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

Great Lakes Commission
2013 Annual Meeting

Moderator: Ken Johnson, Chair
Dan Duchniak, General Manager, Waukesha Water Utility

September 9, 2013

Agenda

- Waukesha Background
- Water Needs
- Water Supply Alternatives
- Summary

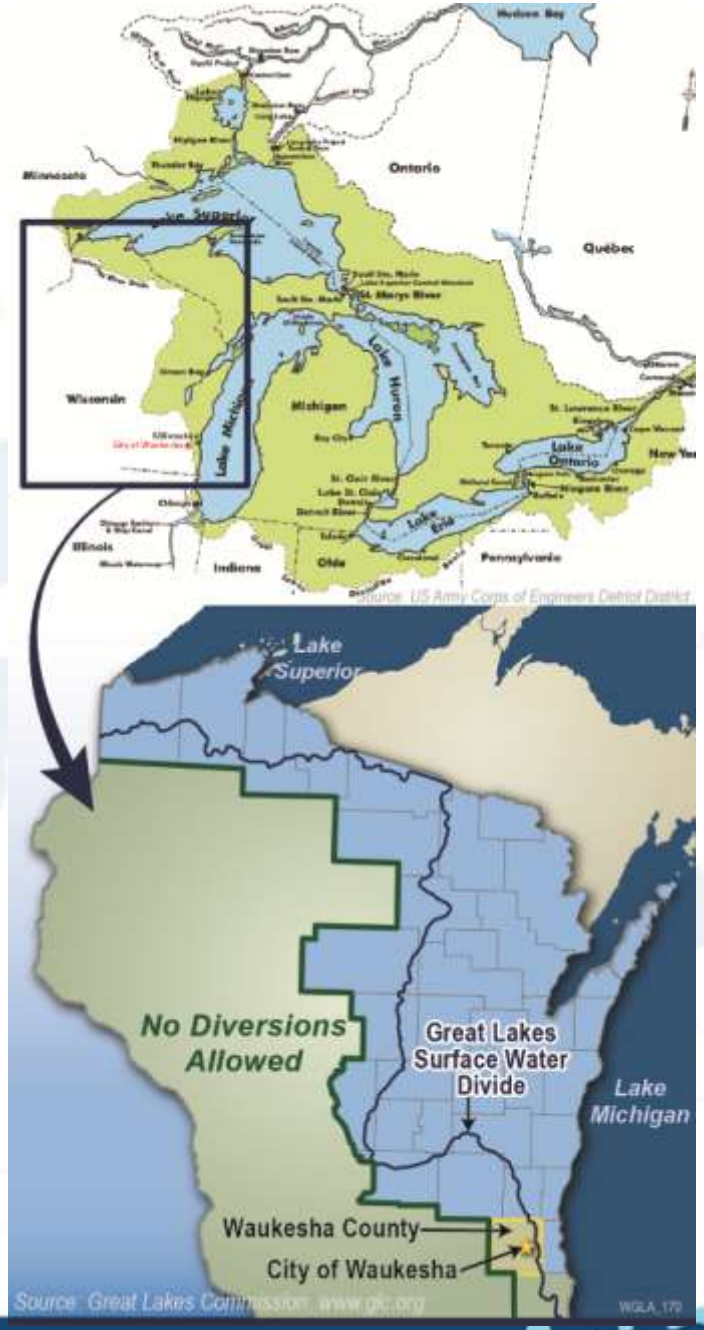
Waukesha Background

Waukesha location

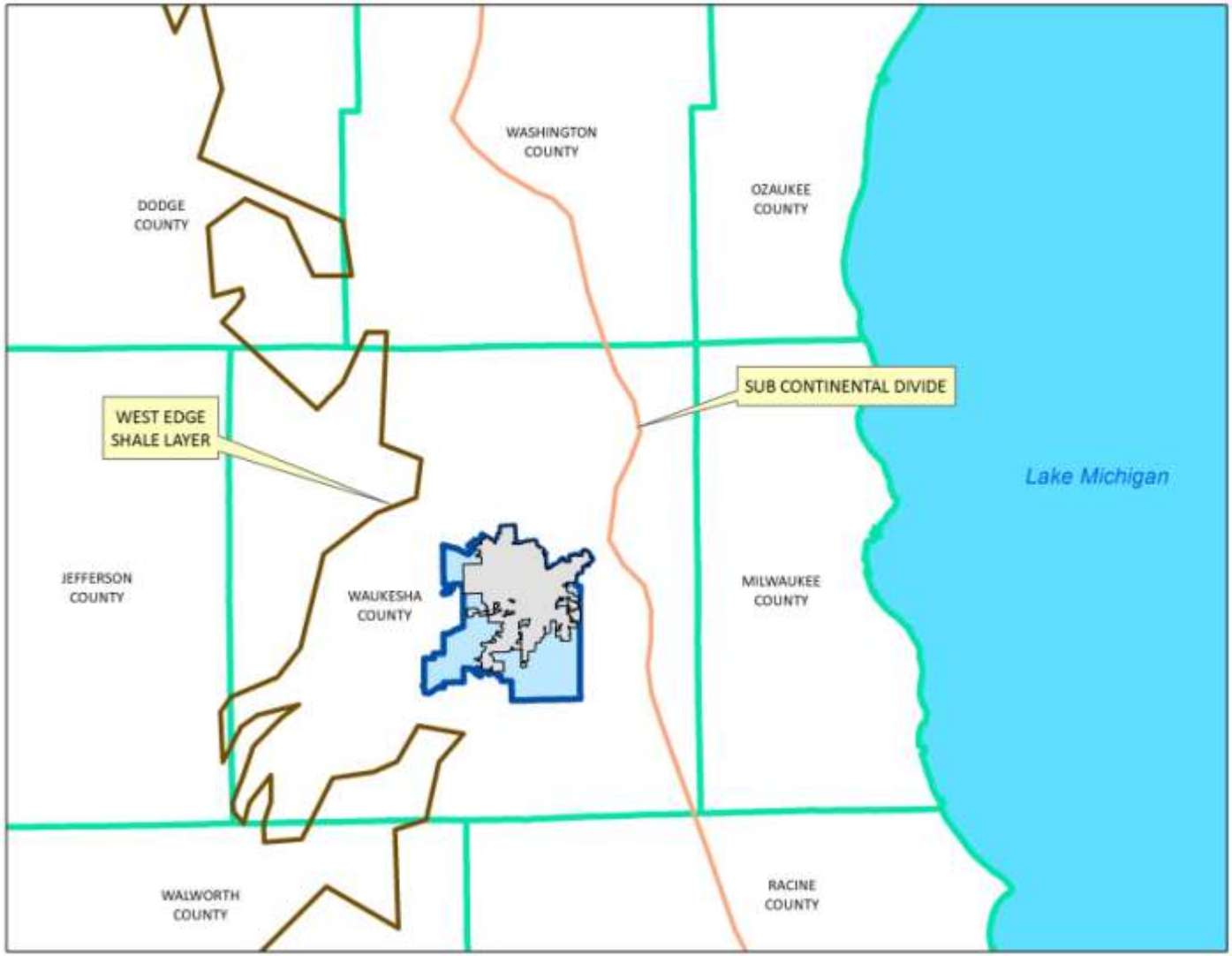
- City of Waukesha is 1.5 miles west of Great Lakes surface water divide in straddling county

Great Lakes Compact – Exceptions to the Diversion Ban

- Straddling community
- Community in a straddling county



About the City of Waukesha



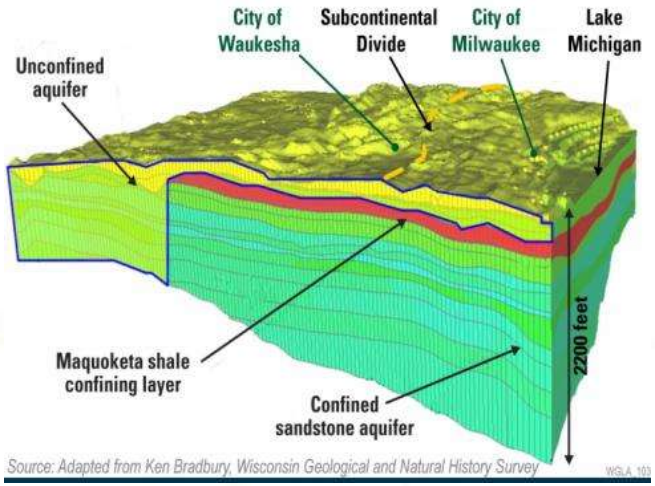
City of Waukesha

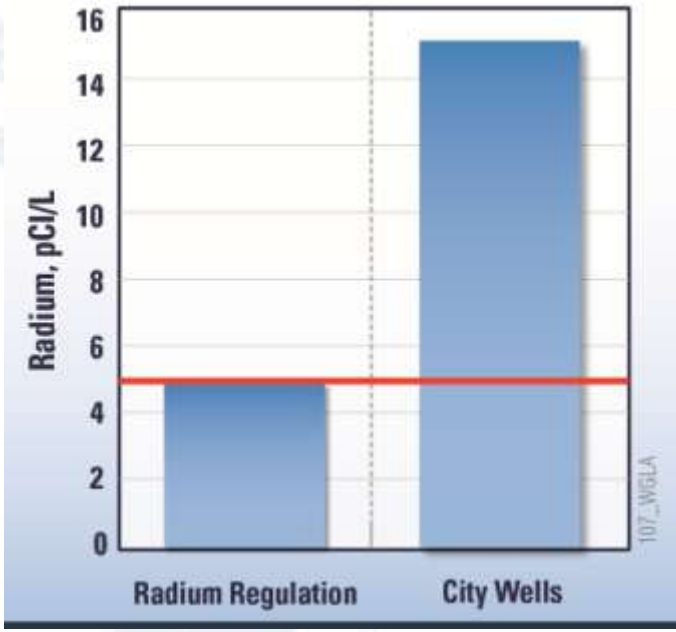
Statistic	2000	2010
Population	64,825	70,718
Demographics		
White	91%	88%
Non-white	9%	12%
Median Household Income	$50,085	$57,001
Population below poverty level	5.9%	10.6%

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

Waukesha needs a new water supply

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

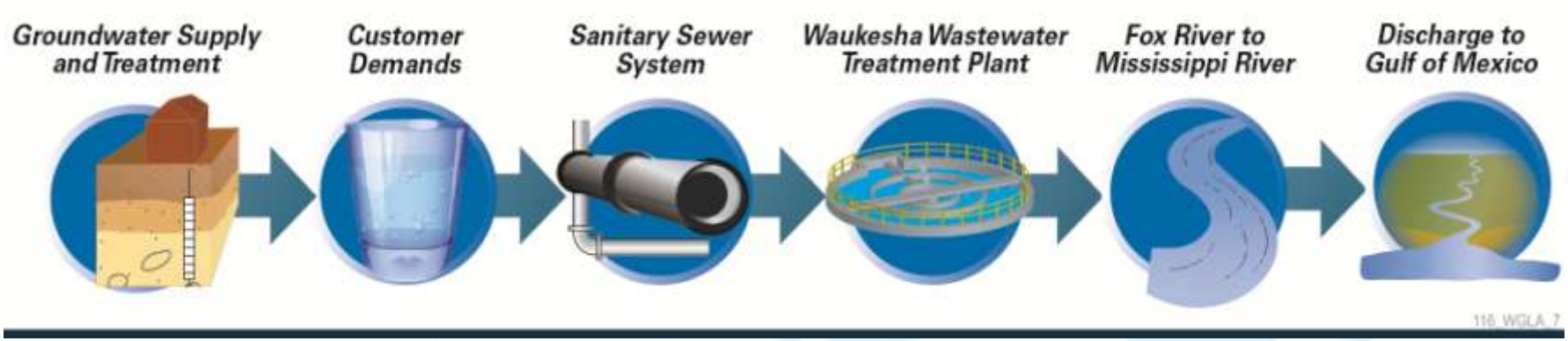




Conserving water makes sense for Waukesha

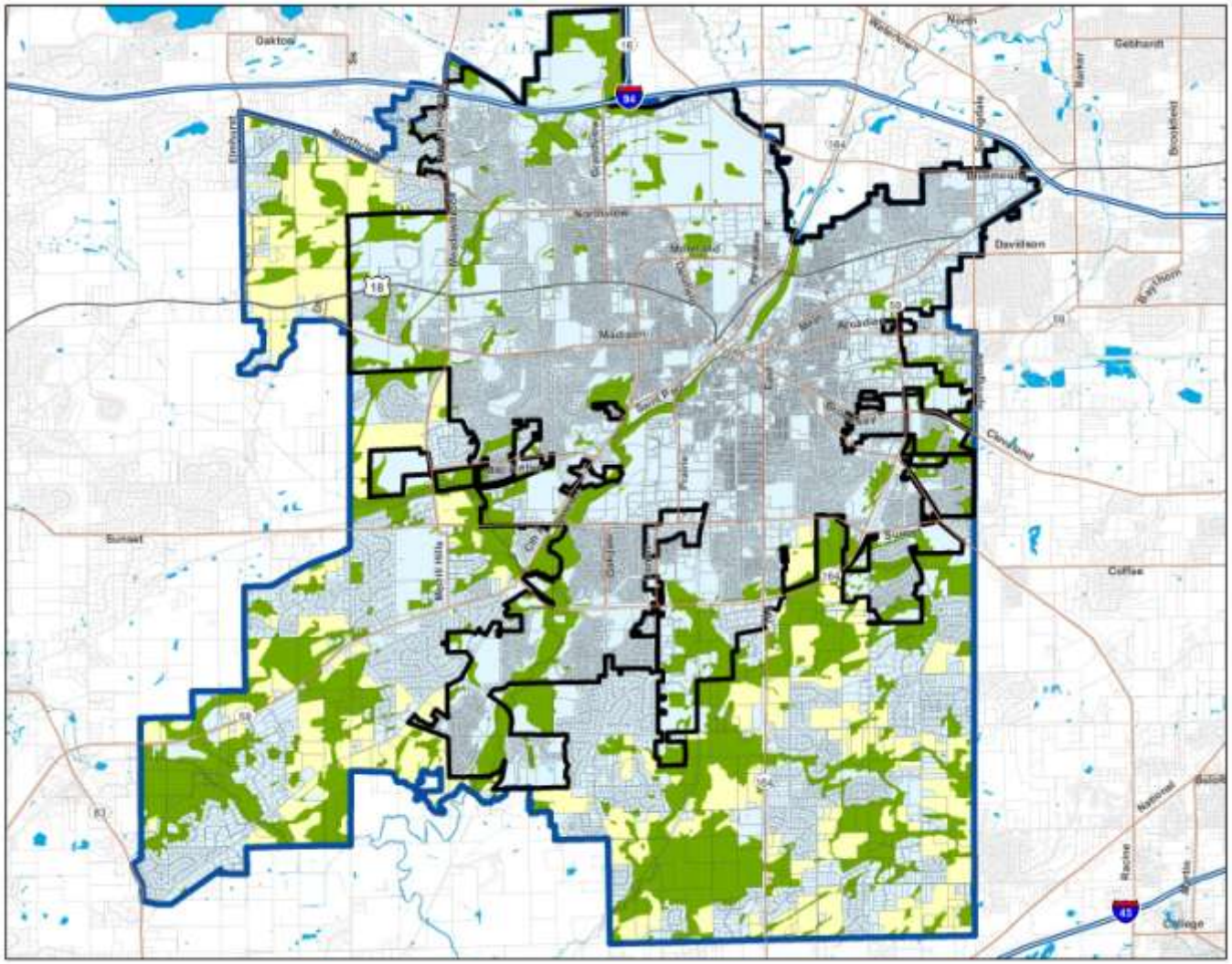
- Outdoor sprinkling restrictions
- Inclining block water rates to encourage conservation
- High efficiency fixture rebates
- Public education and outreach

Waukesha's groundwater supply is not sustainable

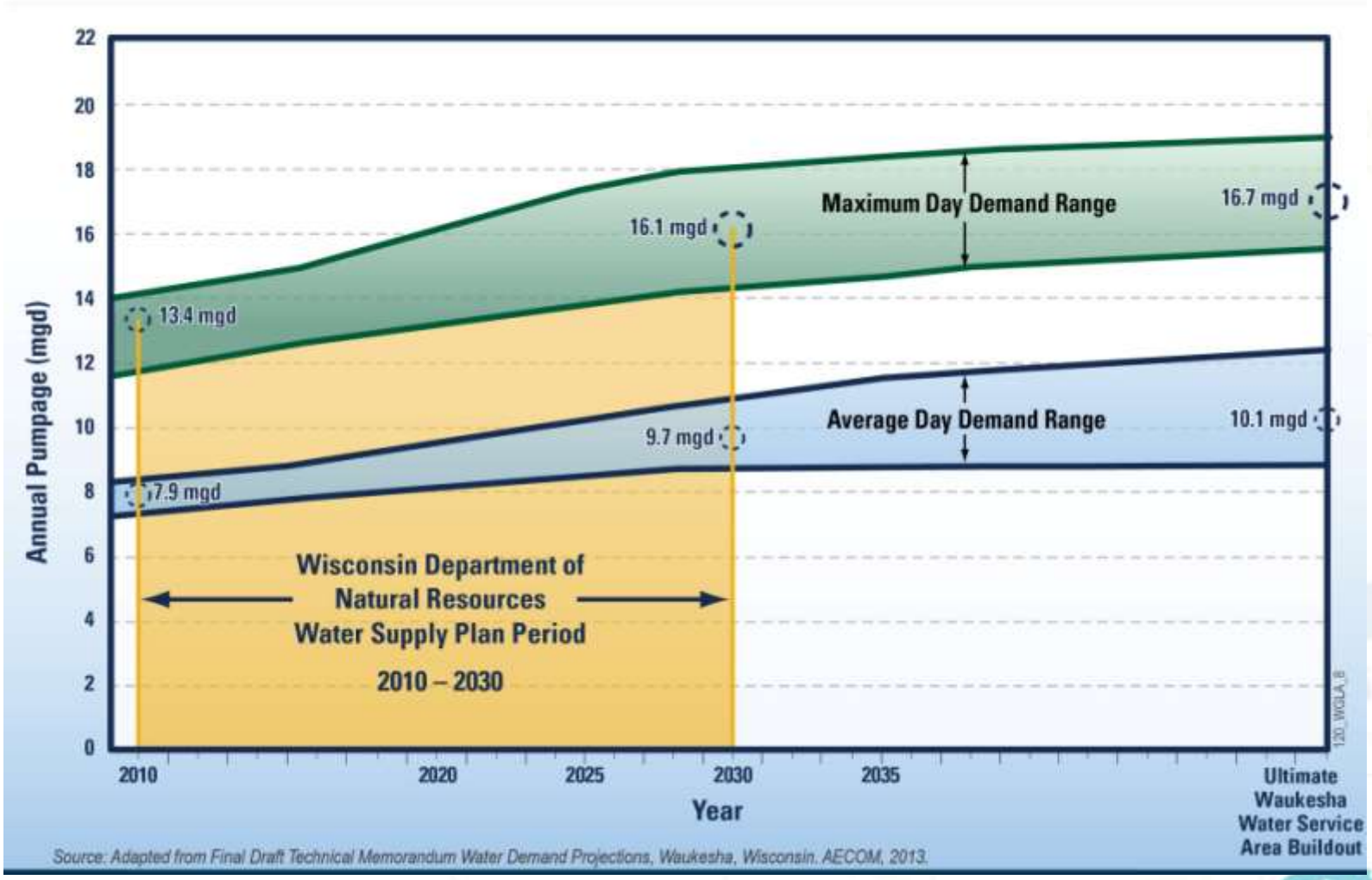


Water Needs

Waukesha Water Supply Service Area



Requesting a reasonable amount of water



Water Supply Alternatives

Legislative and legal considerations

- Act 310 – Groundwater Quantity Act (2003)
- 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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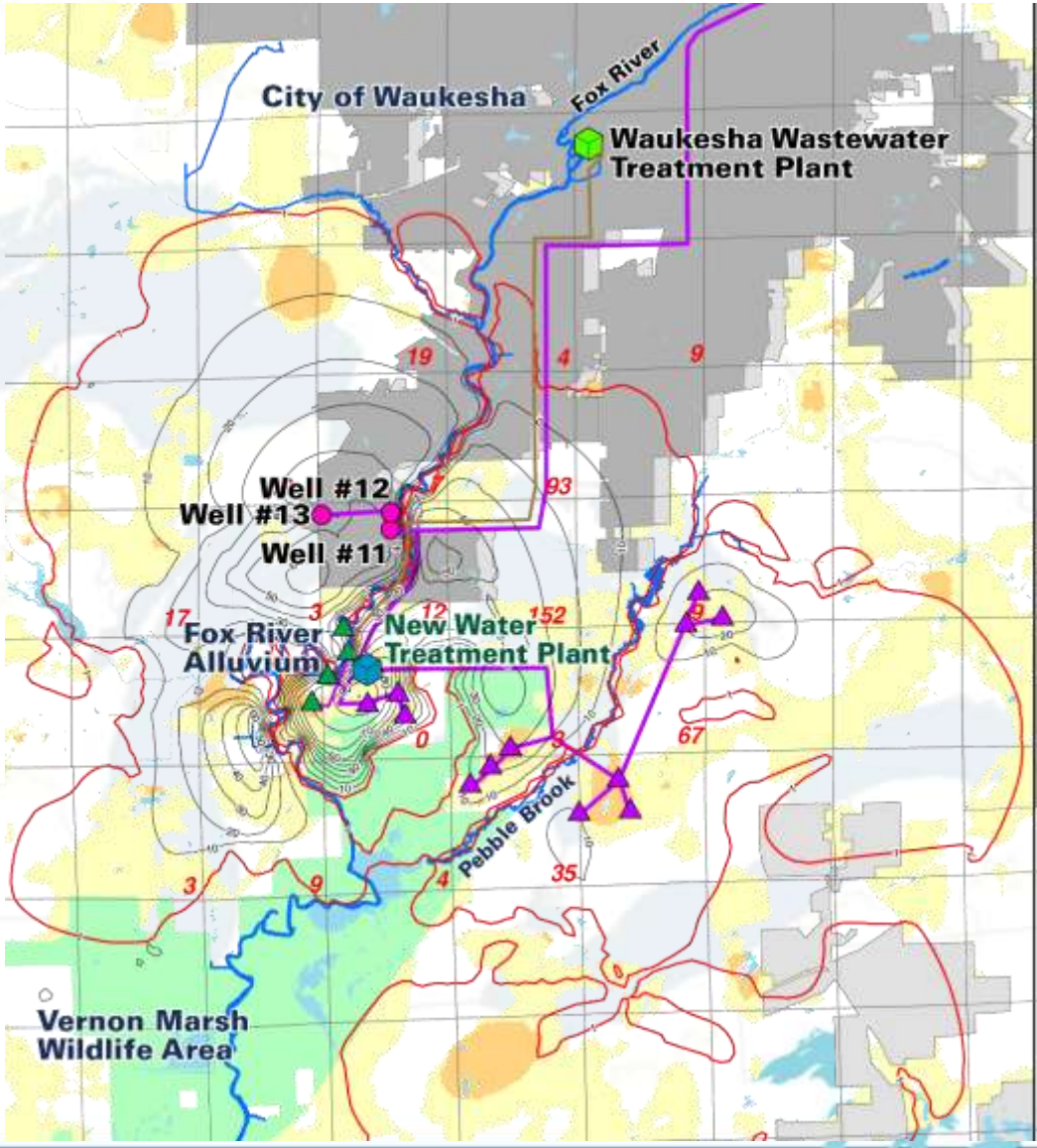
Waukesha supply alternatives evaluation criteria

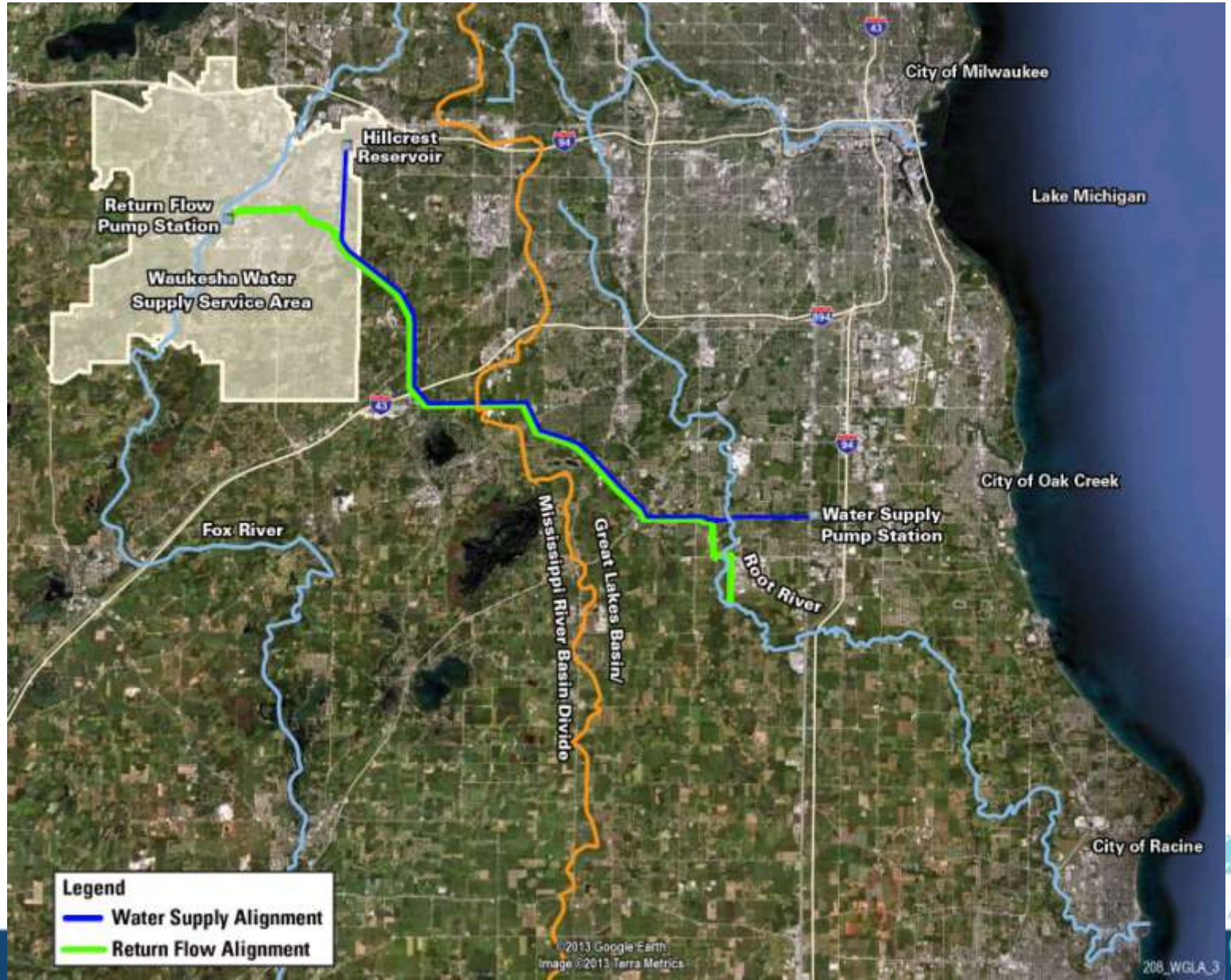
- Environmental impact
- Public health
- Implementability
- Long-term sustainability

Alternatives to a Lake Michigan water supply:

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



Lake Michigan alternative



Root River comparison

Benefits to Root River

No other reasonable water supply for Waukesha

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 is the only reasonable alternative

Summary

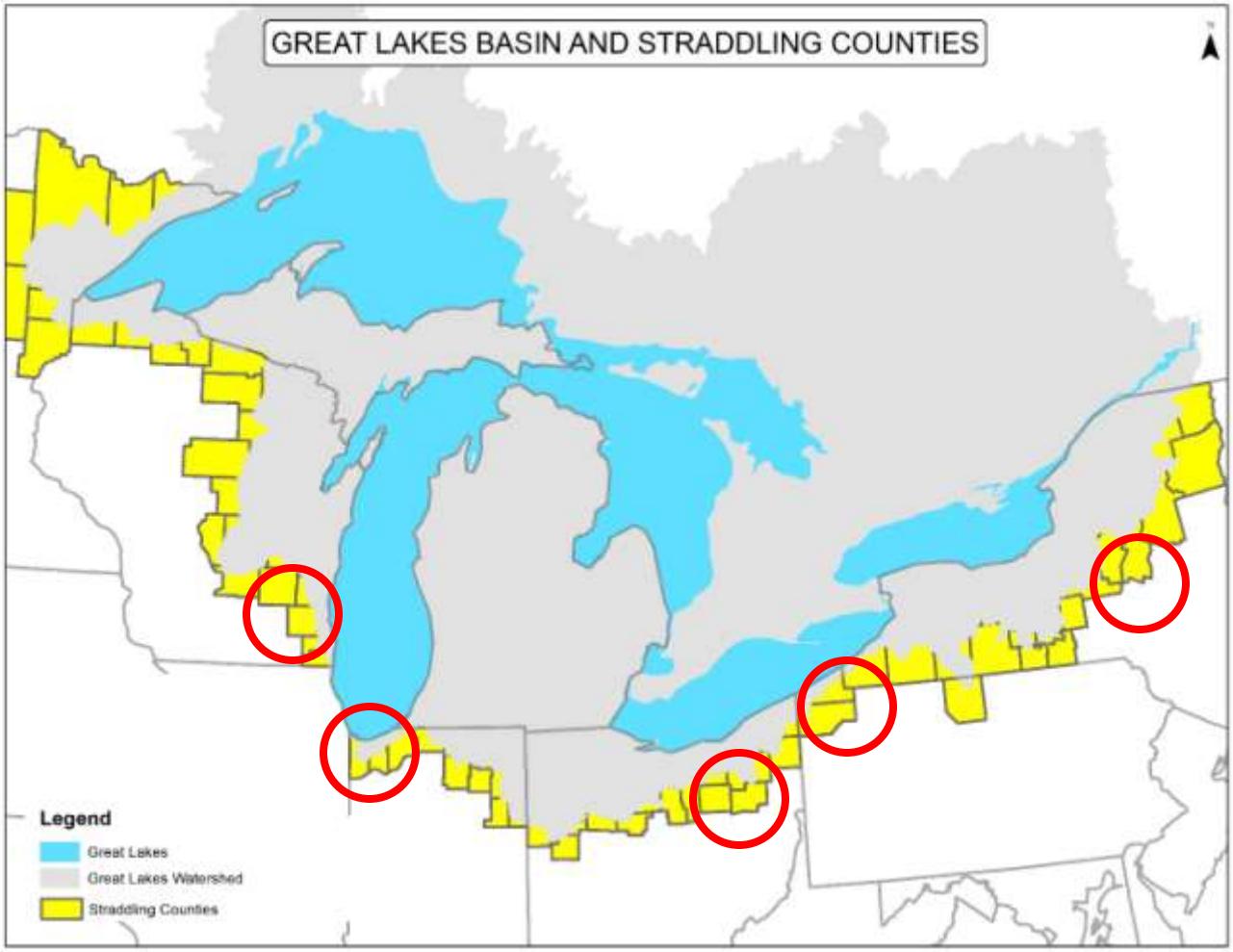
Benefits – Waukesha diversion with return flow

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

Waukesha meets 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 Precedents



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 and provides tremendous benefits to a Great Lakes tributary’s habitat and fisheries.

Thank You

Dan Duchniak, P.E.

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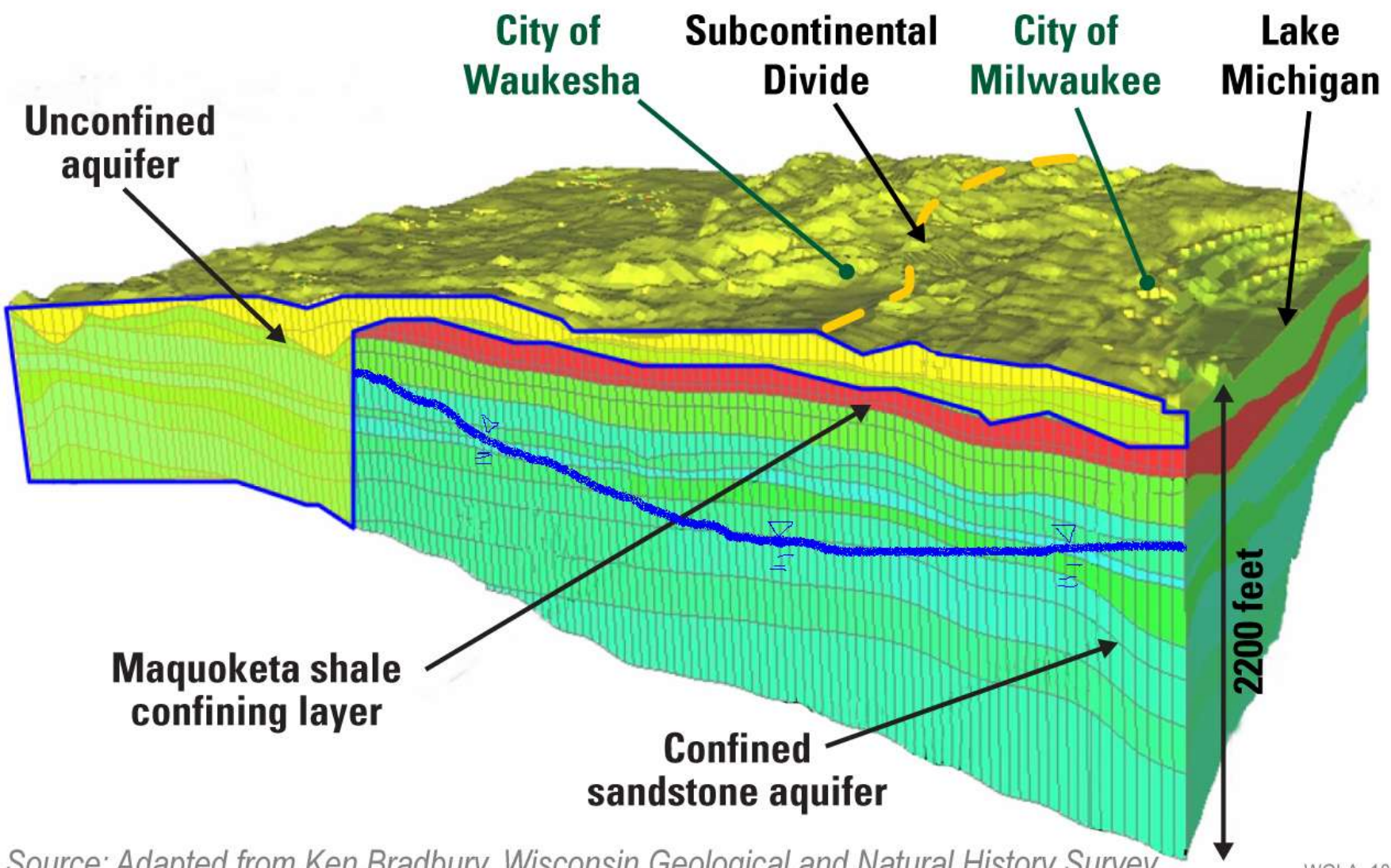
Pre-Development Water Levels 1950



Source: Adapted from Ken Bradbury, Wisconsin Geological and Natural History Survey

Fox River Summer 2012

Fox River Summer 2012

Return Flow

Return Flow

- Wisconsin has more than 500 municipal wastewater treatment plants
  - 22 flow to Great Lakes
  - 8 flow 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

Root River Flow Augmentation

- WDNR considered augmenting flow to the Root River but was cost prohibitive
  - WDNR has augmented flow at Strawberry Creek egg harvesting facility in Door County by pumping flow from Sturgeon Bay ship canal to Strawberry Creek
- Low flows documented and flow augmentation proposed since 1966
  - Options included reservoir storage, groundwater pumping and use of Lake Michigan water
  - Reports recommended construction of a 660 acre “Oakwood Lake” to augment flows in Root River
- Regional consolidation of wastewater treatment has decreased flow in Root River from 16 dischargers to 3

Fisheries

- WDNR operates the steelhead egg harvesting facility
  - 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 yielded over 10,000 salmonids providing over 10,000 angling hours
- ~25 miles of River downstream of potential return flow location
- 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

Conclusions

- Completing additional Root River analysis to support WDNR's data request
- Water Quality
  - Return flow treated to improve water quality
- Flooding
  - Maximum return flow rate is infrequent
  - Maximum return flow rate small compared to river flows during storm events
    - Max return flow <0.7% of 25-yr river flows at return location downstream of Steelhead Facility
    - Max return flow <0.5% of 100-yr river flows at return location downstream of Steelhead Facility
- Low Flow
  - Root River low flow documented and flow augmentation proposed since 1966
  - WDNR has considered flow augmentation for steelhead egg harvesting facility
- Fisheries
  - Return flow improves fisheries, river function, and angling opportunities during low flow times (e.g. summer and fall)

Waukesha Water Supply Service Area