Troy Bedrock Valley Aquifer Model

A tool for regional planning
• A major sand and gravel aquifer in southeastern Wisconsin
• Complex shape
• Glacial geology complex and poorly defined
SEWRPC Groundwater Model As Starting Point

• 3-D model of groundwater system of southeastern Wisconsin
• 18 layers
• 530,000 active cells
• Extensive data collection and calibration
• 4 year cooperative effort between SEWRPC, USGS, WGNHS and dozens of local communities
• Very powerful planning tool for regional groundwater management
• Grid size (2500 feet) too coarse for local modeling
• More layers and detail in glacial aquifer needed
Step One: Compile Existing Data

- Well siting studies over last few years generated geophysical data, test borings, and pumping tests
- Private well logs available to fill in gaps
- WGNHS to conduct additional geophysics in Vernon Marsh
Step 2: Prepare Conceptual Model of Aquifer

- 6 geologic cross sections of glacial materials to identify major aquifers, confining units, and shape of valley
- Translate geologic conditions into model design
Western Portion of Valley

- Most of valley is filled with clay
- Upper and lower sand units separated by clay layer
- Clay layer has windows or gaps
Eastern Portion of Valley

- Valley gets broader
- Lower sand gets less continuous
Next Steps: Model Design and Calibration

- Details to be worked out between participants
- Near field area to have smaller grid size (about 1/10th regional model)
- Minimum of five layers
- Calibration with pumping test data
What Can Model be Used For?

- Designing efficient well fields
- Wellhead protection planning
- Estimating safe yield of aquifer
- Predicting response to pumping high capacity wells
- Predicting potential impact on lakes, streams and wetlands
- Predicting impacts to private wells
- Evaluating artificial recharge projects
- Other things in the future
Questions?????