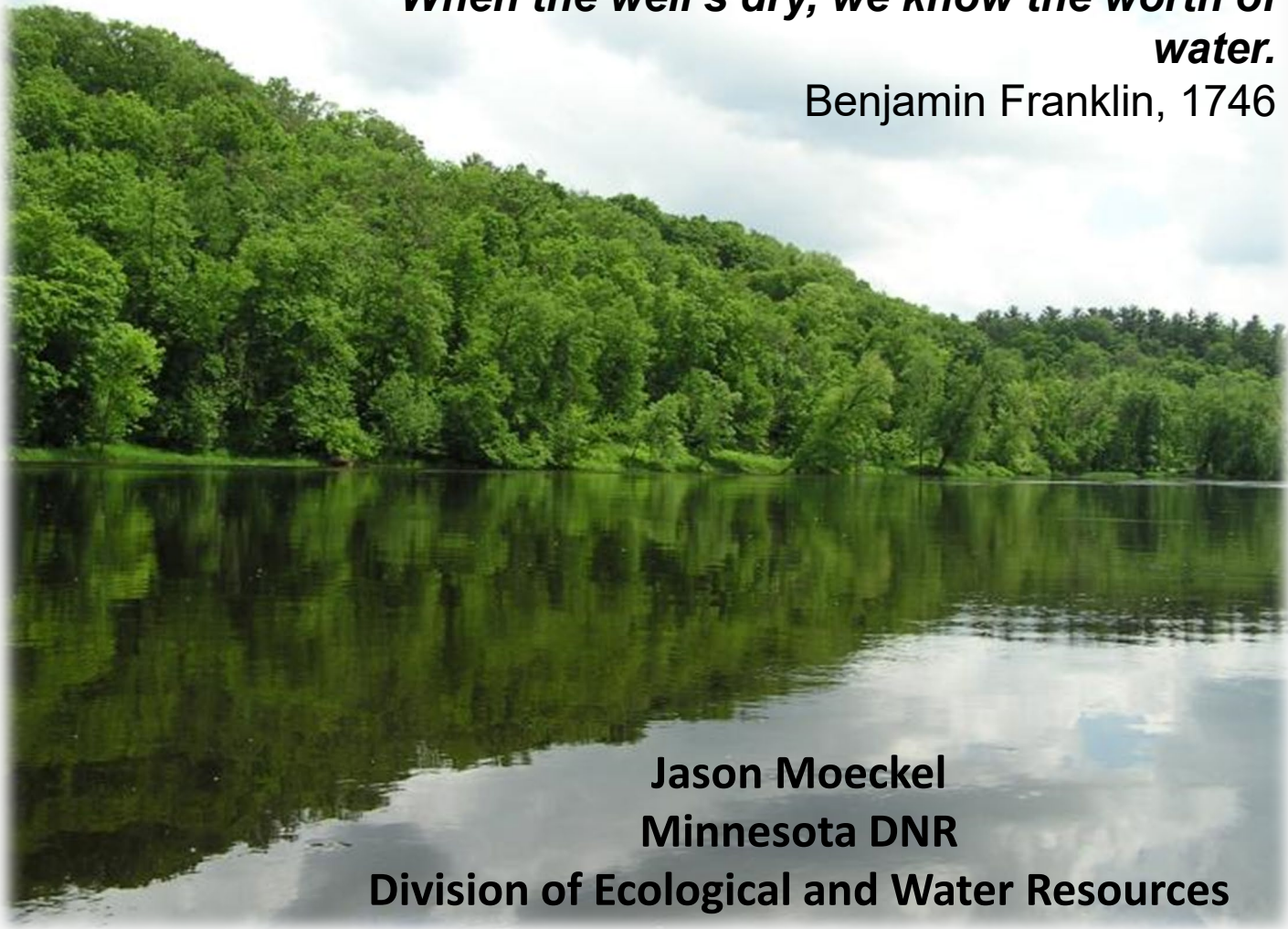


# Groundwater: Do We Have Enough?

*When the well's dry, we know the worth of  
water.*

Benjamin Franklin, 1746



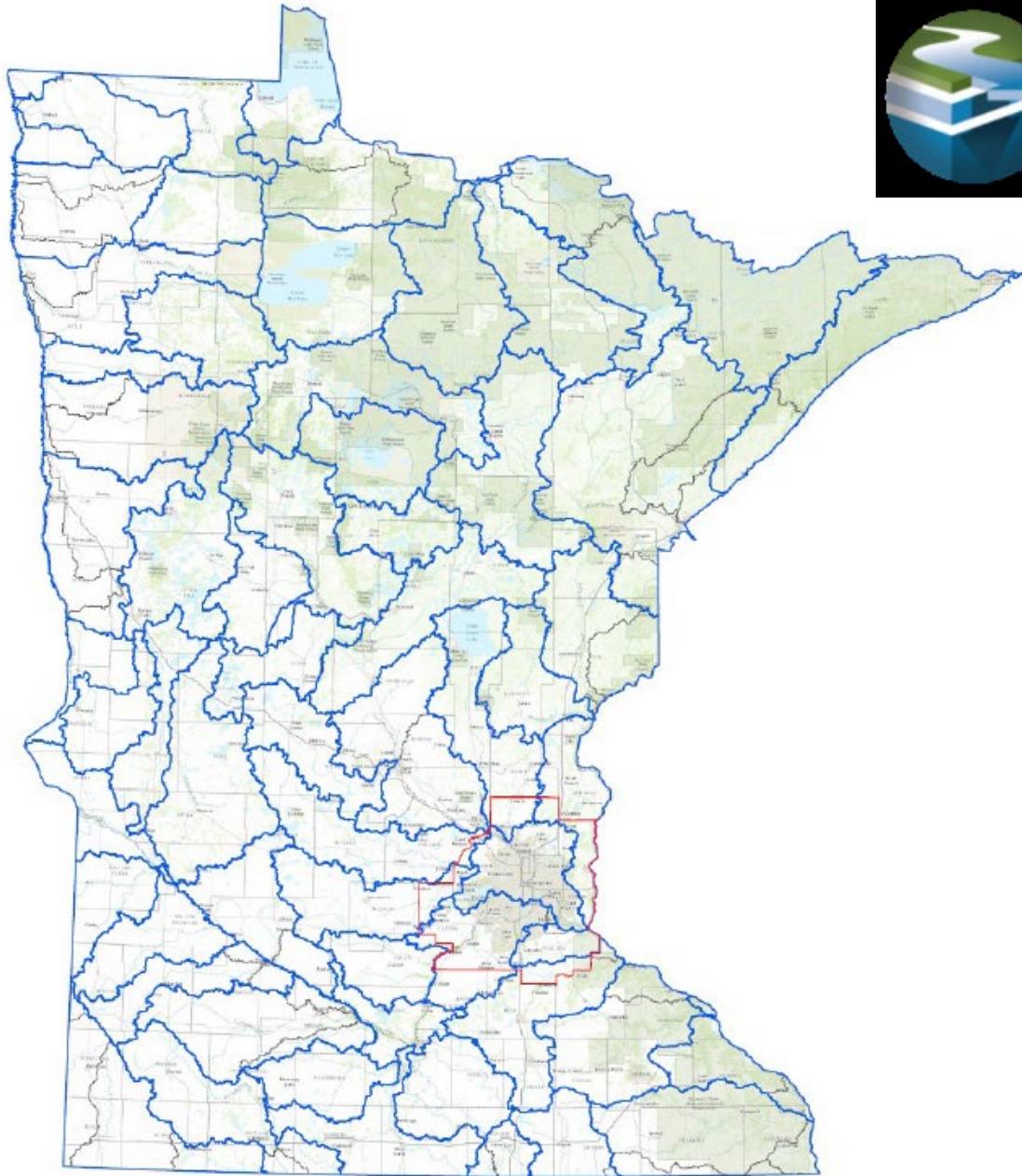
Jason Moeckel  
Minnesota DNR

Division of Ecological and Water Resources



# Key Insights from Our Journey

- Clear Statutory Mandate
- Invest in data and analysis
  - Geographic scale depends on the question(s)
- Get everyone involved
- Expect slow and small changes
- Uncertainty is hard for everyone!



- Working together on local issues
- As the water flows
- Linking data to local action

# **Groundwater: At Risk of Overuse and Contamination**

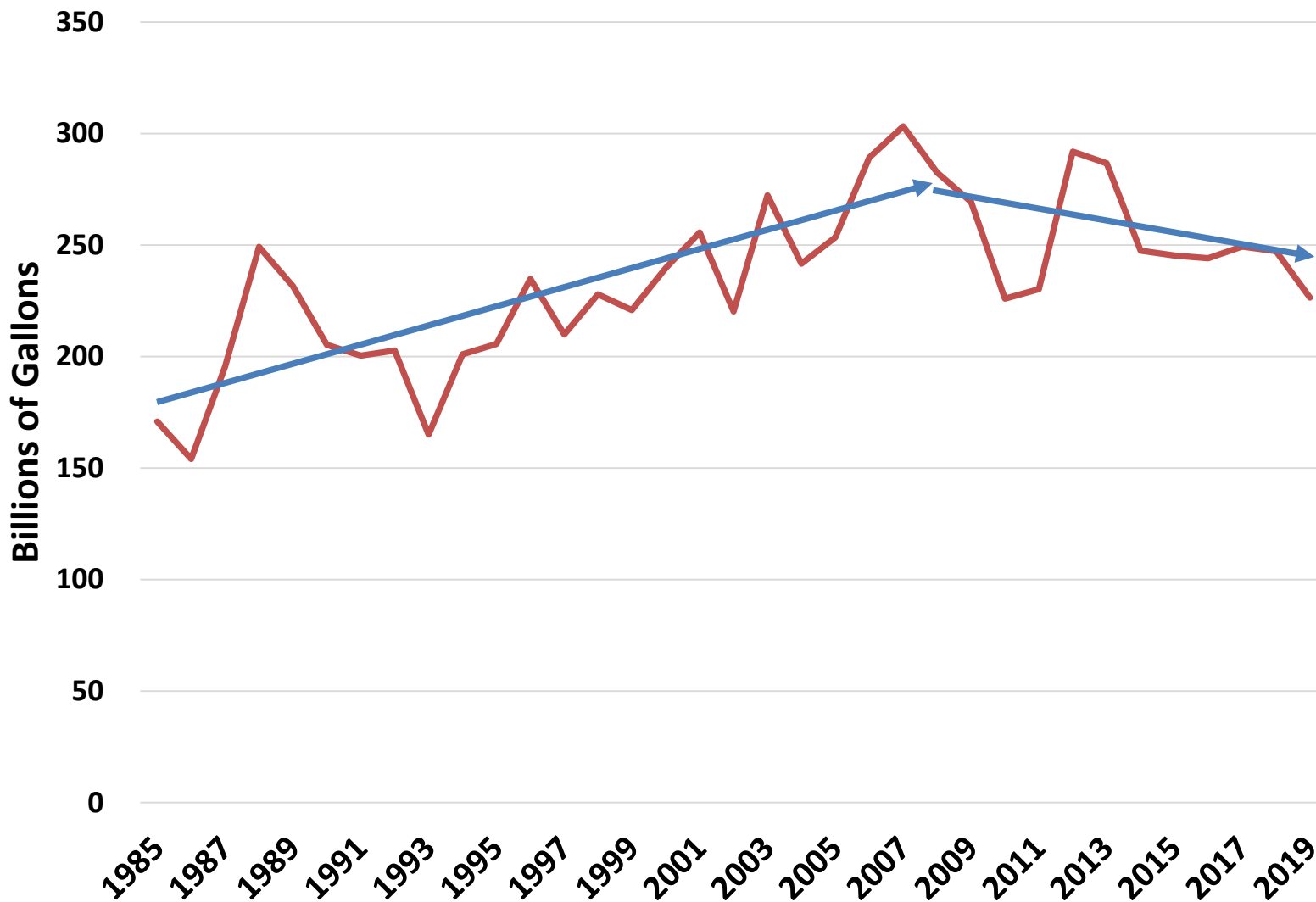


# Audience Participation

- ⦿ Do you know how many gallons your household uses per day?
- ⦿ Do you think per capita use is going up or down?

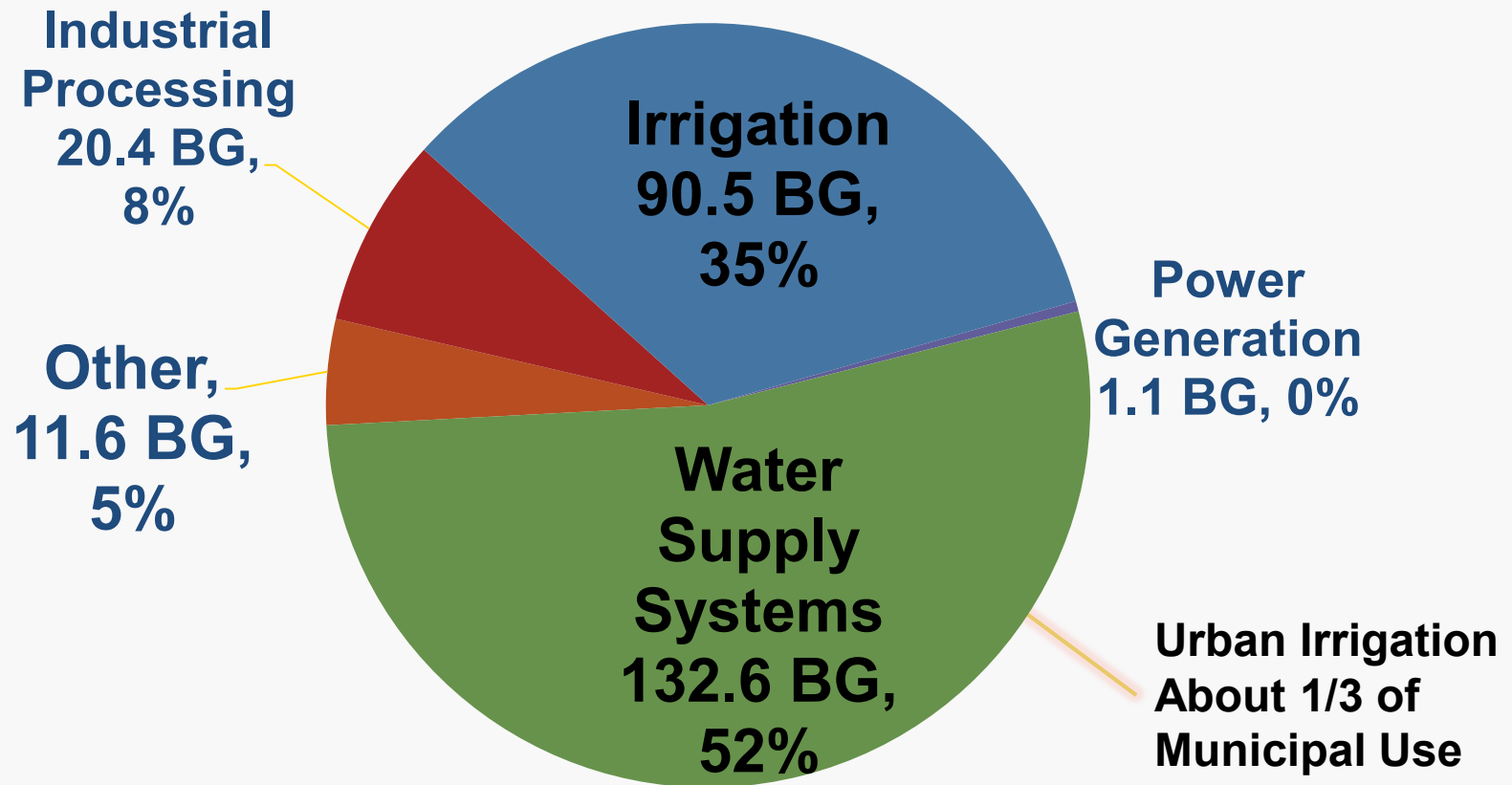


# Statewide Annual Reported Groundwater Use



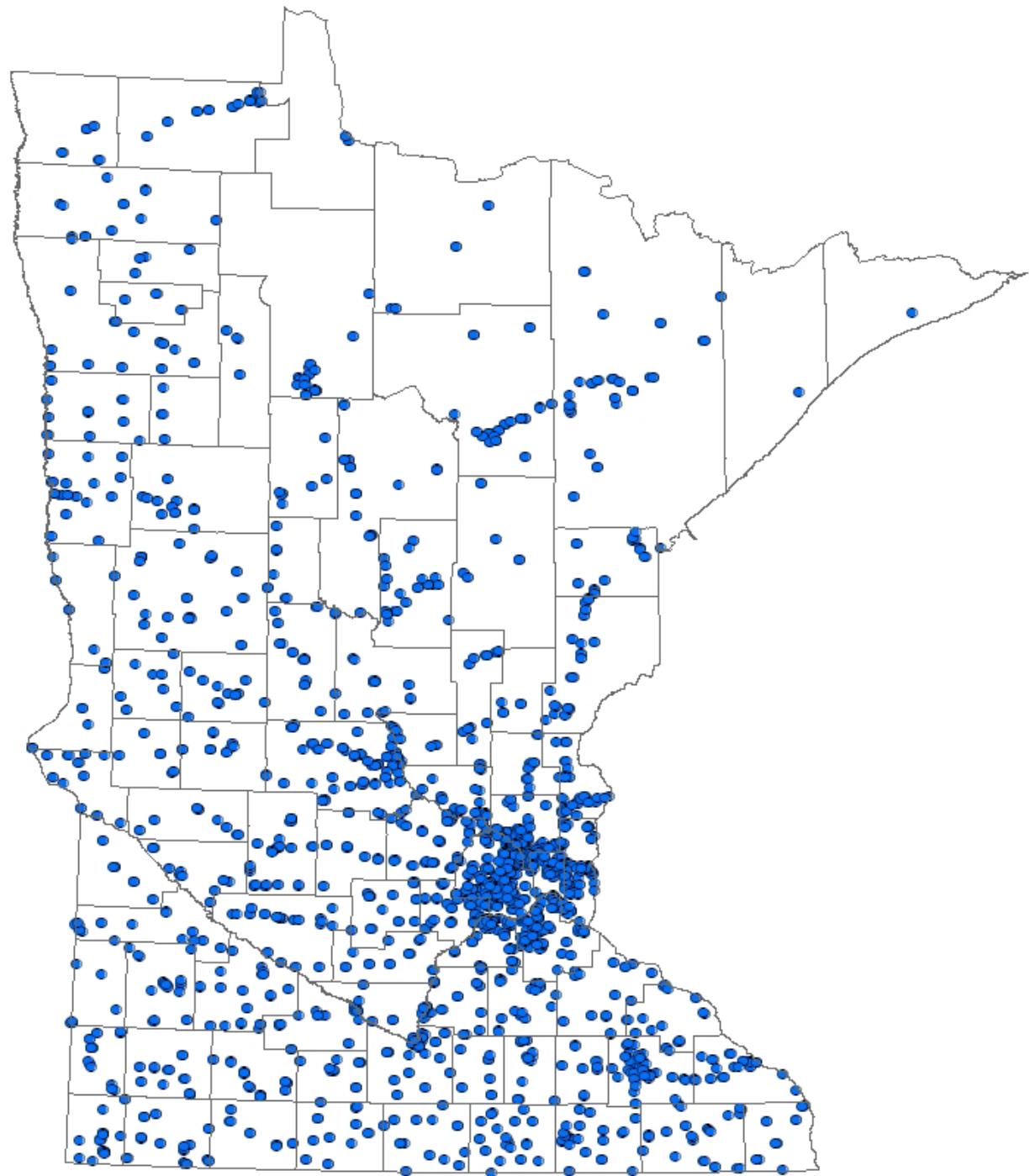
# Groundwater Use By Major Category

## 5 Year Average from 2010 - 2014



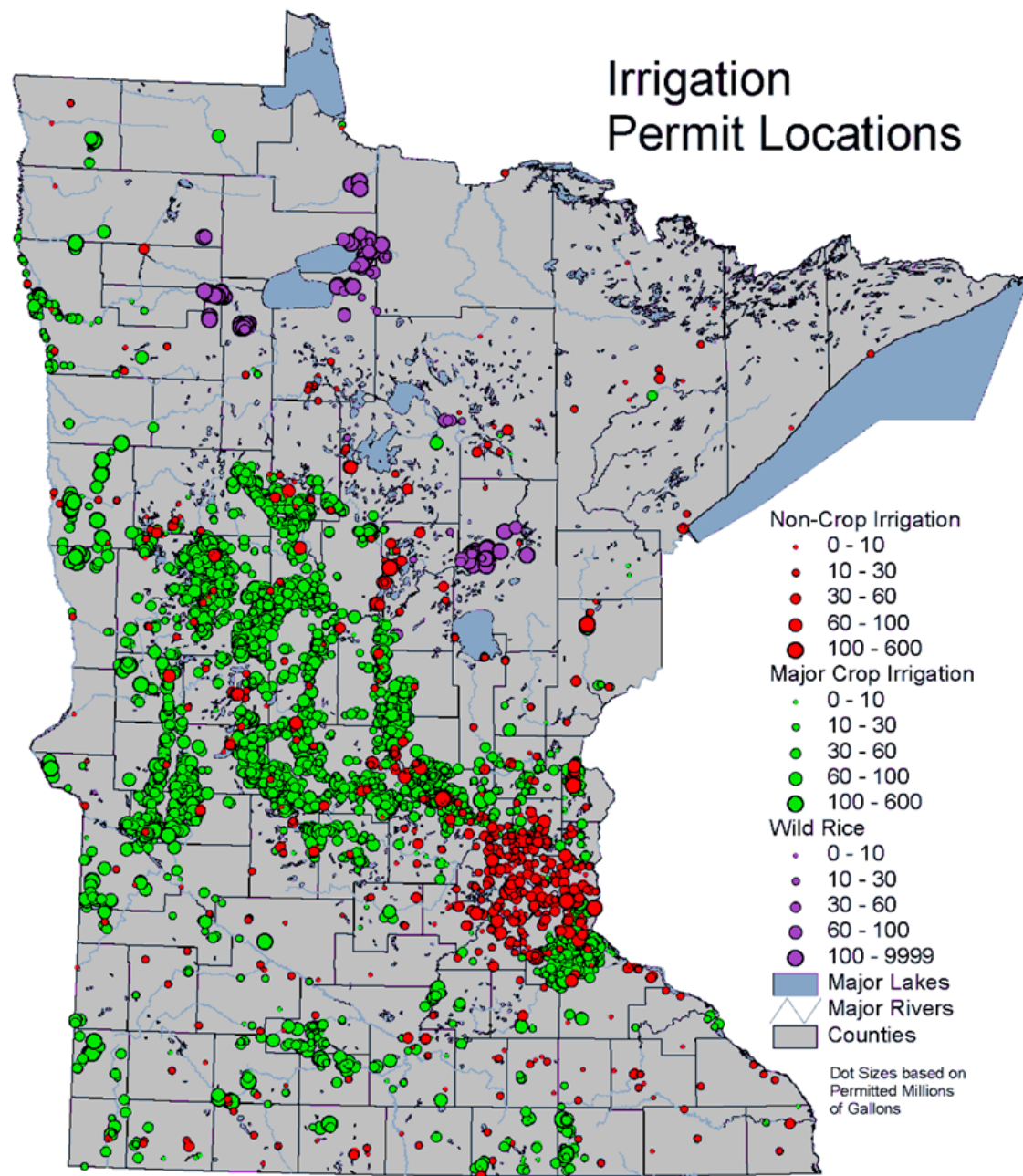
BG = Billion Gallons

# Community Water Supply Wells





# Irrigation Permits



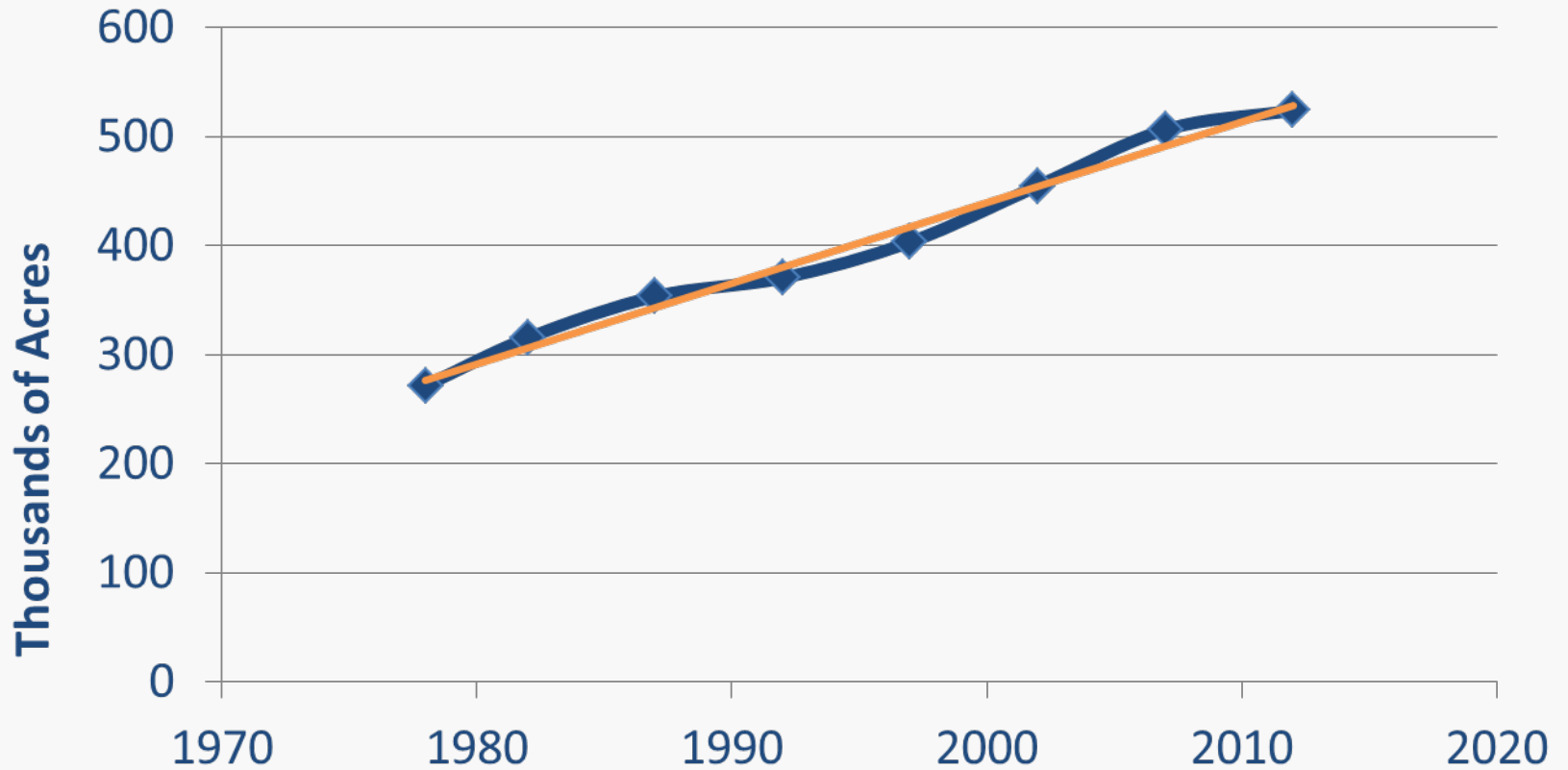
50 0 50 100 Miles

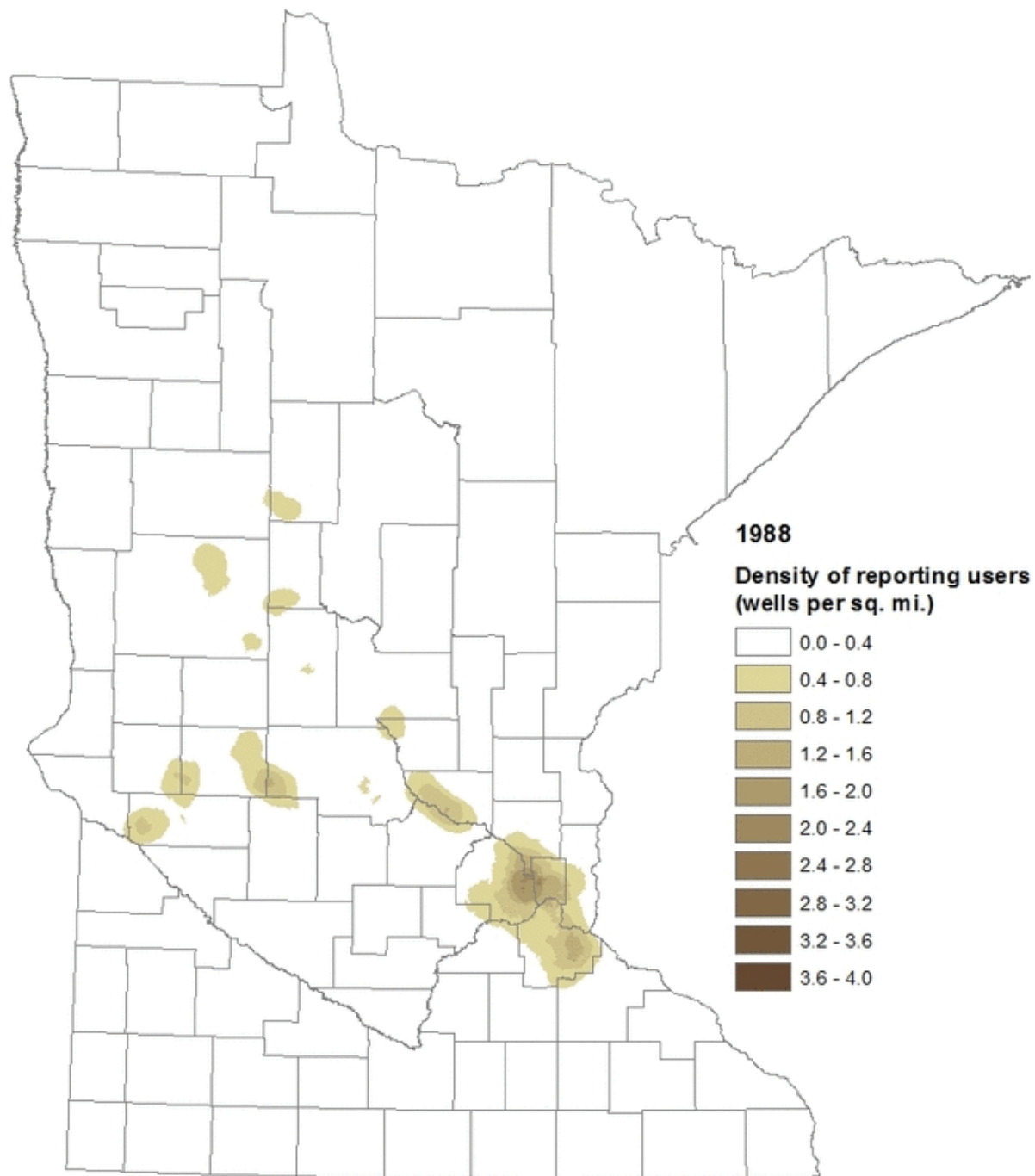
Minnesota DNR Waters  
Water Appropriation Permit Program





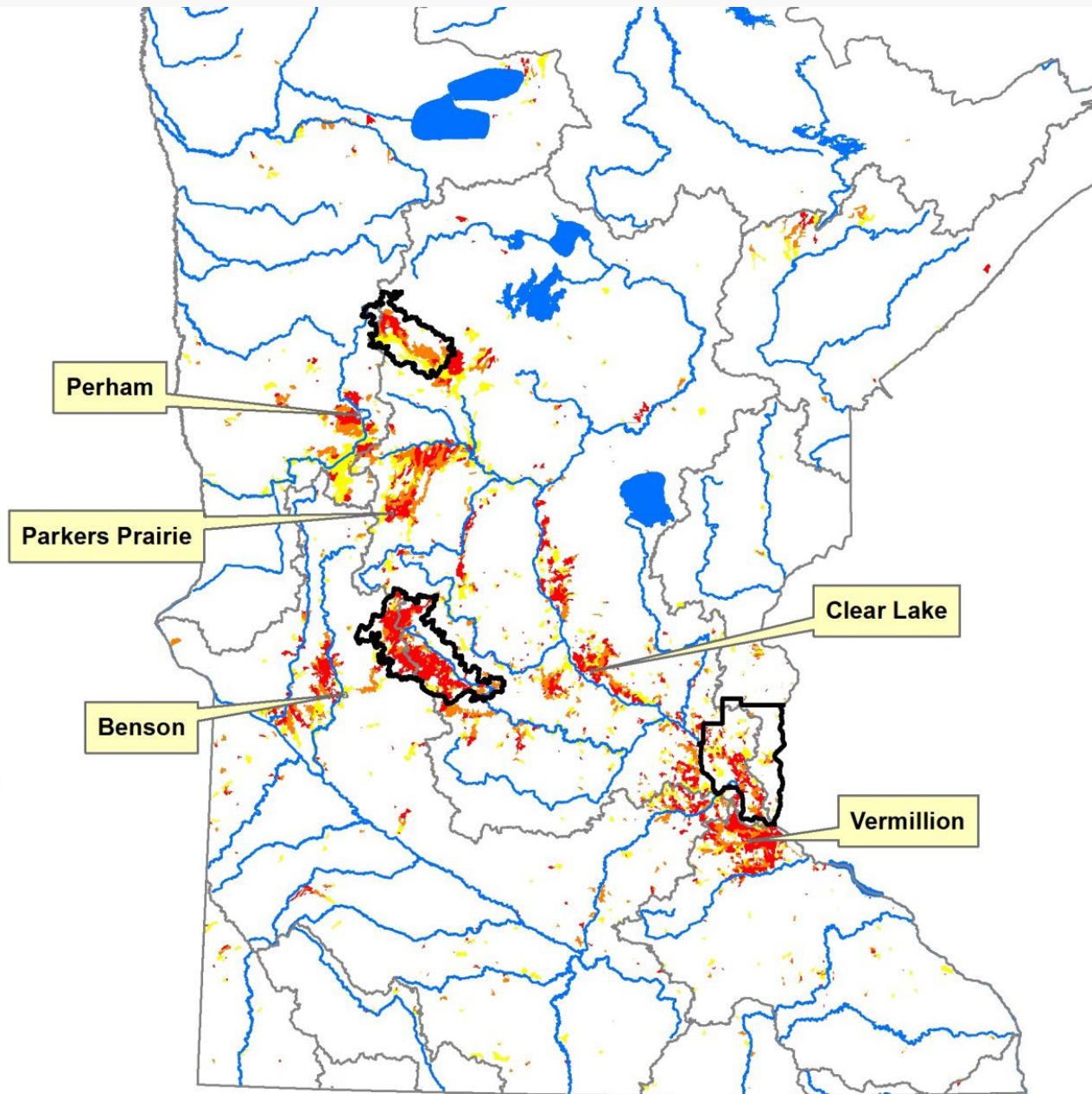
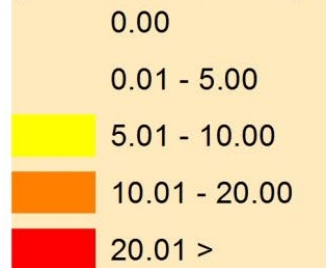
# Minnesota Irrigated Cropland

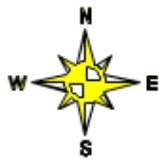




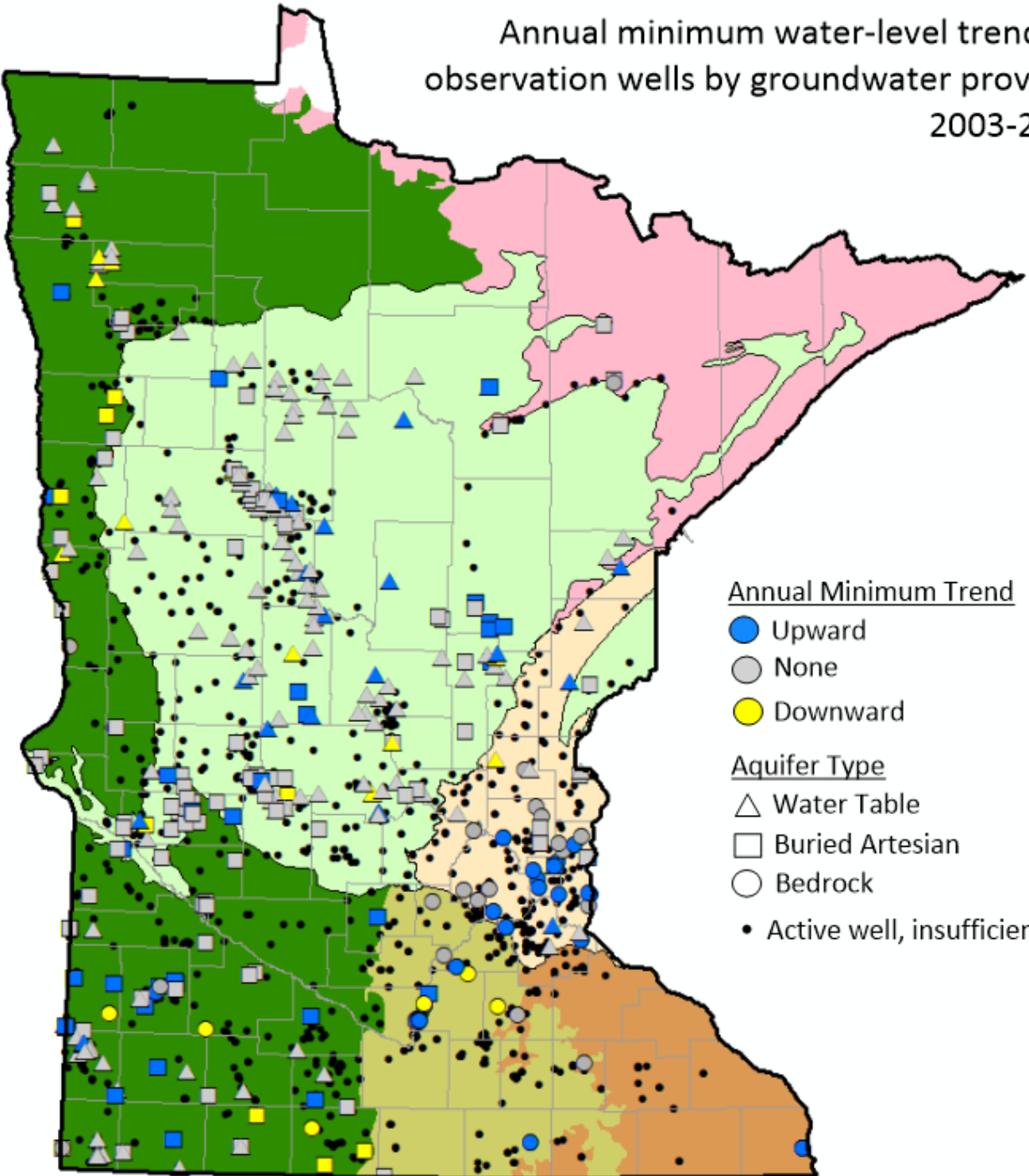
## DNR Level 09 Catchments

Water Use Index  
(use/available %)





# Annual minimum water-level trends in observation wells by groundwater province 2003-2022



### Annual Minimum Trend

- Upward
- None
- Downward

### Aquifer Type

- △ Water Table
- Buried Artesian
- Bedrock
- Active well, insufficient data



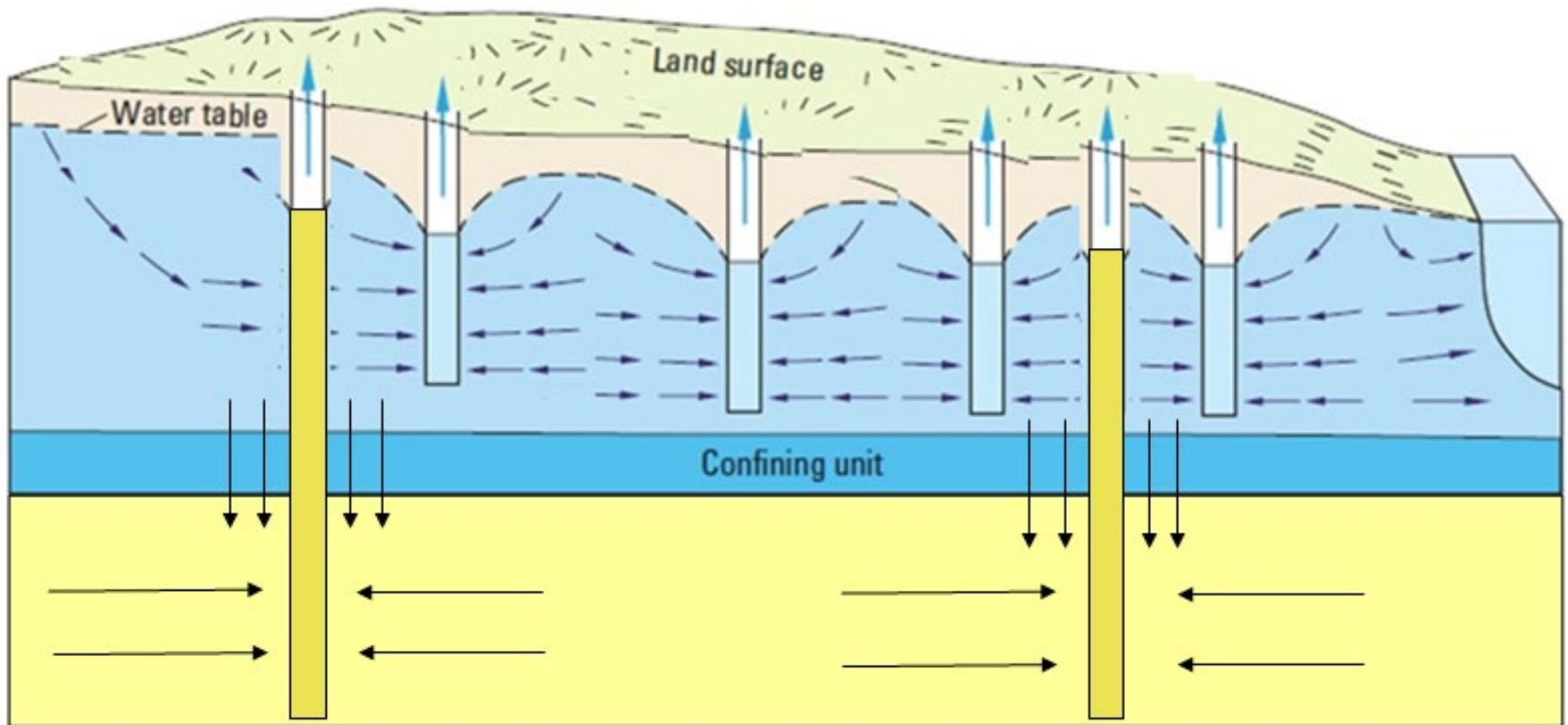
# DNR Strategies

- 1. Heighten the priority given to groundwater**
- 2. Enhance the information available for decisions**
- 3. Improve management of appropriation permits**
- 4. Improve compliance with permits and regulations**
- 5. Improve communication and education**
- 6. Effectively address challenges in areas of high use**
- 7. Promote water conservation and wise use practices**

# Cumulative 'Cones'



# Groundwater Models



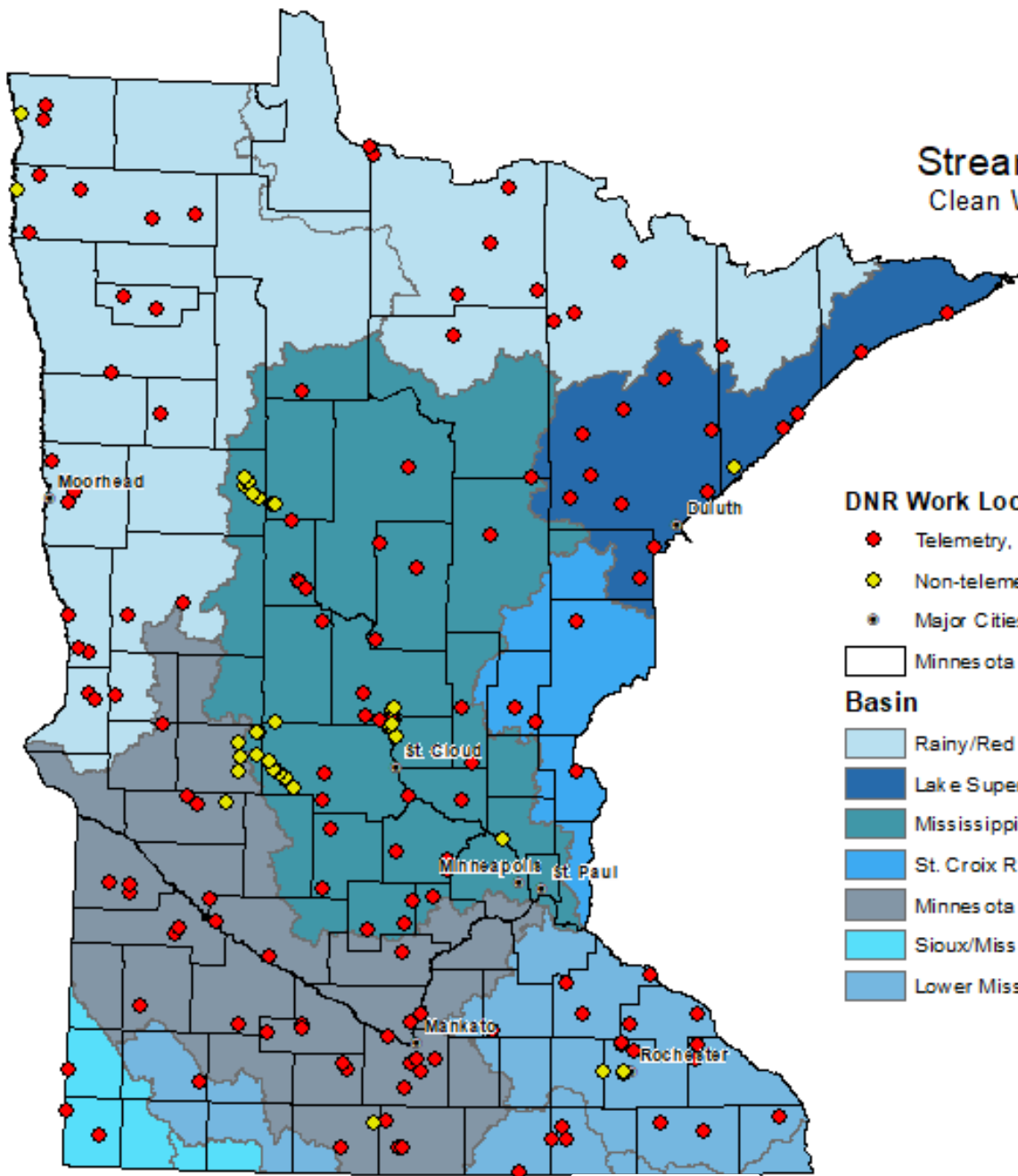


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# Stream Gage Monitoring Network

Clean Water Land and Legacy Funded Gages



### DNR Work Locations

- Telemetry, live-feed data (141)
- Non-telemetered data (38)
- Major Cities

□ Minnesota Counties

### Basin

- Rainy/Red River Basin
- Lake Superior/Great Lakes Basin
- Mississippi Headwaters
- St. Croix River Basin
- Minnesota River Basin
- Sioux/Missouri River Basin
- Lower Mississippi River Basin

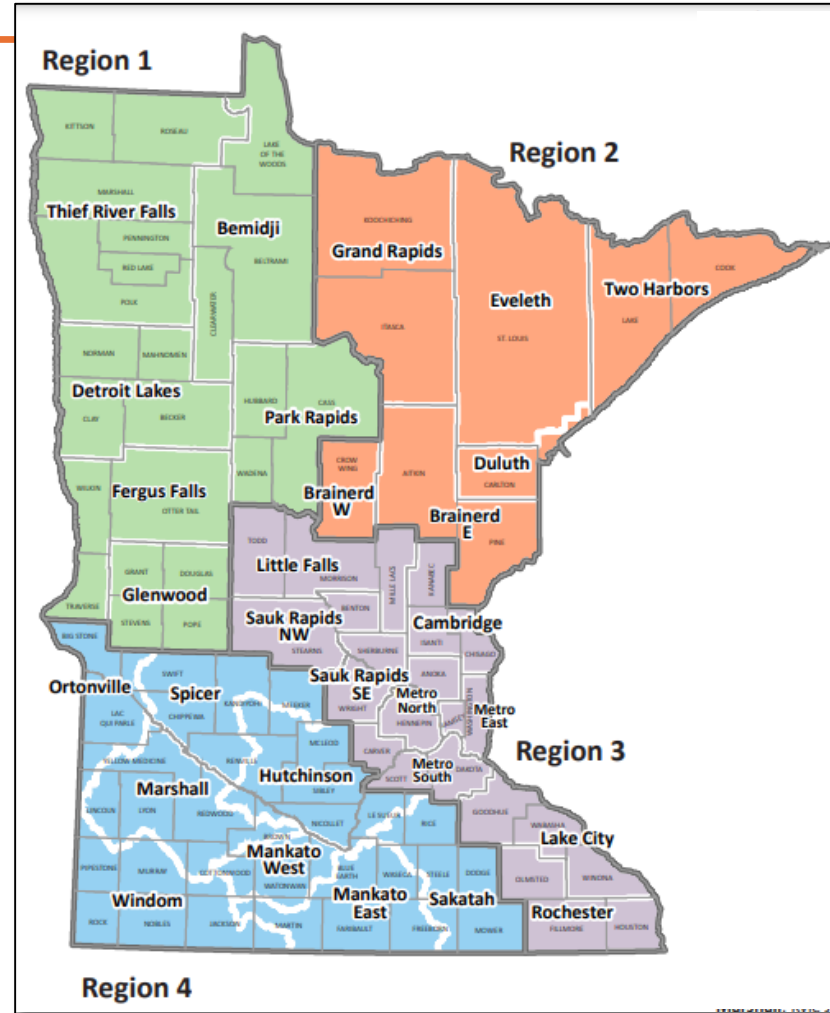


## Watersheds

# Minnesota



## Planning Regions



Additional slide courtesy of Jack Wittman