



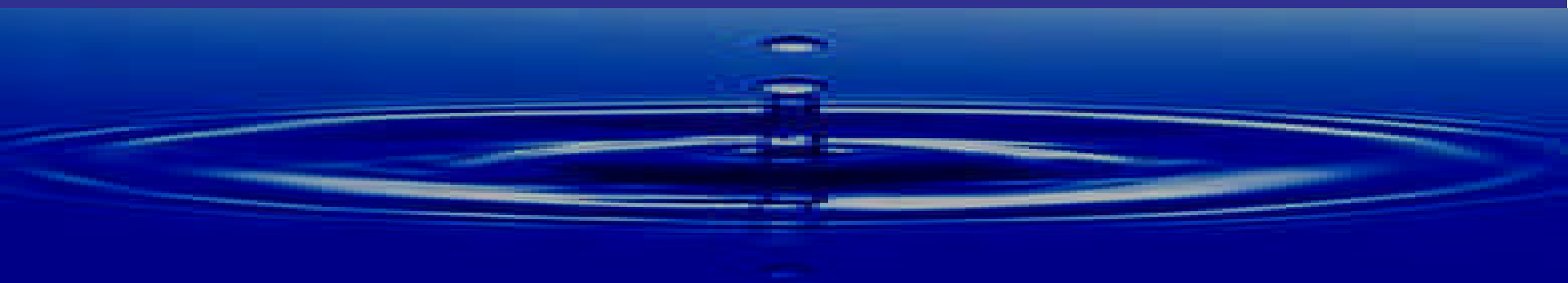
Twin City Area Water Supply Planning

**Minnesota Ground Water Association
Fall Conference 2007**

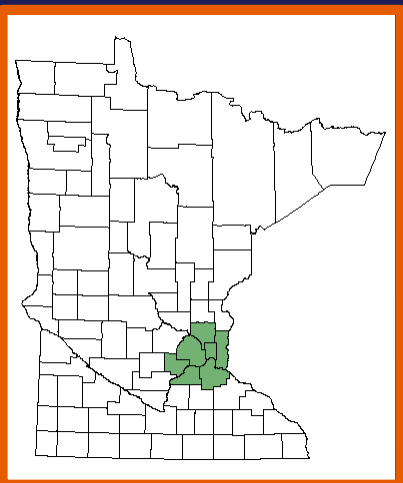
Chris Elvrum

Manager, Water Supply Planning






November 13, 2007

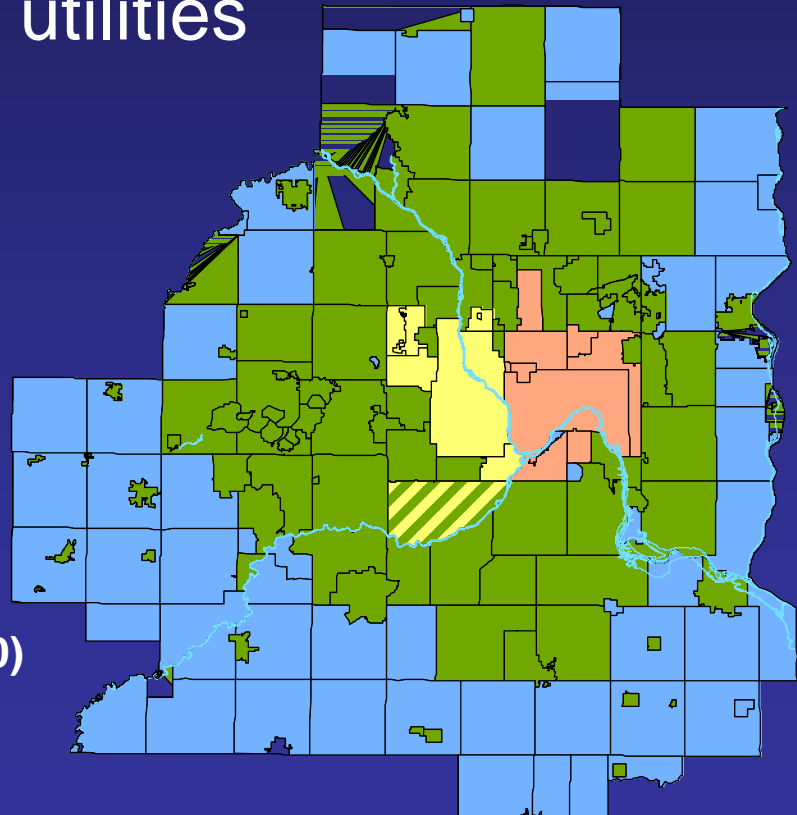


Metropolitan Area Water Supply Sources



- 2.8 million users
- 187 cities, townships, & tribes
- 109 water utilities

-  Municipal wells } (1,800,000)
-  Private wells }
-  River alone (465,000)
-  River, lakes, municipal wells (415,000)
-  River and municipal wells (85,000)



Why Use Groundwater?

- High capacity aquifers available
- Generally requires no treatment
- Less susceptible to droughts
- Groundwater is “dirt cheap”
 - Low Capital Cost: Build (and pay) as You Go,
 - Low user fees pay for cost of service



Result



- **Systems developed independently, supply ourselves mentality**
- **Interconnections only for emergencies**
 - Smallest mains are at the edge of town
 - Dissimilar water chemistries
- **Lack of coordinated look at resource availability**



Master Plan Development



Minnesota Statute 473.1565

- Evaluate supply availability and develop options for areas with potential limitations
 - Groundwater model primary tool
- Improve the security, reliability and efficiency of the region's water supplies and supply development
 - Institutional and engineering issues



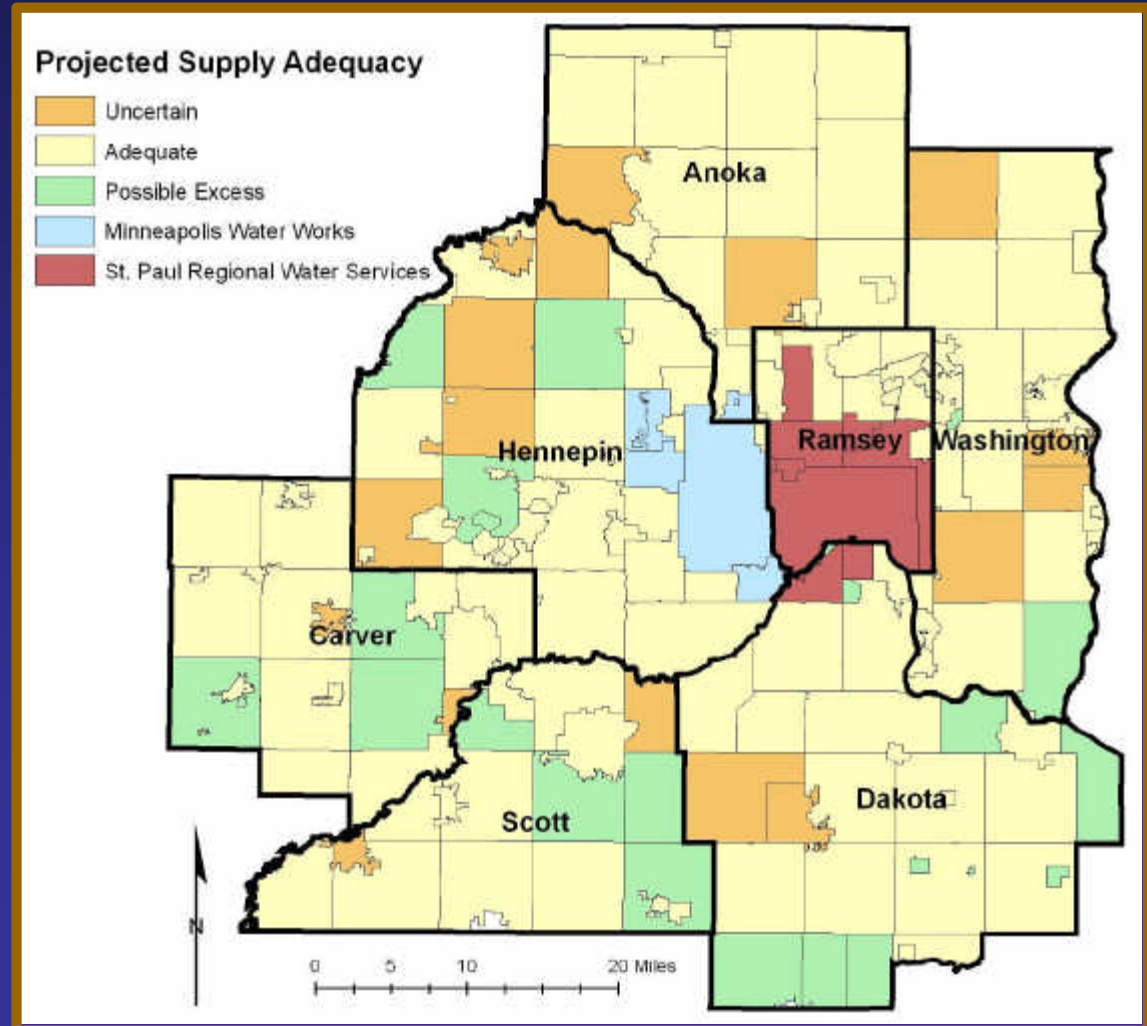
Regional water supply master plan
(2008)



Phase I Projected Supply Adequacy



- Demand Projections
- Aquifer Availability
- Impact of Withdrawals



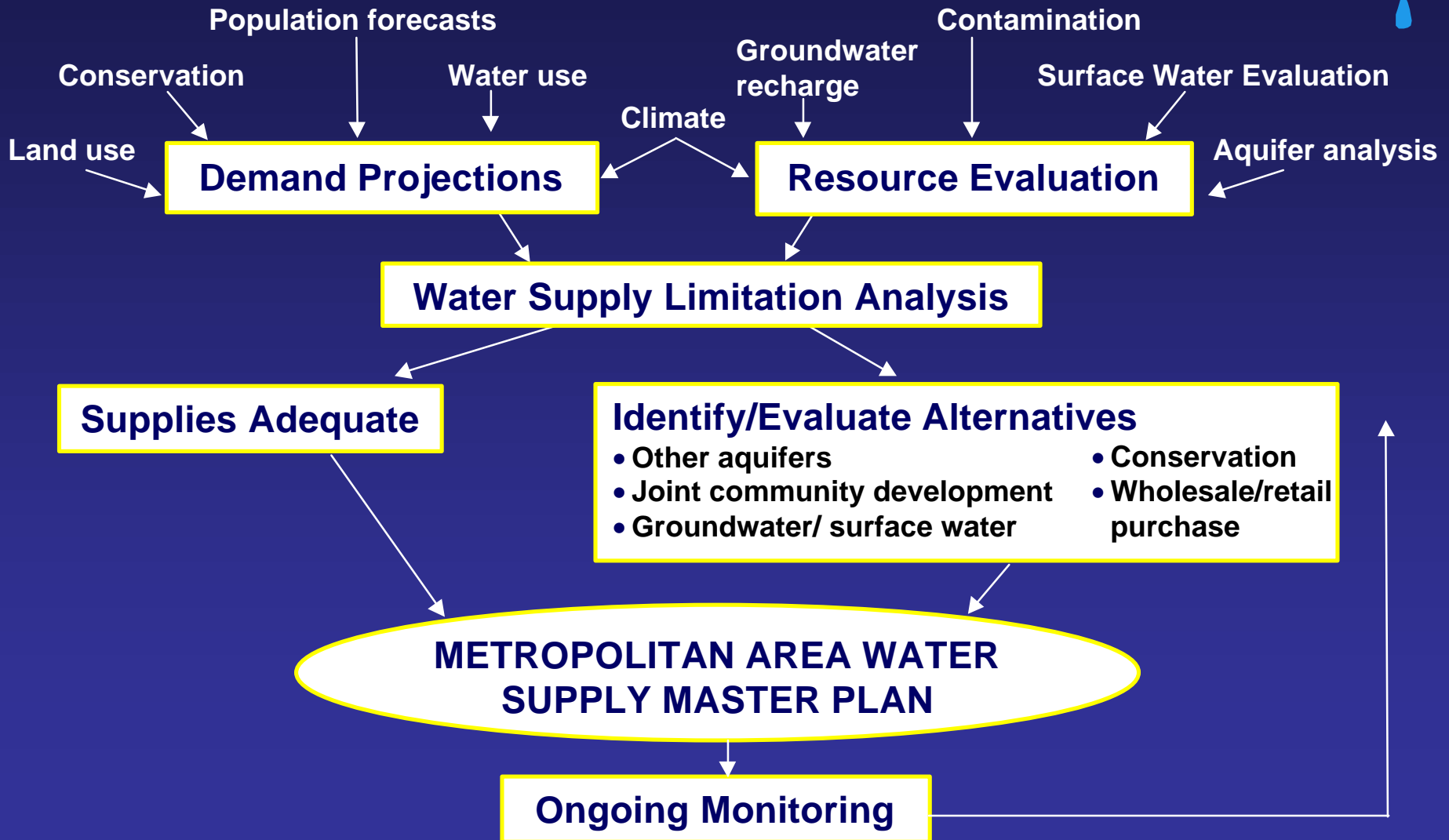
How do we sustainably manage our water supplies?



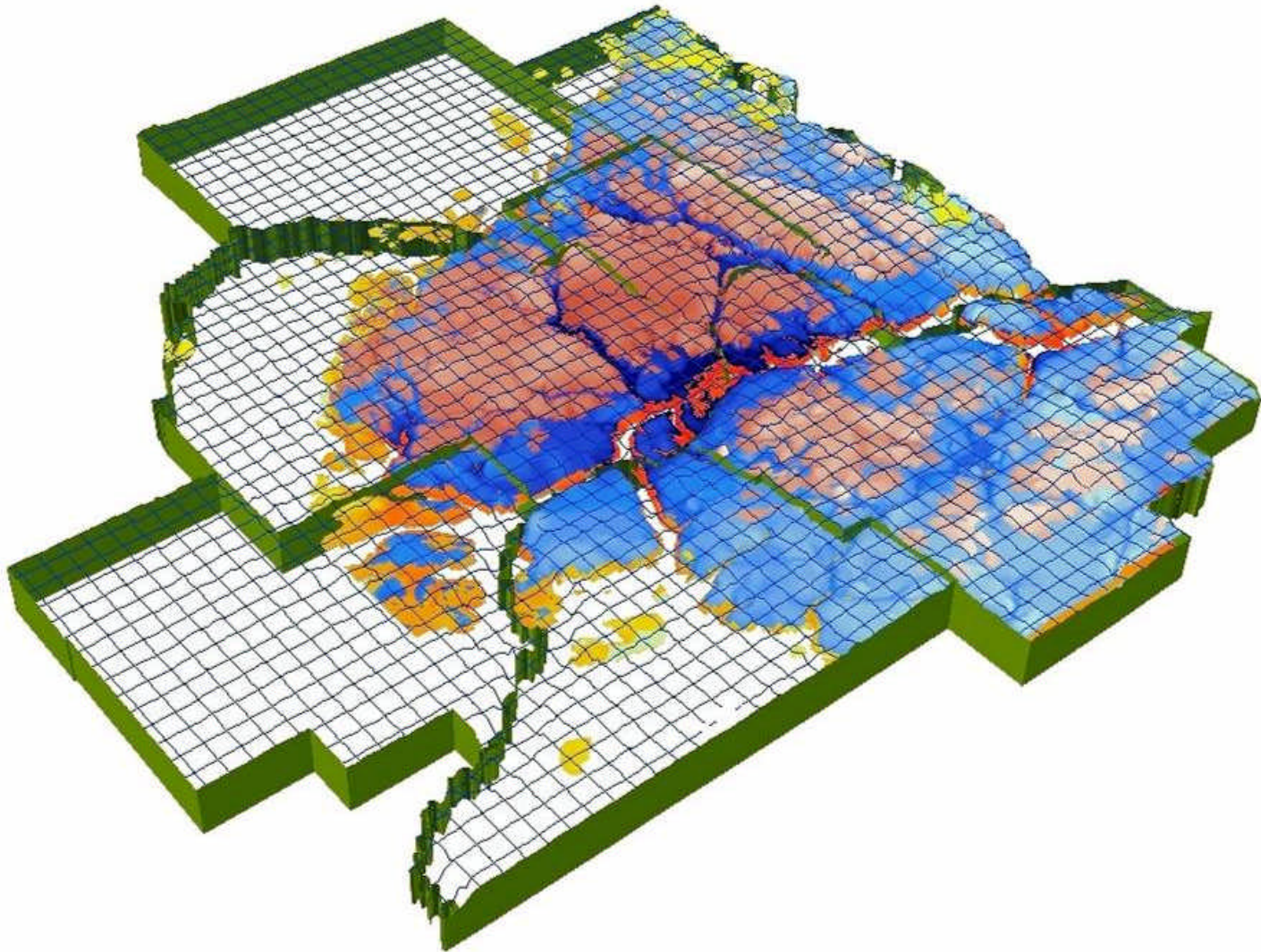
- How much will we need?
- Are aquifers available where we want them?
- Are we “mining” groundwater (pumping more than can be replenished)?
- Will pumping harm my neighbor’s wells or natural resources that depend on groundwater?
- How will drought or climate change affect supplies?
- Is contamination a limitation?



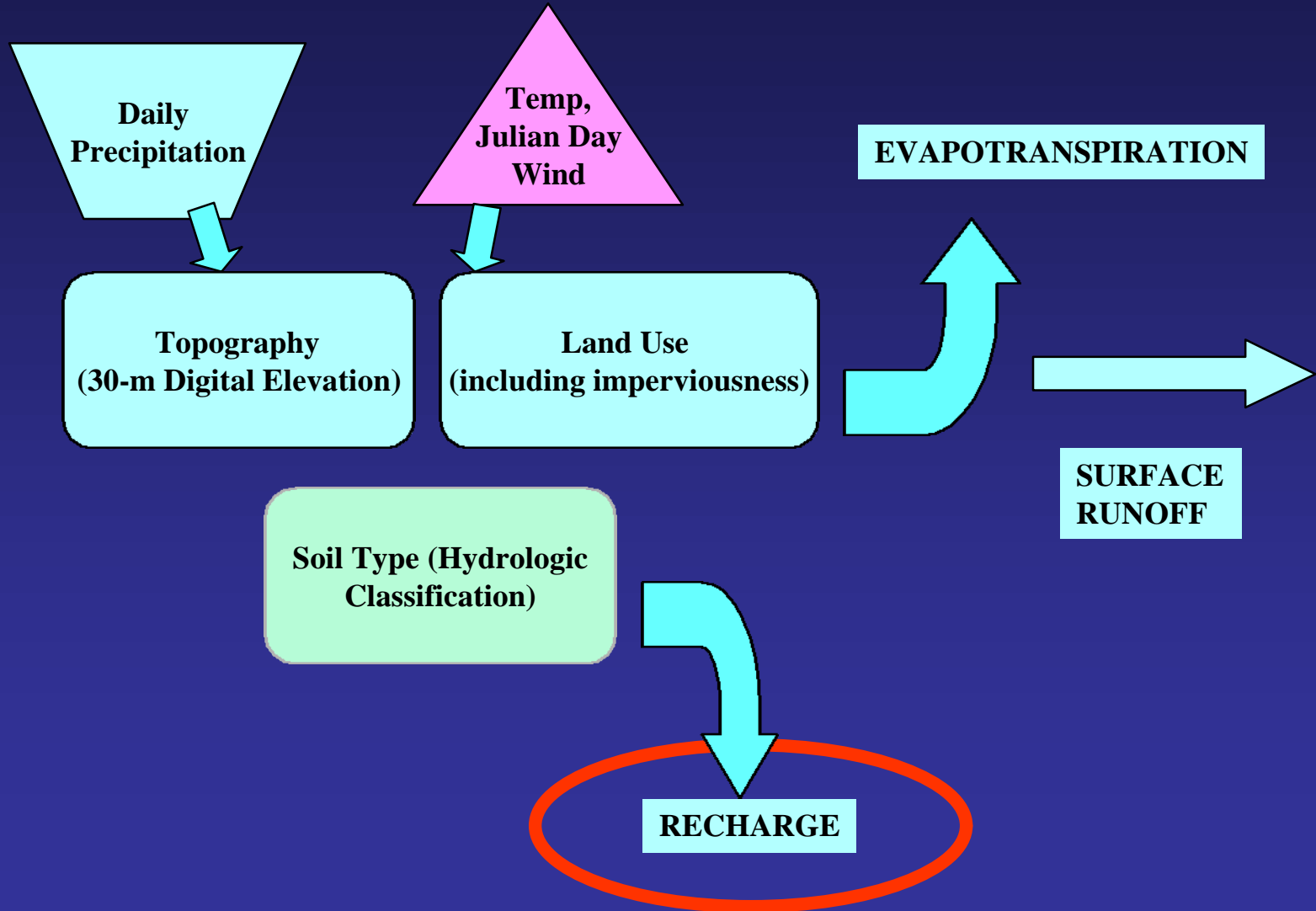
Resource Availability Assessment



Metro Model Reloaded



Surface Water Balance (SWB) Model for Recharge



Metropolitan Area Water Use



Today

2050

1.16 bgd total

Power Generation

774 mgd — . . —▶ **?**

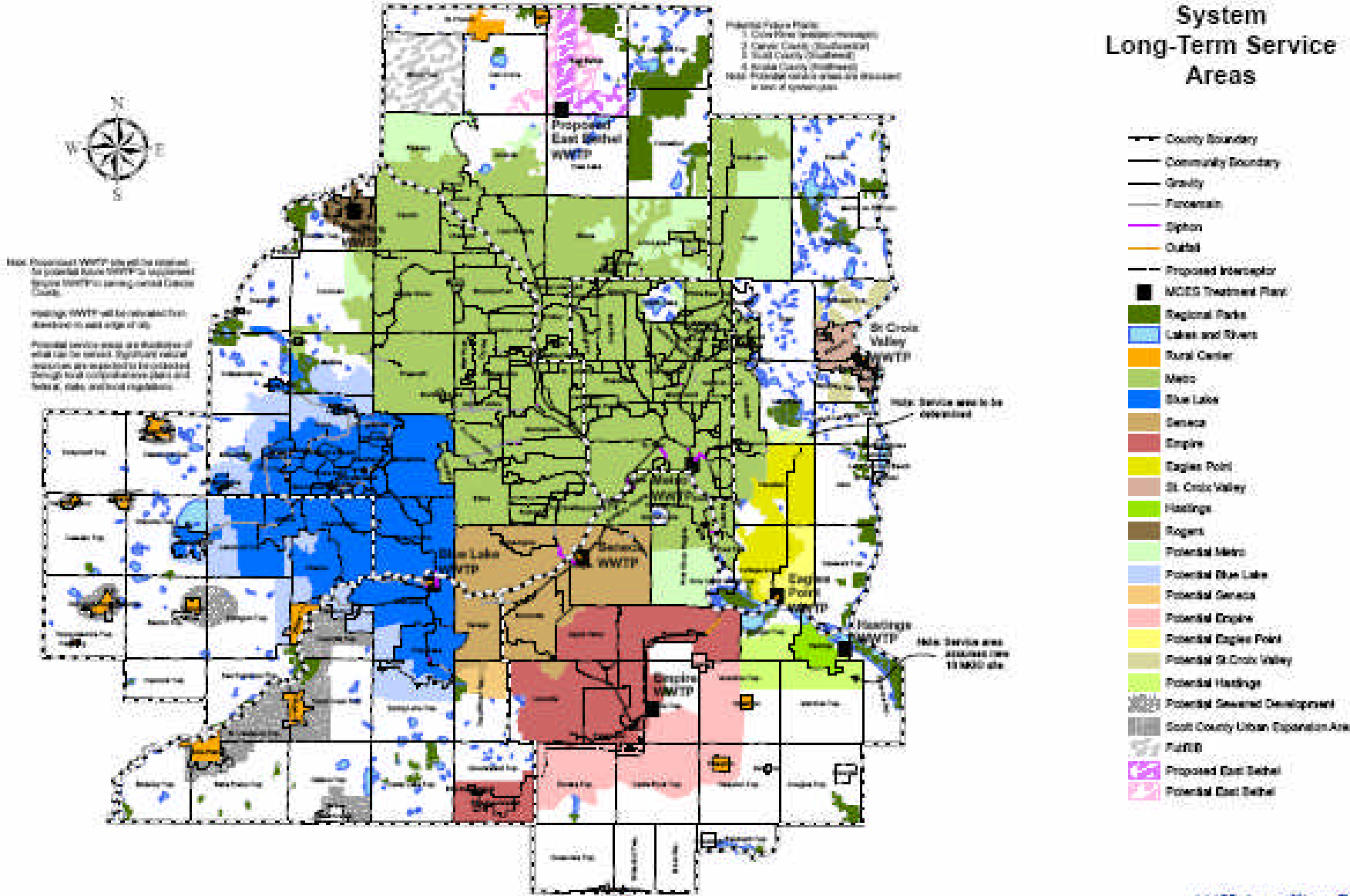
Municipal

310 mgd — . . —▶ **477** mgd
(54% increase)

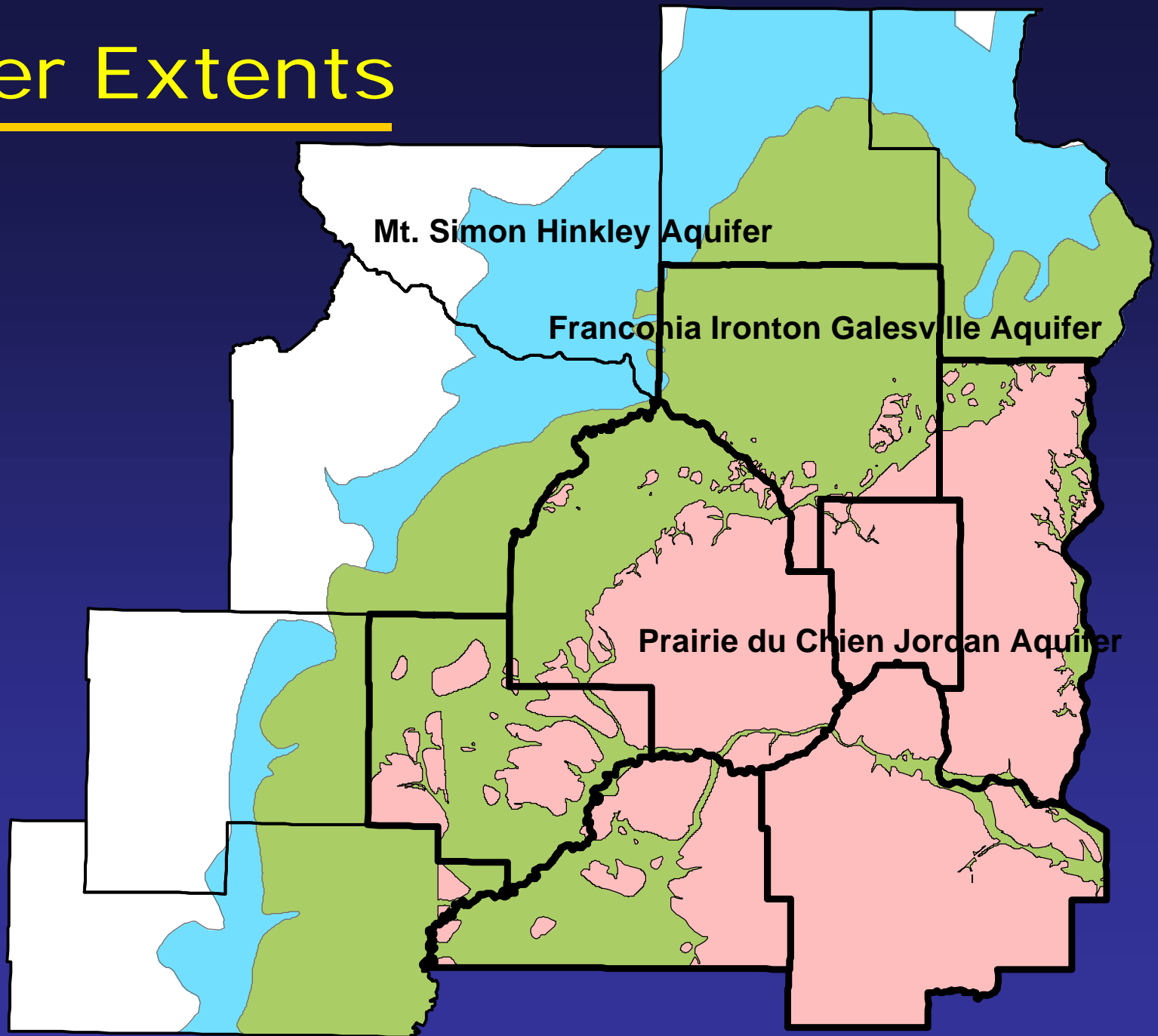
Other

76 mgd — . . —▶ **?**

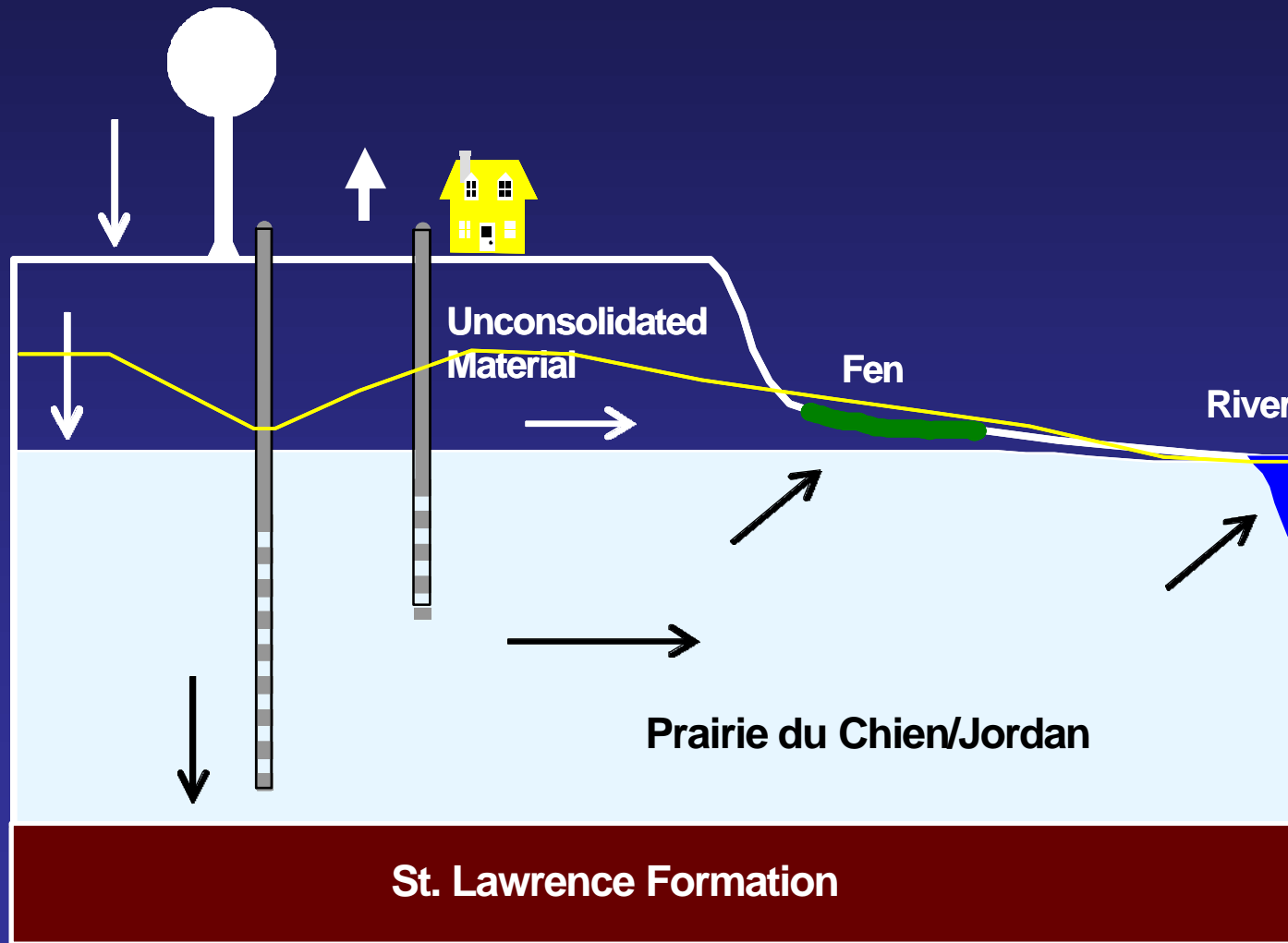
Regional Wastewater System Long-Term Service Areas



Aquifer Extents



Competing Uses



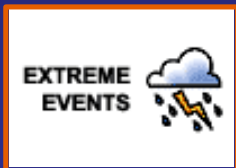
Changing Climate



Winter: 4 – 8° warmer
Summer: 7 – 16° warmer



Winter: 15 – 35 % more
Summer: 15 % less



Extreme heat more common
Rainstorm frequency increase 50-100%



Growing season 3 – 6 weeks longer



Ice cover will continue to decline

Contamination



- Natural and Manmade
- Treatment (\$\$)



Surface Water



- Drought
- Contamination



Challenges for Developing a Water Supply Plan



- Perception of water richness
- Many sustainability issues have little to do with quantity
- Communities still want to supply themselves
 - Just drill more wells
 - Hesitation to cooperate without certain need to
- Uncertainty (and/or lack of agreement) on some key factors that determine sustainability
 - Regulatory decisions
 - Competing interests





More information:

<http://www.metrocouncil.org/environment/WaterSupply/index.htm>

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 **Metropolitan Council**
Environmental Services