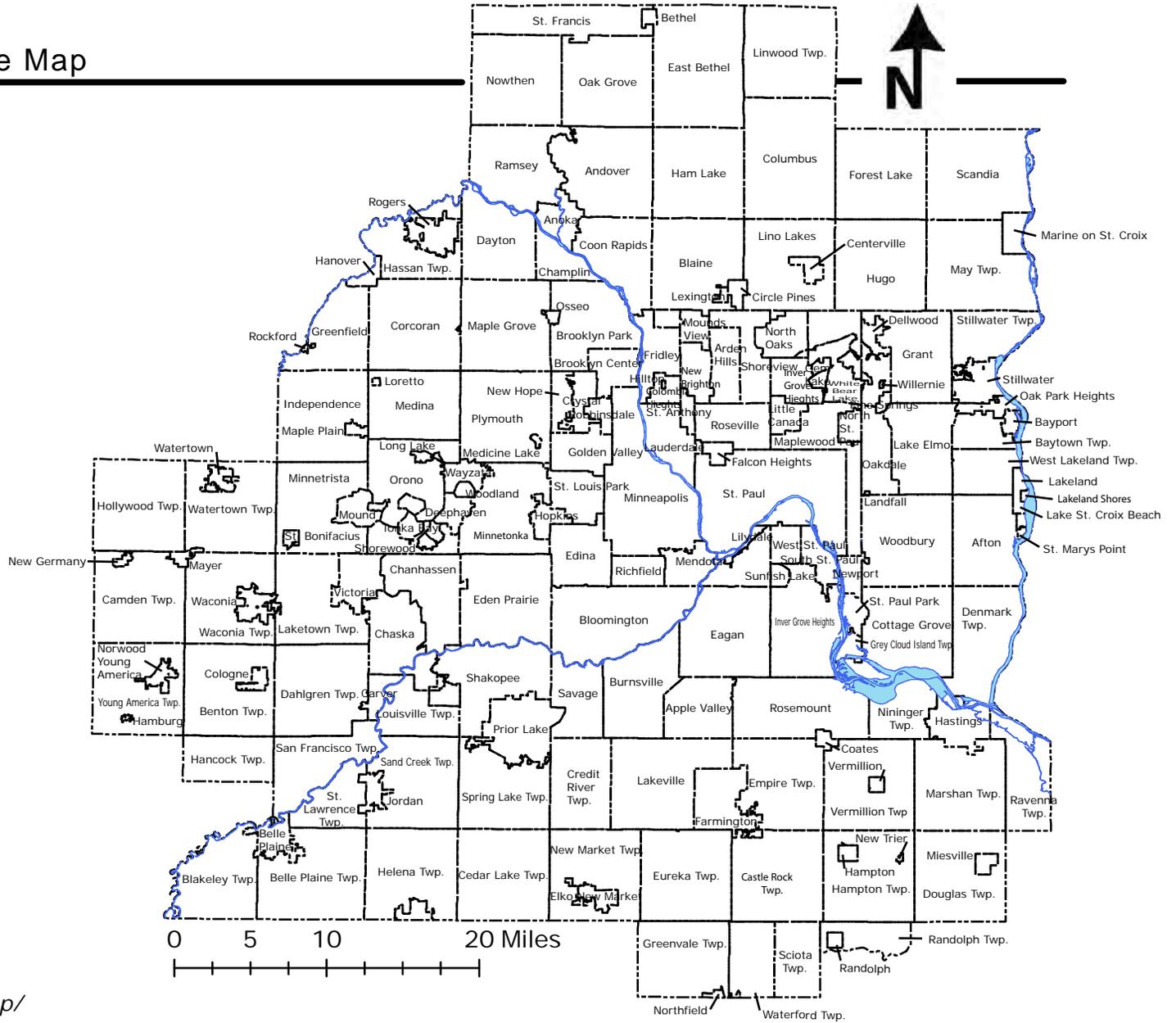
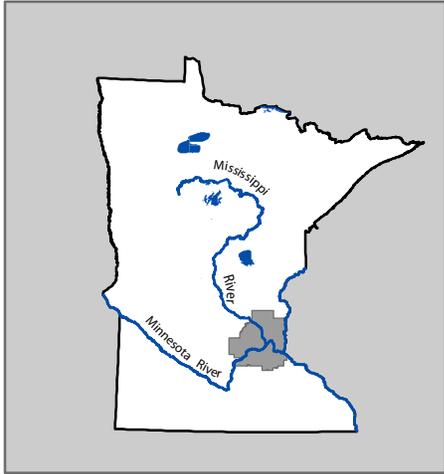


APPENDIX 1: MAPS

- A. Metropolitan Area Reference Map
- B. Public Water Suppliers
- C. Interconnection Status
- D. Bedrock Geology
- E. Regional Groundwater Flow Directions
- F. Long-Term Average Annual Recharge
- G. Trout Streams and Calcareous Fens
- H. Minnesota Department of Health Drinking Water Protection Areas
- I. Minnesota Department of Health Special Well Construction Areas
- J. Areas Groundwater Pumping is Likely to Directly Impact Surface Water Features
- K. 2030 Model-Projected Drawdown in the Prairie du Chien-Jordan Aquifer
- L. 2050 Model-Projected Drawdown in the Prairie du Chien-Jordan Aquifer
- M. 2030 Model-Projected Drawdown in the Franconia-Ironton-Galesville Aquifer
- N. 2050 Model-Projected Drawdown in the Franconia-Ironton-Galesville Aquifer
- O. 2030 Model-Projected Drawdown in Areas Groundwater Pumping is Likely to Impact Surface Water Features
- P. 2050 Model-Projected Drawdown in Areas Groundwater Pumping is Likely to Impact Surface Water Features
- Q. 2030 Model-Projected Drawdown in the Mt. Simon-Hinckley Aquifer
- R. 2050 Model-Projected Drawdown in the Mt. Simon-Hinckley Aquifer
- S. Baseflow Measurement Sites

Metropolitan Area Reference Map



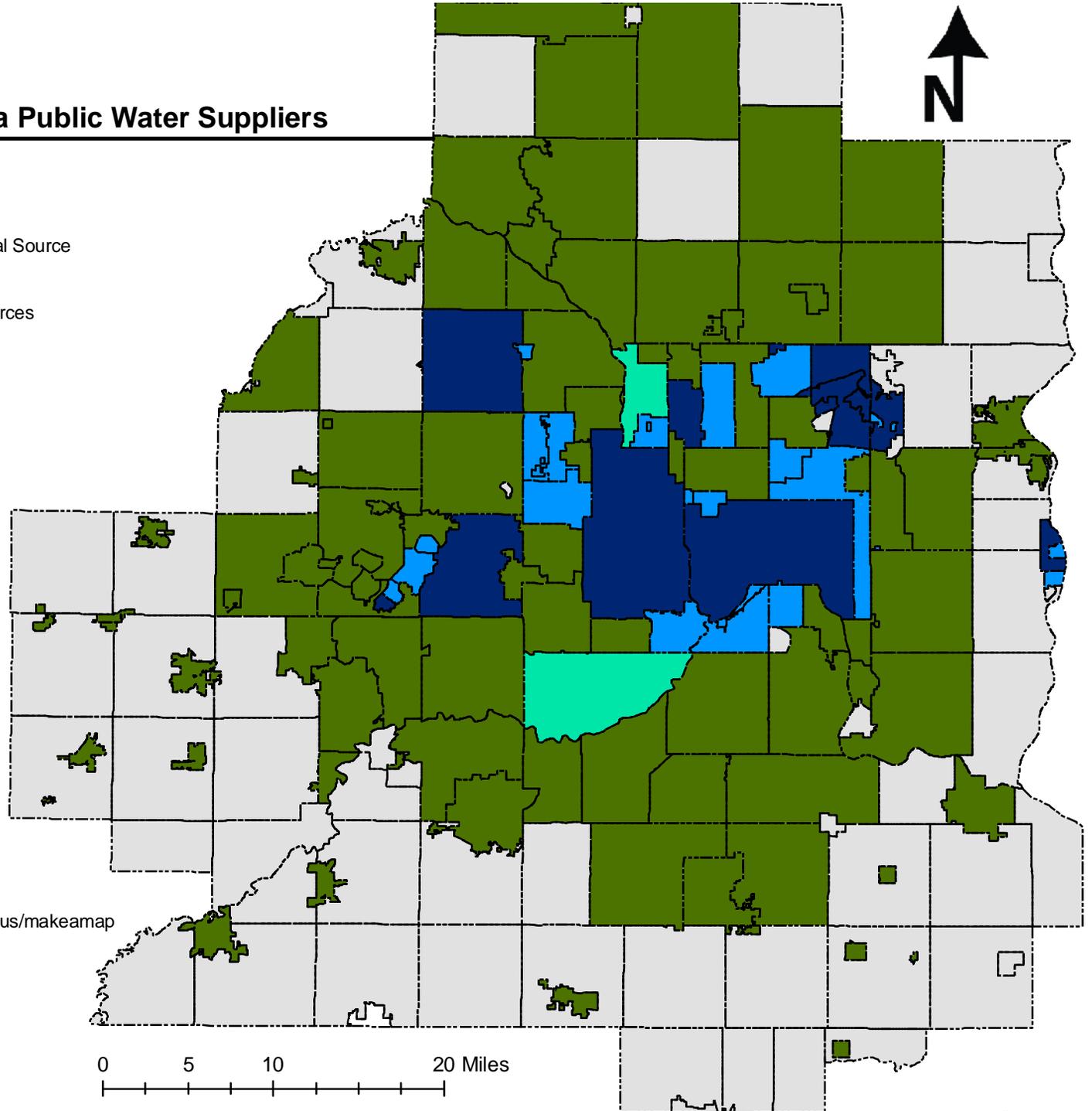
Created by the Metropolitan Council
 on August Thirteenth 2008.
 View these datasets online at
<http://gis.metc.state.mn.us/makeamap/>

Twin Cities Metropolitan Area Public Water Suppliers

 City & Township Boundaries

Public Water Suppliers

-  Serves Multiple Communities Using Local Source
-  Community Uses Outside Source
-  Community Uses Local and Outside Sources
-  Community Uses Local Source
-  No Public Water Supply - Private Wells



Metropolitan Council, 8/27/2009

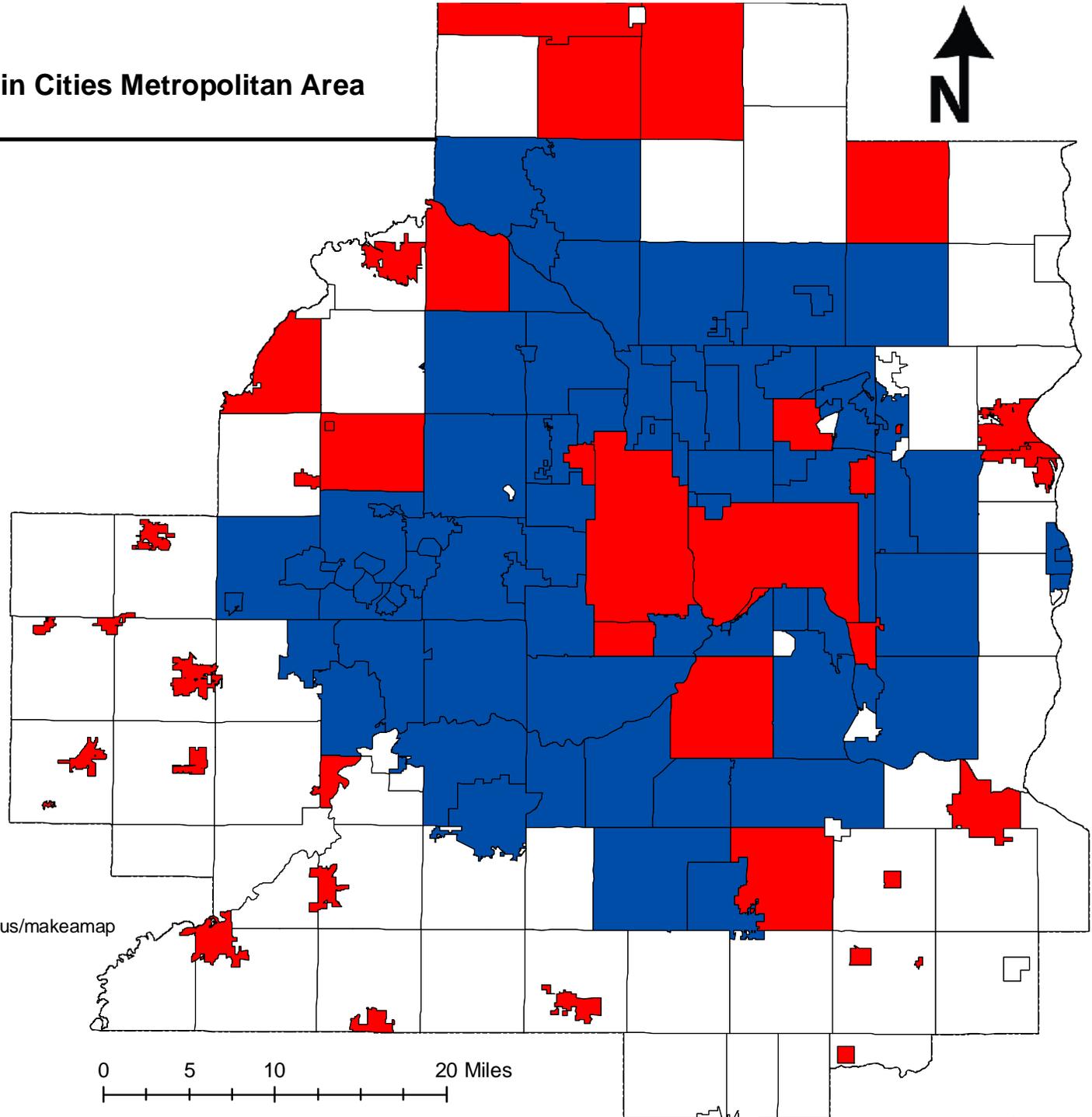
View datasets online at <http://gis.metc.state.mn.us/makeamap>

Source:
Metropolitan Council

Interconnection Status of Twin Cities Metropolitan Area Public Water Suppliers

-  City & Township Boundaries
-  No Municipal Supply
-  No Reported Interconnection
-  One or More Interconnection Reported

Note: This map illustrates communities with physical interconnections that allow them to receive water from neighboring public water suppliers.



Metropolitan Council, 8/25/2009
View datasets online at <http://gis.metc.state.mn.us/makeamap>

Source:
Metropolitan Council

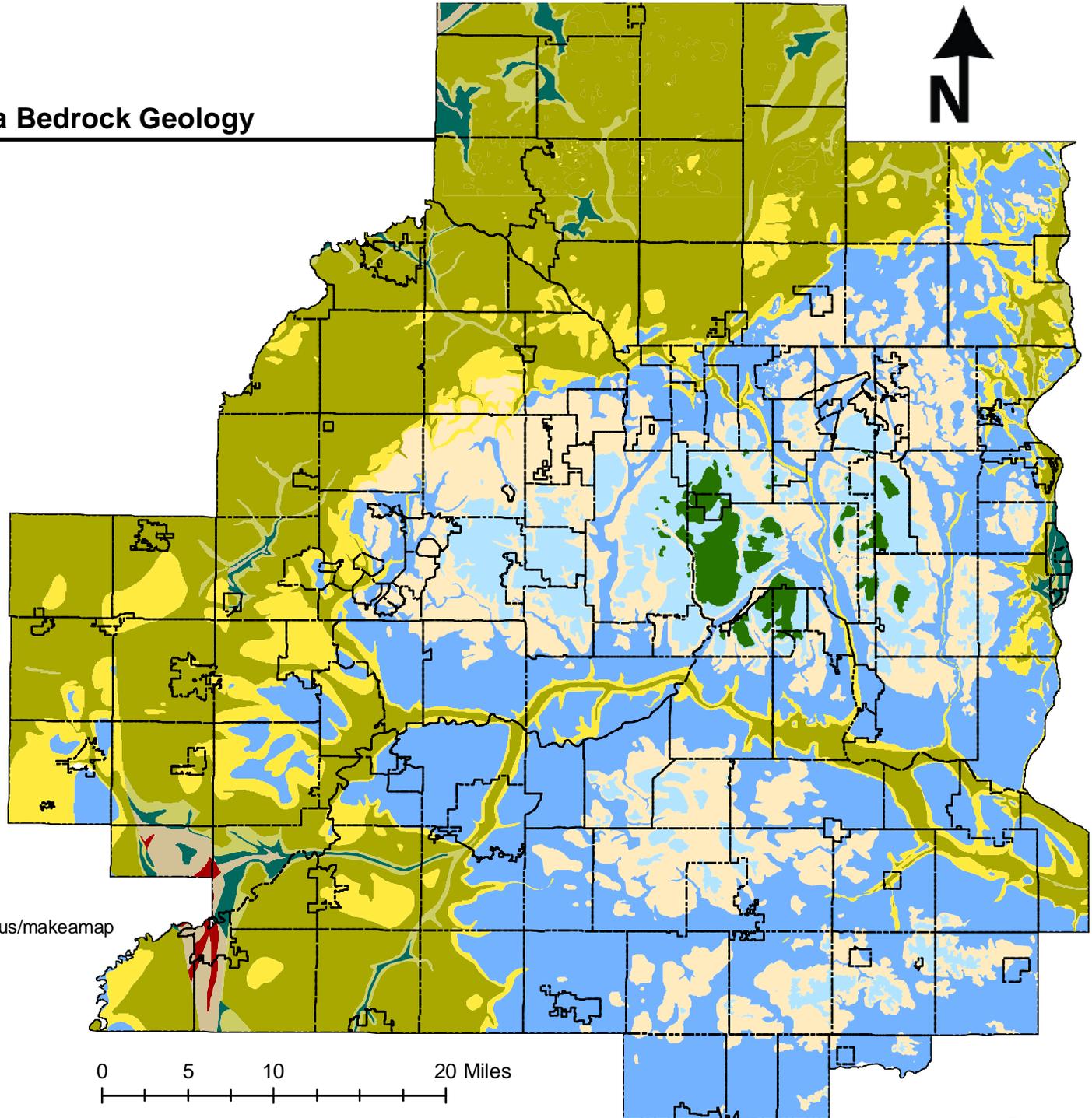
Twin Cities Metropolitan Area Bedrock Geology



 City & Township Boundaries

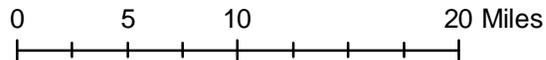
Geologic Unit Name

-  DECORAH SHALE
-  PLATTEVILLE-GLENWOOD FRMS.
-  ST. PETER SANDSTONE
-  PRAIRIE DU CHIEN GROUP
-  JORDAN SANDSTONE
-  ST. LAWRENCE FORMATION
-  ST. LAWRENCE-FRANCONIA FRMS.
-  FRANCONIA FORMATION
-  IRONTON-GALESVILLE SANDSTONES
-  EAU CLAIRE FORMATION
-  MT. SIMON SANDSTONE
-  RED CLASTIC SERIES



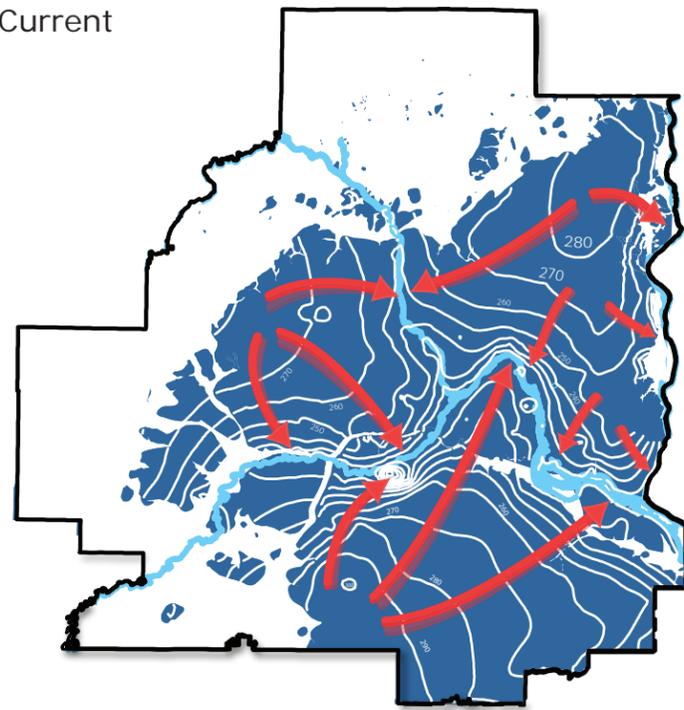
Metropolitan Council, 2/11/2009
View datasets online at <http://gis.metc.state.mn.us/makeamap>

Source:
Minnesota Geological Survey
Metropolitan Council



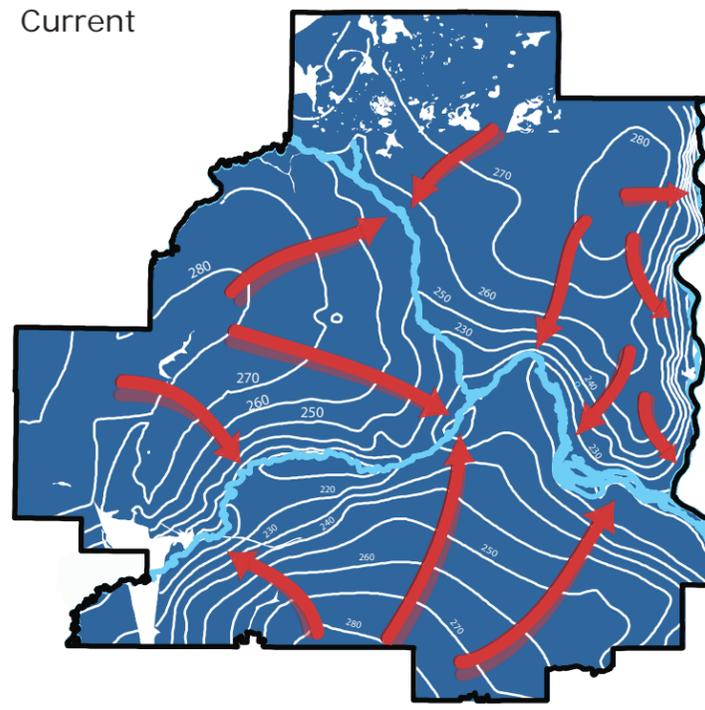
Changes in Aquifer Elevation and Regional Groundwater Flow Direction in Three Metropolitan Area Aquifers

Current



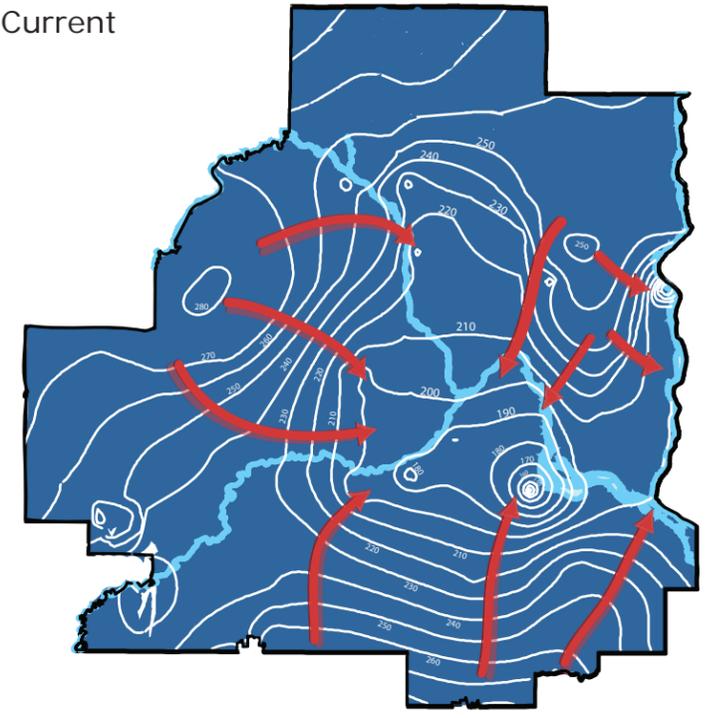
Prairie du Chien - Jordan Aquifer

Current



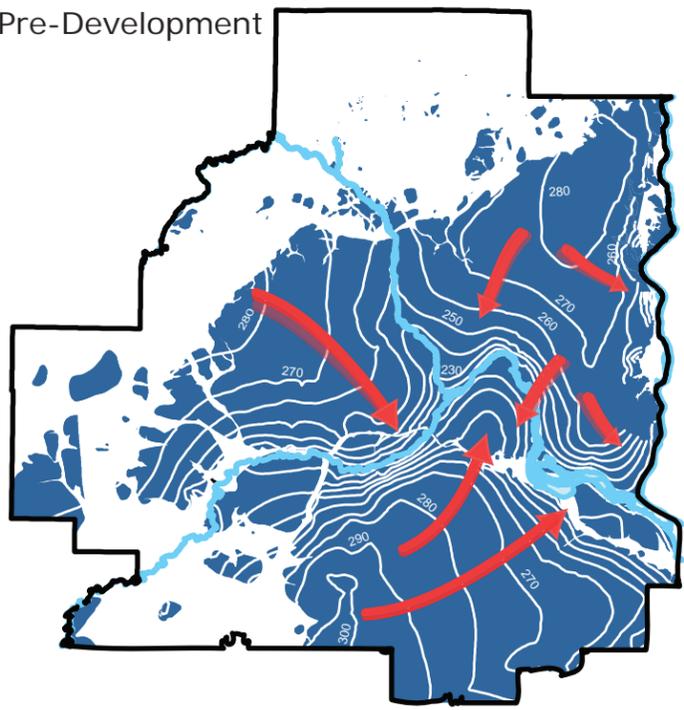
Franconia Ironton-Galesville Aquifer

Current

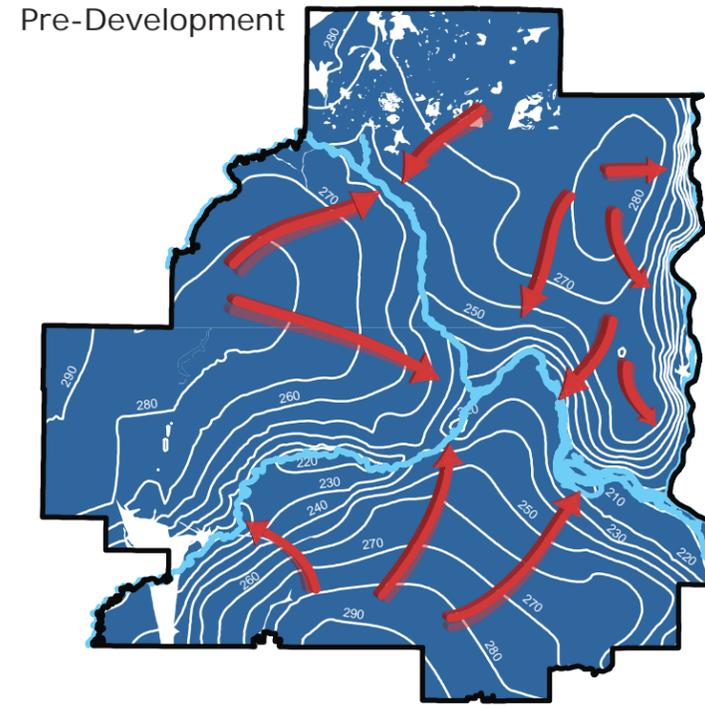


Mount Simon-Hinckley Aquifer

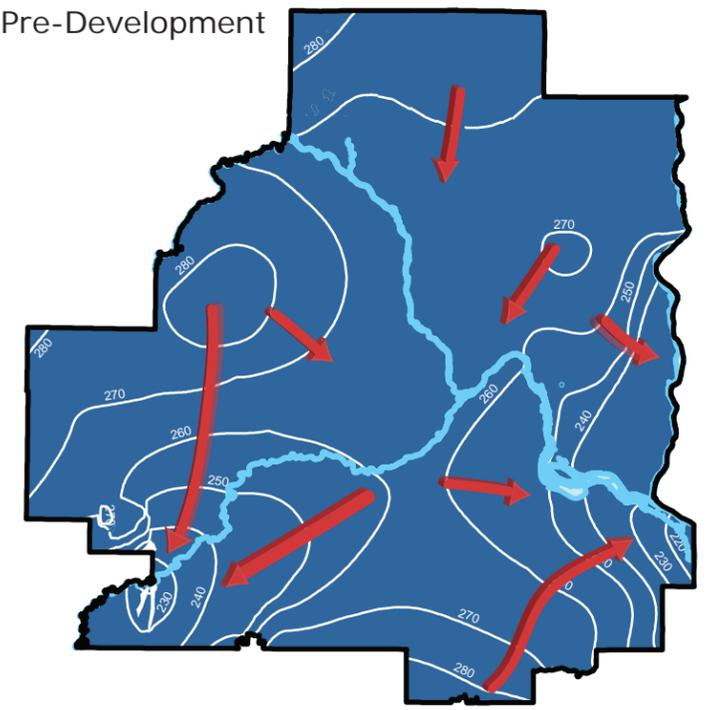
Pre-Development



Pre-Development



Pre-Development



River



Contour
(10 Meter Interval)



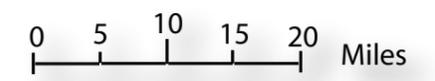
Regional
Flow Direction



Aquifer
Extent



270
Elevation above Sea Level
(Meters)

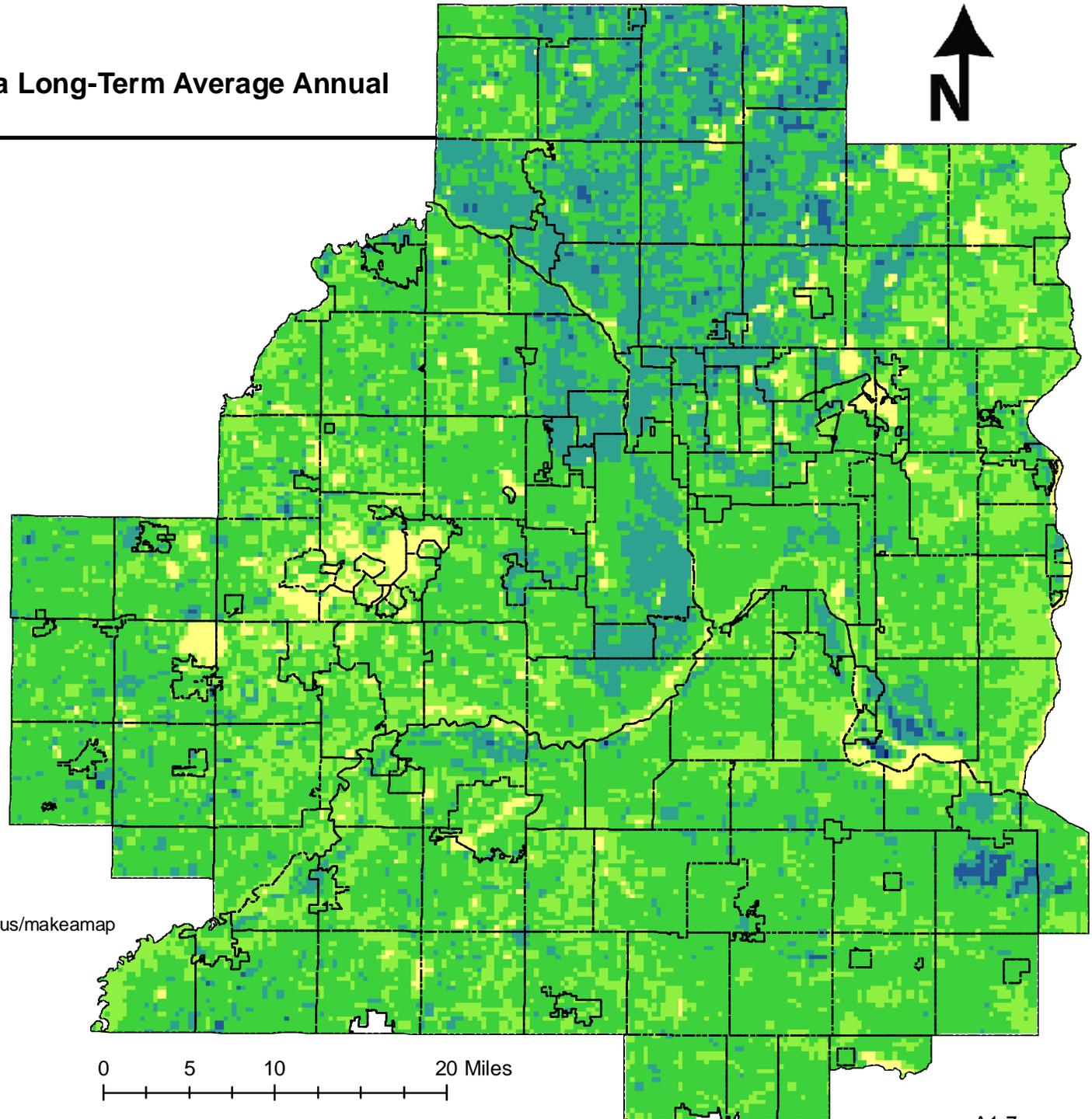
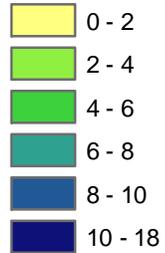


Twin Cities Metropolitan Area Long-Term Average Annual Recharge



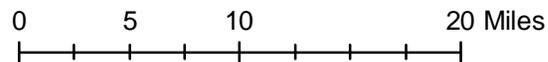
 City & Township Boundaries

Recharge Rate (Inches per Year)



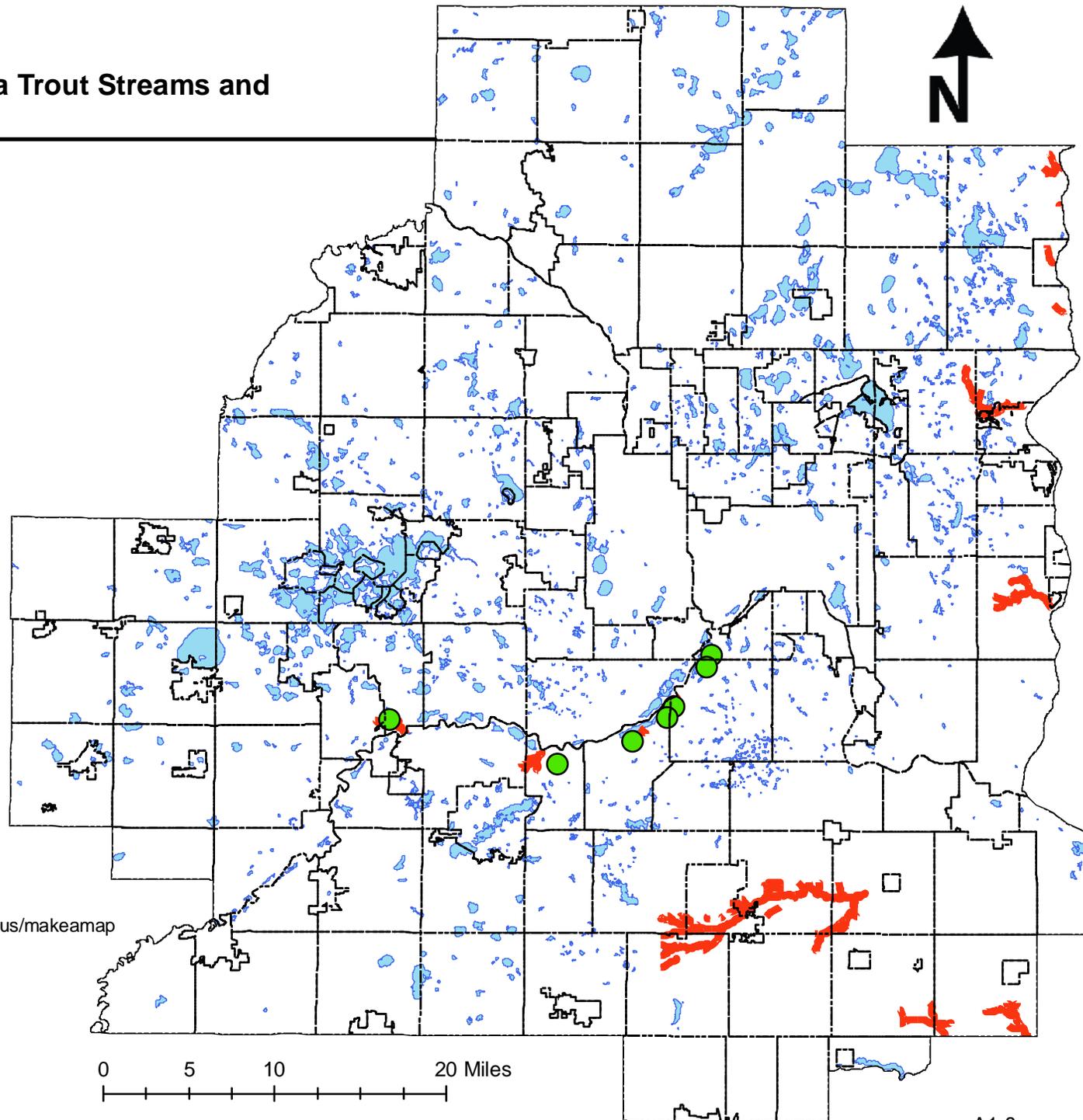
Metropolitan Council, 8/26/2009
View datasets online at <http://gis.metc.state.mn.us/makeamap>

Source:
Metropolitan Council



Twin Cities Metropolitan Area Trout Streams and Calcareous Fens

- City & Township Boundaries
- Calcareous Fens
- Trout Streams
- Lakes

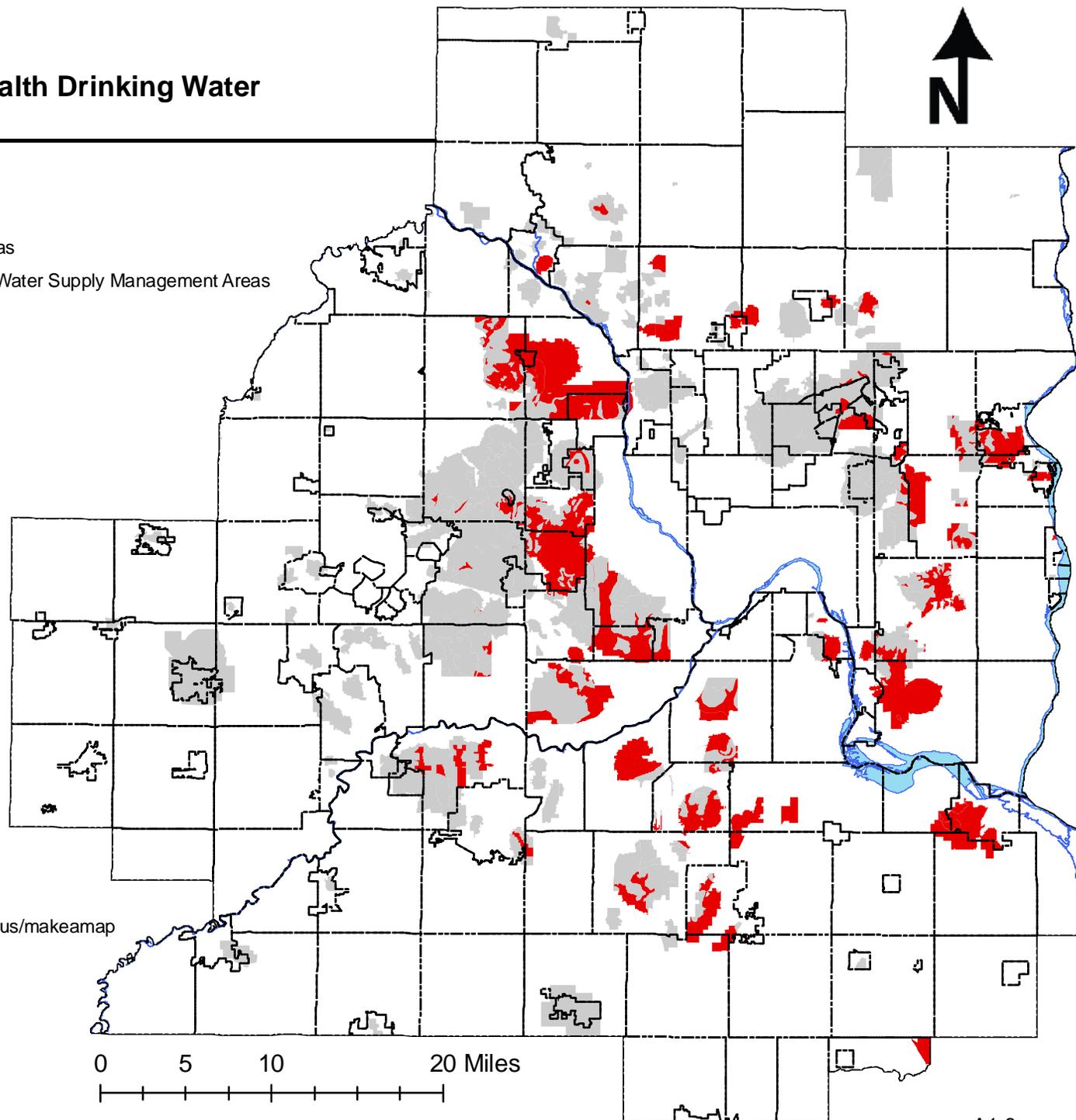


Metropolitan Council, 2/17/2009
View datasets online at <http://gis.metc.state.mn.us/makeamap>

Source:
Minnesota Department of Natural Resources
Metropolitan Council

Minnesota Department of Health Drinking Water Protection Areas

-  City & Township Boundaries
-  Rivers
-  Drinking Water Supply Management Areas
-  High or Very High Vulnerability Drinking Water Supply Management Areas

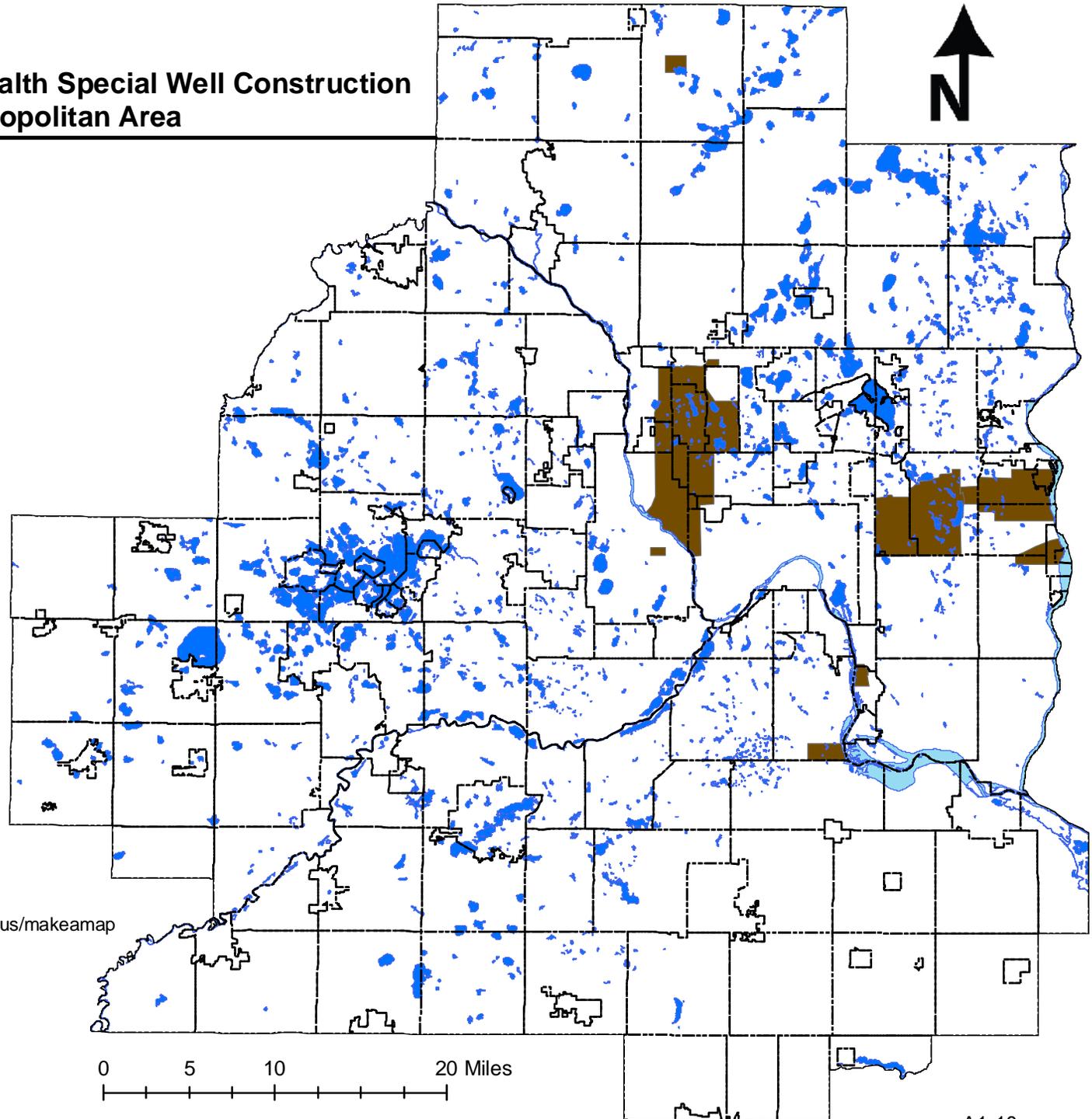


Metropolitan Council, 8/26/2009
View datasets online at <http://gis.metc.state.mn.us/makeamap>

Source:
Minnesota Department of Health
Metropolitan Council

Minnesota Department of Health Special Well Construction Areas in the Twin Cities Metropolitan Area

- City & Township Boundaries
- Rivers
- Lakes
- Special Well Construction Areas



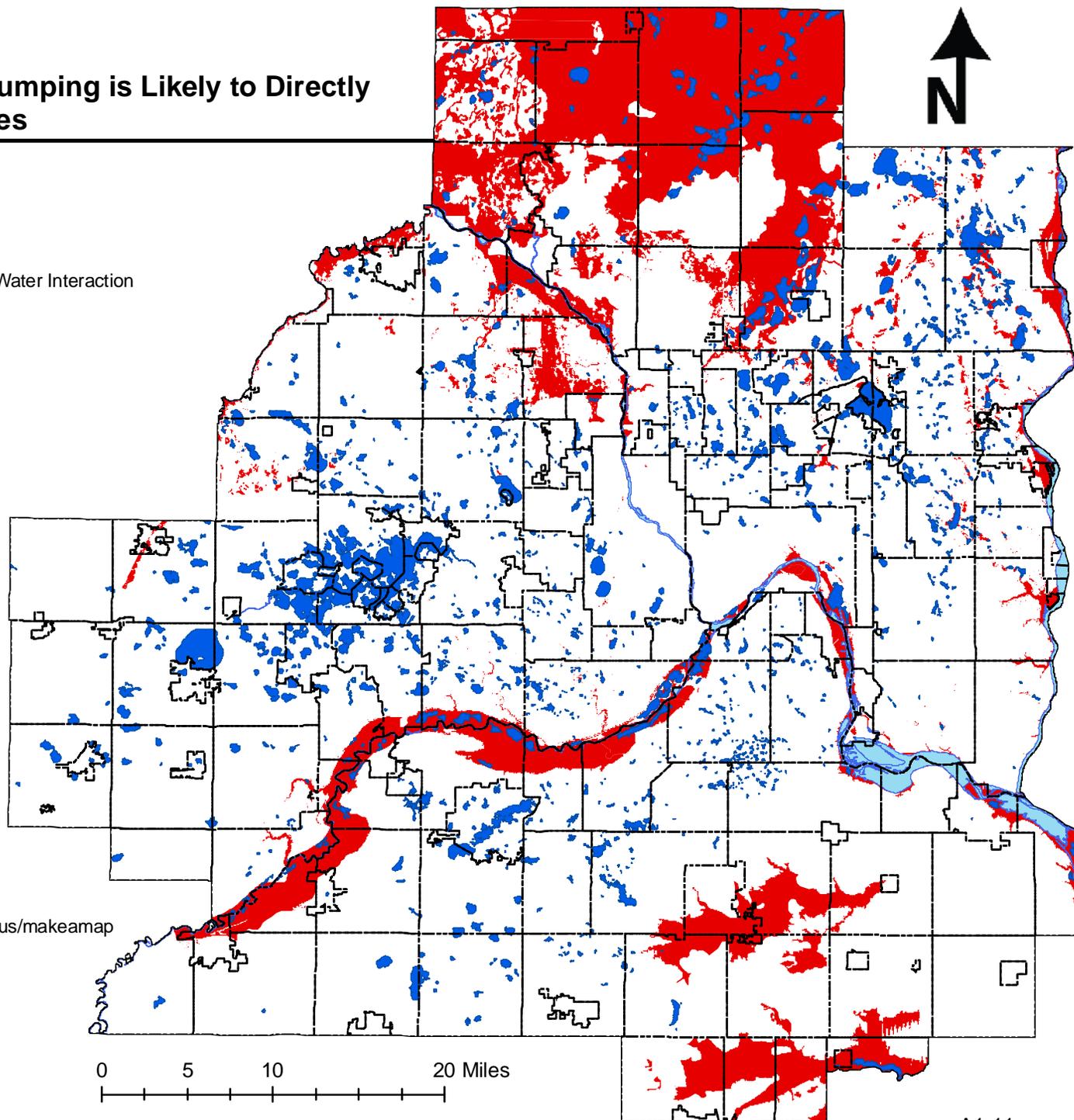
Metropolitan Council, 2/23/2009
View datasets online at <http://gis.metc.state.mn.us/makeamap>

Source:
Minnesota Department of Health
Metropolitan Council

Areas Where Groundwater Pumping is Likely to Directly Impact Surface Water Features

-  City & Township Boundaries
-  Rivers
-  Lakes
-  High Potential for Groundwater-Surface Water Interaction

Note: This map was created through a regional assessment of geologic and water table conditions. Additional areas of groundwater and surface water interaction may exist due to local conditions. This map highlights areas where bedrock aquifer pumping is most likely to impact surface water resources.



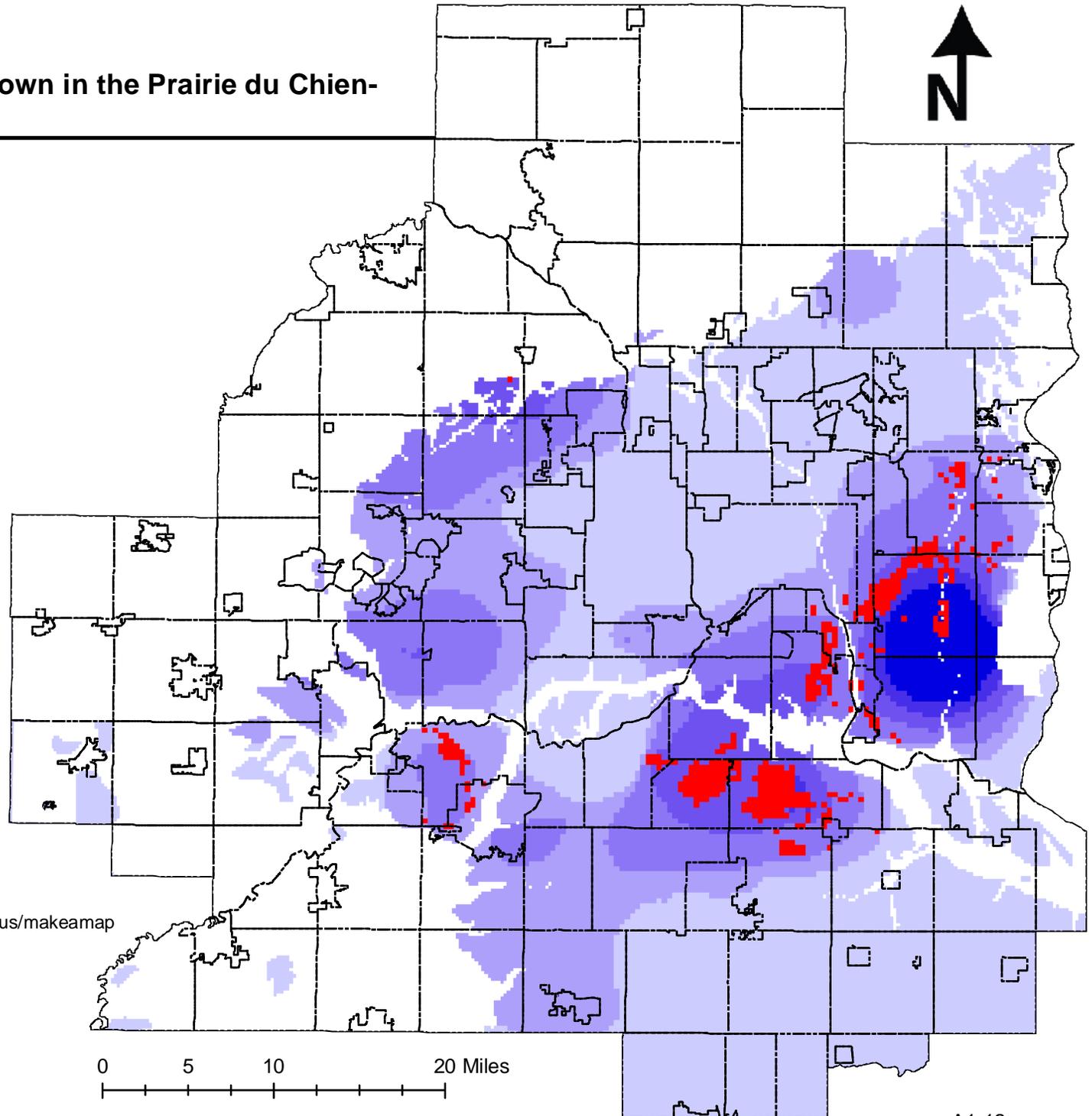
Metropolitan Council, 2/13/2009
View datasets online at <http://gis.metc.state.mn.us/makeamap>

Source:
Metropolitan Council

2030 Model-projected Drawdown in the Prairie du Chien-Jordan Aquifer



Note: These model results assume long-term average conditions and continued development of traditional water supplies. Summer conditions may exacerbate short-term drawdown.



Metropolitan Council, 8/26/2009
View datasets online at <http://gis.metc.state.mn.us/makeamap>

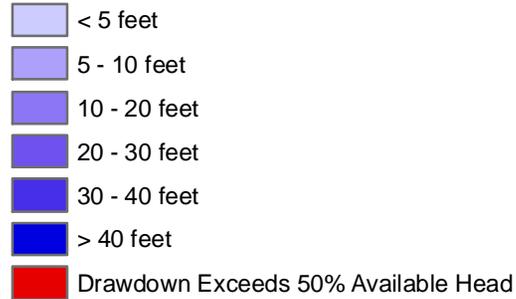
Source:
Metropolitan Council

2050 Model-projected Drawdown in the Prairie du Chien-Jordan Aquifer

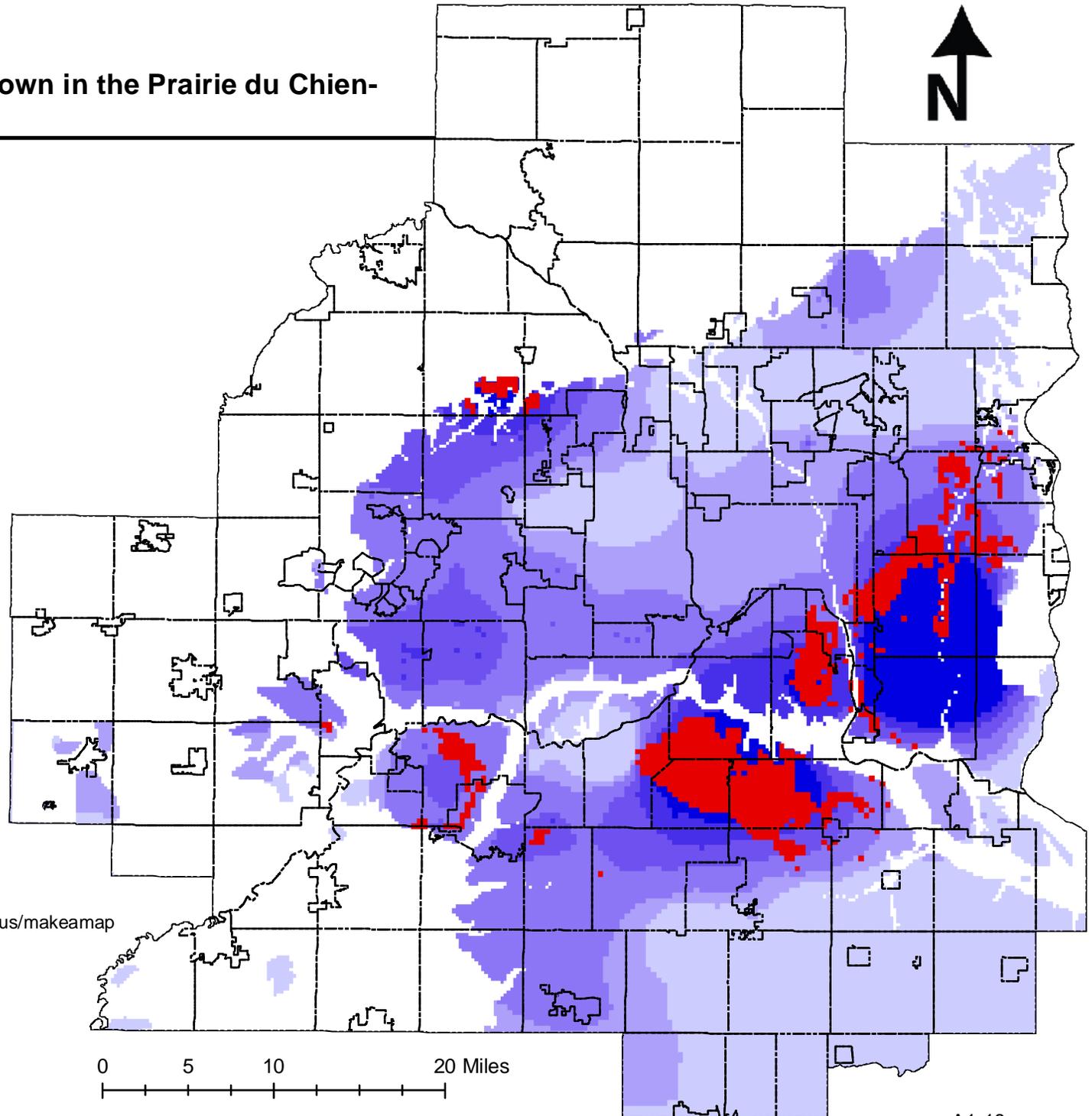


 City & Township Boundaries

Model-projected Drawdown: 2050



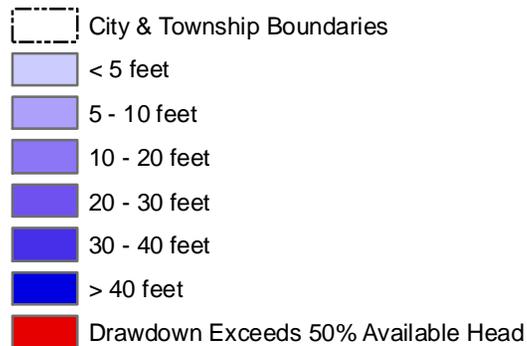
Note: These model results assume long-term average conditions and continued development of traditional water supplies. Summer conditions may exacerbate short-term drawdown.



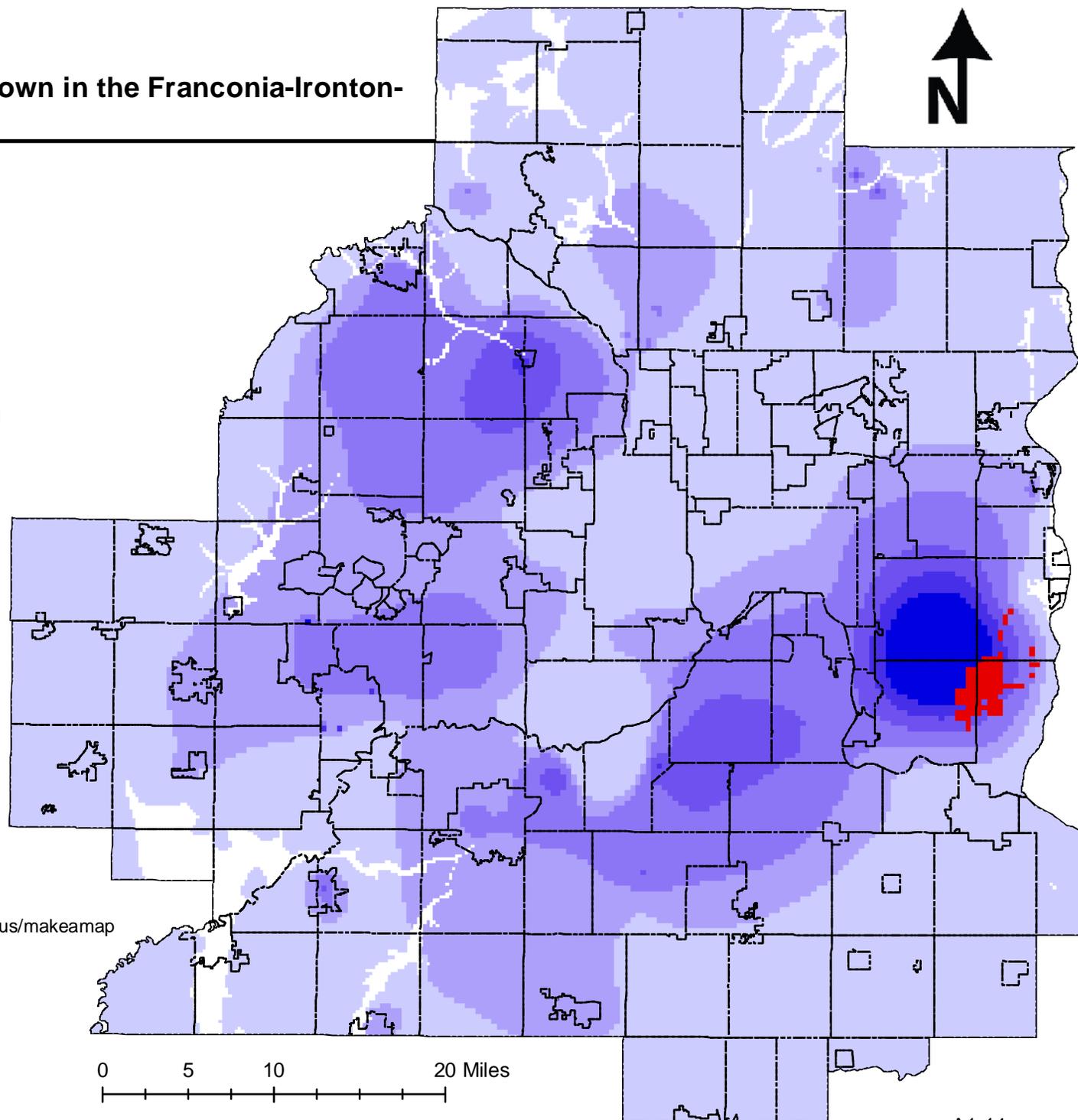
Metropolitan Council, 8/26/2009
View datasets online at <http://gis.metc.state.mn.us/makeamap>

Source:
Metropolitan Council

2030 Model-projected Drawdown in the Franconia-Ironton-Galesville Aquifer



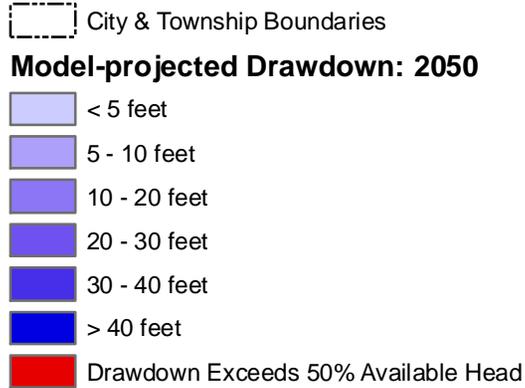
Note: These model results assume long-term average conditions and continued development of traditional water supplies. Summer conditions may exacerbate short-term drawdown.



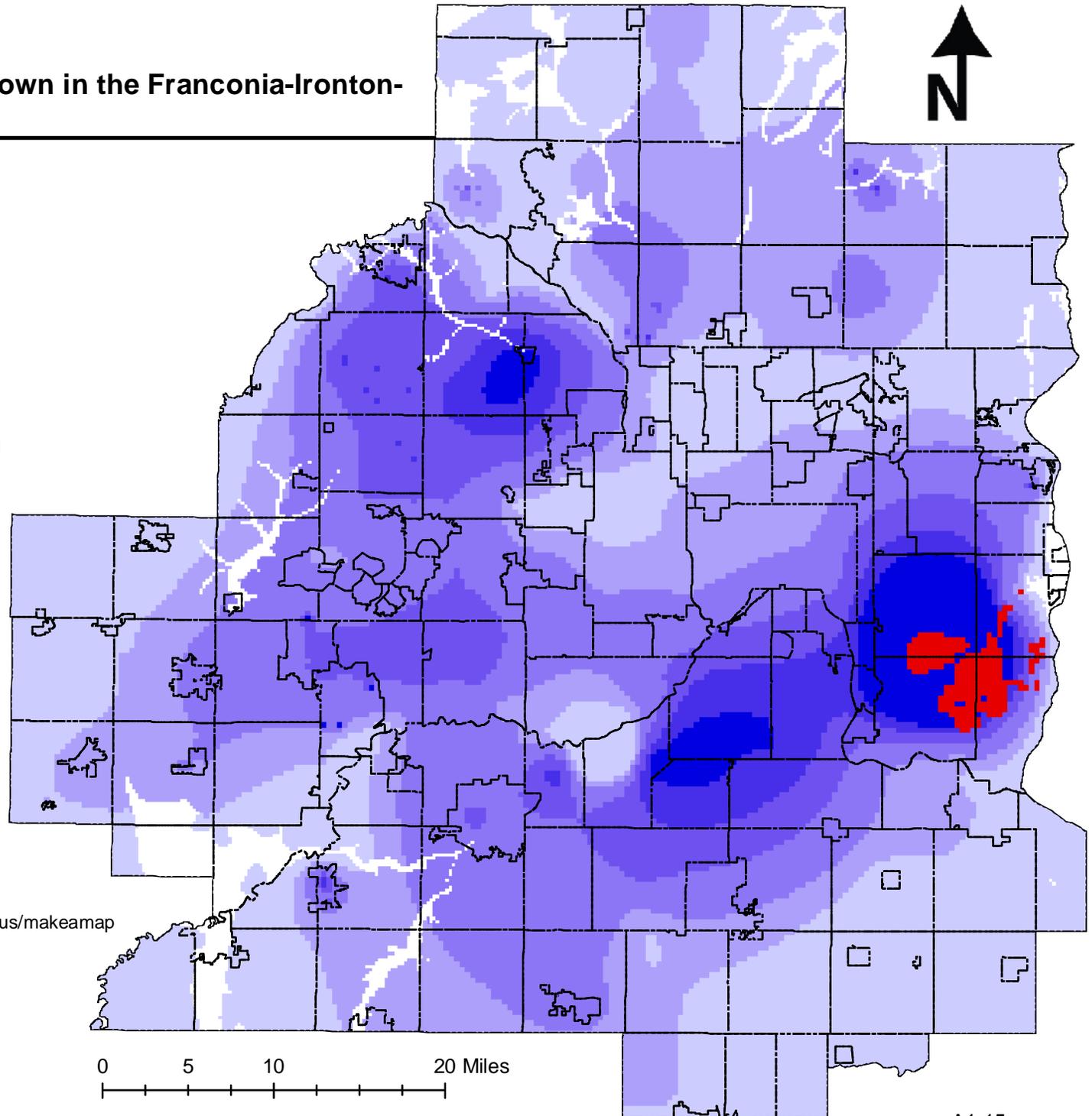
Metropolitan Council, 8/26/2009
View datasets online at <http://gis.metc.state.mn.us/makeamap>

Source:
Metropolitan Council

2050 Model-projected Drawdown in the Franconia-Ironton-Galesville Aquifer



Note: These model results assume long-term average conditions and continued development of traditional water supplies. Summer conditions may exacerbate short-term drawdown.



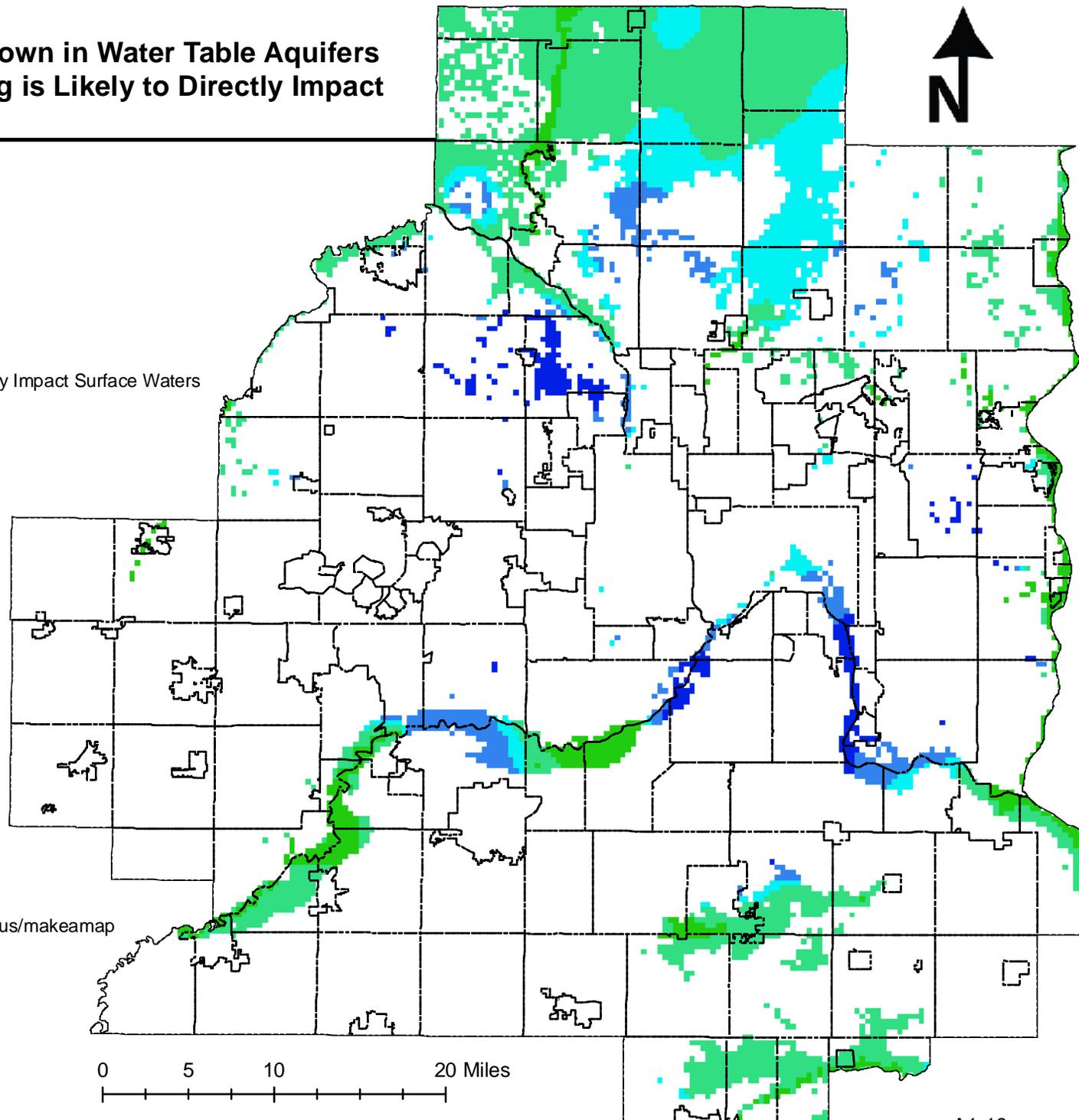
Metropolitan Council, 8/26/2009
View datasets online at <http://gis.metc.state.mn.us/makeamap>

Source:
Metropolitan Council

2030 Model-projected Drawdown in Water Table Aquifers Where Groundwater Pumping is Likely to Directly Impact Surface Water Features

- City & Township Boundaries
- 0 - 1 foot
- 1 - 3.281 feet (1 meter)
- 3.281 - 5 feet
- 5 - 10 feet
- Greater than 10 feet
- Groundwater Pumping Unlikely to Directly Impact Surface Waters

Note: These model results assume long-term average conditions and continued development of traditional water supplies. Summer conditions may exacerbate short-term drawdown.



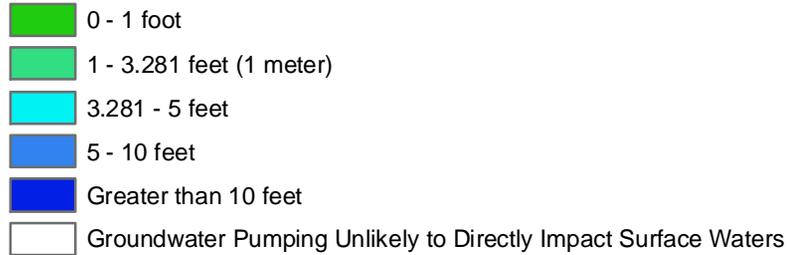
Metropolitan Council, 8/26/2009
View datasets online at <http://gis.metc.state.mn.us/makeamap>

Source:
Metropolitan Council

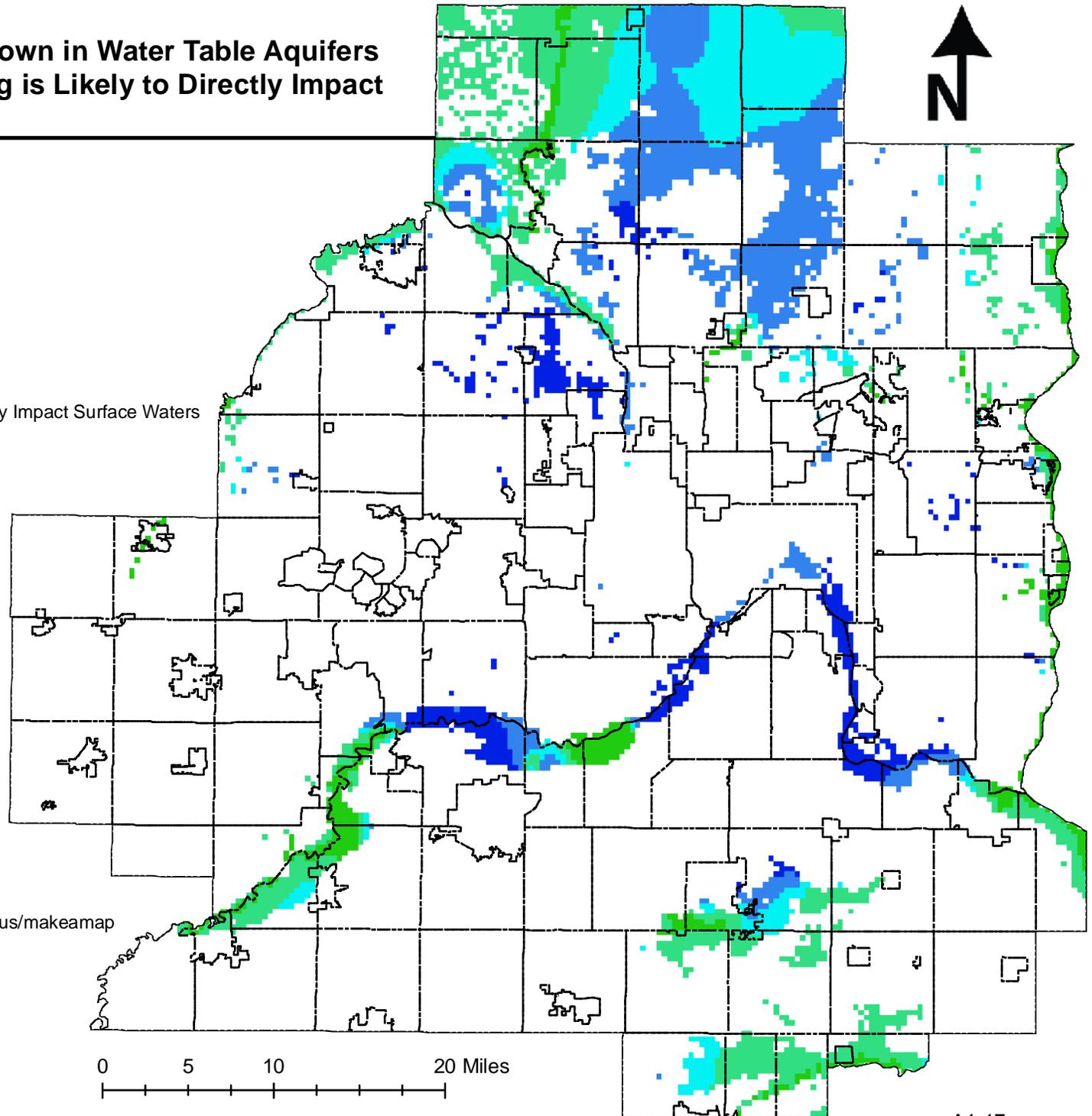
2050 Model-projected Drawdown in Water Table Aquifers Where Groundwater Pumping is Likely to Directly Impact Surface Water Features

City & Township Boundaries

Model-projected Drawdown



Note: These model results assume long-term average conditions and continued development of traditional water supplies. Summer conditions may exacerbate short-term drawdown.



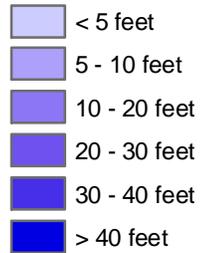
Metropolitan Council, 8/26/2009
View datasets online at <http://gis.metc.state.mn.us/makeamap>

Source:
Metropolitan Council

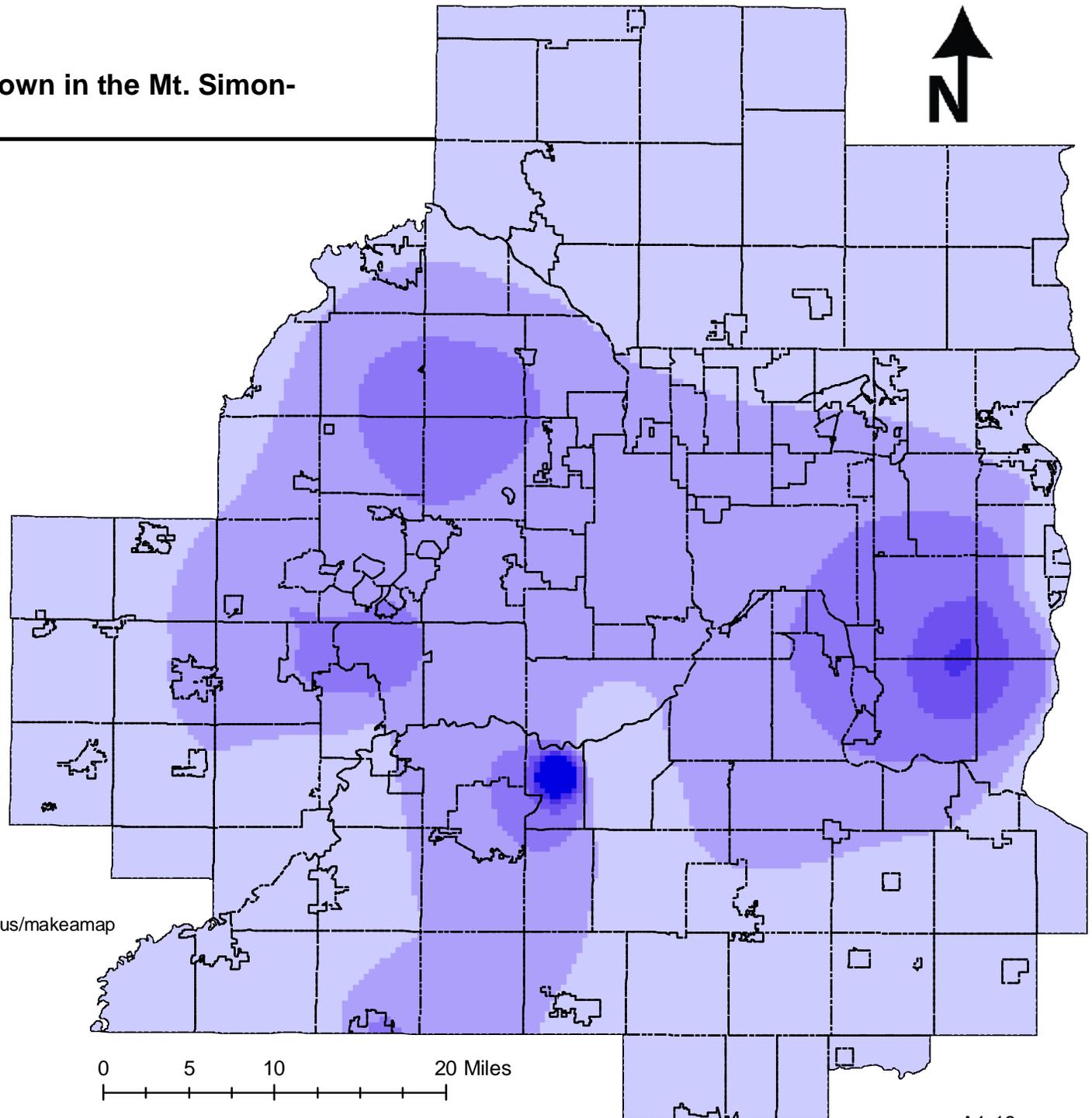
2030 Model-projected Drawdown in the Mt. Simon-Hinckley Aquifer

 City & Township Boundaries

Model-projected Drawdown: 2030



Note: These model results assume long-term average conditions and continued development of traditional water supplies. Summer conditions may exacerbate short-term drawdown.



Metropolitan Council, 8/26/2009

View datasets online at <http://gis.metc.state.mn.us/makeamap>

Source:
Metropolitan Council

2050 Model-projected Drawdown in the Mt. Simon-Hinckley Aquifer

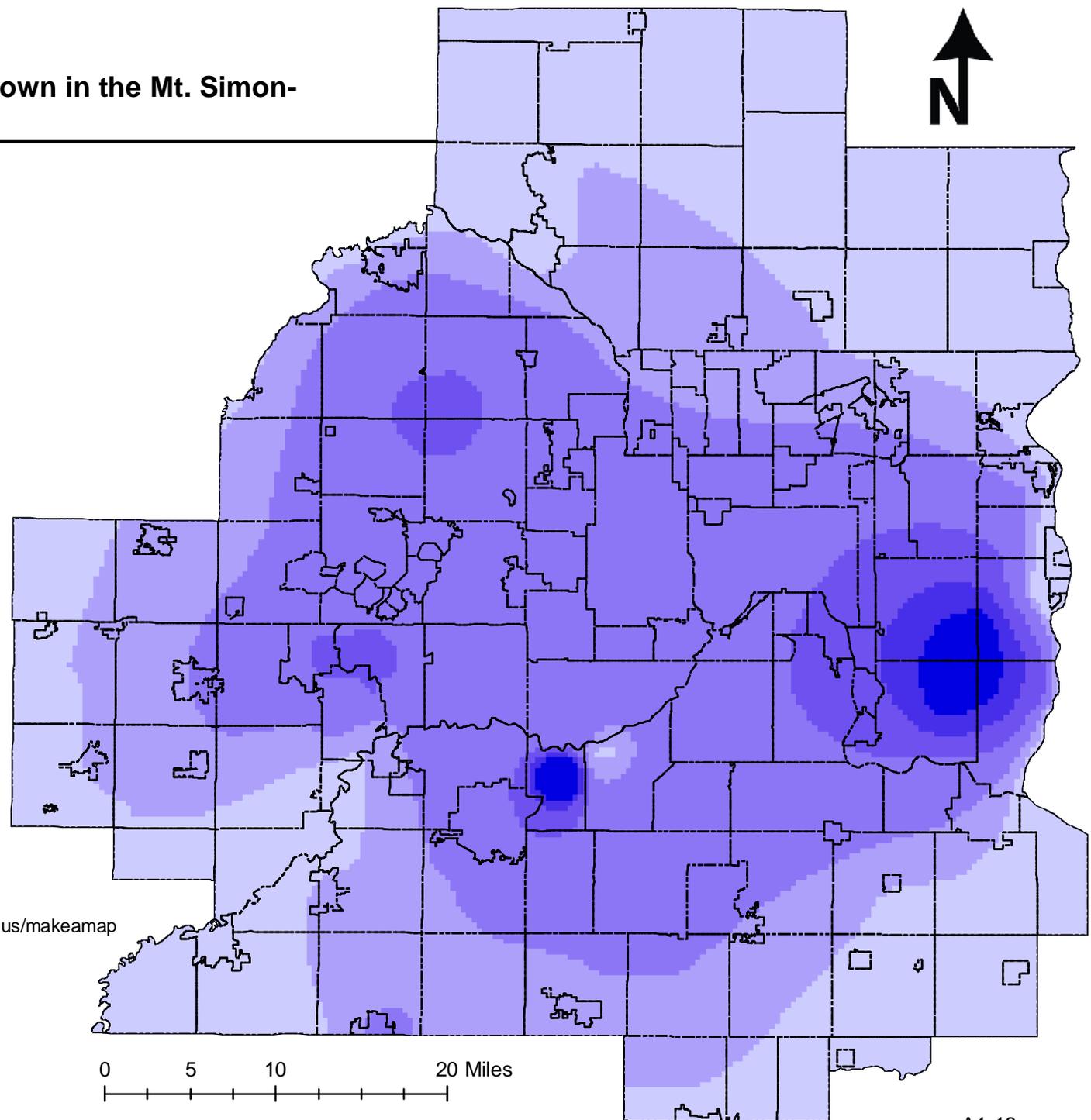


 City & Township Boundaries

Model-projected Drawdown: 2050

-  < 5 feet
-  5 - 10 feet
-  10 - 20 feet
-  20 - 30 feet
-  30 - 40 feet
-  > 40 feet

Note: These model results assume long-term average conditions and continued development of traditional water supplies. Summer conditions may exacerbate short-term drawdown.

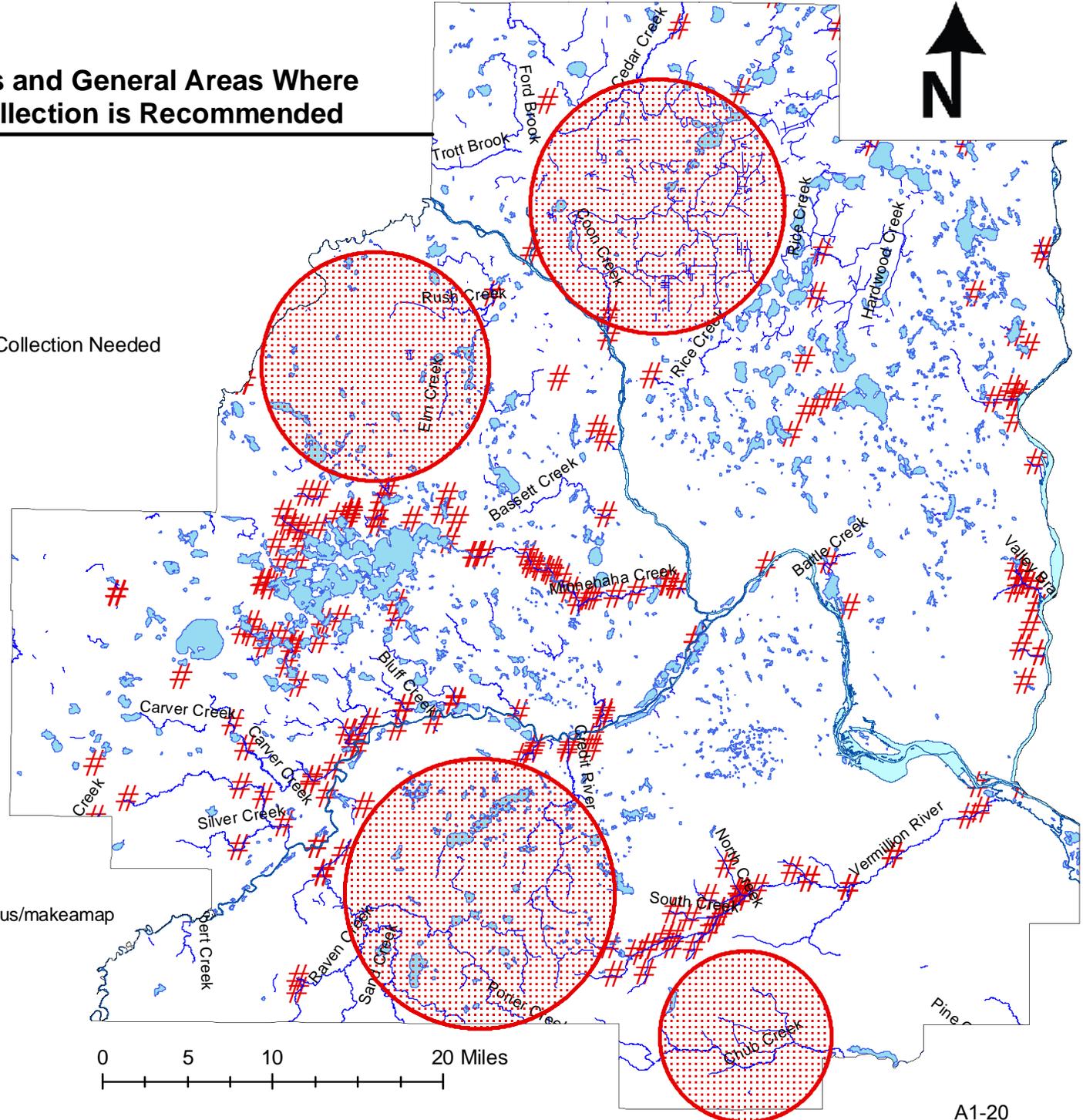


Metropolitan Council, 8/26/2009
View datasets online at <http://gis.metc.state.mn.us/makeamap>

Source:
Metropolitan Council

Baseflow Measurement Sites and General Areas Where Additional Baseflow Data Collection is Recommended

-  Lakes
-  Rivers
-  Perennial Streams
-  Baseflow Sites
-  General Area where Additional Data Collection Needed



Metropolitan Council, 2/19/2009
 View datasets online at <http://gis.metc.state.mn.us/makeamap>

Source:
 Metropolitan Council