



# *Southeastern Wisconsin Regional Water Supply Planning Program*

## *Background and Alternative Plans Being Considered*



Southeastern Wisconsin Regional Planning Commission  
Environmental Justice Task Force

November 27, 2007

#132752




# Regional Water Supply Plan

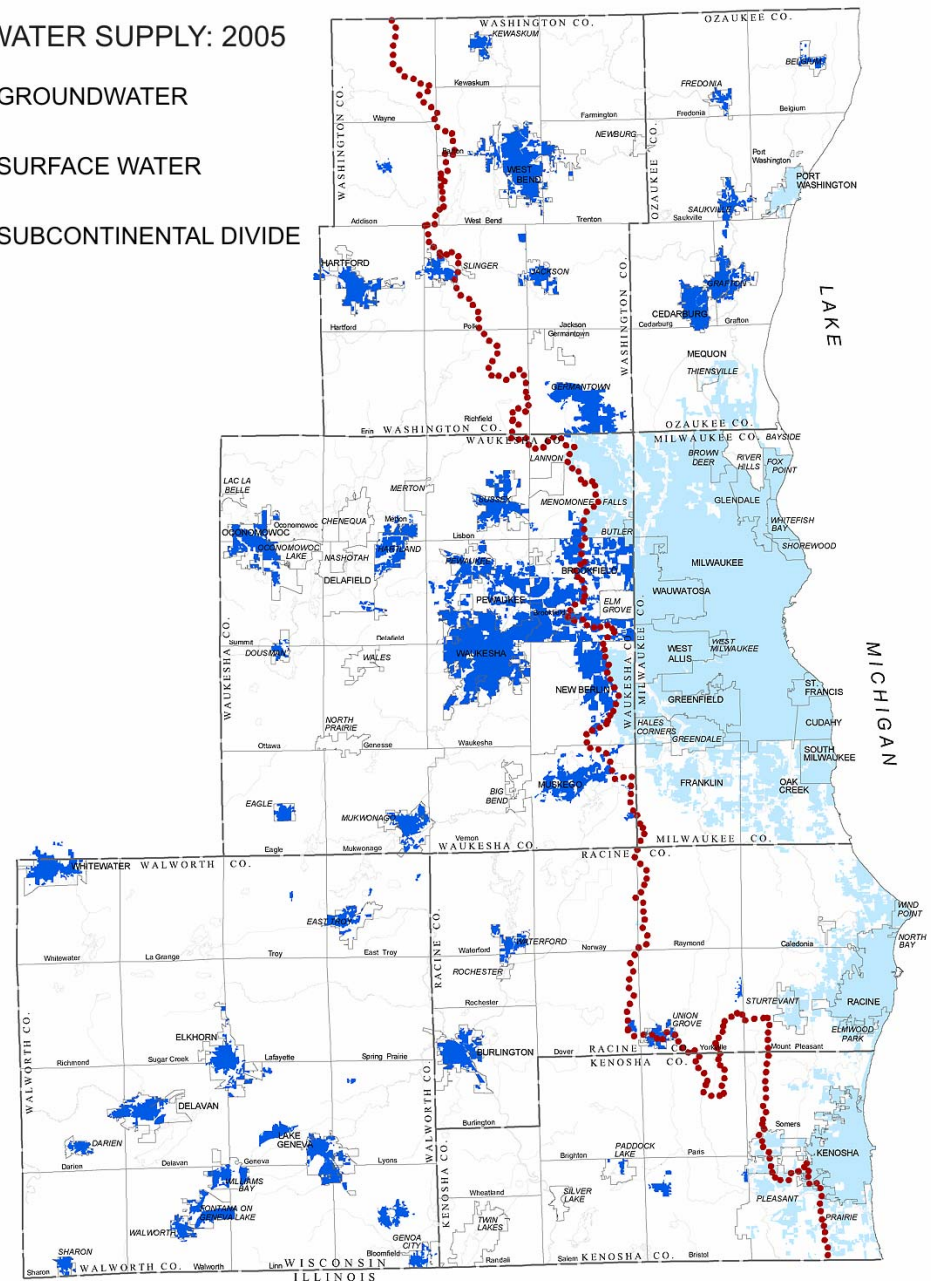
**Objective – To assure that the water supply for this Region can sustain existing and planned population and development.**

## Experience to Date

- Current water supply
  - Lake Michigan – 9 plants (28 systems) serving 1.2 million people (211 mgd)
  - Groundwater – 50 systems serving 400,000 people (50 mgd)
  - Groundwater – individual wells serving 400,000 people (24 mgd)
- Groundwater deep aquifer – historic 4 to 5 feet annual drawdown and some radium and dissolved solids problems.
- Groundwater shallow aquifer – some isolated seasonal supply problems.
- Lake Michigan water – existing treatment plants operating at less than 50 percent of capacity.
- Total Regional water use demand has changed little over last 10 years – ranging from about a 5 percent decline in Milwaukee County to a 15 percent increase in Waukesha County.

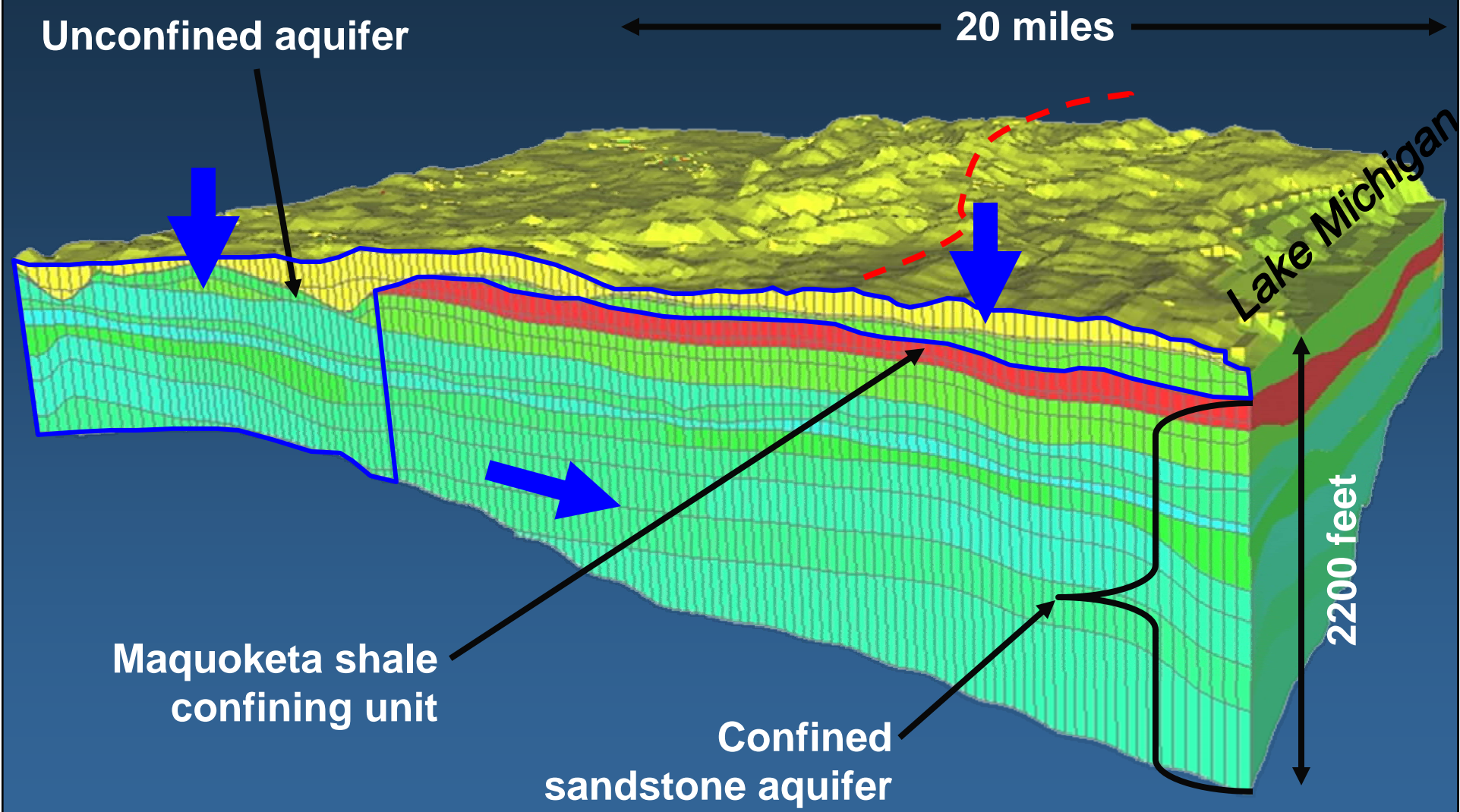
PUBLIC WATER SUPPLY: 2005

-  GROUNDWATER
-  SURFACE WATER
-  SUBCONTINENTAL DIVIDE



# Background

## General Hydrogeology of Southeast Wisconsin



Source: USGS

# Background

## Relative well depths

**Tallest buildings: ~600 ft. high**

**Domestic wells: 100-300 ft. deep**

**Most municipal wells:  
~200-800 ft. deep**

**Deepest wells: ~2200 ft. deep  
(municipal wells in SE WI)**

**Dolomite**

**Shale**

**Sandstone**

**Granite**

# Regional Water Supply Plan

## Scope of study

- Forecast future water use demand in the Region.
- Consider potential of water conservation to reduce future demand.
- Identify groundwater recharge areas which should be protected from development.
- Assess potential for shallow groundwater recharge through infiltration of stormwater runoff and treatment plant effluent.

## Consider potential alternative sources of supply




- Shallow groundwater
- Lake Michigan water replacing groundwater east of the subcontinental divide.
- Lake Michigan water replacing groundwater in “straddling communities” which already have “return flow”
- Lake Michigan water replacing groundwater in “straddling communities” and “communities in straddling counties” and providing for “return flow”.

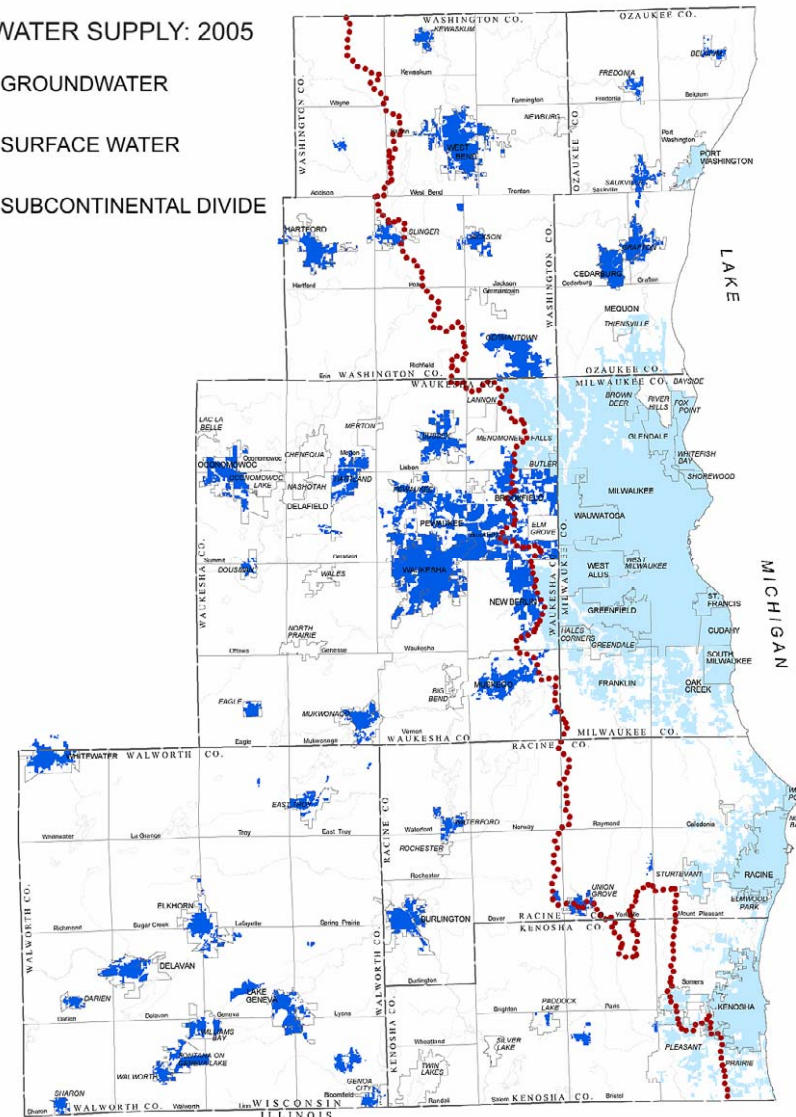
## Estimate costs and impacts of alternatives

- Groundwater-Surface Water Interdependence and Impacts

Identify any development constraints necessary to assure water supply sustainability

PUBLIC WATER SUPPLY: 2005




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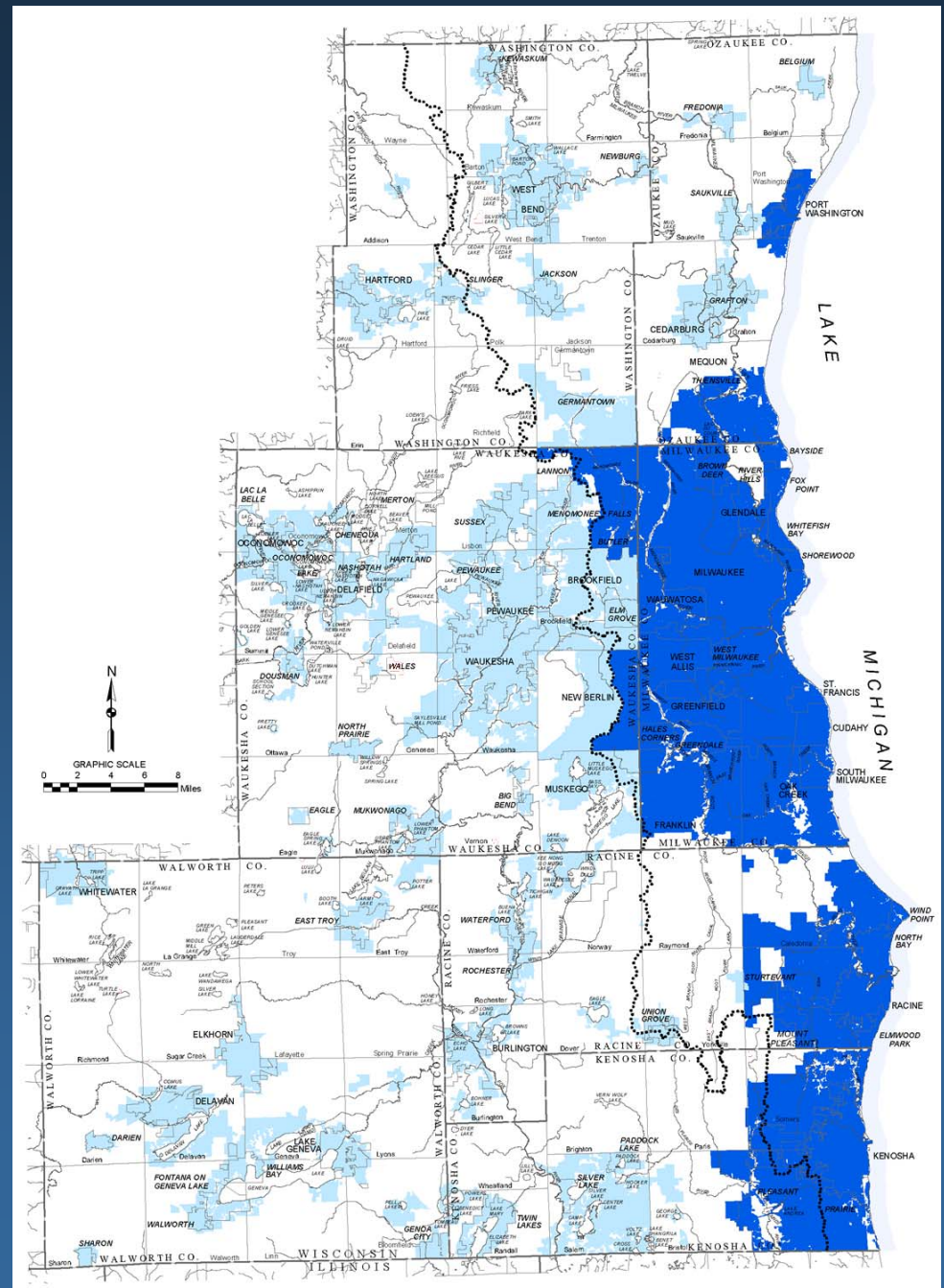
# Regional Water Supply Plan

## Alternative Plan 1 – Design Year 2035 Forecast Conditions Under Existing Trends and Committed Actions

### LEGEND

-  AREAS SERVED BY PUBLIC WATER UTILITIES PROVIDING WATER FROM LAKE MICHIGAN: 2035
-  AREAS SERVED BY PUBLIC WATER UTILITIES PROVIDING GROUNDWATER: 2035
-  SUBCONTINENTAL DIVIDE




- Existing 2007 water supply facilities
- Enhanced local water conservation programs
- Continued reliance on groundwater sources to meet 2035 demand (light blue)
- Continued reliance on Lake Michigan water sources for all areas now served, meeting 2035 demand (dark blue)
- Recharge of groundwater at new construction sites to the extent required by State law
- Continued reliance on private wells for residential areas (about 180,000 residences) plus selected agricultural, irrigation, and industrial uses

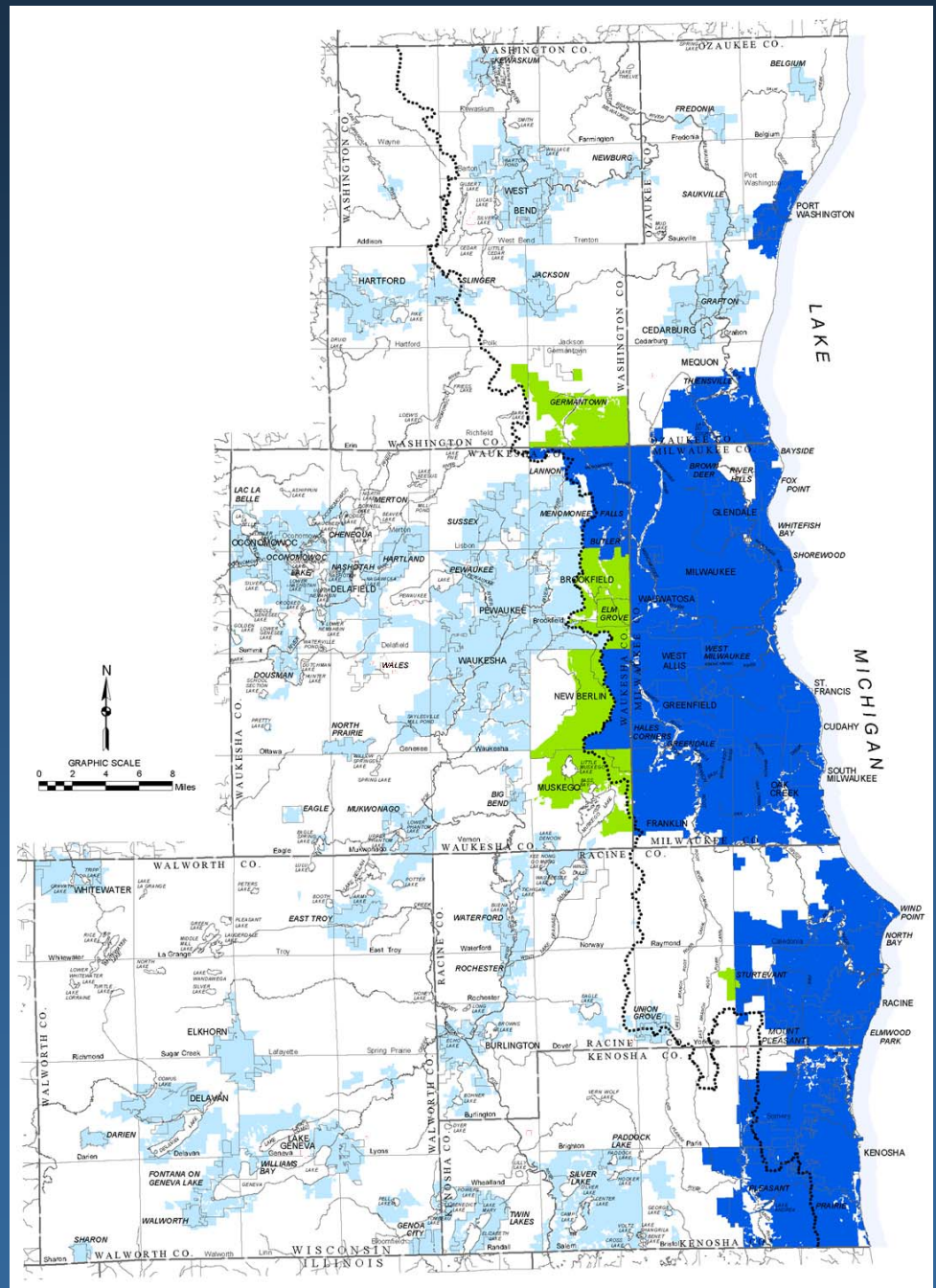


# Regional Water Supply Plan

## Alternative Plan 2 – Limited Expansion of Lake Michigan Supply

### LEGEND

-  AREAS SERVED BY PUBLIC WATER UTILITIES PROVIDING WATER FROM LAKE MICHIGAN UNDER ALTERNATIVE PLAN 1: 2035
-  AREAS CONVERTED FROM GROUNDWATER TO SURFACE WATER UNDER ALTERNATIVE PLANS 2 AND 3 COMPARED TO ALTERNATIVE PLAN 1: 2035
-  SUBCONTINENTAL DIVIDE







- Includes all aspects of Alternative Plan 1, but converts certain areas to Lake Michigan supply
  - 4 areas east of the subcontinental divide (Germantown, Elm Grove, Brookfield-east, and Yorkville) all with existing return flow (green)
  - 2 areas west of the divide (New Berlin-central, Muskego) both with existing return flow (green)

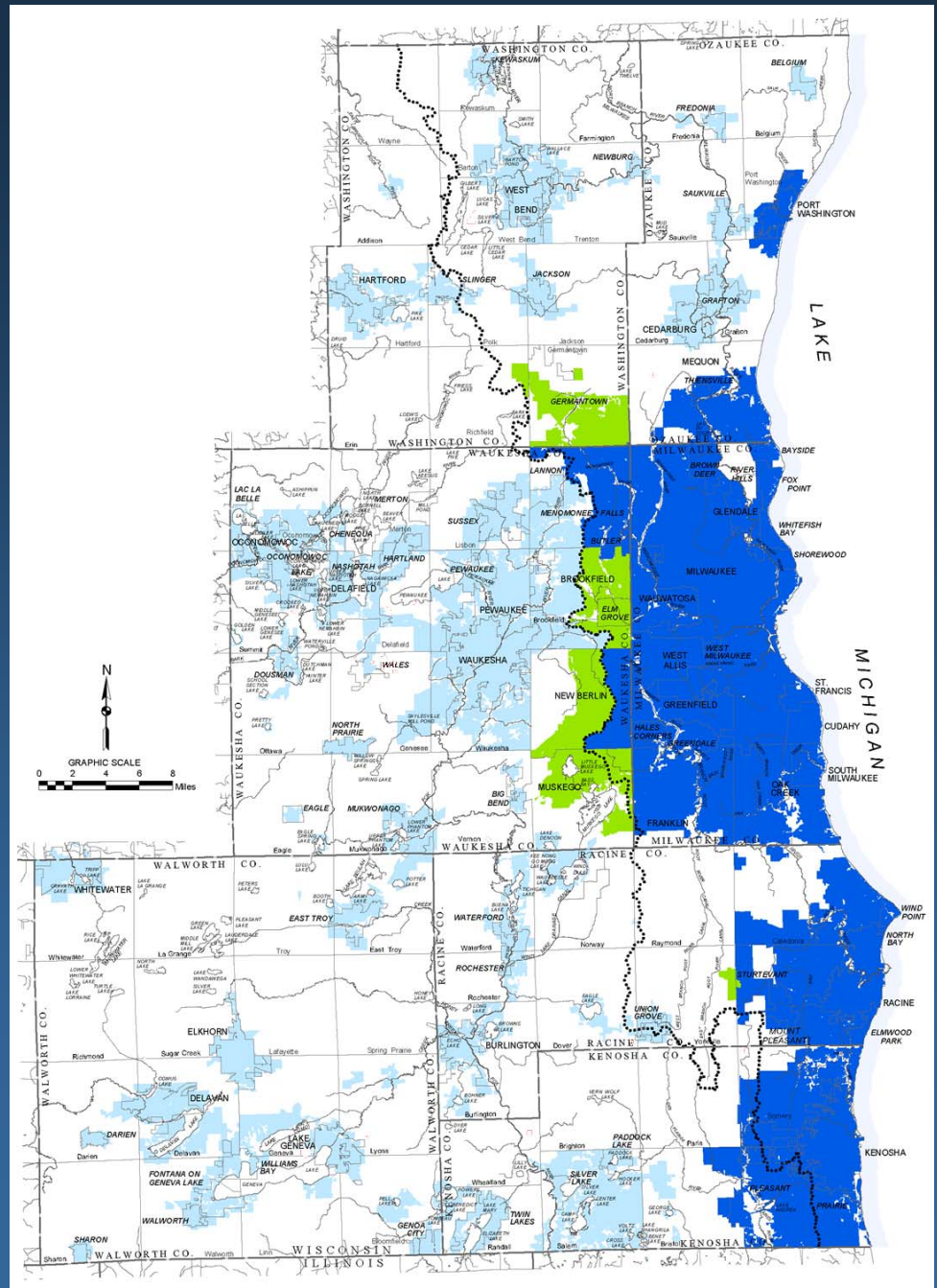
# Regional Water Supply Plan

## Alternative Plan 3 – Groundwater Recharge

### LEGEND

-  AREAS SERVED BY PUBLIC WATER UTILITIES PROVIDING WATER FROM LAKE MICHIGAN UNDER ALTERNATIVE PLAN 1: 2035
-  AREAS CONVERTED FROM GROUNDWATER TO SURFACE WATER UNDER ALTERNATIVE PLANS 2 AND 3 COMPARED TO ALTERNATIVE PLAN 1: 2035
-  AREAS SERVED BY PUBLIC WATER UTILITIES PROVIDING GROUNDWATER: 2035
-  SUBCONTINENTAL DIVIDE

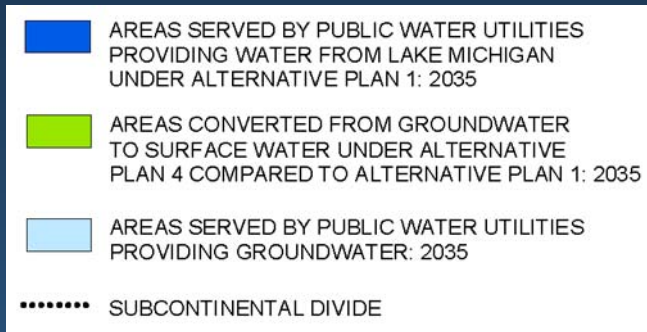
- Includes all aspects of Alternative Plan 2
- Enhancement of rainfall infiltration over 4.0 square miles of open space through bioengineering; sites to be selected
- Protection of most significant groundwater recharge areas through public purchase if necessary
- Recharge of groundwater at new construction sites beyond the extent required in State law
- Redirection of wastewater treatment plant effluent to shallow aquifer after enhanced treatment at 3-4 demonstration locations
- Recharge deep aquifer with treated Lake Michigan area



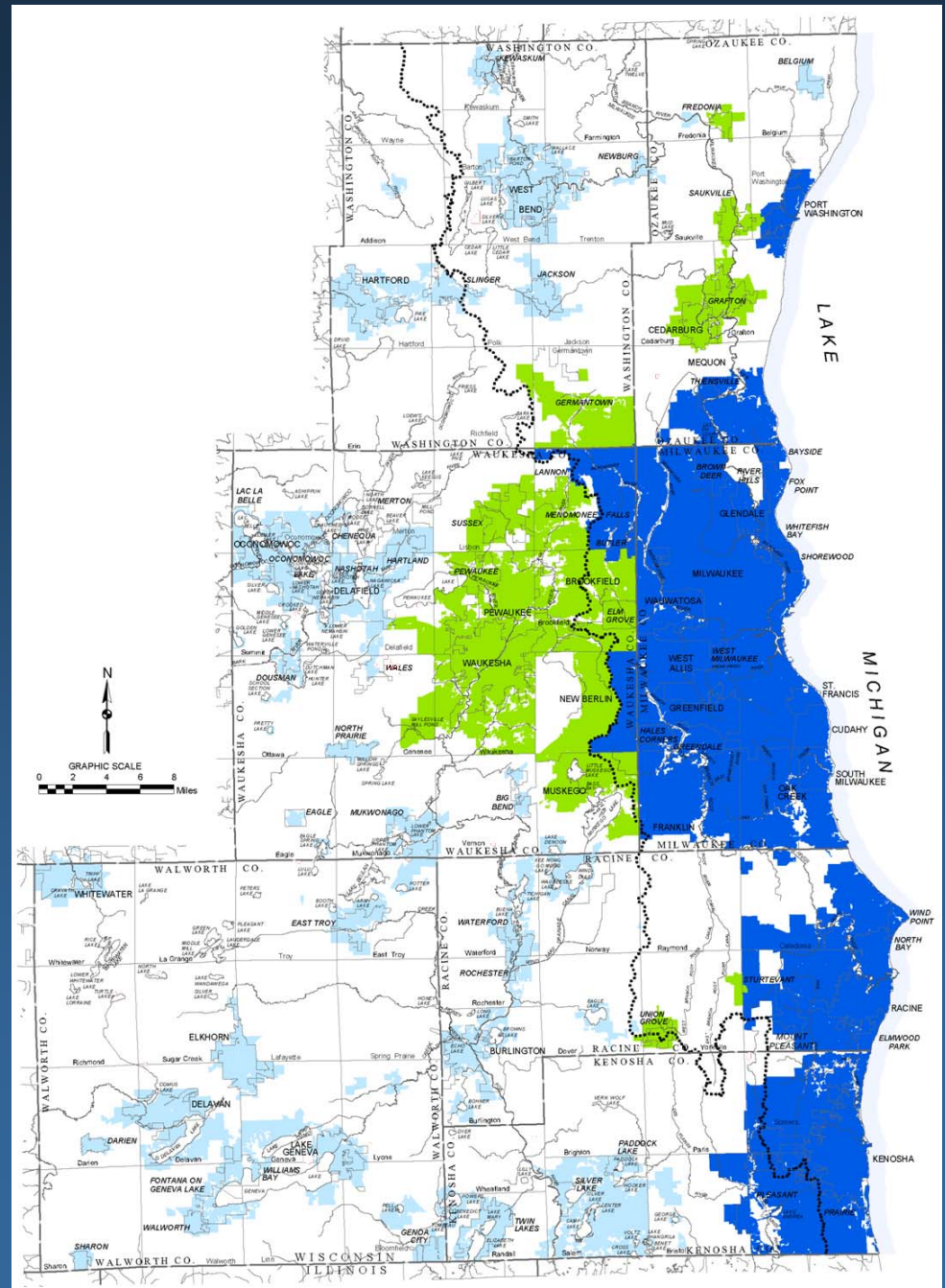


# Regional Water Supply Plan

## Alternative Plan 4 – Further Expansion of Lake Michigan Supply



- Includes all aspects of Alternative Plan 2 but with conversion of selected additional areas to Lake Michigan supply all with return flow components
  - 4 areas east of the subcontinental divide (Cedarburg, Grafton, Fredonia, Saukville) (green)
  - 4 areas in communities which straddle the divide (Brookfield-west, Menomonee Falls-west, Brookfield-town, Union Grove) (green)
  - 5 areas which are in communities west of the divide within a straddling county (Pewaukee-city, Pewaukee-village, Sussex, Lannon, Waukesha) (green)





## *Regional Water Supply Plan*

### Alternative Plan Evaluation Criteria

- Cost Effectiveness
- Impacts on Groundwater System
- Impacts on Surface Water System
- Environmental Justice Considerations
- Implementability
- Consistency with State and Federal Regulations and Policies
- Flexibility and Adaptability