Q. How does BASINS calculate stream width and depth values during manual and automatic watershed delineation?

A. BASINS implements a neural network, developed by Muttiah, et.al. (1997) to predict two-year peak stream discharge based on drainage area and elevation. It then estimates width and depth from the equations: $W = 1.22Q^{0.557}$ and $D = 0.34Q^{0.341}$, derived from a regression analysis in Allen, et al (1994).

Muttiah, R.S., R. Srinivasan, and P.M Allen, 1997. Prediction of Two-year Peak Stream Discharges Using Neural Networks. J. American Water Resources Association. Vol. 33, No.3, June, 1997.
Summary: A neural network was trained separately for each two-digit USGS regional basin. Possible input parameters were limited to only those readily available from GIS operations. Each basin neural network was trained based on 75 to 1000 pairs of predicted and observed discharge values and then tested against an independent set of 47 to 559 test pairs. Best performance was found using just drainage area and elevation as independent variables. Correlation coefficients for the 17 regional basins ranged from 0.67 to 0.92 which compares favorably with previous regression results.

Allen, P.M., J.G. Arnold, and B.W. Byars, 1994. "Downstream Channel Geometry for Use in Planning-Level Models", Water Resources Bulletin. Vol. 30, No. 4, August, 1994.
Summary: Using 674 data sets from the literature, regressions were performed to identify the best-fit coefficients and exponents in the equations: $W = aQ^b$; $D = cQ^f$; and $V = kQ^m$ introduced by Leopold and Maddock (1953). Q was either bank-full discharge, two-year or 2.33 year frequency flows. Continuity requires that Q = WDV, so ack = 1 and b + f + m = 1. In the regression, Width, Depth and Velocity are treated as dependent variables with discharge (Q) independent, under the above continuity constraints. Width and depth predictions, made on an independent set of 41 data points showed, R-squared values of 0.95 and 0.87, respectively.
Leopold, L.B. and T. Maddock, 1953. "The Hydraulic Geometry of Stream Channels and Some Physiographic Implications", U.S. Geological Survey Professional Paper 252.