DWR Delta Simulation Model (DWR/DSM)

Purpose: DWR/DSM was developed to simulate Delta hydrodynamics and salinity.

CALFED Potential: This model will be replaced by DSM2.

Approach: One-dimensional; explicit, finite difference method of characteristics solution of dynamic wave equations; Lagrangian salinity transport model; rectangular channels.

Input Data: Input includes data on boundary conditions (Golden Gate tide stage, flow at Sac/Vernalis, and smaller inflows); incremental operation of structures (cross-Delta channel near Walnut Grove, Suisun Marsh Salinity Control Gate, Clifton Court Forebay tidal gates, other planned South Delta gates, agricultural diversions [260 nodes representing 1,700 actual] and returns [110 nodes] based on survey data [estimated monthly but adjusted for precipitation] trying to use remote sensing for soil moisture); can use DWRSIM for inputs to simulations run at monthly time-step with DWRDSM.

Methods: Code is based on Fisher Model; method of characteristics for solution of hydrodynamics; Lagrangian transport solution for salinity; 15-minute time-step or larger scale depending on application, although as an explicit model, smaller time-steps provide better stability of solution; uses rectangular cross-sectional geometry.

Results: Output includes data on velocity, flow, stage, and salinity.

Applications: Specifically developed for the Delta; broadly applied typically in one of two modes - verification of historical events/planning; hydrodynamic module has been calibrated using stage data May 1988 and verified for stage, velocity, and flow for May and December 1988, February and April 1989. Salinity module was calibrated for May through August 1988 and verified for August through December 1988. Other calibration/verification efforts have used May 1988. DWR used the model to analyze effects of structures on Delta circulation/salinity. DWR verified DSM for the South Delta using April 1993 (no barrier at Old River) and July-August 1992 (barrier in place); DSM replaced DWOPER for hydraulic analysis of Delta. MWD is a new user and has run an isolated facility (hypothetical) case study for diversion at Hood.

Documentation: DWR, 1991-94. Methodology for Flow and Salinity Estimates in the Sacramento-San Joaquin Delta and Suisun Marsh, 12th-15th annual progress report to SWRCB.

Source: License for the Fisher Model must be obtained to use DWR/DSM. Contact Chris Enright, DWR; Francis Chung, DWR HQ; Kamyar Guivechi, DWR Central; Ralph Finch, DWR; Carl Jacobs, DWR; Chuching Wang, MWD.