

# SOFTWARE REVIEW

## THWELLS

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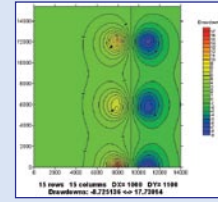
THWELLS is an analytical solution that calculates the drawdown or buildup of piezometric head caused by multiple pumping or injection wells. The model can be used for a confined, leaky, or unconfined aquifer based on the assumptions that the aquifer is homogeneous, isotropic, uniformly thick, and of infinite extent. It is ideal where geology and hydrologic conditions are fairly simple and the required information about the aquifer (such as hydraulic conductivity, storage coefficient, and saturated thickness) is reliable. THWELLS is an interactive DOS-based program. Data entry is facilitated through a sequence of screens. Results can be viewed in table format or graphically on screen or in a file, and saved for post-processing. The graphic display includes both time-drawdown curves for selected locations and contour plots for a user-specified time.

A THWELLS model can be constructed quickly and provides reliable results when applied to an appropriate setting. Computational accuracy has been verified by comparing results with those obtained using IMAGEW-1, WALTON35, CAPZONE, and GWFLOW. Boundary effect can be considered using image wells.

A primary weakness of THWELLS is that graphic results cannot be routed directly to a printer. Instead, a Surfer-compatible ASCII file, containing grid information and calculated drawdowns, is generated for presentation of contours and other post-processing tasks. Another shortcoming is that the result-screen view always uses a full screen and cannot be resized. Thus, it is cumbersome to use simultaneously with other programs. Significant improvement in the output graphics should be considered in developing future versions.

THWELLS is an inexpensive yet readily adaptable code for evaluating drawdown

## Review of THWELLS



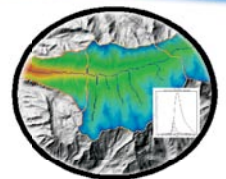
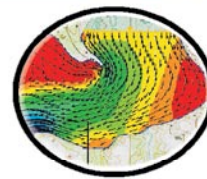
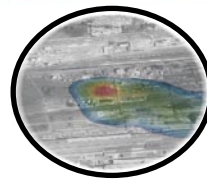
<b>Ease of Use:</b>	<b>Application:</b> Drawdown from multiple wells (analytical solution)
<b>GUI:</b> N/A	<b>Best Features:</b> Ease of use
<b>Output/Plotting:</b>	<b>Worst Feature:</b> Graphic Result
<b>Documentation:</b>	
<b>Speed:</b>	
<b>OVERALL RATING:</b>	
<b>Rating System:</b>	Excellent ← Poor

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from single or multiple pumping wells in simple settings.

The program can be purchased from International Ground Water Modeling Center ([typhoon.mines.edu/software/igwmcsoft/](http://typhoon.mines.edu/software/igwmcsoft/)) for \$50. Contact Sophia Seo at [hseo@mines.edu](mailto:hseo@mines.edu).

# Water Resources Modeling Software



## Groundwater Modeling System (GMS)

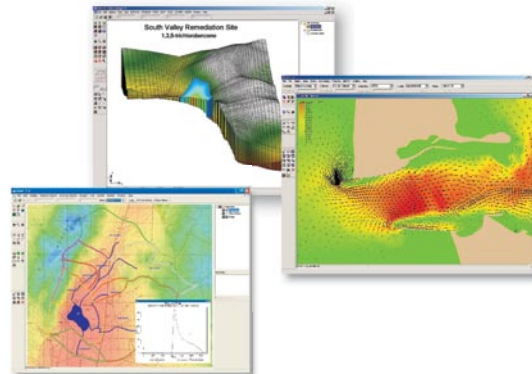
- GIS based modeling with 15 different groundwater models
- Particle-tracking, reactive, and multi-phase transport capability
- Integrated geostatistical and subsurface characterization tools
- True 3D visualization and animation
- Automated calibration and parameter estimation

## Surface-Water Modeling System (SMS)

- GIS-based modeling of hydrodynamics and transport in surface water
- River dynamics, pollutant and sediment transport capability
- Coastal circulation and wave action analysis
- 3D visualization and animation of models and computational results

## Watershed Modeling System (WMS)

- GIS-based modeling interface for complete H&H analysis
- Automated delineation of watersheds and floodplains
- Integrated hydrologic models for runoff prediction
- Custom tools for Maricopa Co. AZ; LA County, CA; Orange Co. CA



- Hydraulic modeling of rivers, pipe networks and dambreak flooding
- Distributed (2D) surface-water / groundwater modeling

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