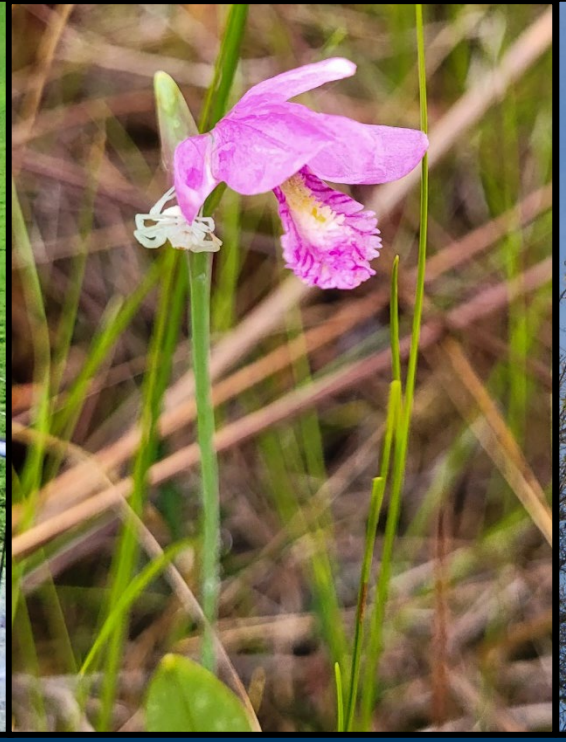


Groundwater Management in the Land of 10,000 Lakes

Jason B. Moeckel and Ellen J. Considine | February 24, 2026

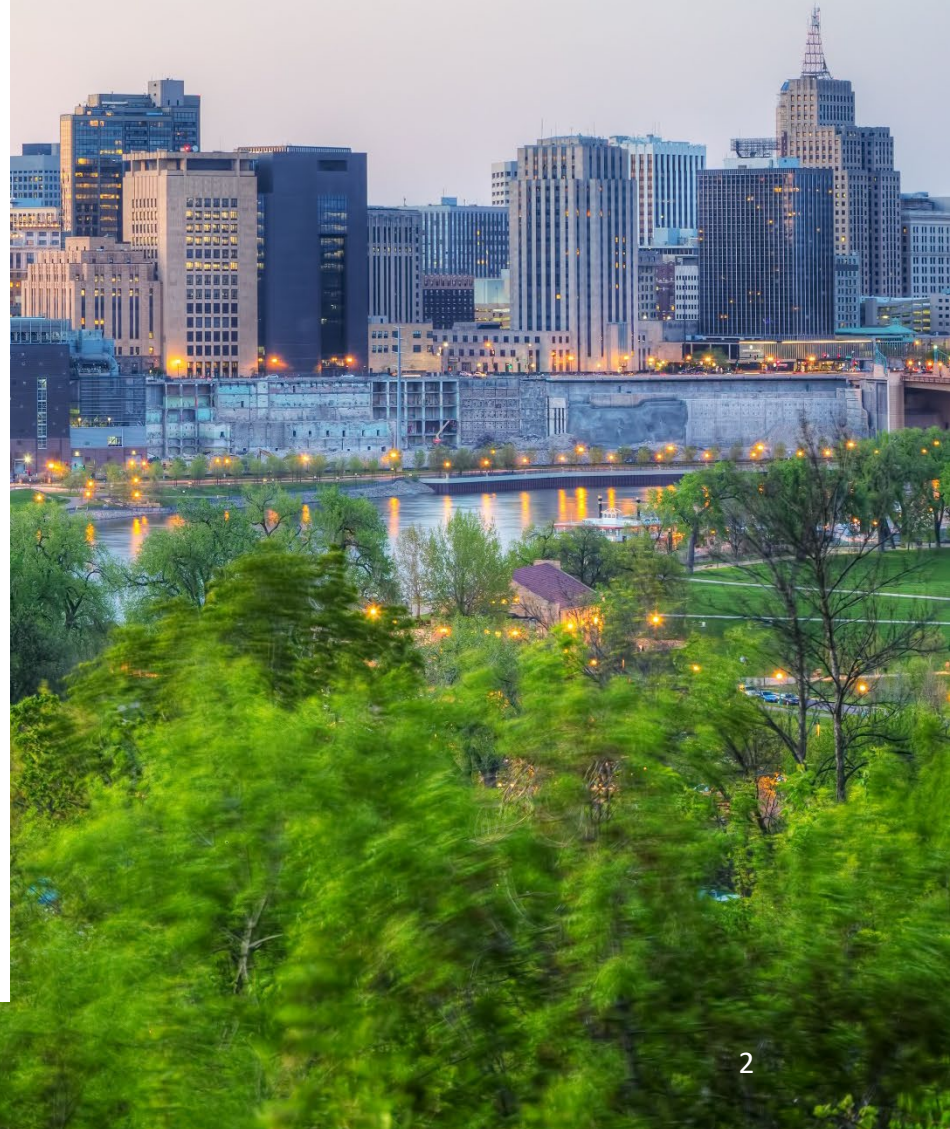
Ecological and Water Resources

DEPARTMENT OF NATURAL RESOURCES

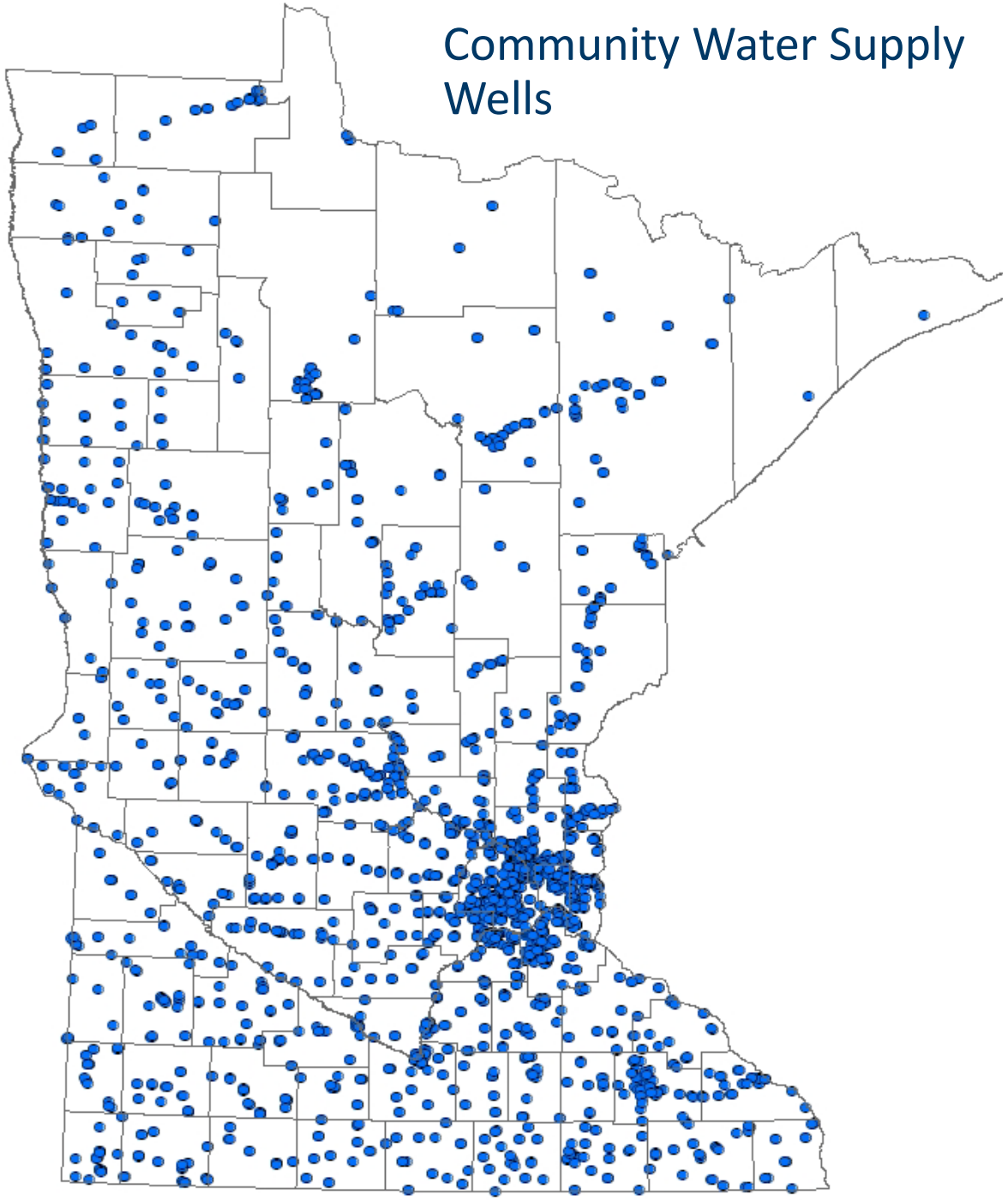
Groundwater | Minnesota DNR (state.mn.us)

Some Key Challenges

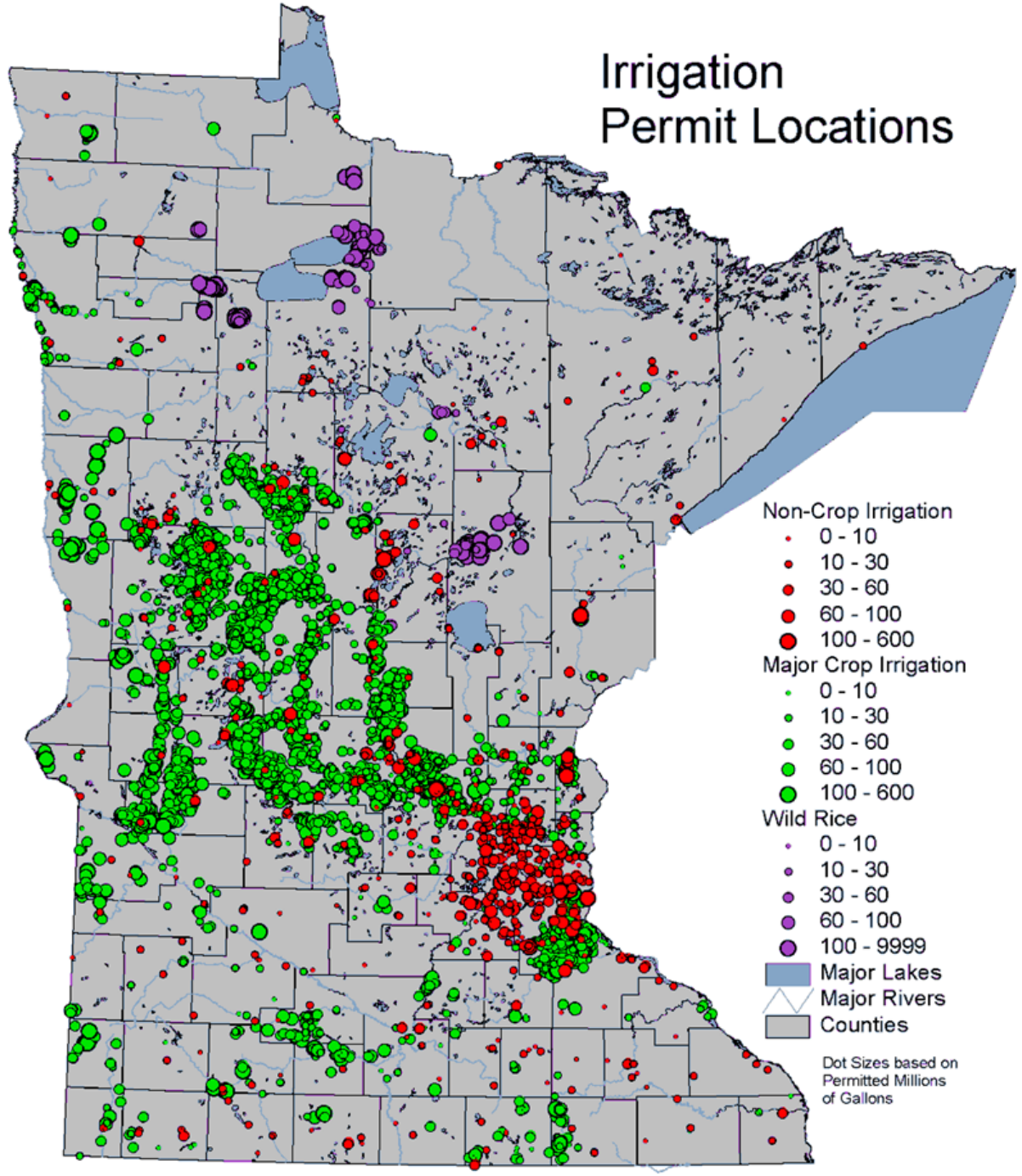
- Aquifers don’t follow neat boundaries
- Not all aquifers are well mapped and characterized (especially W. MN)
- Increased demand in water stressed areas
- Plans for growth and expansion are dynamic and can change rapidly (race to be first)
- Limits are best understood as ranges of risk



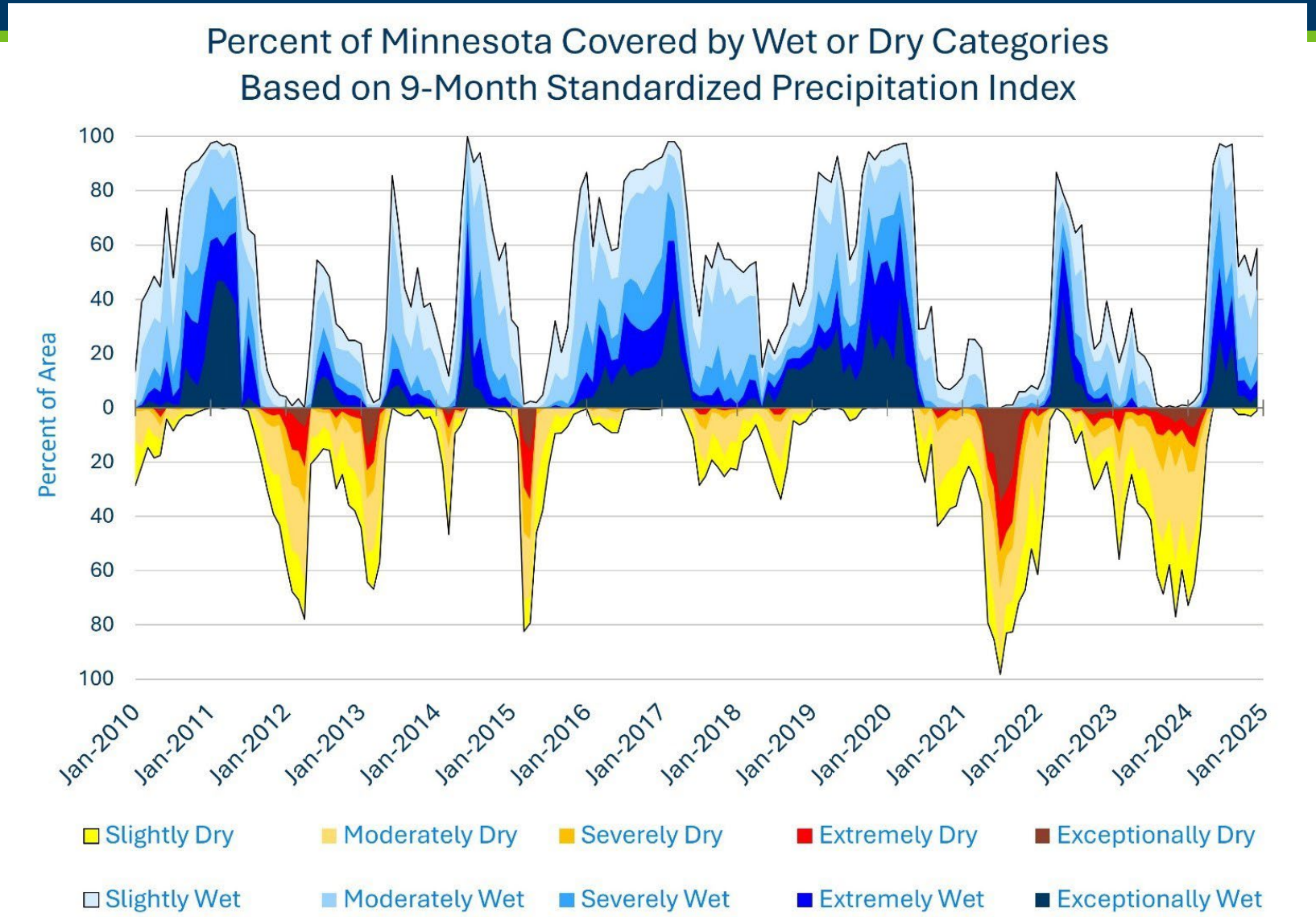
Community Water Supply Wells



Irrigation Permit Locations

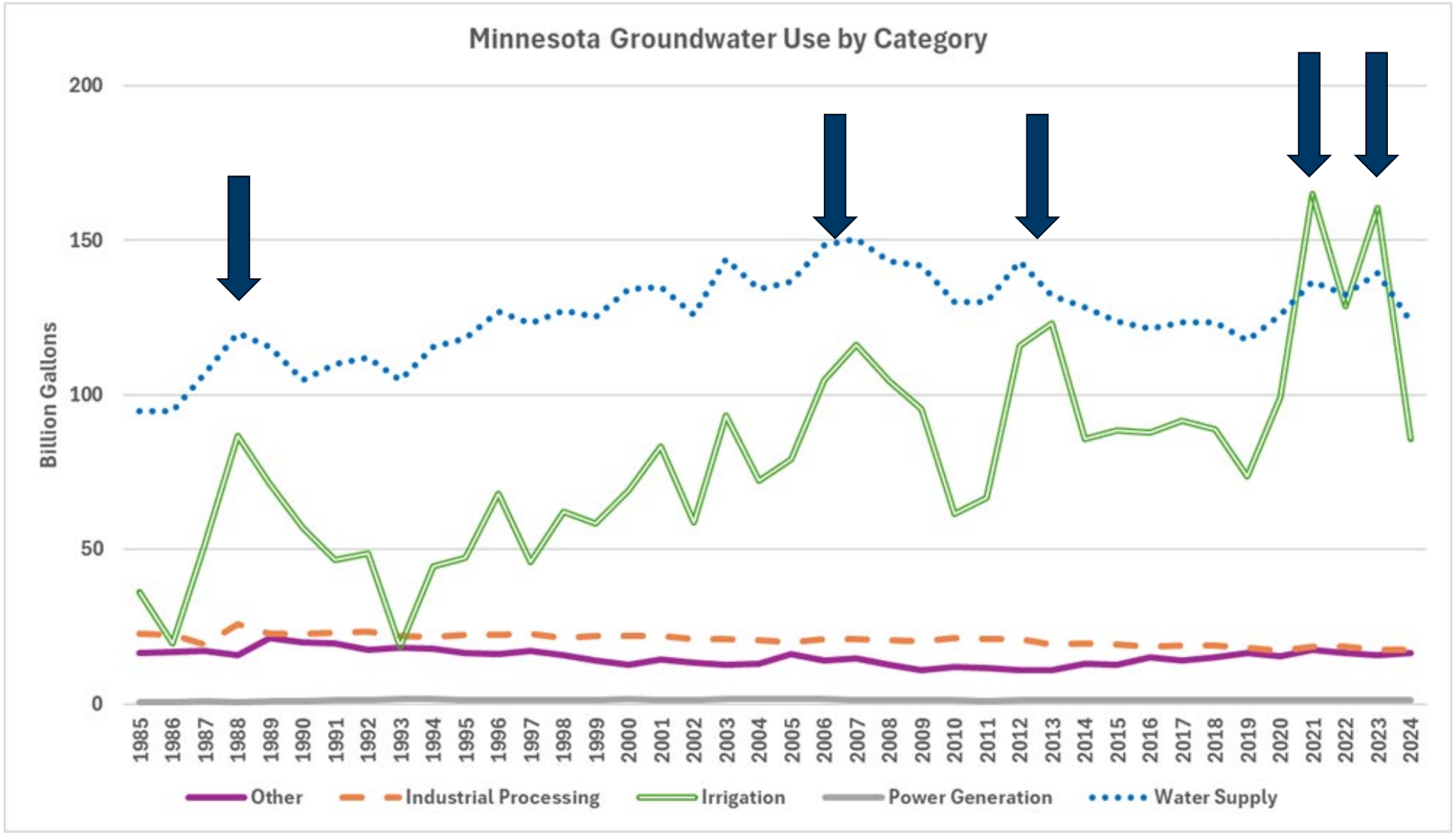


Climatic Drivers of Water Use



DEPARTMENT OF NATURAL RESOURCES
State Climatology Office

Groundwater Use Trends



Groundwater Management Strategies

- ✓ Heighten the priority given to groundwater
- ✓ Enhance the information available for decisions
- ✓ Improve management of appropriation permits
- ✓ Improve compliance with permits and regulations
- ✓ Improve communication and education
- ✓ Effectively address challenges in areas of high use
- ✓ Promote water conservation and wise use practices

Groundwater regulation in Minnesota

Water Quantity

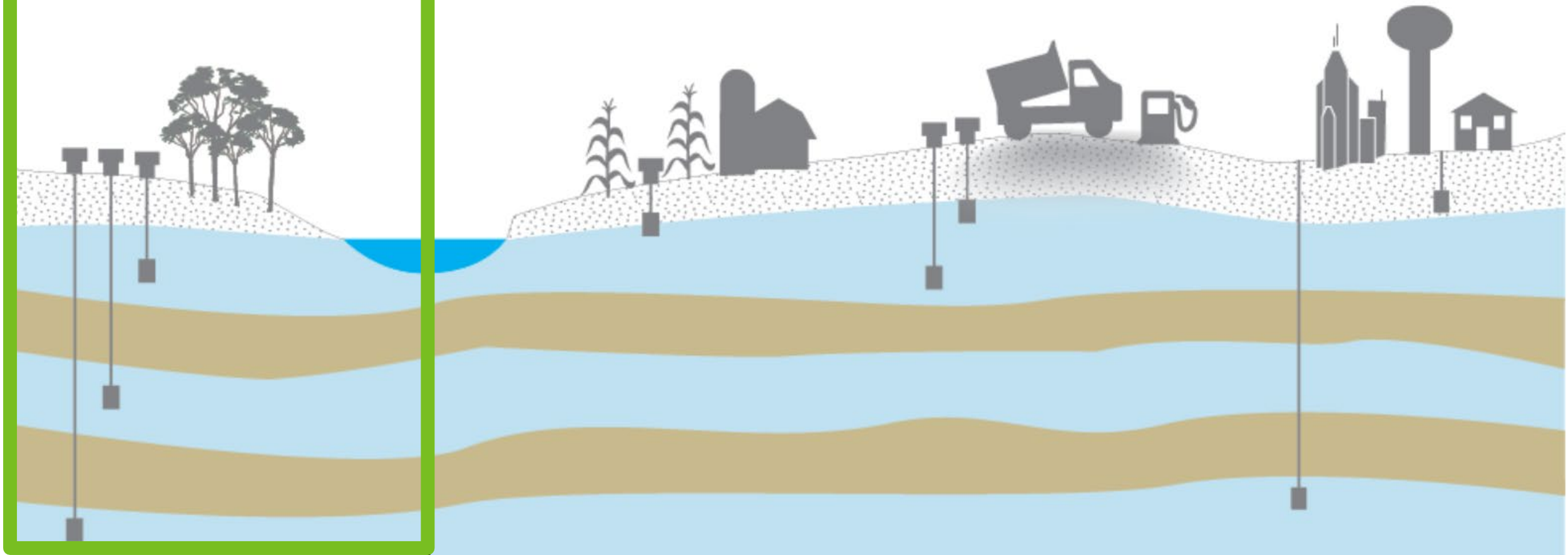
Department of Natural Resources (DNR)

Water Quality

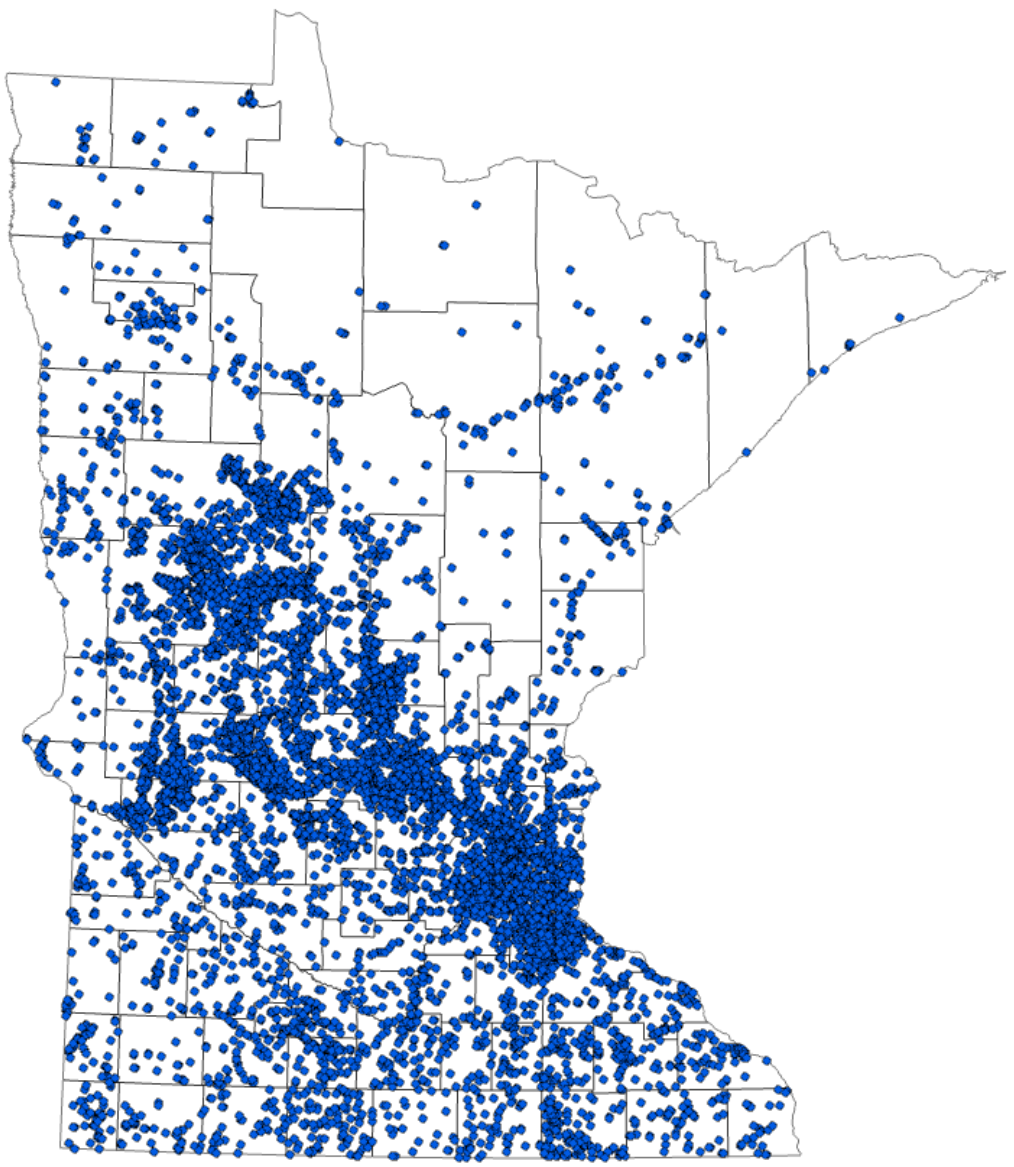
Department of Agriculture (MDA)

Pollution Control Agency (MPCA)

Department of Health (MDH)



DNR water permitting



Need an appropriation permit if:

- > 10,000 gallons per day
- > 1 million gallons per year

Required:

- Annual water use reporting

Minnesota Permitting and Reporting System

Groundwater Sustainability Statute (103G.287, Subd. 5)

Groundwater use is sustainable if:

1. **Future generations** will have enough water

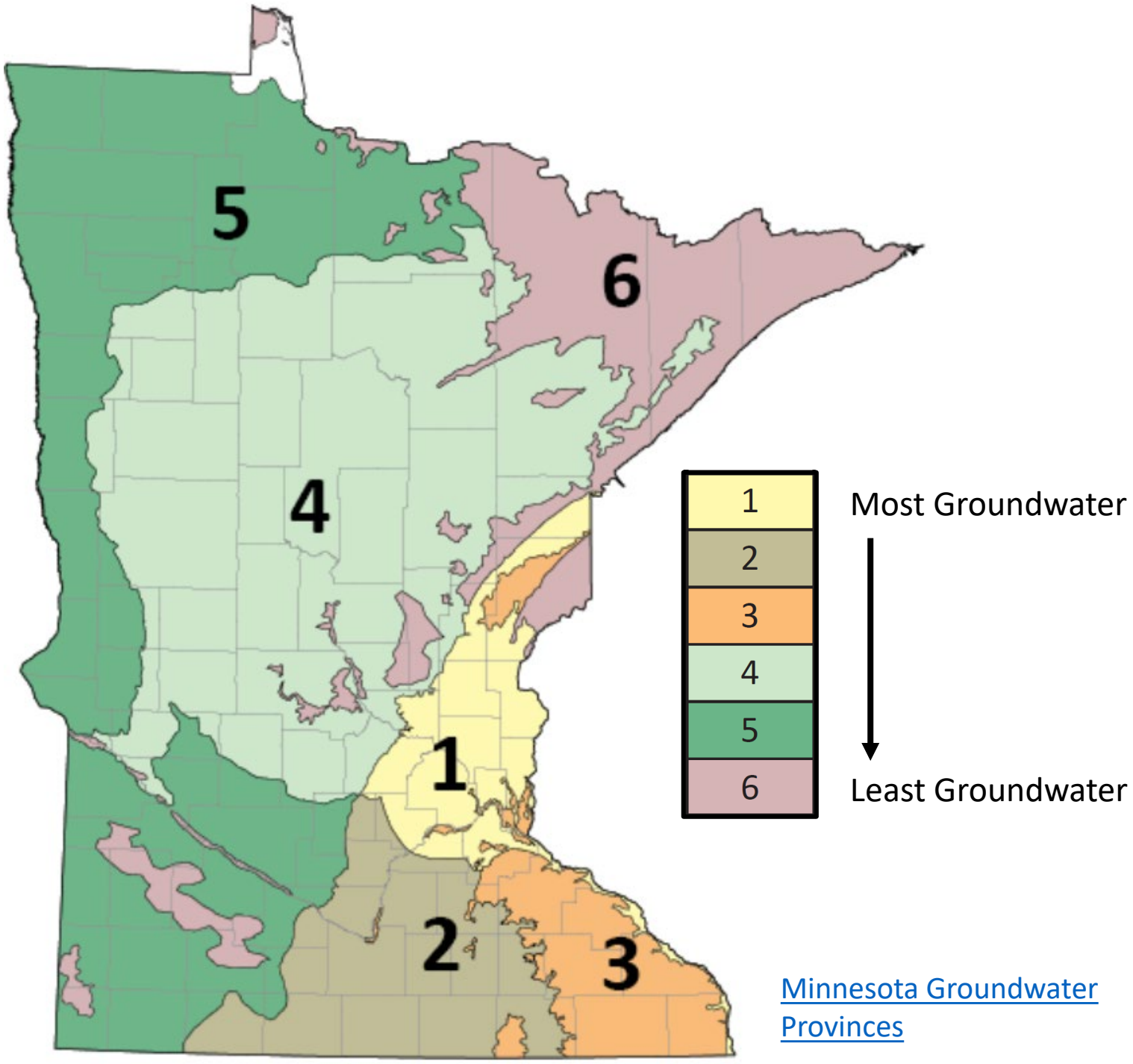
2. **Ecosystems** are protected

3. **Drinking water** is protected

4. **Water quality** is not degraded

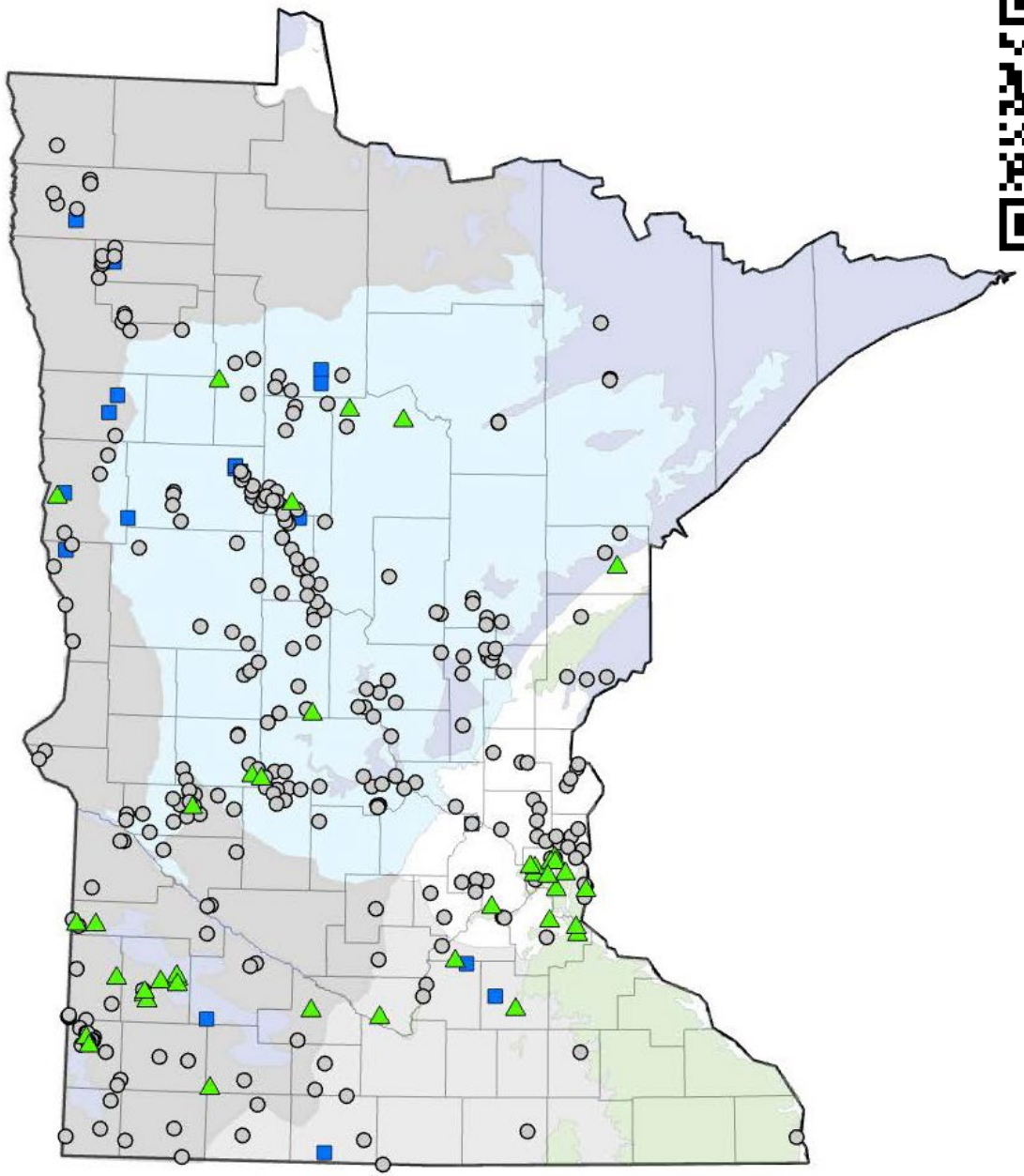
Challenges

Groundwater availability



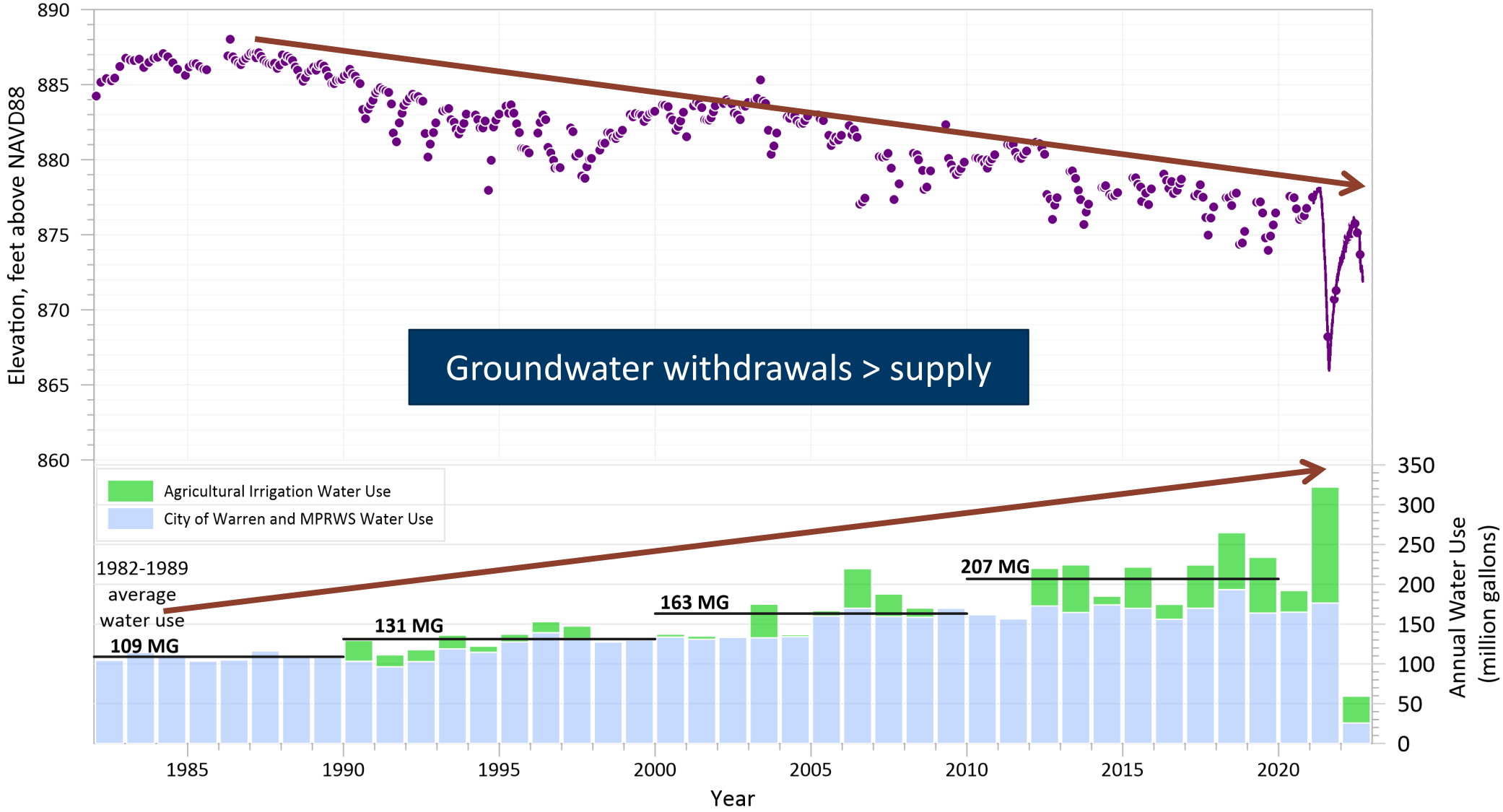
Minnesota Groundwater Provinces

Leaving water for future generations



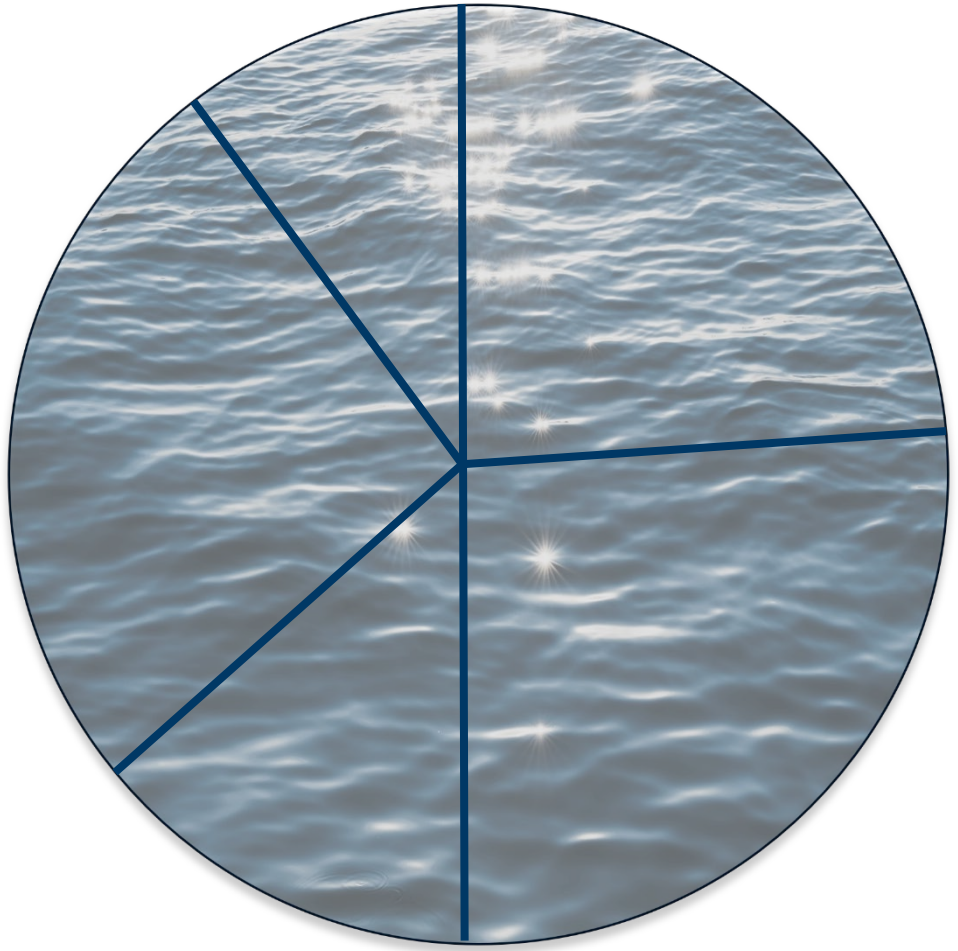
DNR Groundwater Monitoring

Northwest Minnesota



Water use conflict

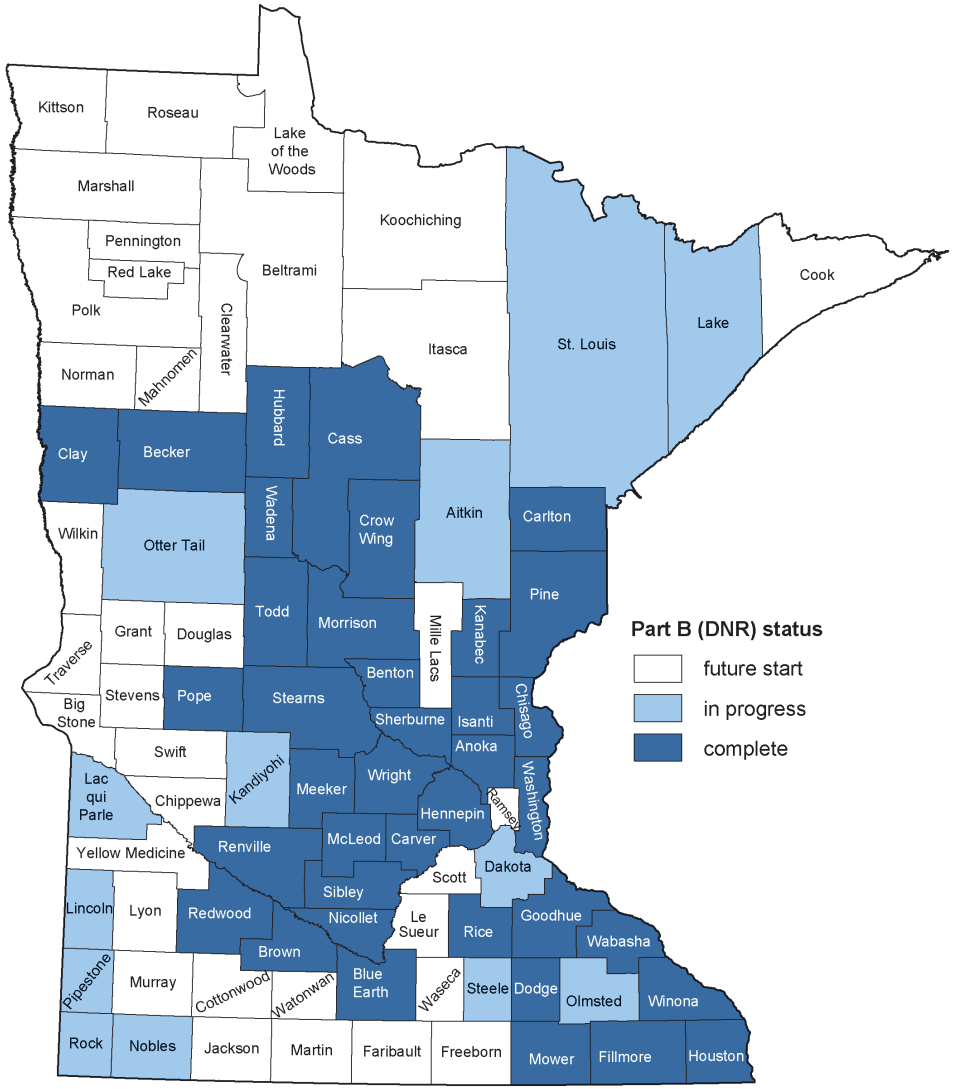
1. DNR: Determine how much groundwater is available.
2. Users: Decide how to share the water.



Minnesota Rules 6115.0740

Challenges

Geologic and groundwater mapping



[County Groundwater Atlas]

Protecting drinking water

1. 

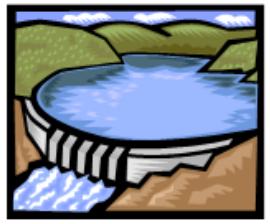
Domestic water supply

2. 

Consumptive less than 10,000 gallons/day

3. 

Agricultural irrigation & processing

4. 

Power production

5. 

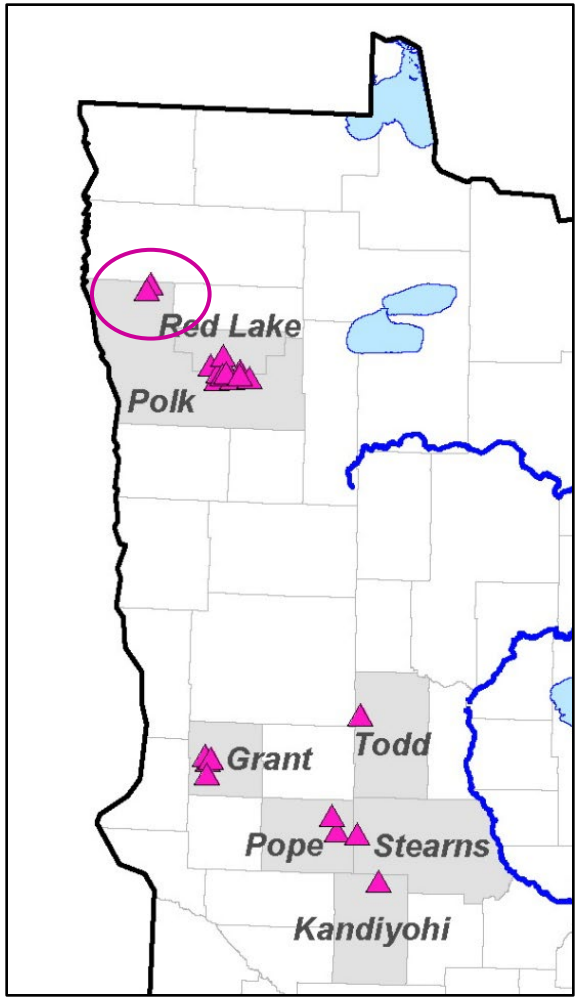
Consumptive use more than 10,000 gallons/day

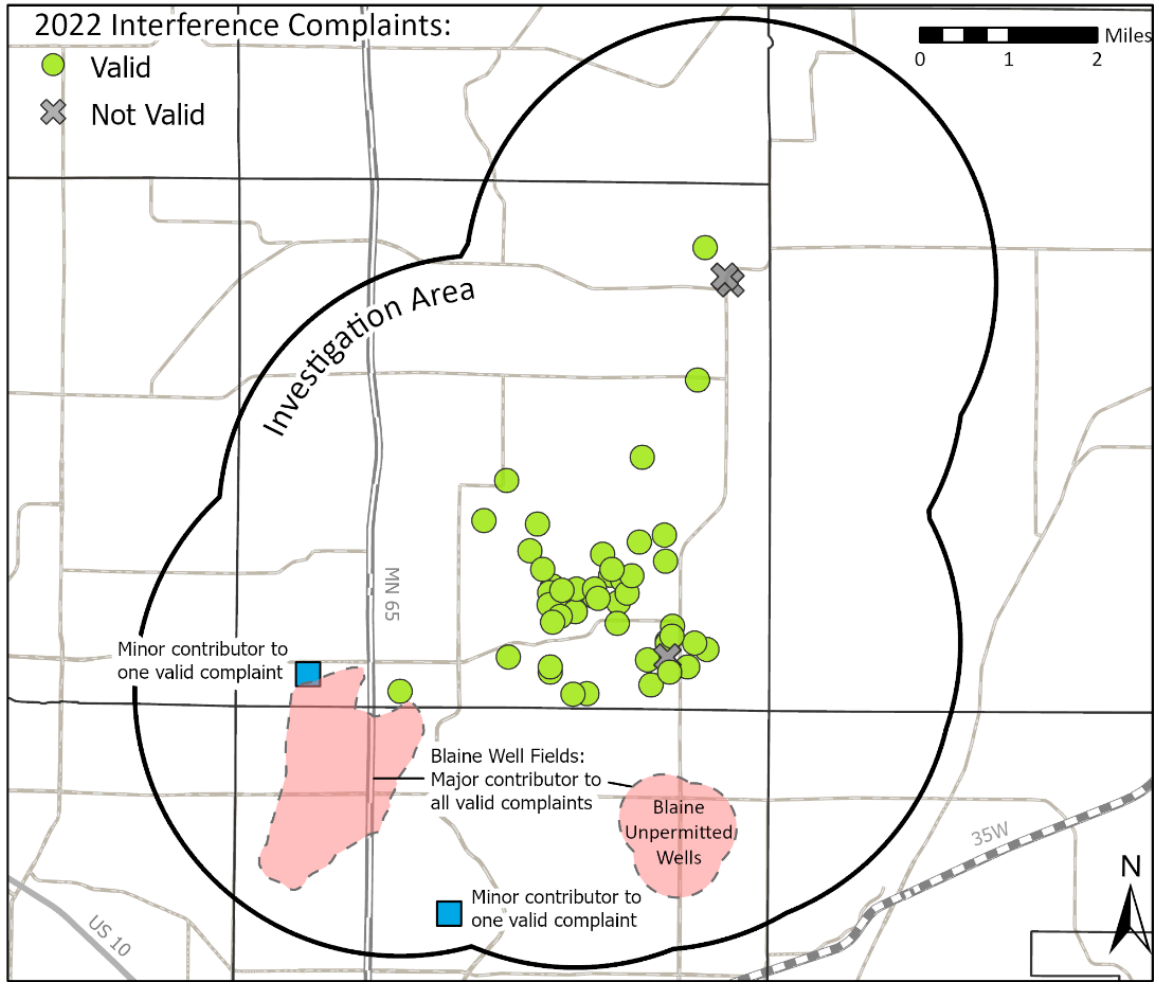
6. 

Non-essential uses

[Minnesota Statute 103G.261]

2021 and 2022 well interferences

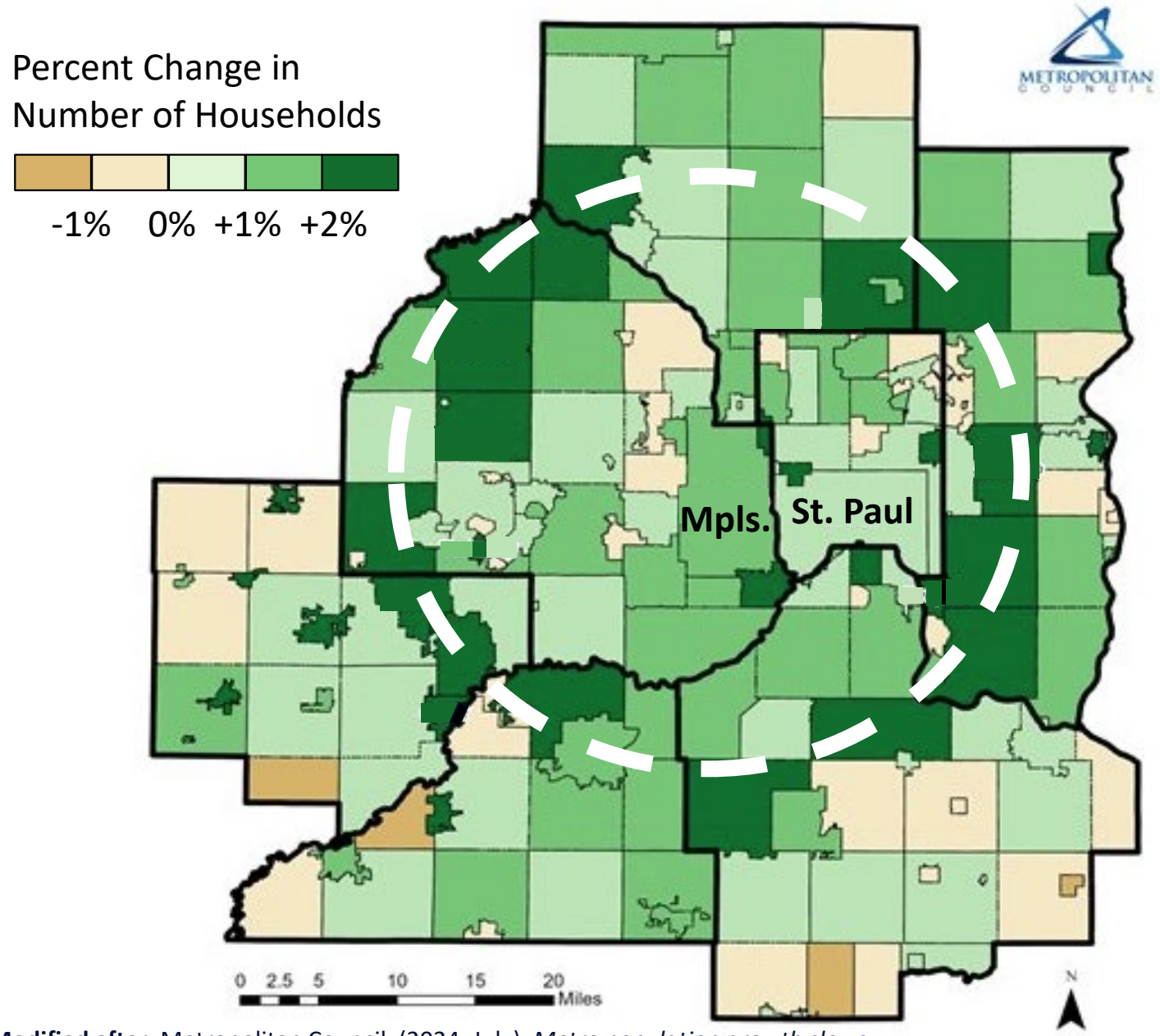




[Minnesota Rules 6115.0730]

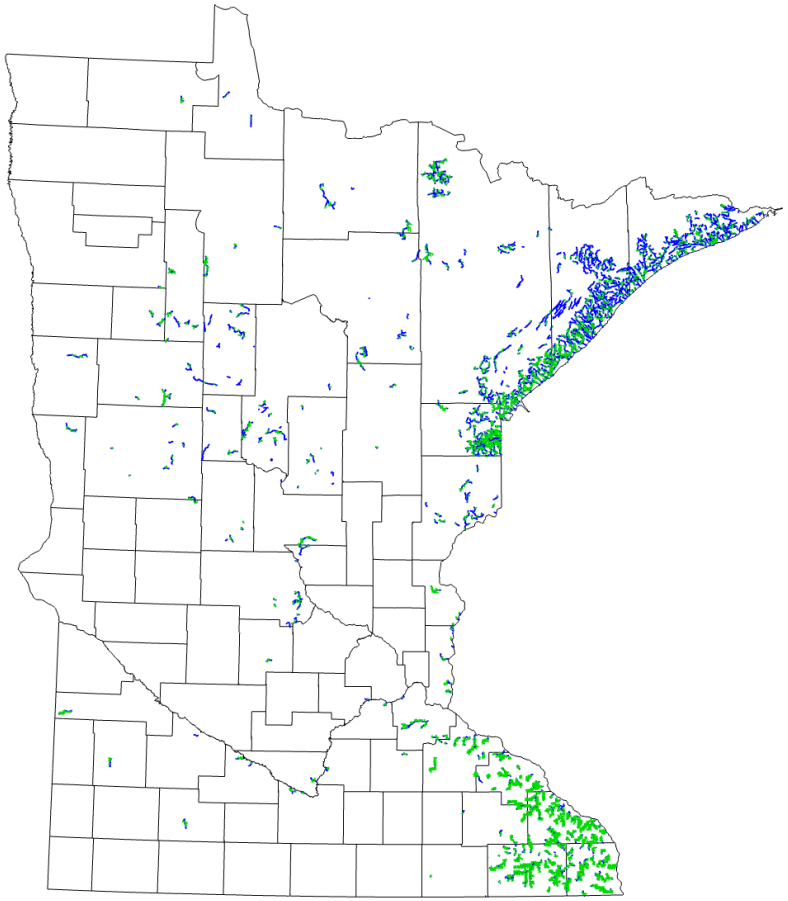
Challenges

Metro fringe

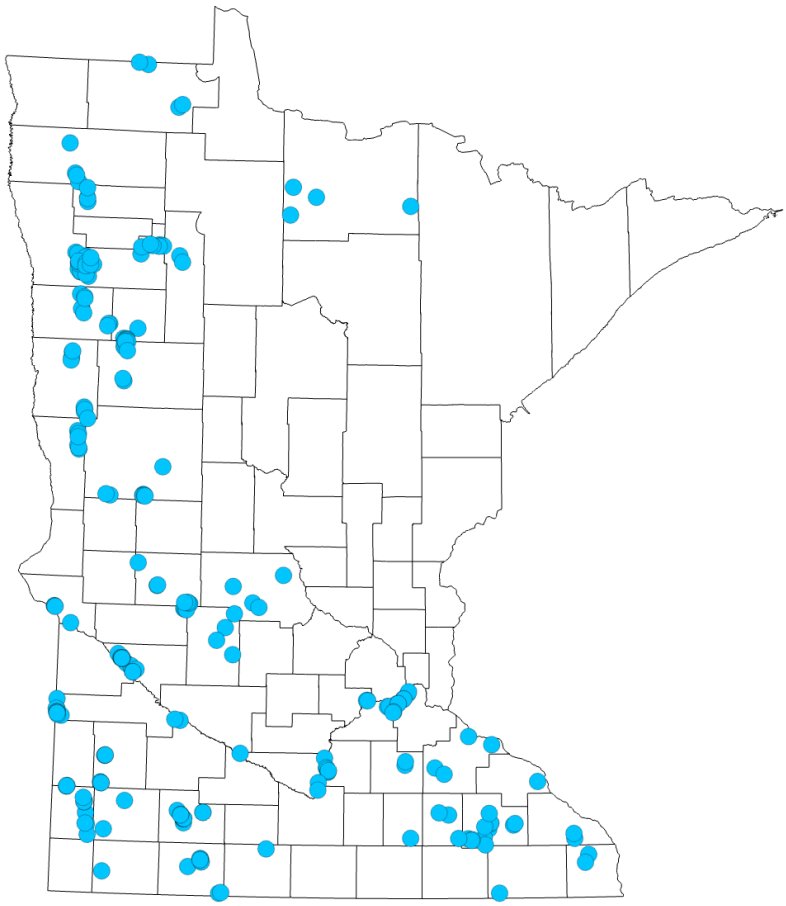


Modified after: Metropolitan Council. (2024, July). *Metro population growth slows, construction strong*. Retrieved November 4, 2024, from https://metrocouncil.org/News-Events/Council-News/Newsletters/Metro-population-growth-2024.aspx

Protecting ecosystems

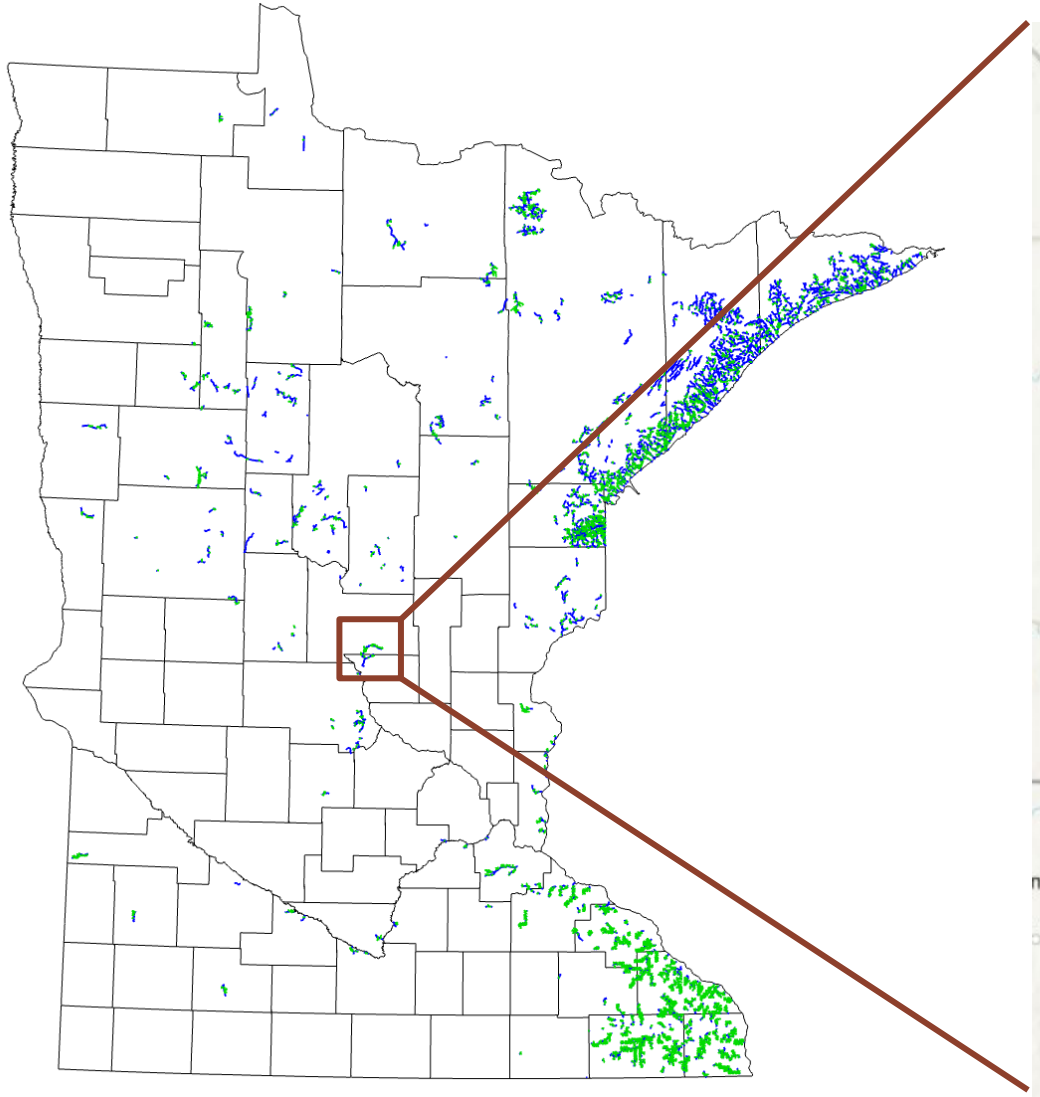


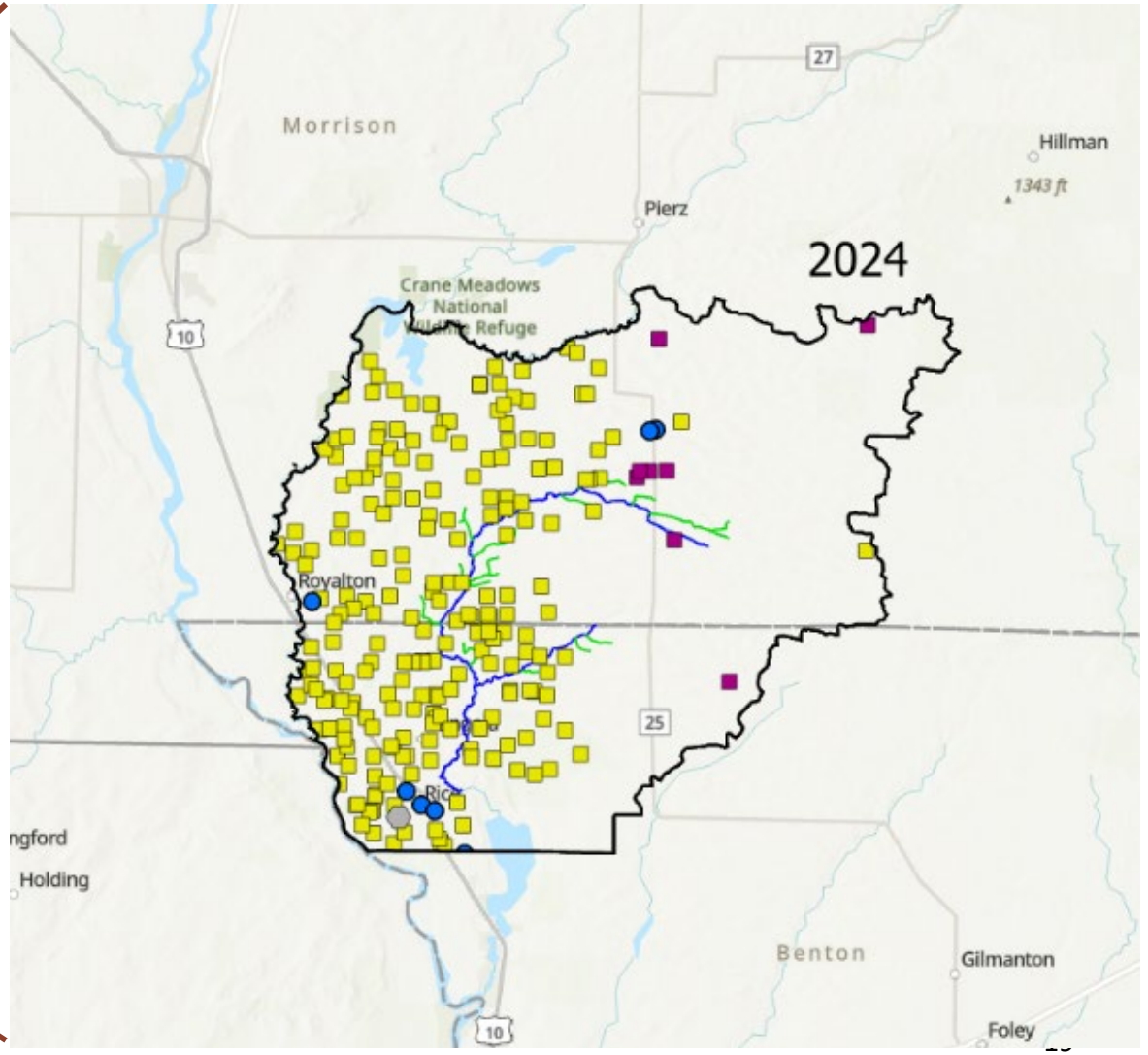
Trout Streams



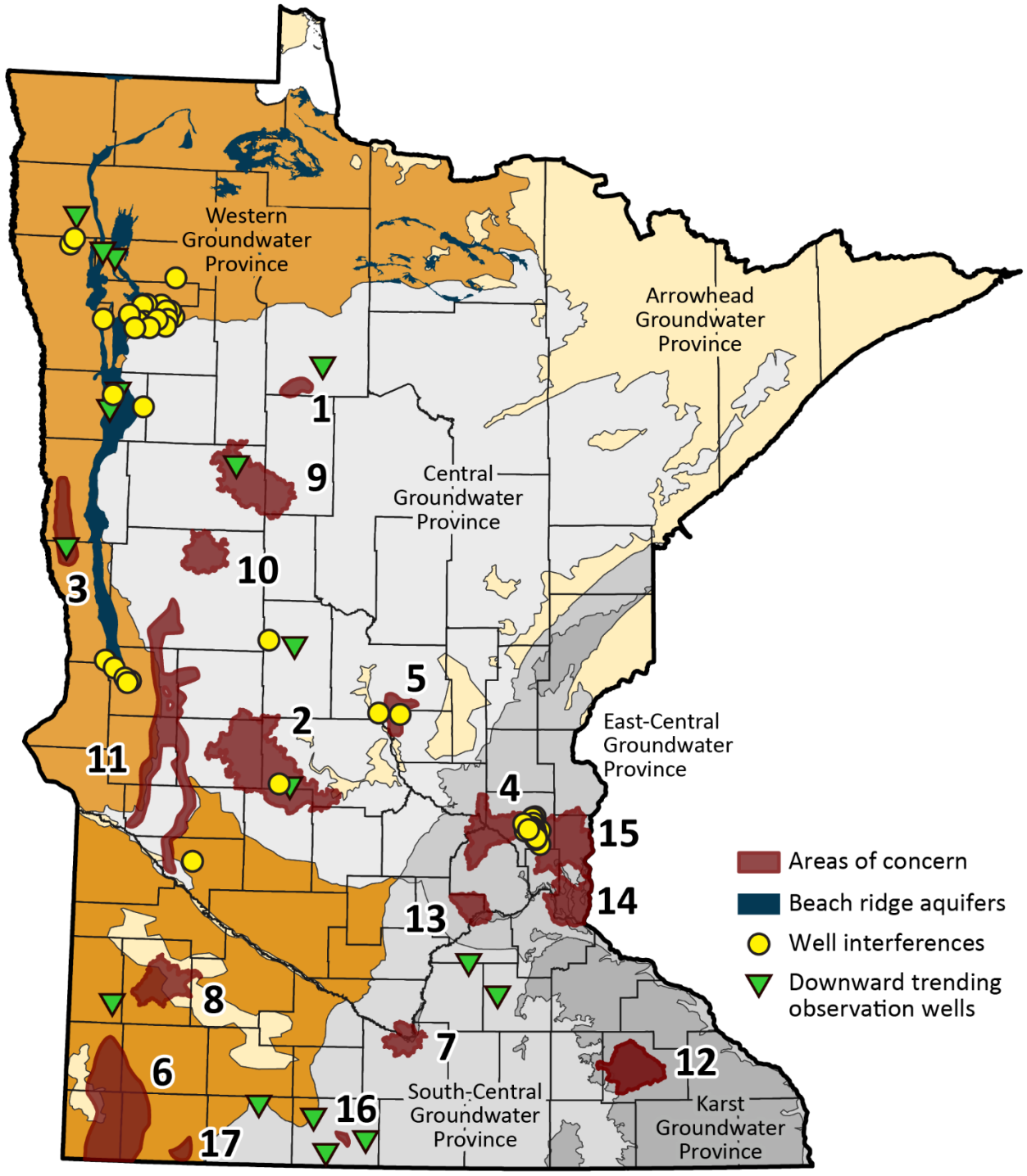
Calcareous Fens

Little Rock Creek





Groundwater Management Areas and Areas of Concern



Looking Ahead

- A changing climate is changing water use intensity
- Trends suggest a need to consider long-term implications of an increased reliance on groundwater resources
- As we think about investments in water supply infrastructure, we should be considering opportunities for water reuse and conservation

Thank You