

Wisconsin Geological and Natural History Survey Open-File Report 2004-01
Simulation of regional groundwater flow in southeastern Wisconsin
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The Wisconsin Geological and Natural History Survey (WGNHS) and the U.S. Geological Survey (USGS) have completed the majority of the work on the regional groundwater flow model for southeastern Wisconsin. Two draft reports, one describing model construction and calibration and one presenting and interpreting model results, have been submitted to the Southeastern Wisconsin Regional Planning Commission and to the municipalities and utilities that funded the project. We are also preparing to have these reports peer reviewed so that they can be formally published.

In the interest of encouraging use of the model and in response to requests from consultants and academics, we are making the model and the draft reports available as this open-file report from the WGNHS. The model work is still preliminary in the sense that it is subject to modification and has not yet been subjected to peer review. However, the WGNHS and USGS are not supporting the model at this time nor are we yet posting databases associated with the model. Although we may be available to answer some questions, we will not help users run or modify the model or do troubleshooting. We are not responsible for any model results generated outside our agencies.

Instructions

The model consists of two phases - a steady-state predevelopment simulation (root name SS_v1) and a transient simulation with pumping wells that extends from 1864 to 2000 (root name TRAN_v1). All input files for these runs are posted. The simulations are also posted as Groundwater Vistas (GWV) files called SS_v1.gwv and TRAN_v1.gwv. GWV can be used to regenerate input files and analyze output. Base maps called by the two GWV files are posted.

Using either standard MODFLOW96 derived from the USGS Web site or the GWV version of MODFLOW96, the steady-state and transient simulations can be performed. The head output from the steady-state model is the initial condition for the transient simulation. The user might want to change the name of the simulations in GWV by using the MODEL> MODFLOW> PACKAGES option. The default path for the model is C:\SEWI. The user can change the directory where input and output files are stored in GWV by using the MODEL>PATH TO MODELS menu as well as the map directory under PLOT>MAP OVERLAYS.

GWV reads and writes files in binary format. Standard Modflow96 reads and writes files in unformatted format. As a result, the starting head condition for GWV Modflow must be a binary file and the starting head condition for Standard Modflow96 must be an unformatted file (see comments in SS_v1.LOG and TRAN_v1.LOG). Starting head files in both formats are provided.

The 18-layer model has many special elements and features. For example, the spatial zonation of the vertical hydraulic conductivity values is different than the zonation of horizontal hydraulic conductivity. In GWV vertical hydraulic conductivity is stored under the LEAKAGE array in GWV. Also, well pumping by stress period is input to GWV through the analytic well option - only the sanitary deep tunnel under Milwaukee is input directly as MODFLOW nodes. Inactive nodes are flagged with the value -1000 and dry nodes are flagged with the value -900, but the wet/dry option is not active. Other characteristics of the model will be easier to understand in the context of the first report on model construction and calibration.

The user is cautioned that results using standard Modflow96 will not exactly match results using GWV Modflow because of differences in how the source code was compiled and differences in formatting (single versus double precision). However, the results will be substantively identical.

This CD-ROM contains all files needed to perform the steady-state and transient simulations without the aid of a modeling interface. To use GWV, you will need to purchase Version 3 (or higher when available) and it might be necessary to download the most recent compilation of the GWV code. When opening the GWV files for this project, it is sometimes necessary to use the command PLOT>MAP> WINDOW and outline the display window with the cursor to reset label fonts.

Contents of CD-ROM

The CD-ROM contains four *.zip files:

1. GWVFILES.zip contains all files necessary to run simulations from the GWV interface. The contents are listed in GWVFILES.lst.
2. INPUT.zip contains all files necessary to run simulations using Standard Modflow96. The contents are listed in INPUT.lst.
3. SELECTED_OUTPUT.zip contains for the steady-state simulation the list output in ASCII format and the head output in binary format. For the transient simulation it contains the list output in ASCII format and the drawdown output in binary format. The contents are listed in SELECTED_OUTPUT.lst.
4. CONVERT_FORMAT.zip contains a program to convert binary output files to unformatted format (BIN2UNF.EXE) and a program to convert unformatted output files to binary format (UNF2BIN.EXE). They can be used on Modflow output files containing matrices for head, drawdown, and various flux types. The contents are listed in CONVERT_FORMAT.lst.

The programs WINZIP or PKUNZIP can be used to unzip the 4 zip files.

The CD_ROM also contains the file WOFR_2004-01, a report in two parts that describes the model and our results. The readme file (this file) is included in PDF and TXT formats.

System Requirements

Software

- * Adobe Acrobat Reader (6.x or higher)
- * Adobe Acrobat (6.x or higher)
- * GSView

To read/view PDF files, obtain and install the latest version of Adobe Acrobat Reader (available at no charge from <<http://www.adobe.com/>>) or GSView (available at no charge from <<http://www.cs.wisc.edu/~ghost/>>).

*To perform analyses, the user will also need MODFLOW96 derived from the USGS Web site (<<http://water.usgs.gov/nrp/gwsoftware/modflow/modflow-96h.html>>) or the Groundwater Vistas version of MODFLOW96.

Hardware/operating system

- * Intel Pentium or equivalent processor with Microsoft Windows 95, 98 SE, Windows Millennium, Windows NT4.0 with Service Pack 6, Windows 2000, Windows XP or higher operating system
- * At least 128 MB RAM (256 MB or greater recommended)
- * VGA color graphics system

The information we are providing here is preliminary and may change as we finalize the model and review our reports. The USGS and WGNHS are not

responsible for any model outputs or predictions generated by outside users based on usage of this model.

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