



Overview of Groundwater Modeling

Jim Feild, PhD, Wood Environment & Infrastructure Solutions Inc.

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GW Modeling Update Overview

- Progress since last month
 - Updated CSM Memo Outline
 - New model base layers
 - CSM Memo writing
- Overall GW Model Status
- QA/QC activities
- Next steps

Progress – Updated CSM Memorandum Outline

Comments Received

- Two sets of comments received – requires further discussion with GW modeling team
- One minor change from MPCA

2.0	East Metro Lithology/Geology
2.1	Description and Discussion of the geology/lithology included in the CSM and future Numerical Groundwater Model
2.2	Geological Structure - faults, fractures, and conduit flow
2.3	Maps/Figures/X-sections of lithology/geology (including surfaces)

Progress – Updated Model Base Layers

- ✓ Bedrock surfaces
- ✓ Hydraulic conductivity ranges for bedrock units
- ✓ Surface topography raster from MN and WI DEMs
- ✓ Groundwater elevations, screen intervals, and screen lithologies for area-wide groundwater monitoring wells.
- ✓ Lake stage and stream gauging data (discharge and gage height)
- ✓ Compiling significant groundwater withdrawals- STILL IN PROGRESS

Progress – CSM Memorandum Writing

Complete



2.0

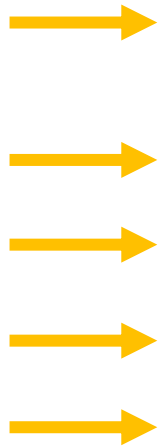
East Metro Lithology/Geology

2.1 Description and Discussion of the geology/lithology included in the CSM and future Numerical Groundwater Model

2.2 Geological Structure - faults, fractures, and conduit flow

2.3 Maps/Figures/X-sections of lithology/geology (including surfaces)

In Progress



3.0

East Metro Hydrostratigraphy

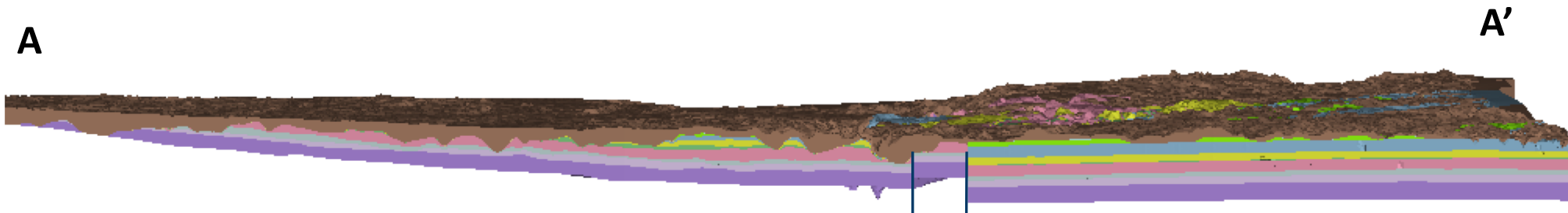
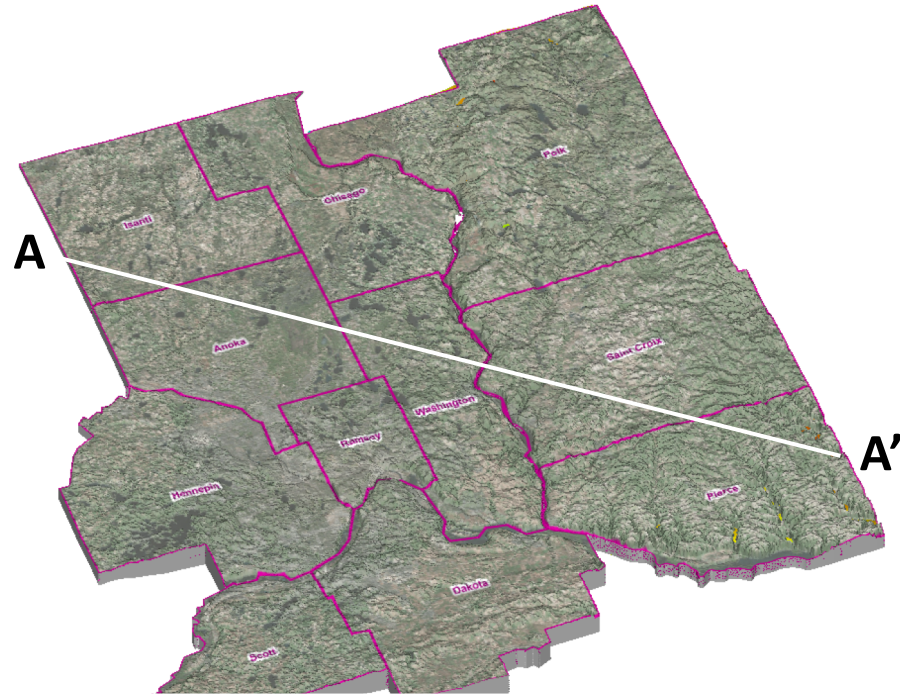
3.1 Aquifers

3.2 Confining Units/Aquitards

3.3 Maps/X-sections/Figures for Hydrostratigraphy (including surfaces)

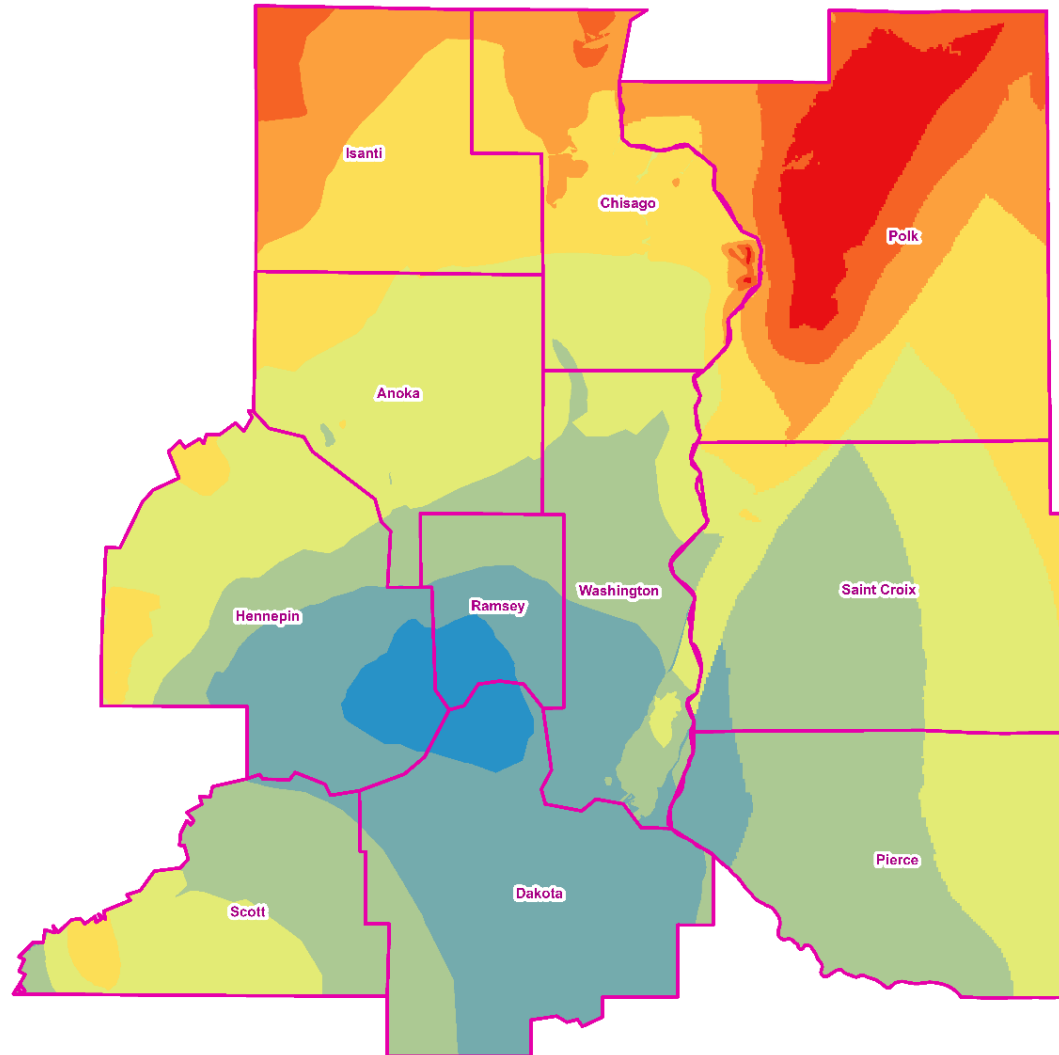
Overall Groundwater Model Status

GEOLOGIC BASE MODEL



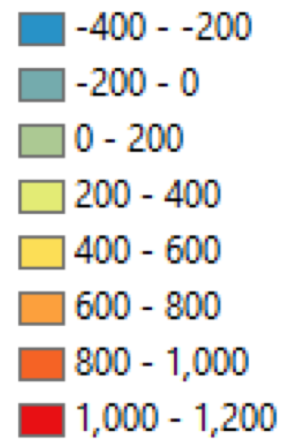
- Quaternary
- Decorah Shale
- Plateville_Glenwood
- St. Peter Sandstone
- Prairie Du Chien
- Jordon Sandstone
- St. Lawrence
- Tunnel City Group
- Wonewoc
- Eau Claire
- Mt. Simon

Overall Groundwater Model Status (Cont'd)

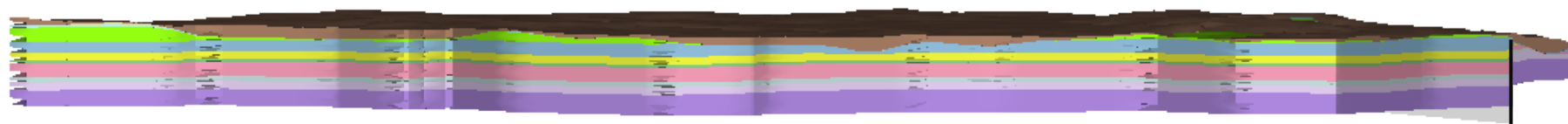
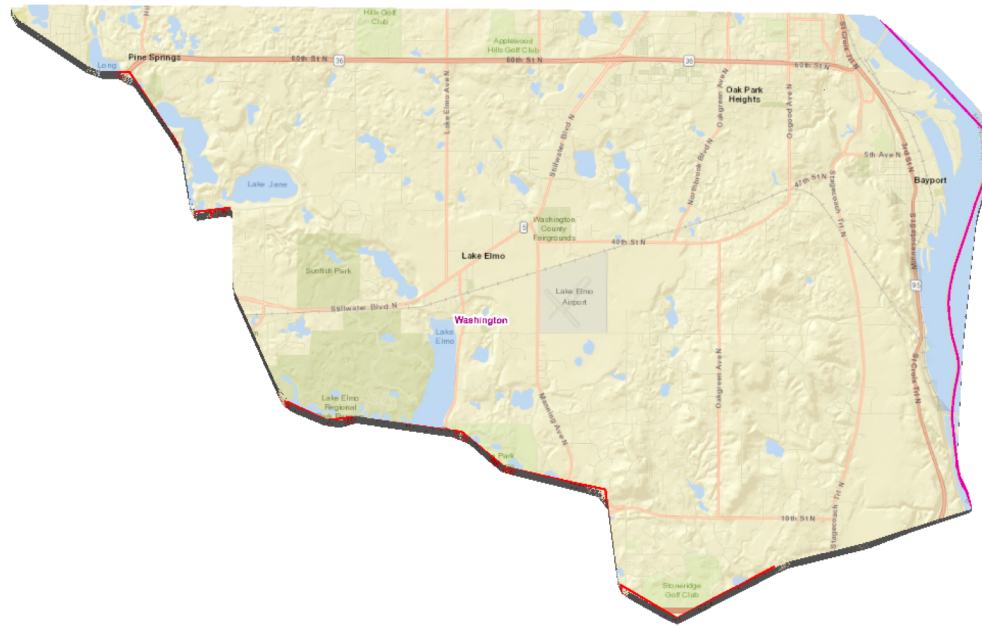


GEOLOGIC BASE MODEL

MODEL BUILT STARTING WITH
THE BASE SURFACE



Project 1007



- Quaternary
- Decorah Shale
- Plateville_Glenwood
- St. Peter Sandstone
- Prairie Du Chien
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- ❑ Once CSM is complete, inputs will require QA/QC.
- ❑ Once QA/QC is complete, verification and validation is completed to the degree needed to ensure model meets intended purpose
 - Verification (finding and fixing errors)
 - Validation (checking the accuracy of the model's representation of the real system).
 - Both steps are iterative.

Data sets used for Verification and Validation

Synoptic Groundwater Elevation Measurements Data Sets

- 2011 – 2 sets NE Metro Area
- 2012 – 2 sets NE Metro Area
- 2013 – 2 sets NE Metro Area
- Winter 1989 – Metro Wide
- March/August 2008 - Metro Wide
- Others available from the DNR website

Next Steps - Model

QA/QC of
Bedrock
Surfaces

Determine
Extent of Model
Domain

Incorporate
quaternary
units, shallow
bedrock, and
bathymetry
(where avail.)

Download
Climate Data

Compile and
organize data
from previous
models

Generate plots,
tables, and
figures

Next Steps – CSM Memo Sections

- 4.0 CSM Boundaries
 - 4.1 Boundary locations (by layer)
 - 4.2 CSM boundary types (to be used in the numerical model)
 - 4.2.1 General Head
 - 4.2.2 Rivers, lakes, and streams (via separate packages in MODFLOW)
 - 4.2.3 Constant Head
 - 4.2.4 Recharge areas
 - 4.2.5 Well influence (pumping and/or injection)

- 5.0 Input Parameters
 - 5.1 Maps/Tables of hydraulic data (hydraulic conductivity, etc.) by layer and/or lithology
 - 5.2 Maps/Tables of recharge across model domain
 - 5.3 Maps/Tables of surface water (rivers, lakes, and streams)
 - 5.3.1 Maps/Tables of Baseflow
 - 5.3.2 Maps/Tables of Bathymetry
 - 5.4 Potentiometric surface maps for calibration and verification

- 6.0 Summary of CSM and Next Steps (building numerical model)

Thank you!

Jim Feild, PhD

Wood, East Metro Groundwater Model Lead

james.feild@woodplc.com

865.266.9492

Sarah Shaw

Wood, East Metro Senior Hydrogeologist

Sarah.shaw@woodplc.com