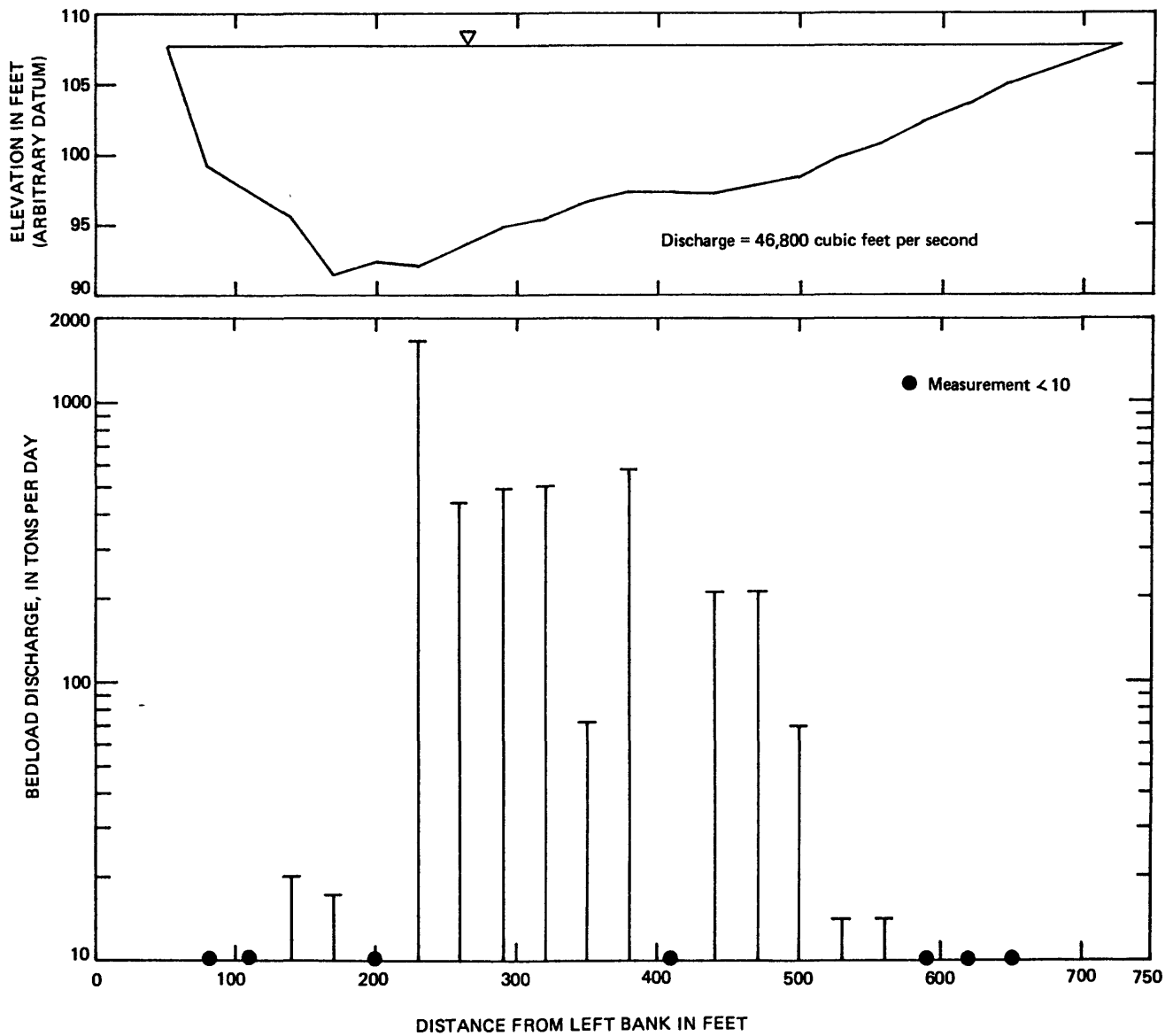


Figure 16b.--Cross section and distribution of bedload discharge, Susitna River at Sunshine, June 8, 1983.

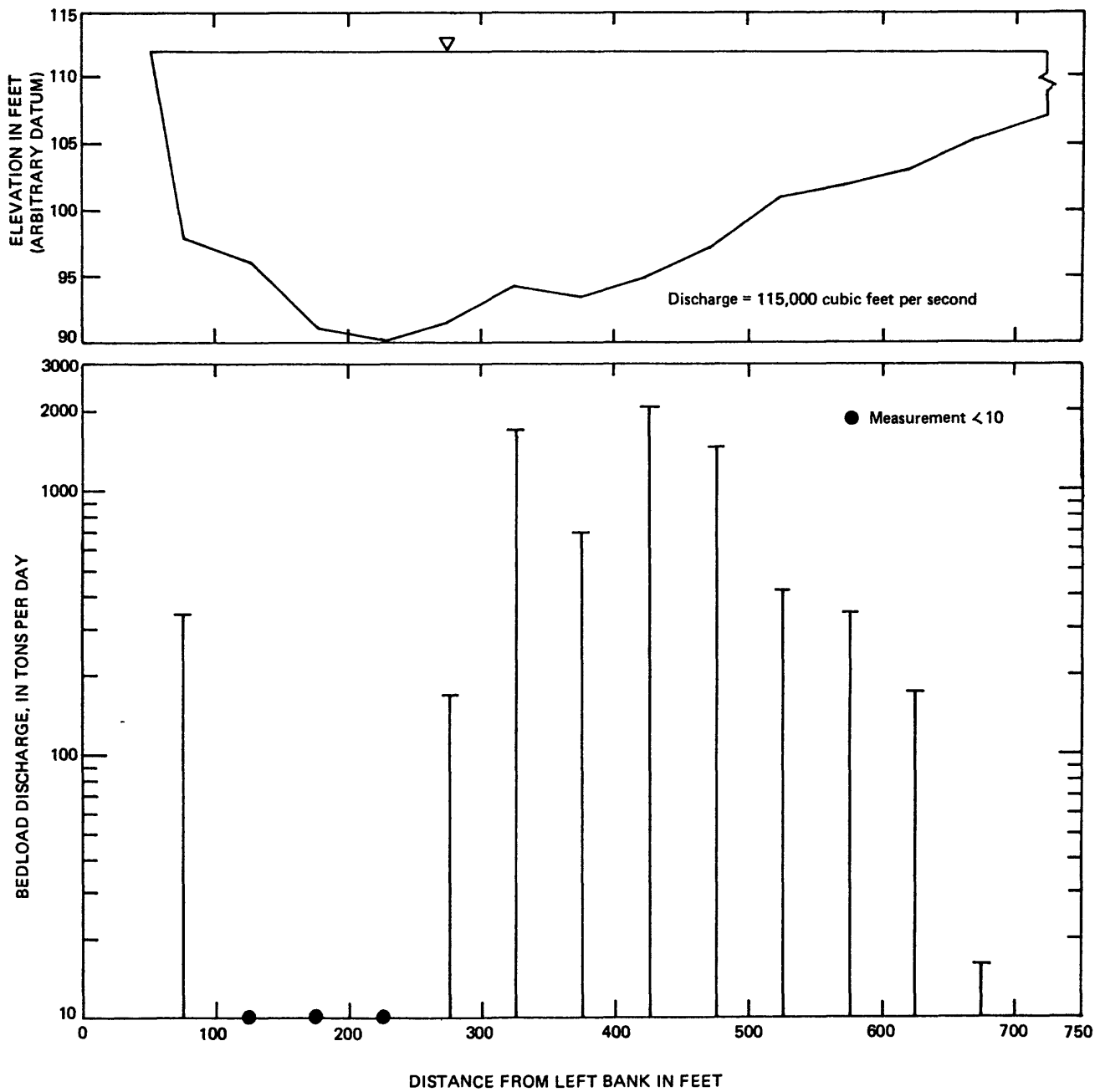


Figure 16c.--Cross section and distribution of bedload discharge, Susitna River at Sunshine, August 9, 1983.

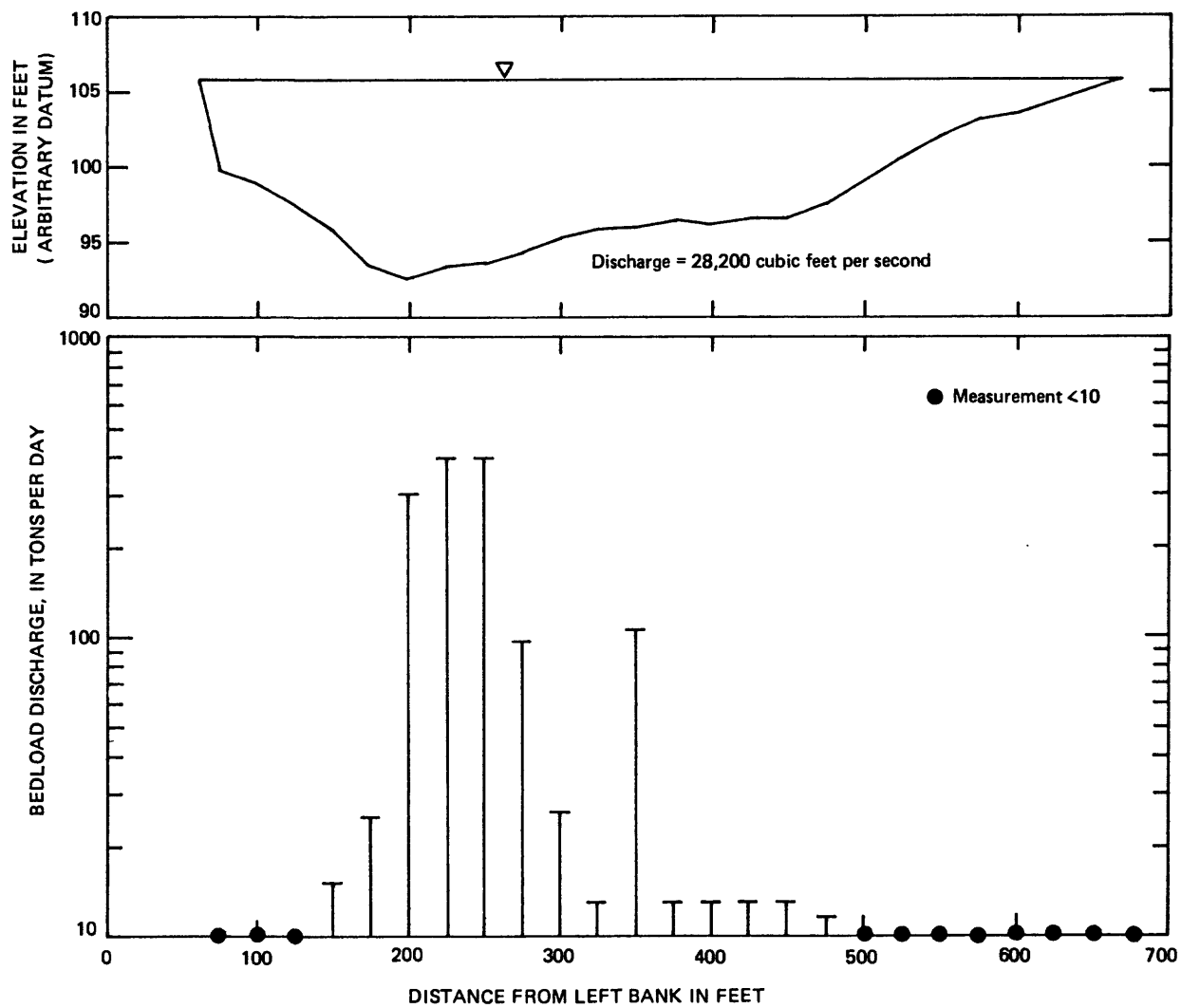


Figure 16d.--Cross section and distribution of bedload discharge, Susitna River at Sunshine, October 4, 1983.

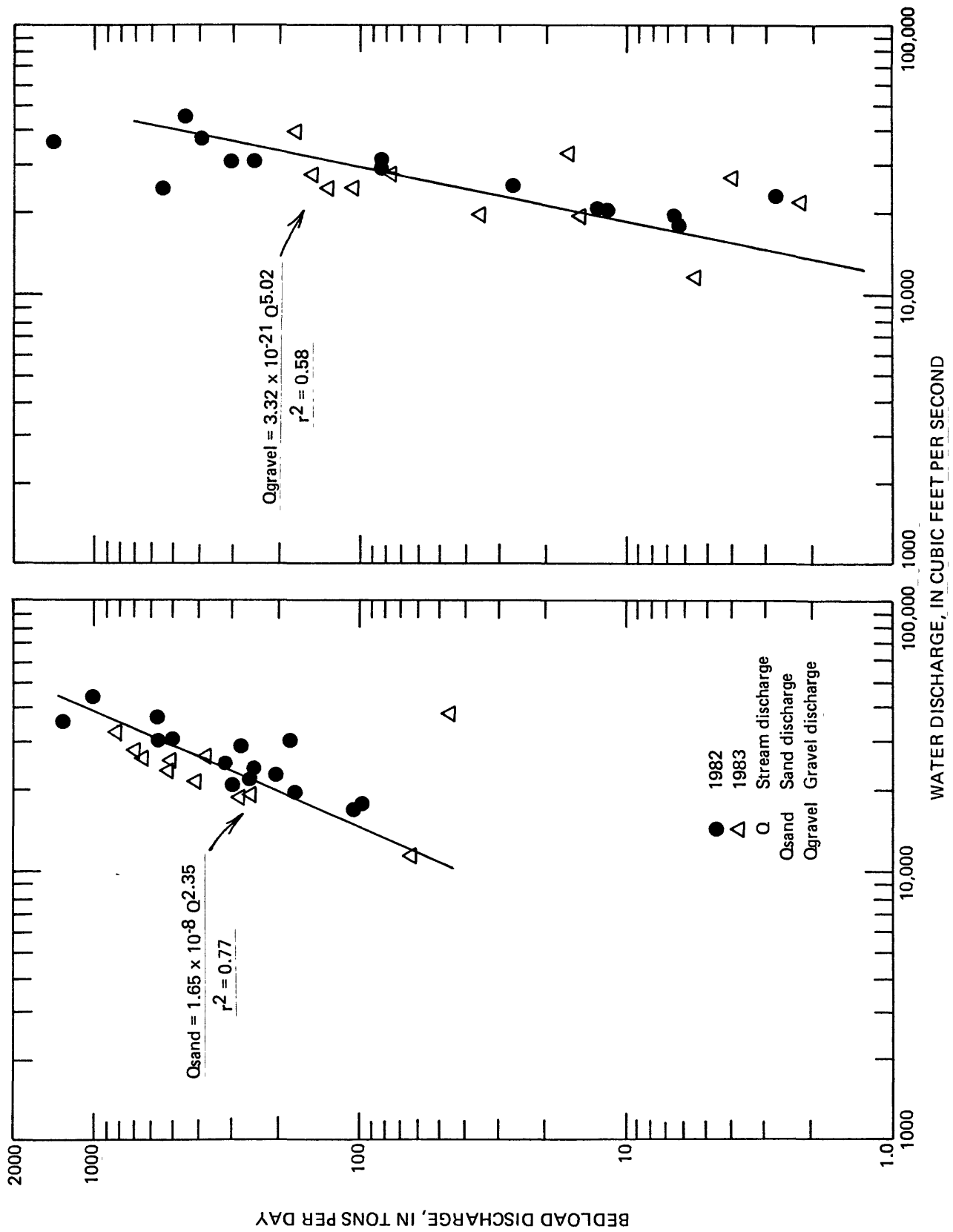


Figure 17.--Bedload-transport curves of sand and gravel for Susitna River near Talkeetna, May to September, 1982 and 1983.

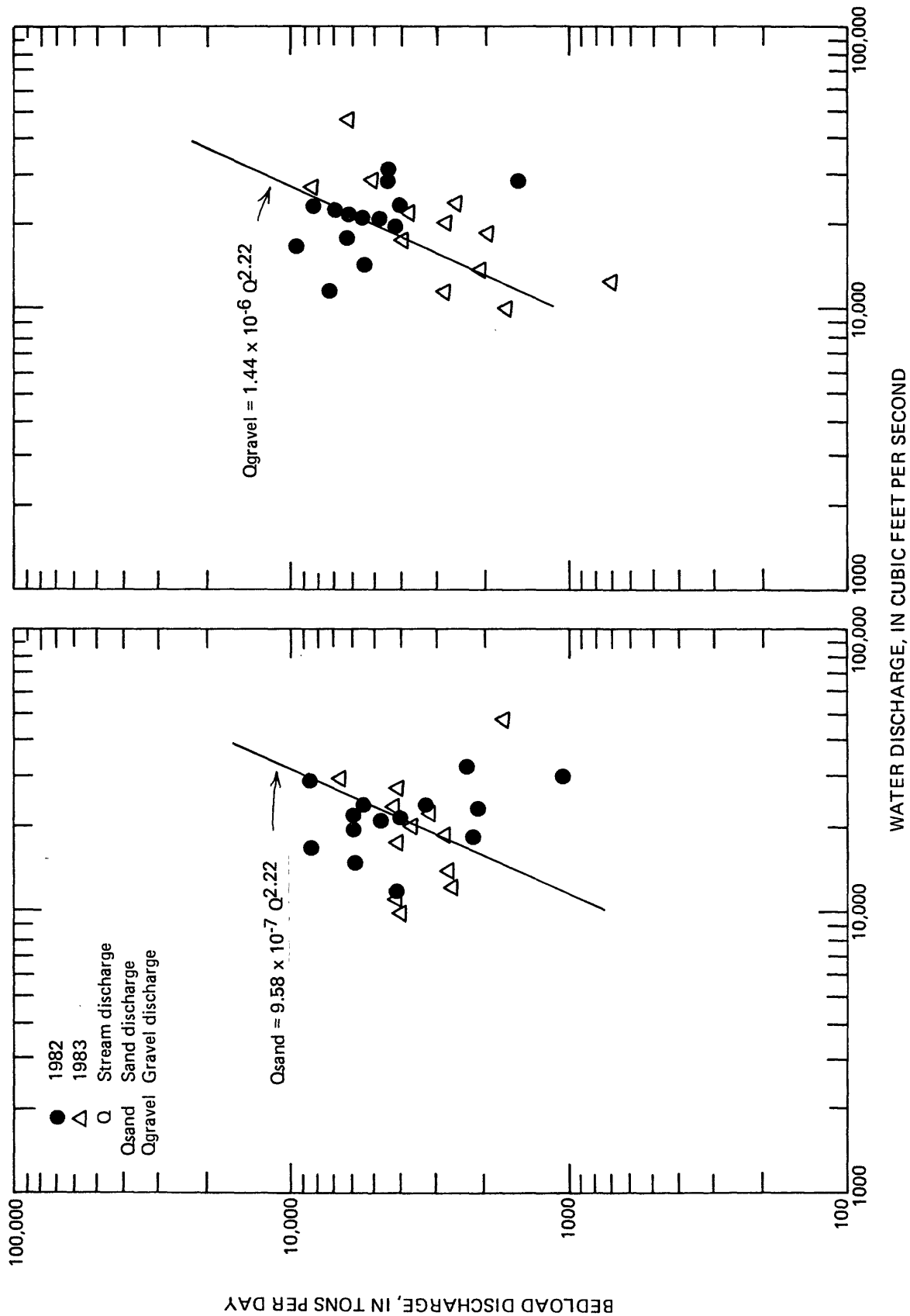


Figure 18.--Bedload-transport curves of sand and gravel for Chulitna River below canyon near Talkeetna, May to September, 1982 and 1983. Transport curves are based on assumed bedload/suspended sand relations. Equations obtained from least-squares analysis were not used ( $r^2$  less than 0.20).

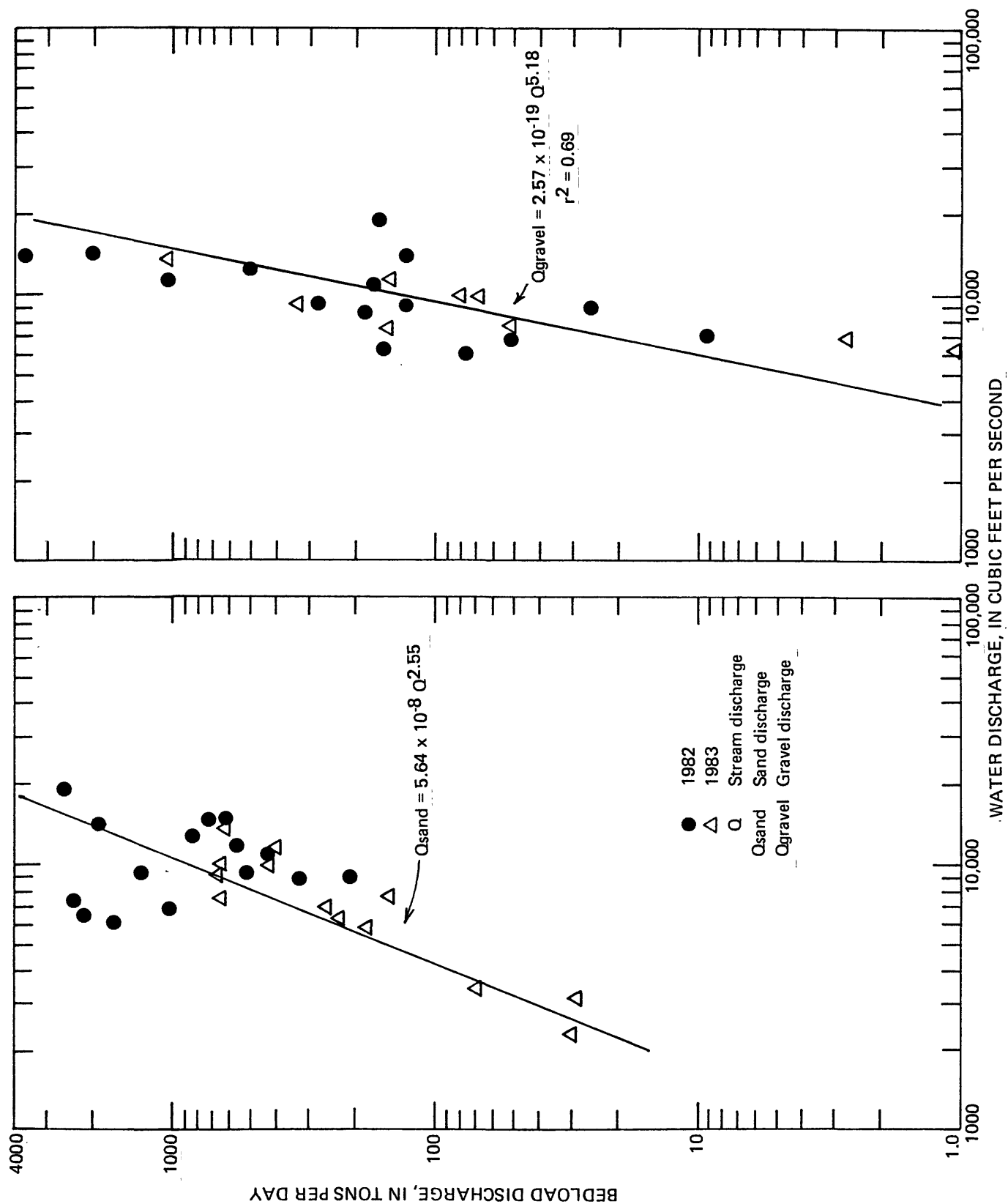


Figure 19.--Bedload-transport curves of sand and gravel for Talkeetna River near Talkeetna, May to September, 1982 and 1983. Transport curve of bedload sand based on assumed bedload/suspended sand relation. Equation obtained from least-squares analysis was not used ( $r^2 = 0.46$ ).



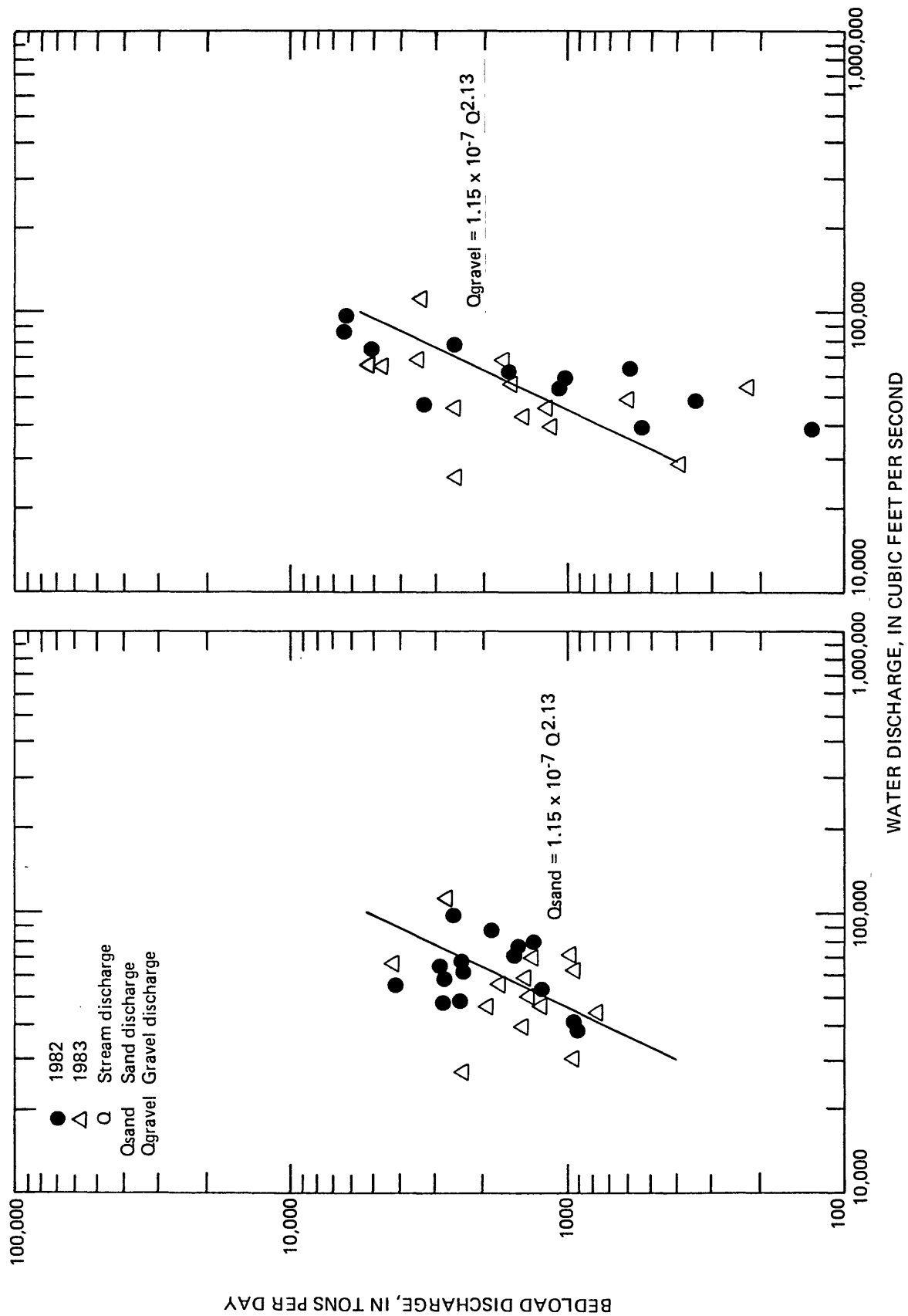


Figure 20.--Bedload-transport curves of sand and gravel for Susitna River at Sunshine, May to September, 1982 and 1983.

Transport curves are based on assumed bedload/suspended sand relations. Equations obtained from least-squares analysis were not used ( $r^2$  less than 0.27).

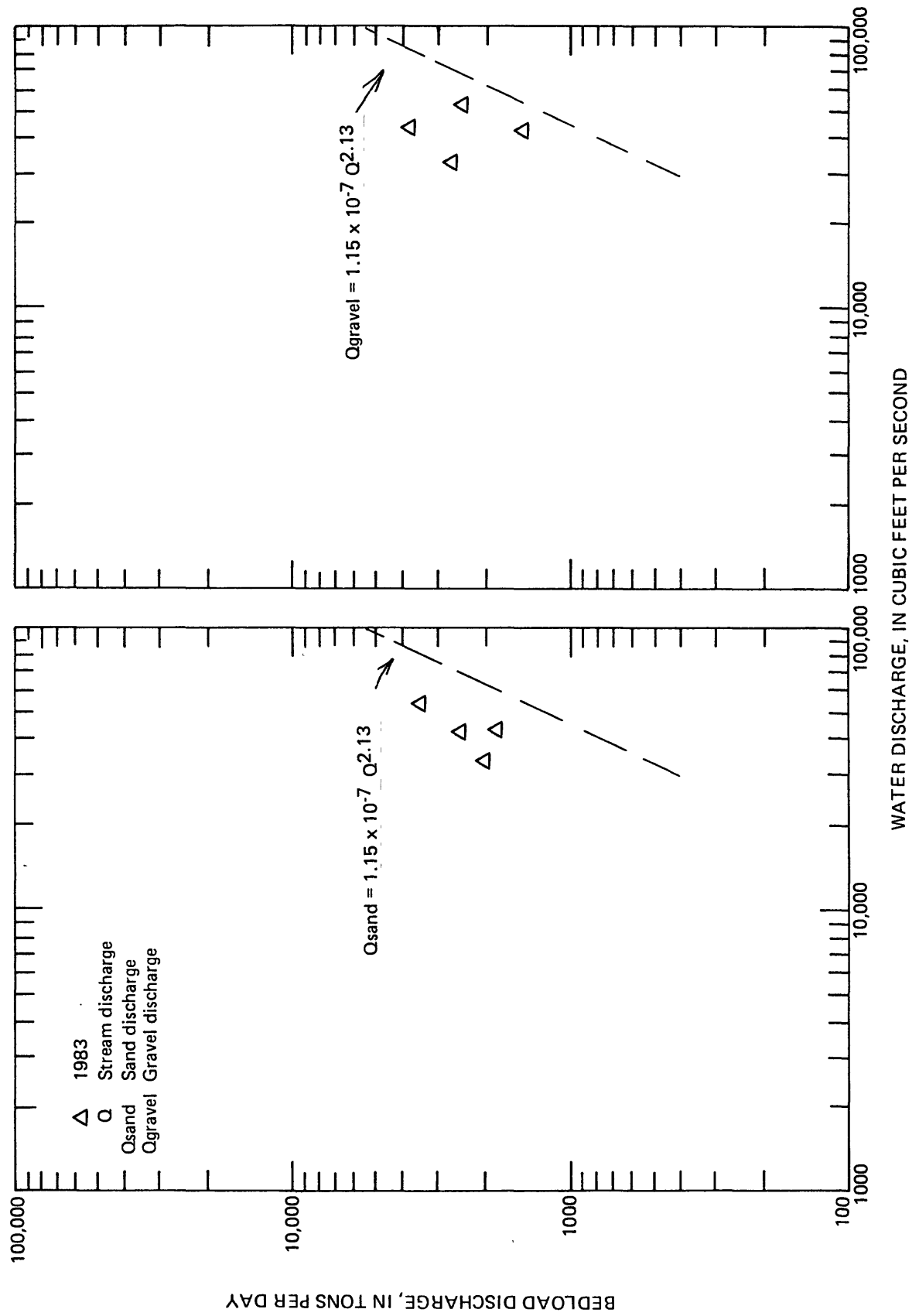


Figure 21.--Bedload discharge of sand and gravel versus water discharge for Susitna River below Chulitna River near Talkeetna (sum of right and left channels), May to September 1983. Dashed lines correspond to transport curves established for Susitna River at Sunshine, May to September, 1982 and 1983.

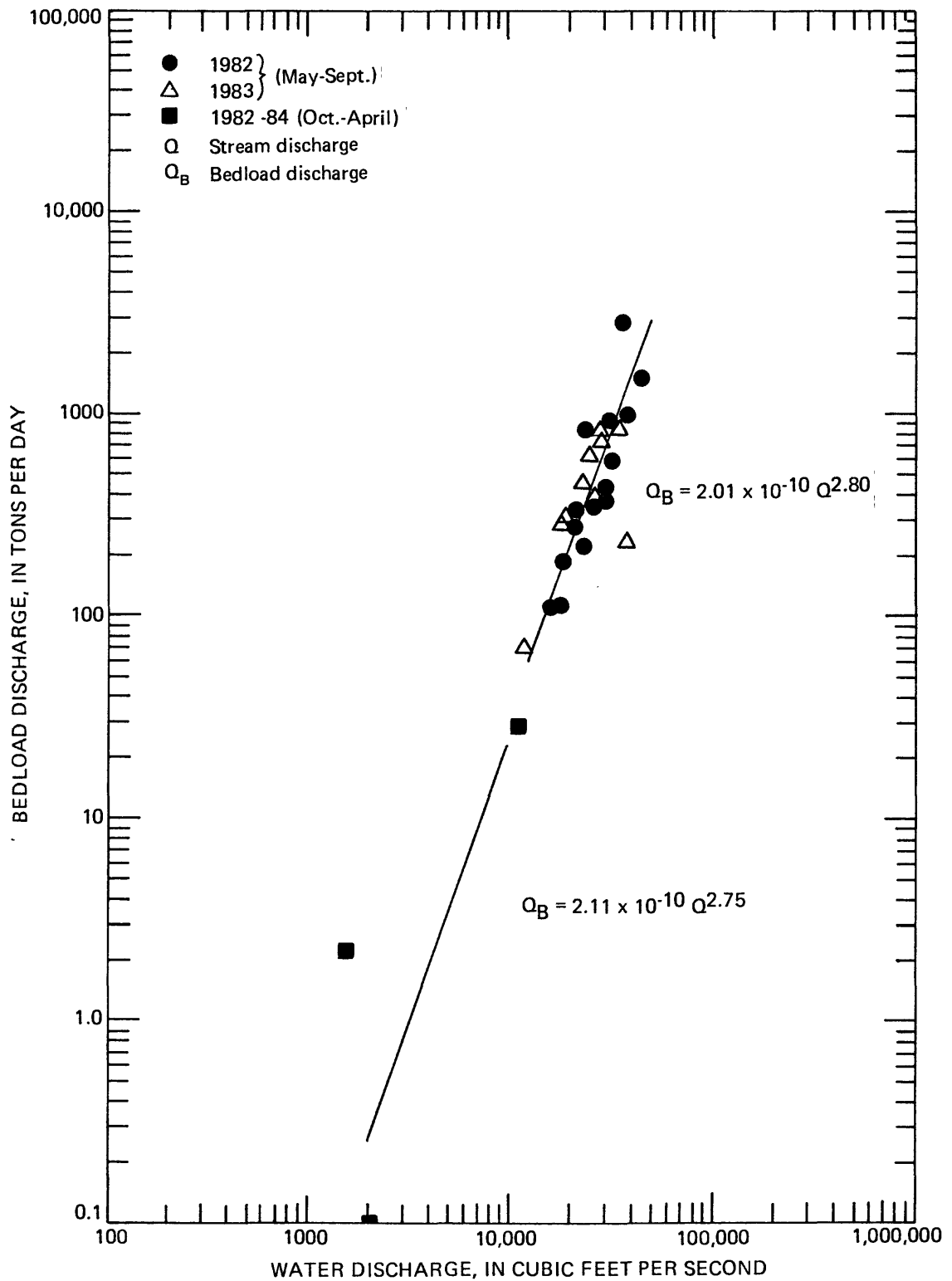


Figure 22.--Relation between bedload discharge and water discharge for Susitna River near Talkeetna, May to September, 1982 and 1983 and October to April, 1982 through 1984.

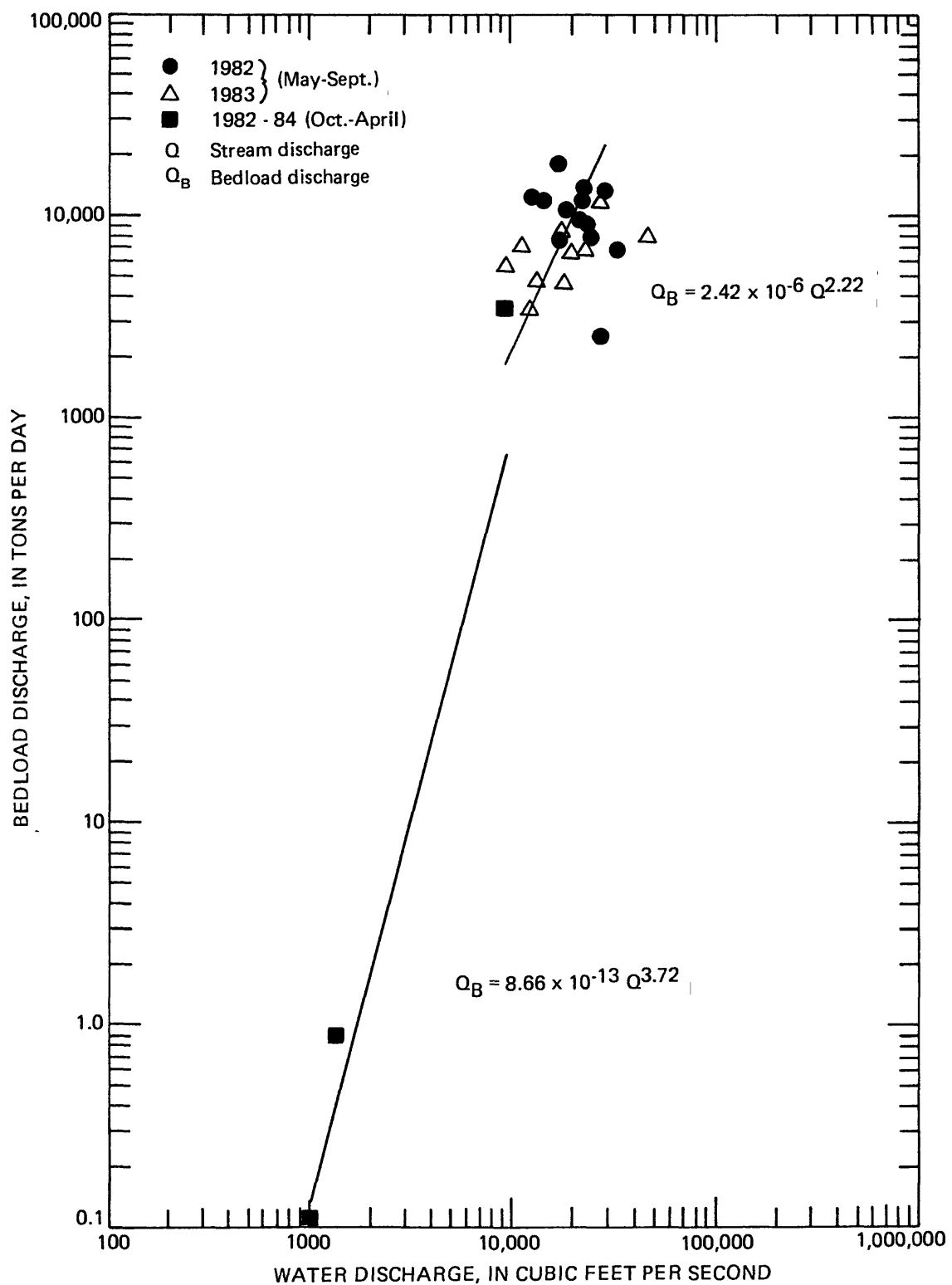


Figure 23.--Relation between bedload discharge and water discharge for Chulitna River below canyon near Talkeetna, May to September, 1982 and 1983 and October to April, 1982 through 1984.

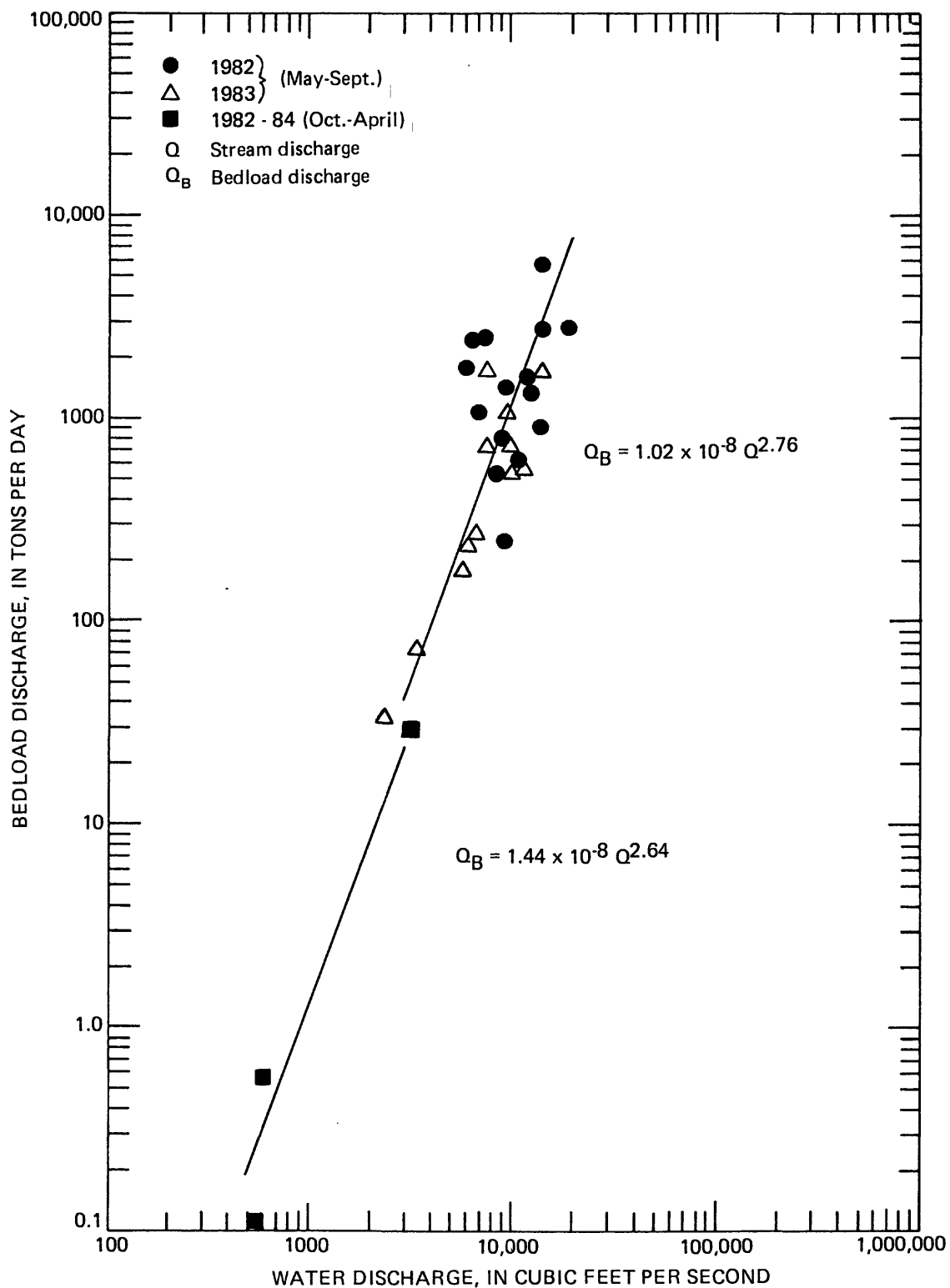


Figure 24.--Relation between bedload discharge and water discharge for Talkeetna River near Talkeetna, May to September, 1982 and 1983 and October to April, 1982 through 1984.

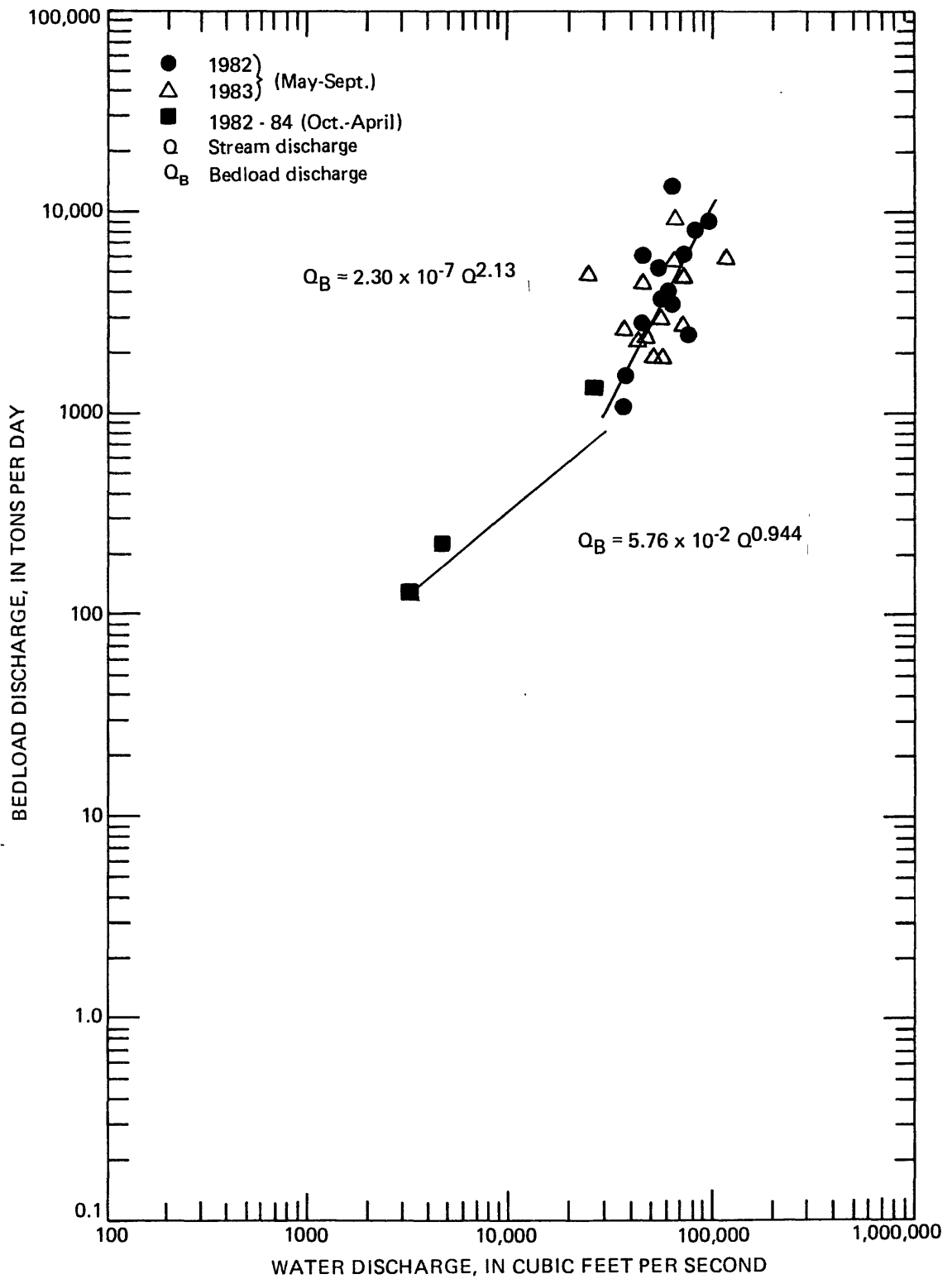


Figure 25.--Relation between bedload discharge and water discharge for Susitna River at Sunshine, May to September, 1982 and 1983 and October to April, 1982 through 1984.

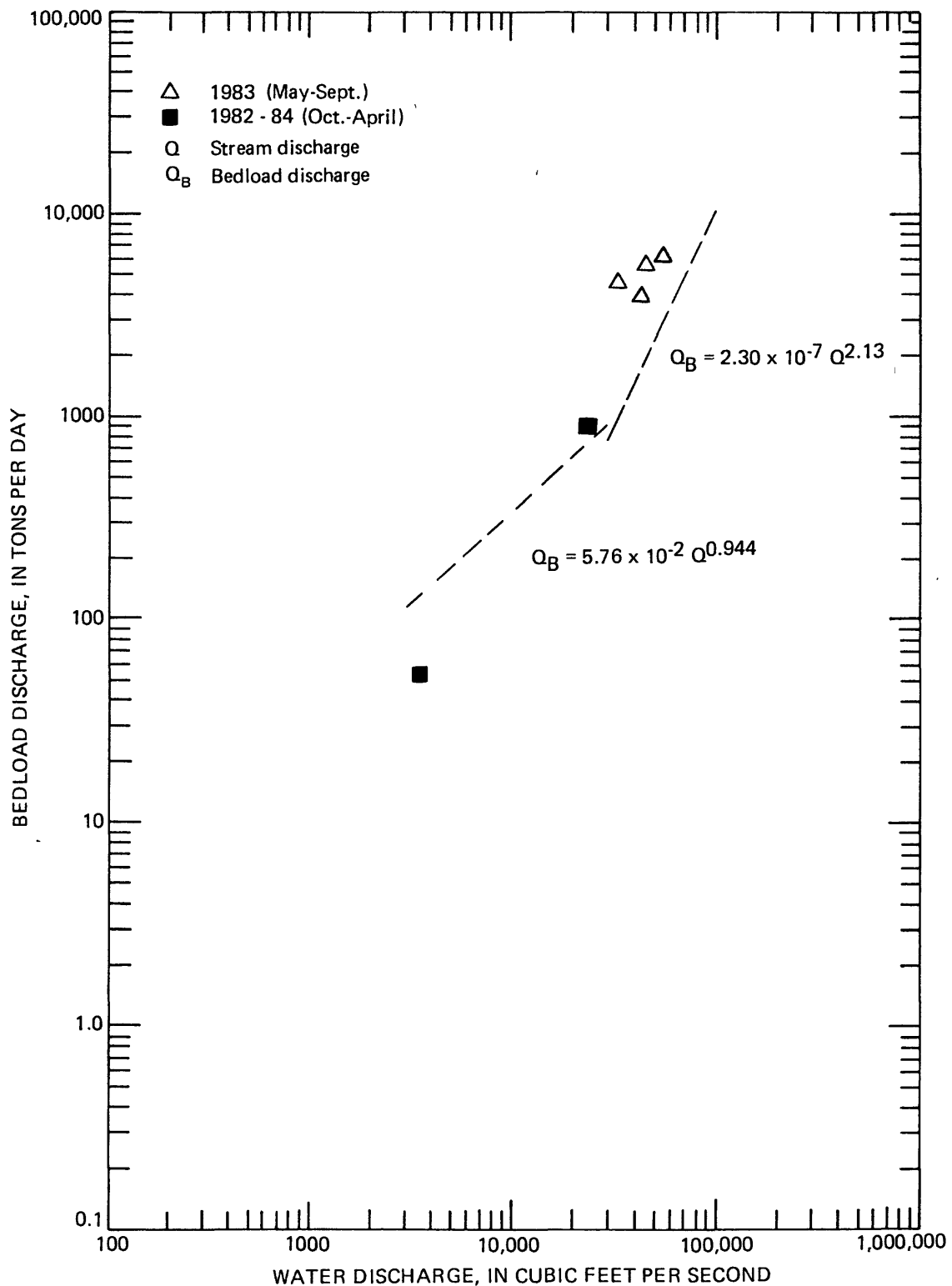


Figure 26.--Bedload discharge versus water discharge for Susitna River below Chulitna River near Talkeetna (sum of right and left channels), May to September, 1983 and October to April, 1982 through 1984. Dashed lines correspond to transport curves established for Susitna River at Sunshine, May to September, 1982 and 1983 and October to April, 1982 through 1984.

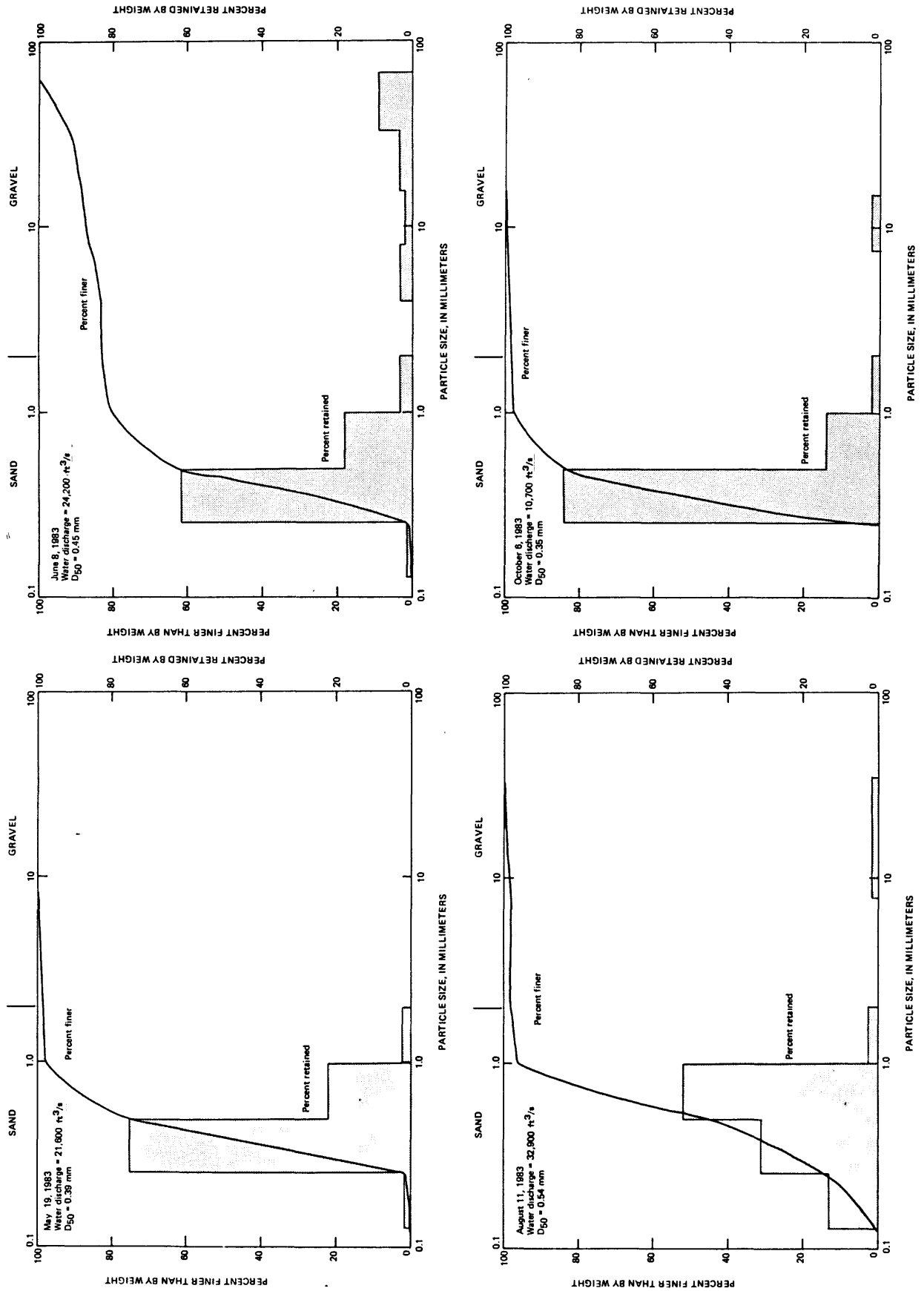


Figure 27.--Particle-size distribution and median diameter ( $D_{50}$ ) of bedload, Susitna River near Talkeetna.



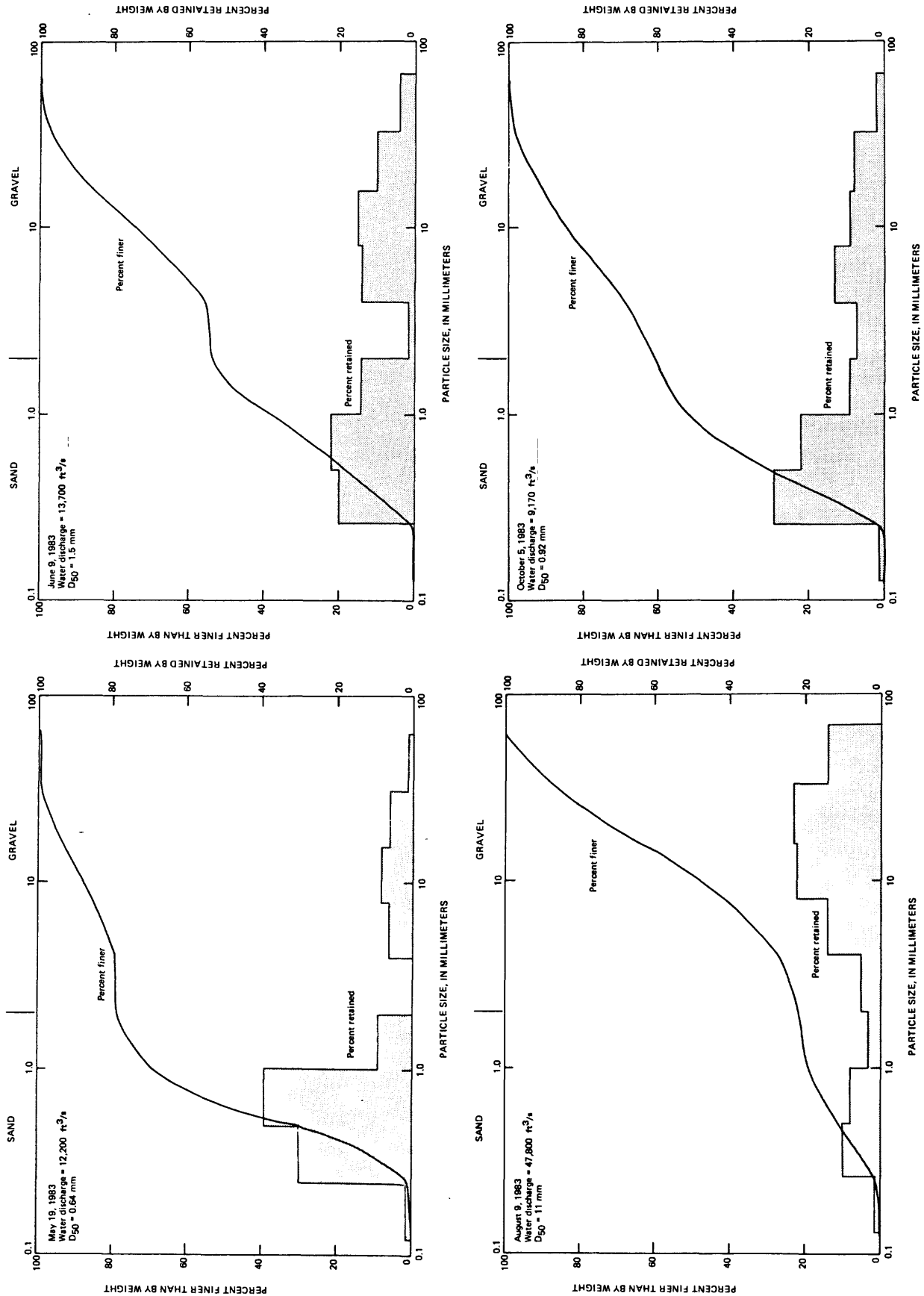


Figure 28.--Particle-size distribution and median diameter ( $D_{50}$ ) of bedload, Chulitna River below canyon near Talkeetna.

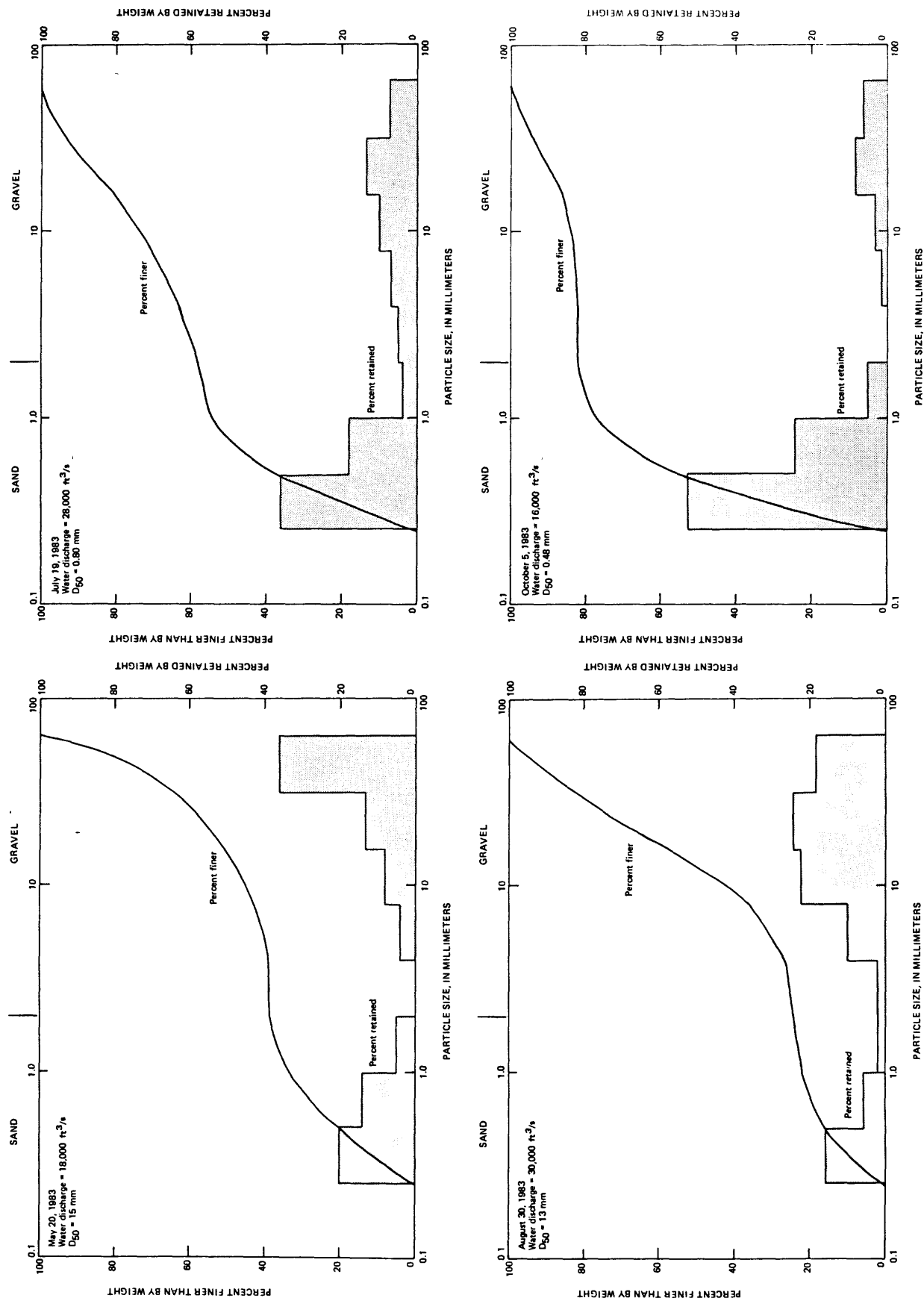


Figure 29.--Particle-size distribution and median diameter ( $D_{50}$ ) of bedload, Susitna River (right channel) below Chulitna River near Talkeetna.

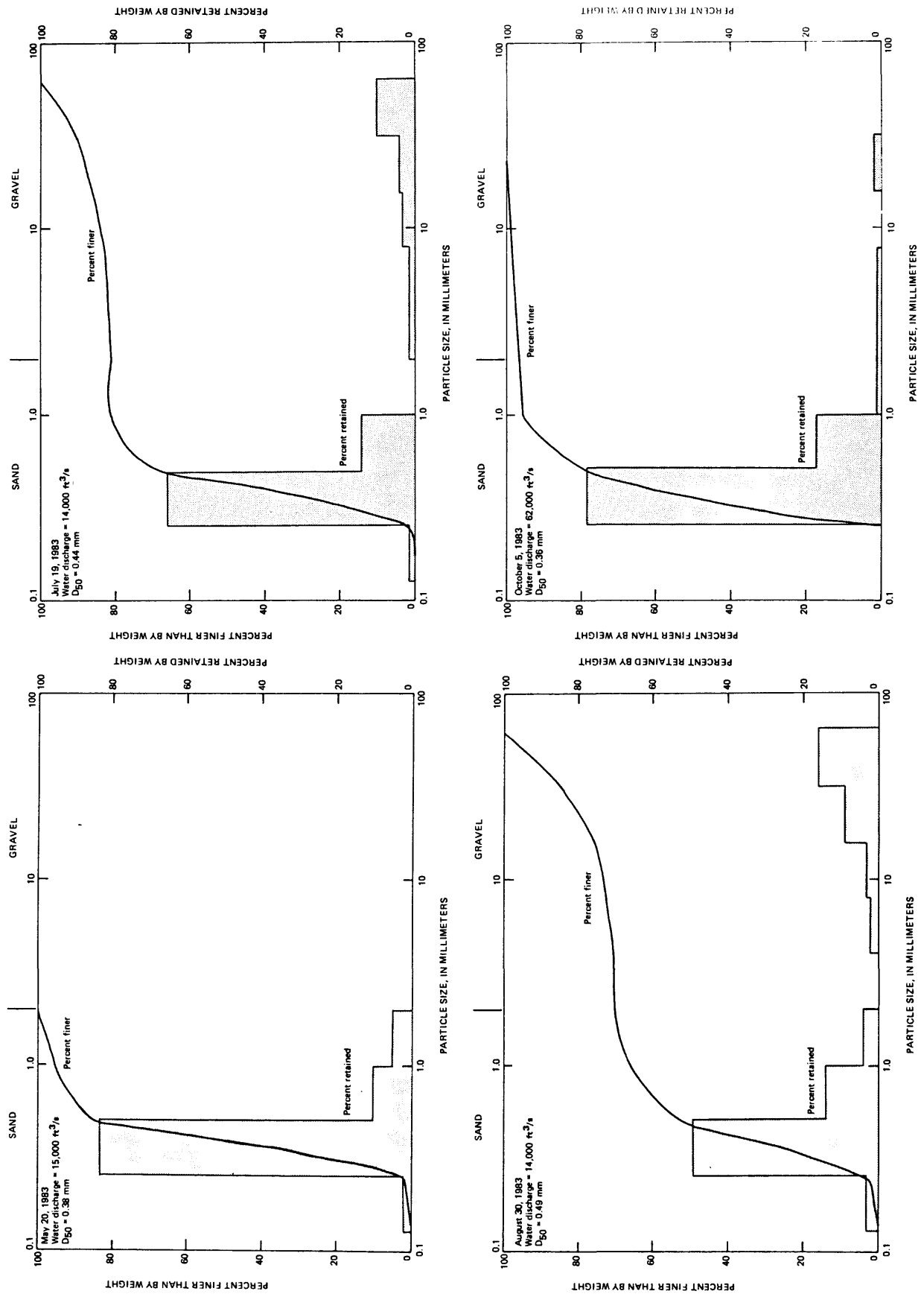


Figure 30.--Particle-size distribution and median diameter ( $D_{50}$ ) of bedload, Susitna River (left channel) below Chulitna River near Talkeetna.

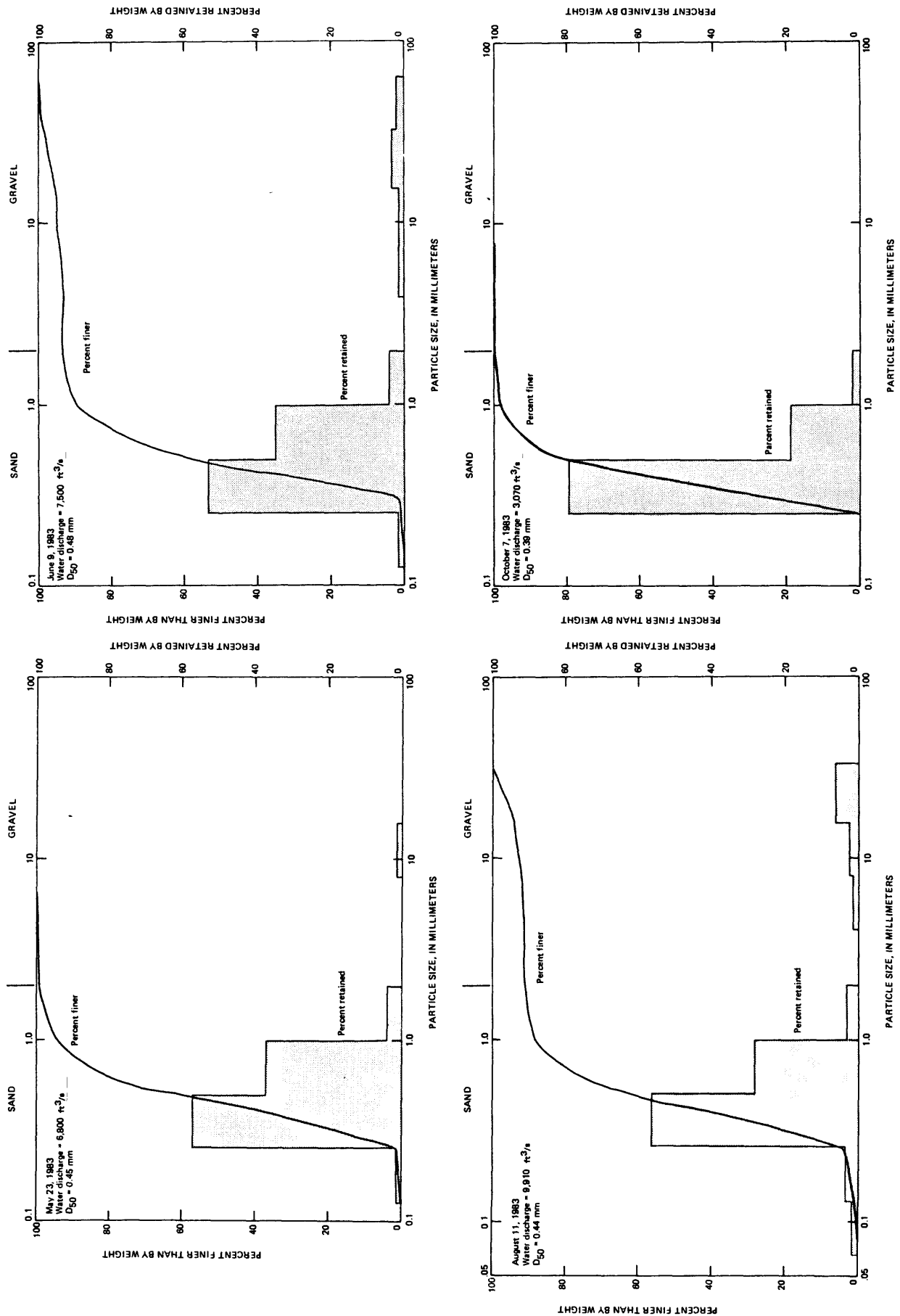


Figure 31.--Particle-size distribution and median diameter ( $D_{50}$ ) of bedload, Talkeetna River near Talkeetna.

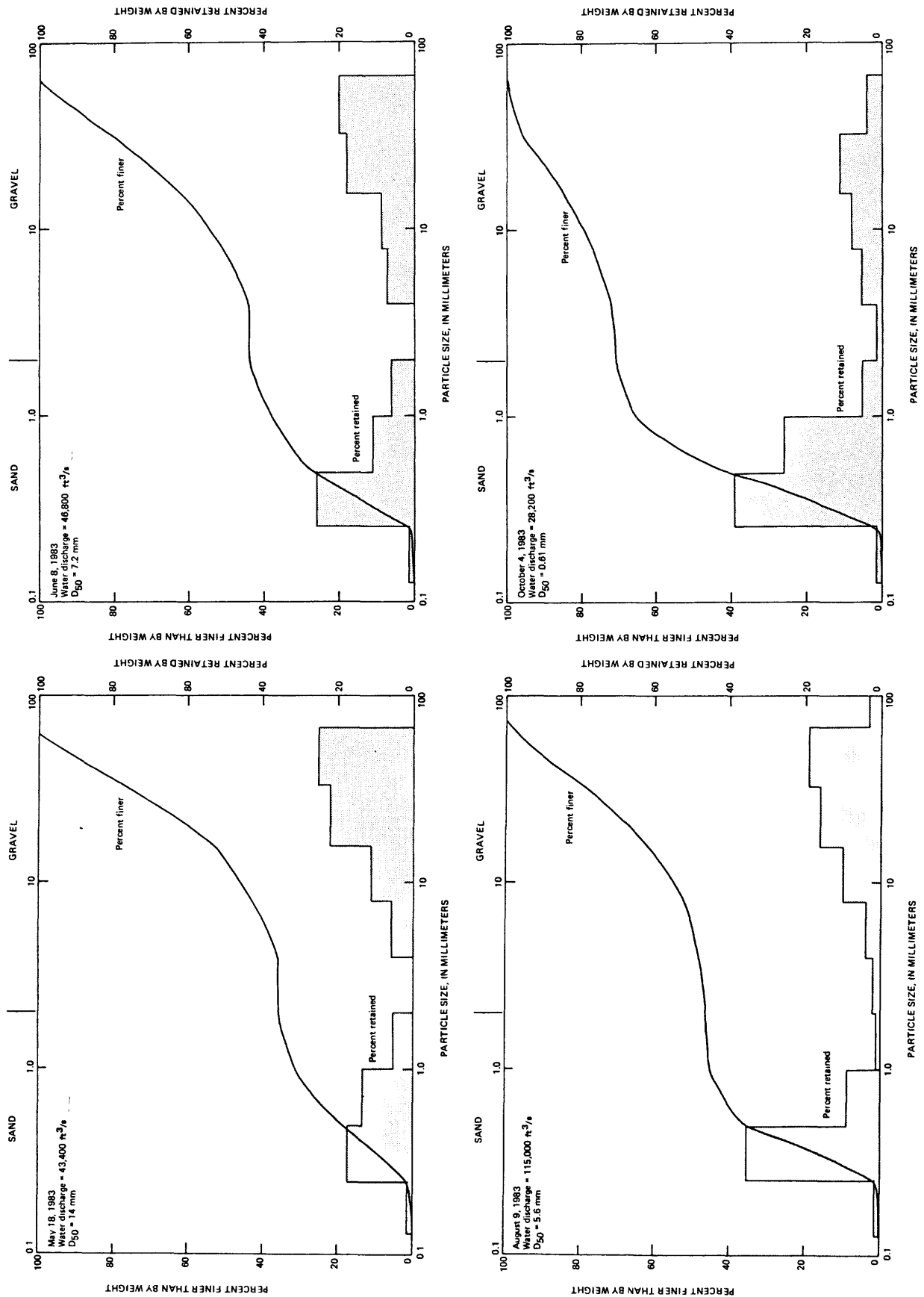


Figure 32.--Particle-size distribution and median diameter ( $D_{50}$ ) of bedload, Susitna River at Sunshine.

Table 1. -- Suspended-sediment data for selected stations in the Susitna River basin, October 1982 to October 1983

| Station name and number                 | Date of collection | Discharge (ft <sup>3</sup> /s) | Water temperature (°C) | Sediment concentration (mg/L) | Sediment discharge (ton/d) | Suspended sediment                                |       |       |       |       |                    |       |       |       |             |
|---|--------------------|--------------------------------|------------------------|-------------------------------|----------------------------|---|-------|-------|-------|-------|--------------------|-------|-------|-------|-------------|
|   |                    |                                |                        |                               |                            | Percent finer than size indicated, in millimeters |       |       |       |       | Suspended sediment |       |       |       |             |
|   |                    |                                |                        |                               |                            | 0.002   | 0.004 | 0.008 | 0.016 | 0.031 | 0.062              | 0.125 | 0.250 | 0.500 | 1.000 2.000 |
| Susitna River at Gold Creek (15292000)  | 1983               |                                |                        |                               |                            |   |       |       |       |       |                    |       |       |       |             |
|   | Mar. 18            | 1,670                          | 0.0                    | 4                             | 18                         | --  | --    | --    | --    | --    | --                 | --    | --    | --    | --          |
|   | May 19             | 20,000                         | 4.0                    | 456                           | 24,600                     | --  | --    | --    | --    | --    | 37                 | --    | --    | --    | --          |
|   | June 28            | 27,000                         | 12.0                   | 747                           | 54,500                     | --  | --    | --    | --    | --    | 63                 | --    | --    | --    | --          |
|   | July 28            | 18,200                         | 14.0                   | 399a                          | 19,600                     | --  | --    | --    | --    | --    | 66                 | --    | --    | --    | --          |
|   | Aug. 25            | 27,700                         | 8.0                    | 494                           | 36,900                     | --  | --    | --    | --    | --    | 40                 | --    | --    | --    | --          |
| Susitna River near Talkeetna (15292100) | 1983               |                                |                        |                               |                            |   |       |       |       |       |                    |       |       |       |             |
|   | May 19             | 21,600                         | 4.5                    | 386                           | 22,500                     | 9   | 11    | --    | 18    | --    | 36                 | 52    | 76    | 97    | 100         |
|   | May 25             | 19,300                         | 6.5                    | 164                           | 8,550                      | --  | --    | --    | --    | --    | 31                 | 40    | 57    | 76    | 99          |
|   | June 1             | 38,000                         | 9.0                    | 663                           | 68,000                     | 9   | 13    | 16    | 28    | 44    | 63                 | 72    | 91    | 100   | --          |
|   | June 8             | 24,200                         | 10.5                   | 287                           | 18,800                     | --  | --    | --    | --    | --    | 35                 | 46    | 76    | 98    | 100         |
|   | June 23            | 27,700                         | 14.0                   | 346                           | 25,900                     | 14  | 21    | --    | 35    | --    | 49                 | 57    | 74    | 89    | 100         |
|   | July 7             | 27,400                         | --                     | 958                           | 70,900                     | --  | --    | --    | --    | --    | 73                 | --    | --    | --    | --          |
|   | July 21            | 18,900                         | 13.0                   | 297                           | 15,200                     | --  | --    | --    | --    | --    | 66                 | 73    | 84    | 99    | 100         |
|   | Aug. 2             | 23,800                         | 14.0                   | 521                           | 33,500                     | 28  | 33    | 36    | 46    | 55    | 64                 | 73    | 89    | 100   | --          |
|   | Aug. 11            | 32,600                         | 11.0                   | 603                           | 53,100                     | 23  | 26    | 33    | 46    | 58    | 76                 | 88    | 98    | 100   | --          |
|   | Aug. 31            | 26,800                         | 9.0                    | 297                           | 21,500                     | --  | --    | --    | --    | --    | 22                 | 36    | 71    | 99    | 100         |
|   | Sept. 14           | 11,300                         | 6.0                    | 41                            | 1,250                      | --  | --    | --    | --    | --    | 41                 | 52    | 73    | 100   | --          |
|   | Oct. 6             | 10,600                         | .5                     | 23                            | 658                        | --  | --    | --    | --    | --    | 32                 | 36    | 53    | 98    | 100         |

Table 1. -- Continued

| Station name<br>and number  | Date of<br>collection  | Discharge<br>(ft <sup>3</sup> /s)  | Water<br>tem-<br>pera-<br>ture<br>(°C)   | Sediment<br>concen-<br>tration<br>(mg/L)  | Sediment<br>discharge<br>(ton/d)   | Suspended sediment<br>Percent finer than size indicated, in millimeters   |  |  |  |  |  |  |  |   |  |   |
|---|--|--|--|---|--|---|--|--|--|--|--|--|--|---|--|---|
|   |  |  |  |   |  | 0.002   | 0.004  | 0.008  | 0.016  | 0.031  | 0.062  | 0.125  | 0.250  | 0.500   | 1.000  | 2.000   |
|   |  |  |  |   |  |   |  |  |  |  |  |  |  |   |  |   |
| Chulitna River<br>near<br>Talkeetna<br>(15292400)   | 1983<br>Jan. 20<br>Mar. 17   | 1,400<br>1,060   | --<br>--   | 9<br>7  | 34<br>20   | --<br>--  | --<br>--   | --<br>--   | --<br>--   | --<br>--   | --<br>--                                     | --<br>--   | --<br>--   | --<br>--  | --<br>--   | --<br>--  |
| Chulitna River<br>below canyon<br>near<br>Talkeetna<br>(15292410)                           | 1983<br>May 19<br>May 25<br>May 31<br>June 2<br>June 9<br>June 22<br>June 26<br>July 6<br>July 20<br>Aug. 2<br>Aug. 9<br>Aug. 31<br>Sept. 13<br>Oct. 5 | 12,300<br>11,600<br>18,500<br>17,600<br>13,700<br>23,500<br>29,300<br>20,000<br>22,400<br>47,500<br>27,000<br>9,850<br>9,170 | 5.5<br>--<br>7.0<br>7.5<br>6.5<br>10.0<br>16.5<br>6.0<br>6.5<br>6.0<br>6.5<br>5.5<br>1.5 | 347<br>235<br>1,080<br>773<br>443<br>1,500<br>2,040<br>1,240<br>1,770<br>4,690<br>1,500<br>614<br>200 | 11,500<br>7,360<br>53,900<br>36,700<br>16,400<br>95,200<br>161,000<br>67,000<br>107,000<br>601,000<br>109,000<br>16,300<br>4,950 | 11<br>25<br>17<br>22<br>29<br>33<br>31<br>--<br>23<br>19<br>20<br>9<br>18 | 18<br>33<br>19<br>31<br>40<br>34<br>33<br>--<br>32<br>25<br>29<br>11<br>21 | --<br>--<br>27<br>37<br>44<br>44<br>34<br>--<br>42<br>28<br>38<br>34<br>13<br>-- | --<br>50<br>35<br>43<br>55<br>54<br>35<br>--<br>51<br>38<br>43<br>18<br>30 | --<br>--<br>44<br>50<br>61<br>62<br>36<br>--<br>61<br>50<br>51<br>21<br>-- | 42<br>63<br>53<br>54<br>66<br>67<br>75<br>73 | 51<br>70<br>66<br>61<br>70<br>77<br>82<br>--<br>79<br>73<br>69<br>24<br>48 | 67<br>86<br>84<br>75<br>79<br>87<br>91<br>--<br>92<br>87<br>87<br>30<br>67 | 97<br>100<br>99<br>100<br>100<br>97<br>100<br>--<br>100<br>97<br>99<br>50<br>99 | 98<br>--<br>100<br>--<br>--<br>99<br>--<br>--<br>--<br>100<br>100<br>100<br>100<br>100 | 99<br>--<br>--<br>--<br>--<br>100<br>--<br>--<br>--<br>--<br>--<br>--<br>--<br>-- |
| Susitna River<br>(right channel)<br>below Chulitna<br>River near<br>Talkeetna<br>(15292439) | 1983<br>May 20<br>June 24<br>July 19<br>Aug. 30<br>Oct. 5  | 18,000a<br>29,000a<br>28,000a<br>30,000a<br>16,000a  | 7.0<br>10.5<br>8.5<br>8.5<br>1.5   | 253<br>1,600<br>855<br>428<br>166   | 12,300<br>125,000<br>64,600<br>34,700<br>7,170   | 10<br>24<br>28<br>21<br>--  | 16<br>35<br>35<br>26<br>--   | --<br>43<br>47<br>31<br>--   | 25<br>54<br>56<br>44<br>--   | --<br>62<br>66<br>58<br>--   | 41<br>68<br>73<br>66<br>30                   | 50<br>76<br>78<br>75<br>37   | 73<br>88<br>87<br>89<br>50   | 98<br>97<br>100<br>100<br>98  | 100<br>99<br>--<br>--<br>100   | --<br>100<br>--<br>--<br>--   |
| Susitna River<br>(left channel)<br>below Chulitna<br>River near<br>Talkeetna<br>(15292440)  | 1983<br>May 20<br>June 24<br>July 19<br>Aug. 30<br>Oct. 5  | 15,000a<br>25,000a<br>14,000a<br>14,000a<br>6,200a   | 7.0<br>14.0<br>12.5<br>10.0<br>1.5   | 254<br>424<br>526<br>240<br>44  | 10,300<br>28,600<br>19,900<br>9,070<br>737   | --<br>20<br>20<br>--<br>--  | --<br>28<br>25<br>--<br>--   | --<br>39<br>29<br>--<br>--   | --<br>48<br>38<br>--<br>--   | --<br>55<br>52<br>--<br>--   | 38<br>62<br>62<br>23<br>24                   | 55<br>70<br>72<br>33<br>34   | 76<br>88<br>88<br>90<br>75   | 98<br>100<br>100<br>99<br>100   | 100<br>--<br>--<br>100<br>--   | --<br>--<br>--<br>--<br>--  |

Table 1. -- Continued

| Station name<br>and number                         | Date of<br>collection | Discharge<br>(ft <sup>3</sup> /s) | Water<br>tem-<br>pera-<br>ture<br>(°C) | Sediment<br>concen-<br>tration<br>(mg/L) | Sediment<br>discharge<br>(ton/d) | Suspended sediment<br>finer than size indicated, in millimeters |       |       |       |       |       |       |       |       |       |
|--|-----------------------|-----------------------------------|--|--|----------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|  |                       |                                   |  |  |                                  | 0.002   | 0.004 | 0.008 | 0.016 | 0.031 | 0.062 | 0.125 | 0.250 | 0.500 | 2.000 |
|  |                       |                                   |  |  |                                  | (ton/d)   |       |       |       |       |       |       |       |       |       |
| Talkeetna<br>River near<br>Talkeetna<br>(15292700) | 1982                  |                                   |  |  |                                  |   |       |       |       |       |       |       |       |       |       |
|  | Oct. 14               | 3,450                             | 1.0                                    | 25                                       | 233                              | --  | --    | --    | --    | --    | 25    | 38    | 66    | 96    | 100   |
|  | 1983                  |                                   |  |  |                                  |   |       |       |       |       |       |       |       |       |       |
|  | Mar. 18               | 555                               | .0                                     | 3  | 4.5                              | --  | --    | --    | --    | --    | --    | --    | --    | --    | --    |
|  | May 23                | 6,720                             | 6.5                                    | 126                                      | 2,290                            | --  | --    | --    | --    | --    | 21    | 36    | 63    | 100   | --    |
|  | May 26                | 5,790                             | 5.5                                    | 90                                       | 1,410                            | --  | --    | --    | --    | --    | 17    | 28    | 49    | 100   | --    |
|  | June 3                | 14,400                            | 5.5                                    | 724                                      | 28,100                           | 9   | 11    | 13    | 19    | 30    | 42    | 59    | 84    | 100   | --    |
|  | June 9                | 7,500                             | 8.0                                    | 114                                      | 2,310                            | --  | --    | --    | --    | --    | 17    | 27    | 56    | 100   | --    |
|  | June 22               | 10,000                            | 11.0                                   | 287                                      | 7,750                            | 23  | 28    | --    | 41    | --    | 61    | 71    | 85    | 99    | 100   |
|  | June 23               | 10,100                            | 10.5                                   | 249                                      | 6,790                            | --  | --    | --    | --    | --    | 61    | 71    | 81    | 100   | --    |
|  | July 8                | 11,400                            | 9.0                                    | 806                                      | 24,800                           | --  | --    | --    | --    | --    | 67    | --    | --    | --    | --    |
|  | July 18               | 7,460                             | 10.0                                   | 372                                      | 7,490                            | --  | --    | --    | --    | --    | 45    | 54    | 64    | 99    | 100   |
|  | July 29               | 7,960                             | 11.5                                   | 738                                      | 15,900                           | --  | --    | --    | --    | --    | 63    | --    | --    | --    | --    |
|  | Aug. 3                | 9,420                             | 10.5                                   | 1,060                                    | 27,000                           | 16  | 20    | 22    | 31    | 39    | 73    | 81    | 92    | 100   | --    |
|  | Aug. 11               | 9,860                             | 10.0                                   | 253                                      | 6,740                            | --  | --    | --    | --    | --    | 66    | 88    | 100   | --    | --    |
|  | Sept. 1               | 6,050                             | 7.0                                    | 120                                      | 1,960                            | --  | --    | --    | --    | --    | 29    | 41    | 74    | 99    | 100   |
|  | Sept. 12              | 3,380                             | 8.0                                    | 49                                       | 447                              | --  | --    | --    | --    | --    | 31    | 50    | 83    | 100   | --    |
|  | Sept. 27              | 2,280                             | .5                                     | 28                                       | 172                              | --  | --    | --    | --    | --    | 32    | 64    | 96    | 100   | --    |
|  | Oct. 4                | 4,250                             | 1.5                                    | 41                                       | 470                              | --  | --    | --    | --    | --    | 17    | --    | --    | --    | --    |
| Susitna River<br>at Sunshine<br>(15292780)         | 1982                  |                                   |  |  |                                  |   |       |       |       |       |       |       |       |       |       |
|  | Oct. 13               | 19,400                            | 0.5                                    | 50                                       | 2,620                            | --  | --    | --    | --    | --    | 36    | 44    | 69    | 100   | --    |
|  | 1983                  |                                   |  |  |                                  |   |       |       |       |       |       |       |       |       |       |
|  | Jan. 20               | 4,720                             | .0                                     | 5  | 64                               | --  | --    | --    | --    | --    | --    | --    | --    | --    | --    |
|  | Mar. 17               | 3,320                             | .0                                     | 5  | 45                               | --  | --    | --    | --    | --    | --    | --    | --    | --    | --    |
|  | May 12                | 33,100                            | 4.0                                    | 622                                      | 55,600                           | --  | --    | --    | --    | --    | 36    | --    | --    | --    | --    |
|  | May 18                | 43,400                            | 5.5                                    | 396                                      | 46,400                           | 13  | 16    | --    | 26    | --    | 47    | 56    | 72    | 85    | 97    |
|  | May 24                | 39,200                            | 6.5                                    | 225                                      | 23,800                           | --  | --    | --    | --    | --    | 35    | 43    | 65    | 98    | 100   |
|  | June 1                | 75,300                            | 7.5                                    | 871                                      | 177,000                          | 10  | 12    | 17    | 24    | 34    | 41    | 57    | 83    | 98    | 100   |
|  | June 8                | 47,000                            | 11.0                                   | 431                                      | 54,700                           | --  | --    | --    | --    | --    | 46    | --    | --    | --    | --    |
|  | June 23               | 67,900                            | 14.0                                   | 850                                      | 156,000                          | 25  | 33    | 43    | 52    | 61    | 69    | 78    | 89    | 100   | --    |
|  | June 24               | 67,100                            | 11.5                                   | 942                                      | 171,000                          | --  | --    | --    | --    | --    | 73    | --    | --    | --    | --    |
|  | July 5                | 66,800                            | 14.0                                   | 1,060                                    | 191,000                          | --  | --    | --    | --    | --    | 80    | --    | --    | --    | --    |
|  | July 19               | 50,800                            | 10.0                                   | 753                                      | 103,000                          | --  | --    | --    | --    | --    | 71    | --    | --    | --    | --    |
|  | July 27               | 44,400                            | 12.5                                   | 570                                      | 68,300                           | --  | --    | --    | --    | --    | 62    | --    | --    | --    | --    |
|  | Aug. 1                | 59,200                            | 13.0                                   | 950                                      | 152,000                          | 20  | 29    | 41    | 49    | 59    | 70    | 79    | 90    | 100   | --    |
|  | Aug. 3                | 57,500                            | 10.5                                   | 1,030                                    | 160,000                          | 22  | 31    | 42    | 54    | 66    | 73    | 80    | 91    | 100   | --    |
|  | Aug. 8                | 76,100                            | 10.0                                   | 2,840                                    | 584,000                          | 13  | 22    | 23    | 35    | 51    | 71    | 85    | 95    | 99    | 100   |
|  | Aug. 11               | 87,200                            | 9.0                                    | 1,160                                    | 273,000                          | --  | --    | --    | --    | --    | 59    | --    | --    | --    | --    |
|  | Aug. 24               | 54,800                            | 9.5                                    | 381                                      | 56,400                           | --  | --    | --    | --    | --    | 43    | --    | --    | --    | --    |
|  | Aug. 29               | 47,700                            | 8.5                                    | 401                                      | 51,600                           | --  | --    | --    | --    | --    | 31    | 41    | 65    | 99    | 100   |
|  | Sept. 12              | 25,200                            | 7.5                                    | 167                                      | 11,400                           | 20  | 27    | --    | 34    | --    | 41    | 47    | 66    | 100   | --    |
|  | Oct. 4                | 28,000                            | 2.0                                    | 171                                      | 12,900                           | 12  | 15    | --    | 19    | --    | 29    | 37    | 68    | 99    | 100   |

a Estimated



Table 2. -- Hydraulic and bedload data for selected stations in the Susitna River basin, March 1983 to February 1984

| Station name<br>and number                                | Date of<br>collection | Water<br>dis-<br>charge<br>(ft <sup>3</sup> /s) | Aver-<br>age<br>depth<br>(ft) | Width<br>(ft) | Aver-<br>age<br>velo-<br>city<br>(ft/s) | Water<br>sur-<br>face<br>slope<br>(ft/ft) | Bed-<br>load<br>dis-<br>charge<br>(ton/d) | Particle-size distribution of bed sediment            |       |      |     |     |     |     |     |      |      |      |      |
|---|-----------------------|---|-------------------------------|---------------|---|---|---|---|-------|------|-----|-----|-----|-----|-----|------|------|------|------|
|   |                       |   |                               |               |   |   |   | Percentage, by weight, finer than size (mm) indicated |       |      |     |     |     |     |     |      |      |      |      |
|   |                       |   |                               |               |   |   |   | 0.062   | 0.125 | 0.25 | 0.5 | 1.0 | 2.0 | 4.0 | 8.0 | 16.0 | 32.0 | 64.0 | 76.0 |
| 1983<br>Susitna<br>River near<br>Talkeetna<br>(15292100)  | Mar. 25               | 1,600   | --                            | --            | --                                      | --  | 2.1                                       | --  | 0     | 3    | 75  | 100 | --  | --  | --  | --   | --   | --   | --   |
|   | May 19                | 21,600  | 5.8                           | 617           | 6.0                                     | .0013                                     | 430                                       | --  | 0     | 1    | 76  | 98  | 100 | --  | --  | --   | --   | --   | --   |
|   | May 25                | 19,300  | 5.5                           | 601           | 5.8                                     | .0012                                     | 298                                       | --  | 0     | 1    | 64  | 87  | 88  | 89  | 89  | 90   | 92   | 100  | --   |
|   | June 1                | 39,100  | 7.4                           | 662           | 8.0                                     | .0016                                     | 225                                       | --  | 0     | 1    | 19  | 21  | 21  | 21  | 23  | 27   | 29   | 100  | --   |
|   | June 8                | 24,200  | 5.8                           | 624           | 6.7                                     | .0013                                     | 632                                       | --  | 0     | 1    | 62  | 80  | 83  | 83  | 86  | 88   | 91   | 100  | --   |
|   | June 23               | 27,000  | 6.0                           | 615           | 7.3                                     | .0014                                     | 840                                       | --  | 0     | 1    | 60  | 80  | 82  | 82  | 83  | 85   | 86   | 100  | --   |
|   | July 7                | 27,400  | 6.5                           | 601           | 7.0                                     | .0015                                     | 776                                       | --  | 0     | 1    | 65  | 87  | 90  | 91  | 92  | 94   | 95   | 100  | --   |
|   | July 21               | 19,200  | 5.2                           | 598           | 6.2                                     | .0013                                     | 302                                       | --  | 0     | 1    | 87  | 94  | 95  | 95  | 95  | 96   | 100  | --   | --   |
|   | Aug. 2                | 24,000  | 5.9                           | 600           | 6.8                                     | .0014                                     | 668                                       | --  | 0     | 1    | 63  | 78  | 80  | 81  | 83  | 85   | 89   | 100  | --   |
|   | Aug. 11               | 32,900  | 6.2                           | 611           | 8.7                                     | .0015                                     | 854                                       | --  | 0     | 13   | 44  | 96  | 98  | 98  | 98  | 99   | 100  | --   | --   |
|   | Aug. 31               | 26,800  | 6.4                           | 636           | 6.6                                     | .0014                                     | 399                                       | --  | 0     | 1    | 80  | 98  | 99  | 99  | 100 | --   | --   | --   | --   |
|   | Sept. 14              | 11,300  | 4.0                           | 565           | 5.0                                     | .0014                                     | 70  | --  | --    | 0    | 76  | 88  | 92  | 93  | 93  | 93   | 100  | --   | --   |
|   | Oct. 6                | 10,700  | 3.9                           | 545           | 5.0                                     | .0014                                     | 27  | --  | --    | 0    | 84  | 98  | 99  | 99  | 99  | 100  | --   | --   | --   |
|   | 1984                  |   |                               |               |   |   |   |   |       |      |     |     |     |     |     |      |      |      |      |
| Feb. 17   | 2,000                 | --  | --                            | --            | --                                      | 0   | --  | --  | --    | --   | --  | --  | --  | --  | --  | --   | --   | --   | --   |
| 1983<br>Chulitna<br>River near<br>Talkeetna<br>(15292410) | Mar. 24               | 1,000   | --                            | --            | --                                      | --  | 0   | --  | --    | --   | --  | --  | --  | --  | --  | --   | --   | --   | --   |
|   | May 19                | 12,200  | 6.3                           | 323           | 6.0                                     | .00068                                    | 3,360                                     | --  | 0     | 1    | 31  | 70  | 79  | 79  | 85  | 93   | 99   | 100  | --   |
|   | May 25                | 11,400  | 6.7                           | 335           | 5.1                                     | .00068                                    | 7,050                                     | --  | --    | 0    | 12  | 40  | 60  | 64  | 78  | 90   | 99   | 100  | --   |
|   | May 31                | 18,500  | 7.7                           | 353           | 6.8                                     | .0010                                     | 4,740                                     | --  | 0     | 2    | 18  | 38  | 59  | 60  | 71  | 82   | 92   | 100  | --   |
|   | June 2                | 17,800  | 8.0                           | 339           | 6.6                                     | .0012                                     | 8,240                                     | --  | 0     | 1    | 20  | 39  | 51  | 52  | 66  | 76   | 87   | 100  | --   |
|   | June 9                | 13,700  | 6.6                           | 353           | 5.9                                     | .0010                                     | 4,810                                     | --  | --    | 0    | 20  | 42  | 56  | 57  | 71  | 86   | 96   | 100  | --   |
|   | June 22               | 23,500  | 9.0                           | 370           | 7.1                                     | .0015                                     | 6,840                                     | --  | 0     | 1    | 29  | 50  | 63  | 64  | 70  | 78   | 90   | 100  | --   |
|   | July 6                | 29,000  | 10.1                          | 388           | 7.4                                     | .0015                                     | 11,800                                    | --  | 0     | 1    | 21  | 45  | 57  | 58  | 67  | 76   | 88   | 100  | --   |
|   | July 20               | 20,000  | 8.6                           | 356           | 6.5                                     | .0010                                     | 6,500                                     | --  | 0     | 1    | 25  | 51  | 58  | 61  | 70  | 79   | 93   | 100  | --   |
|   | Aug. 2                | 22,200  | 8.2                           | 370           | 7.3                                     | .0013                                     | 6,980                                     | --  | 0     | 1    | 21  | 42  | 46  | 47  | 53  | 65   | 80   | 97   | --   |
|   | Aug. 9                | 47,800  | 11.9                          | 445           | 9.0                                     | .0026                                     | 7,980                                     | --  | 0     | 1    | 11  | 19  | 22  | 27  | 41  | 63   | 86   | 100  | --   |
|   | Aug. 31               | 27,200  | 9.1                           | 386           | 7.7                                     | .0012                                     | 11,600                                    | --  | 0     | 1    | 19  | 30  | 36  | 41  | 54  | 69   | 84   | 98   | --   |
|   | Sept. 13              | 9,850   | 6.0                           | 332           | 4.9                                     | .00064                                    | 5,780                                     | --  | --    | 0    | 31  | 50  | 71  | 77  | 87  | 94   | 100  | --   | --   |
|   | Oct. 5                | 9,170   | 5.8                           | 330           | 4.8                                     | .00044                                    | 3,380                                     | --  | 0     | 1    | 30  | 52  | 61  | 68  | 81  | 90   | 98   | 100  | --   |
| 1984  |                       |   |                               |               |   |   |   |   |       |      |     |     |     |     |     |      |      |      |      |
| Feb. 29   | 1,420                 | --  | --                            | --            | --                                      | .88                                       | 0   | 1   | 2     | 49   | 73  | 79  | 79  | 84  | 100 | --   | --   | --   | --   |

Table 2. -- Continued

| Station name<br>and number         | Date of<br>collection | Water<br>dis-<br>charge<br>(ft <sup>3</sup> /s) | Aver-<br>age<br>depth<br>(ft) | Width<br>(ft) | Aver-<br>age<br>velo-<br>city<br>(ft/s) | Water<br>sur-<br>face<br>slope<br>(ft/ft) | Bed-<br>load<br>dis-<br>charge<br>(ton/d) | Particle-size distribution of bed sediment            |       |      |     |     |     |     |     |      |      |      |      |
|------------------------------------|-----------------------|---|-------------------------------|---------------|---|---|---|---|-------|------|-----|-----|-----|-----|-----|------|------|------|------|
|                                    |                       |   |                               |               |   |   |   | Percentage, by weight, finer than size (mm) indicated |       |      |     |     |     |     |     |      |      |      |      |
|                                    |                       |   |                               |               |   |   |   | 0.062   | 0.125 | 0.25 | 0.5 | 1.0 | 2.0 | 4.0 | 8.0 | 16.0 | 32.0 | 64.0 | 76.0 |
| Susitna<br>River                   | 1983<br>Mar. 23       | 1,000a  | --                            | --            | --                                      | --  | 0.56b                                     | --  | --    | 0    | 90  | 100 | --  | --  | --  | --   | --   | --   | --   |
| (right<br>channel)                 | May 20                | 18,000a   | 3.0                           | 1,080         | 5.5                                     | --  | 4,310                                     | --  | --    | 0    | 20  | 34  | 39  | 39  | 43  | 51   | 64   | 100  | --   |
| below                              | June 24               | 29,000a   | 4.2                           | 1,110         | 6.8                                     | --  | 2,560                                     | --  | --    | 0    | 1   | 28  | 45  | 53  | 60  | 69   | 79   | 100  | --   |
| Chulitna                           | July 19               | 28,000a   | 4.5                           | 862           | 7.2                                     | --  | 3,300                                     | --  | --    | --   | 0   | 36  | 54  | 58  | 63  | 80   | 93   | 100  | --   |
| River near                         | Aug. 30               | 30,000a   | 4.4                           | 817           | 8.4                                     | --  | 4,750                                     | --  | --    | --   | 0   | 16  | 22  | 24  | 26  | 36   | 58   | 82   | 100  |
| Talkeetna                          | Oct. 5                | 16,000a   | 4.4                           | 714           | 5.1                                     | --  | 818                                       | --  | --    | --   | 0   | 53  | 77  | 82  | 82  | 83   | 94   | 100  | --   |
| (15292439)                         | 1984<br>Feb. 16       | 1,400a  | --                            | --            | --                                      | --  | 52  | --  | --    | 0    | 50  | 99  | 100 | --  | --  | --   | --   | --   | --   |
| Susitna<br>River (left<br>channel) | 1983<br>Mar. 23       | 1,600a  | --                            | --            | --                                      | --  | 0   | --  | --    | --   | --  | --  | --  | --  | --  | --   | --   | --   | --   |
| below                              | May 20                | 15,000a   | 4.0                           | 550           | 6.9                                     | --  | 350                                       | --  | --    | 0    | 2   | 85  | 95  | 100 | --  | --   | --   | --   | --   |
| Chulitna                           | June 24               | 25,000a   | 5.0                           | 774           | 6.5                                     | --  | 3,720                                     | --  | --    | 0    | 2   | 43  | 60  | 62  | 63  | 67   | 73   | 84   | 100  |
| River                              | July 19               | 14,000a   | 3.7                           | 605           | 6.2                                     | --  | 660                                       | --  | --    | 0    | 1   | 67  | 81  | 81  | 62  | 83   | 86   | 90   | 100  |
| near                               | Aug. 30               | 14,000a   | 3.3                           | 618           | 6.9                                     | --  | 968                                       | --  | --    | 0    | 3   | 52  | 66  | 70  | 70  | 72   | 75   | 84   | 100  |
| Talkeetna                          | Oct. 5                | 6,200a  | 3.3                           | 454           | 4.1                                     | --  | 69  | --  | --    | --   | 0   | 78  | 95  | 96  | 97  | 98   | 98   | 100  | --   |
| (15292440)                         | 1984<br>Feb. 16       | 2,000a  | --                            | --            | --                                      | --  | 0   | --  | --    | --   | --  | --  | --  | --  | --  | --   | --   | --   | --   |

Table 2. -- Continued

| Station name<br>and number | Date of<br>collection | Water<br>dis-<br>charge<br>(ft <sup>3</sup> /s) | Aver-<br>age<br>depth<br>(ft) | Width<br>(ft) | Aver-<br>age<br>velo-<br>city<br>(ft/s) | Water<br>sur-<br>face<br>slope<br>(ft/ft) | Bed-<br>load<br>dis-<br>charge<br>(ton/d) | Particle-size distribution of bed sediment            |       |      |     |     |     |     |     |      |      |      |      |
|----------------------------|-----------------------|---|-------------------------------|---------------|---|---|---|---|-------|------|-----|-----|-----|-----|-----|------|------|------|------|
|                            |                       |   |                               |               |   |   |   | Percentage, by weight, finer than size (mm) indicated |       |      |     |     |     |     |     |      |      |      |      |
|                            |                       |   |                               |               |   |   |   | 0.062   | 0.125 | 0.25 | 0.5 | 1.0 | 2.0 | 4.0 | 8.0 | 16.0 | 32.0 | 64.0 | 76.0 |
| Talkeetna                  | 1983                  |   |                               |               |   |   |   |   |       |      |     |     |     |     |     |      |      |      |      |
| River near                 | Mar. 30               | 550   | --                            | --            | --                                      | --  | 0.06                                      | --  | --    | 0    | 60  | 100 | --  | --  | --  | --   | --   | --   | --   |
| Talkeetna                  | May 23                | 6,780   | 4.5                           | 343           | 4.4                                     | --  | 273                                       | --  | 0     | 1    | 58  | 95  | 99  | 99  | 100 | --   | --   | --   | --   |
| (15292700)                 | May 26                | 5,790   | 4.2                           | 335           | 4.1                                     | --  | 188                                       | --  | 0     | 1    | 69  | 97  | 100 | --  | --  | --   | --   | --   | --   |
|                            | June 3                | 13,600  | 6.3                           | 348           | 6.2                                     | --  | 1,700                                     | --  | 0     | 1    | 20  | 34  | 38  | 38  | 46  | 64   | 90   | 100  | --   |
|                            | June 9                | 7,500   | 4.4                           | 340           | 5.0                                     | --  | 736                                       | --  | 0     | 1    | 54  | 89  | 93  | 93  | 94  | 95   | 98   | 100  | --   |
|                            | June 22               | 9,880   | 4.6                           | 335           | 6.4                                     | --  | 534                                       | --  | 0     | 1    | 39  | 78  | 85  | 85  | 87  | 90   | 99   | 100  | --   |
|                            | July 8                | 11,400  | 5.4                           | 345           | 6.1                                     | --  | 574                                       | --  | 0     | 2    | 41  | 71  | 74  | 75  | 76  | 78   | 87   | 100  | --   |
|                            | July 18               | 7,500   | 4.4                           | 338           | 5.0                                     | --  | 1,700                                     | --  | 0     | 1    | 50  | 89  | 91  | 91  | 91  | 92   | 93   | 100  | --   |
|                            | Aug. 3                | 9,160   | 4.7                           | 340           | 5.7                                     | --  | 1,040                                     | --  | 0     | 1    | 28  | 62  | 68  | 70  | 75  | 82   | 93   | 100  | --   |
|                            | Aug. 11               | 9,910   | 5.3                           | 341           | 5.5                                     | --  | 752                                       | --  | 1     | 4    | 60  | 88  | 91  | 91  | 92  | 94   | 100  | --   | --   |
|                            | Sept. 1               | 6,070   | 3.9                           | 334           | 4.7                                     | --  | 240                                       | --  | 0     | 1    | 65  | 96  | 100 | --  | --  | --   | --   | --   | --   |
|                            | Sept. 12              | 3,380   | 2.8                           | 323           | 3.7                                     | --  | 73  | --  | --    | 0    | 63  | 98  | 100 | --  | --  | --   | --   | --   | --   |
|                            | Sept. 27              | 2,280   | 2.4                           | 320           | 3.0                                     | --  | 32  | --  | --    | 0    | 50  | 91  | 98  | 99  | 99  | 100  | --   | --   | --   |
|                            | Oct. 7                | 3,070   | 3.0                           | 323           | 3.2                                     | --  | 29  | --  | --    | 0    | 79  | 98  | 100 | --  | --  | --   | --   | --   | --   |
|                            | 1984                  |   |                               |               |   |   |   |   |       |      |     |     |     |     |     |      |      |      |      |
|                            | Feb. 28               | 590   | --                            | --            | --                                      | --  | .56                                       | 0   | 1     | 3    | 48  | 97  | 100 | --  | --  | --   | --   | --   | --   |

Table 2. -- Continued

| Station name<br>and number                    | Date of<br>collection | Water<br>dis-<br>charge<br>(ft <sup>3</sup> /s) | Aver-<br>age<br>depth<br>(ft) | Width<br>(ft) | Aver-<br>age<br>velo-<br>city<br>(ft/s) | Water<br>sur-<br>face<br>slope<br>(ft/ft) | Bed-<br>load<br>dis-<br>charge<br>(ton/d) | Particle-size distribution of bed sediment            |       |      |     |     |     |     |     |      |      |      |      |
|---|-----------------------|---|-------------------------------|---------------|---|---|---|---|-------|------|-----|-----|-----|-----|-----|------|------|------|------|
|   |                       |   |                               |               |   |   |   | Percentage, by weight, finer than size (mm) indicated |       |      |     |     |     |     |     |      |      |      |      |
|   |                       |   |                               |               |   |   |   | 0.062   | 0.125 | 0.25 | 0.5 | 1.0 | 2.0 | 4.0 | 8.0 | 16.0 | 32.0 | 64.0 | 76.0 |
| Susitna<br>River at<br>Sunshine<br>(15292780) | 1983                  |   |                               |               |   |   |   |   |       |      |     |     |     |     |     |      |      |      |      |
|   | Mar. 23               | 3,200   | --                            | --            | --                                      | --  | 126                                       | --  | 0     | 1    | 47  | 93  | 95  | 95  | 97  | 100  | --   | --   | --   |
|   | May 18                | 43,400  | 9.3                           | 635           | 7.3                                     | --  | 2,190                                     | --  | 0     | 1    | 18  | 31  | 36  | 36  | 42  | 53   | 75   | 100  | --   |
|   | May 24                | 39,200  | 9.1                           | 645           | 6.7                                     | .0023                                     | 2,580                                     | --  | 0     | 1    | 33  | 54  | 57  | 57  | 60  | 68   | 83   | 98   | 100  |
|   | June 1                | 75,000  | 10.6                          | 952           | 7.4                                     | .0023                                     | 4,680                                     | --  | 0     | 1    | 19  | 26  | 28  | 29  | 34  | 49   | 75   | 96   | 100  |
|   | June 8                | 46,800  | 9.4                           | 672           | 7.4                                     | .0019                                     | 4,440                                     | --  | 0     | 1    | 27  | 38  | 44  | 44  | 51  | 62   | 80   | 100  | --   |
|   | June 23               | 68,400  | 10.2                          | 902           | 7.4                                     | .0021                                     | 9,380                                     | --  | 0     | 1    | 27  | 39  | 45  | 46  | 56  | 75   | 93   | 100  | --   |
|   | July 5                | 66,400  | 10.5                          | 903           | 7.0                                     | .0020                                     | 5,610                                     | --  | 0     | 9    | 14  | 17  | 17  | 27  | 53  | 68   | 89   | 100  | --   |
|   | July 19               | 50,800  | 10.0                          | 675           | 7.5                                     | .0020                                     | 1,960                                     | --  | 0     | 1    | 46  | 66  | 70  | 73  | 77  | 85   | 96   | 100  | --   |
|   | Aug. 1                | 59,400  | 9.3                           | 901           | 7.1                                     | .0018                                     | 2,900                                     | --  | 0     | 2    | 31  | 44  | 48  | 52  | 60  | 72   | 89   | 100  | --   |
|   | Aug. 3                | 57,500  | 9.1                           | 901           | 7.0                                     | --  | 1,940                                     | --  | 0     | 1    | 67  | 86  | 89  | 92  | 95  | 98   | 100  | --   | --   |
|   | Aug. 8                | 73,900  | 10.4                          | 955           | 7.4                                     | .0021                                     | 2,600                                     | --  | 0     | 2    | 26  | 34  | 37  | 42  | 50  | 59   | 82   | 100  | --   |
|   | Aug. 9                | 115,000   | 13.4                          | 958           | 9.0                                     | .0023                                     | 5,920                                     | --  | 0     | 1    | 36  | 45  | 46  | 48  | 52  | 62   | 78   | 97   | 100  |
|   | Aug. 29               | 47,700  | 9.9                           | 670           | 7.2                                     | .0018                                     | 2,400                                     | --  | 0     | 1    | 37  | 48  | 52  | 56  | 64  | 73   | 89   | 96   | 100  |
|   | Sept. 12              | 25,200  | 7.4                           | 595           | 5.7                                     | .0012                                     | 4,870                                     | --  | --    | 0    | 31  | 44  | 49  | 52  | 63  | 78   | 93   | 100  | --   |
|   | Oct. 4                | 26,200  | 7.9                           | 610           | 5.9                                     | .0014                                     | 1,320                                     | --  | 0     | 1    | 40  | 66  | 71  | 72  | 77  | 85   | 96   | 100  | --   |
|   | 1984                  |   |                               |               |   |   |   |   |       |      |     |     |     |     |     |      |      |      |      |
|   | Feb. 23               | 4,630   | --                            | --            | --                                      | --  | 216                                       | --  | 0     | 1    | 30  | 58  | 61  | 64  | 69  | 77   | 93   | 100  | --   |

a Estimated

b Minimum value, total cross section not sampled.

Table 3.-- Bed-material data for selected stations in the Susitna River basin  
May to October 1983

|   |                       | (Sampling point stationing from left bank) |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|---|-----------------------|--|---|-------|------|------|-----|-----|-----|-----|------|------|------|-------|-----|----|-----|-----|
| Station name<br>and number                    | Date of<br>collection | Sampling<br>point                          | Bed material                                      |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  | Percent finer than size indicated, in millimeters |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  | 0.062   | 0.125 | 0.25 | 0.50 | 1.0 | 2.0 | 4.0 | 8.0 | 16.0 | 32.0 | 64.0 | 128.0 |     |    |     |     |
| Susitna River<br>near Talkeetna<br>(15292100) | May 16                | 110a                                       | --  | --    | --   | --   | --  | --  | --  | --  | --   | --   | --   | --    | --  | -- | 14  | 100 |
|   |                       | 140b                                       | --  | --    | --   | --   | --  | --  | --  | --  | --   | --   | --   | --    | --  | -- | 100 | --  |
|   |                       | 170c                                       | --  | --    | --   | --   | --  | --  | --  | 0   | 1    | 26   | 100  | --    | --  | -- | 100 | --  |
|   |                       | 230c                                       | --  | --    | --   | --   | --  | 0   | 1   | 2   | 11   | 22   | 100  | --    | --  | -- | 100 | --  |
|   |                       | 260a                                       | --  | --    | --   | --   | --  | --  | --  | --  | --   | --   | --   | --    | --  | -- | --  | --  |
|   |                       | 290c                                       | --  | --    | --   | --   | 0   | 1   | 1   | 2   | 5    | 24   | 83   | 100   | --  | -- | 83  | 100 |
|   |                       | 320c                                       | --  | --    | --   | 0    | 1   | 1   | 1   | 3   | 10   | 39   | 100  | --    | --  | -- | 100 | --  |
|   |                       | 350c                                       | --  | --    | --   | --   | --  | --  | --  | 0   | 1    | 8    | 19   | 100   | --  | -- | 19  | 100 |
|   |                       | 380c                                       | --  | --    | --   | --   | --  | --  | --  | --  | 0    | 36   | 100  | --    | --  | -- | 100 | --  |
|   |                       | 410c                                       | --  | --    | --   | --   | --  | --  | --  | 0   | 1    | 2    | 100  | --    | --  | -- | 100 | --  |
|   |                       | 440b                                       | --  | --    | --   | --   | --  | --  | --  | --  | --   | --   | 0    | 100   | --  | -- | 0   | 100 |
|   |                       | 470c                                       | --  | --    | --   | --   | --  | --  | --  | --  | --   | 0    | 12   | 67    | 100 | -- | 67  | 100 |
|   |                       | 500c                                       | --  | --    | --   | --   | --  | --  | --  | --  | --   | --   | 0    | 28    | 100 | -- | 28  | 100 |
|   |                       | 530b                                       | --  | --    | --   | --   | --  | --  | --  | --  | --   | --   | 0    | 31    | 100 | -- | 31  | 100 |
|   |                       | 560a                                       | --  | --    | --   | --   | --  | --  | --  | --  | --   | --   | --   | --    | --  | -- | --  | --  |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |
|   |                       |  |   |       |      |      |     |     |     |     |      |      |      |       |     |    |     |     |

See footnotes at end of table

Table 3.--Continued

| Station name<br>and number   | Date of<br>collection | Sampling<br>point | (Sampling point stationing from left bank)        |       |      |      |     |     |     |     |      |      |      |       |     |
|--|-----------------------|-------------------|---|-------|------|------|-----|-----|-----|-----|------|------|------|-------|-----|
|  |                       |                   | Bed material                                      |       |      |      |     |     |     |     |      |      |      |       |     |
|  |                       |                   | Percent finer than size indicated, in millimeters |       |      |      |     |     |     |     |      |      |      |       |     |
|  |                       |                   | 0.062   | 0.125 | 0.25 | 0.50 | 1.0 | 2.0 | 4.0 | 8.0 | 16.0 | 32.0 | 64.0 | 128.0 |     |
| Chulitna River<br>below canyon<br>near Talkeetna<br>(15292410)                                 | May 19                | 70c               | --  | --    | --   | --   | --  | --  | --  | --  | 0    | 11   | 100  | --    | --  |
|  |                       | 110c              | --  | --    | 0    | 2    | 4   | 42  | 51  | 74  | 90   | 100  | --   | --    | --  |
|  |                       | 150c              | --  | --    | 0    | 16   | 60  | 70  | 70  | 75  | 83   | 90   | 90   | 100   | 100 |
|  |                       | 190c              | --  | --    | 0    | 19   | 59  | 65  | 66  | 68  | 72   | 78   | 78   | 100   | 100 |
|  |                       | 230c              | --  | --    | 0    | 1    | 1   | 15  | 31  | 70  | 87   | 89   | 100  | --    | --  |
| Susitna<br>River (right<br>channel)<br>below Chulitna<br>River near<br>Talkeetna<br>(15292439) | Sept. 13              | 50a               | --  | --    | --   | --   | --  | --  | --  | --  | --   | --   | --   | --    | --  |
|  |                       | 90c               | --  | --    | --   | 0    | 1   | 11  | 27  | 51  | 76   | 97   | 100  | --    | --  |
|  |                       | 130c              | --  | 0     | 1    | 61   | 90  | 92  | 92  | 93  | 95   | 98   | 100  | --    | --  |
|  |                       | 170c              | --  | --    | 0    | 22   | 36  | 47  | 47  | 55  | 70   | 89   | 100  | --    | --  |
|  |                       | 210c              | --  | --    | 0    | 23   | 23  | 36  | 42  | 53  | 72   | 93   | 100  | --    | --  |
|  |                       | 250c              | --  | --    | --   | 0    | 1   | 3   | 3   | 4   | 9    | 43   | 100  | --    | --  |
|  |                       | 290a              | --  | --    | --   | --   | --  | --  | --  | --  | --   | --   | --   | --    | --  |
| Susitna<br>River (right<br>channel)<br>below Chulitna<br>River near<br>Talkeetna<br>(15292439) | May 19                | 2920cd            | --  | --    | --   | --   | --  | --  | 0   | 1   | 4    | 13   | 50   | 100   | 100 |
|  |                       | 2960cd            | --  | 0     | 3    | 35   | 72  | 76  | 76  | 79  | 84   | 90   | 100  | --    | --  |
|  |                       | 3570cd            | --  | 0     | 1    | 16   | 45  | 59  | 60  | 68  | 78   | 99   | 100  | --    | --  |
|  |                       | 3620cd            | --  | --    | 0    | 1    | 4   | 7   | 8   | 16  | 38   | 88   | 100  | --    | --  |
|  |                       | 3670cd            | --  | --    | 0    | 1    | 1   | 2   | 2   | 3   | 13   | 49   | 100  | --    | --  |
|  |                       | 3720cd            | --  | --    | 0    | 1    | 3   | 4   | 5   | 9   | 23   | 64   | 100  | --    | --  |
|  |                       | 3770cd            | --  | --    | 0    | 1    | 2   | 4   | 4   | 8   | 20   | 57   | 100  | --    | --  |
|  |                       | 3820cd            | --  | --    | --   | 0    | 1   | 1   | 2   | 5   | 11   | 44   | 100  | --    | --  |
|  |                       | 3870cd            | --  | --    | --   | 0    | 1   | 2   | 2   | 2   | 4    | 7    | 53   | 100   | 100 |
|  |                       | 4000cd            | --  | --    | --   | 0    | 1   | 1   | 1   | 2   | 3    | 9    | 39   | 100   | 100 |
|  |                       |                   | --  | --    | --   | --   | --  | --  | --  | --  | --   | --   | --   | --    | --  |
|  | Oct. 7                | 3830cd            | --  | --    | --   | --   | --  | --  | --  | 0   | 1    | 22   | 100  | --    | --  |
|  |                       | 3980cd            | --  | --    | 0    | 2    | 8   | 10  | 10  | 11  | 12   | 12   | 12   | 100   | 100 |
|  |                       | 4060cd            | --  | --    | 0    | 7    | 39  | 50  | 53  | 57  | 68   | 80   | 83   | 100   | 100 |

See footnotes at end of table

Table 3.--Continued

| (Sampling point stationing from left bank)   |                       |                   |   |       |      |      |     |     |     |     |      |      |      |       |    |     |  |  |
|--|-----------------------|-------------------|---|-------|------|------|-----|-----|-----|-----|------|------|------|-------|----|-----|--|--|
| Station name<br>and number   | Date of<br>collection | Sampling<br>point | Bed material                                      |       |      |      |     |     |     |     |      |      |      |       |    |     |  |  |
|  |                       |                   | Percent finer than size indicated, in millimeters |       |      |      |     |     |     |     |      |      |      |       |    |     |  |  |
|  |                       |                   | 0.062   | 0.125 | 0.25 | 0.50 | 1.0 | 2.0 | 4.0 | 8.0 | 16.0 | 32.0 | 64.0 | 128.0 |    |     |  |  |
| Susitna River<br>(left channel)<br>below Chulitna<br>River near<br>Talkeetna<br>(15292440) | May 17                | 1100ce            | 1   | 1     | 3    | 6    | 11  | 16  | 16  | 21  | 29   | 41   | 67   | 100   |    |     |  |  |
|  |                       | 1300ce            | 2   | 4     | 7    | 9    | 11  | 15  | 16  | 24  | 37   | 59   | 84   | 100   |    |     |  |  |
|  |                       | 1500ce            | 2   | 4     | 22   | 92   | 100 | --  | --  | --  | --   | --   | --   | --    | -- |     |  |  |
|  |                       | 1700ce            | 1   | 2     | 4    | 7    | 10  | 15  | 15  | 22  | 35   | 51   | 100  | --    | -- |     |  |  |
|  |                       | 1900ce            | 1   | 2     | 3    | 12   | 20  | 26  | 27  | 35  | 48   | 73   | 85   | 100   |    |     |  |  |
|  |                       | 2100ce            | 13  | 30    | 94   | 100  | --  | --  | --  | --  | --   | --   | --   | --    | -- |     |  |  |
|  |                       | 2160ce            | 11  | 29    | 94   | 99   | 100 | --  | --  | --  | --   | --   | --   | --    | -- |     |  |  |
|  |                       | 2370ce            | 21  | 39    | 71   | 88   | 89  | 89  | 89  | 89  | 91   | 94   | 100  | --    | -- |     |  |  |
|  |                       | 2500ce            | 0   | 2     | 4    | 5    | 9   | 15  | 16  | 26  | 41   | 65   | 100  | --    | -- |     |  |  |
|  |                       | 2700ce            | 0   | 1     | 3    | 9    | 13  | 16  | 16  | 20  | 26   | 42   | 67   | 100   |    |     |  |  |
|  |                       | 2880ce            | 7   | 14    | 28   | 45   | 48  | 51  | 51  | 56  | 62   | 76   | 100  | --    | -- |     |  |  |
|  | May 18                | 100c              | --  | --    | --   | --   | --  | --  | --  | --  | 0    | 5    | 26   | 100   |    |     |  |  |
|  |                       | 225c              | --  | --    | --   | --   | --  | --  | --  | 0   | 1    | 10   | 23   | 100   |    |     |  |  |
|  |                       | 700c              | --  | --    | 0    | 2    | 3   | 4   | 5   | 10  | 20   | 39   | 100  | --    | -- |     |  |  |
|  |                       | 750c              | --  | --    | --   | --   | --  | --  | 0   | 1   | 4    | 14   | 77   | 100   |    |     |  |  |
|  |                       | 800c              | --  | --    | 0    | 1    | 7   | 10  | 11  | 13  | 18   | 35   | 55   | 100   |    |     |  |  |
|  |                       | 850c              | --  | --    | 0    | 1    | 2   | 3   | 3   | 7   | 20   | 53   | 100  | --    | -- |     |  |  |
|  |                       | 900c              | --  | --    | --   | --   | 0   | 1   | 1   | 2   | 11   | 42   | 100  | --    | -- |     |  |  |
|  |                       | 950c              | --  | --    | --   | --   | --  | --  | --  | 0   | 3    | 10   | 43   | 100   |    |     |  |  |
|  |                       | 1000c             | --  | --    | --   | --   | --  | --  | 0   | 1   | 2    | 14   | 50   | 100   |    |     |  |  |
|  |                       |                   | Oct. 7  | 670c  | --   | --   | --  | --  | --  | --  | --   | --   | 0    | 5     | 49 | 100 |  |  |
| 750c   | --                    |                   |   | --    | --   | --   | --  | --  | --  | --  | 0    | 7    | 26   | 100   |    |     |  |  |
| 820c   | --                    |                   |   | --    | --   | --   | --  | --  | --  | --  | 0    | 5    | 59   | 100   |    |     |  |  |

See footnotes at end of table

Table 3.--Continued

| Station name<br>and number                      | Date of<br>collection | Sampling<br>point | (Sampling point stationing from left bank) |       |      |      |     |     |     |     |      |      |      |       |     |  |
|---|-----------------------|-------------------|--|-------|------|------|-----|-----|-----|-----|------|------|------|-------|-----|--|
|   |                       |                   | Bed material                               |       |      |      |     |     |     |     |      |      |      |       |     |  |
|   |                       |                   | 0.062                                      | 0.125 | 0.25 | 0.50 | 1.0 | 2.0 | 4.0 | 8.0 | 16.0 | 32.0 | 64.0 | 128.0 |     |  |
| Talkeetna River<br>near Talkeetna<br>(15292700) | May 18                | 60b               | --   | --    | --   | --   | --  | --  | --  | --  | --   | --   | --   | --    | 100 |  |
|   |                       | 90c               | --   | 0     | 1    | 30   | 58  | 58  | 58  | 59  | 59   | 59   | 100  | --    | --  |  |
|   |                       | 120c              | --   | --    | --   | 0    | 1   | 2   | 2   | 3   | 6    | 23   | 34   | 100   | --  |  |
|   |                       | 150c              | --   | --    | --   | 0    | 3   | 6   | 6   | 9   | 15   | 49   | 100  | --    | --  |  |
|   |                       | 180c              | --   | --    | --   | 0    | 1   | 2   | 2   | 3   | 10   | 50   | 100  | --    | --  |  |
|   |                       | 210c              | --   | --    | --   | --   | --  | --  | --  | 0   | 1    | 14   | 100  | --    | --  |  |
|   |                       | 240c              | --   | --    | --   | --   | --  | --  | --  | --  | --   | 0    | 18   | 100   | --  |  |
|   |                       | 270c              | --   | --    | --   | --   | --  | --  | --  | 0   | 1    | 5    | 75   | 100   | --  |  |
|   |                       | 300b              | --   | --    | --   | --   | --  | --  | --  | --  | --   | 0    | 8    | 100   | --  |  |
|   |                       | 330c              | --   | --    | --   | --   | --  | --  | --  | --  | 0    | 4    | 65   | 100   | --  |  |
|   | Sept. 13              | 60a               | --   | --    | --   | --   | --  | --  | --  | --  | --   | --   | --   | --    | --  |  |
|   |                       | 100c              | --   | --    | 0    | 37   | 47  | 48  | 48  | 48  | 49   | 49   | 49   | 100   | --  |  |
|   |                       | 140c              | --   | --    | 0    | 1    | 4   | 5   | 5   | 5   | 5    | 11   | 67   | 100   | --  |  |
|   |                       | 180c              | --   | --    | --   | --   | --  | --  | --  | 0   | 3    | 31   | 100  | --    | --  |  |
|   |                       | 220c              | --   | --    | --   | --   | --  | --  | --  | --  | 0    | 4    | 17   | 100   | --  |  |
|   |                       | 260c              | --   | --    | --   | --   | --  | --  | --  | --  | 0    | 2    | 19   | 100   | --  |  |
|   |                       |                   | --   | --    | --   | --   | --  | --  | --  | --  | --   | --   | --   | --    | --  |  |
| Susitna River<br>at Sunshine<br>(15292780)      | May 18                | 150a              | --   | --    | --   | --   | --  | --  | --  | --  | --   | --   | --   | --    | --  |  |
|   |                       | 200c              | --   | --    | 0    | 3    | 6   | 14  | 15  | 30  | 51   | 81   | 100  | --    | --  |  |
|   |                       | 300c              | --   | --    | --   | 1    | 1   | 2   | 2   | 5   | 13   | 43   | 100  | --    | --  |  |
|   |                       | 400c              | --   | --    | --   | --   | 1   | 2   | 2   | 4   | 9    | 20   | 84   | 100   | --  |  |
|   |                       | 500c              | --   | --    | --   | 1    | 1   | 1   | 1   | 3   | 9    | 43   | 78   | 100   | --  |  |
|   |                       | 600c              | --   | --    | --   | --   | --  | --  | --  | --  | --   | 1    | 11   | 100   | --  |  |
|   |                       |                   | --   | --    | --   | --   | --  | --  | --  | --  | --   | --   | --   | --    | --  |  |
|   | Oct. 4                | 100a              | --   | --    | --   | --   | --  | --  | --  | --  | --   | --   | --   | --    | --  |  |
|   |                       | 150a              | --   | --    | --   | --   | --  | --  | --  | --  | --   | --   | --   | --    | --  |  |
|   |                       | 200c              | --   | --    | 0    | 9    | 20  | 23  | 24  | 32  | 45   | 57   | 100  | --    | --  |  |
|   |                       | 250c              | --   | --    | 0    | 2    | 6   | 9   | 14  | 31  | 61   | 84   | 100  | --    | --  |  |
|   |                       | 300c              | --   | --    | --   | 0    | 1   | 1   | 2   | 6   | 14   | 28   | 41   | 100   | --  |  |
|   |                       | 350c              | --   | --    | --   | --   | 0   | 1   | 1   | 1   | 5    | 18   | 100  | --    | --  |  |
|   |                       | 400c              | --   | --    | --   | --   | --  | --  | --  | --  | 0    | 5    | 28   | 100   | --  |  |
|   |                       | 450a              | --   | --    | --   | --   | --  | --  | --  | --  | --   | --   | --   | --    | --  |  |
|   |                       | 500a              | --   | --    | --   | --   | --  | --  | --  | --  | --   | --   | --   | --    | --  |  |
|   |                       | 550b              | --   | --    | --   | --   | --  | --  | --  | --  | --   | 0    | 100  | --    | --  |  |

a Streambed too coarse for obtaining samples

b Few particles obtained, non-representative sample

c Representative sample obtained for particles finer than 128 mm

d Stationing from left bank of Susitna River, left channel (15292440)

e Samples obtained from island and bar areas



Table 4. -- Water discharge and estimated sediment yields at selected stations in the Susitna River basin, October 1982 to September 1983

| Drainage area   |                                  | Water discharge (acre-ft) | Suspended sediment (tons) |           |           | Bedload (tons) |         | Total sediment (tons) |         |           |
|---|----------------------------------|---------------------------|---------------------------|-----------|-----------|----------------|---------|-----------------------|---------|-----------|
| Station name and number                               | Drainage area (mi <sup>2</sup> ) |                           | Period                    | Silt-clay | Sand      | Total          | Sand    |                       | Gravel  | Total     |
| Susitna River near Talkeetna (15292100)               | 6,320                            | October                   | 450,000a                  | --        | --        | 9,300          | 360     | 28                    | 388     | 9,690     |
|   |                                  | November                  | 160,000a                  | --        | --        | 780            | 16      | .8                    | 17      | 797       |
|   |                                  | December                  | 150,000a                  | --        | --        | 720            | 14      | .7                    | 15      | 735       |
|   |                                  | January                   | 150,000a                  | --        | --        | 740            | 15      | .8                    | 16      | 756       |
|   |                                  | February                  | 140,000a                  | --        | --        | 620            | 12      | .6                    | 13      | 633       |
|   |                                  | March                     | 110,000a                  | --        | --        | 340            | 5.6     | .3                    | 5.9     | 346       |
|   |                                  | April                     | 120,000a                  | --        | --        | 500            | 9.7     | .5                    | 10      | 510       |
|   |                                  | May                       | 1,000,000a                | 140,000   | 210,000   | 350,000        | 7,300   | 1,100                 | 8,400   | 358,000   |
|   |                                  | June                      | 1,600,000a                | 480,000   | 440,000   | 920,000        | 20,000  | 7,200                 | 27,200  | 947,000   |
|   |                                  | July                      | 1,400,000a                | 750,000   | 330,000   | 1,080,000      | 14,000  | 1,600                 | 15,600  | 1,100,000 |
|   |                                  | August                    | 1,600,000a                | 570,000   | 410,000   | 980,000        | 16,000  | 930                   | 16,900  | 997,000   |
|   |                                  | September                 | 850,000a                  | 35,000    | 86,000    | 121,000        | 3,400   | 400                   | 3,800   | 125,000   |
|   |                                  | October to April          | 1,280,000a                | --        | --        | 13,000         | 432     | 32                    | 465     | 13,500    |
|   |                                  | May to September          | 6,450,000a                | 1,970,000 | 1,480,000 | 3,450,000      | 60,700  | 11,200                | 71,900  | 3,520,000 |
|   |                                  | Total                     | 7,730,000a                | --        | --        | 3,460,000      | 61,100  | 11,300                | 72,400  | 3,530,000 |
| Chulitna River below canyon near Talkeetna (15292410) | 2,580a                           | October                   | 338,100                   | --        | --        | 37,000         | 2,500   | 1,900                 | 4,400   | 41,400    |
|   |                                  | November                  | 149,600                   | --        | --        | 5,100          | 80      | 47                    | 127     | 5,230     |
|   |                                  | December                  | 114,000                   | --        | --        | 2,600          | 26      | 14                    | 40      | 2,640     |
|   |                                  | January                   | 96,700                    | --        | --        | 1,900          | 17      | 9.0                   | 26      | 1,930     |
|   |                                  | February                  | 57,500                    | --        | --        | 630            | 2.8     | 1.3                   | 4.1     | 634       |
|   |                                  | March                     | 64,600                    | --        | --        | 720            | 3.2     | 1.5                   | 4.7     | 725       |
|   |                                  | April                     | 74,300                    | --        | --        | 1,100          | 8.4     | 4.4                   | 13      | 1,110     |
|   |                                  | May                       | 546,100                   | 120,000   | 130,000   | 250,000        | 55,000  | 32,000                | 87,000  | 337,000   |
|   |                                  | June                      | 1,124,000                 | 1,100,000 | 560,000   | 1,660,000      | 110,000 | 80,000                | 190,000 | 1,850,000 |
|   |                                  | July                      | 1,372,000                 | 2,000,000 | 760,000   | 2,760,000      | 130,000 | 100,000               | 230,000 | 2,990,000 |
|   |                                  | August                    | 1,364,000                 | 1,800,000 | 1,400,000 | 3,200,000      | 95,000  | 84,000                | 179,000 | 3,380,000 |
|   |                                  | September                 | 652,500                   | 240,000   | 390,000   | 630,000        | 88,000  | 60,000                | 148,000 | 778,000   |
|   |                                  | October to April          | 894,800                   | --        | --        | 49,100         | 2,640   | 1,980                 | 4,610   | 53,700    |
|   |                                  | May to September          | 5,059,000                 | 5,260,000 | 3,240,000 | 8,500,000      | 478,000 | 356,000               | 834,000 | 9,330,000 |
|   |                                  | Total                     | 5,953,000                 | --        | --        | 8,550,000      | 481,000 | 358,000               | 839,000 | 9,390,000 |

a Estimated

Table 4. -- Continued

| Station name and number                   | Drainage area (mi <sup>2</sup> ) | Period           | Water discharge (acre-ft) | Suspended sediment (tons) |           | Bedload (tons) |         | Total sediment (tons) |
|---|----------------------------------|------------------|---------------------------|---------------------------|-----------|----------------|---------|-----------------------|
|   |                                  |                  |                           | Silt-clay                 | Sand      | Sand           | Gravel  |                       |
|   |                                  |                  |                           | Total                     | Total     | Total          | Total   |                       |
| Talkeetna River near Talkeetna (15292700) | 2,006                            | October          | 206,100                   | --                        | --        | 1,200          | 150     | 1,350                 |
|   |                                  | November         | 73,980                    | --                        | --        | 63             | 2.8     | 66                    |
|   |                                  | December         | 66,550                    | --                        | --        | 45             | 1.5     | 47                    |
|   |                                  | January          | 51,410                    | --                        | --        | 380            | .7      | 26                    |
|   |                                  | February         | 32,210                    | --                        | --        | 25             | 7.6     | 7.8                   |
|   |                                  | March            | 34,770                    | --                        | --        | 150            | .2      | 158                   |
|   |                                  | April            | 39,790                    | --                        | --        | 15             | 8.5     | 15                    |
|   |                                  | May              | 279,800                   | --                        | --        | 4,200          | .4      | 4,630                 |
|   |                                  | June             | 536,300                   | 13,000                    | 33,000    | 15,000         | 430     | 50,600                |
|   |                                  | July             | 535,100                   | 110,000                   | 110,000   | 15,000         | 4,100   | 239,000               |
|   |                                  | August           | 541,300                   | 260,000                   | 170,000   | 19,000         | 5,000   | 454,000               |
|   |                                  | September        | 234,700                   | 240,000                   | 110,000   | 20,000         | 6,300   | 376,000               |
|   |                                  | October to April | 504,800                   | 7,800                     | 16,000    | 3,600          | 120     | 27,500                |
|   |                                  | May to September | 2,127,000                 | --                        | --        | 1,360          | 156     | 1,520                 |
| Susitna River at Sunshine (15292780)      | 11,100                           | October          | 994,900                   | --                        | --        | 12,000         | 4,800   | 16,800                |
|   |                                  | November         | 374,900                   | --                        | --        | 5,400          | 1,200   | 6,600                 |
|   |                                  | December         | 345,100                   | --                        | --        | 5,100          | 1,000   | 6,100                 |
|   |                                  | January          | 320,700                   | --                        | --        | 4,800          | 950     | 5,750                 |
|   |                                  | February         | 259,000                   | --                        | --        | 3,900          | 730     | 4,630                 |
|   |                                  | March            | 214,000                   | --                        | --        | 3,400          | 540     | 3,940                 |
|   |                                  | April            | 249,700                   | --                        | --        | 3,800          | 700     | 4,500                 |
|   |                                  | May              | 1,930,000                 | 370,000                   | 560,000   | 23,000         | 23,000  | 976,000               |
|   |                                  | June             | 3,457,000                 | 2,100,000                 | 1,300,000 | 74,000         | 110,000 | 3,580,000             |
|   |                                  | July             | 3,405,000                 | 2,900,000                 | 1,000,000 | 37,000         | 64,000  | 4,000,000             |
|   |                                  | August           | 3,725,000                 | 2,700,000                 | 2,000,000 | 44,000         | 38,000  | 4,780,000             |
|   |                                  | September        | 1,786,000                 | 280,000                   | 410,000   | 73,000         | 55,000  | 818,000               |
|   |                                  | October to April | 2,758,000                 | --                        | --        | 38,400         | 9,920   | 48,300                |
|   |                                  | May to September | 14,300,000                | 8,350,000                 | 5,270,000 | 251,000        | 290,000 | 14,100,000            |
|   |                                  | Total            | 17,060,000                | --                        | --        | 289,000        | 300,000 | 589,000               |

a Estimated