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Hydrologic Data Development System

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ABSTRACT

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The Hydrologic Data Development System (HDDS) is a package of spatial data and menu-driven programs that allows user-interactive determination of hydrologic parameters and estimation of flood frequency relationships for the design of highway drainage structures. The program employs Arc/Info, a commercial geographic information system.

A data base was developed to cover the extent of Texas at a scale of 1:2,000,000 and a smaller sample area of Northeast Texas at a scale of 1:250,000. The data include digital elevation models, major highways, soil characteristics, design rainfall depth/frequency/duration, land use, stream gauge sites, and other themes. New tables were developed to spatially relate soil characteristics and land use to runoff coefficients used in the Soil Conservation Service Runoff Curve Number method.

Spatial analysis techniques were employed to define watershed outlets and determine important hydrologic parameters. The system delineates drainage boundaries and flow paths using relevant digital elevation data, and overlays other data layers to determine parameters such as average watershed slope, time of concentration, area-weighted runoff curve numbers, and area-weighted design rainfall. Input files can be established and submitted to THYSYS, the Texas Department of Transportation hydraulic program, to determine flood frequency relationships. The results can then be used for the design of drainage structures.

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