

Publications



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Sediment Transport in the Lower Guadalupe and San Antonio Rivers

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Texas law requires that fresh water inflows into coastal regions be maintained at adequate levels for an ecologically sound environment; however, very limited data are available on the relation between river flow and sediment transport to coastal regions. This study was undertaken to analyze existing data and to collect field data for the lower part of the Guadalupe River and the San Antonio River. The primary sampling locations were at the U. S. Highway 59 bridges in Victoria for the Guadalupe River and in Goliad for the San Antonio River.

No existing data on bedload transport were located. The first part of the analysis of existing data therefore centered on possible correlations of suspended sediment concentrations with simultaneous flow rate, with flow rates which occurred before the sediment concentrations were measured, with particle fall velocity, and with the phase of the hydrograph when the sediment samples were collected. The primary correlation was between the concentration and the simultaneous river flow rate. Even though there is a large amount of scatter in this correlation, none of the other variables was important enough for all of the data to provide any reduction in the scatter. The second part of the analysis of existing data related to which percentage of the flows carries which percentage of the suspended sediment. This analysis confirmed the conventional wisdom that the large majority of the suspended sediment is carried by the infrequent large flows.

Because of the very low flows which existed during most of the project period, somewhat more emphasis than originally planned had to be placed on the analysis of existing data. Nevertheless, several sets of field data were collected. A pumping sampling system was tested in order to provide enough sediment for grain size analysis. The concentrations of the pumped samples compared favorably with the traditional P-61 sampling technique. Therefore, this system was used for some of the samples. A few bedload samples were collected; Very limited data indicated that the bedload transport rates are much smaller than the suspended load transport rates. The two largest sets of data were collected on the Guadalupe River at Victoria in April 1990 and on the San Antonio River at Goliad in July 1990. The grain size distributions for various phases of the hydrographs showed very little variations, and there were also very small differences in the suspended grain sizes for the Guadalupe and San Antonio Rivers. For the particular events sampled during these two Held trips, there appeared to be a good correlation between the flow rate and the sediment concentration for the test on the Guadalupe River while there was clearly a

significant lag between the flow hydrograph and the suspended sediment hydrograph for the San Antonio River.

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