Human Health: Drinking Water

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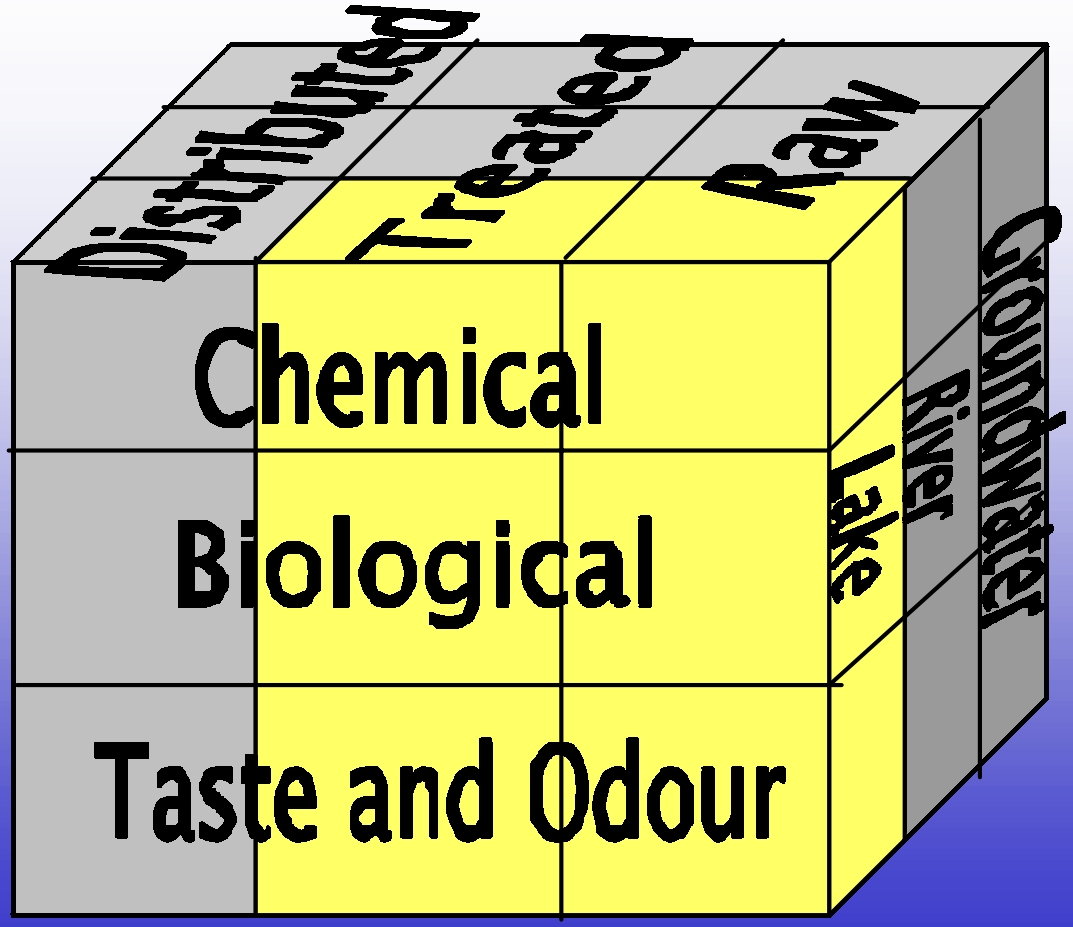
SOLEC Objective

TREATED drinking water supplies should be safe to drink

SOLEC Indicator

Drinking Water Quality features **TRENDS** in chemical and microbial contaminant levels in raw, treated and distributed water

Factors of Drinking Water



Drinking Water Workshop

- Issue is **TREATABILITY**
- U.S. and Ontario policies and regulations provide the minimum standards, guidelines and treatment levels for drinking water

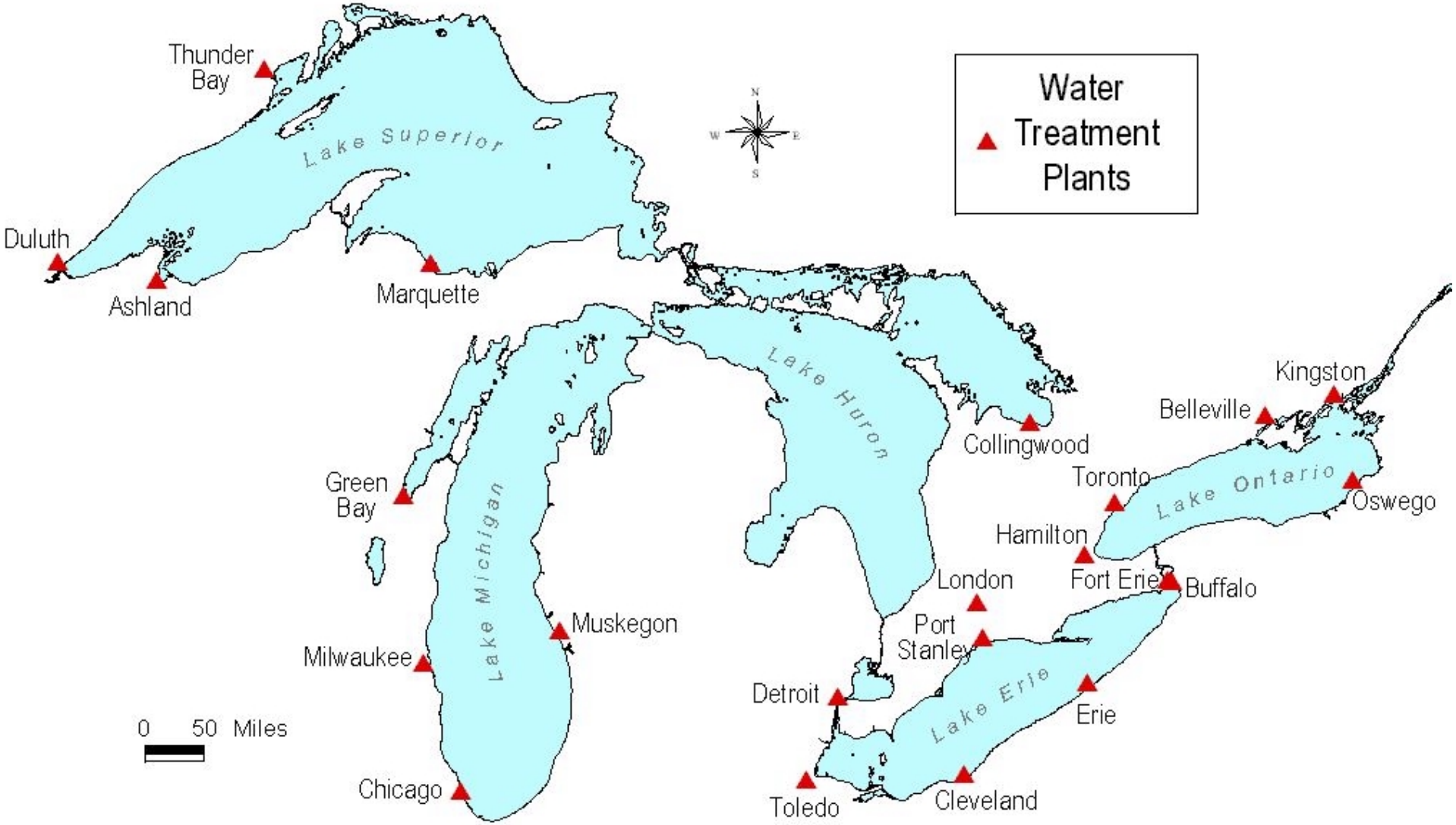
Drinking Water Workshop Conclusions

- The Parties emphasize the need for more attention to the quality of the raw water and the issue of its treatability.
- Greater protection of source water means more reliable treatment

Indicator Measurements

- Suspended Matter as Turbidity
- Organic Matter as Total Organic Carbon (TOC) or Dissolved Organic Carbon (DOC)
- Taste and Odour
- Pathogens
- Chemicals

Selected Water Treatment Plants



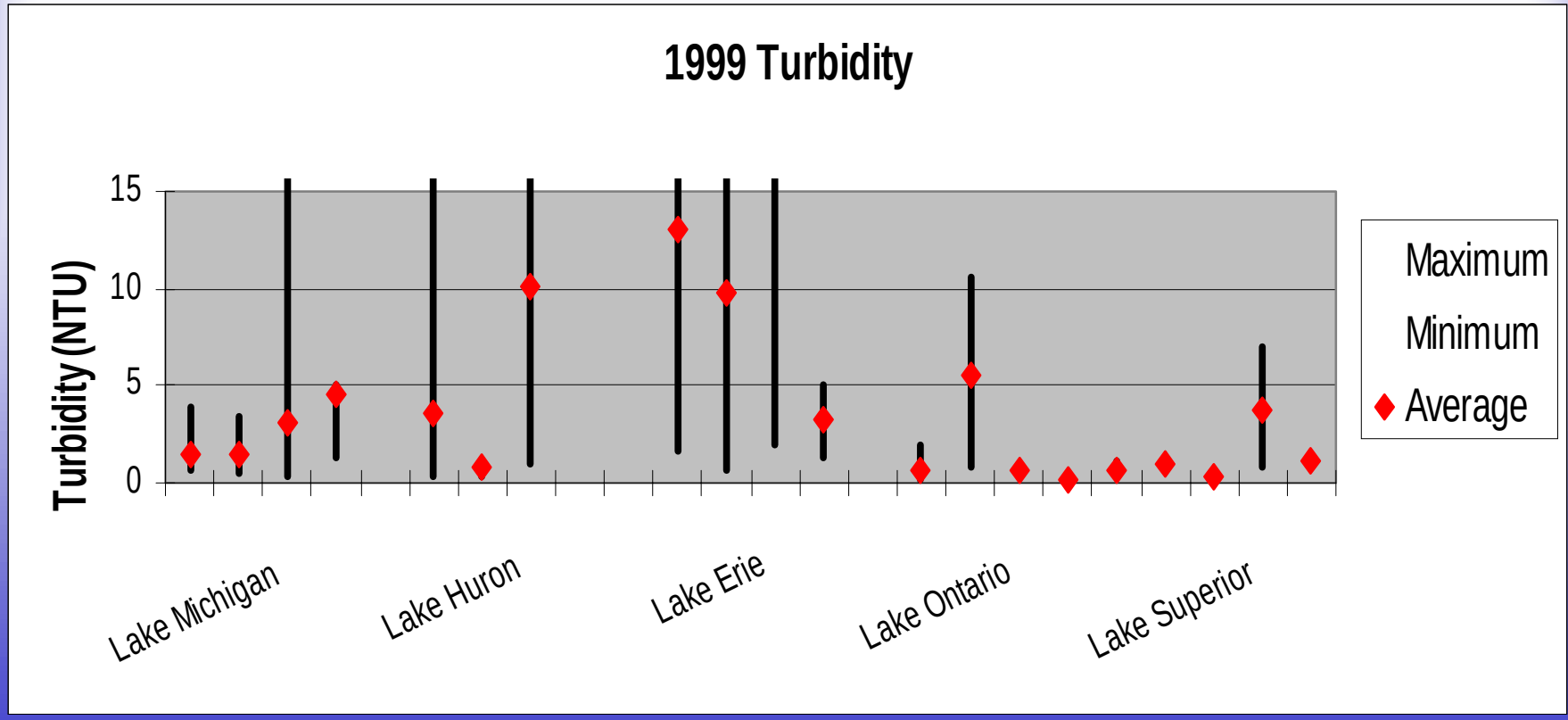
Turbidity

- Data are widely available in raw and treated water
- Raw water data are site specific
- Simple, continuously available measurement

Turbidity as an Indicator

- SOLEC measurement “local trends or deviations from baseline”
- Strong relationship between turbidity and health related parameters

1999 Turbidity Fluctuations



Turbidity Results

- Source water turbidity fluctuates both by season and location
- Treated water turbidity is very low

Organic Matter

- Total Organic Carbon (TOC) data for U.S. sites
- Dissolved Organic Carbon (DOC) data for Canadian sites

Organic Carbon as an Indicator

Increased organic carbon is linked to an increase in disinfection by-products and potential for carcinogenic compounds

Organic Carbon Results

- Raw water levels at these sites are almost always better than treated water standard
- Not a problem in Great Lakes

Taste and Odour

- Aesthetic parameter
- Important indicator for consumers
- “Inoffensive” is objective

Taste and Odour as an Indicator

- Difficult to quantify scientifically due to variety of gauging methods
- Related to presence of algae
- Methods for measurement include taste and odour panels, threshold odour, and Geosmin/MIB (2-methyl-isoborneol) tests

Taste and Odour Results

- Increasing problem over last 3 years
- Numerous consumer complaints
- Clearer water, higher temperatures
- More studies initiated to quantify problem agents like MIB/Geosmin

Pathogens

- Total Coliform
- *E. coli*
- Giardia
- Cryptosporidium

Pathogens as an Indicator

- Total Coliform is most frequent measurement
  - Usually present in raw water
  - Always measured in treated water
- *E. coli* testing not routinely performed in raw water

Pathogens as an Indicator, Continued

- Low risk for Giardia & Cryptosporidium in Great Lakes raw water unless intake is directly influenced by onshore sources
- Present methods for Giardia and Cryptosporidium are not as reliable

Pathogen Results

- 2 sites exceeded standards in 10 years for treated water from US Safe Drinking Water Information System
- Ontario Drinking Water Surveillance Program did not exceed standards through 1996
- Similar results in municipal data
- Low pathogen presence for these 22 sites

Chemicals

- Atrazine
- Nitrate
- Nitrite

Atrazine and Nitrogen as Indicators

- Atrazine
  - One source is herbicide application
- Nitrate and nitrite
  - Sources can be fertilizer runoff and septic tank leaching

Chemicals

- Atrazine
  - Raw water levels better than required minimum for treated
- Nitrate/Nitrite
  - Raw water levels better than required minimum for treated

Existing Pressures

- Non-point sources
- Increased algae presence and increased temperatures producing “offensive” taste or odour
- Balance between disinfection by-products and microbial protection
- Aging distribution systems
- Research
- Consumer Confidence

Conclusions

- State of drinking water at these 22 sites is good
- Source water protection needs to be promoted
- Lack of uniformity in data prevents comprehensive comparisons
- Consumer Confidence Reports provide comprehensive data

Acknowledgements

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Molly Madden

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