

Minnesota Pollution Control Agency's Statewide Ambient Groundwater Monitoring Network

Sharon Kroening

Minnesota Pollution Control Agency



Minnesota Pollution
Control Agency

Ambient Data Uses

- Informs drinking water protection efforts
- Identifies threats to groundwater
- Guides development of practices to prevent groundwater degradation
- Provides information for TMDL studies

Maintained Since 2004

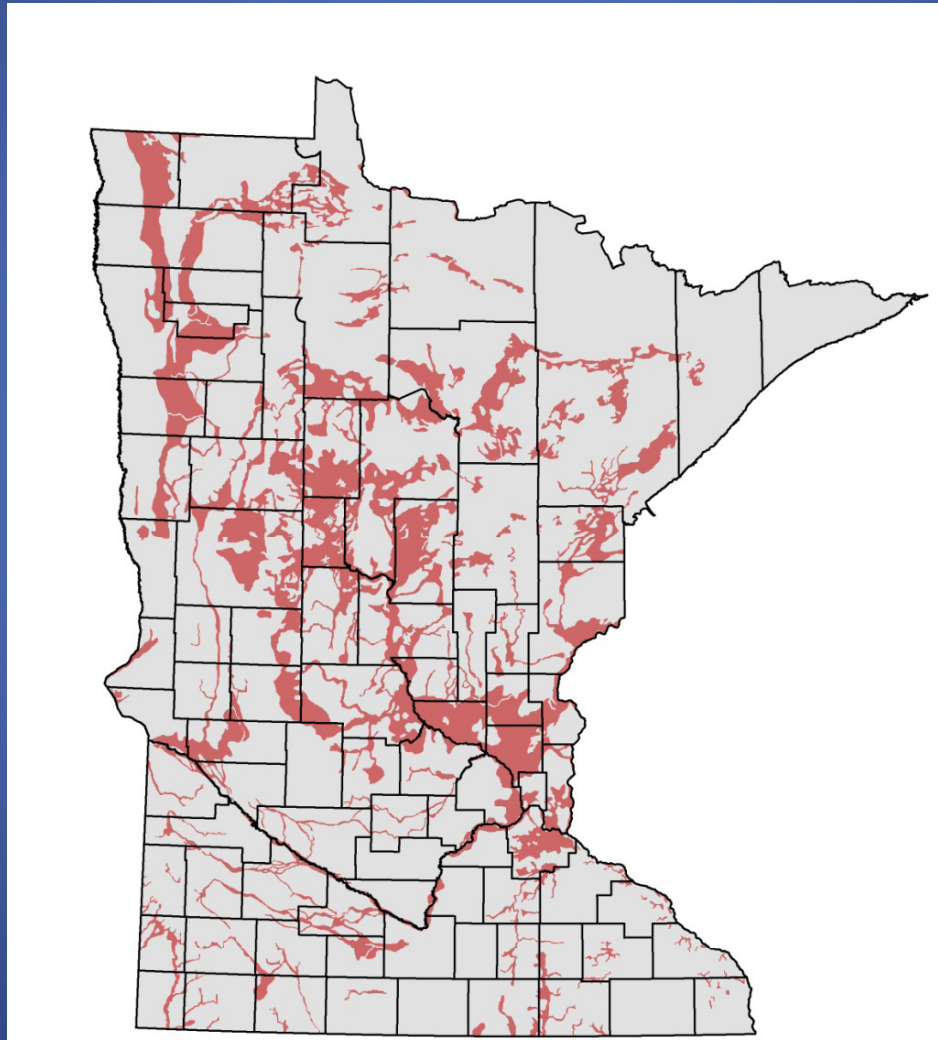
Focuses on:

- Urban and undeveloped settings
- Aquifers that are vulnerable to contamination
- Trend assessments

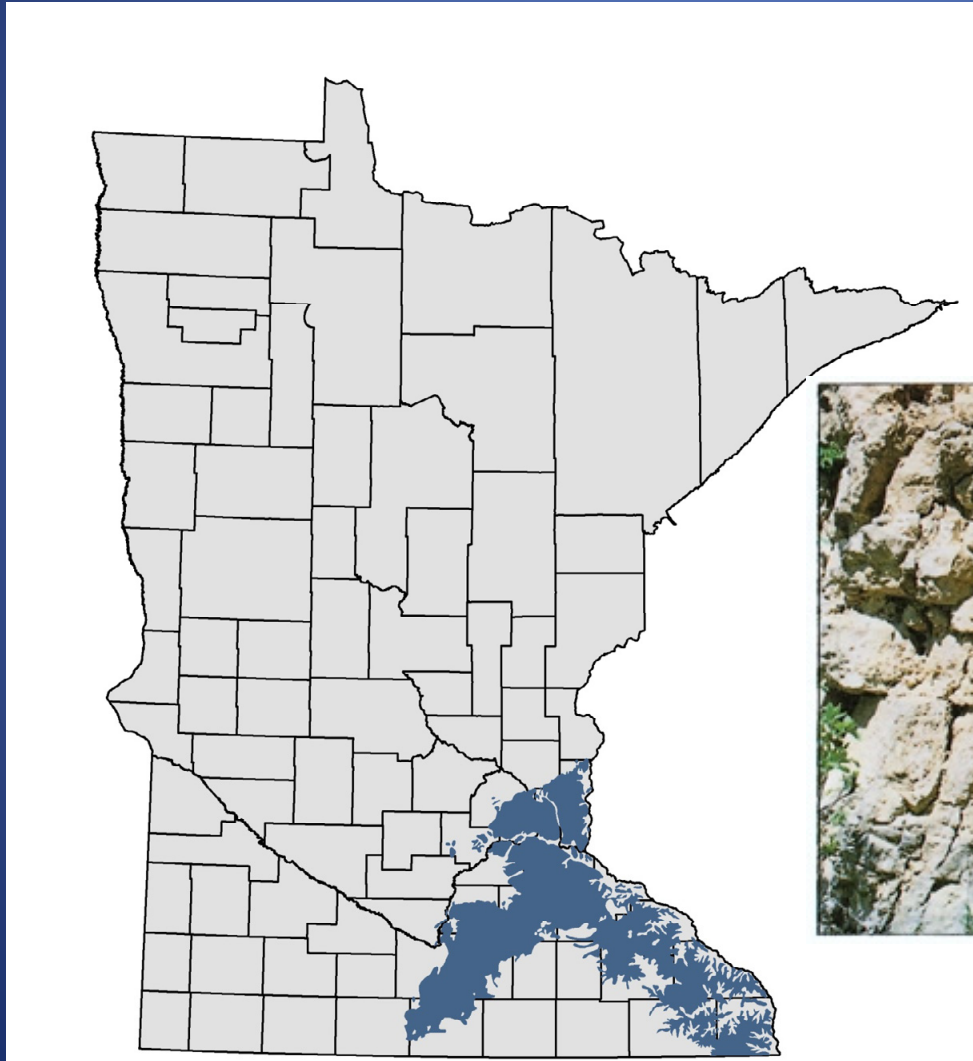


Assessed Aquifers

Sand and Gravel Aquifers



Prairie du Chien-Jordan



Sand and Gravel Aquifer: Early Warning Network

- Subnetwork of shallow water-table wells
- Serves as “Early-Warning System”
- First look at emerging groundwater trends

Network Initially Developed Using Existing Wells



Wells
sampled for
a limited
analyte list

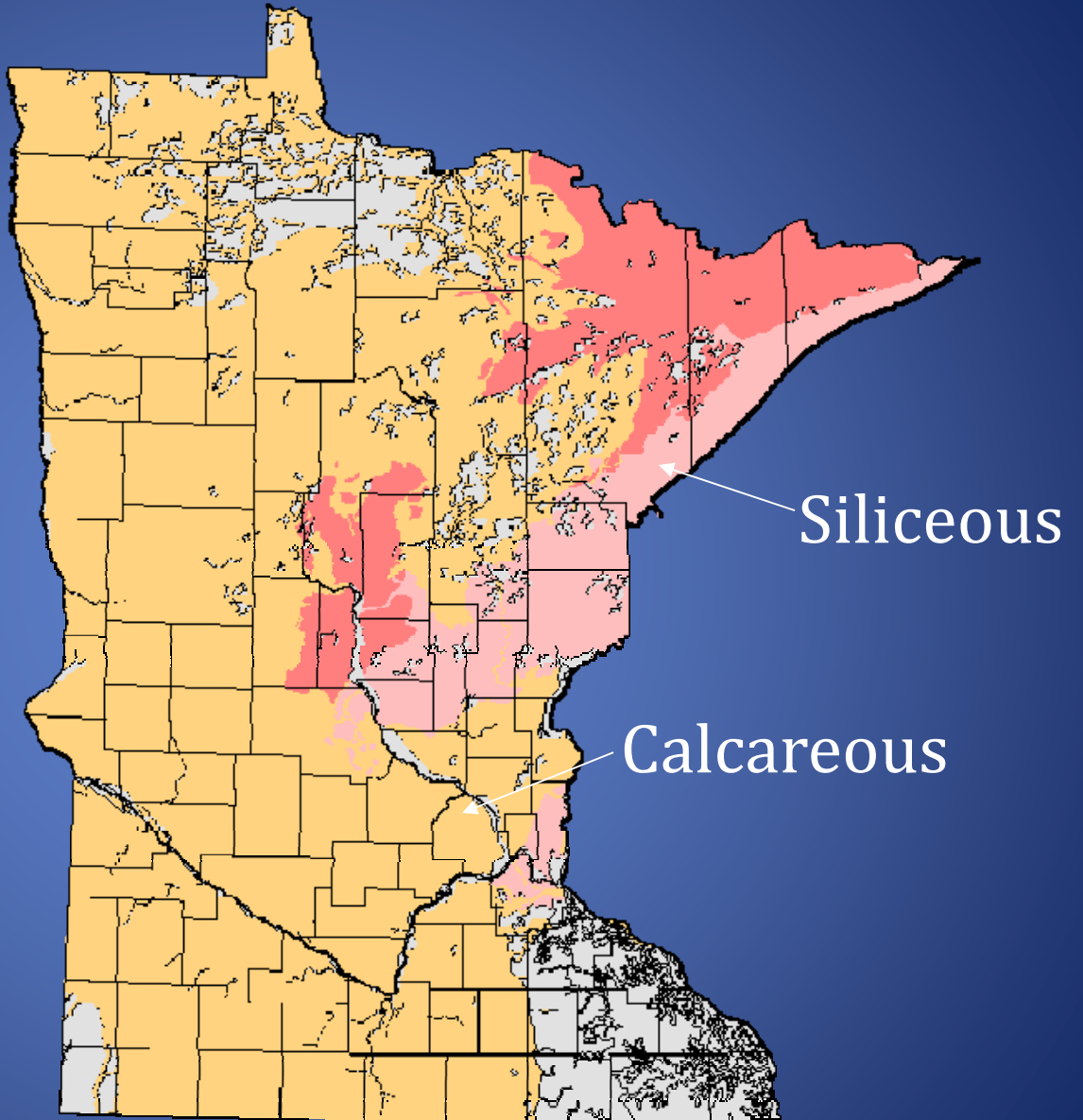


Limitations

- Wells in commercial/industrial areas located near petroleum leak sites.
- Few shallow wells available in residential areas using subsurface sewage treatment systems.

Early-Warning Network Enhancements

Glacial Deposit Types



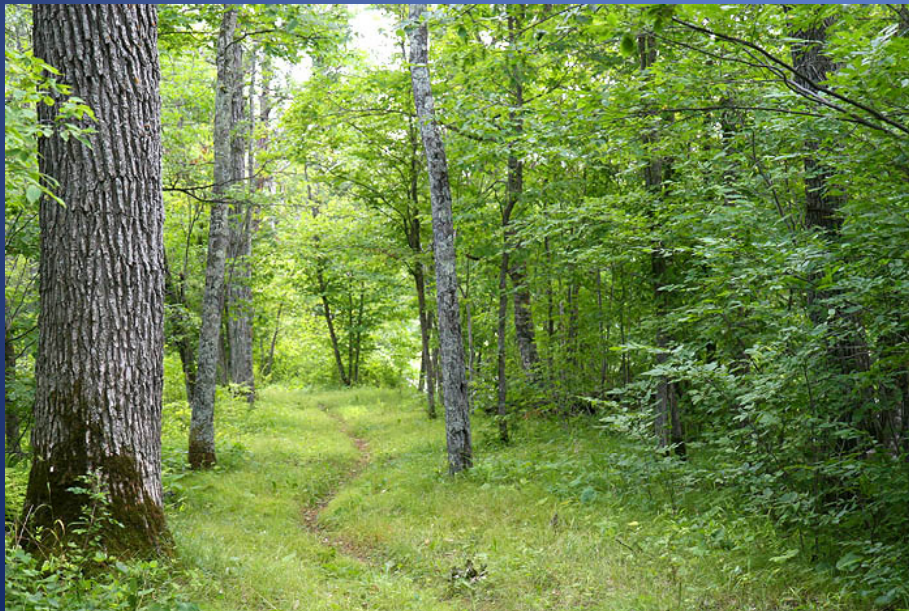
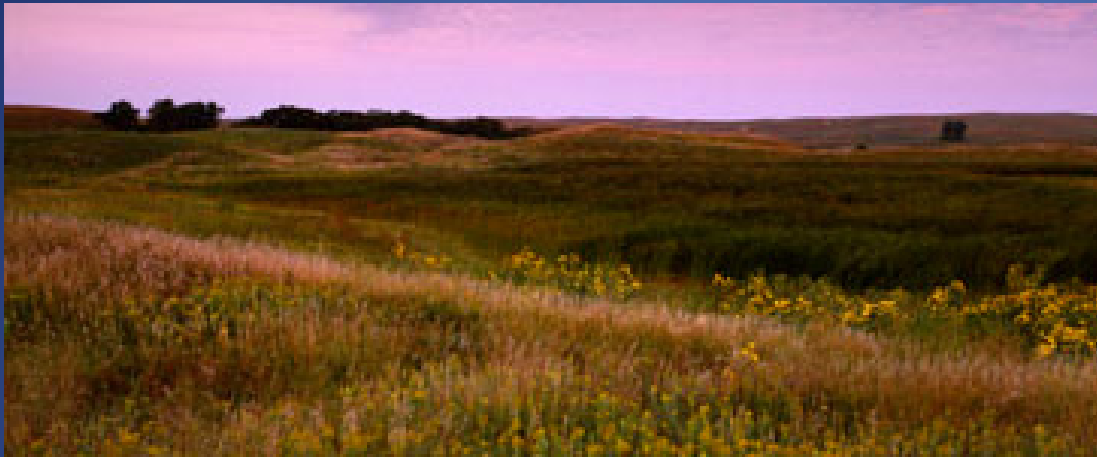
Urban Residential Sewered and Unsewered



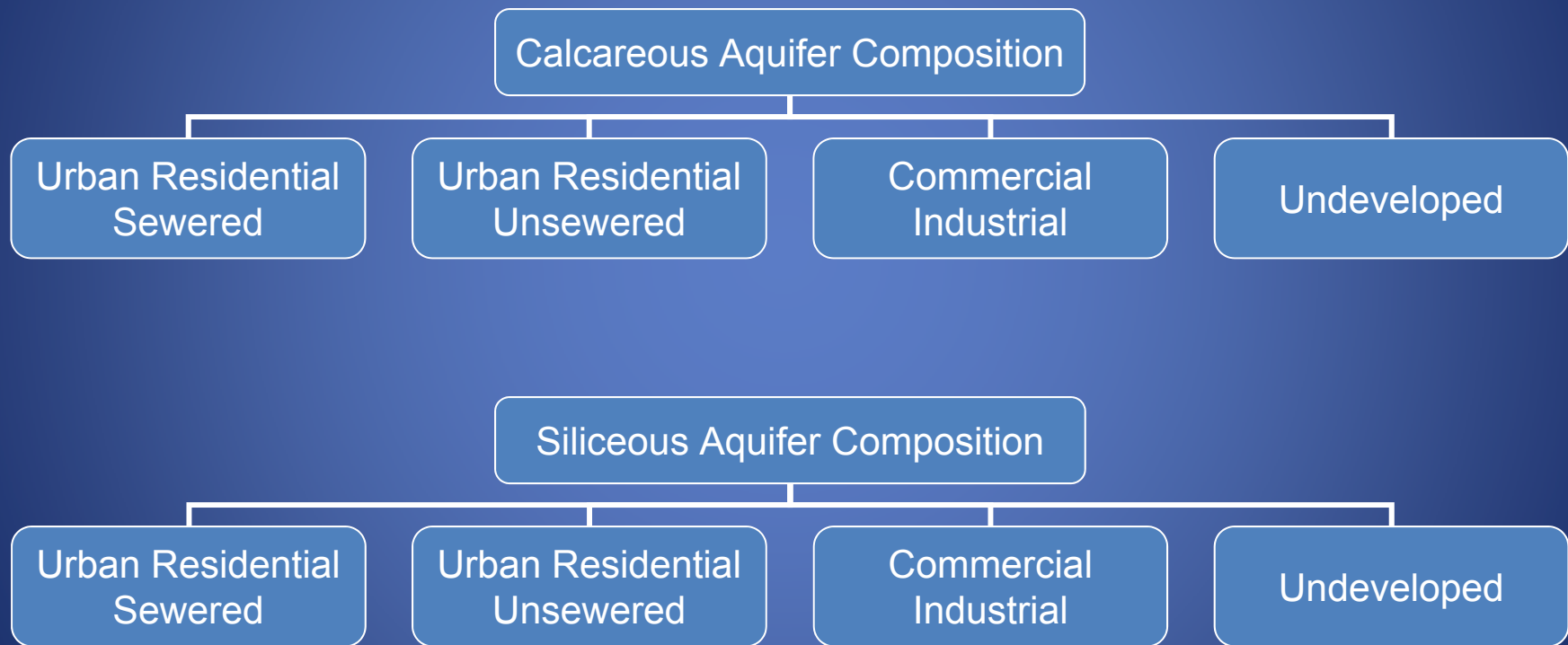
Commercial/Industrial



Undeveloped



Network Structure

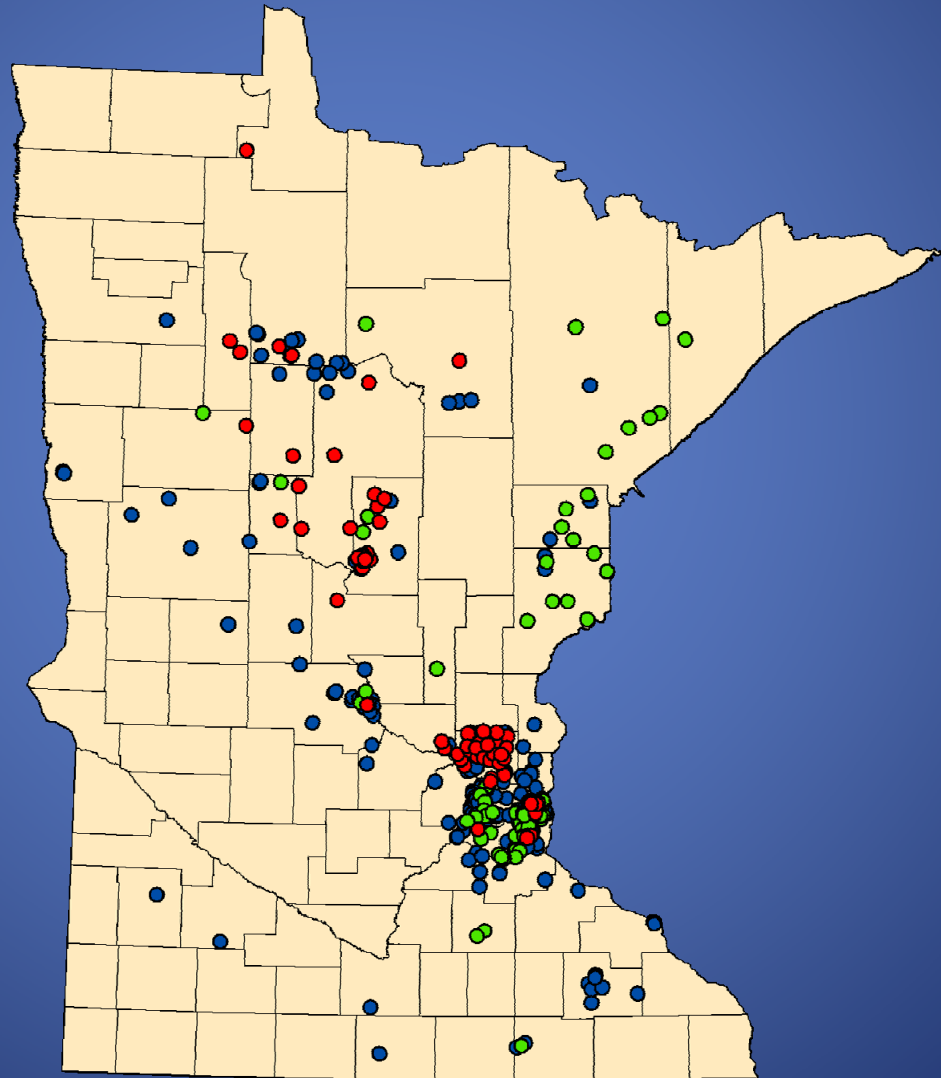


Funding for
Network
Enhancements

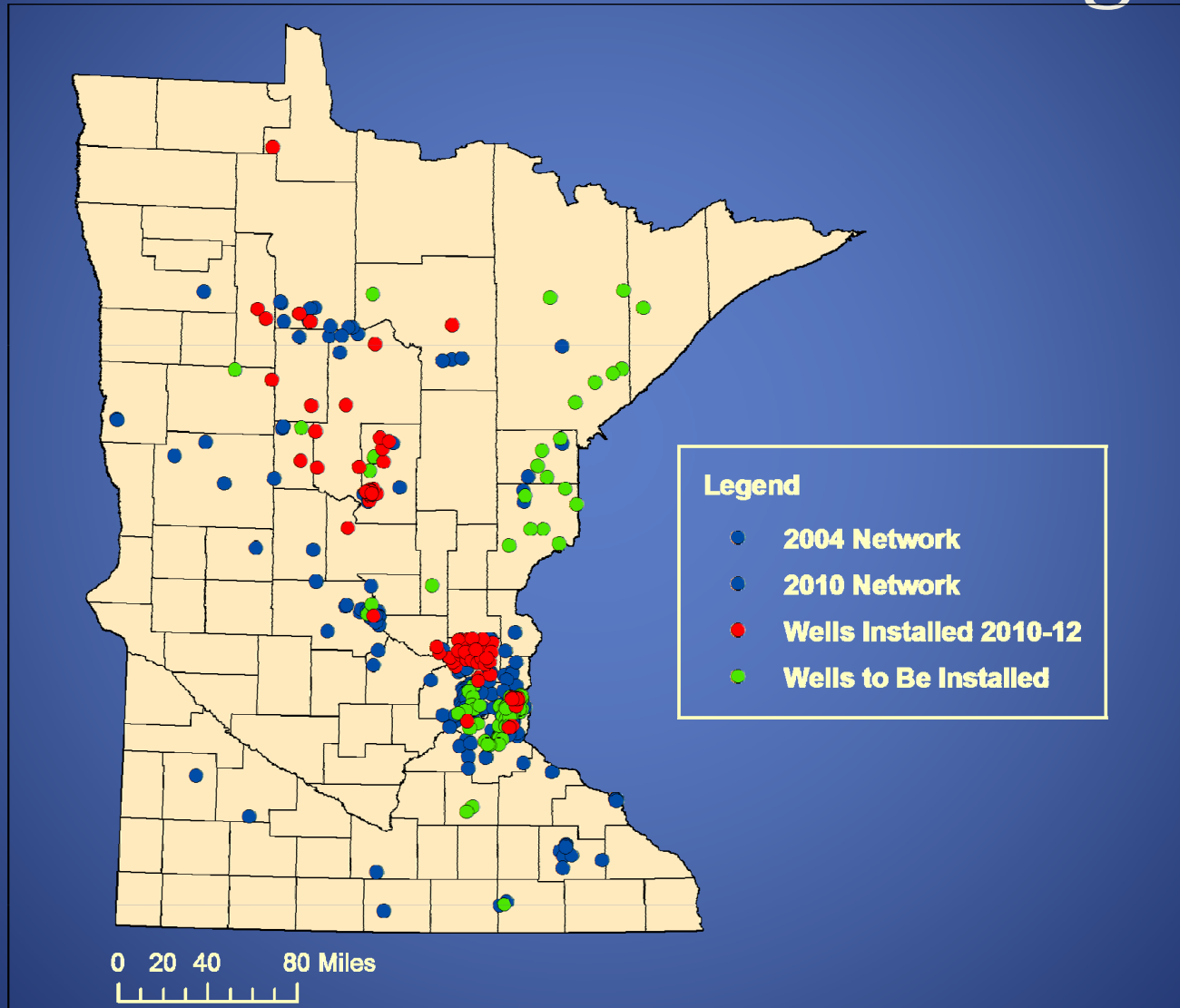




Network Enhancement Progress



Network Enhancement Progress



Enhanced Analyte List

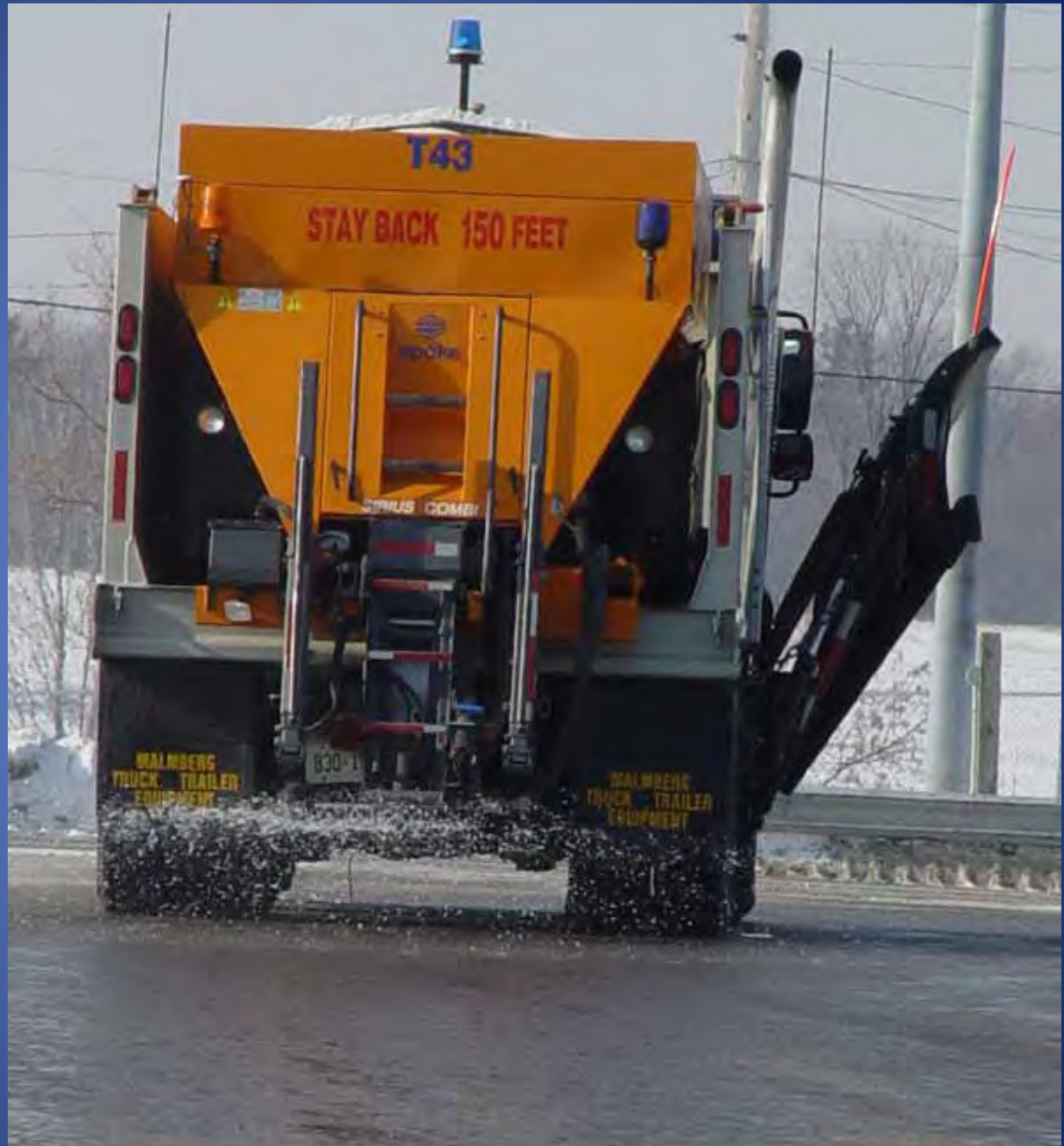
- About 100 chemicals
- Major ions (Chloride)
- Nutrients (Nitrate)
- Volatile Organic Compounds (Petroleum)
- Trace elements
- Selected wells
 - Contaminants of Emerging Concern
 - Pesticides (in cooperation with MDA)

Sampling Van

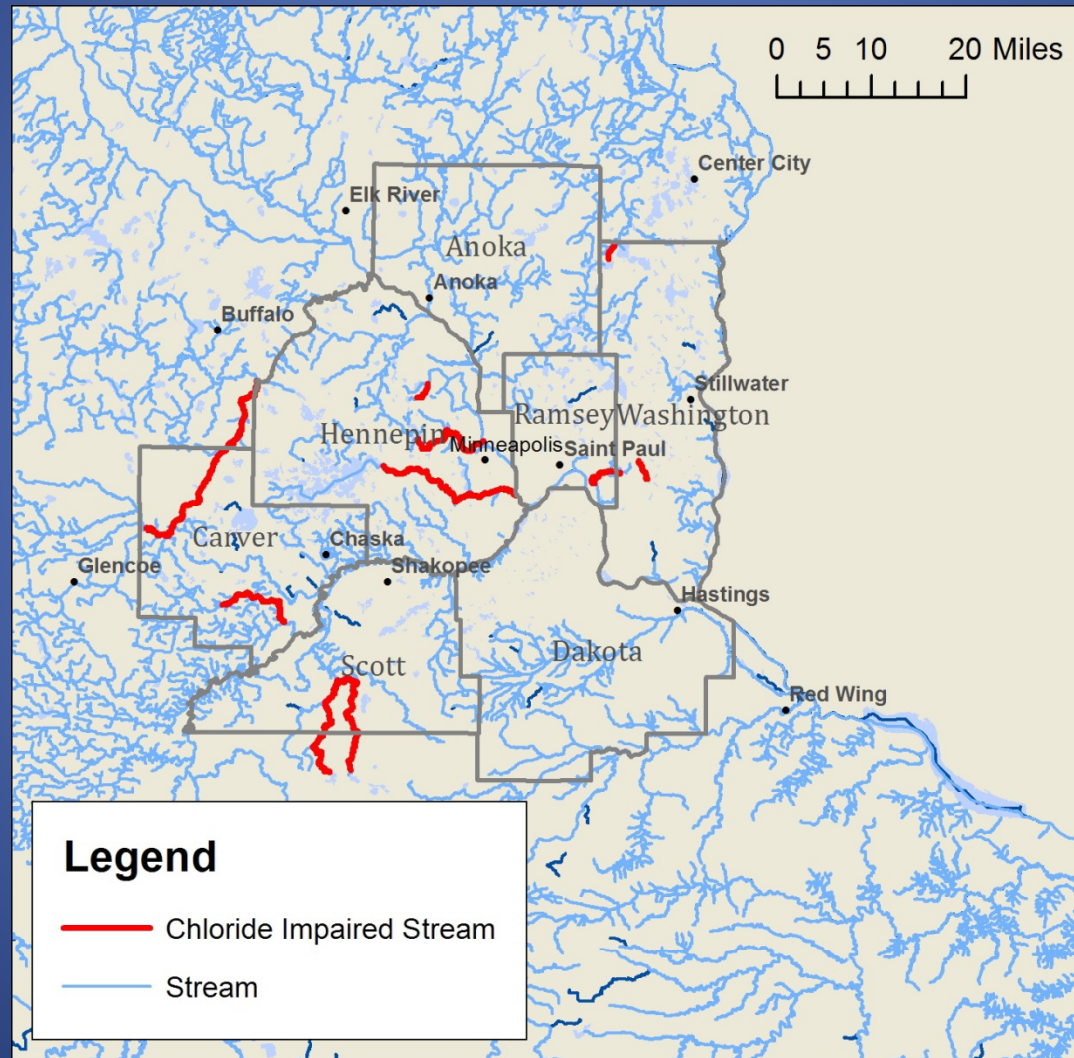


Applications

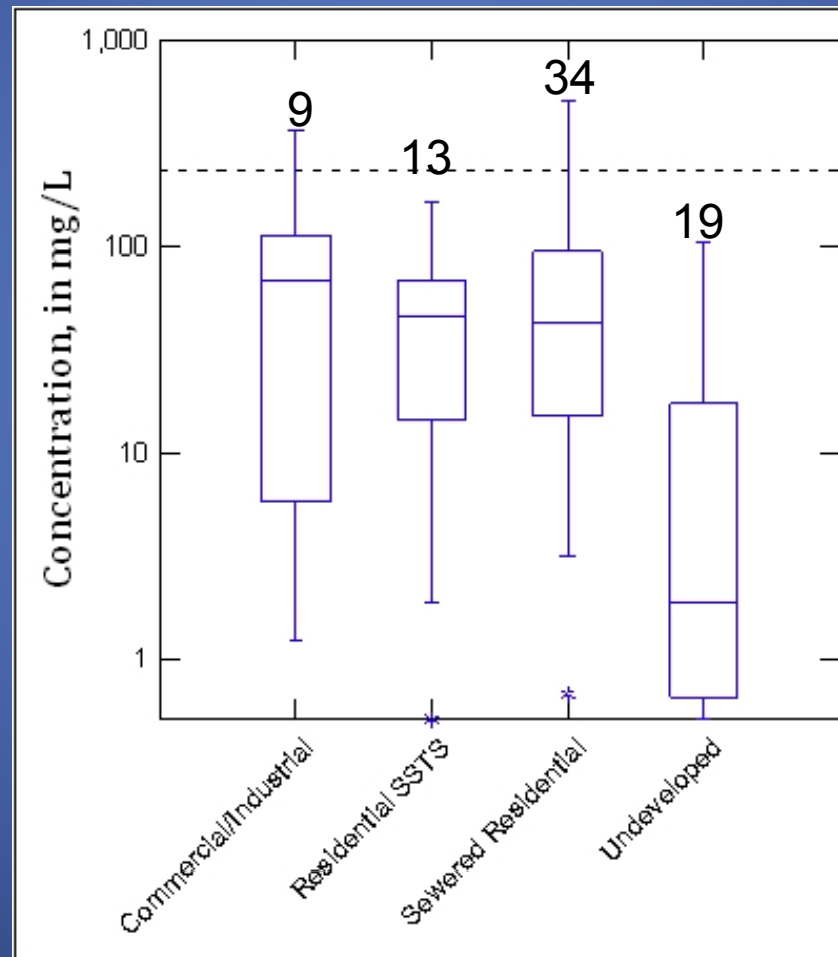
Deicing Chemicals



Streams Impaired by Chloride



Chloride Concentrations in Shallow GW



Phosphorus



Regional Variations In Lake Phosphorus Concentrations

- Heiskary et al, 1987, Lake and Reservoir Management
- Heiskary and McCollar, 1989, Journal of Minnesota Academy of Sciences

Phosphorus Concentrations in Groundwater

Summary Statistics from Wells Located in Undeveloped Areas

Glacial Lobe Provenance	Median	Minimum	Maximum
Calcareous	41 ug/L	3 ug/L	483 ug/L
Siliceous	28 ug/L	6 ug/L	42 ug/L

Thank You!