Three-Dimensional Geological Mapping for Groundwater Applications: 
*Workshop Wrap-up*

Denver, Colorado
26 October 2002
The Challenge

- With optimal benefit/cost, to construct an appropriate 3D geological model that will facilitate analyses for immediate and/or future needs
Determine appropriate format & platform
- Cross-sections
- Structure contours & isopachs
- Surfaces
- Solids
Determine desired level of detail
Determine achievable level of detail
Generalize existing models
- Drilling logged by a geologist
  - Core
  - Borehole geophysics
Geophysical surveys
- Seismic
- Radar
- Gravity
- Resistivity
- Hydrogeological tests
Water wells & engineering drilling
- location errors; centroids
- reliability assessment
- varying detail
- clustering
- nonstandard terminology
- audit precision
- position drill holes vertically
- hang the model
- insights into geology
Bathymetry
- key hydrogeological features
- uppermost layer = water
- offshore geology
Offshore surveys
- extent of fine-grained sediments
- groundwater discharge
Digital geological maps
  - surficial & bedrock
  - new mapping
  - stacked polygons
  - outcrop & subcrop
  - fit
Build the model at maximum detail
- resolution permitted by the data
- genetic & historical models
- modeling method
  - Site selection, correlation - prediction - geostatistics, edge control, marker beds, quality assurance
Generalize as required by application
  - Lump units
- Quantify confidence level & priority level
  - Validation procedures
  - Priority for enhancement
- Iterate & set priorities for new info
Version & documentation
Applications

- Vulnerability, resources
- Interaction, geos & hydrogeos
- Assign hydrogeological properties; deal with pinchouts
- Add water levels & chemistry
- Model & iterate
- Legacy
  - official geological model
  - enhanced databases