Trapper Creek

General Information

Trapper Creek confluences with the South Fork of Red River about 3 miles upstream from the Forest Service's Red River Work Center on the Nez Perce National Forest. The study reach is about a 360 ft length of stream about 0.8 miles upstream of the confluence with the South Fork Red River and about 0.25 miles upstream from Forest Service Road 9560. The site is on land administered by the Forest service at an elevation of about 4,880 ft. The drainage area upstream of this location is 8.02 mi^2 and the geology of the watershed is predominantly metamorphic.

This site is associated with an existing Forest Service gaging station. Streamflow records and sediment transport measurements are available from water year 1986 to 1997. Additional information collected at the site include a survey of the stream reach, pebble counts of the substrate surface and core samples of the substrate subsurface material. Figures 1 and 2 show photographs of looking upstream and downstream from the gaging station.

Figure 1. Trapper Creek looking upstream of the gaging station.

Figure 2. Trapper Creek looking downstream of the gaging station.

Streamflow records are available for water years 1986 through 1997, typically from the beginning of the spring snowmelt hydrograph into the fall. Estimated average annual streamflow (Q_a) is about 12.7 ft^3/s (21.6 in) and bankfull discharge (Q_b) is estimated at 90.4 ft^3/s. During the period of record, daily mean discharges ranged from 1.43 ft^3/s to 130 ft^3/s. The highest instantaneous discharge recorded was 141 ft^3/s in May 1997.

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 0.0414 ft/ft. Cross-sections of the channel were surveyed at four locations. The gage is located at about 4 ft upstream of cross-section 3 (XS3).

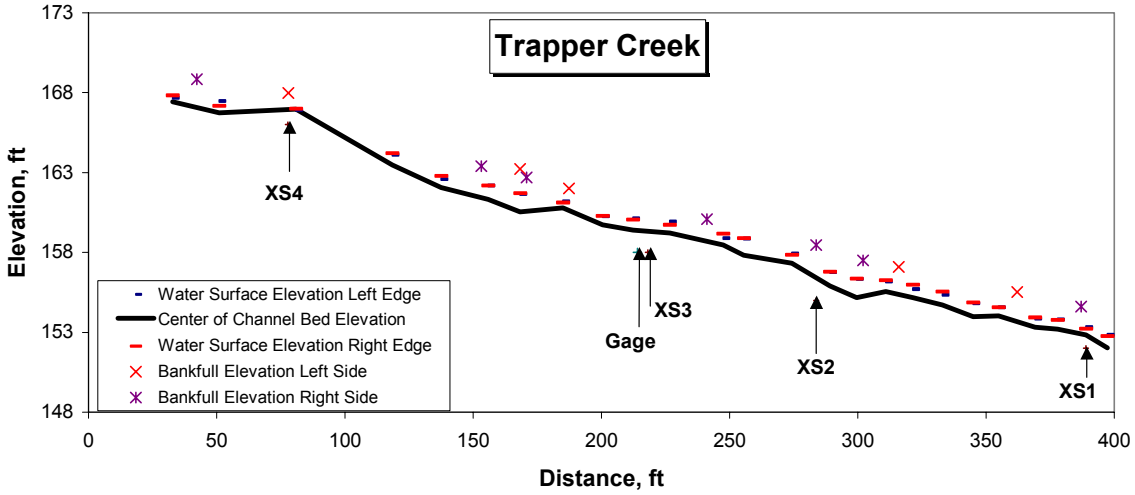

Figure 3. Longitudinal profile of the study reach in Trapper Creek.

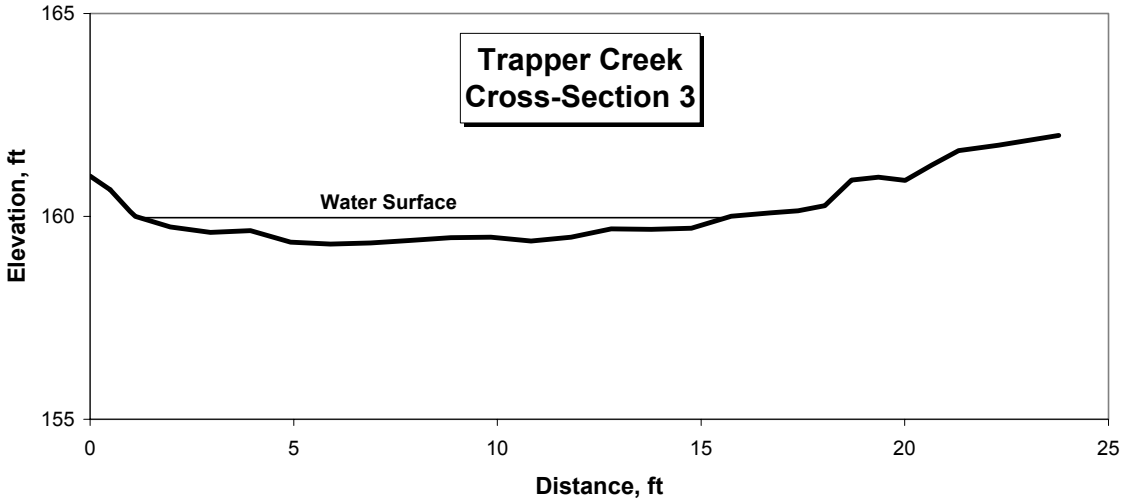

Figure 4. Cross-section 3 of Trapper Creek.

Channel Geometry

Figure 3 shows the cross-section of the channel at Cross-Section 3, just downstream of the gaging station. The station geometry relationships for this cross-section are shown in Figure 4. Information for 1986 through 1997 were used to develop the power relationships. Over the range of discharges when sediment transport was measured (1.69 to 135 ft^3/s) estimated stream width, estimated average depth and estimated average velocity vary from 14.5 to 20.0 ft, 0.27 to 1.53, and 0.42 to 4.41 ft/s, respectively. The average reach slope is 0.0414 ft/ft.

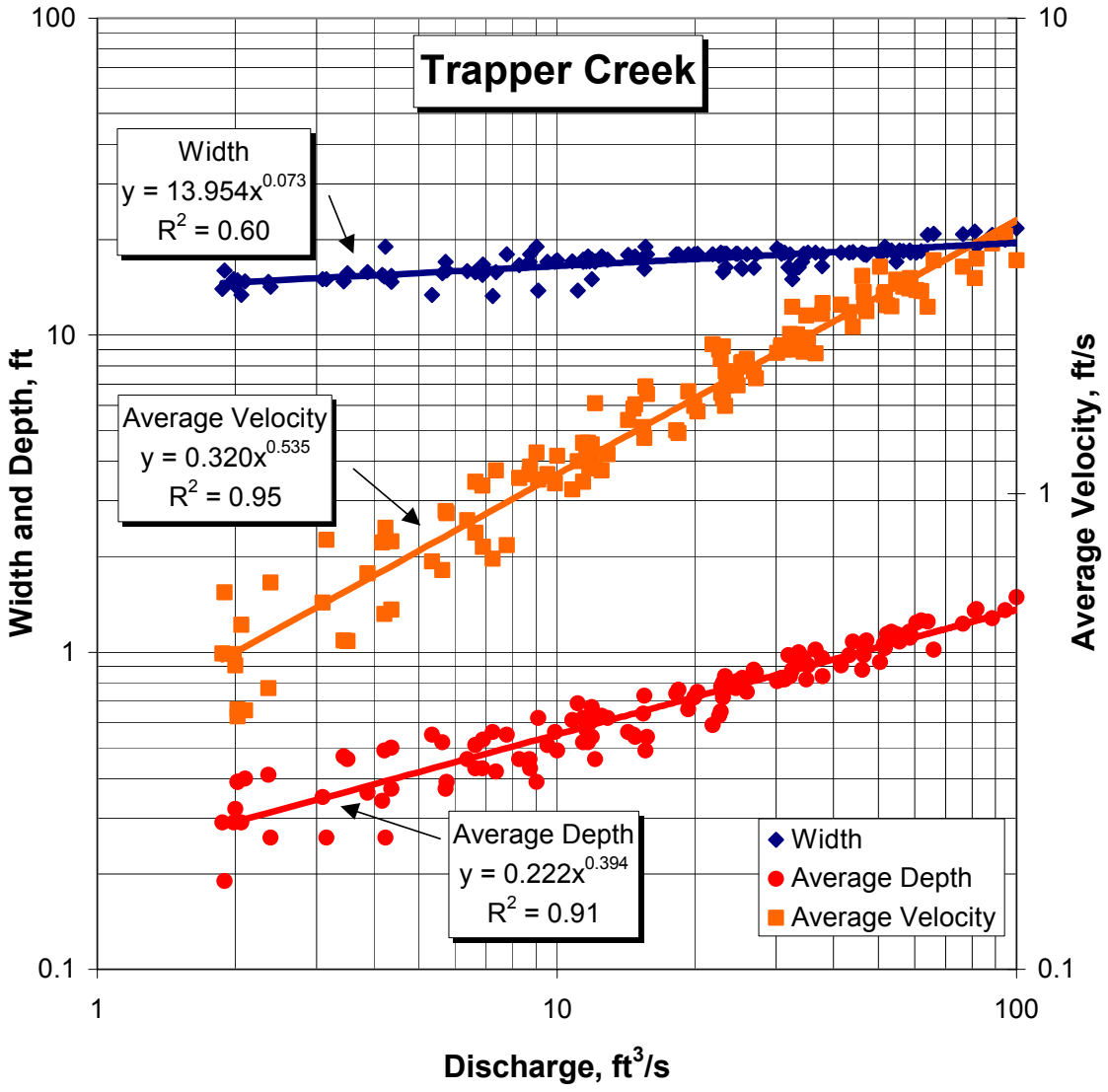

Figure 4. Width, average depth, and average velocity versus stream discharge at Cross-section 3 on Trapper Creek.

Channel Material

Surface pebble counts were made at cross-section 3 in 1994 and at three locations in the study reach in August 1995. In August of 1995, a core sample of subsurface material was also collected at three locations. The average D_{50} and D_{90} for the surface material in the reach were 67 mm and 136 mm, respectively, in 1994 and 85 mm and 300 mm in 1995 (Figure 5). About 7% of the surface material is sand (2 mm) size or smaller in 1995. The average D_{50} and D_{90} for the subsurface material collected in 1995 was 17 mm and 89 mm, respectively.

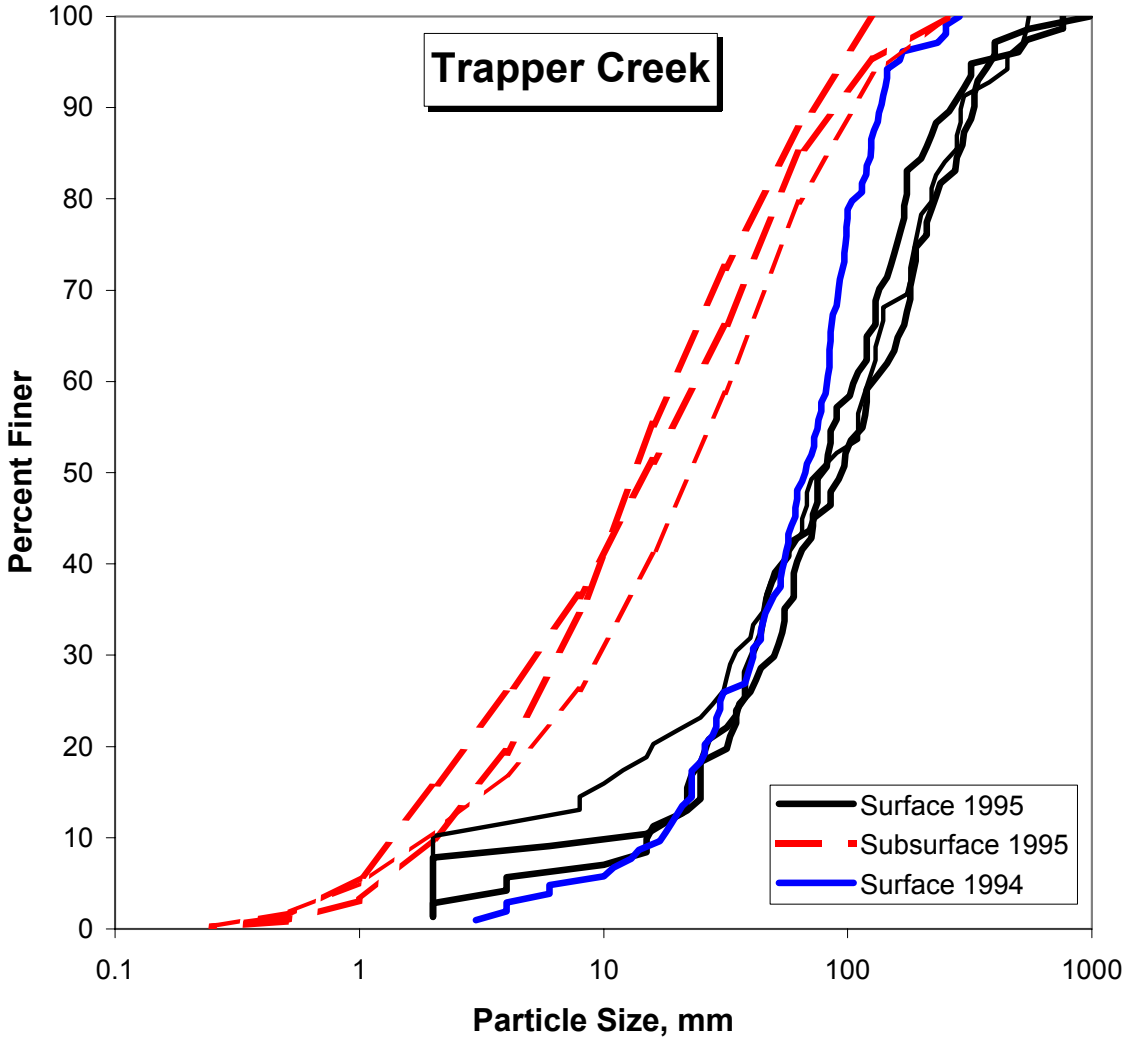

Figure 5. Particle size distribution for surface and subsurface material samples collected in the Trapper Creek reach.

Sediment Transport

Sediment transport measurements made in 1986 through 1997. The sediment transport data include 166 measurements of bedload transport and 143 measurements of suspended sediment. Sediment transport measurements spanned a range of stream discharges from 1.69 ft^3/s ($0.13Q_a$:$0.02Q_b$) to 135 ft^3/s ($10.65Q_a$:$1.49Q_b$). Bedload transport ranged from 0.0005 to 15.1 t/d and suspended sediment transport ranged from 0.0045 to 27.8 t/d. Over the range of measured discharges, suspended transport accounts for the majority of the material in transport, especially at lower discharges (Figure 6).

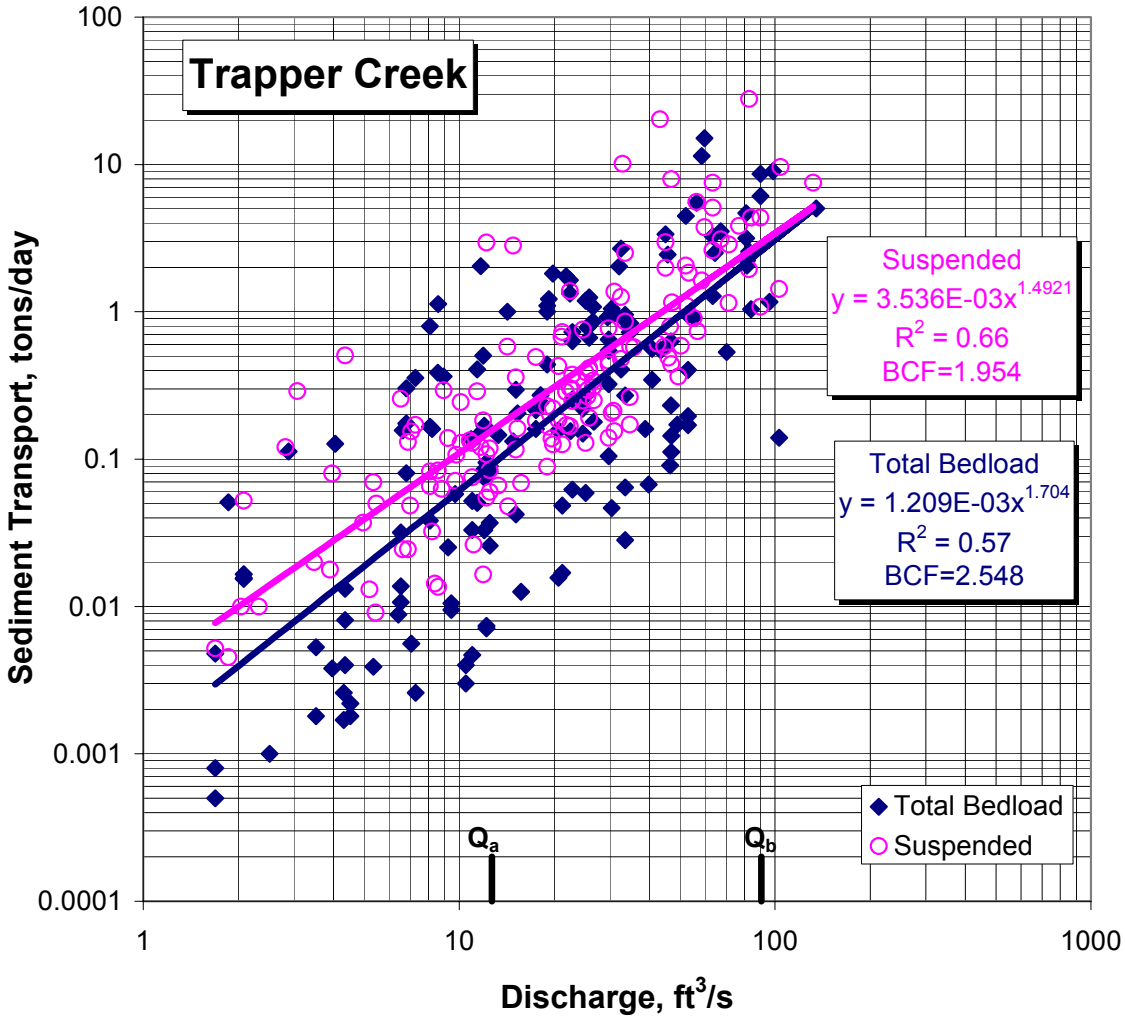

Figure 6. Bedload and suspended load transport rate versus discharge.

The bedload transport rates by size class (Figure 7) shows that the larger rates are associated with material 0.5 to 2 mm diameter. Only two bedload samples contained material larger than 32 mm diameter and these were at discharges of 81 ft^3/s and 84 ft^3/s.

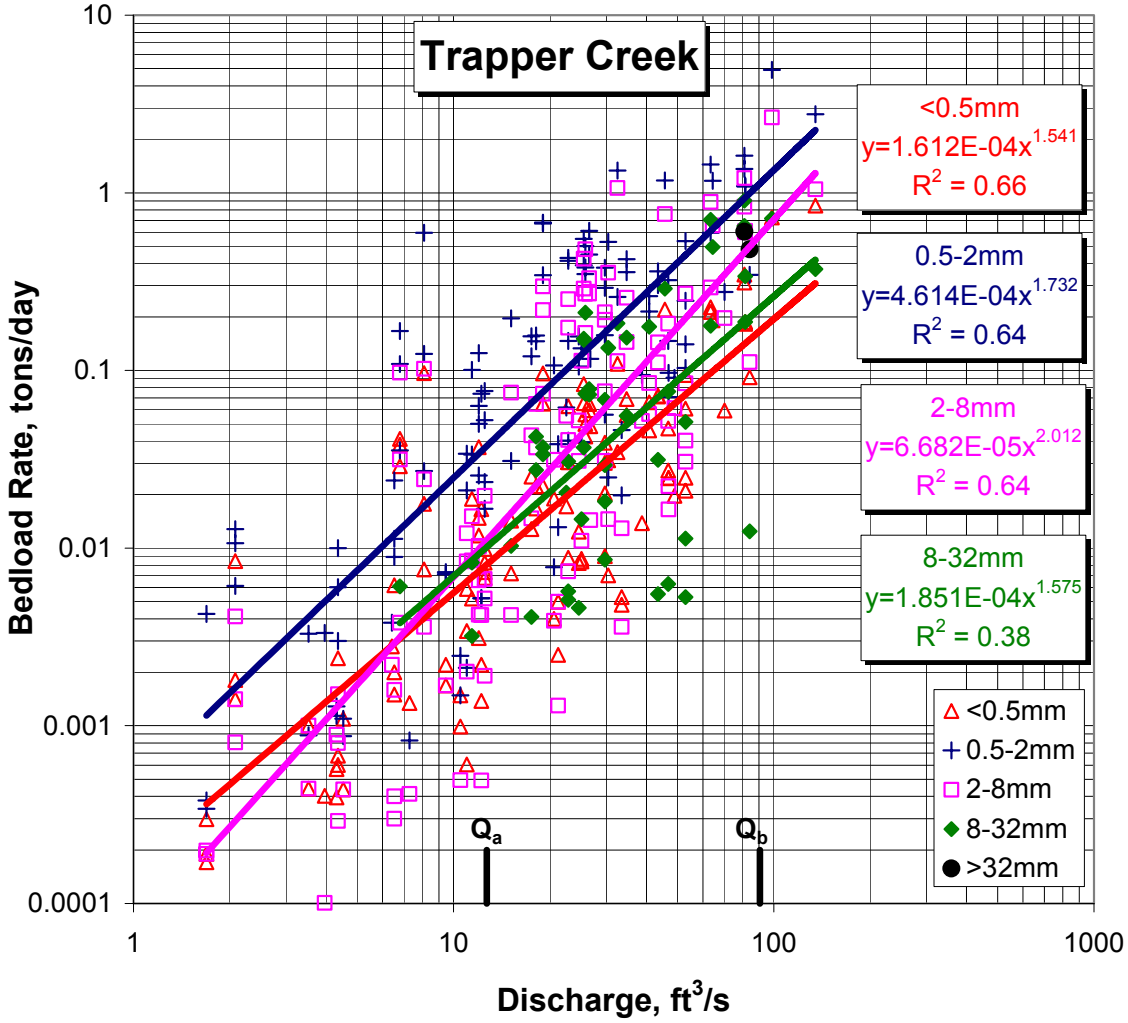

Figure 7. Bedload transport rate versus discharge for selected size classes.

The size of the largest particle in the bedload sample increased with discharge (Figure 8). The largest particle measured in a bedload sample was 41 mm at a discharge of 84 ft^3/s. Although the largest particle size increased with discharge, the D_{50} for the majority of the samples was <2 mm.

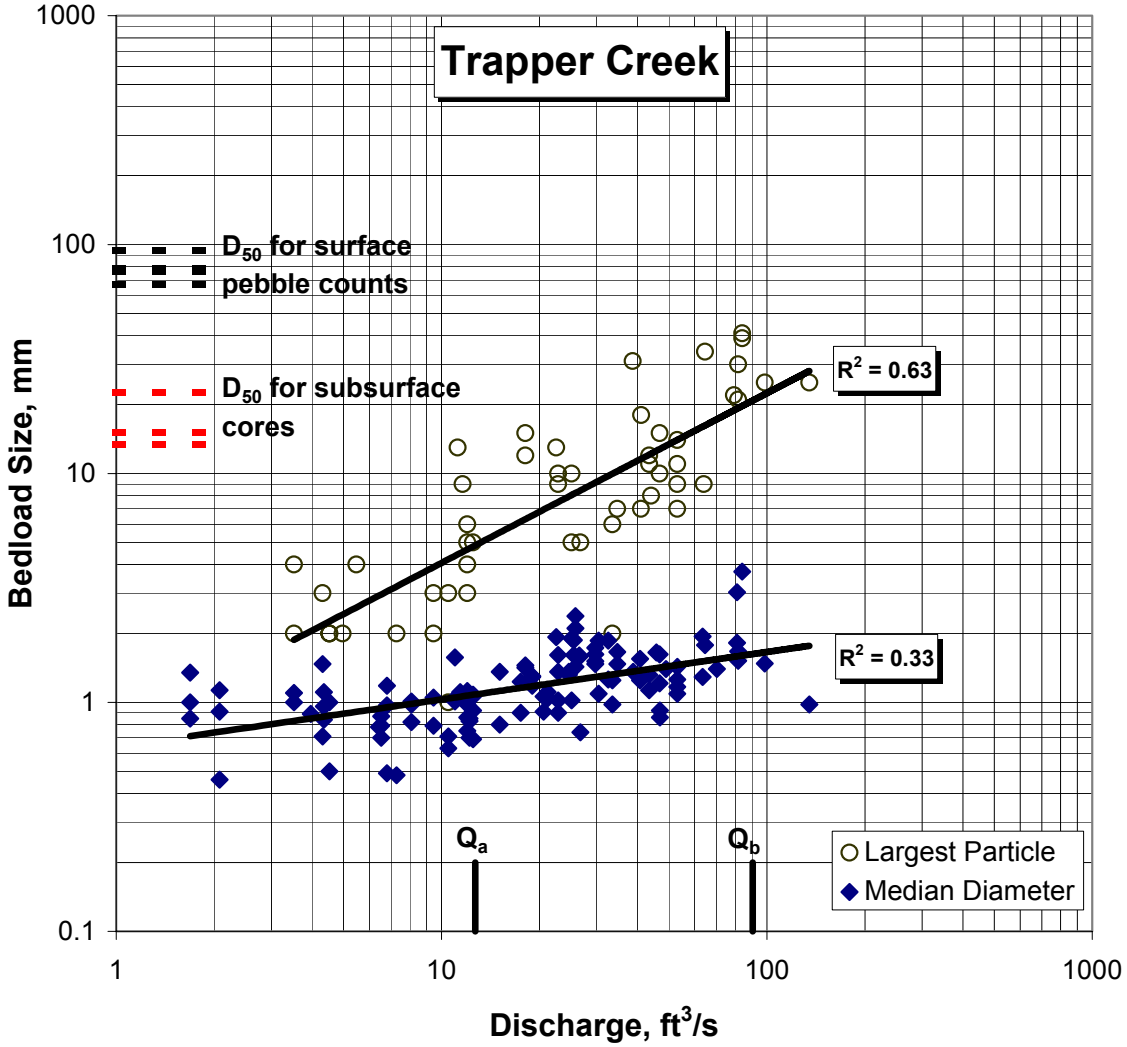

Figure 8. Largest particle in the bedload sample and median size of the sample versus stream discharge for the Trapper Creek site.