

A Three-Dimensional Model of Saltwater Intrusion in Kings and Queens Counties, New York

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A Three-dimensional version of the U.S. Geological Survey's SUTRA ground-water flow model code (acronym for Saturated-Unsaturated TRANsport, available at <http://water.usgs.gov/software>) is being tested for simulation of saltwater intrusion in the ground-water system of Kings and Queens Counties on Long Island, New York. This model solves two equations: a fluid mass balance for unsaturated and saturated ground-water flow, and a solute mass balance. The solute concentration corresponds to the mass fraction of total dissolved solids, and density dynamics driven by solute concentration are accounted for. An extensive geographic information system of the region is the basis for representing complex model geometry and boundary conditions in three dimensions. The direct-banded matrix solver that is typically used with two-dimensional SUTRA models has large computer-memory and processing requirements and was replaced by an iterative solver.