Squaw Creek

General Information

Squaw Creek is a tributary to the Salmon River. It enters the north side of the river about 10 miles downstream of North Fork, Idaho. The study reach is about a 130 ft length of stream about 2 miles upstream from the mouth of Squaw Creek, just upstream of the Papoose Creek road. The site is on land administered by the Salmon-Challis National Forest at an elevation of about 3,940 ft. The drainage area is 14.3 mi^2 and the geology of the watershed is predominantly intrusive igneous.

This site is associated with an existing Forest Service gaging station. Streamflow records are available from water year 1990 and 1992 to 1995 and sediment transport measurements are available from water year 1990 to 1996. Additional measurements included a survey of the stream reach and pebble counts of the substrate surface material.

Figure 1. Squaw Creek looking downstream at cross-section 2.

Figure 2. Squaw Creek looking upstream from the gage.

Streamflow was recorded for water years 1990 and 1992 through 1995 typically from the beginning of the spring snowmelt hydrograph and into the fall. Estimated average annual streamflow (Q_a) for the stream is 3.89 ft^3/s and the estimated bankfull discharge (Q_b) is 22.0 ft^3/s. Recorded daily mean discharge for this period ranged from 0.666 ft^3/s to 28.6 ft^3/s.

Channel Profile and Cross-Section

Figure 3 shows the longitudinal profile for the channel bed in the center of the channel, the water surface elevations along each bank at the time of the survey and bankfull flow elevations (floodplains). The average gradient for the study reach is 0.0240 ft/ft. Cross-sections of the channel were surveyed at two locations. Cross-section 1 (XS1) is located at the stream gage.

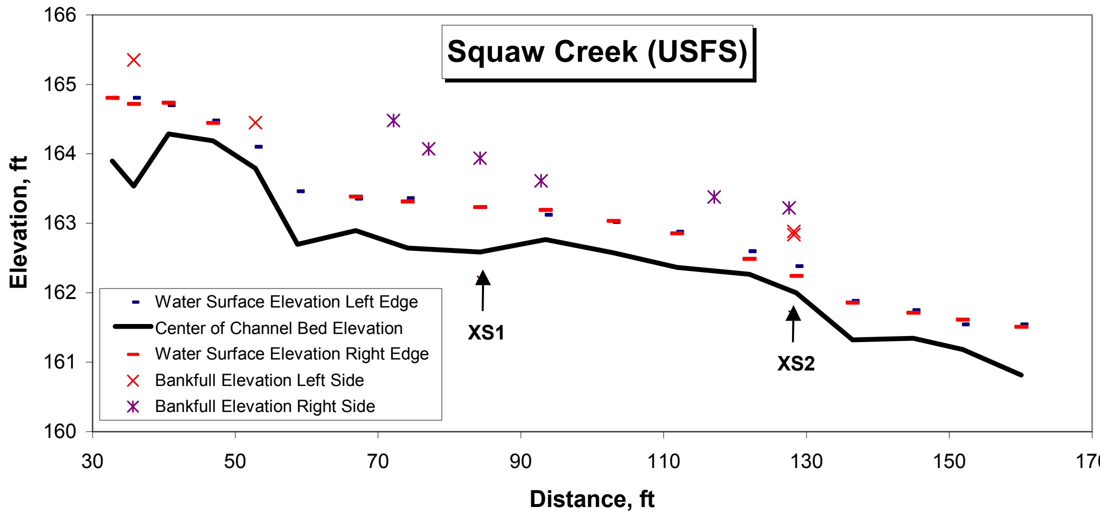

Figure 3. Longitudinal profile of the study reach in Squaw Creek.

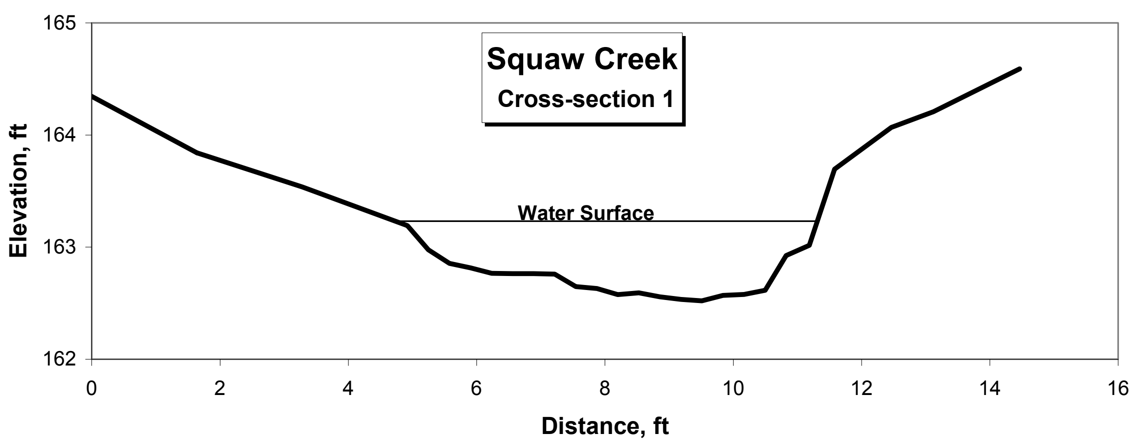

Figure 4. Cross-section 1 of Squaw Creek at the gaging station.

Channel Geometry

Figure 4 shows the cross-section at the sediment transport measurement site (cross-section 1) and the water surface at the time of the survey. The channel geometry relationships for this cross-section are shown in Figure 5. All data collected during discharge measurements in 1990 through 1996 were used to develop the displayed power relationships with discharge (Figure 5). Over the range of discharges when sediment transport was measured (1.13 to 53.6 ft^3/s) estimated stream width, estimated average depth and estimated average velocity varied from 5.7 to 10.1 ft, 0.40 to 0.95 ft, and 0.5 to 5.6 ft/s, respectively. The average reach gradient is 0.0240 ft/ft.

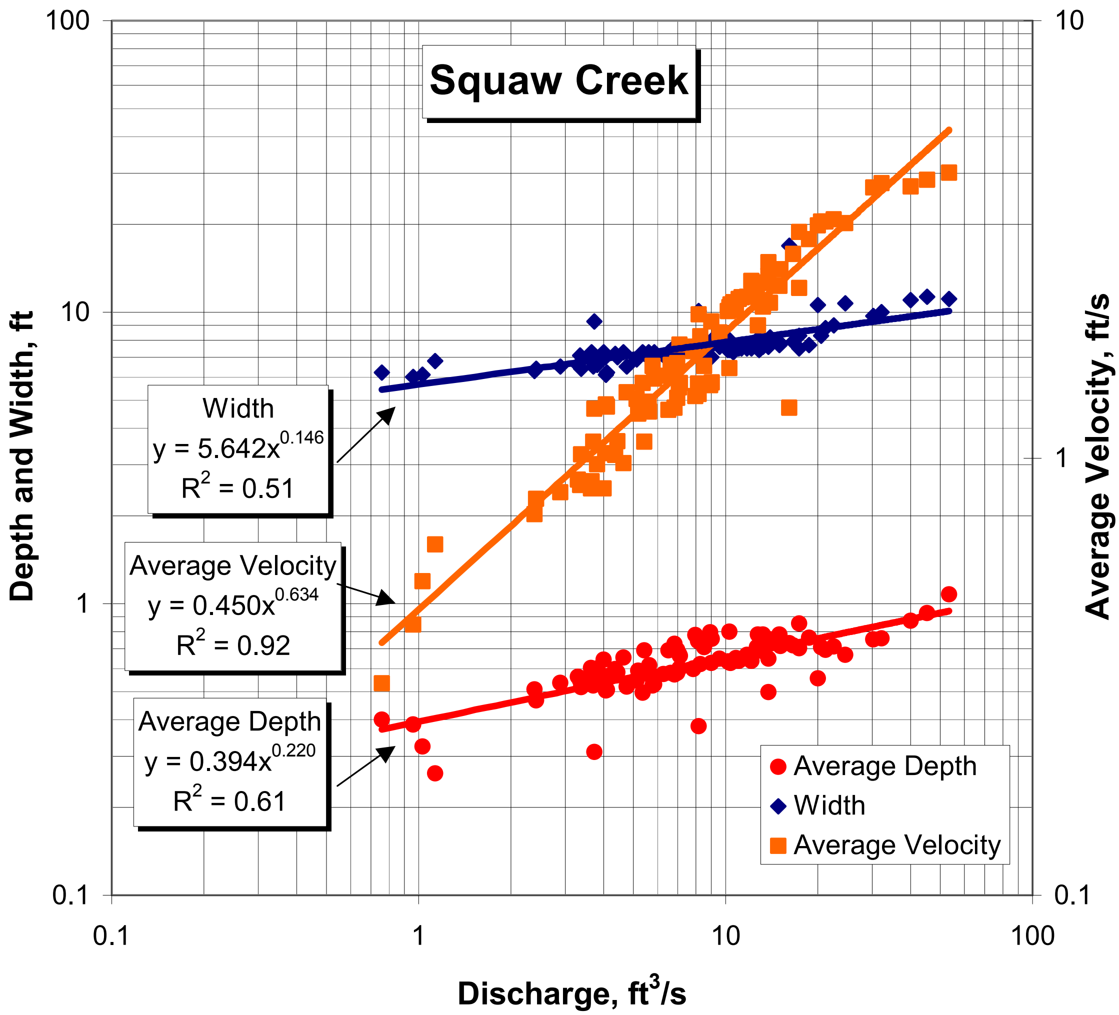

Figure 5. Width, average depth and average velocity versus stream discharge at the measurement cross section on Squaw Creek.

Channel Material

On July 5, 1994 surface pebble counts were made near cross-section 1. The average D_{50} and D_{90} for the surface substrate in the reach are 27 mm and 74 mm, respectively (Figure 6). About 13 % of the surface material was 3 mm diameter or smaller. No core samples of subsurface material were collected at this site.

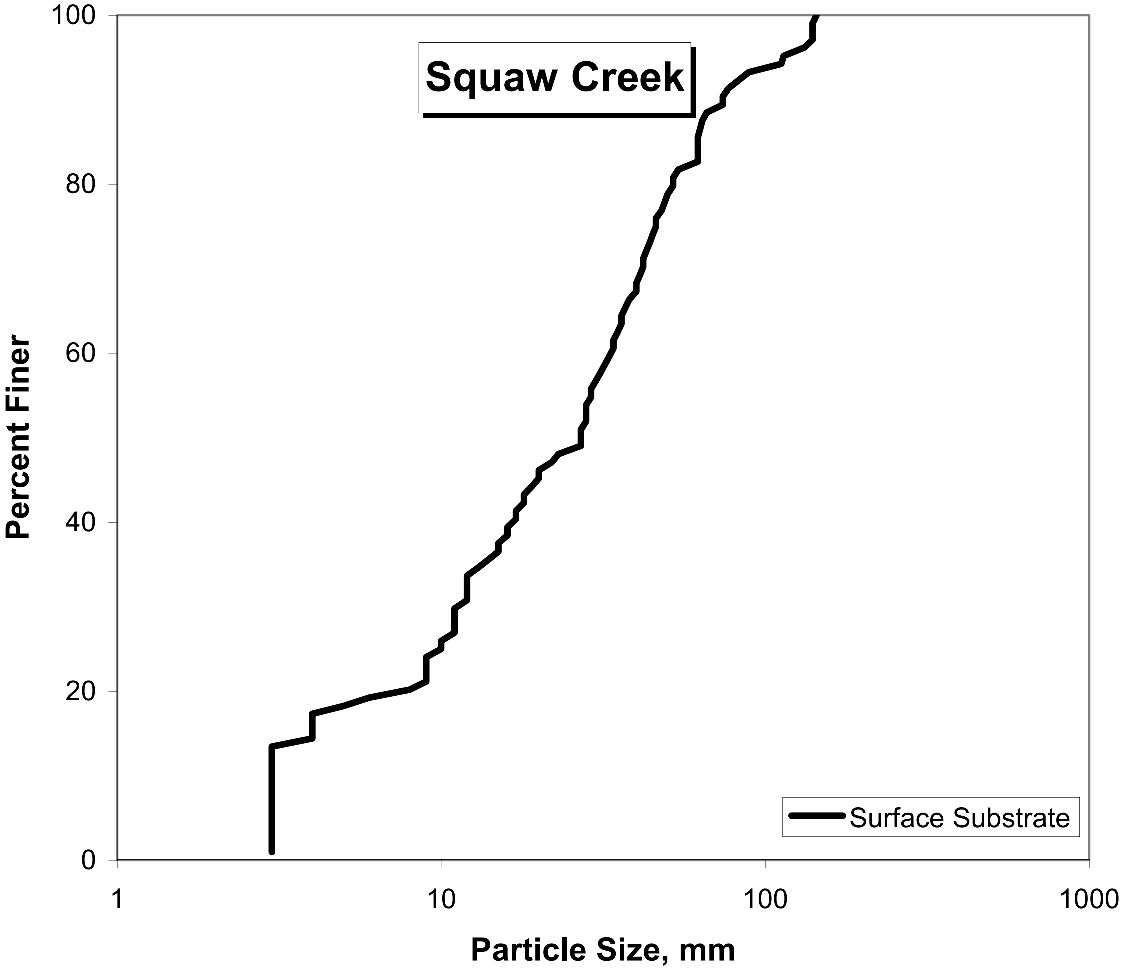

Figure 6. Particle size distribution for surface material samples collected in Squaw Creek.

Sediment Transport

The bedload and suspended load measurements in water years 1990 through 1996 were all made in the vicinity of the gaging station. The sediment transport data include 42 (plus 51 zeros) measurements of bedload transport and 90 measurements of suspended sediment. Sediment transport measurements spanned a range of stream discharges from 0.76 ft^3/s ($0.20Q_a$; $0.03Q_b$) to 53.6 ft^3/s ($13.78Q_a$; $2.44Q_b$). Bedload transport ranged from 0.00833 to 12.1 t/d and suspended transport ranged from 0.00177 to 20.4 t/d. At discharges near and larger than bankfull, suspended and bedload transport account for about equal proportions of the total sediment load. At lower discharges, suspended transport accounts for the majority of the material in transport (Figure 7).

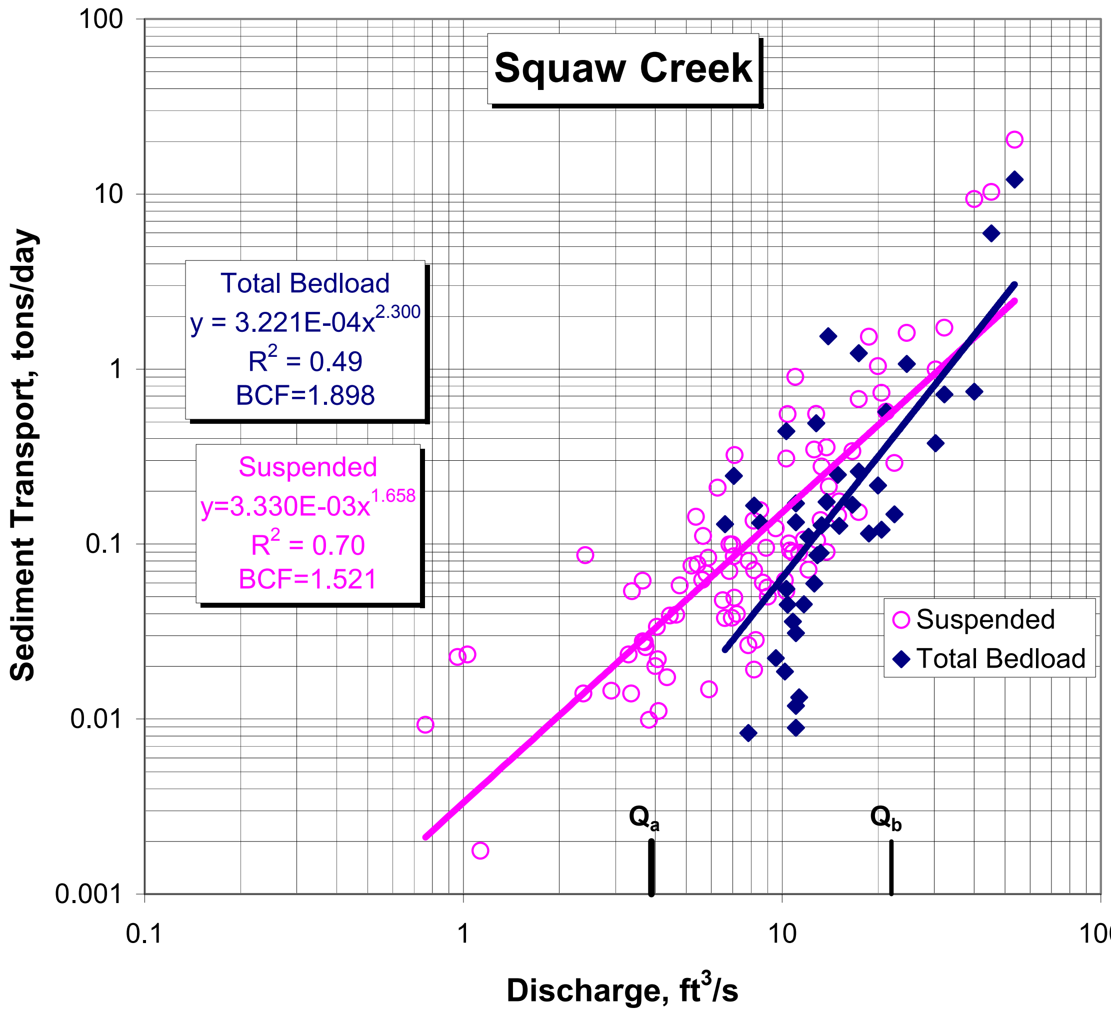

Figure 7. Bedload and suspended load transport rate versus discharge.

The bedload transport rates by size class (Figure 8) shows that the larger rates are associated with material in the 0.5 to 2 mm diameter size class. No relationship is shown for the size class >32 mm, since only four samples contained this size of material. All four bedload samples that contained material larger than 32 mm diameter were collected at discharges of 24.6 ft^3/s or larger.

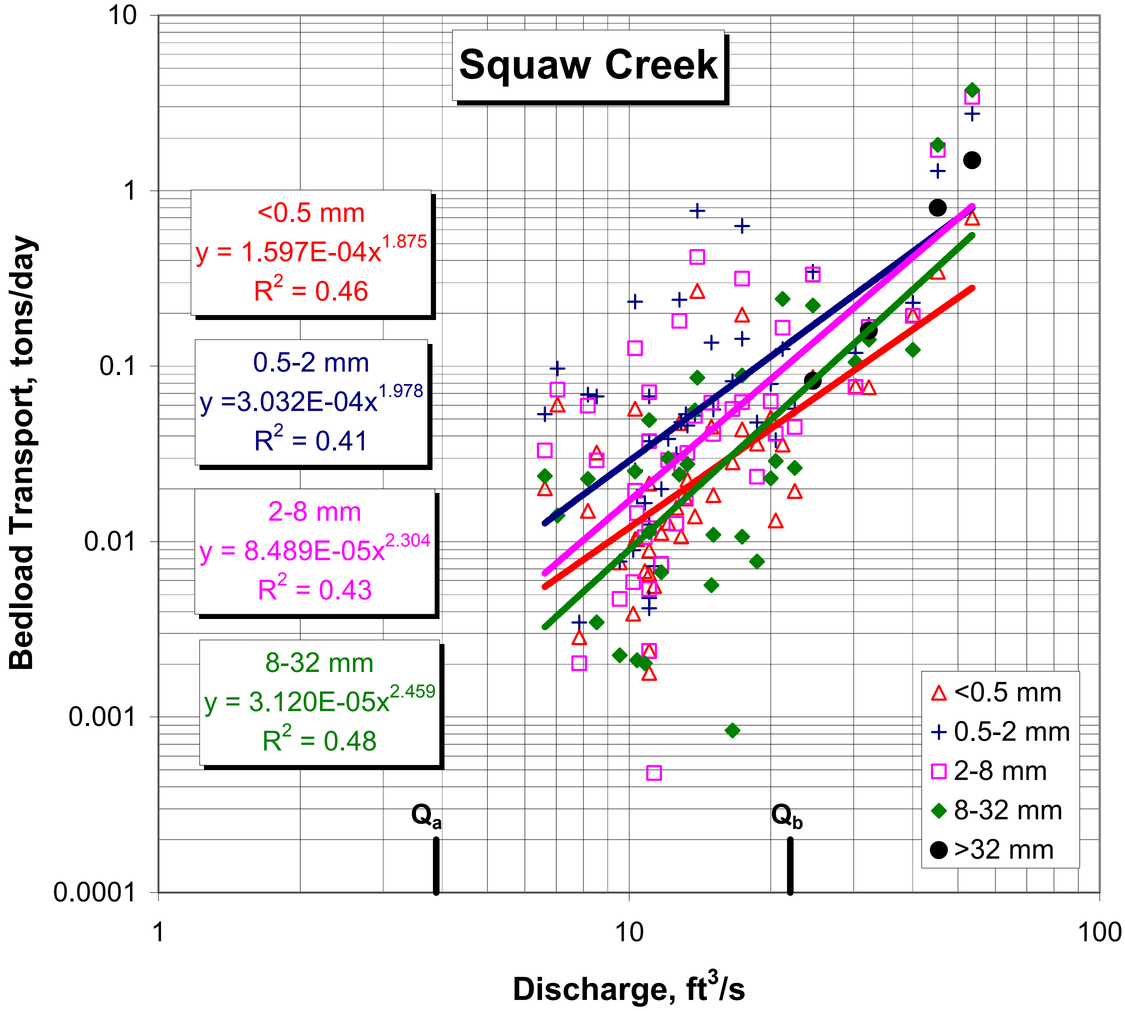

Figure 8. Bedload transport rate versus discharge for selected size classes.

About 79% of the bedload samples had a median diameter between 0.5 and 2 mm (Figure 9). The largest median diameter was 5.9 mm at a discharge of 45.3 ft^3/s. Data on the largest individual particle in bedload samples are not available for this site. However, the fact that material in the 16 to 32 mm diameter class or larger occurred in all the bedload samples collected at discharges larger than 21 ft^3/s, provides some evidence that the median diameter of surface substrate material may be in motion at discharges near bankfull.

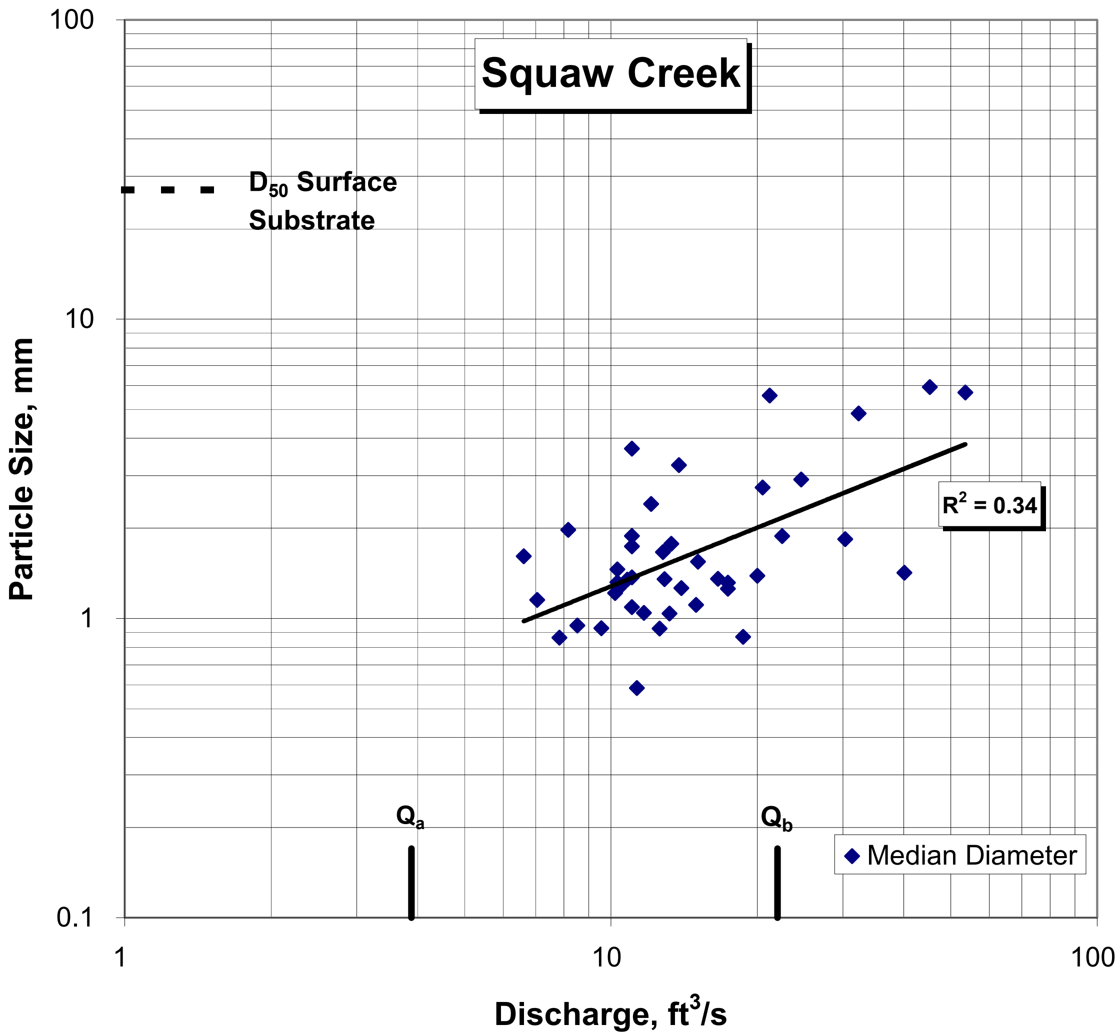

Figure 9. Median size of the bedload sample versus stream discharge for Squaw Creek.