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SALT - A Better way of Estimating Suspended Sediment Discharge

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Hardware and software supporting a sediment sampling procedure--Sampling At List Time (SALT) have been perfected. SALT provides estimates of sediment discharge having improved accuracy and estimable precision. Although the greatest benefit of SALT may accrue to those attempting to monitor "flashy" small streams, its superior statistical properties should improve any suspended sediment monitoring program. Several studies have found that current methods of estimating sediment discharge commonly yield values that are 50 percent low. Without exception the precision and bias of such estimates are unknown. SALT estimators are unbiased and their precision can be estimated. SALT sampling requires the minimum number of sediment samples for any desired level of precision.

The SALT procedure uses a pumping sampler, a stage sensing device, and a Small battery-powered computer, to estimate total suspended sediment yield. Sampling is directed by estimates of suspended sediment transported during discrete time periods so that the probability of taking a sample is proportional to its estimated contribution to total sediment discharge. This sampling scheme gives unbiased estimates of total suspended sediment and its variance, and automatically emphasizes sampling at higher flow levels.

When applied to real data with known yield, this probability scheme underestimated total suspended sediment by only 0.6 percent. The estimate obtained using a flow-duration curve and sediment rating curve was 49.3 percent of the true value.