

Fischer Delta Model Version 8

Purpose: The Fischer Delta Model was developed to simulate hydrodynamics and salinity distribution in the Sacramento-San Joaquin Delta.

CALFED Potential: The model has been incorporated into many models (e.g., DWR/DSM) and has a high potential for use in CALFED alternatives analysis (e.g., isolated facility).

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

Input Data: Input includes data on Delta flow geometry, friction factors (Manning's n), monthly average Delta inflows and diversions (from DWRSIM), agricultural return flows applied at 23 locations throughout the Delta, monthly-averaged rainfall and precipitation based on historical records for 1922-1978, and 19-year mean tide at Eckley in Carquinez Strait.

Methods: This model comprises five subroutines (GEOM, DELFLO, HYDROL, ENDSAL, and DELSAL). GEOM provides dimensions of Delta channels. DELFLO uses a finite difference scheme and the method of characteristics to solve one-dimensional transport equations (continuity and momentum). Delta channel flows are computed at 90 second intervals. DELSAL calculates total dissolved solids concentration at 15 minute intervals using a Lagrangian approach (discrete volume elements move along the channel subject to longitudinal dispersion, inflow, and outflow).

Results: DELFLO provides surface-water elevation and flow; DELSAL provides total dissolved solids, chloride or other conservative constituent concentrations.

Applications: The model has been used to simulate the effects of hydraulic barriers, Delta Cross Channel operations, salinity at potential intake structures for the Los Vaqueros reservoir, and the effects of an isolated facility at Hood.

Documentation: Fischer, 1982. DELFLO and DELSAL flow and transport models for the Sacramento-San Joaquin Delta in Reclamation, 1987, Kellogg Unit Reformulation Study Planning Report/draft Environmental Statement Water Quality and Hydrology Appendix.

Source: Hugo B. Fischer, Inc.