

# **WATER REUSE AND CONSERVATION**

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# Background

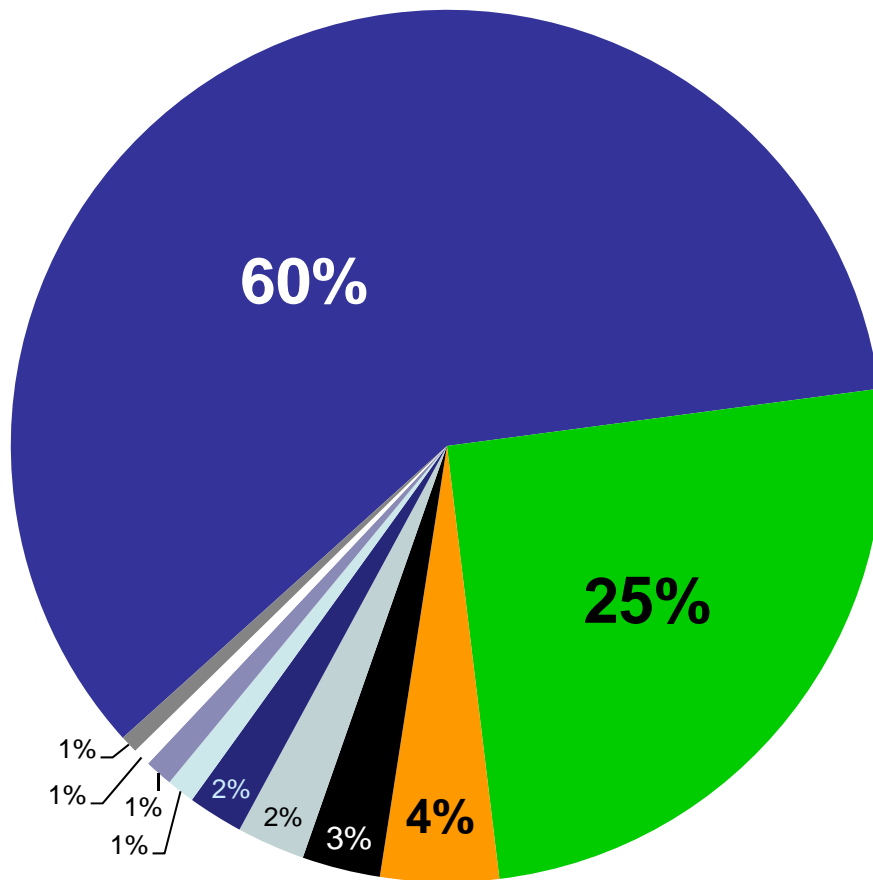
Benefits of Reuse, Recharge &  
Reduction

Examples across Minnesota

Common hurdles

# Opportunities for Water Conservation & Reuse

## 2010 Groundwater Use:



- Municipal Waterworks
- Major Crop Irrigation
- Agricultural Processing
- Ethanol Processing
- Golf Course Irrigation
- Pollution Containment
- Dewatering
- Rural Water Districts
- Temporary Construction
- Livestock Watering

# White Bear Lake

## Why is White Bear Lake so dry? It's not just drought.

By John Brewer

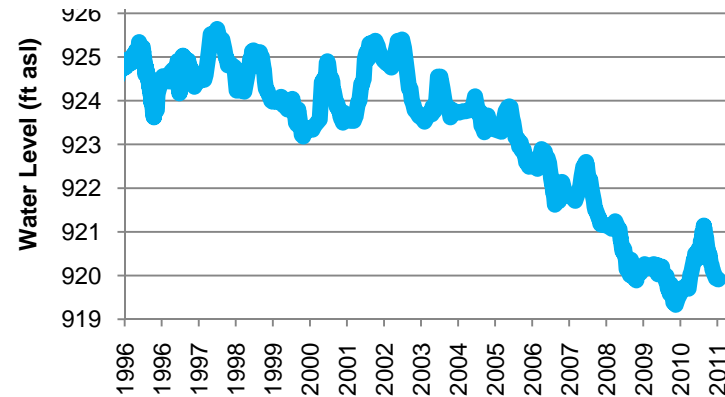
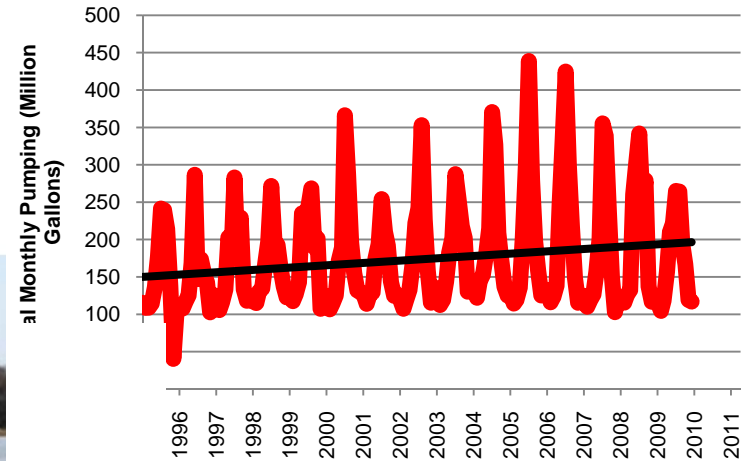
[jbrewer@pioneerpress.com](mailto:jbrewer@pioneerpress.com)

Posted: 02/18/2012 10:23:15 PM CST

Updated: 02/20/2012 09:54:43 AM CST



In November 2011, a resident removes a boat from the extended beachfront along White Bear Lake. Water levels are near historic lows. (Pioneer Press: Chris Polydoroff) (Chris Polydoroff)



# Controls on Water Use

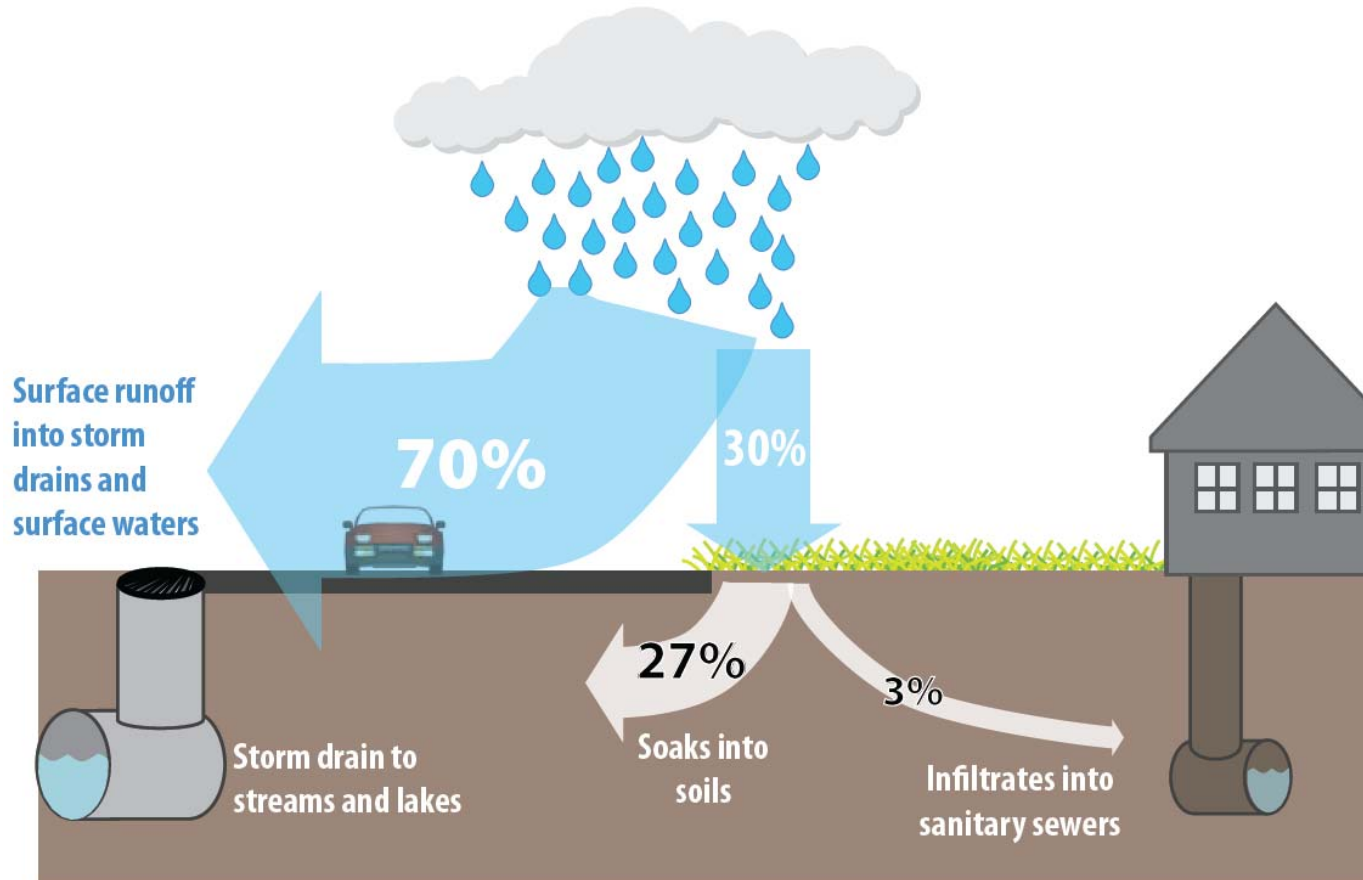
Reuse – Wastewater & Stormwater

Recharge – Infiltrating precipitation

Reduce – Conservation

Remember: Consider long-term consequences to prevent unintended results

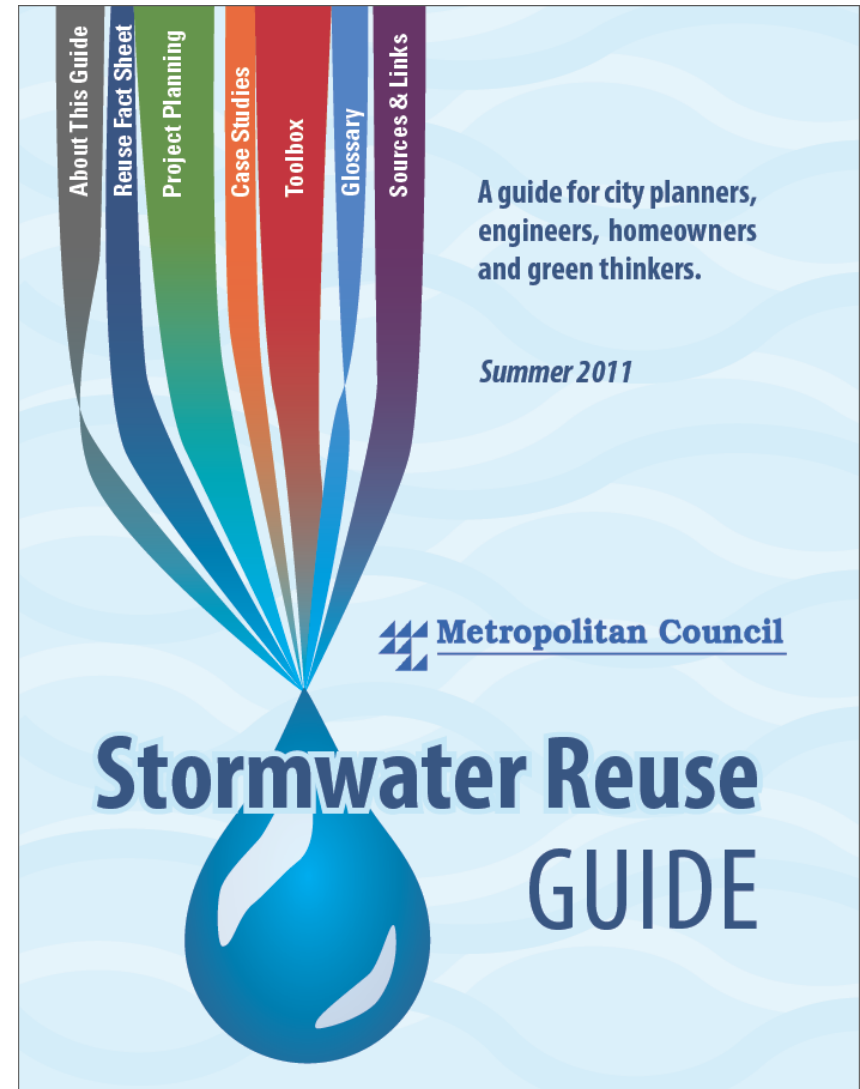
# Stormwater Reuse



Source: CDM and HKGi

# Stormwater Reuse Guide

- Reduce demand on potable infrastructure
- Diversify water sources to reduce risk
- Reduce mass loading of pollutants to surface waters





# Stormwater Reuse Guide

Reuse Fact Sheet 

Project Planning 

Case Studies 

Toolbox 

Glossary 

Sources & Links 

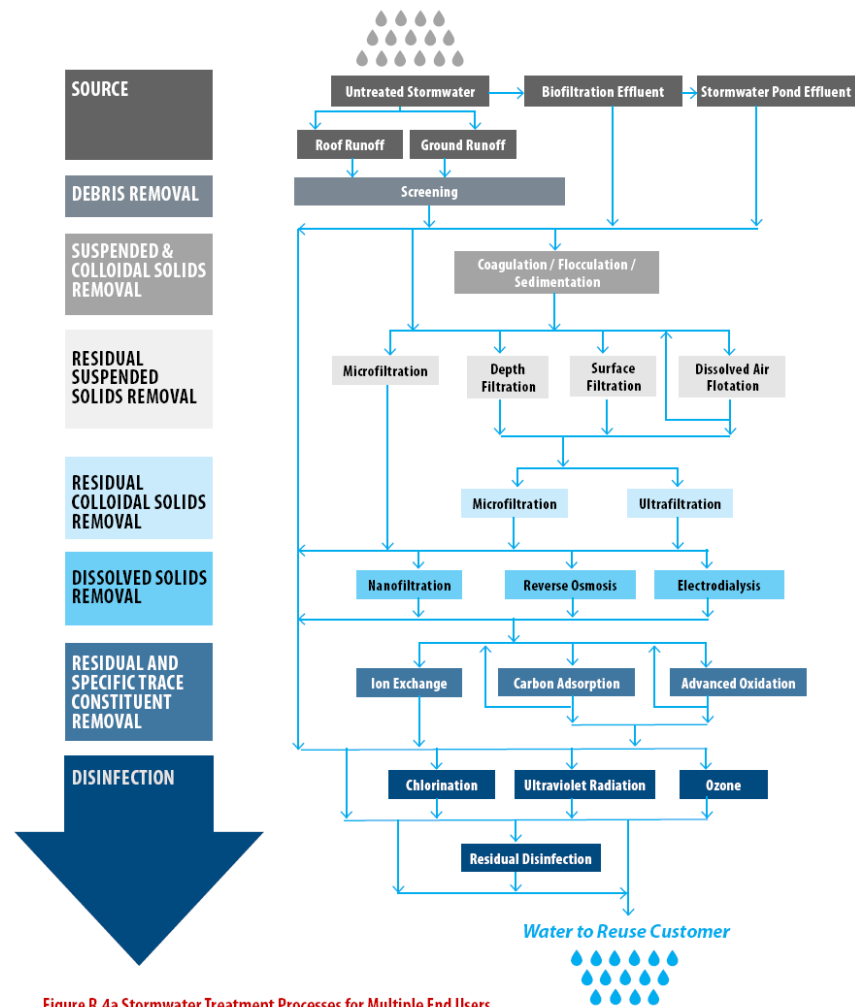


Figure R.4a Stormwater Treatment Processes for Multiple End Users

Source: Metcalf & Eddy, Water Reuse, Issues, Technologies, and Applications, 2007



# Wastewater Reuse



Mankato

*679 MGY saved*

Shakopee Mdewakanton  
Sioux Community

*35 MGY saved*

East Bethel

*In progress...*

# Wastewater Reuse

## *Recycling Treated Wastewater for Industrial Use Study\**

Reduce aquifer depletion

Reduce demand on finite water resources

Provide reliable, low-cost water for industry

*\*Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).*



# Wastewater Reuse Applications

## Types & Locations

- Agricultural irrigation: throughout Greater MN
- Golf course irrigation & wetland enhancement: Nisswa, Montgomery, Shakopee Mdewakanton Sioux Community, etc.
- Power plant water supply: Mankato

## Drivers

- Water quality limitations in receiving water body
- Water supply concerns
- Environmental stewardship

# Study Conclusions

Wastewater recycling for industrial use:

	Industry Demand* million gallons per day	Treated WW Supply million gallons per day
Minnesota	445	425
Twin Cities Metro Area	75	255

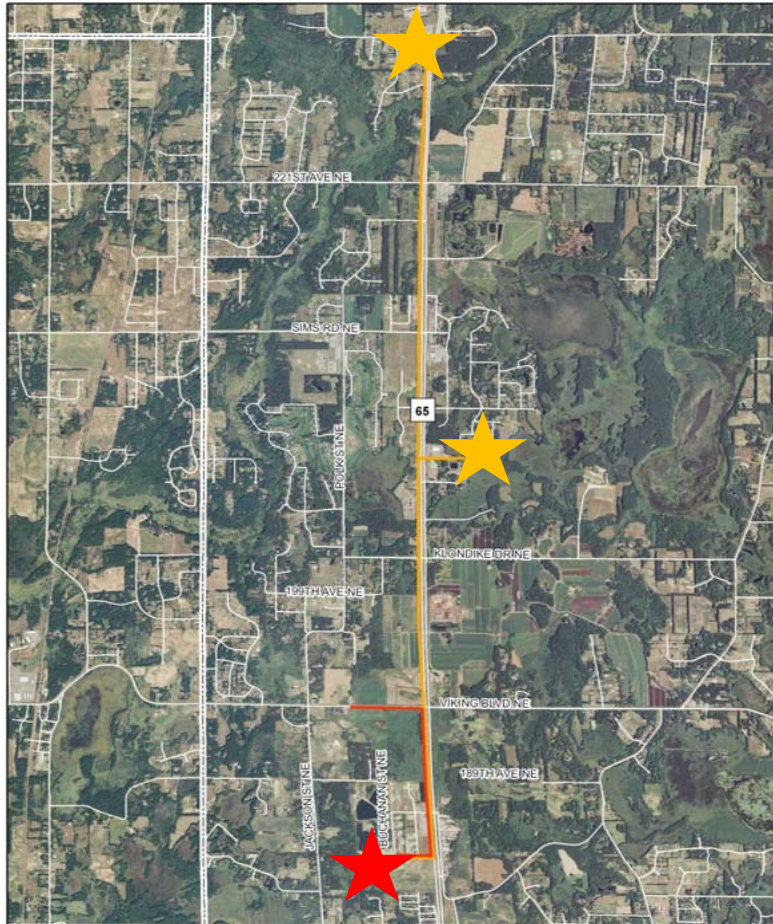
The economics of wastewater recycling are competitive in some situations

Implementation issues exist

“Demonstration” project: could take multiple forms



# East Bethel Water Reclamation Facility



- 0.41 MGD tertiary wastewater reclamation plant
- Effluent suitable for reuse
- Initial use: groundwater recharge

# Recharge

Precipitation that infiltrates to replenish groundwater



Benefits:

- Increased quantity of groundwater
- Reduced impact to surface waters
- Lower stormwater utility fee

Implications:

- Impacts to quality of groundwater, including drinking water sources

# Maplewood Mall Stormwater Infiltration

Mitigate impacts:

- Kohlman Lake

Cost effective

Improve aesthetics

Maintain parking



Photo by Ramsey-Washington Metro Watershed District



# Maplewood Mall Stormwater Infiltration

Estimated reduction in contaminants

- Phosphorus loading from 33 to 13 pounds per year
- Sediment loads from 3.2 to 0.3 tons per year

Improved aesthetics and traffic control



# Challenges

## Coordinating stakeholders

- Utilities: plumbing, electrical, communications, water
- Negotiating changes to leases to accommodate changed parking configurations
- Maintaining communication channels

## Compacted soils – low infiltration rates

## Stormwater BMP maintenance



Princeton Elm



Swamp White Oak



Northern Acclaim Honeylocust



Stately Manor Kentucky Coffeetree



Crusader Hawthorn



Ivory Silk Japanese Tree Lilac

# Reduce



Regulation examples: Municipal watering restrictions

Benefits:

- Controlled per capita water
- Lower daily peaks for water utilities, reduced need to expand storage, lowered risk of well interference

Implications:

- Increased enforcement costs
- Shifting demand, not reducing demand

# Rates

Examples: Municipal rates, permit rates & fees

Benefits:

- Creates incentive to conserve water

Implications:

- Reduced water use may reduce water utility revenue
- Possible increase in unreported and unpermitted use

# Technology

Examples: Arctic Cat Inc., Home appliances, Ag irrigators

Benefits:

- Reduced per capita water use
- Reduced energy use & waste
- Increased municipal capacity

Implications:

- Reduced use can reduce water utility revenue





# Irrigation Advancements



# Final Thoughts

Reduction, reuse & recharge projects benefit Minnesota

Examples exist across the region & State

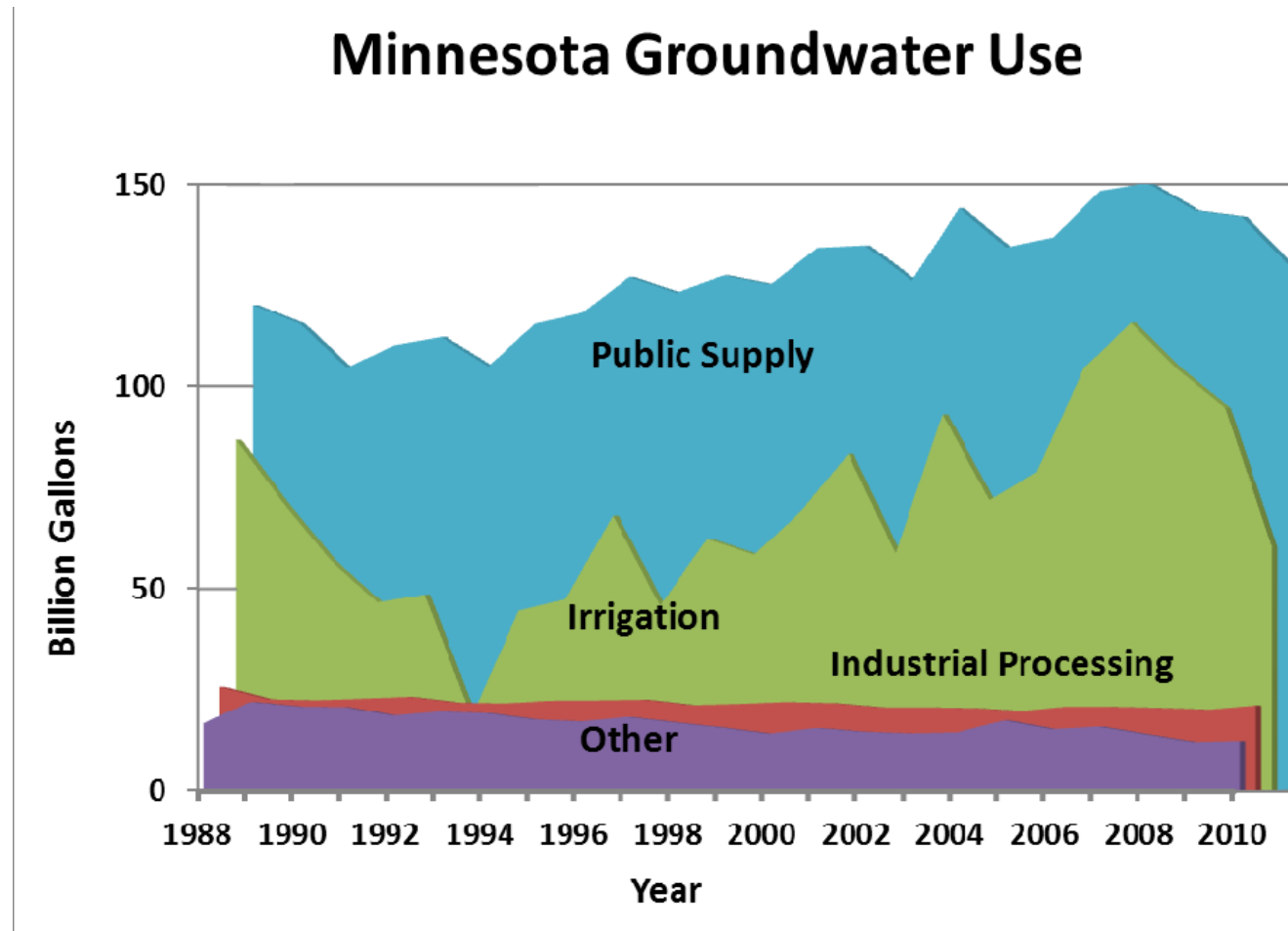
Need to address common challenges

- Economic feasibility
- Water quality
- Regulatory oversight

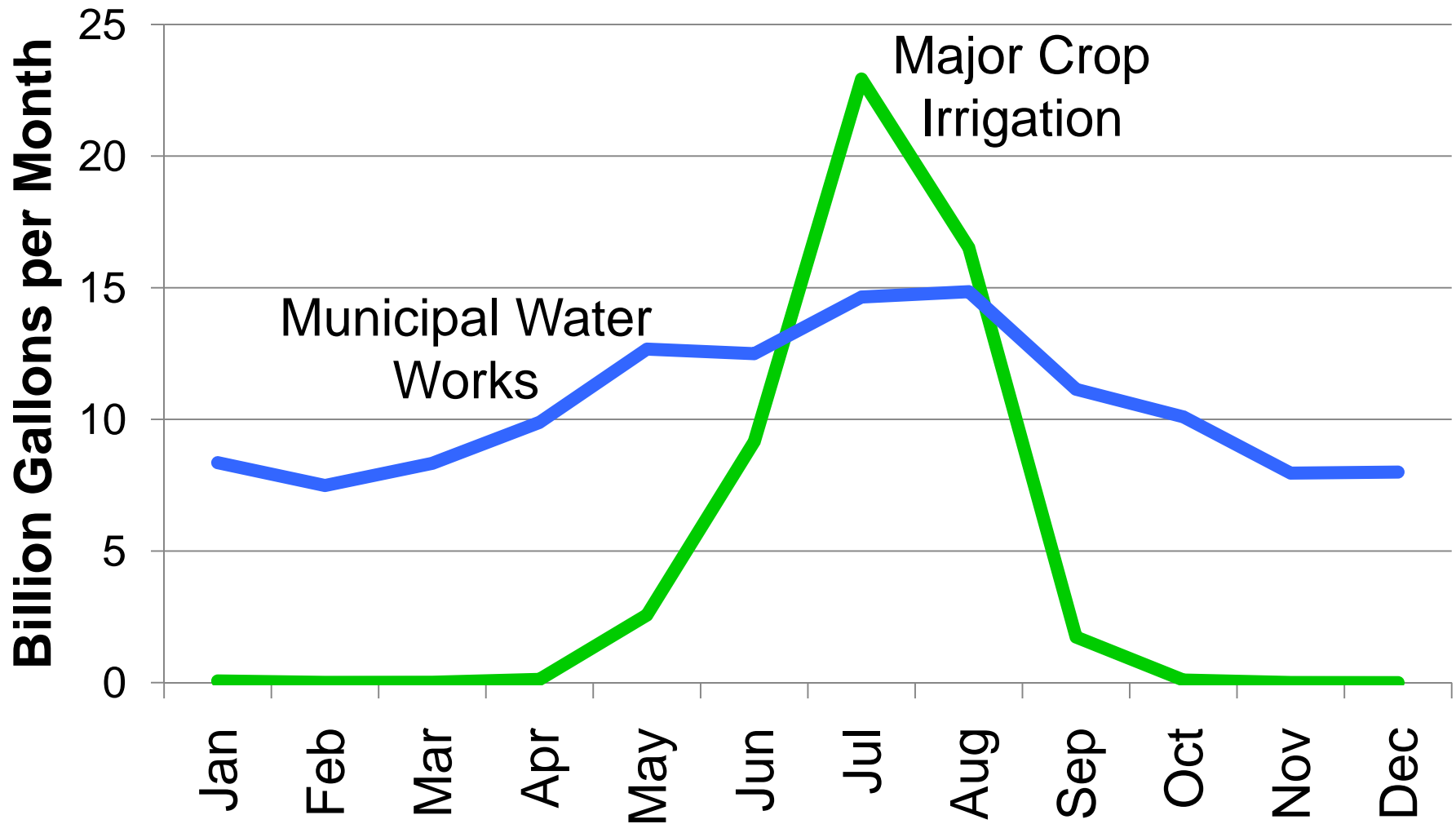


# Additional Information

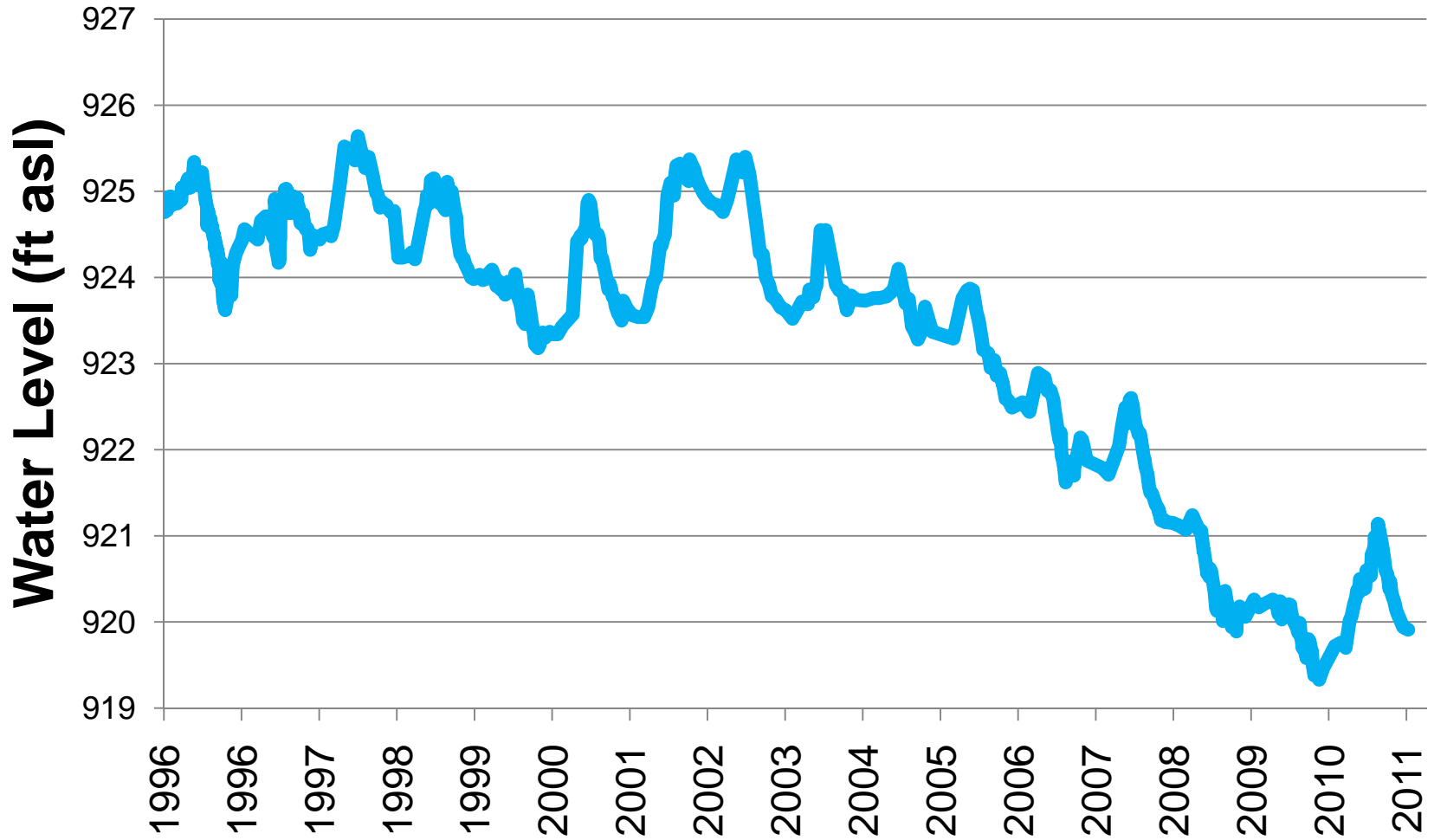
# Water Use is Increasing



# Seasonal Patterns Shape Options



# White Bear Lake Level



# Groundwater Pumping in Surrounding Communities

