Waukesha Water Utility

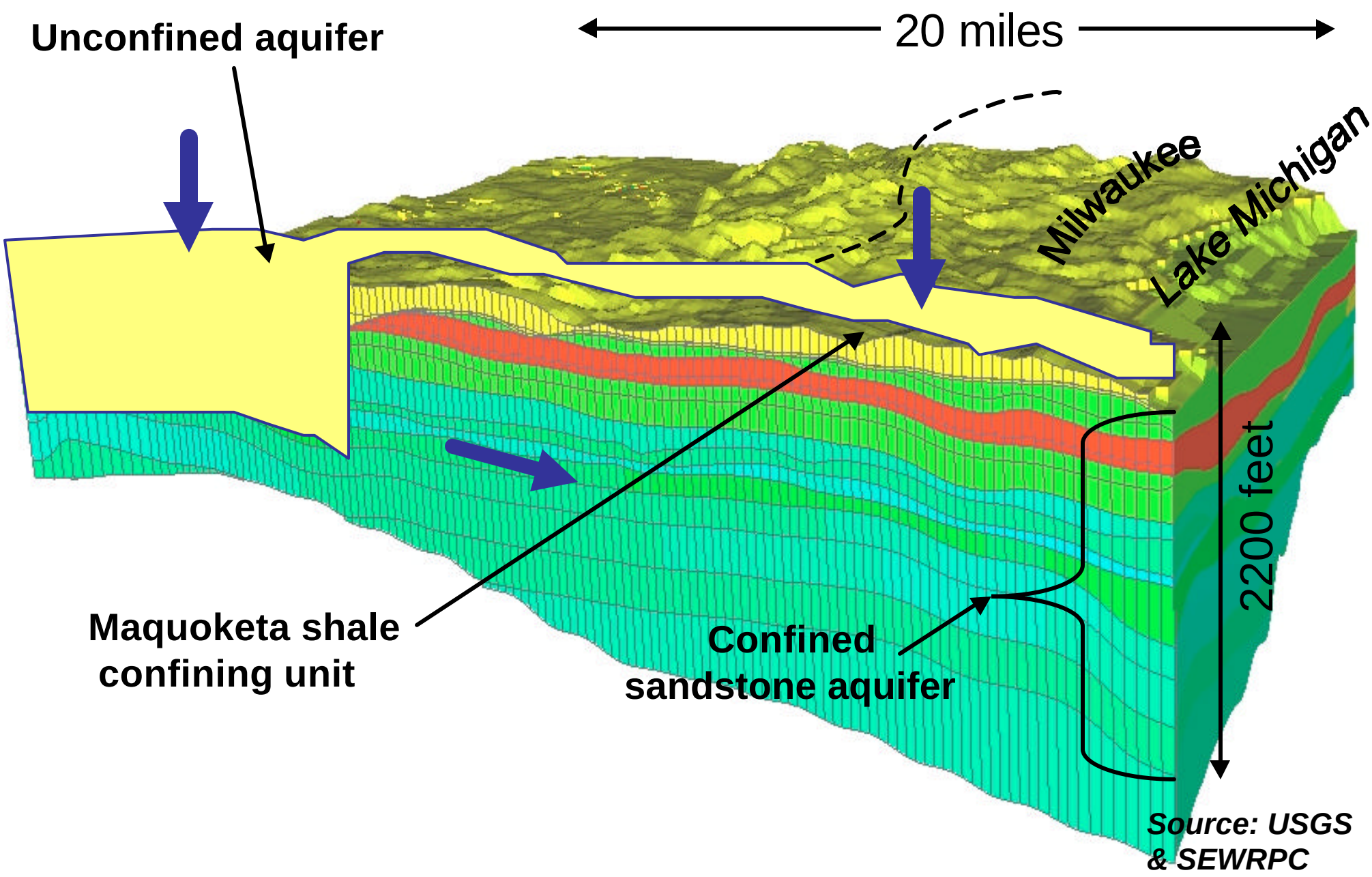
Preliminary Draft of Great Lakes Application

October 12, 2009

History of Water Supply Issue

- Future Water Supply Study – 3/2002
- SEWRPC Study – 9/2005 to present
- City of Waukesha Public Presentations
  - Long Term Water Strategy - 11/2006
  - Water Options Analysis – 2/2007
  - Great Lakes Option Discussion – 1/2009
    - Peter Annin
    - DNR
- Numerous Individual and group Meetings
  - Environmental Groups
  - Business Community
- Reponses to Questions Submitted By Environmental Consortium
  - 50 page Q&A Document
- Legislative Council Committee and Hearings
  - 175 page Compact Implementation Bill
- Participated in Groundwater Advisory Committee

General Hydrogeology of Southeast Wisconsin



Relative well depths

tallest buildings: ~600 ft high

domestic wells: 100-300 ft deep

dolomite

most municipal wells: ~200-800 ft deep

shale

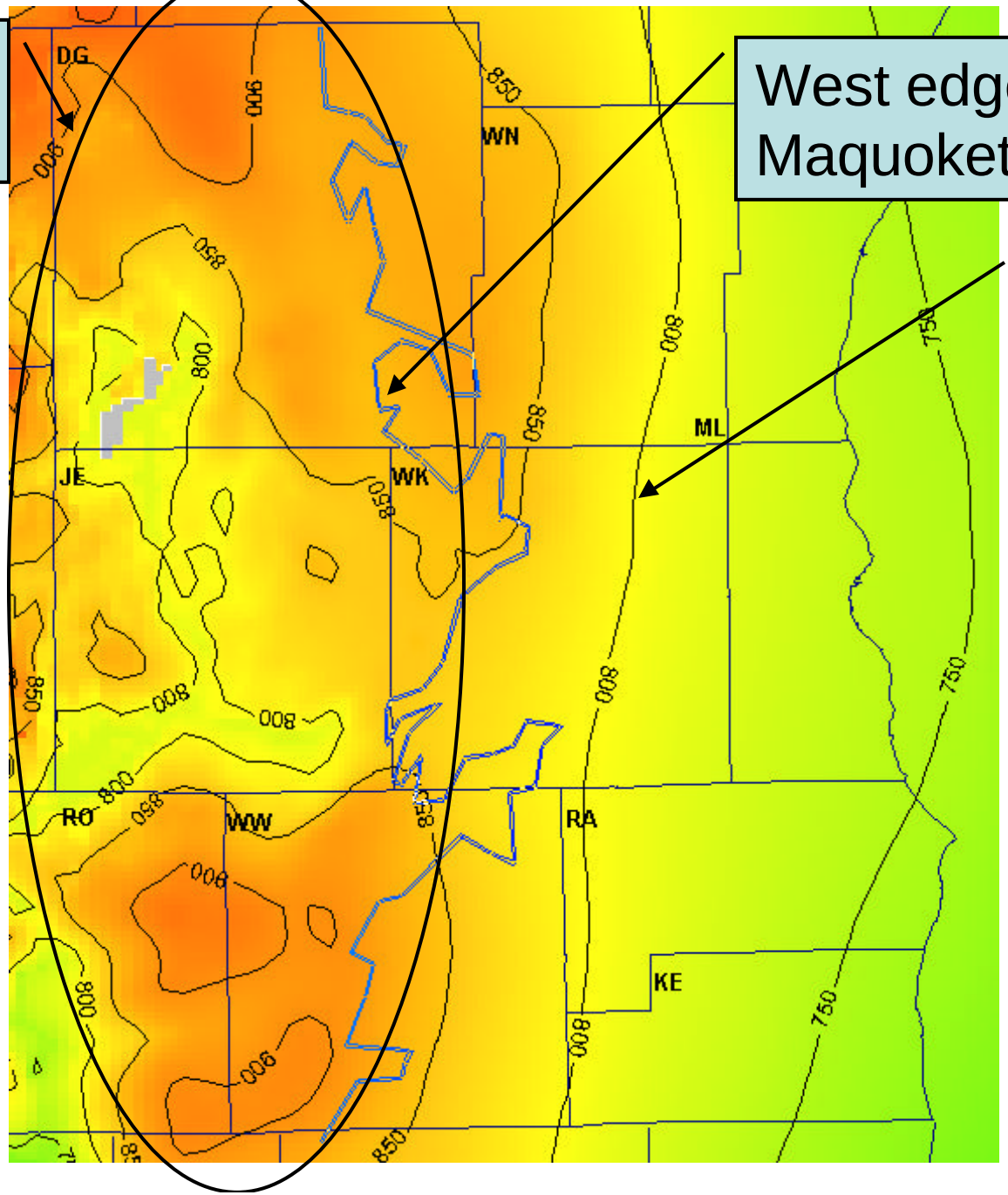
sandstone

deepest wells: ~2200 ft deep
(municipal wells in SE WI)

granite

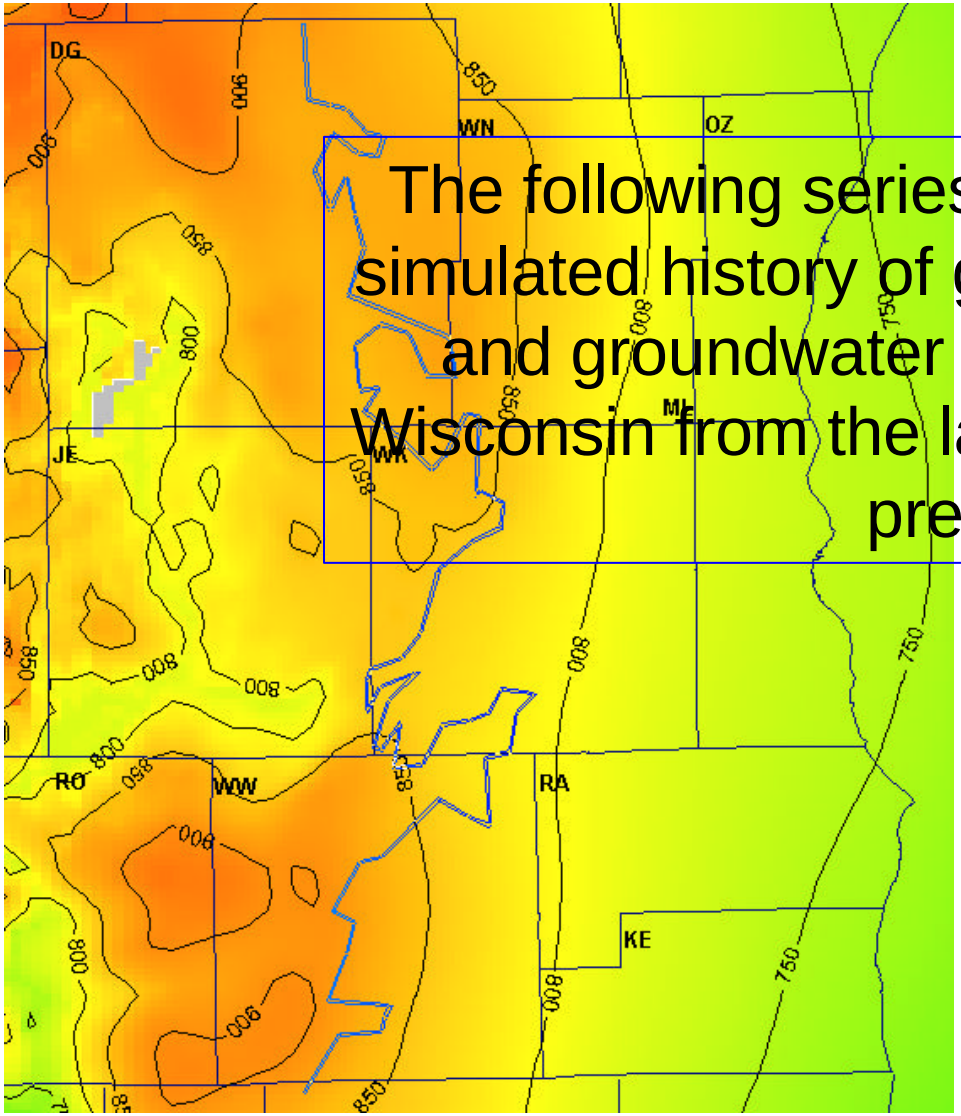
Simulated deep water levels through time

unconfined area

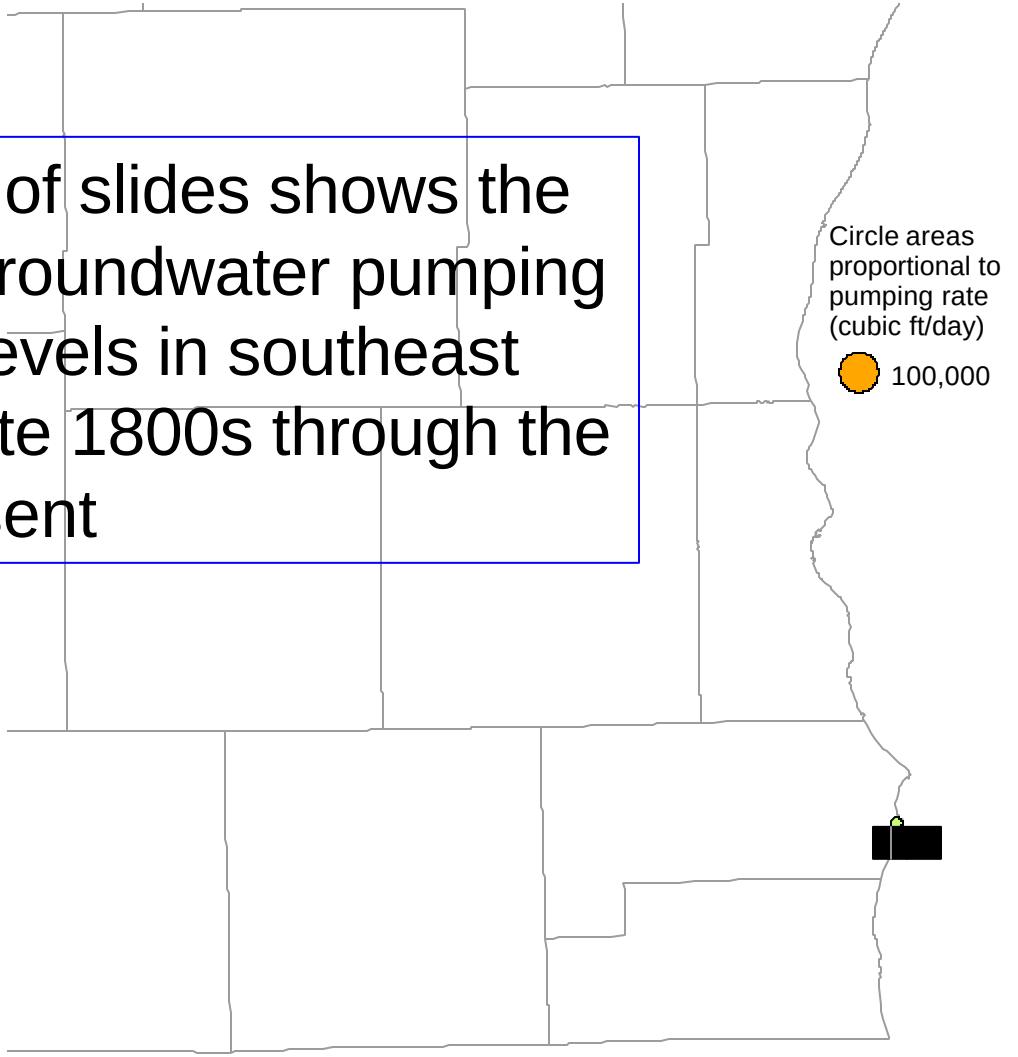


West edge of Maquoketa Shale

water elevations in deep sandstone (feet above sea level)



The following series of slides shows the simulated history of groundwater pumping and groundwater levels in southeast Wisconsin from the late 1800s through the present

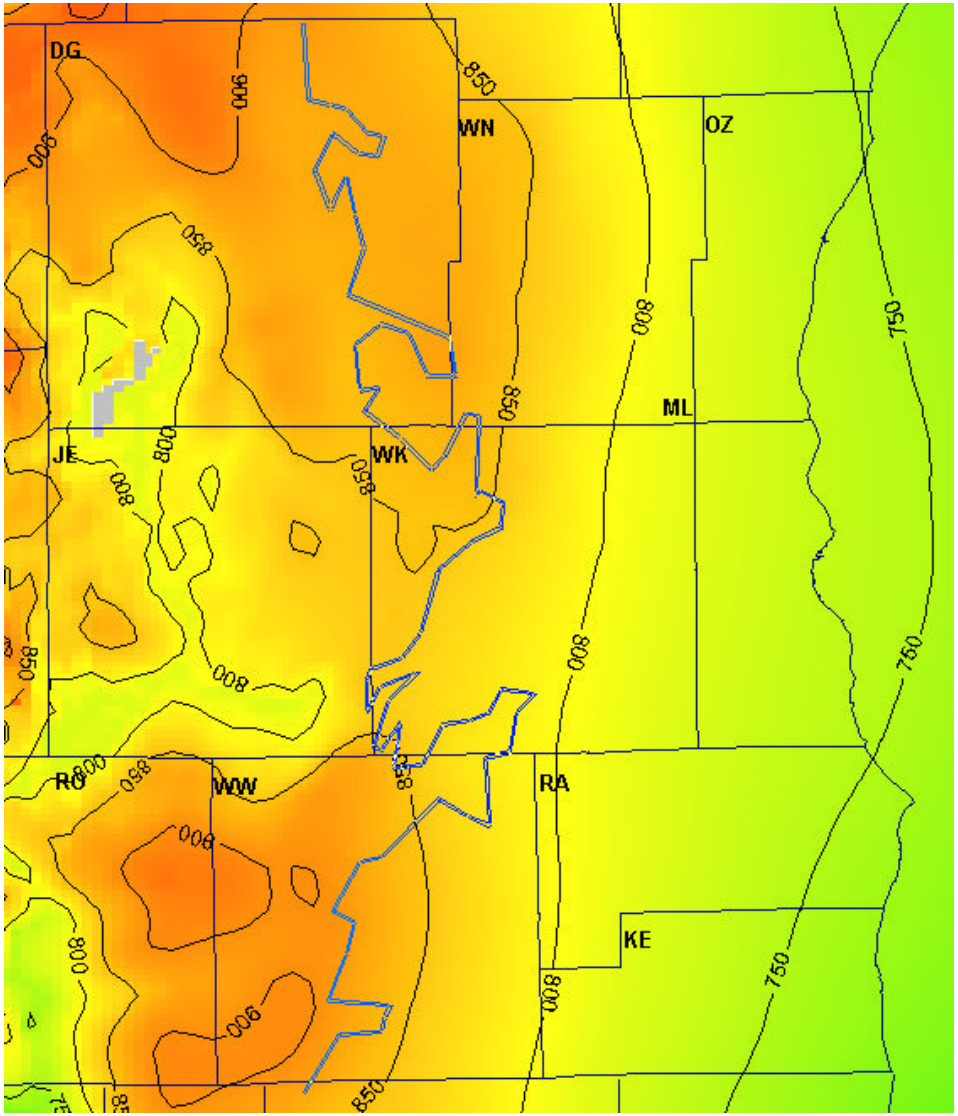


Water Levels in the Sandstone Aquifer
(feet above sea level)

Well Locations and Pumping Rates

Shallow Deep

Pre-1864



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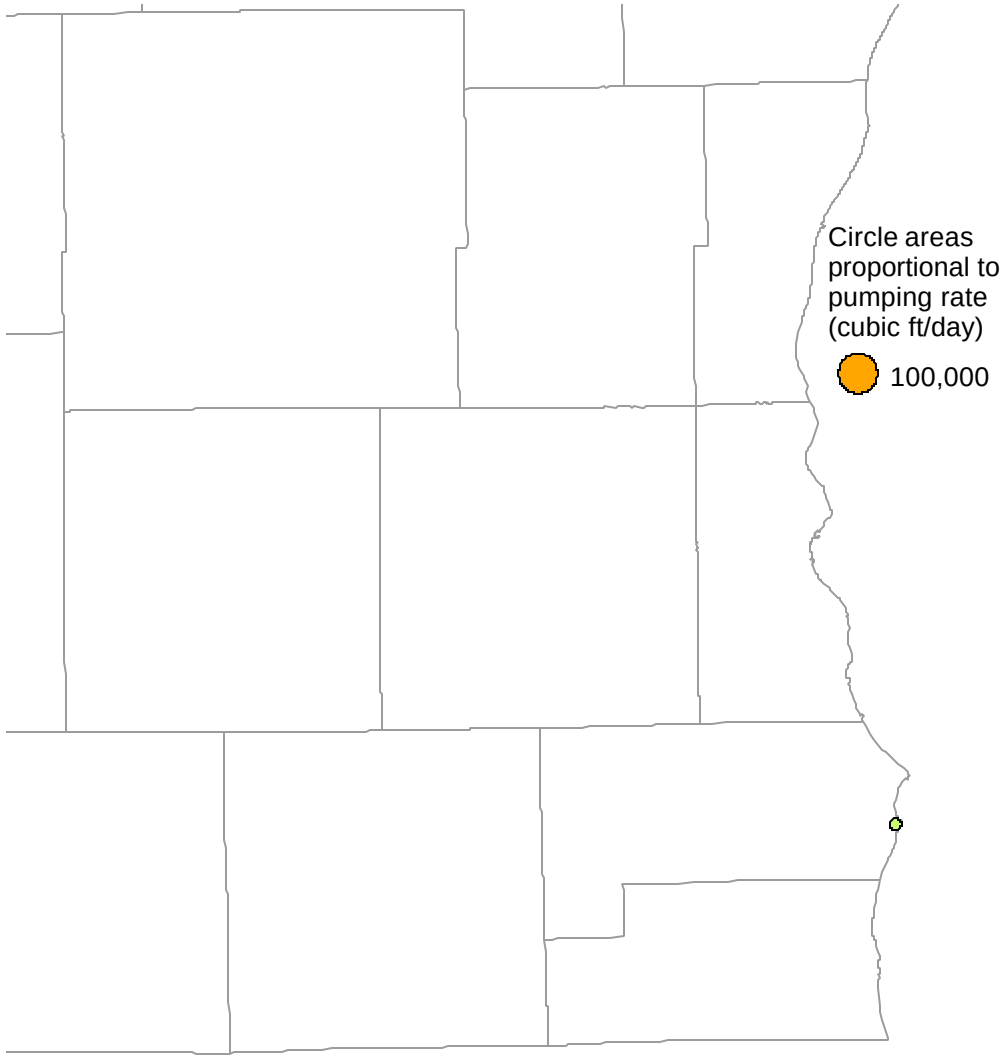
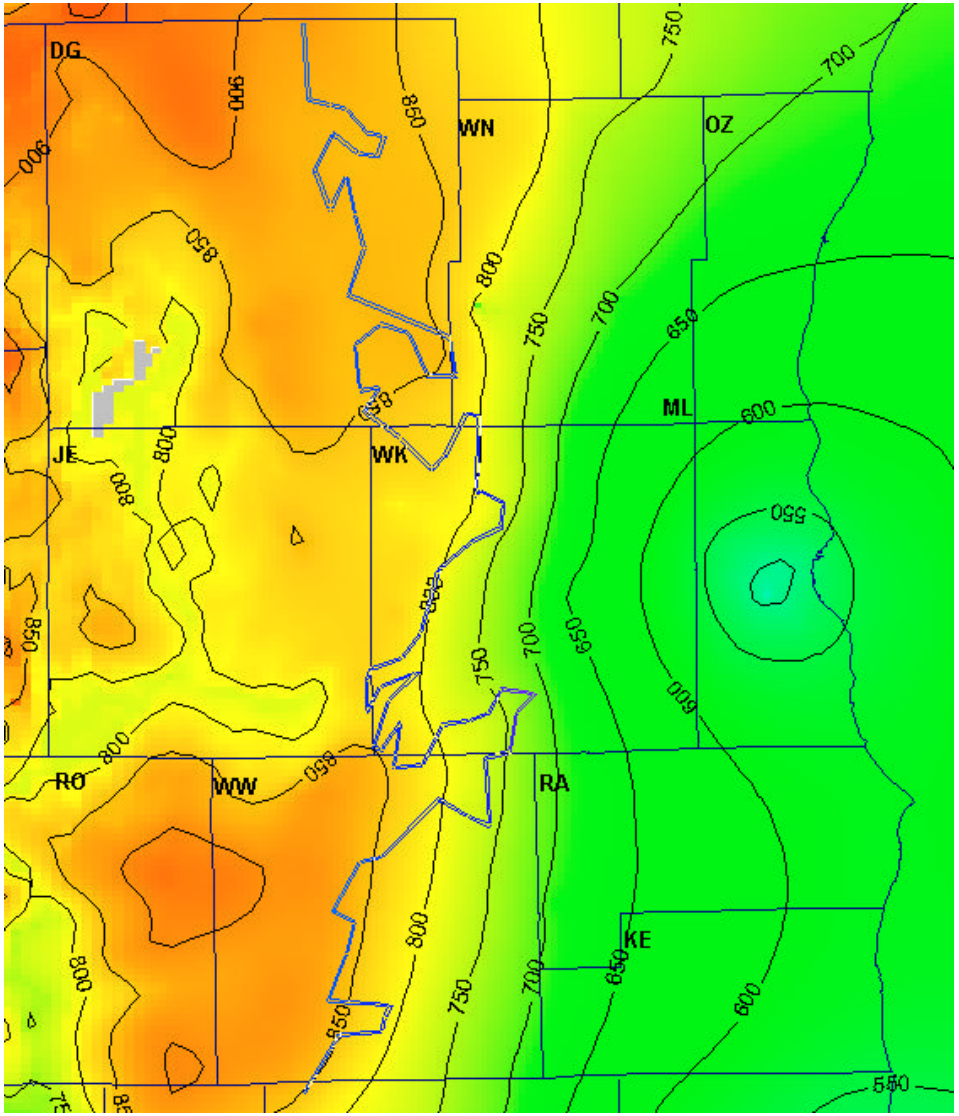


Well Locations and Pumping Rates

Shallow Deep

1864-1880



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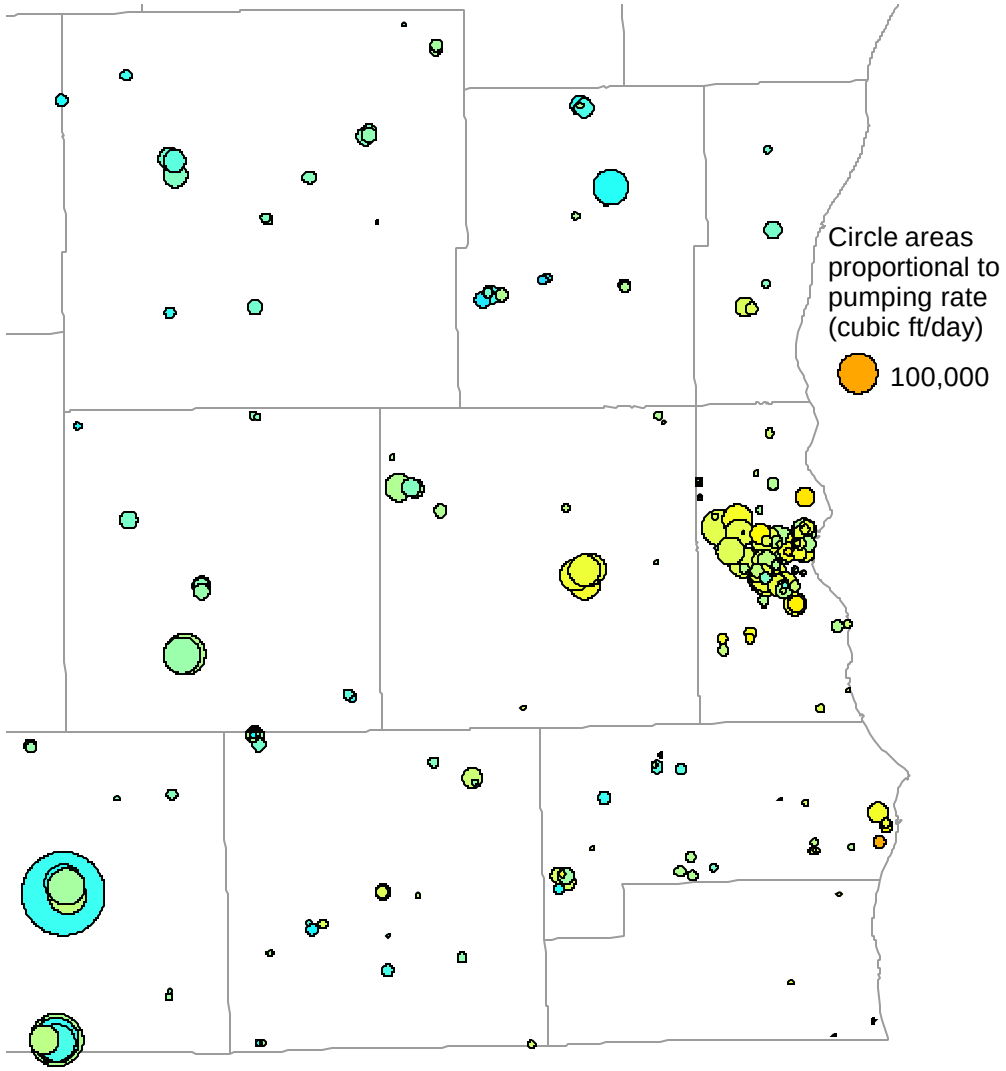
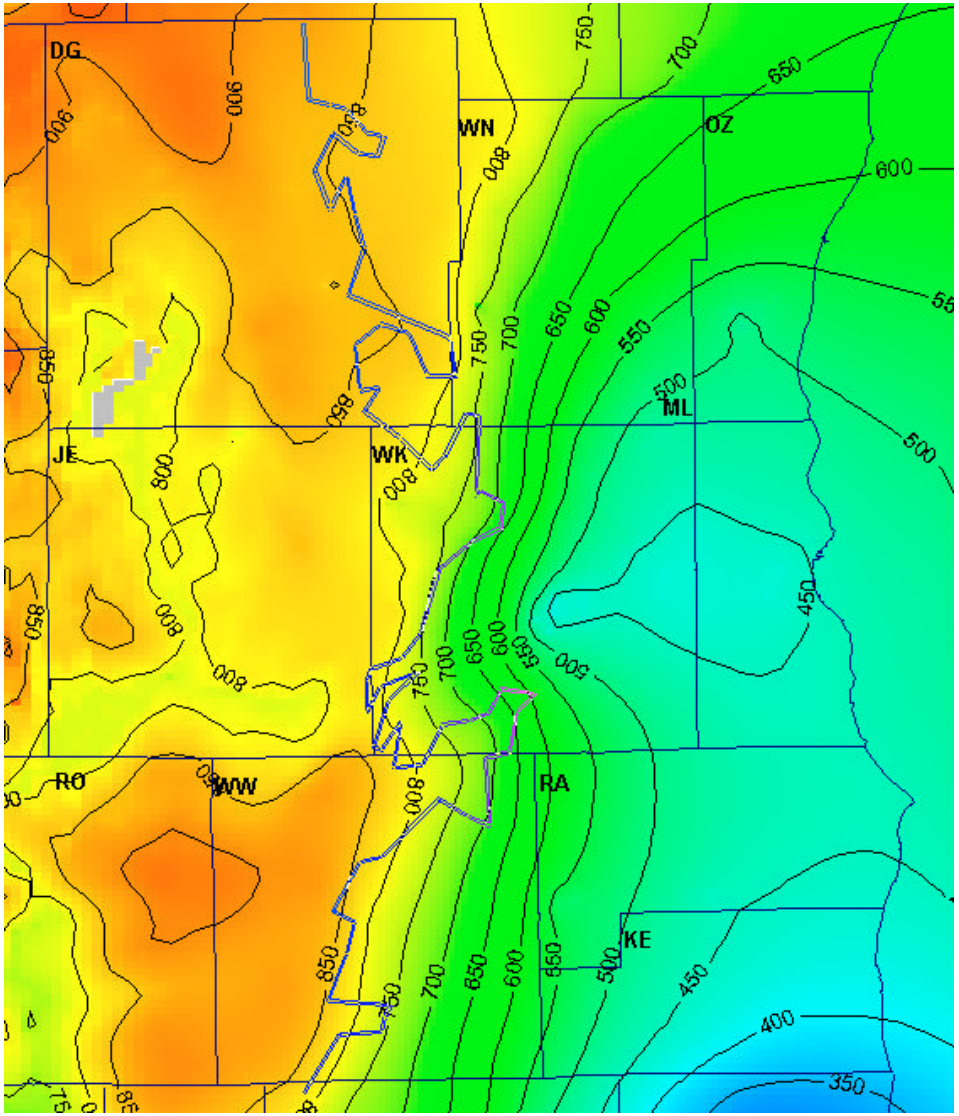


Well Locations and Pumping Rates

Shallow Deep

1940-1945



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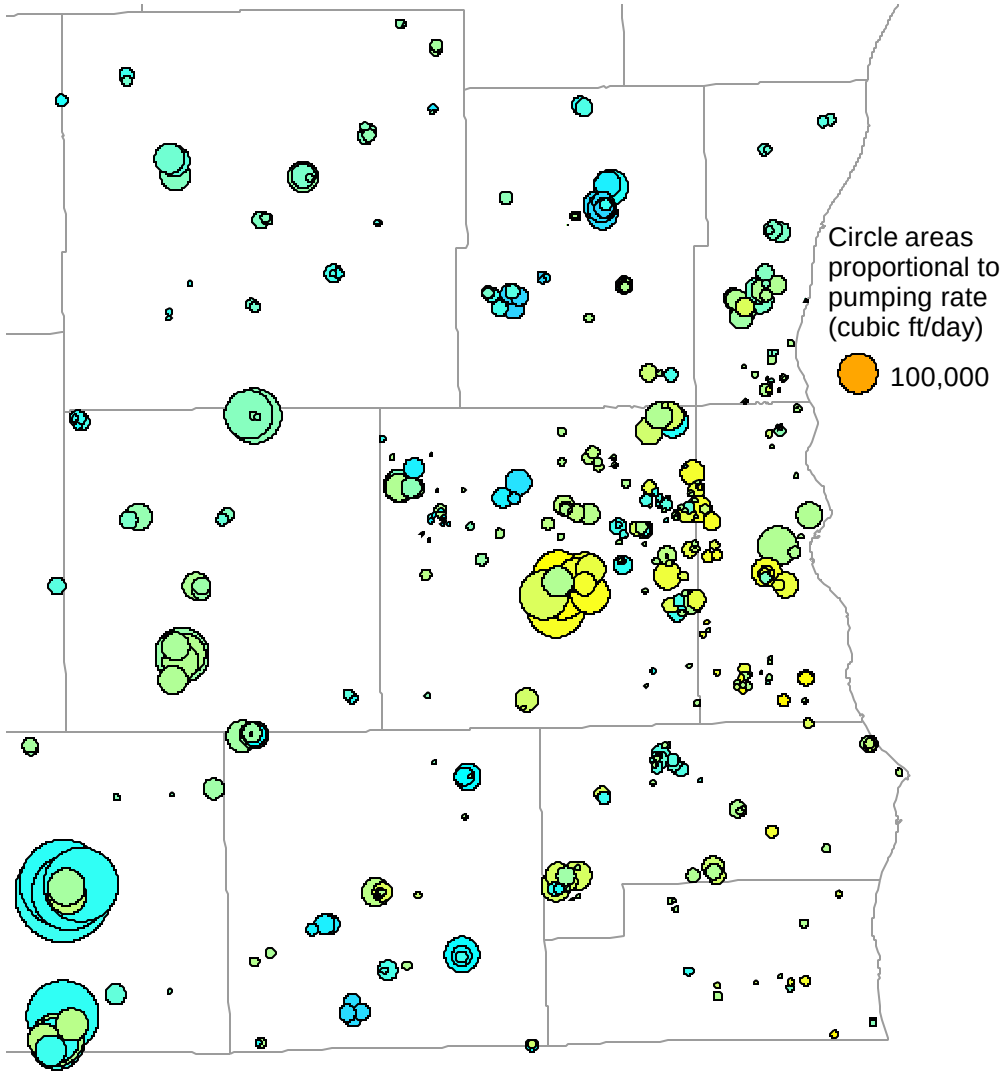
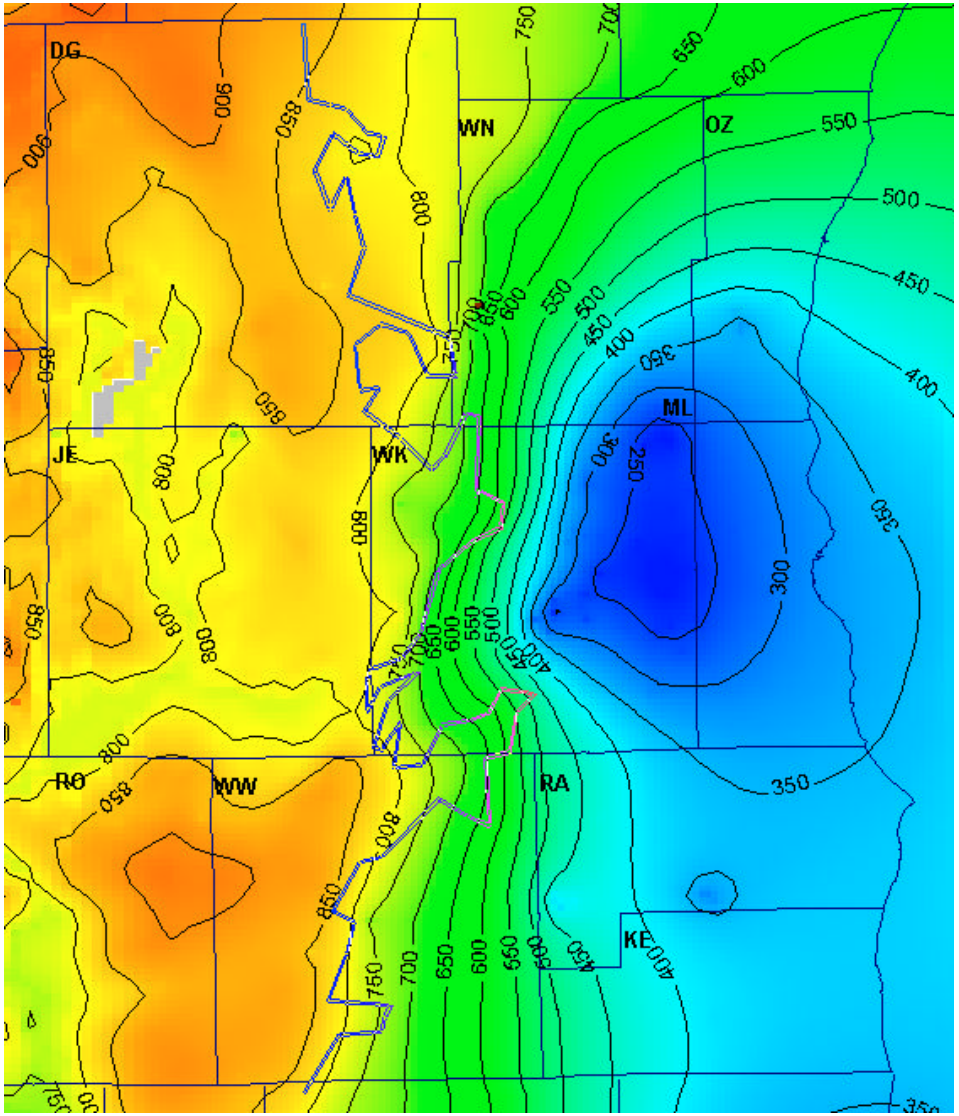
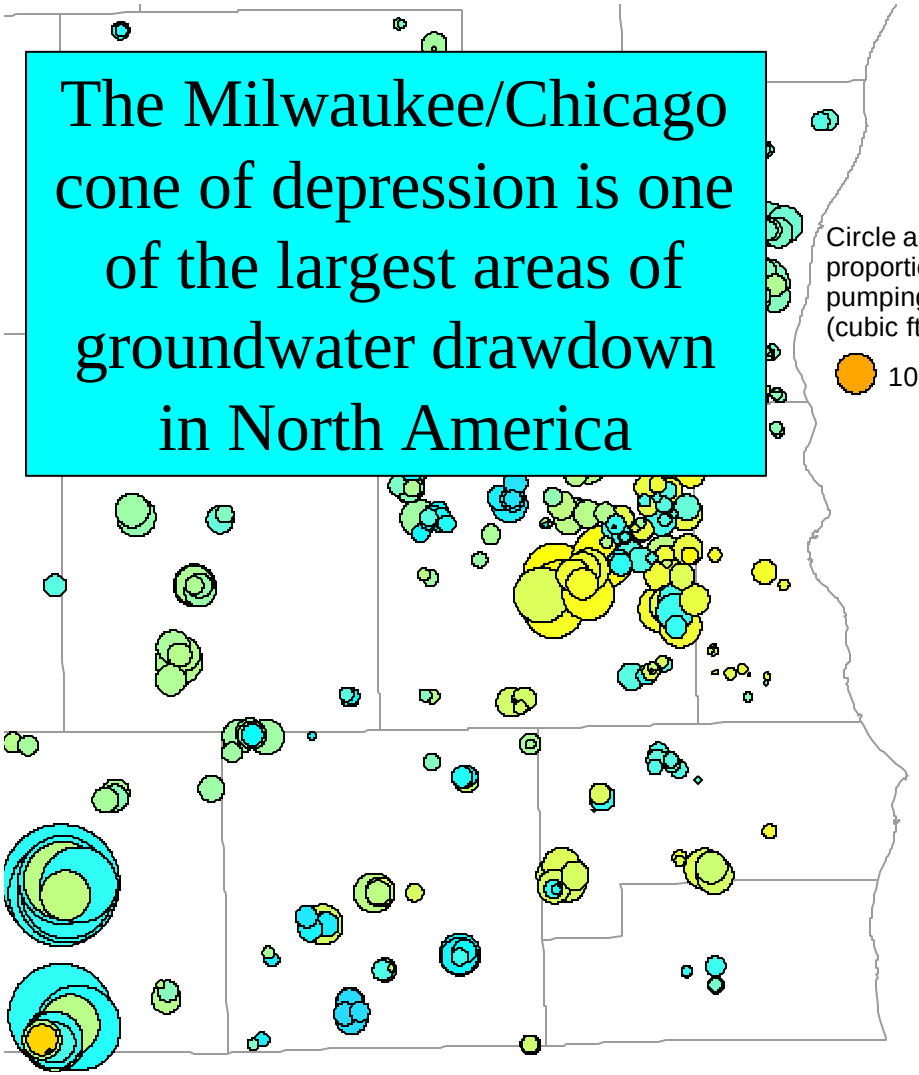


Well Locations and Pumping Rates

Shallow Deep

1970-1980





Water Levels in the Sandstone Aquifer (feet above sea level)

Well Locations and Pumping Rates

Shallow Deep

2010-2020

Issues in Waukesha

- Current Water Supply
  - Radium Consent Order
  - Other Contaminants and Quality Issues
  - Impact on Surface Waters
- Long Term Water Supply
  - Develop New Supply
- Conservation Alone Will Not Resolve the Issue

Steps in the Process

- Study of Water Supply Alternatives
- Service Area Definition
- Population Projections
- Water Supply Needs

Future Water Supply Study

- Initiated in 2001
- Completed in March 2002
- Consultants
  - CH2M Hill
  - Ruekert/Mielke
- Recommendations
  - Great Lakes Water
  - Well Water West or South of the City

Future Water Supply

- Various Groups Represented
  - City of Waukesha
    - Vince Moschella
    - Paul Feller
    - Peter Conine
  - DNR
    - Lee Boushon
    - Frank Fuja
    - Tony Ratarasarn
  - SEWRPC
    - Bob Biebel
  - USGS
    - Jim Krohelski
  - Wisconsin Geological Survey
    - Ken Bradbury
  - University of Wisconsin Madison
    - Dr. Ken Potter

Future Water Supply

- Criteria
  - Reliability
  - Sustainable
  - Cost Effective
  - Environmentally Sound
  - Protects Public Health
  - Infrastructure
  - Operations & Maintenance

Base Alternatives

Water Source	Primary Reason for Screening Out
Fox River	Inadequate year-round supply
Rock River	Inadequate year-round supply
Fox or Rock River Dam	Environmental Issues and public concerns
Waukesha Quarry	Inadequate supply, other uses
Waukesha Springs	Inadequate supply
Pewaukee Lake	Limited supply, adverse environmental impacts
Milwaukee River	Poor quality
Wastewater Reuse	Limited Supply, water quality issues
Milwaukee Wellfield	Political, legal, infrastructure concerns
Dolomite Aquifer	Inadequate supply, limited sites

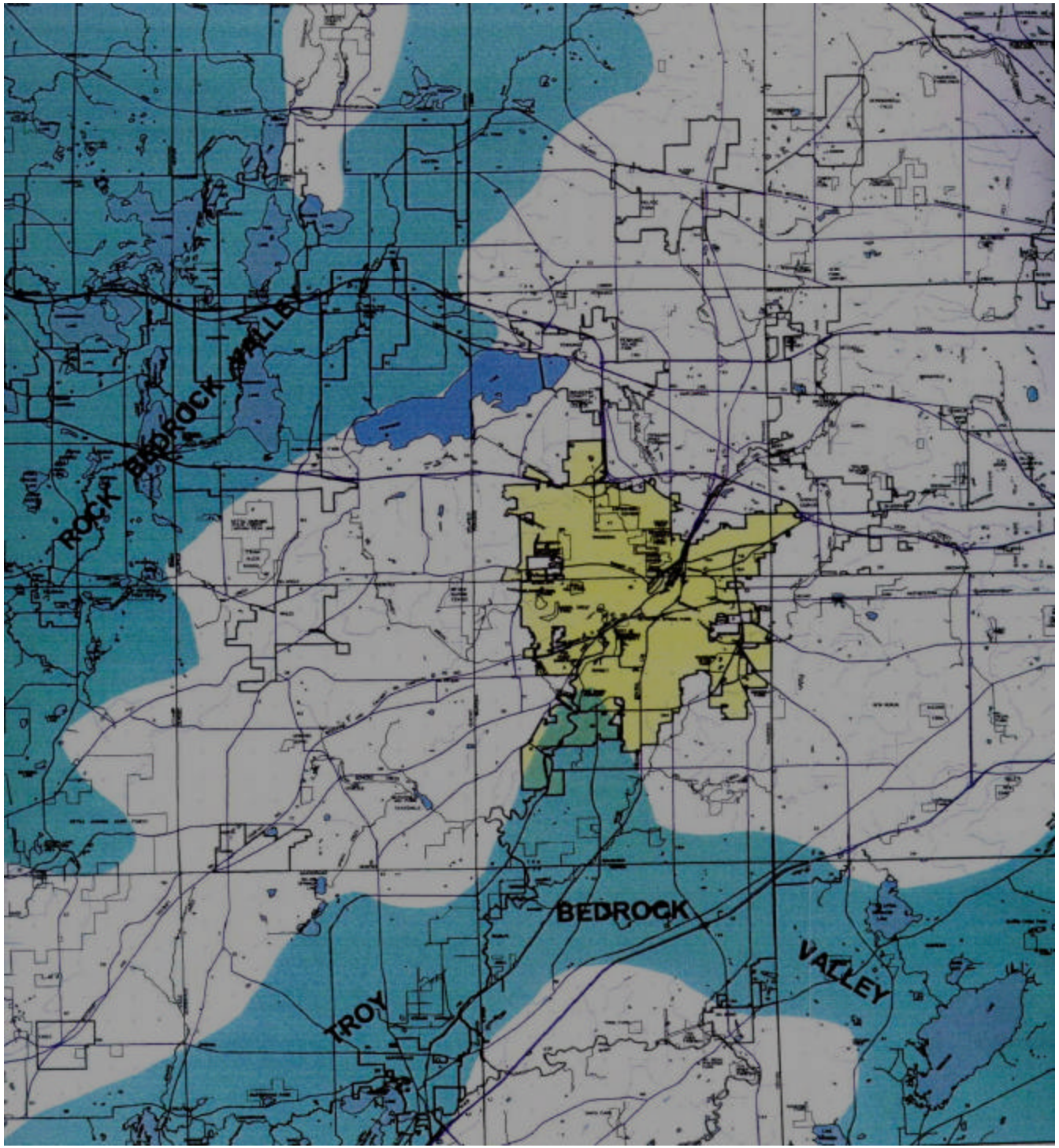
Remaining Alternatives

- Sandstone West Waukesha
- Shallow Wells
  - Troy Bedrock Valley (South of Waukesha)
  - Rock Bedrock Valley (West of Waukesha)
- Lake Michigan
  - Best Environmental Option
  - Lowest Cost Alternative

SEWRPC Water Supply Study

(Draft Recommendations)

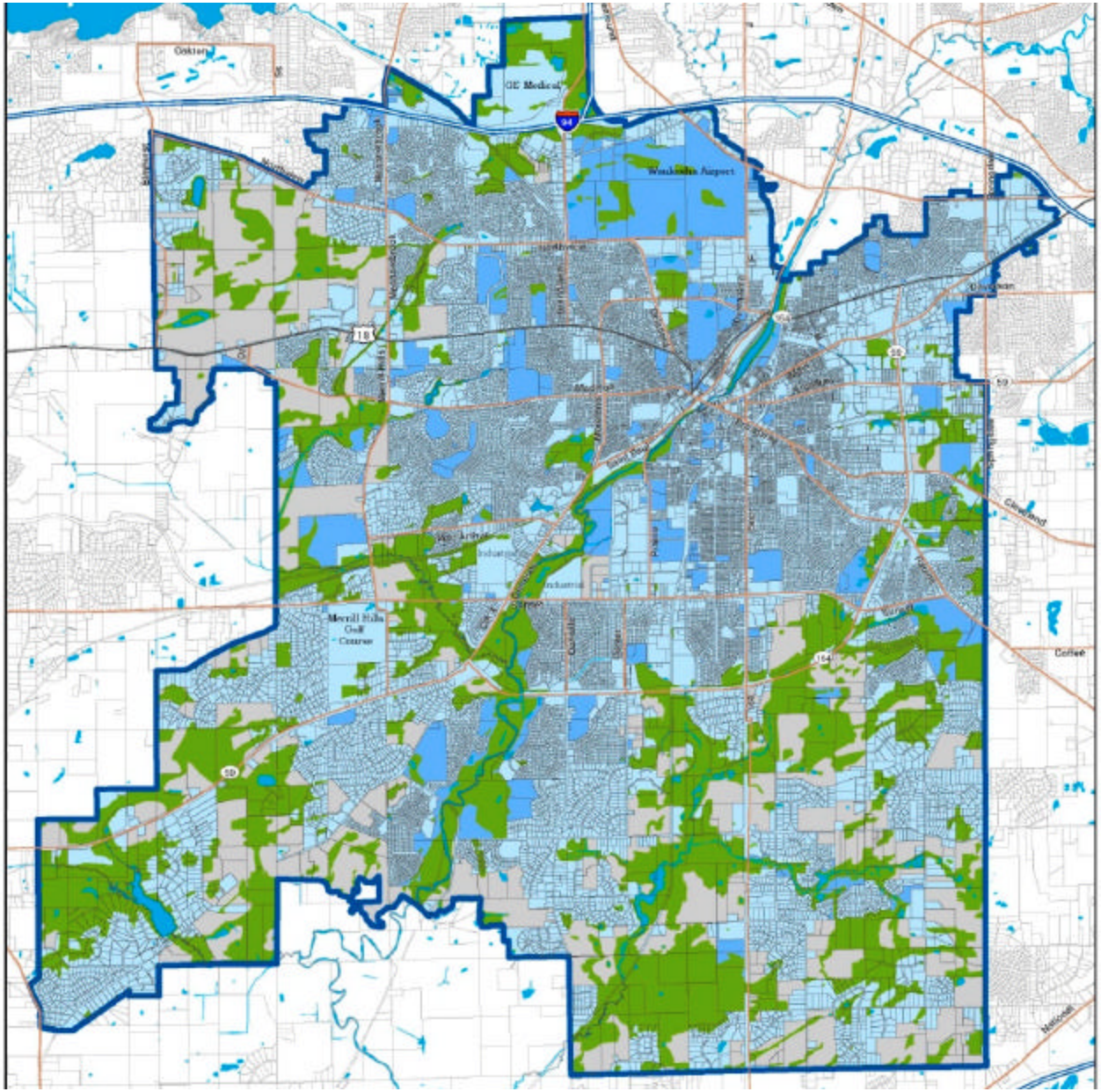
- Preliminary Recommendation
  - City of Waukesha switch to Great Lakes Water Supply
  - Surface Water Impacts – Deep and Shallow
  - Best Environmental Option
    - Recycle and Reuse of the Resource
  - Cost Effective


ROCK
BEDROCK VALLEY
BEDROCK
VALLEY
TROY

Regional Body Determined Service Area

- Required under 2007 Act 227
- Request to Regional Body
  - Letter to SEWRPC dated August 8, 2008
- SEWRPC Response
  - Area defined in Report dated December 23, 2008

Water Supply Service Area



Population Projections

- Request to SEWRPC
  - Determine Ultimate Population for Service Area
    - Request made by Steve Crandell on February 16, 2009
- Response from SEWRPC
  - Received March 17, 2009
  - Projected Population 97,400 at Build-Out
    - 2000 Population within Service Area – 75,500
    - Projected 2028 Population within Service Area – 85,800
    - Projected 2035 Population within Service Area – 88,500

Water Supply Requirements

- AECOM study based on SEWRPC Projections
- Developed a Minimum and a Maximum for Average Day Demand and Maximum Day Demand
- Recommended Request for 18.5 MGD Maximum Day Demand at Build-Out
  - Limited to a minimal amount of days under build-out conditions
- Less than Previous Projections of 20-24 MGD

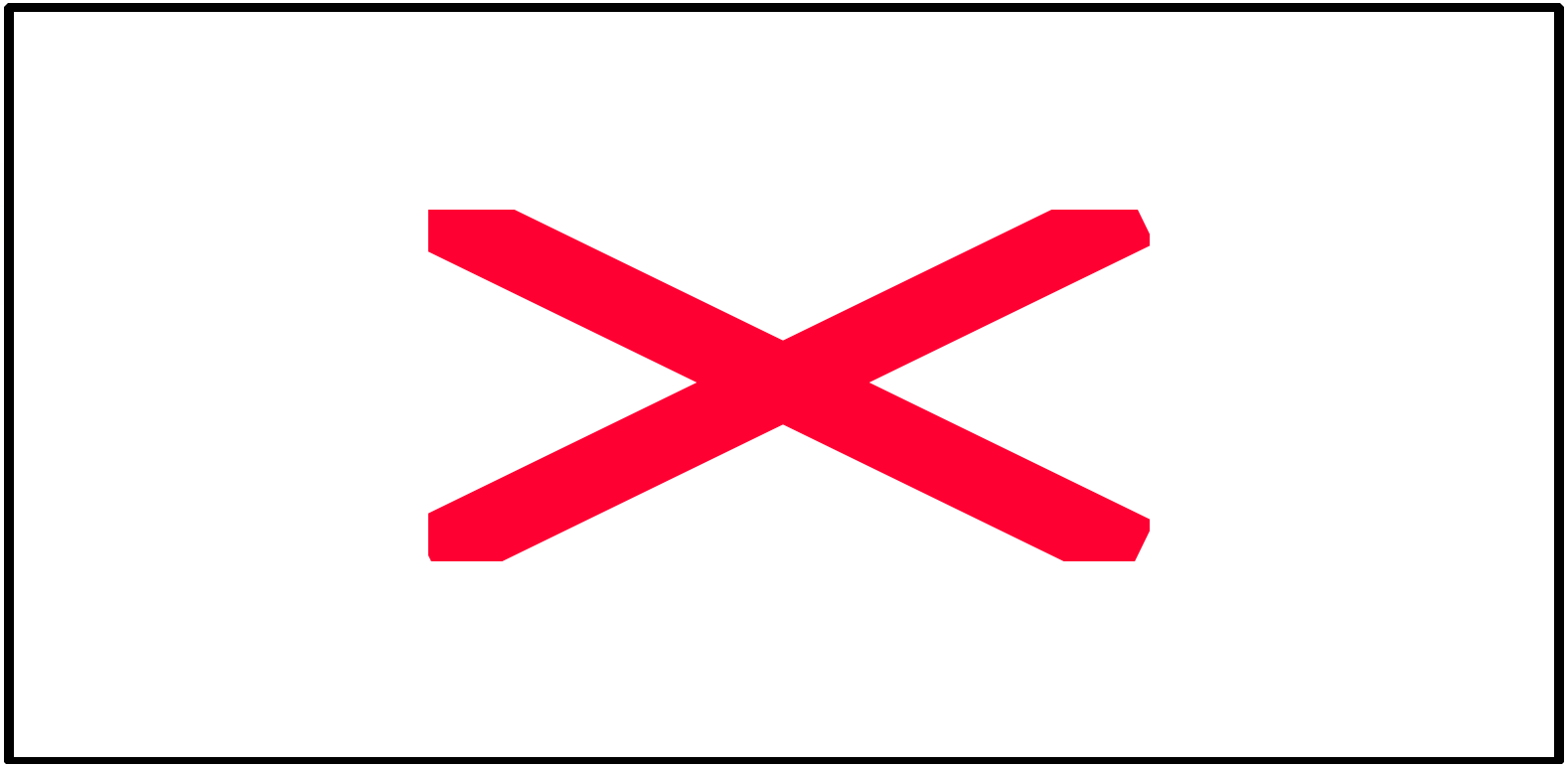
Overall Goals of Water Supply and Return Flow

- Replace current unsustainable water supply with a sustainable supply
- Reduce water use within the water service area
- Return water to Source Watershed in a way that is beneficial to the environment
- Manage return of water to maximize ecological, hydrological, and environmental impacts

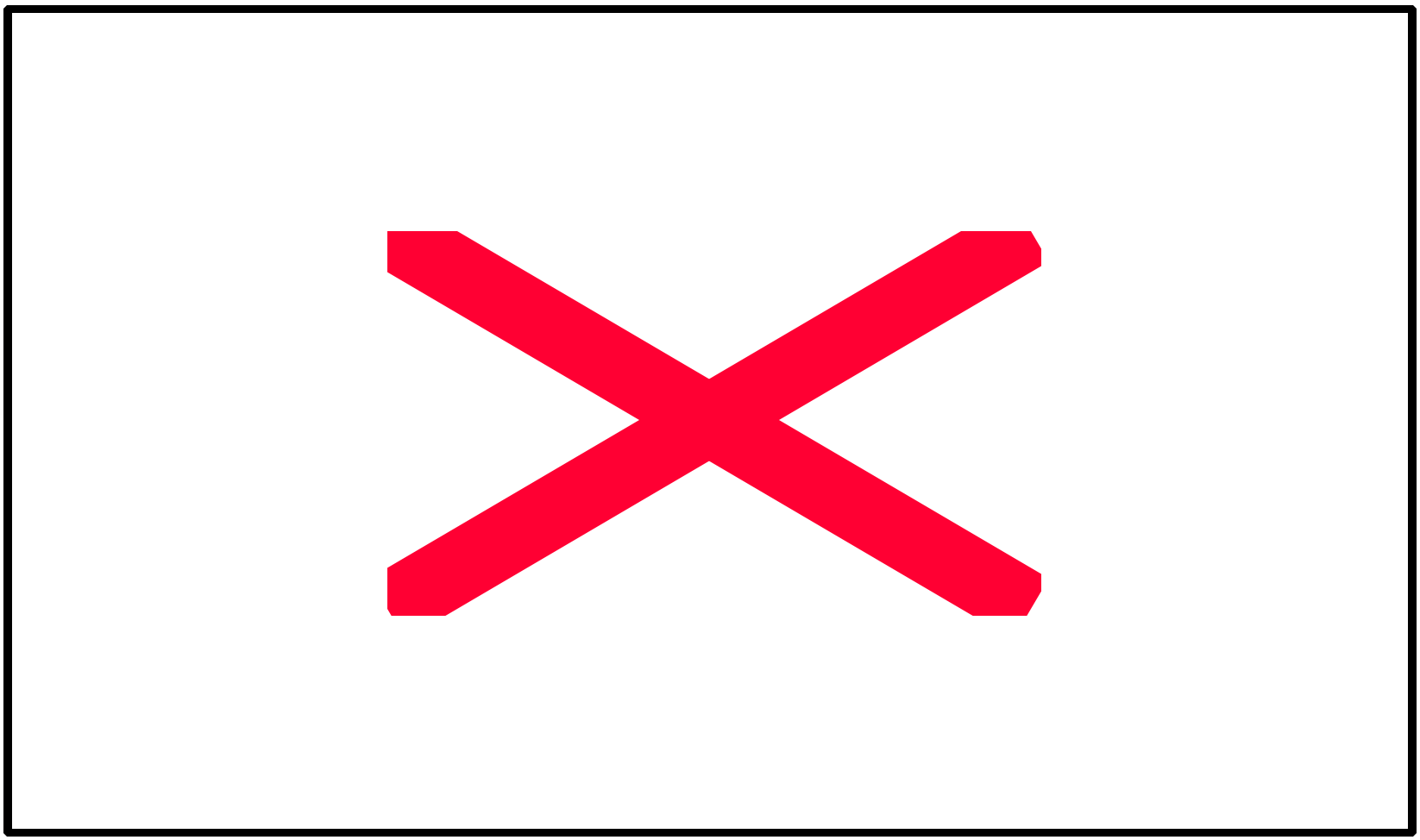
The Waukesha Plan: Effective Water Cycle Management

- What is the water source?
- How is source protected and conserved?
- How is water treated?
- How is water used/conserved within the community?
- How is wastewater treated?
- What is location of return flow?
- How can water be recycled back to the source watershed?
- How can return flow occur in line with receiving water watershed goals and objectives?

The Current Water Use System



Proposed Water Use and Return Flow System



Application Requirements of New Wisconsin Compact Implementation Law

- Application for Lake Michigan Water
- Water Area Supply Plan
- Wastewater Facility Plan Amendment

Water Area Supply Plan

- Service Area
- Utilization of Existing Infrastructure
- City of Waukesha Population and Projections
- Water Use and Water Use Projections
- Water Conservation and Protection Plan
- Sources and Quantities of Water Supplies
- Water Supply Options Analysis
- Permitting Requirements
- Regional Water Needs Assessment

Sourcewater Alternative: Deep Wells

- Continued lowering of the deep aquifer levels
- Increased treatment costs for treating the radium
- Radium disposal
- Potential for increased contaminants and other water quality issues as aquifer levels continue to decline
- Cost of pumping from deeper sources potentially uses more energy
- Sending “old” water elsewhere
- Increased negative surface water impacts

Sourcewater Alternative: Shallow Wells

- Limited long-term water supply
- Draws water from surface waters, reduces base streamflow
  - Local ecology and streams
  - Western Waukesha County wellfield
- Loss of groundwater to Illinois and ultimately the Gulf of Mexico
- Environmental impacts not sustainable in the long run

Sourcewater Alternative: Lake Michigan

- Ample supply and existing pumping capacity from potential providers
- Recycles water back to Lake Michigan through return flow
  - High quality return flow water
  - Can be used to address flow issues on either Underwood Creek or the Root River
    - Optimize Underwood Creek restoration
    - Provide additional flow for Root River hatchery at low flow when hatchery in operation
- Begins the process of recovery of deep aquifer

Water Options Costs (20 Years)

	Capital Cost	O&M $/yr.	Annual Water Softening Costs	Total Cost*
Sandstone Alternatives				
Sandstone West of Waukesha	$116,000,000	$2,500,000	$2,200,000	***$176,000,000***
Shallow Aquifer Alternatives				
Shallow Aquifer	$96,000,000	$3,800,000	$2,200,000	***$145,000,000***
Lake Michigan Alternatives				
Lake Michigan	$56,000,000	$5,300,000		***$116,000,000***

*** Indicates Net Present Value**

Reasonable Water Supply Alternative

"Reasonable water supply alternative" means a water supply alternative that is similar in cost to, and as environmentally sustainable and protective of public health as, the proposed new or increased interbasin transfer and that does not have greater adverse environmental impacts than the proposed new or increased interbasin transfer.

Wastewater Facility Plan Amendment

- Wastewater facilities plan is limited to infrastructure necessary to return water to the Lake Michigan source watershed.
  - Background information / Existing conditions
  - Possible discharge locations
  - Effluent limitations
  - Alternatives analysis
  - Permitting requirements
  - User charge (fiscal) cost analysis
  - Recommended alternative

Overview of Management Plan Goals

- Manage levels and flows as part of a broader management strategy to:
  - Provide return of water to Lake Michigan
  - Improve flow on receiving stream

Return Flow Options

- Root River
- Underwood Creek
- Lake Michigan (through direct pipe)
- MMSD

General Management Plan

Return average daily seasonal water use back to the Lake Michigan source watershed via a tributary.

No or Partial Discharge

Waukesha WWTP

General Management Plan

Any amount over the average daily seasonal water use discharged to the Fox River

Waukesha WWTP

General Management Plan

When stream is above a two-year stream level, reduce discharge to average day water use minus consumptive use*

Waukesha WWTP

*USGS estimates consumptive use in Midwest is between 10% and 15%

Return Flow Options Costs

(20 years)

	Capital Cost	O&M $/yr.	Total Cost*
Underwood Creek	$22,000,000	$499,000	**$27,500,000**
Root River	$34,000,000	$988,000	**$44,000,000**
Lake Michigan Direct	$58,000,000	$1,500,000	**$75,000,000**

*** Indicates Net Present Value**

MMSD

- According to the SEWRPC Draft Water Supply Study, “the basic reason for this return flow option not being considered further is that the MMSD sewerage system is not sized to convey or treat the City of Waukesha wastewater. Thus, a pipeline from Waukesha to a MMSD sewage treatment plant would be required and treatment plant capacity duplicating the City of Waukesha capacity would be needed.”

Impact of Return Flow for Underwood Creek Option

- Addition of return water to Underwood Creek will not affect sediment transport
- The resulting water depth will enhance fish passage
- No need to change current restoration plans

Water Conservation and Protection Plan

- Deals with full water cycle management
  - Water use
  - Conservation
  - Sourcewater protection
  - Stormwater management
  - Cooperation with neighboring communities
  - Planning and zoning

Waukesha as a Leader in Water Conservation

- Water use reduced by 11% since conservation plan implemented in 2006
  - Daytime sprinkling ban ordinance passed
    - Number of peak days where use is above 10 million gallons per day
    - 2005: 28
    - Since 2005: 1 (and none since July 2006)
  - Approval of first conservation rate structure in Wisconsin
  - City Hall water use declined by 90% since water use analysis and retrofit demonstration project
  - Public Education/Outreach

Rate Structure History

(Single Family Home Example)

Residential

Rate per 1,000 gallons

Gallons	Original Rate
75,000/qtr	$1.95
Next 1,425,000/qtr	$1.83
Over 1,500,000/qtr	$1.61

Residential

Rate per 1,000 gallons

Gallons/qtr	Old Rate	Gallons/qtr	New Rate
		First 10,000	**$2.05**
First 30,000	$1.95	Next 20,000	**$2.65**
Next 10,000	$2.20	Over 30,000	**$3.40**
Over 40,000	$2.70		

Public Education: 2008 Refrigerator Magnets Bill Stuffers

Don't Get Soaked by Overwatering Your Lawn!

City of Waukesha Sprinkling Ordinance

May 1st – October 1st

Odd-numbered addresses - may water on Tuesdays & Saturdays prior to 9 AM or after 5 PM

Even-numbered addresses - may water on Thursdays & Sundays prior to 9 AM or after 5 PM

A hand-held water can, container, or hose may be used at any time to water gardens, trees, or shrubs, if the device is utilized manually and not left unattended.

For questions call 262-521-5272
or visit our conservation website at:
www.ci.waukesha.wi.us/WaterUtility/

Water Education Classes with Waukesha School District

Cooperative Program
Partnered With
Waukesha School District
(Won VIP Award In 2007)

- Began 1990
- 1,000 5th Grade Students Every Year
- They Participate In Outdoor Field Investigation In The Fox River Sanctuary
- They Visit A Water Utility Pumping Station And Learn About Where Their Water Comes From

Conservation Alone Will NOT Solve the Problem

- It is Part of the SOLUTION!

NEXT STEPS

- Further Studies On Return Flow
- Future Meetings

THANK YOU!!

QUESTIONS??????

Send written Comments to:

Waukesha Water Utility
115 Delafield Street
Waukesha, WI 53188

Or email to:

contactus@waukesha-water.com