# **Minnesota Ground Water Association**

Fall 2006 Conference – November 14, 2006

# Ground Water Management – The Minnesota Model -

Data, Tools, Techniques, and Organization

# Jim Berg, Minnesota DNR Waters

# Presentation

Mapping Hydrologic Systems

## Abstract

Recent hydrologic/geologic mapping innovations regarding bedrock hydrostratigraphic revisions and buried sand and gravel aquifer delineation have dramatically changed the way DNR Waters and the Minnesota Geological Survey produce maps for the County Geologic and Regional Hydrogeologic Map series, and other projects. Buried sand and gravel aquifer mapping requires several key elements including: surficial geologic maps, glacial stratigraphy, located and interpreted drillers logs in a database, scientific borehole logs, rotosonic core, and appropriate depositional models. Representing all this information and resulting interpretations has become more accurate and efficient through the use of closely spaced digital cross-sections that can quickly be transformed into three-dimensional surfaces with geographic information software or other specialized three-dimensional software.

## Education

B.A. Geology; Carleton College, Northfield, Minnesota; 1977 M.S. Geology; University of Kansas, Lawrence Kansas; 1981

## Experience

1995-present Minnesota DNR Waters, St. Paul, MN, Hydrogeologist
1987-1995 Environmental consulting companies in the Twin cities area, Hydrogeologist
1981-1986 Champlin Petroleum, Inc., Denver, CO, Exploration Geologist

# Affiliations

Minnesota Ground Water Association Minnesota Professional Geologist

# Bob Tipping, Minnesota Geological Survey

# Presentation

Mapping Hydrologic Systems – Paleozoic bedrock aquifers

# Abstract

The usefulness of viewing and manipulating geologic and hydrologic data in a multi-dimensional GIS environment has prompted DNR Waters and the Minnesota Geological Survey to change the way we make maps. In this part of the talk, examples from the current Scott County Geologic Atlas revision will be used to demonstrate how these products have changed with regard to Paleozoic bedrock aquifers, and what we expect to provide in future projects. The major points of this presentation are:

- Understanding ground-water systems requires an iterative approach between geologic mapping (2 and 3D) and hydrogeologic, hydrochemical data gathering and analysis.
- Data sets provided from MGS/DNR projects need to be "model-ready".
- Geologic and hydrogeologic mapping need to be easily revisable.

#### Education

B.A. History; Carleton College, Northfield, Minnesota; 1981 M.S. Geology; University of Minnesota, Minneapolis, Minnesota; 1992

#### Experience

1990-present Minnesota Geological Survey

### Affiliations

Minnesota Ground Water Association Minnesota Professional Geologist

### Jan D. Falteisek, Minnesota DNR Waters Presentation

Ground Water Sensitivity–Managing the Interface Between People and Ground Water

### Abstract

Pollution sensitivity maps of the ground water system are interpretive tools that can assist water resource managers to protect the resource by helping to identify areas for additional investigation, to focus limited management resources, or to consider a higher level of regulatory protection. Educational programs for the public can also be enhanced by use of these interpretive maps. This talk will briefly review their construction and application in selected areas in Minnesota.

### Education

M.A. (geology), University of Missouri, Columbia, 1983 B.A. (math), Southwest State University, Marshall, 1974

### Experience

1990 to present, Minnesota Dept. of Natural Resources, Hydrogeologist Supervisor 1983 to 1990, Minnesota Pollution Control Agency, Hydrologist 1978 to 1983, Missouri Dept. of Natural Resources, student worker, hydrologist

### Affiliations

Geological Society of America American Geophysical Union National Ground Water Association Minnesota Ground Water Association Minnesota Professional Geologist Lic. # 30114

# Stu Grubb, Emmons and Olivier Resources

### Presentation

Stormwater Management and Ground Water Sensitivity

### Abstract

Ground water sensitivity maps can be created for many different applications using a variety of techniques. Users of these maps (planners, regulators, engineers) must be aware of the underlying data, assumptions, and methodologies in order to make appropriate use of the information. Washington County and the associated watershed districts have created maps intended to be used for stormwater infiltration and stormwater management planning. The methodology used to create the maps will be discussed. The maps will be compared to the more familiar groundwater pollution sensitivity maps available in the county geologic atlas.

# Cathy O'Dell, Minnesota Pollution Control Agency

## Presentation

Taking Advantage of Existing Water Quality Data

## Abstract

This presentation will focus on accessible ground water quality data – what can be obtained through the internet, what must be obtained through the library or file review – and efforts underway to make more ground water quality data accessible from your desk top.

### Education

M.S. (geology), University of Minnesota, Minneapolis, 1988 B.A. (geology), Carleton College, 1982

### Experience

1997 to present: Minnesota Pollution Control Agency (Voluntary Investigation & Cleanup Program; and Environmental Outcomes – Water Assessment and Environmental Information Section)

1996 to 1997: Minnesota Department of Natural Resources Division of Waters (hydrologist, well sealing program)

1989 to 1996: Geraghty & Miller, Inc. (Environmental Consulting)

1988 to 1989: Levine Fricke, Inc. (Environmental Consulting)

1986 to 1988: Barr Engineering Co. (Environmental Consulting)

## Affiliations

Minnesota Ground Water Association

# Laurel Reeves, Minnesota DNR Waters

## Presentation

Making Ground Water Allocation Decisions for New Demands...or how does DNR Waters come up with permitted water appropriation rates & amounts?

- What are the "new demands";
- What are the purposes that the water allocation process is meant to achieve;
- What methods are used to evaluate requests;
- What are the difficulties & pitfalls;
- How can this work more effectively and efficiently.

### Education:

B.A. (geology), Macalester College, 1970

### Experience:

1981 – present, State of Minnesota, Dept. of Natural Resources, Waters Division with a brief interval at Minnesota Pollution Control Agency (hydrogeologist)

1970 – 1980, Soil Exploration Co./Twin City Testing (geologist)

## Affiliations:

Minnesota Ground Water Association Licensed Geologist, Minnesota

#### Daniel Stoddard, Minnesota Department of Agriculture Assistant Director for Environmental Programs, Pesticide and Fertilizer Management Division

## Presentation

Monitoring, Prevention and Mitigation of Agricultural Contaminant Sources

- The primary state statutes for addressing pesticide and fertilizer contamination in waters of the state.
- Monitoring and prevention activities conducted by the MN Dept. of Agriculture.
- The response (mitigation) process for pesticide and nutrient contamination as outlined in state law, the MN Pesticide Management Plan and the MN Nitrogen Fertilizer Management Plan.
- Current pesticide and fertilizer contamination issues and future activities.

## **Education & Licensure**

M.S. Management of Technology, University of Minnesota

- B.S. Geology, University of Minnesota
- P.G. Licensed Professional Geologist, State of Minnesota

### Experience

1997-Present, Assistant Division Director, MN Dept. of Agriculture

- 1992-1997, Hydrologist Supervisor, Incident Response Unit, MN Dept. of Agriculture
- 1990-1992, Senior Hydrologist, Technical Review Unit, MN Dept. of Agriculture
- 1987-1990, Hydrologist, Tanks and Spills Section and Site Response (Superfund) Section, MN Pollution Control Agency
- 1984-1987, Environmental Consultant, for water supply and contaminant remediation projects

# The Roles, Programs, and Challenges of Agencies with Ground Water Responsibilities

**Paul Hoff** is supervisor of the Environmental Information and Reporting Unit in the MPCA's Environmental Analysis and Outcomes Division. This unit is responsible for several environmental monitoring, data analysis and reporting activities at the MPCA. These currently include ambient ground water monitoring and assessment; ground water data access; mercury monitoring and fate/transport research; air and water quality data analysis; emerging issues and contaminants studies; and publication of environmental quality trend information for scientists, lawmakers and citizens.

He has worked at the MPCA since 1979 in various multidisciplinary positions, including public information for solid and hazardous waste issues; he supervised the Agency's public information office from 1981 to 1990; and directed the agency's Environmental Review program from 1991 to 1998.

Paul has a bachelor of science degree from the University of Minnesota College of Agriculture with minors in environmental studies and economics, and has completed graduate coursework at the University of St. Thomas. He and his family drink Washington County well-water every day.

**Jim Stark** is representing the U. S. Geological Survey (USGS) Minnesota Water Science Center for Jeff Stoner, the Center Director. Jim manages special hydrologic studies and National Water Quality Assessment Program activities for the Center. Jim has worked for the USGS in Michigan, Utah and Minnesota. He is a Professional Geologist and holds MS degrees in Geology and in Water Resources, from the University of Wisconsin, as well as an MBA from the University of St Thomas.

#### John R. Wells, Minnesota Environmental Quality Board

Title of Presentation: Toward Sustainable Management of Water in Minnesota

- EQB and its partners are required by law to "take the pulse" of water conditions each biennium, addressing research needs, water availability, trends in ground water quality and program needs
- EQB issues a water policy and priorities report each biennium and a state water plan once a decade based upon the results
- Examples of the program in action
- Challenges for the future and conclusions

#### Education

MSPH, School of Public Health, University of North Carolina at Chapel Hill, 1977 BS, Chemistry, University of Wi sconsin at Madison, 1972

#### Experience

1986-present, Minnesota Environmental Quality Board, Strategic Planning Director (water, sustainable development and Smart Growth) 1983-1986, Minnesota Environmental Quality Board, Senior Hydrologist (water policy & organization) 1979-1983, Minnesota Water Planning Board, Senior Hydrologist (water policy & organization) 1977-1979, Minnesota Department of Natural Resources, Senior Water Planner (water policy & organization)

#### Affiliations

American Water Resources Association Minnesota Ground Water Association National Sustainable Water Resources Roundtable International Sustainability Indicators Network

# Jill V. Trescott and David Swenson, Dakota County Water Resources Office

## Presentation

Building a Comprehensive Local Groundwater Management

### Abstract

Since 1989, Dakota County has gradually built a groundwater management program that integrates regulation; remediation and mitigation; education and outreach; and monitoring.

### Authors

**Jill V. Trescott** is an Environmental Scientist with the Dakota County Water Resources Office. She has a bachelor's degree from Wellesley College and a master's degree from the University of North Texas. She manages non-point source groundwater pollution monitoring and prevention efforts for Dakota County, including the Hastings Area Nitrate Study (Phases I and II) and Ambient Groundwater Quality Study (comanager with Vanessa Demuth). The Hastings Area Nitrate Study (Phase I) was recognized by the National Groundwater Association as its Outstanding Project in Groundwater Protection for 2003.

**David Swenson** is the Groundwater Supervisor of the Water Resources Office at Dakota County. He has a bachelor's degree in Geology from the University of Minnesota and a master's degree in Geochemistry from New Mexico Institute of Mining and Technology. He directs groundwater and groundwater-surface water applied research studies, the delegated well management program, sewage system program, and is involved with Vermillion River Watershed activities.

# Terry Lee, Olmsted County Environmental Resource Services

## Presentation

An Example of Local Leadership in Ground Water Management

Water Resources Coordinator and MGWA member since 1987, Terry Lee was instrumental in moving Olmstead County toward comprehensive protection of the Decorah Edge.

# Paul Barlow, U.S. Geological Survey

## Presentation

Simulation-Optimization Modeling—A Tool for Improved Understanding of Ground-Water Systems and Their Management

- Simulation-optimization modeling combines numerical simulation with optimization(management) modeling techniques
- Simulation-optimization modeling can be applied to many types of ground-water management and policy-evaluation problems
- An example application is described in which simulation-optimization modeling is used to evaluate tradeoffs between several proposed minimum instream-flow criteria and ground-water development in the Big River Basin of Rhode Island.
- Some optimization-modeling resources are described

## Education

Ph.D. (environmental engineering), University of Connecticut, 1997 M.S. (hydrology), University of Arizona, 1987 B.S. (geology), Haverford College, 1983

# Experience

1983-present: hydrologist, U.S. Geological Survey

# Affiliations

American Geophysical Union (AGU) National Ground-Water Association (NGWA)