

WHI E-News Topics

2004 November Edition

Product News

- » ***NOW SHIPPING!*** [HydroGeo Analyst - The Complete Groundwater & Borehole Data Management and Visualization Solution for Environmental Professionals!](#)

Consulting News

- » [Let Us Help You With Our Extended Modeling Support Services](#)

Training News

- » [WHI's Line-Up of Environmental & Groundwater Modeling Courses!](#)

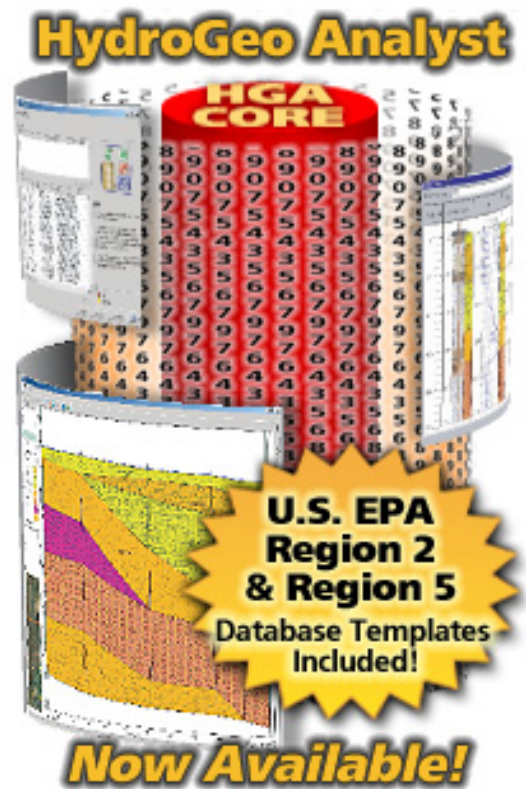
Upcoming Professional Courses:

- » [Applied Groundwater Flow & Contaminant Transport Modeling](#)
- » [Contaminated Site Risk Assessment and Groundwater Modeling](#)
- » [The Human Health Risk Assessment Course](#)
- » [GIS Data Management for Groundwater Modelers](#)
- » [The Groundwater Pollution and Hydrology Course](#)

Tips & Tricks

- » [Interpreting Geology & Defining Model Layers For Use In Groundwater Models](#)

Waterloo Hydrogeologic, Inc. is a recognized leader in the development and application of environmental software and services.



Call for
Guest Columnists!

We want your articles! Please send your groundwater related article to us today!

HydroGeo Analyst - The Complete Groundwater & Borehole Data Management and Visualization Solution for Environmental Professionals!

[HydroGeo Analyst](#), developed by Waterloo Hydrogeologic, Inc., represents the next generation in groundwater and borehole data management and visualization technology. HydroGeo Analyst integrates a complete range of easy-to-use analysis and reporting tools, with a powerful yet extremely flexible database technology - all wrapped into an innovative graphical user interface. With HydroGeo Analyst, you can expect the highest level of performance and a completely scalable solution to meet your project demands!

ALL-IN-ONE SOLUTION

HydroGeo Analyst offers a completely integrated solution without the need to export data to third party programs for analysis, visualization, and reporting. HydroGeo Analyst incorporates all the tools you need to import your data directly, and create professional reports. There is no need to purchase, learn, or maintain third-party products - HydroGeo Analyst has it all!

HydroGeo Analyst's suite of software tools includes:

[Project Wizard](#) (database creation, client management, etc.)

[Data Transfer System](#) (validating and importing YOUR data)

[Template Manager](#) (database tables, fields, templates, etc.)

[Materials Specification Editor](#) (manages soil classifications)

[Query Builder](#) (on-the-fly, map-ready data querying)

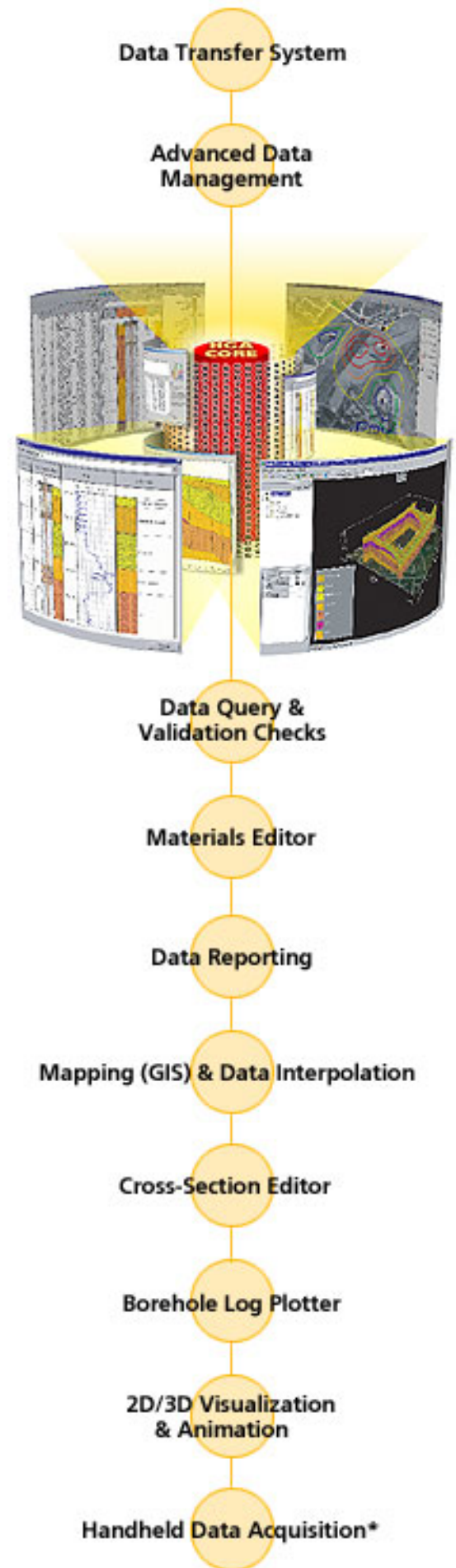
[GIS Map Manager](#) (GIS mapping, contouring, gridding, etc.)

[Cross-Section Editor](#) (geologic, hydrogeologic, model layers)

[HGA 3D-Explorer](#) (3D visualization and animation of data)

[Borehole Log Plotter](#) (design and plot borehole logs)

[Report Editor](#) (fully customizable reports)



Universal Data Transfer System:

HydroGeo Analyst has an extremely flexible and logical Universal Data Transfer System that simplifies and speeds up the challenging and time-consuming process of importing your data.

- ▶ Comprehensive importing of any data format, such as;
 - ▶ Text files (TXT, CSV, TAB, ASCII, etc.)
 - ▶ Microsoft Excel™ spreadsheets (XLS)
 - ▶ Microsoft Access™ databases (MDB)
 - ▶ Dbase Database Format (DBF)
 - ▶ Any other ODBC or OLEDB data sources
- ▶ On-the-fly unit and coordinate system conversions
- ▶ Seamless data validation and error checking during import
- ▶ [Click here for more information](#)

Query Builder:

HydroGeo Analyst harnesses the power of 'Structured Query Language' (SQL) to help you access and interact with your data on-the-fly.

- ▶ Uses 'Structured Query Language' (SQL), the industry-standard!
- ▶ Quickly generate simple or complex data queries
- ▶ Display query results directly through the GIS Map Manager
- ▶ [Click here for more information](#)

GIS Map Manager:

The GIS Map Manager is built on ESRI™ technology and is packed with an abundance of GIS mapping features that seamlessly connect your project maps with the HydroGeo Analyst database.

- ▶ Create map layers from station data and query results
- ▶ Import a vast array of basemap formats for your projects (BMP, DIB, BIL, BIP, BSQ, JPG, TIF, DXF, DWG, SHP, etc.)
- ▶ Create thematic maps from virtually any field in the database
- ▶ [Click here for more information](#)

Cross-Section Editor:

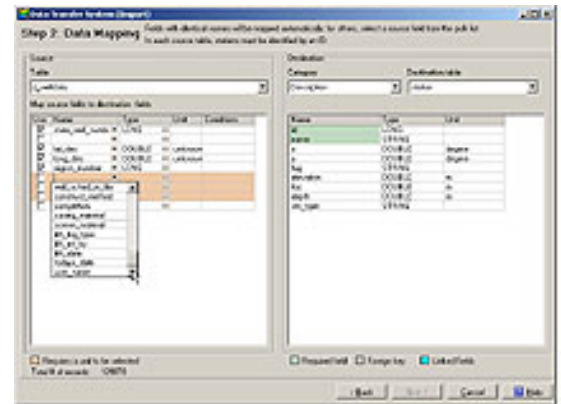
The Cross-Section Editor offers a complete set of interactive tools for developing geologic, hydrogeologic, and model layer cross-section interpretations.

- ▶ Digitize layers representing unique geologic formations or hydrogeologic properties
- ▶ Digitize interpreted model layers for use in Visual MODFLOW
- ▶ Add cross-section interpretations directly to your reports
- ▶ [Click here for more information](#)

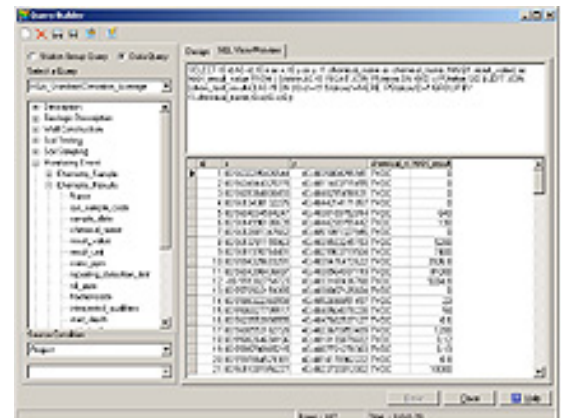
*-Coming in 2005

[Click here to download the HydroGeo Analyst PDF Brochure!](#)

**The Next Generation
in Environmental
Data Management
Technology!**



Flexible Data Transfer



Custom SQL Queries

Borehole Log Plotter:

The Borehole Log Plotter is a built-in borehole logging component developed with a full range of features that support the design and plotting of professional borehole logs and well construction details.

- ▶ Choose from pre-designed borehole log templates, or design custom borehole logs in minutes
- ▶ Robust import and export functionality for data exchange and presentation
- ▶ Automated data links reduce the need for user intervention!
- ▶ [Click here for more information](#)

HGA 3D-Explorer:

The HGA 3D-Explorer is a seamlessly integrated 3D visualization and animation tool designed for easy rendering of your well lithology, surfaces, and interpreted cross-sections.

- ▶ Display multiple cross-sections/fence diagrams, well locations with lithology, maps, contours, etc., all within the same 3D graphical environment
- ▶ View 3D cross-sections of geologic, hydrogeologic, or model layers
- ▶ Powerful import and export features for visualization of data, plus animation
- ▶ [Click here for more information](#)

Report Editor:

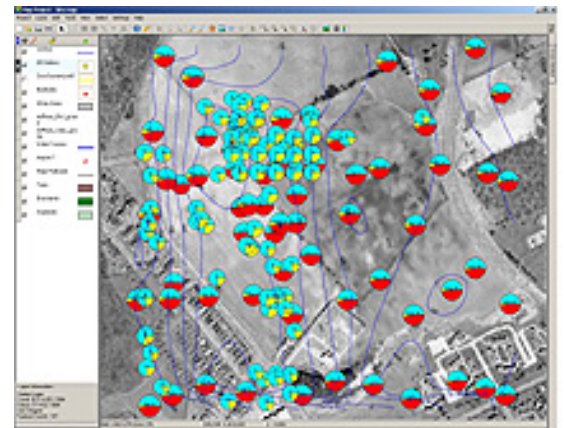
The Report Editor assists users in generating professional reports directly from HydroGeo Analyst projects.

- ▶ Use pre-defined report templates, or create an unlimited number of custom report templates!
- ▶ Incorporate data values, time-series graphs, tables, logs, cross-sections, 3D views, maps, etc.
- ▶ Dynamic linking of reports to HGA data and components automates the report creation process
- ▶ [Click here for more information](#)

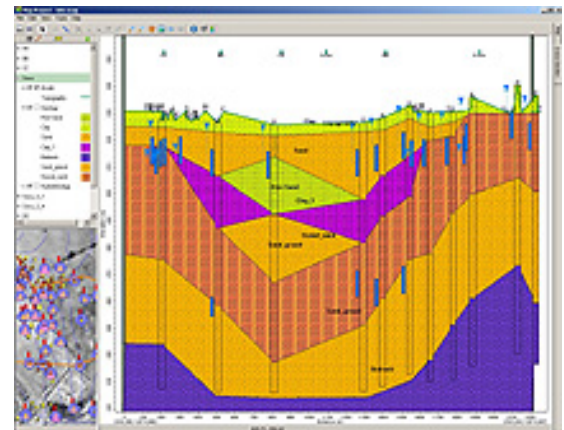
...PLUS SO MUCH MORE!

Check our [website](#) or download the [2-page PDF](#) for further information on all of the Features and Benefits of HydroGeo Analyst! Ask us about our multi-license discounts!

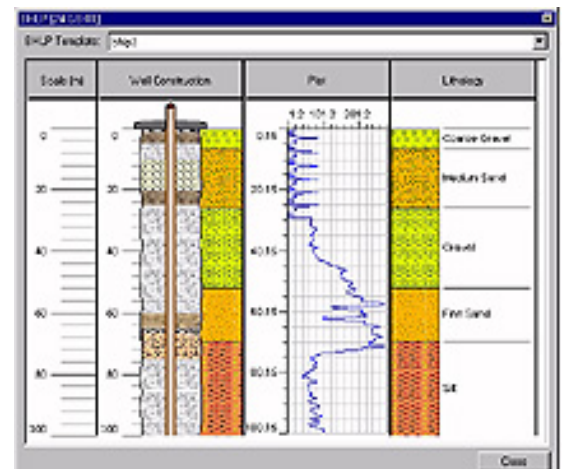
To learn more about HydroGeo Analyst, or to receive a Demonstration version of HydroGeo Analyst, please contact us today at 1-519-746-1798, or by email at sales@waterloohydrogeologic.com



High Impact Thematic Maps



Versatile Cross-Section Editor



Borehole Log Plots

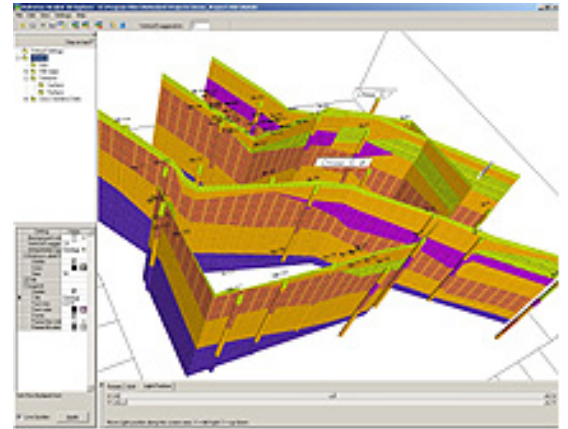
Introductory Price:
US\$ 2995 Single User

Download your
FREE demo today!

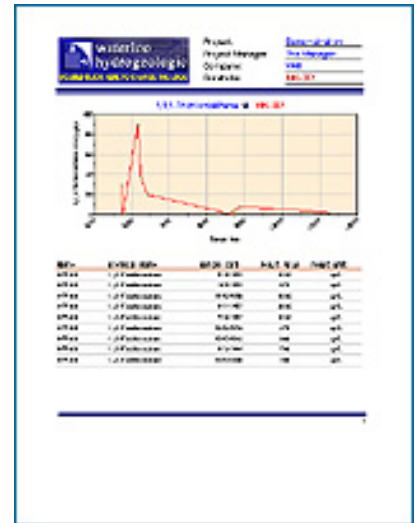
FREE DEMO

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Call us at 519-746-1798
Or order online

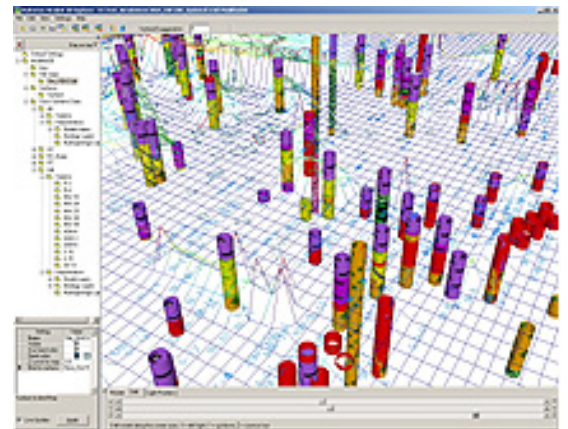
ORDER NOW



Stunning 3D Fence Diagrams



Professional Reports in Minutes



Interpolate & Grid Surfaces

For more information about **HydroGeo Analyst**, visit our website or contact us:

http://www.waterloohydrogeologic.com/software/Hydrogeo_Analyst/Hydrogeo_analyst_ov.htm

For more information about our software, please visit our website or contact us today:

Website: http://www.waterloohydrogeologic.com/software/software_main.htm

Email: sales@waterloohydrogeologic.com

Phone: (519) 746-1798



Consulting News

Let Us Help You With Our Extended Modeling Support Services

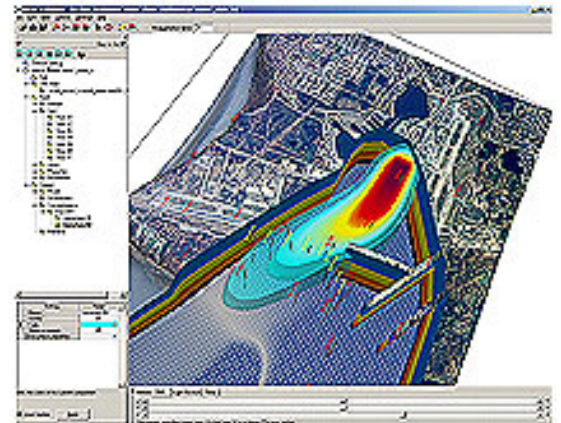
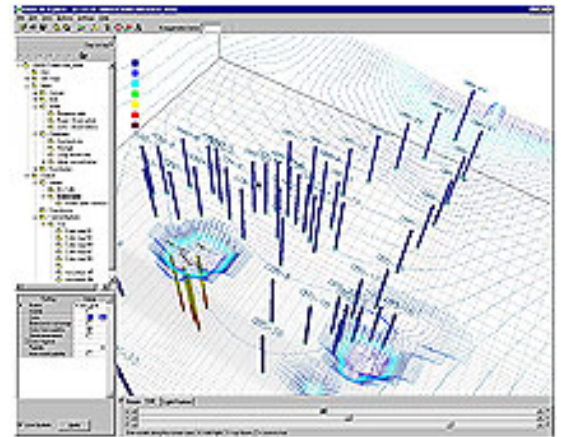
The consulting staff at Waterloo Hydrogeologic provides 'on-demand' [Extended Modeling Support](#) (EMS) services to clients from around the world. Our modelers work directly with clients to find solutions to their modeling difficulties. The level of assistance ranges from step-by-step modeling support for those new to groundwater modeling, to modeling support for more advanced modeling projects such as quantifying groundwater seepage into underground mine shafts.

Our modeling team members are able to provide answers to your model specific questions using a variety of software programs including [Visual MODFLOW](#), [FEFLOW](#), [AquiferTest Pro](#), and [HydroGeo Analyst](#).

Recent examples of projects that have benefited from our EMS services include:

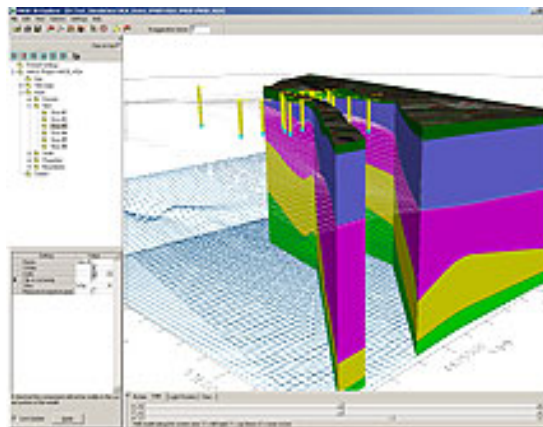
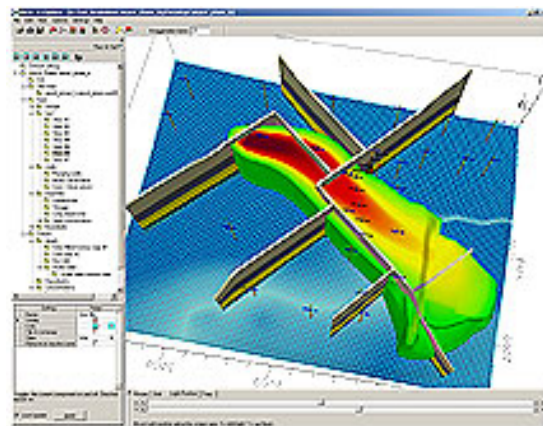
- Simulation of groundwater seepage through a dry dock on the east coast of Canada
- Examination of the impact of groundwater extraction on surface water features in the Capitan Reef, New Mexico, USA
- Examination of sustainable yield for a municipal supply well in the Floridan Aquifer, Florida, USA
- Well optimization and simulation of temporary dewatering in an urban area in California, USA
- Wellhead protection area modeling in northern and northeastern Ontario, Canada
- Fate and transport simulation of chlorinated solvents beneath a landfill in Texas, USA
- Three-dimensional visualization of groundwater flow and contaminant migration using Visual MODFLOW's 3-D Explorer for presentation to a non-technical audience.
- Simulation of a pump and treat system in northeastern USA.

Waterloo Hydrogeologic's team of dedicated professional consultants includes geologists, hydrogeologists, and engineers, with specialties ranging from physical and geochemical hydrogeology to complex numerical modeling, and expertise in:



- [GIS and Environmental Data Management](#)
- [Watershed Management and Source Protection](#)
- [Site Characterization and Risk Assessment](#)
- [Contaminated Site Solutions](#)
- [Environmental Solutions for Mining](#)
- [Model Review and Litigation Support](#)
- [Advanced Groundwater Modeling](#)

Our consulting team would be glad to discuss how we can help support your groundwater modeling projects.



[Click here to get your copy today!](#)

For more information related to this topic see our **EMS page** on our website:

Website: www.waterloohydrogeologic.com/consulting/consulting_extended_modeling_support.htm

Email: consulting@waterloohydrogeologic.com

Phone: (519) 746-1798

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Training News

WHI's Line-Up of Environmental & Groundwater Modeling Courses!

The 2004-2005 Waterloo Hydrogeologic Open Enrollment schedule has been set. In response to comments from groundwater professionals who have taken our Groundwater Modeling Courses in the past, and from those who would like to attend courses in the future, WHI has combined the strengths of our previous Groundwater Modeling, Advanced Groundwater Modeling, and Model Calibration courses into one [Applied Groundwater Flow & Contaminant Transport Modeling](#) course. This course includes updated lecture material, as well as new hands-on laboratories to support the new course material. WHI has also created a new short course entitled [GIS Data Management for Groundwater Modelers](#), which teaches the theory and hands-on application of GIS data integration and interpolation to support groundwater modeling efforts, as well as 3-dimensional visualization of modeling results in both the Visual MODFLOW, HydroGeo Analyst and GIS environments.

Click on the titles below and see which courses are appropriate for you!

- » [Applied Groundwater Flow & Contaminant Transport Modeling](#) - NEW
- » [Groundwater Contamination & Remediation](#) - UPDATED
- » [Finite Element Groundwater Modeling](#) - UPDATED
- » [Aquifer Test Analysis](#) - NEW
- » [Unsaturated Zone Modeling and Evaluation of Landfill Impacts](#) - UPDATED
- » [The Human Health Risk Assessment Course](#) - NEW
- » [Water Quality Data Management & Modeling](#) - UPDATED
- » [Regulatory Review of Hydrogeology Studies](#) - UPDATED
- » [GIS Data Management for Groundwater Modelers](#) - NEW

Who Can Benefit?

- » Experienced hydrogeologists with no prior groundwater modeling experience
- » Regulators who review modeling reports
- » Managers who want to understand what the modelers are doing
- » Experienced modelers who want to enhance their skills
- » Students who want to acquire new skills
- » Lawyers who want to understand some of the technical issues
- » Industry professionals who want to understand more about what their consultants are telling them

For further details on any of these courses, please visit our [website](#), or contact Miln Harvey, WHI Training Manager, at (519) 746-1798 x233.

Can't make it to one of our Open Enrollment Courses? Call us about our On-Site Custom courses designed to suit your specific needs!

Course Title

Dates/Locations

APPLIED GROUNDWATER FLOW & CONTAMINANT TRANSPORT MODELING



Theory and Hands-on Applications using MODFLOW-2000, MODPATH, MT3D & WinPEST

Simple to complex applications of groundwater flow and contaminant transport models are covered in this 4-day hands-on course. Groundwater resource topics include model development and calibration to groundwater heads and flows, new well development, capture zone delineation, well interference, and stream impact investigations. Contaminant transport topics include model development and calibration to contaminant concentration, source area design, concentration boundary choice, solver comparison, and 3D visualization of flow and transport results. This course is ideally suited for hydrogeologists and modelers with some field investigation and modeling experience who wish to advance their modeling knowledge, and whose responsibilities include model development, review, planning, and project management.

Course Objectives and Benefits

- » Apply Visual MODFLOW Pro to 3D groundwater flow and contaminant transport projects
- » Use MODFLOW-2000 to develop several groundwater flow models
- » Calibrate your groundwater models to observed field data
- » Use MODPATH particle tracking features to determine preferential flow paths and delineate capture zones
- » Use ZoneBudget to assess subregional water budgets within your groundwater model
- » Simulate 3D contaminant transport using RT3D, MT3DMS & MT3D99
- » Use WinPEST to improve model calibration and understand model uncertainty

[Adelaide, Australia](#)
[Nov 23 - 26, 2004](#)

[Juarez, Mexico](#)
[Nov 23 - 26, 2004](#)

[Waterloo, Ontario Canada](#)
[Feb 1 - 4, 2005](#)

[**Register Now**](#)

CONTAMINATED SITE RISK ASSESSMENT AND GROUNDWATER MODELING



Transport Processes, Natural Attenuation and Risk Assessment

This course provides a more complete understanding of groundwater contamination and remediation, and the use of fate and transport models and risk assessment software for analysis. Topics that will be covered include contaminant source area characterization, the risk assessment process, the fundamentals of natural attenuation, and risk-based corrective action. This course is suited for groundwater modelers and risk assessors who wish to develop a better understanding of groundwater contamination and remediation, the risk assessment process, and the use of groundwater models to assess risk-based site-specific standards and contaminant remediation.

Course Objectives and Benefits

- » Define the Risk Assessment process and Risk-Based Corrective Action
- » Enhance your understanding of contaminant transport and natural attenuation processes
- » Detail how to quantify the potential risks of exposure to chemical contaminants
- » Link fate and transport models to risk-based decision making models
- » Quantitatively assess human health and ecological risk from environmental contaminants
- » Define site-specific target levels (SSTLs) for site clean-up goals

[Madrid, Spain](#)
[March 8 - 11 2005](#)

[Register Now](#)

THE HUMAN HEALTH RISK ASSESSMENT COURSE



Practical Approaches to Estimating Risk & Developing Site-Specific Target Levels

An introduction to the use of RISC Workbench for completing human health risk assessments is covered in this 2-day course of lectures and hands-on exercises. Topics that will be covered include hazard identification, exposure assessment, dose-response assessment, and risk characterization. Lectures and exercises will be presented in partnership with Lynn Spence, the developer of RISC Workbench. This course is suited for risk assessors who wish to develop a better understanding of the risk assessment process and the use of groundwater models and RISC Workbench software for completing a human-health risk assessment.

Course Benefits

[Auckland, New Zealand](#)
[Nov 18 - 19, 2004](#)

[Register Now](#)

- » Learn the fundamentals of accepted risk assessment protocols
- » Acquire lots of hands-on experience using the RISC Workbench software
- » Understand the practical aspects of conducting a risk assessment
- » Learn from a skilled risk assessment professional with worldwide experience

GIS DATA MANAGEMENT FOR GROUNDWATER MODELERS



Understanding Data Sources, Data Analysis and Visualization

This 3-day hands-on course presents an introduction to the management and analysis of groundwater data for Visual MODFLOW modelers. Topics include the data types used in groundwater models, the coordinate systems, datums and map projections in a GIS, the interpolation of data within the GIS (kriging, natural neighbor analysis, ...), the development of model layers (cross-sectional analysis of site hydrogeology) and parameter fields for groundwater model construction, and the import and export of different types of data from the GIS system to the groundwater model and back to the GIS system. Other topics that will be covered include 2-D and 3-D visualization of model input and model output. This course is ideally suited for groundwater modelers who wish to develop a comprehensive understanding of the sources of data that are used in groundwater models, the interpolation of this data for modeling, and the interchange of information between the groundwater model and the GIS system.

Course Objectives and Benefits

- » Understand the integration between the GIS system and Visual MODFLOW
- » Assess the applicability of MapInfo, Surfer and HydroGeo Analyst for developing a GIS
- » Use HydroGeo Analyst to develop model cross-sections and layer interfaces
- » Use HydroGeo Analyst to interpolate layer elevations and export them to Visual MODFLOW
- » Export Visual MODFLOW results to GIS and prepare report figures
- » Develop animation files of Visual MODFLOW results and insert them into client presentations

[Waterloo, Canada](#)
[March 29 - April 1, 2005](#)

Register Now

The Groundwater Pollution and Hydrology Course



This course is the only one-week course being offered in the U.S. or Europe which comprehensively covers all aspects of groundwater pollution and hydrology from theory to practice. The instructors are recognized as the top five leading experts and teachers in the field and collectively have over 100 years of practical experience. The course is the established standard among groundwater training courses and for this reason has consistently had the largest attendance of all courses offered anywhere in groundwater.

Who Should Attend

The course is designed for groundwater hydrologists, geologists, engineers, chemists, environmental scientists state/federal regulators, project managers, compliance/regulatory program managers for industry and technical experts.

The emphasis is on acquiring an extensive working knowledge of the concepts, principles and professional practices underlying groundwater pollution, hydrology and remediation. Although some areas are necessarily surveyed in the interest of time, technical depth is the norm in the majority of sessions. Like any short course, some experience is helpful but not necessary as the course teaches basic principles before dealing with more advanced topics. The course succeeds in significantly enhancing the technical skills of all the participants without losing the neophytes and without boring those with 15 years of practical experience. This is the highest rated course in the industry - no course teaches so much!

[Feb 14 - 18, 2005](#)
[Orlando, Florida](#)

[Register Now](#)



[For our full 2004 training schedule, click here!](#)



[To request your free 2004 Training Course Schedule Catalog, click here!](#)

For more information about our course offerings, visit our website or contact us today:

Website: www.waterloohydrogeologic.com/training/training.htm

Email: training@waterloohydrogeologic.com

Phone: (519) 746-1798

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Tips & Tricks

Interpreting Geology & Defining Model Layers For Use In Groundwater Models

For the majority of groundwater modeling projects, modelers will interpret borehole data in order to better understand the hydrogeologic setting of their site. Borehole data offers a 2D framework for defining the 'significant' hydrostratigraphic units that will be used as layer boundaries in a groundwater model. In areas where many hydrostratigraphic units are encountered, modelers may group similar units into common layer types to help simplify the conceptual model design.

Typically, defining and creating the layer surfaces from borehole data is a time-consuming and tedious task. However, the development of [HydroGeo Analyst](#) makes this, and many other tasks, a quick and simple job.

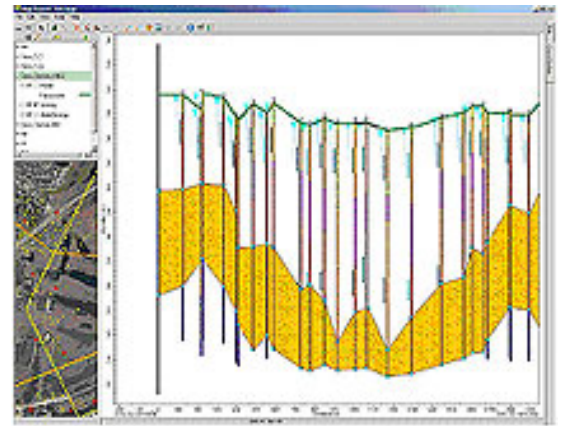
This month's Tips and Tricks section reviews the steps required to create surfaces from HydroGeo Analyst cross sections, and import the surfaces into [Visual MODFLOW](#) for use as layer elevations.

Interpreting Geology & Model Layers

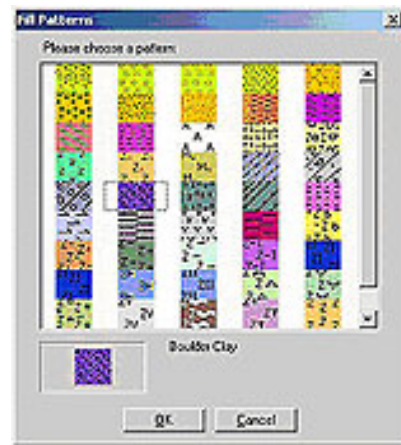
HydroGeo Analyst's Cross-Section Editor is an easy-to-use tool for interpreting and designing geologic, hydrogeologic, and model layers. The GIS Map Manager tool can be used to define a cross-section line, and create an un-interpreted cross section view. In the **Cross-Section** tab, you will see a menu tree with options to view and edit your cross-section's interpreted **Model**, **Geology** and **HydroGeology** layers.

To create a geologic cross-section, [**Click**] the second box beside **Geology** in the menu tree to enable editing of your cross-section's geologic layers. Then [**Select**] **Polygon** from the tool bar menu.

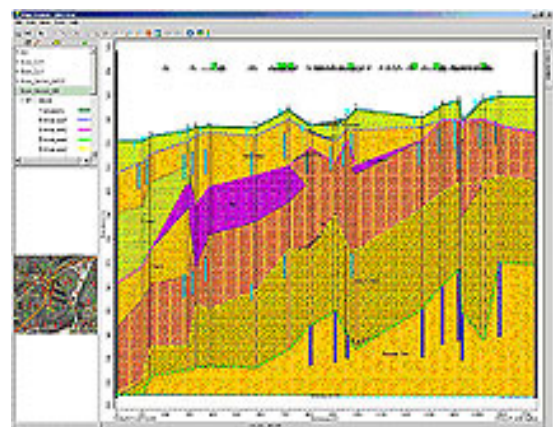
The polygon tool allows you to define the geologic features by connecting polygon vertices to boreholes with similar geology.



Once the polygon has been assigned, the **Geologic Layer Pattern** dialog will appear, allowing you to name the layer, and identify the layer using various geologic patterns from the HGA database.

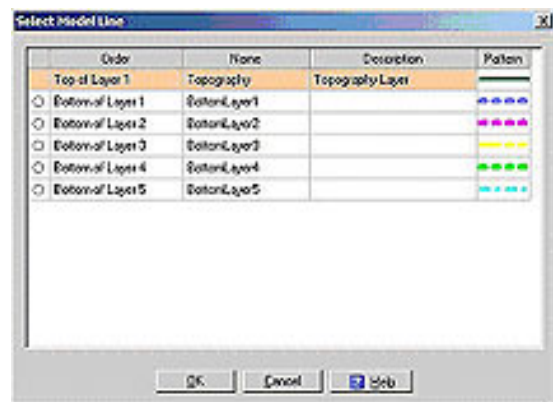


Select the pattern that best represents the geologic type of your polygon (layer). Continue developing polygons for various layers of the cross-section until all unique layers have been defined. Upon completion, you will have the ability to quickly interpret which geologic layers will represent the Visual MODFLOW layers.



Defining geologic layers to represent the model layers is easy. In the menu tree, [Click] the second box beside **Model** to begin defining the layers that will eventually be used as surfaces for your Visual MODFLOW model.

[Select] **Line** from the tool bar menu to define the model layers. A dialog will appear asking you to select which layer you will be defining. Choose the appropriate layer and draw the line that will later represent the layer elevation.



Once the model layers have been interpreted and defined, the elevation and coordinate data will be saved in .TXT file format, and can be found in the Model folder located in your Project directory.

NOTE: To produce representative model layers across the model domain, it is advisable to create and interpret multiple cross-sections that extend from all model boundaries. All subsequent cross-section model layer interpretations will be combined and stored into common model layer files.

Importing Model Layers from HydroGeo Analyst into Visual MODFLOW Pro

Creating model layers with HydroGeo Analyst offers many benefits to Visual MODFLOW Pro users, including:

- Model layers are created based on cross-section interpretations, not only raw borehole data
- Consistency between all interpreted model layers in the domain is ensured, so users are not required to manually match layers or spend time working with a multitude of layer data
- Topographic and layer files are automatically and logically labeled and stored in the HGA project
- Model layers are easily imported using the VMOD layer import utility

Visual MODFLOW Pro's layer import utility allows the user to add control points (if necessary), remove known problem data, and re-interpolate the layer data.

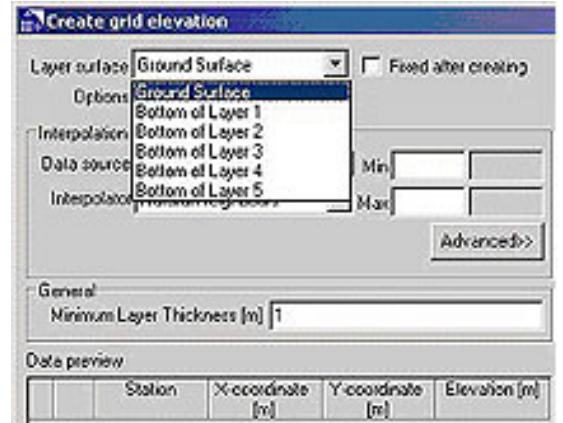
Once you have opened your Visual MODFLOW project:

[Select] **Grid** from the Visual MODFLOW Pro Input menu.

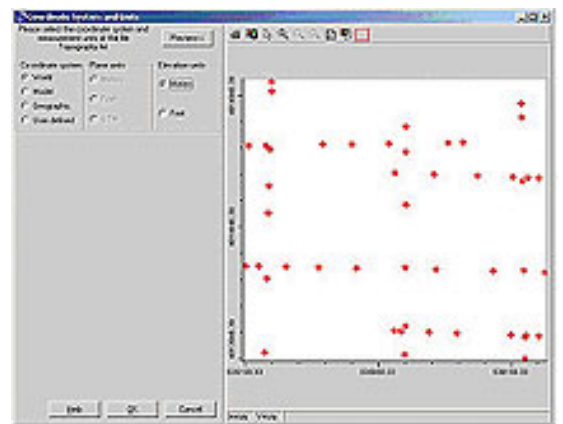
[Select] **Import Elevation** from the side bar. This will launch Visual MODFLOW Pro's layer import utility.

From the **Layer Surface** pull-down menu, [Select] **Ground Surface**. This ensures the Topography.txt file you are about to import corresponds to the model ground surface.

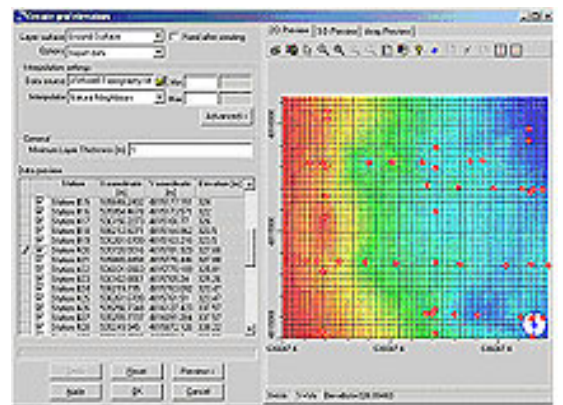
Follow the steps to match columns to the appropriate data fields (x, y, elevation).



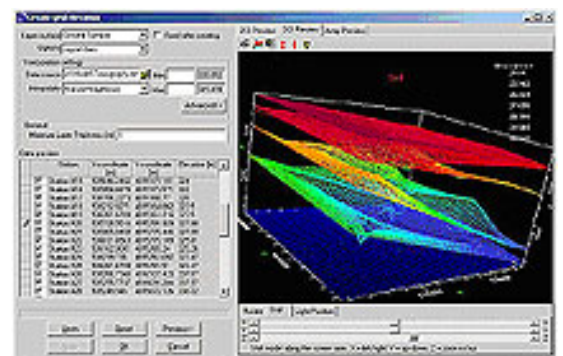
Define your coordinate system (World, Model, Geographic, or User Defined) and your units (Meters, Feet, or UTM).



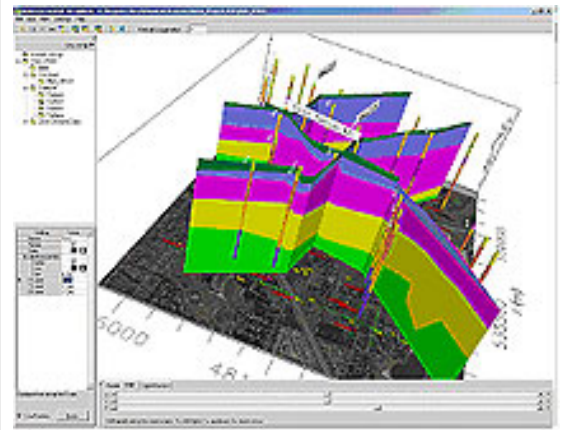
Define the interpolation method that is most appropriate for your data set (Kriging, Natural Neighbors, or Inverse Distance).



View your interpolated layers in the 3D grid view to ensure model layers are appropriate.



Once all of your layers have been imported, you can begin assigning model properties to develop your project.



Depicts model layers generated from [HydroGeo Analyst](#) within [Visual MODFLOW Pro](#)

If you have any questions about this article, or about the use of [HydroGeo Analyst](#) and [Visual MODFLOW Pro](#) software, please contact WHI's Technical Support department

Email: techsupport@waterloohydrogeologic.com:

Website: <http://www.waterloohydrogeologic.com>

Phone: (519) 746-1798



Thank you for reading this month's edition of WHI E-News! For more information about our products and services please use the links below!

[Visit our Website](#) - See what Waterloo Hydrogeologic Inc. has to offer!

[Software Division](#) - Check out our groundwater modeling software.

[Consulting Division](#) - Visit our Consulting Division on the web to see how we can help you.

[Training Division](#) - Visit our Training Division on the web to find a course in your area.

[Equipment Sales](#) - WHI is now selling groundwater monitoring equipment.

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