

GENERALIZED SEDIMENT TRANSPORT COMPUTER MODELS

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Abstract

The U.S. Bureau of Reclamation has developed a series of computer models (GSTAR) for the simulation and prediction of sediment transport, scour, and deposition processes in alluvial rivers and reservoirs. GSTARS, GSTARS 2.0/2.1 and GSTARS3 are based on the stream tube concept using one-dimensional approach along stream tubes to obtain a semi-two-dimensional variation of the hydraulic conditions in rivers and reservoirs. The hydraulic conditions coupled with uneven distribution of scour and deposition among stream tubes can give a semi-three-dimensional variation of the bed geometry. The theory of minimum stream power is used to determine the optimum channel width and geometry. GSTARS, GSTARS 2.0/2.1 and GSTARS3 are intended for quasi-steady flows. GSTAR-1D is a one-dimensional steady and unsteady flow and sediment transport model. It can also model cohesive sediment transport, internal boundary conditions, and stream network. It does not include the same minimization methods of previous GSTARS models.

The Generalized Sediment Transport models for Alluvial Rivers (GSTAR) have been used by many organizations and universities around the world for engineering, research, and teaching purposes. Examples of applications will be presented to illustrate the capabilities of using these models for solving engineering problems.