LISTINGS OF MODEL INPUT VALUES FOR THE SIMULATION OF GROUND-WATER FLOW IN THE SAN ANDRES-GLORIETA AQUIFER IN THE ACOMA EMBAYMENT AND EASTERN ZUNI UPLIFT, WEST-CENTRAL NEW MEXICO

Supplement to Water-Resources Investigations Report 91-4099

By Peter F. Frenzel

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MANUEL LUJAN, JR., Secretary

U.S. GEOLOGICAL SURVEY

Dallas L. Peck, Director

For additional information
write to:

District Chief
U.S. Geological Survey
Water Resources Division
Pinetree Corporate Centre
4501 Indian School Rd. NE, Suite 200
Albuquerque, New Mexico 87110

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ABSTRACT

This report contains listings of model input values for the simulation of ground-water flow in the San Andres-Glorieta aquifer in the Acoma embayment and eastern Zuni uplift, west-central New Mexico. These simulations were developed by Frenzel (Frenzel, P.F., 1992, Simulation of ground-water flow in the San Andres-Glorieta aquifer in the Acoma embayment and eastern Zuni uplift, west-central New Mexico: U.S. Geological Survey Water-Resources Investigations Report 91-4099). The simulation used a digital ground-water flow model and 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 for the simulation of ground-water flow in the San Andres-Glorieta aquifer in the Acoma embayment and eastern Zuni uplift in west-central New Mexico. This simulation was done by Frenzel (1992) using the ground-water flow model code of McDonald and Harbaugh (1988) as altered by Miller (1988). Miller's RIV2 package was used in place of the RIVER package of McDonald and Harbaugh. 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.

The San Andres-Glorieta aquifer and overlying valley fill were studied in cooperation with the New Mexico State Engineer Office, the Pueblo of Acoma, the Pueblo of Laguna, and the U.S. Bureau of Indian Affairs. The purpose was to determine the effects of current and projected ground-water development on flow in the Rio San Jose and on hydraulic heads in the San Andres-Glorieta aquifer.

A digital ground-water flow model was constructed with 2 layers, 76 rows, and 43 columns. A steady-state simulation was used to provide initial conditions for the transient (historical-projection) simulation. The steady-state simulation was the same as the transient except for time-dependent features including storage; and variable recharge, streamflows, underflows, and ground-water withdrawals.

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

Historical ground-water withdrawals and recharge were simulated from the fall of 1899 to the fall of 1985 (historical scenario), and projections were made to 2020 ("Acoma scenario"). Measured hydraulic heads and streamflows were matched by the simulated values. In the projections, the 1986 level of water development was simulated; in addition, a withdrawal of 10,000 acre-feet per year from the San Andres-Glorieta aquifer near the west side of the Pueblo of Acoma was simulated ("Acoma scenario").

A no-development transient simulation ("null scenario") excluded the effects of surface-water impoundment and historical and projected ground-water withdrawals. Historical weather-related recharge was simulated, as were estimated streamflows. The projected part of the null scenario used steady-state values of recharge and streamflow.

LISTINGS OF MODEL INPUT VALUES

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). Model-input values for the steady-state simulation are contained in the first eight listings. Model input values for the transient simulation (standard) are contained in the next eight listings. The standard is comprised of the historical and Acoma scenarios. Model input values for two packages for the null scenario are contained in the next two listings. For the other packages, the null scenario uses the same input as does the standard. The last listing is the Fortran 77 source code for the RIV2 package.

Listing name	Package or description
	Input for the steady-state simulation:
SSBASIC	Basic package
SSBCFIN	Block-centered flow package
SSET	Evapotranspiration package
SSGHB	General head package
SSRIVER	RIV2 river package (Miller, 1988)
SSSIPIN	Strongly implicit procedure package
SSWELLS	Well package
SZOCTRL	Basic package, output control option
	Input for the transient simulations, historical and Acoma scenarios:
TRBASIC	Basic package
TRBCFIN	Block-centered flow package
TRET	Evapotranspiration package
TRGHB	General head package
TRIVER	RIV2 river package (Miller, 1988)
TRSIPIN	Strongly implicit procedure package
TRWELLS	Well package
TZOCTRL	Basic package, output control option
	Input for the null scenario:
UTRIVER	RIV2 river package (Miller, 1988)
UTRWELLS	Well package
	Source code:
ZRIV2F77	Fortran 77 program for the RIV2 package

REFERENCES CITED

Frenzel, P.F., 1992, Simulation of ground-water flow in the San Andres-Glorieta aquifer in the Acoma embayment and eastern Zuni uplift, west-central New Mexico: U.S. Geological Survey Water-Resources Investigations Report 91-4099, 381 p.

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Miller, R.S., 1988, User's guide for RIV2--A package for routing and accounting of river discharge for a modular, three-dimensional, finite-difference, ground-water flow model: U.S. Geological Survey Open-File Report 88-345, 33 p.