GUIDANCE FOR MAXIMIZING THE QUALITY AND QUANTITY OF SUSPENDED-SEDIMENT DATA

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An annual record of daily suspended-sediment discharges produced for a U.S. Geological Survey (USGS) streamgage requires suspended-sediment data that are representative of the flow past a river cross section. Depth-integrated isokinetic sampling by a hydrographer at appropriately selected, multiple cross-stream interval centroids by either or both of the Equal-Discharge-Increment (EWI) or Equal-Width-Increment (EDI) methods provide physical samples for subsequent laboratory analyses and use in computation of the daily sediment record. The expertise and attentiveness of the hydrographer, coupled with the sampling scheme used, can have a considerable and consequential influence on the reliability and cost-effectiveness of the derived sediment record.

An evaluation of largely controllable technical and cost factors supports the preferential use of the EDI method, with separate concentration analyses on each sample, for at least one of the two required depth-integrated cross-section sample sets. This conclusion stems from two primary considerations: The value of visually comparing the contents of individual samples to identify and discard bad samples, thus preempting their submission for laboratory analysis; and identifying concentration trends in the cross-section that, in concert with the information from the second sample set, represents a second opportunity to ferret out bad data.

The cost of individual concentration analyses for a single EDI set of six samples is about double that for a six-sample EWI composite-concentration analysis. However, the additional cost of the individually analyzed EDI sample set over that for an EWI composite-concentration analysis – about 1.3 percent – pales in comparison to the annual funding requirements for producing a daily sediment record.

Preventing erroneous sample data from degrading the quality of the sediment record – and permanent storage in the USGS National Water Information System – is desirable for the sake of the accuracy of the records produced, database integrity, and return on investment. The combined cost of composite analyses on two cross-section sample sets as a percentage of total station costs is not substantially less than that for one sample-set composite analysis plus one EDI sample set analyzed to produce concentration values for each sample. Coupled with enhanced data reliability, the added cost of the latter approach is readily justifiable as a cost-effective “sediment-data quality-assurance policy.”

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