Documentation of Model Input and Output Values for Simulation of Ground-Water Flow in Carson Valley, Douglas County, Nevada, and Alpine County, California

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DISKETTE

(In pocket at back of report)

High-density, double-sided, soft-sectored, 5-1/4-inch diskette with text, input, and output files

CONVERSION FACTORS

Multiply	*By*	*To obtain*
inch (in.)	0.3048	millimeter
mile (mi)	1.609	kilometer

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ASTRACT

Documentation of model input values and output from calibration of a ground-water model for Carson Valley, Nevada and California, has not been published previously. In this report, the documentation, consisting of a listing of input values and calibration output, is contained on a 5-1/4-inch diskette in files presented in the American International Standard Code for Information Interchange (ASCII) format. These files require approximately 1 megabyte of disk space on an IBM-compatible microcomputer using the MS-DOS operating system.

INTRODUCTION

Ground-water flow in Carson Valley was studied from 1980 to 1985 and a two-layer digital model was developed using a computer program written by McDonald and Harbaugh (1988). The computer model is written in a modular structure consisting of independent "packages" to facilitate changes in the types of hydrologic conditions being simulated without changing subroutines in the program. Results of the modeling effort are given by Maurer (1986).

Although the report by Maurer summarizes the application of the model to the hydrologic setting in Carson Valley, a detailed listing of model input values and calibration output has not been published previously. The purpose of this report, which supplements the report by Maurer, is to document the values used in simulations.

The location of the model grid superimposed on the basin-fill aquifer in Carson Valley is shown by Maurer (1986, figure 12). The individual grid cells are 1-mile square and the grid consists of 19 rows and 14 columns. The grid corners are located at the following points:

Corner	North latitude	West longitude
Northwest	39° 7′ 16"	119° 50′ 26"
Northeast	39° 7′ 16"	119° 34′ 52"
Southeast	35° 50′ 4"	119° 34′ 52"
Southwest	35° 50′ 4"	119° 50′ 26"

The two layers of the model and the areal extent of both layers are shown by Maurer (1986, figure 12). All boundaries are no-flow boundaries except for the east side of the model, where a constant-flux boundary is used. Active packages of the modular model for these simulations are: basic, block-centered flow, evapotranspiration, river, recharge, well (transient simulation only), output control, and strongly implicit procedure solver packages. A modified version of the river package of the McDonald and Harbaugh model (1988, p. 6-17) was used to simulate interaction between the surface-water and ground-water systems in Carson Valley and is herein called the stream-flow diversion package. The modified version is described in detail by Prudic (1989), and labeled "DIV" in tables 1 and 2.

Both steady-state and transient simulations were summarized by Maurer (1986). The transient simulation covered a 3-year period, water-years 1981 to 1983, with 12 quarterly stress periods.

INPUT AND CALIBRATION OUTPUT FILES

The original input files and output for the flow model were stored on a Prime computer and transferred to an IBM-compatible microcomputer (operating under MS-DOS version 3.3). Files on the diskette are the same as the original Prime computer files and are presented in the American International Standard Code for Information Interchange (ASCII) format.

Although the model program can be used on a variety of computers, the input files might have to be modified to be compatible with the specific computer and compiler being used. The computer program, written in Fortran 77, is not included on the diskette.

Both the input files and the model output are on a high-density, double-sided, soft-sectored diskette with a capacity of 1.2 megabytes. The root directory on the diskette contains one file named README.DOC (a copy of the printed text of this report) and three subdirectories: (1) SS.IP, input files for the steady-state calibration simulation, (2) TRAN.IP, input files for the transient calibration simulation, and (3) OUTPUT, output files for both steady-state and transient simulations. Tables 1 through 3 show the contents of the subdirectories and descriptions of the files.

Files in tables 1 and 2 labeled ".DTA" are master files containing a continuous listing of all records required for input to each active package in the modular model. Following the basic, block-centered flow, evapotranspiration, and streamflow diversion master files are names and descriptions of individual data files used in each package in the order they appear in the ".DTA" file. For table 2, the ".DTA" master files also contain all records required for the 12 stress periods of the transient simulation. In the basic and block-centered flow packages the same data files are used for each stress period; however, for the evapotranspiration and river packages, individual data files following the master ".DTA" files include only data for the first stress period as examples.

Data contained in the files are in units of feet and seconds. Record lengths and sizes of the input master files are shown in tables 1 and 2. The record length of the model output is 132 characters.

TABLE 1.--*Steady-state input files with maximum record length and size of master files labeled ".DTA." Following the basic input, block-centered-flow, evapotranspiration, and streamflow diversion packages are descriptions of individual data files contained in the master file*

[Symbol: --, included in master ".DTA" file]

File	Maximum record length (characters)	Size (bytes)	Description
BASIC.DTA	120	3,385	Basic input package
IBOUND.TOP	--	--	Array showing active grid cells with a "1," top layer
IBOUND.BOT	--	--	Array showing active grid cells with a "1," bottom layer
SHEAD.TOP	--	--	Starting heads, top layer
SHEAD.BOT	--	--	Starting heads, bottom layer
BCF.DTA	80	7,660	Block-centered-flow package
COND.LR1	--	--	Hydraulic conductivity, top layer
BOT.LR1	--	--	Altitude of bottom, layer 1
VCONT	--	--	Vertical conductance between layers 1 and 2
COND.LR2	--	--	Hydraulic conductivity, bottom layer
BOT.LR2	--	--	Altitude of bottom, layer 2
TOP.LR2	--	--	Altitude of top, layer 2
ET.DTA	80	1,632	Evapotranspiration package
ET.LND	--	--	Altitude of land surface at cells where evapotranspiration is simulated
ER.RT	--	--	Rate of evapotranspiration and extinction depth
DIV.DTA	80	7,861	Streamflow diversion package
DIV.RCH	--	--	Row, column, and layer, altitude of stream stage, diversion rate, and altitude of stream bottom for stream reaches
DIV.ORD	--	--	Order of tributaries and diversions of stream reaches
RECH.DTA	80	999	Recharge package listing layer, row, column, and recharge rates for model cells
OC.DTA	80	168	Output control package
SIP.DTA		74	Strongly implicit procedure package
Total bytes		21,779	

TABLE 2.--*Transient input files with maximum record length and size of master files labeled ".DTA." Following the basic input, block-centered-flow, evapotranspiration, and streamflow diversion packages are descriptions of individual data files contained in the master file*

[Symbol: --, included in master ".DTA" file]

File	Maximum record length (characters)	Size (bytes)	Description
BASIC.DTA	120	4,798	Basic input package
IBOUND.TOP	--	--	Array showing active grid cells with a "1," top layer
IBOUND.BOT	--	--	Array showing active grid cells with a "1," bottom layer
SHEAD.TOP	--	--	Starting heads, top layer
SHEAD.BOT	--	--	Starting heads, bottom layer
BCF.DTA	80	10,383	Block-centered-flow package
SPY.LR1	--	--	Primary storage factor, specific yield, layer 1
COND.LR1	--	--	Hydraulic conductivity, top layer
BOT.LR1	--	--	Altitude of bottom, layer 1
VCONT	--	--	Vertical conductance between layers 1 and 2
STOR.LR2	--	--	Primary storage factor, storage coefficient, layer 2
COND.LR2	--	--	Hydraulic conductivity, bottom layer
BOT.LR2	--	--	Altitude of bottom, layer 2
STOR2.LR2	--	--	Secondary storage factor, specific yield, layer 2
TOP.LR2	--	--	Altitude of top, layer 2
ET.DTA	80	19,270	Evapotranspiration package
ET.LND	--	--	Altitude of land surface at cells where evapotranspiration is simulated, first quarter
ET.RT	--	--	Rate of evapotranspiration and extinction depth, first quarter
DIV.DTA	80	93,222	Streamflow diversion package
DIV.RCH	--	--	Row, column, and layer, altitude of stream stage, diversion rate, and altitude of stream bottom for stream reaches, first quarter
DIV.ORD	--	--	Order of tributaries and diversions of stream reaches, first quarter

TABLE 2.--*Transient input files with maximum record length and size of master files labeled ".DTA."*--Continued

File	Maximum record length (characters)	Size (bytes)	Description
RECH.DTA	80	11,746	Recharge package listing layer, row, column, and recharge rates for model cells, 12 stress periods
WELL.DTA	80	22,383	Well package listing layer, row, column, and pumpage rate at assigned cells, 12 stress periods
OC.DTA	80	6,090	Output control package
SIP.DTA	80	74	Strongly implicit procedure package
Total bytes		167,966	

TABLE 3.--*Size and description of steady-state and transient calibration output*

File	Size (bytes)	Description
SS.LST	90,020	Output for steady-state calibration simulation
TRAN.LST	722,482	Output for transient calibration simulation
Total bytes	812,502	

REFERENCES CITED

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