LISTINGS OF MODEL-INPUT VALUES FOR THE SIMULATION OF GROUND-WATER FLOW IN THE MESILLA BASIN, DOÑA ANA COUNTY, NEW MEXICO, AND EL PASO COUNTY, TEXAS

Supplement to Water-Resources Investigations
Report 91-4155 and to Open-File Report 88-305

By Peter F. Frenzel

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ABSTRACT

This report contains listings of model input values (two diskettes) for the simulation of ground-water flow in the Mesilla Basin in Doña Ana County, New Mexico, and El Paso County, Texas. This simulation used the code for a modular, three-dimensional, finite-difference, ground-water flow model previously developed by the U.S. Geological Survey; the code also contains an added river package (RIV2). This report also contains a listing of the Fortran 77 code for the RIV2 package.

INTRODUCTION

This report contains listings of model input values (two diskettes) for the simulation of ground-water flow in the Mesilla Basin in Doña Ana County, New Mexico, and El Paso County, Texas. This simulation was done by Frenzel (1992) using the code for a modular, three-dimensional, finite-difference, ground-water flow model developed by McDonald and Harbaugh (1988) as altered by Miller (1988). Miller's (1988) RIV2 package was used in place of the river package of McDonald and Harbaugh (1988). In addition to required model input, this report contains a listing of the Fortran 77 code for the RIV2 package. The listings in this report are on 360-kilobyte IBM-PC[1] compatible diskettes.

[1]Use of trade names in this report is for identification purposes only and does not constitute endorsement by the U.S. Geological Survey.

LISTINGS OF MODEL-INPUT VALUES

Anticipated ground-water withdrawals in the Mesilla Basin might decrease streamflow in the Rio Grande and thus decrease the quantity of water that is available to downstream users. A previous model (Frenzel and Kaehler, 1990) was revised to assess the effects of existing ground-water withdrawals on streamflow in the Rio Grande and to provide a tool for the assessment of the effects of future ground-water withdrawals. The revision included a 10-year extension, from 1975 through 1985, of the original simulation period and a decrease in the simulated depth of the basin fill that is based on recent geologic interpretations.

The basin forms a three-dimensional ground-water system. The lateral extent and depth of the system are defined by bedrock that has values of hydraulic conductivity that are much less than those of the basin fill. Most flow into and out of the ground-water system occurs at or near land surface in the Mesilla Valley and is the result of a complex interaction of the river, drains, canals, evapotranspiration, and water withdrawals from wells (Frenzel and Kaehler, 1990).

The model has 4 layers, 36 rows, and 64 columns, and features a stream boundary that keeps an account of the simulated streamflow of the river and drains. The simulated river and drains gain and lose flow at various places along their length, and losses at any point are limited to no more than the simulated streamflow at that point.

Each input listing in this report contains values for a particular modular-model package as defined and described by McDonald and Harbaugh (1988) with the exception of the "river package." River input is for the RIV2 package developed by Miller (1988). Listing names on the diskettes have a numeric suffix. Listing 1 is the Fortran 77 source code for the RIV2 package. Model-input values for the steady-state simulation are contained in listings 2-8, and input values for the transient simulation are contained in listings 9-14. Listing 6 is for both simulations.

Listing name	Description
RIV2.L1	Fortran 77 program for the RIV2 package.

Input for the steady-state simulation:

SSBASIC.L2	Basic package
SSBCFIN.L3	Block-centered flow package
SSET.L4	Evapotranspiration package
SSRIVER.L5	RIV2 river package
SSSIPIN.L6	Strongly Implicit Procedure package
SSWELLS.L7	Well package
SZOCTRL.L8	Basic package output control option

Input for the transient simulation:

TRBASIC.L9	Basic package
TRBCFIN.L10	Block-centered flow package
TRET.L11	Evapotranspiration package
TRRIVER.L12	RIV2 river package
TRWELLS.L13	Well package
TZOCTRL.L14	Basic package output control option

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