The City of Waukesha Application for Lake Michigan Diversion with Return Flow

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General Manager, Waukesha Water Utility

November 14, 2013

Public briefing overview

- Purpose of the meeting
- Logistics
- Introductions

Agenda

- What has changed
- Waukesha background
- Water needs
- Water supply alternatives
- Return flow
- Summary
- What's next?

What was updated in Application

- Preferred water supplier
- Preferred discharge location
- Water volume request
  - From 10.9 MGD to 10.1 MGD
- Water Conservation Plan
  - To Conform with Wisconsin administrative code NR 852
- Water Supply Service Area Plan
  - To Conform with Wisconsin State Statute 281.348
- Water Supply Alternatives
  - To incorporate additional information requests
- Water Supply Alternative cost estimates
  - Based on additional information and inflation to 2013 dollars

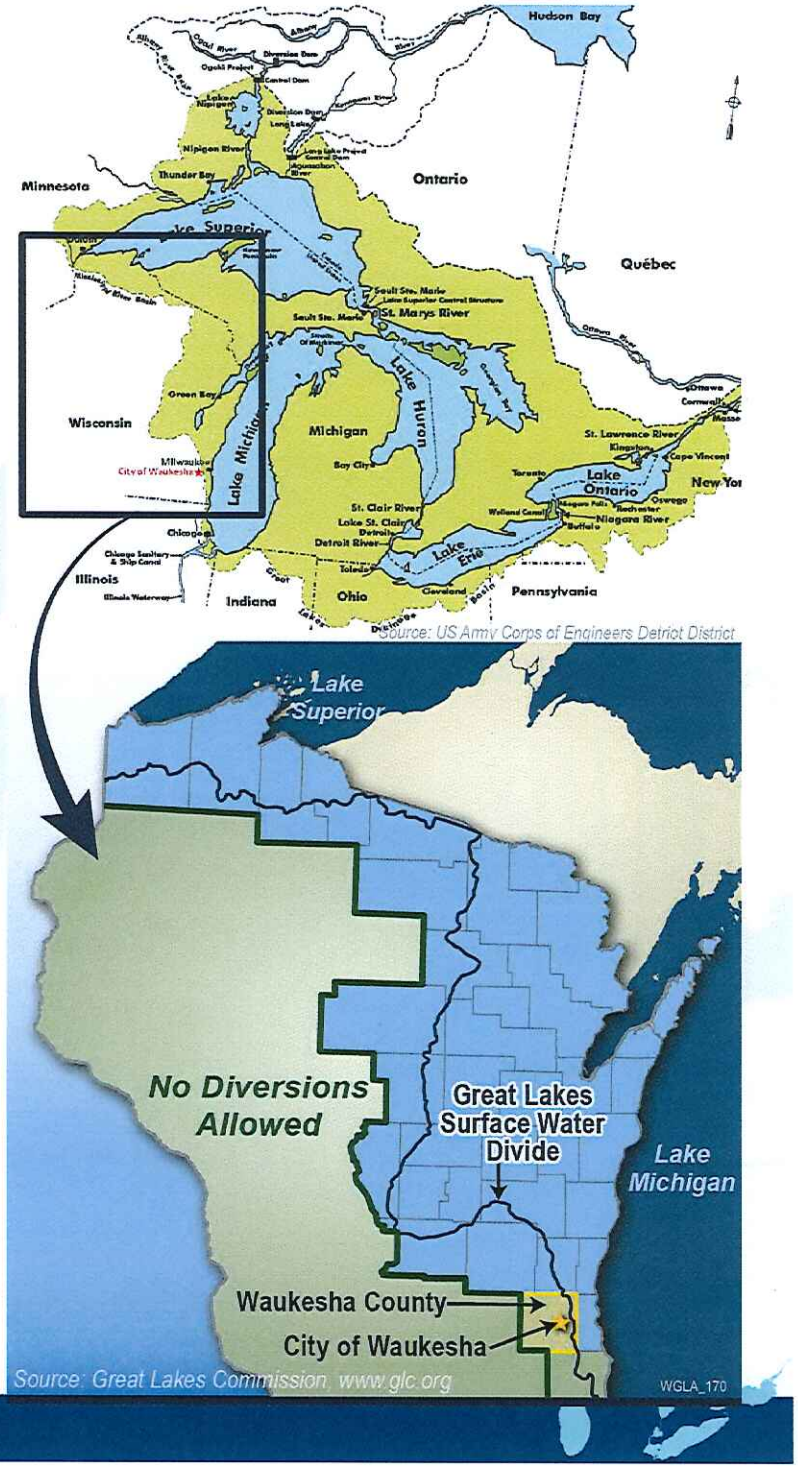
Waukesha Background

Waukesha location

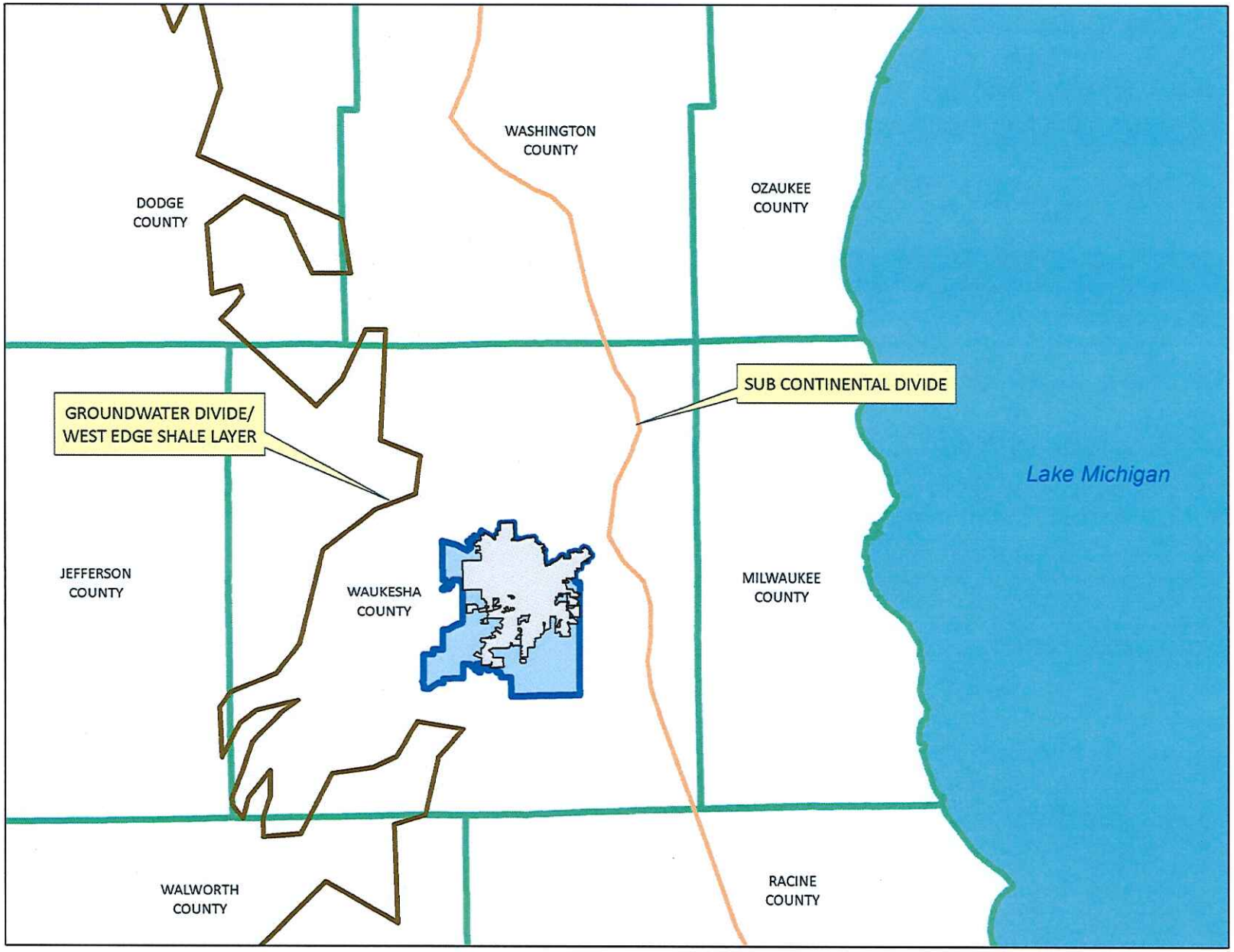
- City of Waukesha is 1.5 miles west of Great Lakes surface water divide in straddling county

Great Lakes Compact – Exceptions to the Diversion Ban

- Straddling community
- Community in a straddling county



About the City of Waukesha



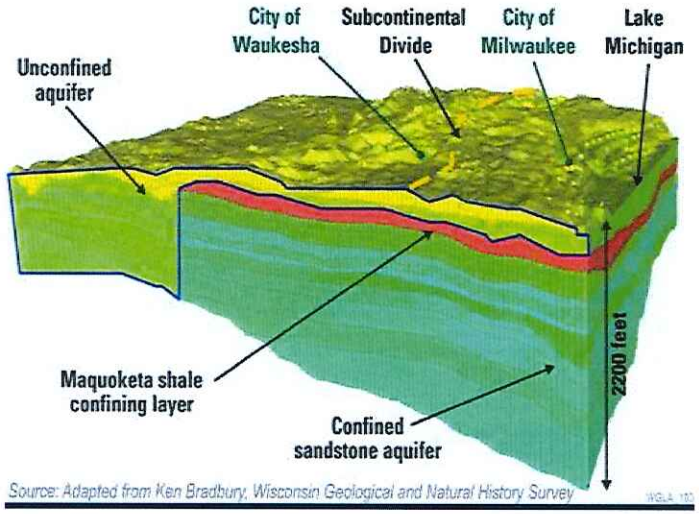
City of Waukesha

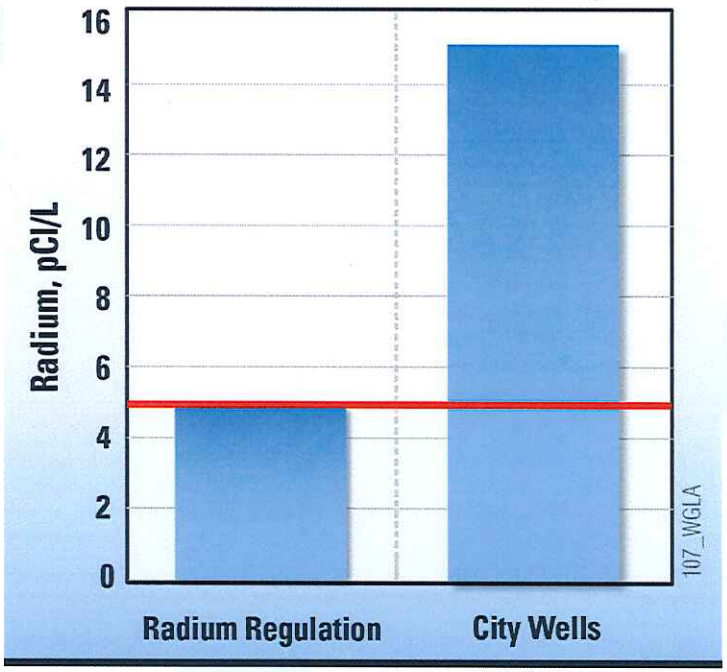
Statistic	2000	2010
Population	64,825	70,718
Demographics		
White	91%	88%
Non-white	9%	12%
Median Household Income	$50,085	$57,001
Population below poverty level	5.9%	10.6%

- 2010 population 70,718
- Urban hub of Waukesha County
- House county services
- Owns/operates transit system

Waukesha needs a new water supply

- Deep groundwater levels are declining (over 400 - 600 ft decline) and capacity decreasing.
- Deep groundwater water quality is getting worse (high radium, salts). Court order to comply with radium by 2018.
- Deep groundwater wells are old (30 to over 80 years). Several are no longer usable.
- Deep groundwater is not sustainable.
- Pumping shallow wells adversely impacts wetlands and streams.
- Even with conservation of existing supplies within the Mississippi River Basin, Waukesha does not have an adequate long-term supply.

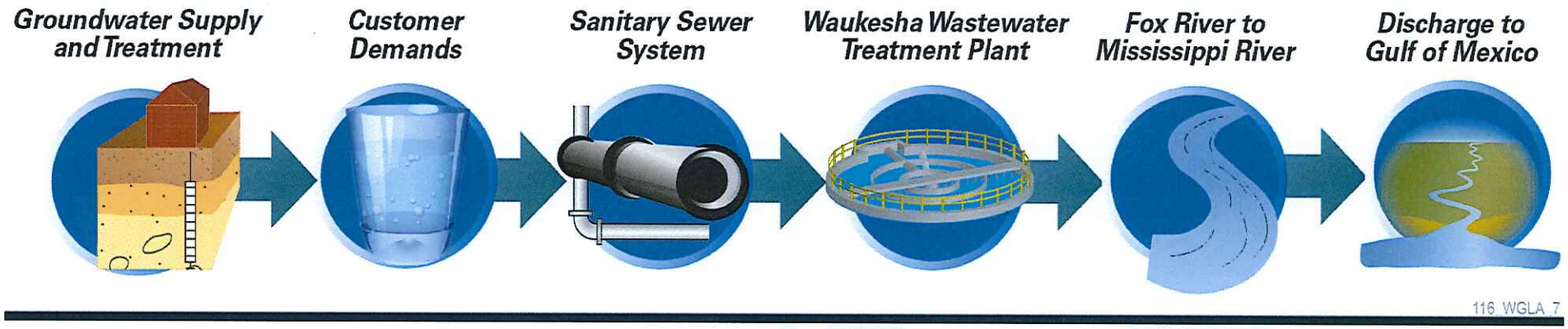




Conserving water makes sense for Waukesha

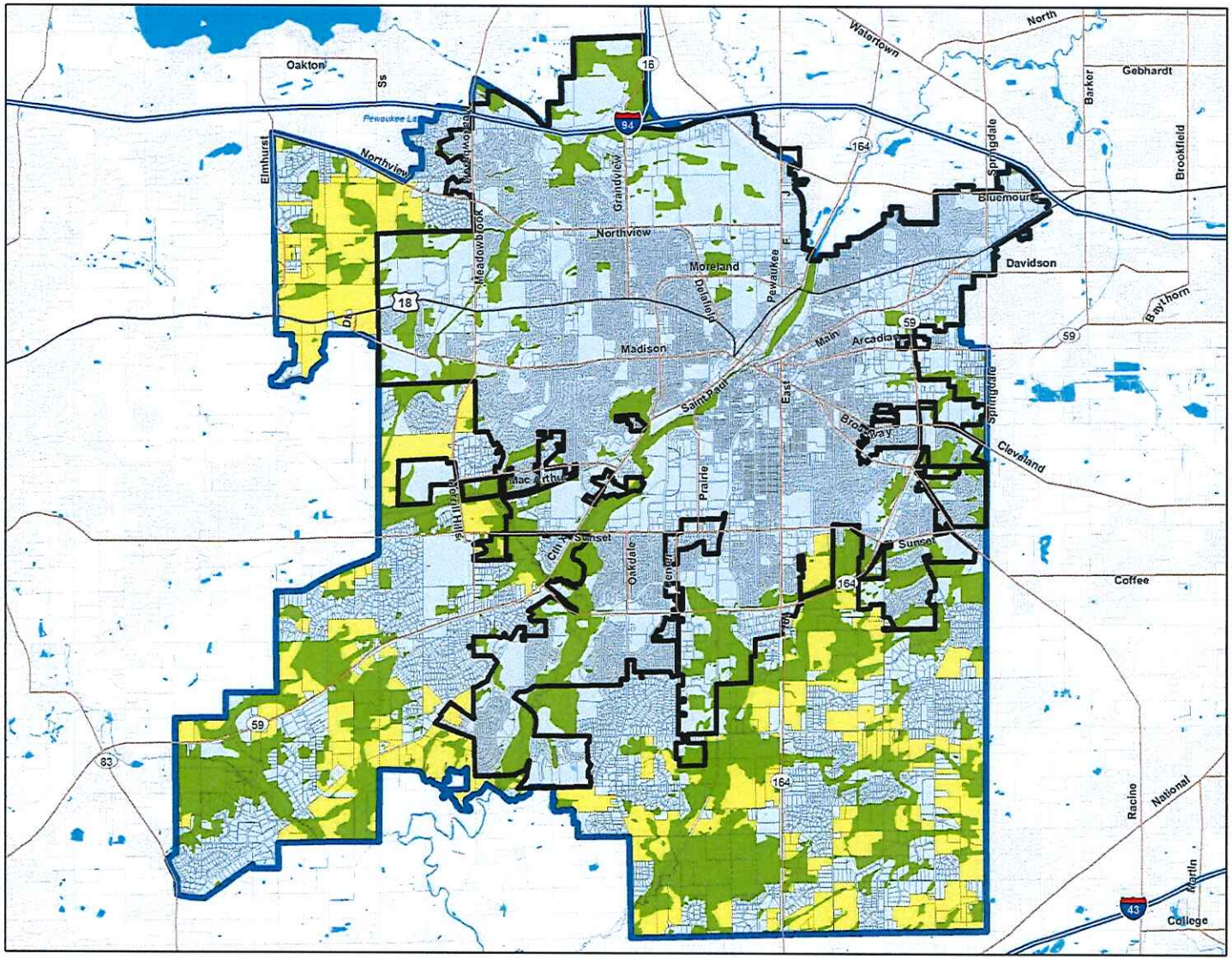
- Outdoor sprinkling restrictions
- Inclining block water rates to encourage conservation
- High efficiency fixture rebates
- Public education and outreach
- Original plan was put into place in 2006 and updated in 2012 to comply with Compact

Waukesha's groundwater supply is not sustainable

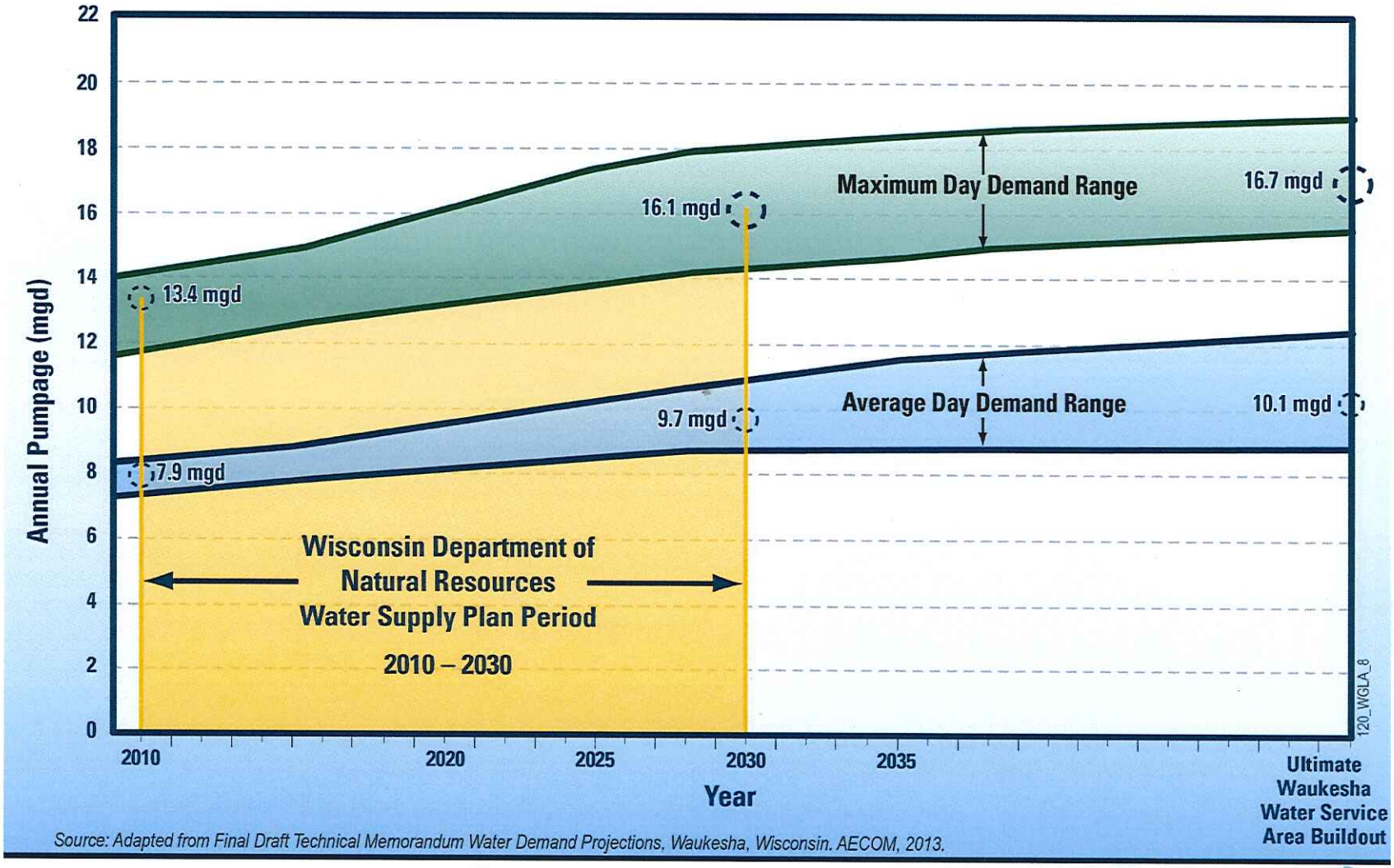


Water Needs

Waukesha Water Supply Service Area



Requesting a reasonable amount of water



Source: Adapted from Final Draft Technical Memorandum Water Demand Projections. Waukesha, Wisconsin. AECOM, 2013.

Water Supply Alternatives

Legislative and legal considerations

- Act 310 – Groundwater Quantity Act (2003)
  - SE Wisconsin designated as one of two Groundwater Management Areas
- Great Lakes Compact
  - Wisconsin implementation legislation
- Lake Beulah Management District
  - State Supreme Court decision
    - DNR must consider impacts when issuing high capacity well permits
- All new water supply alternatives are outside the current city limits

Water supply alternatives studied

14 Water Sources Considered

- Deep Confined Aquifer
- Deep Unconfined Aquifer
- Shallow Aquifers
- Dolomite Aquifer
- Fox River
- Rock River
- Lake Michigan
- Dam On The Fox or Rock River
- Waukesha Quarry
- Waukesha Springs
- Pewaukee Lake
- Milwaukee River
- Wastewater Reuse

Initial screening for water quantity or major environmental and regulatory issues. Eliminated 10 as sole water sources.

6 Water Supply Alternatives Evaluated Further

- Shallow/Deep Aquifers
- Lake Michigan/Shallow Aquifer
- Shallow Aquifers
- Deep Unconfined Aquifer
- Multiple Sources (Shallow and Deep Aquifers, Surface Waters)
- Lake Michigan

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Waukesha supply alternatives evaluation criteria

- Environmental impact
- Public health
- Implementability
- Long-term sustainability

Alternatives to a Lake Michigan water supply:

- Greater adverse environmental impacts
- Are not sustainable
- Greater risk to public health
- Outside the city limits
- Greater impact to other water users

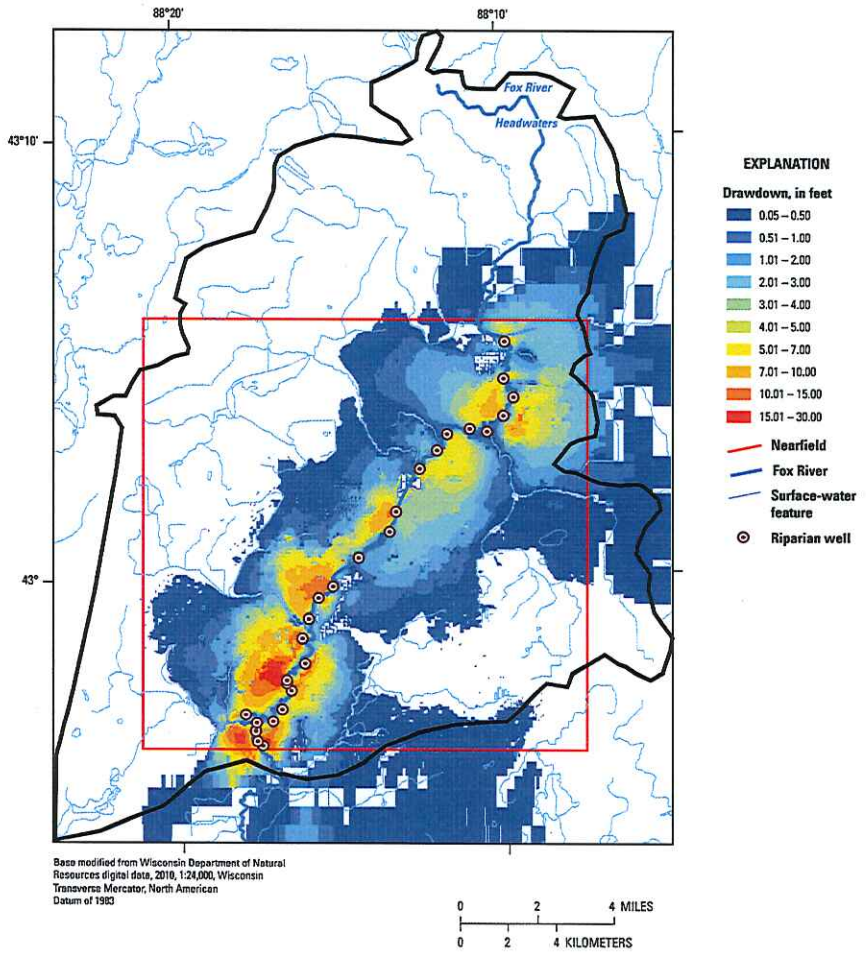


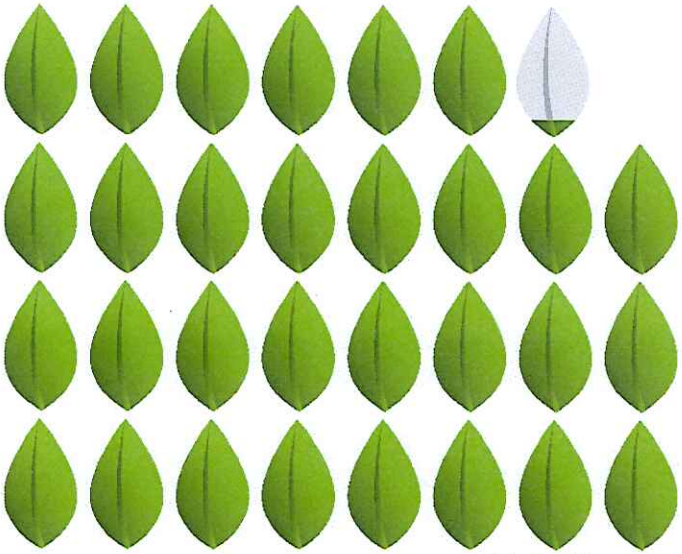
Figure 40A. Simulated drawdown from riparian pumping in model layer 1 (water table)—fine-favored model.

Source: U.S. Geological Survey, Scientific Investigations Report 2012-5108

Impacts of Water Supply Alternatives on Wetlands

Deep and Shallow Aquifers 1′ Drawdown Impacts

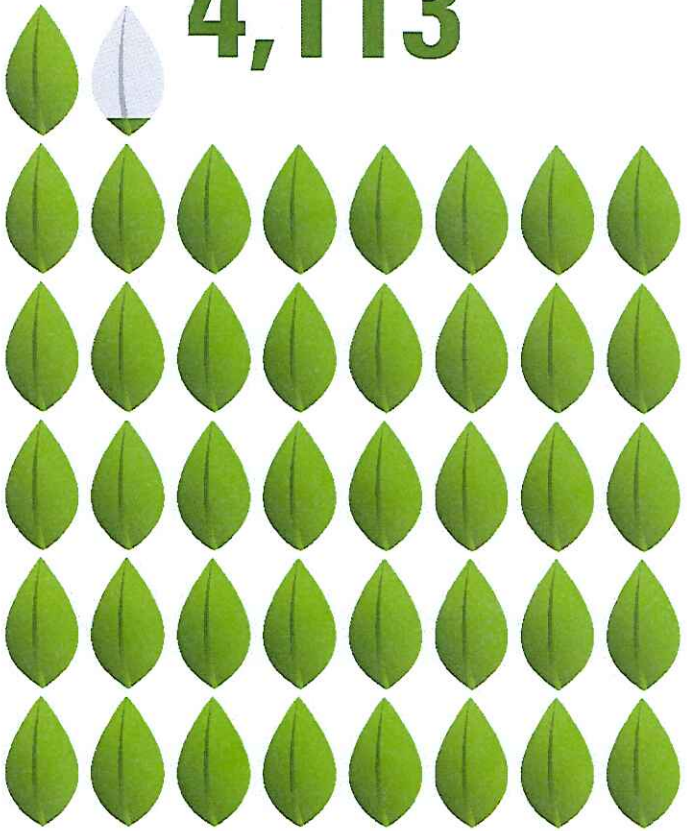
3,091



1 leaf = 100 acres

Shallow Aquifer and Fox River Alluvium 1′ Drawdown Impact

4,113



1 leaf = 100 acres

Lake Michigan Supply and Return Flow Alternatives

≤6

1 leaf = 100 acres

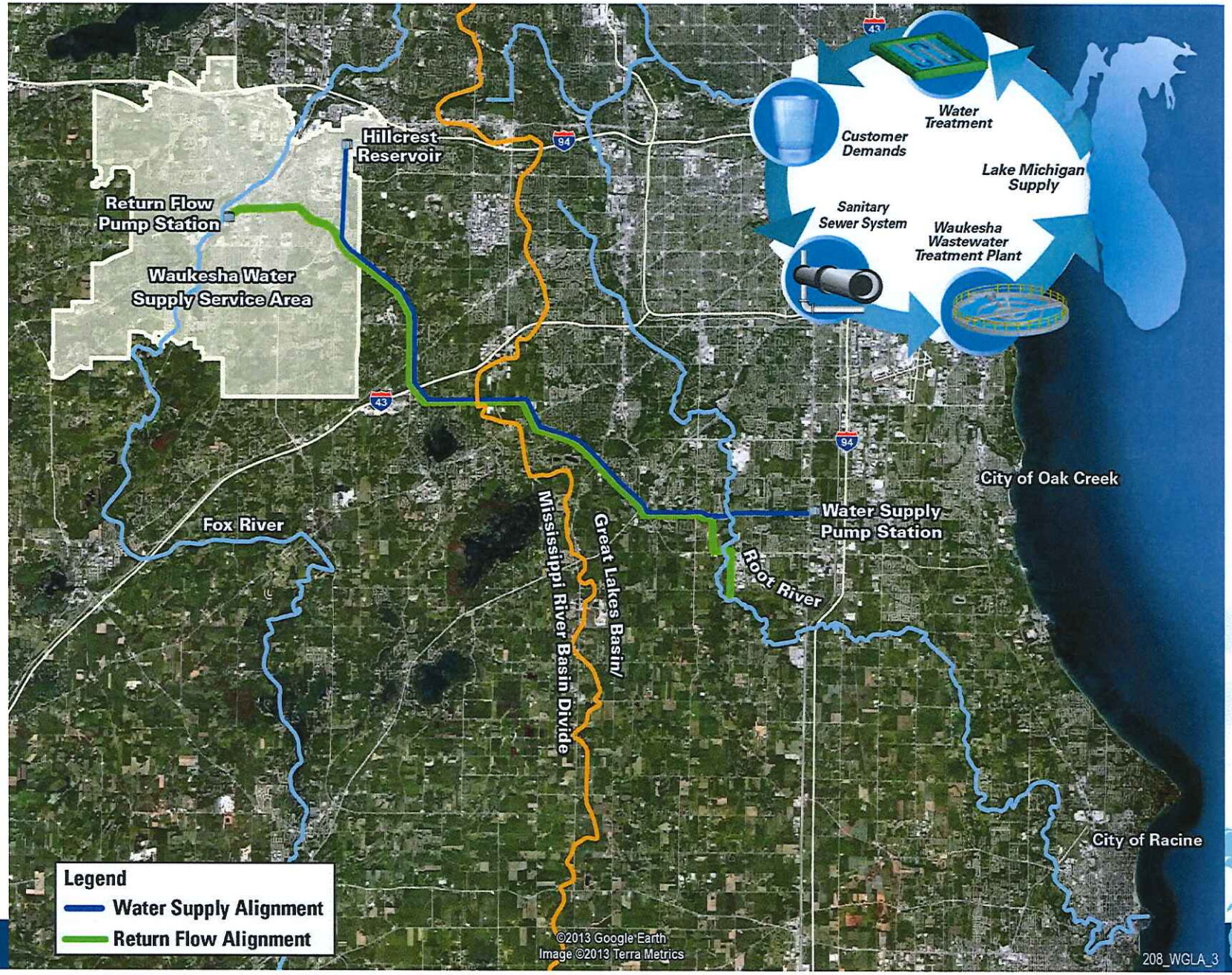
Wisconsin Compact Implementation Statute defines reasonable water supply:

"Reasonable water supply alternative" – "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 diversion and ***that does not have greater adverse environmental impacts than the proposed new or increased diversion."***

Reference: Wis. Stat. § 281.346(1)(ps).

None of the other water supply alternatives are "reasonable" for Waukesha

Lake Michigan Alternative



Return Flow

Return Flow

- Wisconsin has more than 500 municipal wastewater treatment plants
  - 22 flow directly to the Great Lakes
  - 8 flow directly to inland lakes
  - 473 flow to rivers
- Return flow water quality will meet all WDNR and EPA requirements
  - WDNR permit limits include strict phosphorus standards

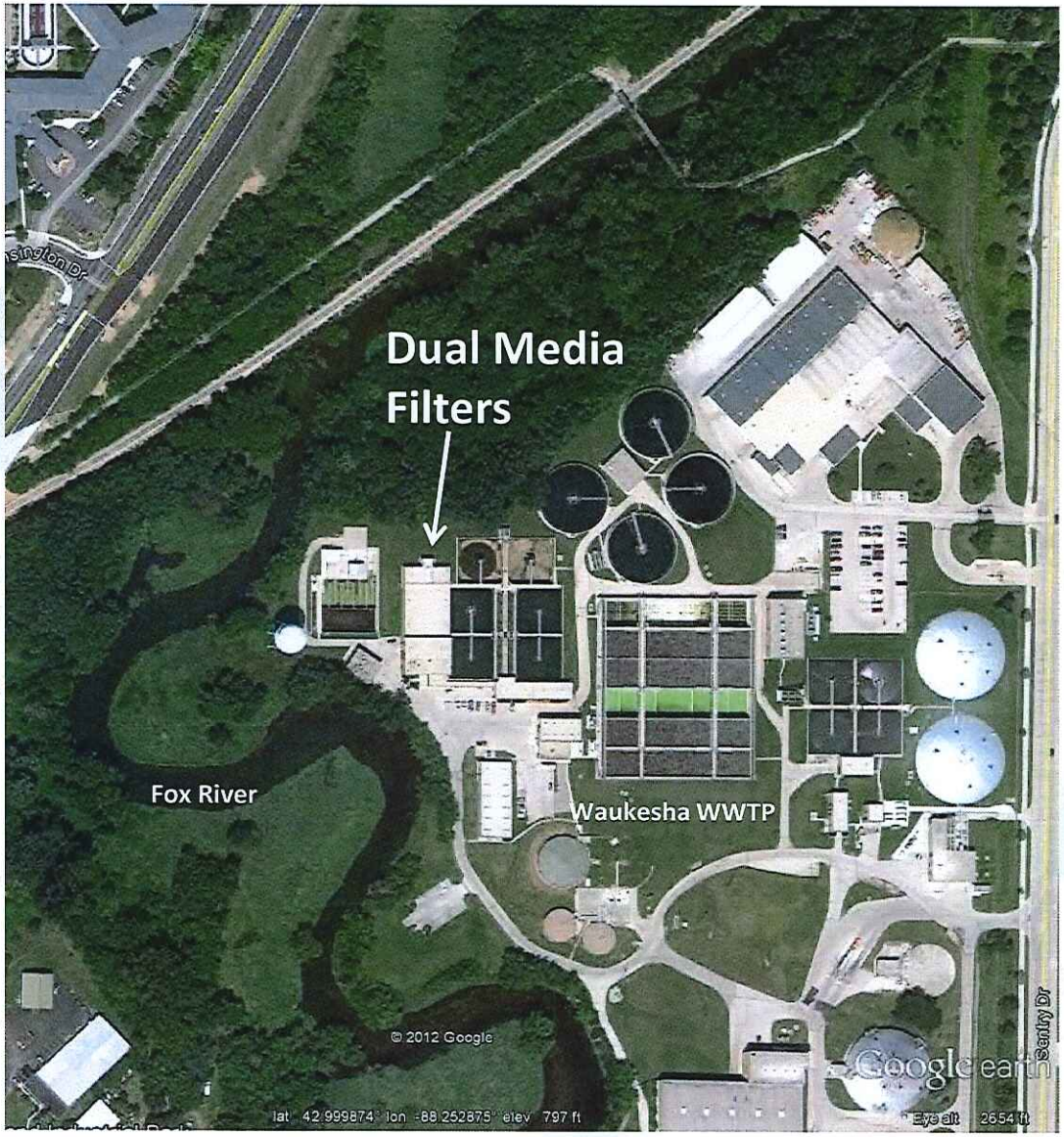
Return Water Quality

- Downstream of the potential return flow location Root River is "impaired"
  - Impairment results in very strict permit limits

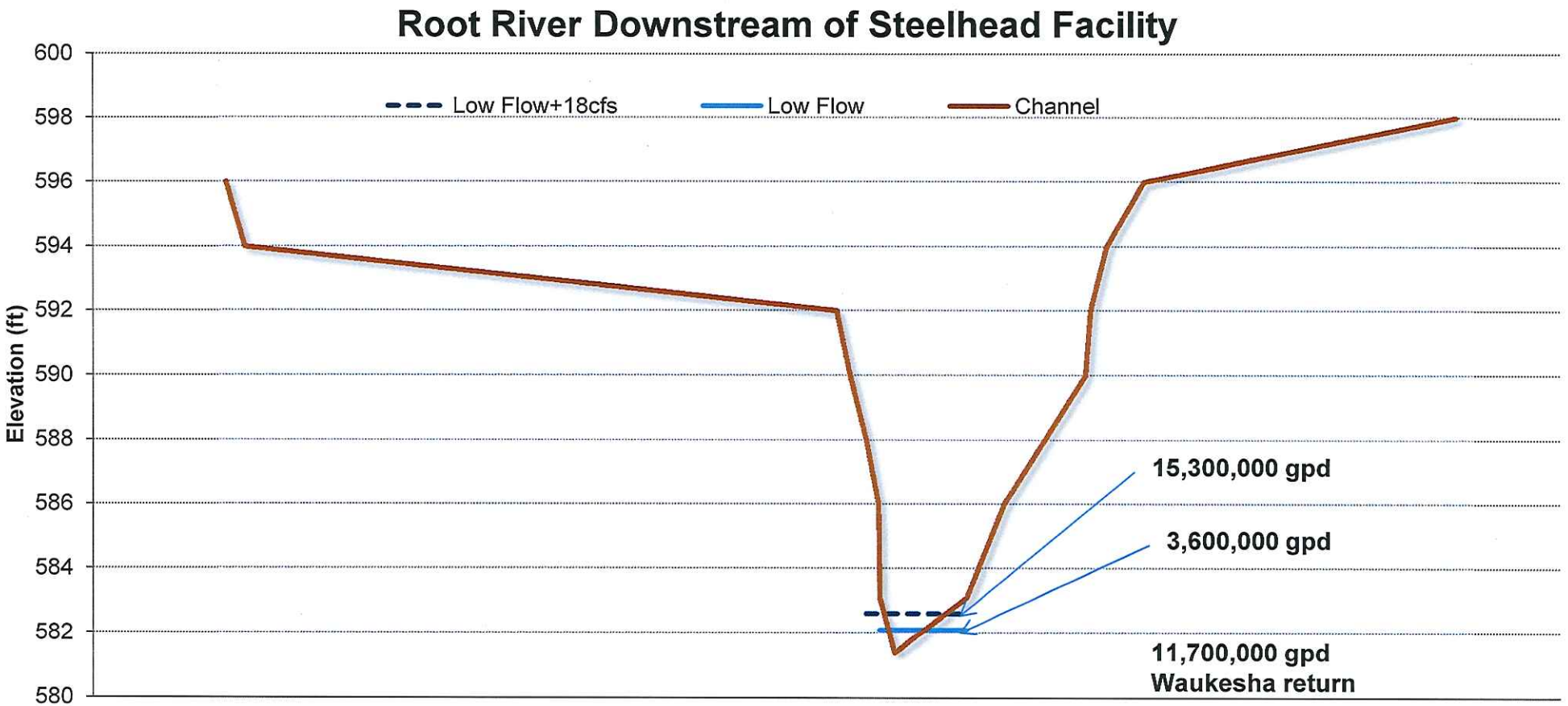
Impairment	Return Flow	Return Flow Effect
PCBs	Return flow will not have PCBs	None
Phosphorus	Return flow will have concentration less than the water quality standard	Will lower concentrations in Root River
Suspended Solids	Return flow will have concentration less than the water quality standard	Will lower concentrations in Root River

Return Water Quality

- Currently treats to levels better than all permit requirements
- Advanced facility with Ultraviolet (UV) light disinfection and tertiary treatment, including dual media sand filters.
  - Few facilities in the State have effluent filtration

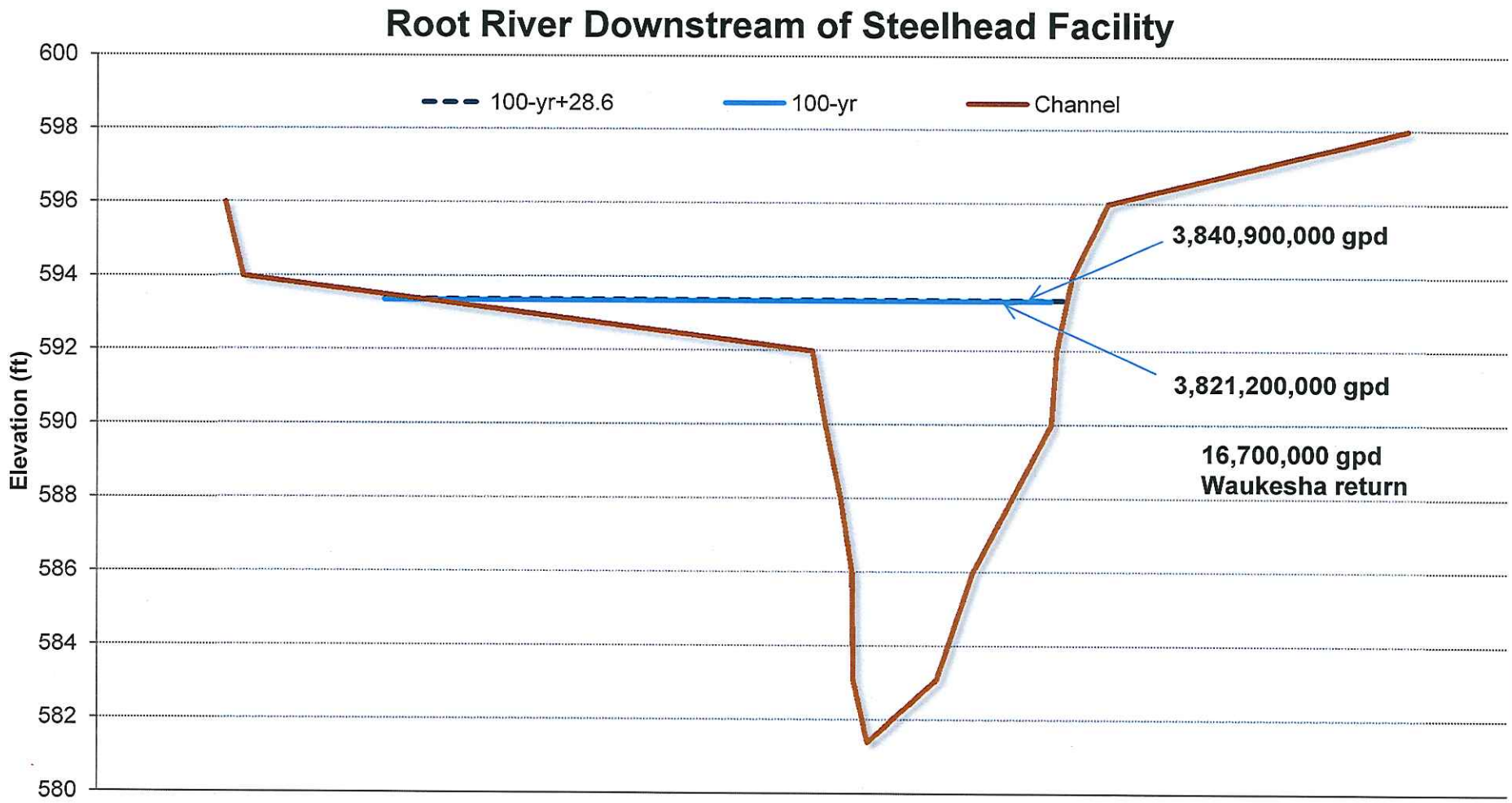


Low River Flow with Average Return Flow



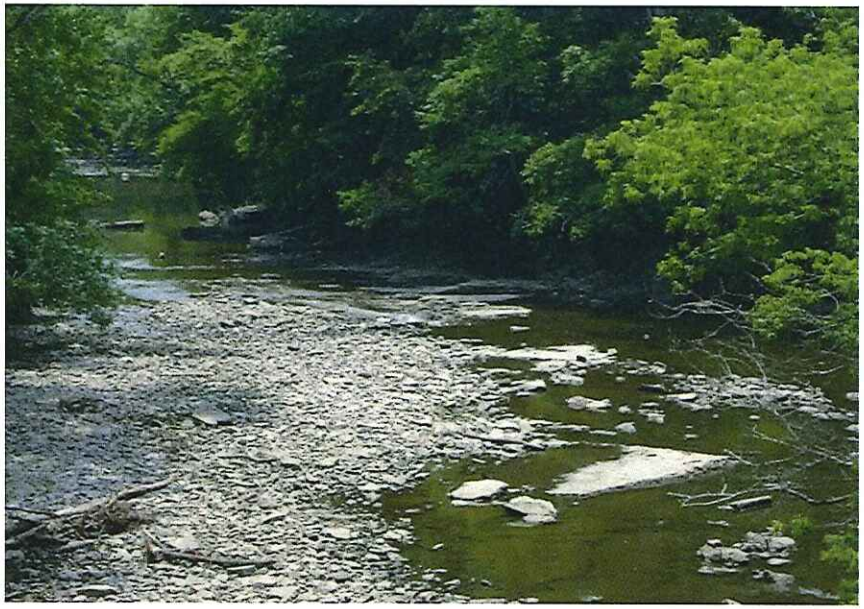
Root River Flow Scenario	River Flow Rate (mgd)	Return Flow Rate (mgd)	River Flow Rate with Return Flow (mgd)	% Increase in River Flow Rate (%)	Increase in water depth (in)	River Avg Velocity (fps)	River Avg Velocity with Return Flow (fps)
Low Flow	3.6	11.7	15.3	321%	6.1	0.63	0.87

100 year River Flow with Maximum Return Flow



Root River Flow Scenario	River Flow Rate (mgd)	Return Flow Rate (mgd)	River Flow Rate with Return Flow (mgd)	% Increase in River Flow Rate (%)	Increase in water depth (in)	River Avg Velocity (fps)	River Avg Velocity with Return Flow (fps)
100 Year Flow	3824.2	16.7	3840.9	0.44%	0.25	5.04	5.05

Root River comparison (quantity and quality)

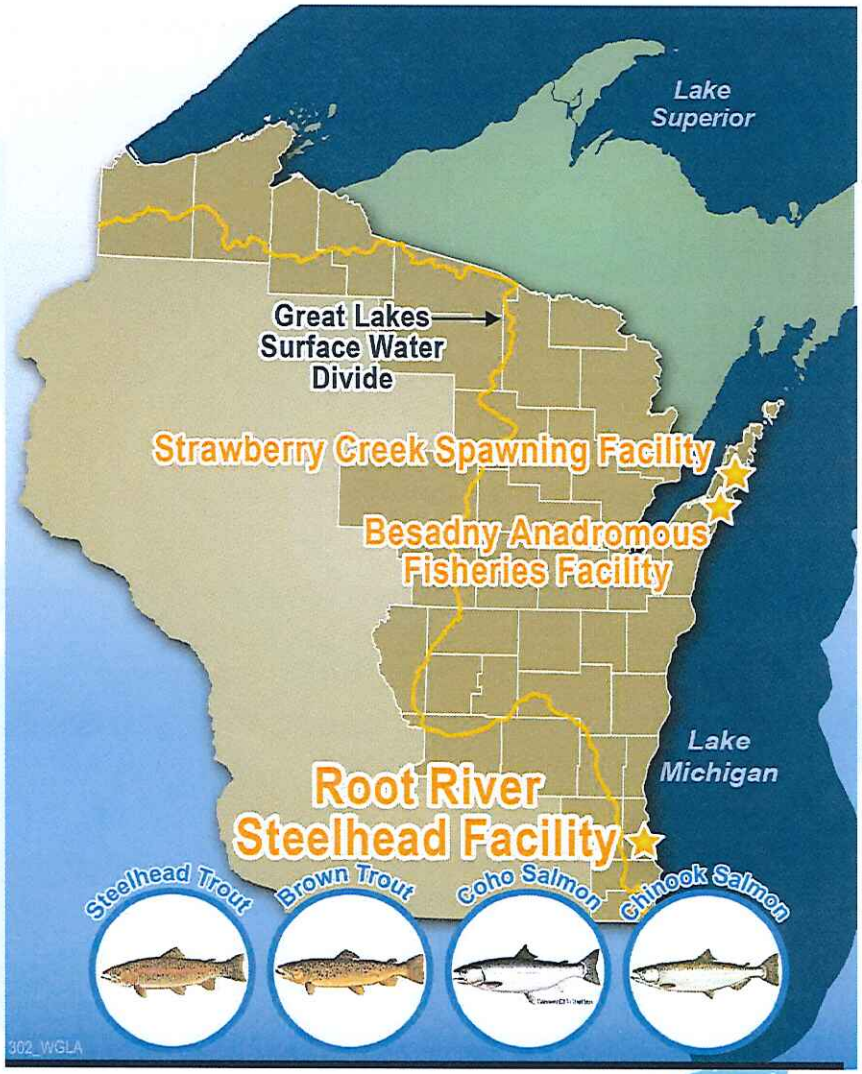


Parameter	Return Flow Water Quality [a]	Permit Required Discharge Quality	Average Root River Water Quality
Biological Oxygen Demand (mg/L)	1.8	≤5.7 to ≤10.0	Approx. 2.4
Total Suspended Solids (mg/L)	1.2	≤10.0	Approx. 10 to 27
Dissolved Oxygen (mg/L) [more oxygen is better]	9.2	≥7.0	Approx. 5.5 to 9.9
Total Phosphorus (mg/L)	<0.075	≤0.075	Approx. 0.13
Fecal Coliform (Counts/100mL)	12	≤400	Approx. 500 to 3,000

[a] Average Historical Waukesha Operation or Permit Limit

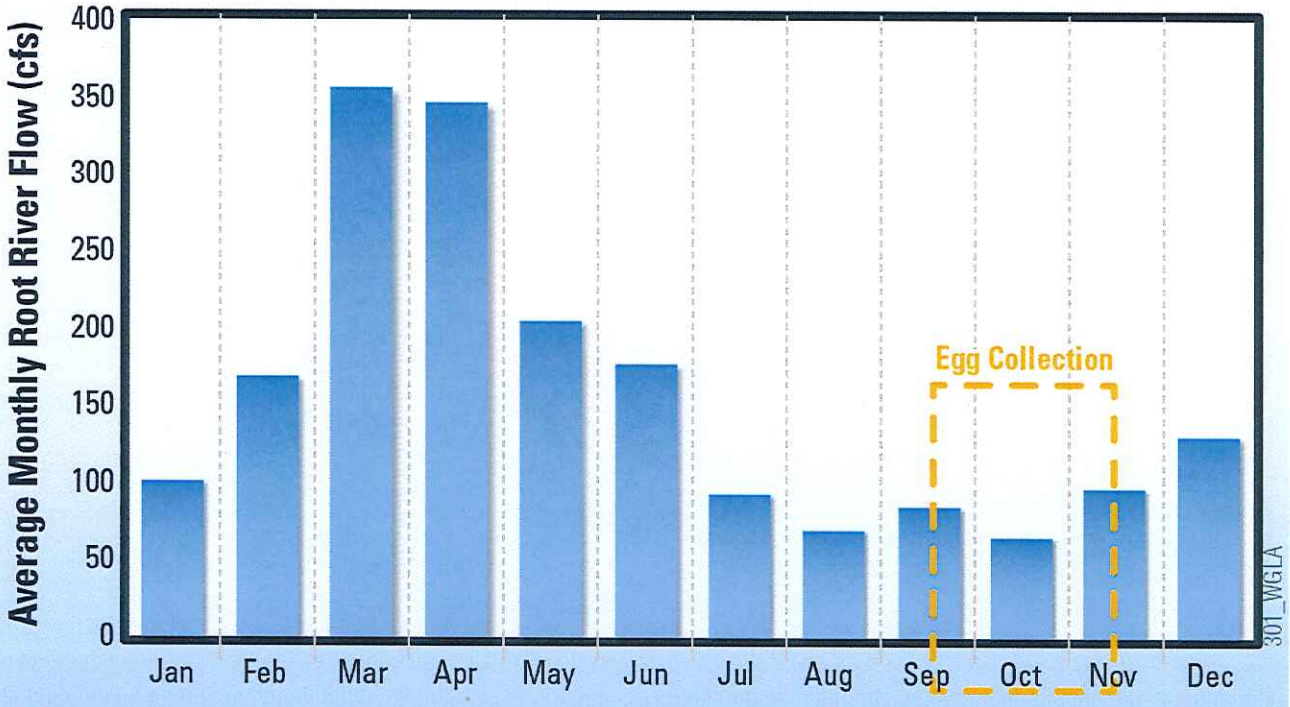
Root River fisheries

- WDNR operates a steelhead egg harvesting facility in Racine.
  - Spring spawning runs for steelhead
  - Fall spawning runs for salmon, steelhead and brown trout
  - Constructed in 1994 to fulfill stocking commitments and monitor salmon and trout populations
- Peak years have provided over 10,000 angling hours.



Benefits to Root River

- Low river flows in summer and fall negatively impact recreational fishing and egg harvesting.
- Increasing low flows improves angling and provides functional habitat during critical spawning periods.
- ~25 miles of river downstream of potential return flow location.



Sources:

1. WDNR Lake Michigan Weir Assessments for the Root River Steelhead Facility. Assessments provided by WDNR and from http://dnr.wi.gov/topic/fishing/hatcheries/spawning.html.
2. Flow data from USGS gage 04087240 Root River at Racine. Data accessed July 18, 2013.

Summary

Lake Michigan is the only reasonable alternative

14 Water Sources Considered

- Deep Confined Aquifer
- Deep Unconfined Aquifer
- Shallow Aquifers
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- Rock River
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Eliminated 5 alternatives based on environmental impacts, public health, long-term reliability, and implementability.

1 Final Reasonable Alternative

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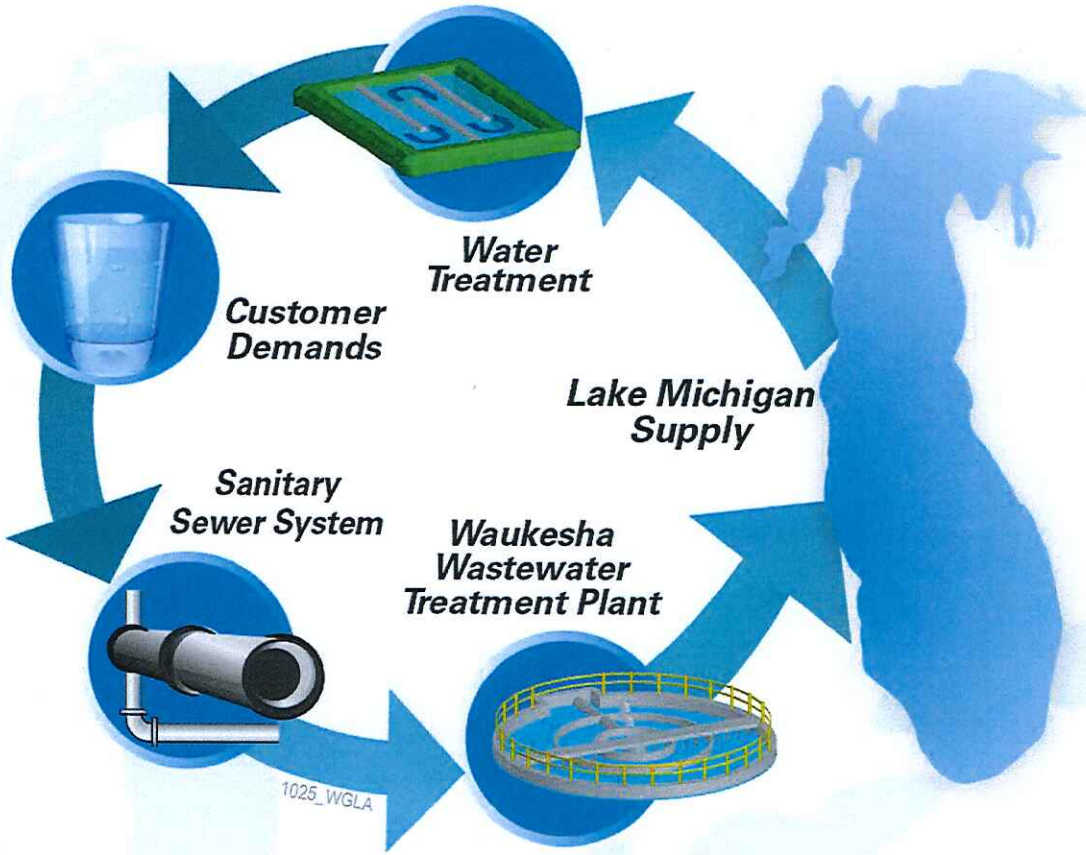
Benefits – Waukesha diversion with return flow

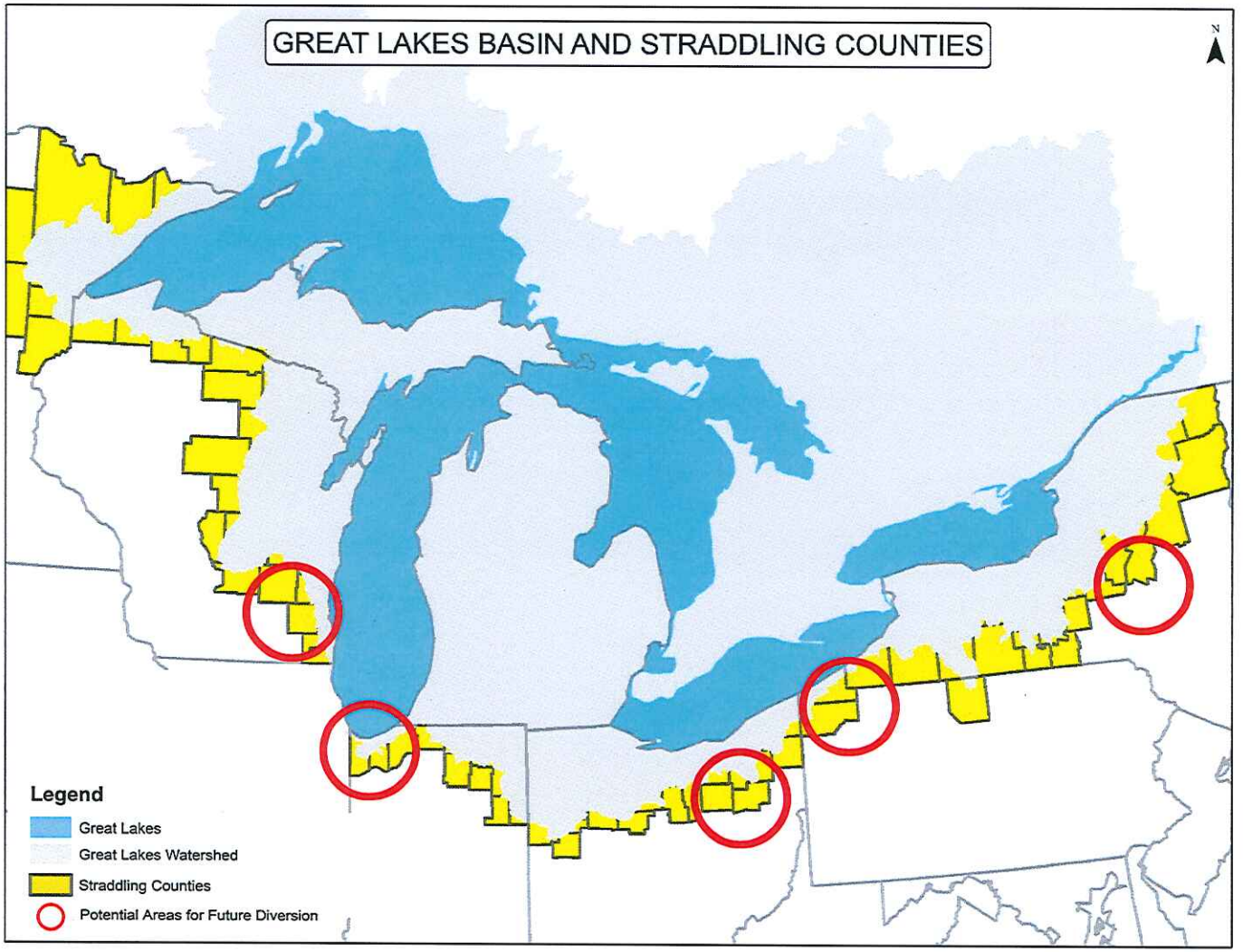
- Help restore natural groundwater flow towards Great Lakes basin
- No impact on lake levels
- Enhance habitat and fisheries in Great Lakes basin
- Reduce radium and salt released to environment



Waukesha meets Compact exception standard criteria

- Need for water cannot be reasonably avoided through efficient use of water and conservation.
- No other reasonable supply is available.
- Reasonable amount of water requested.
- All water, less consumptive use, is returned.
- Restorative of hydrologic conditions of Basin.
- No significant individual or cumulative adverse environmental impacts to Basin waters and water dependent resources.

Great Lakes Basin and US straddling counties (potential for precedents)



What's Next?

Waukesha schedule moving forward

- Revised application submitted to DNR – October 14, 2013
- Waukesha informational meetings
  - November 7, 2013 – Waukesha
  - November 13, 2013 – Oak Creek
  - November 14, 2013 – Racine
  - November 18, 2013 – Milwaukee
- DNR issues Draft EIS and Draft Technical Review
- Public hearings and comments on Draft EIS
- Final EIS and Technical Review Issued
- If approvable, Wisconsin submits to the Regional Body

Take-home points

- Conservation alone can't resolve the water supply issue.
- Service area is consistent with Wisconsin laws and regional water planning.
- The volume of water requested is based on sound planning principles and is reasonable.
- Extensive water supply alternative analyses concluded Lake Michigan was the only reasonable alternative.
- Return flow insures no change in lake levels, is protective of the environment, and provides benefits to Great Lakes habitat and fisheries.
- All other alternatives have significant environmental impacts on area water resources

Thank You

Submit comments to:
Wisconsin DNR
DG/5
PO Box 7921
Madison, WI 53707-7921
Attention: Kassie Lang

Or via email at DNRWaukeshaDiversionApp@wisconsin.gov

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