OVERVIEW OF WATER RESOURCE TRENDS IN WISCONSIN

Overview of Water Resource Trends in Wisconsin

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#239503

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Water Resources Trends in Wisconsin

- Water Quality
  - TMDLs
  - Chlorides
- Water Supply
  - Great Lakes Compact
- FEMA Great Lakes Mapping

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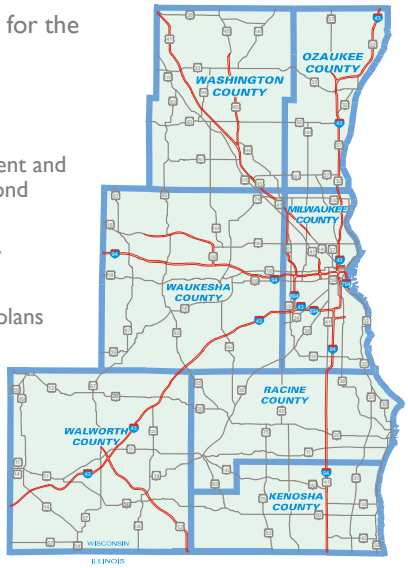
OVERVIEW OF WATER RESOURCE TRENDS IN WISCONSIN

Southeastern Wisconsin Regional Planning Commission (SEWRPC)

- Official Areawide Public Planning Agency for the Seven County Region
- Created in 1960 under State Legislation
- Purpose:
  - Consider and address physical development and infrastructure problems that extend beyond municipal and county boundaries
  - State designated Areawide Water Quality Management Planning Agency
  - Prepare regionwide advisory long-range plans
    - Land Use
    - Transportation
    - Water Quality Management
    - Flooding Management
    - Parks and Open Space
    - Environmental Corridors
    - Natural Areas
    - Water Supply



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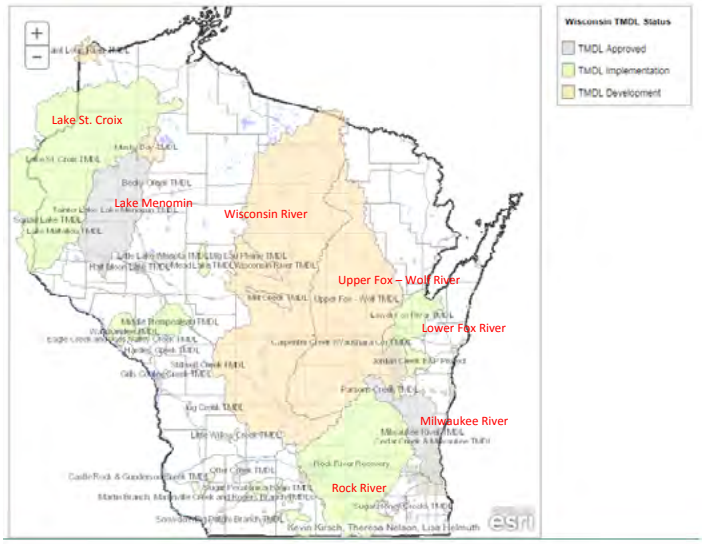
Total Maximum Daily Load (TMDL) Definition

- The load of a pollutant that a waterbody can assimilate and still achieve water quality standards.

Photo source: WDNR

Total Maximum Daily Loads (TMDLs)



Source: WDNR

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Rock River and Milwaukee River Basin TMDL Studies

- Rock River Basin: TMDLs established for total phosphorus and total suspended sediment. Study was prepared by WDNR in collaboration with USEPA.
- Milwaukee River Basin: TMDLs established for total phosphorus, total suspended sediment, and fecal coliform bacteria. Study was prepared by the Milwaukee Metropolitan Sewerage District in collaboration with WDNR and USEPA.
- Primary purpose is to address streams and rivers designated by WDNR and USEPA as having impaired water quality (303(d) list)

Total Maximum Daily Loads (TMDLs)

Source: WDNR

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Phosphorus Criteria (NR 102.06)

- Rivers = **100 µg/L (0.1 mg/l)**
- Streams = **75 µg/L (0.075 mg/l)**
- Reservoirs
  - Stratified = 30 µg/L
  - Not Stratified = 40 µg/L
- Lakes range from 15-30 µg/L
- Lake Michigan = 7 µg/L
- Lake Superior = 5 µg/L
- Exclusions
  - Ephemeral Streams
  - Wetlands
  - Lakes <5 ac

Source: WDNR

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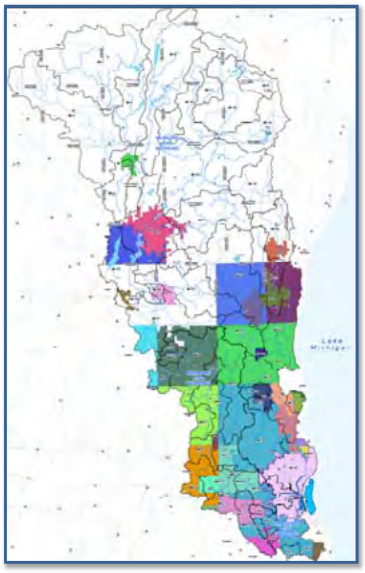
MS4s within the Milwaukee River Basin



- 44 permitted municipal separate storm sewer systems (MS4s)

Source: MMSD/CDM Smith

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Compliance Schedule

- DNR will work with MS4s to establish benchmarks for each 5-year permit term. Benchmarks are to be identified prior to each 5-year permit reissuance.
- It is possible that certain benchmarks will not be easily quantifiable, but there needs to be documentation that achieving such benchmarks will reduce the discharge of pollutants of concern.

Source: WDNR

Demonstrating Compliance

- Compliance with water quality standards
  - The TMDL reductions are the best estimate for meeting water quality standards and are modeled or simulated predictions.
  - Ambient stream monitoring will ultimately be required to demonstrate that water quality standards are being met and an impaired water body can be removed from the 303(d) list.
- Under a TMDL, compliance schedules can be structured in stormwater management plans and permits to allow MS4s time to meet TMDL goals.

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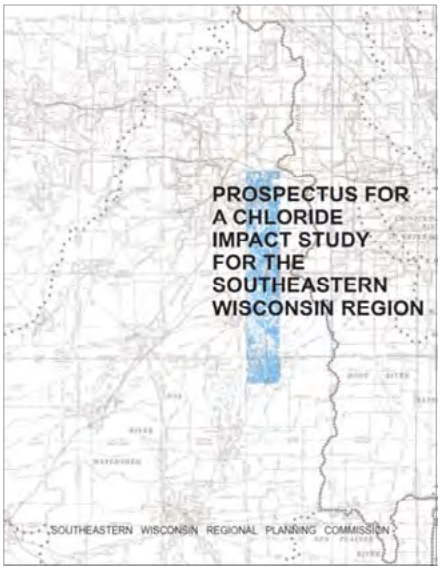
Chlorides

- SEWRPC Study began this year



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Focus of Chloride Study

- Examine potentially significant sources of chloride to the environment:
  - Road salt
  - Wastewater treatment plants
  - Private onsite wastewater treatment systems (e.g., septic systems)
  - Water softening (groundwater and surface water source)
  - Salt storage areas
  - Large agricultural feed lots
  - Fertilizers
  - Landfills
  - Chemical manufacturing
  - Food processing

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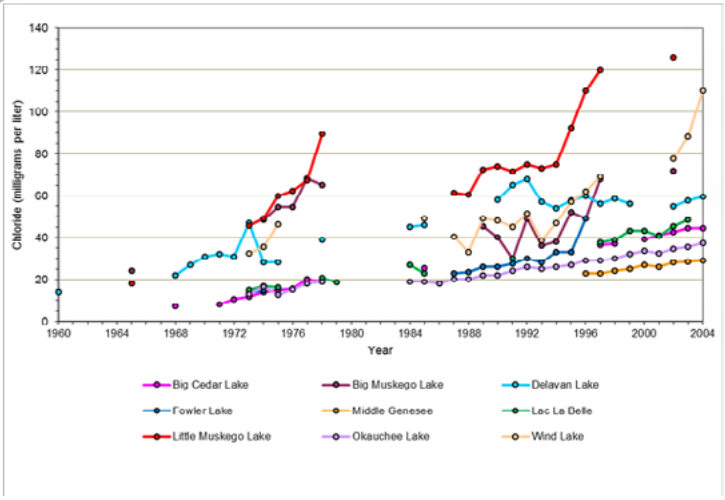
Need for the Study



Acute toxicity criterion: 757 mg/l
Chronic toxicity criterion: 395 mg/l

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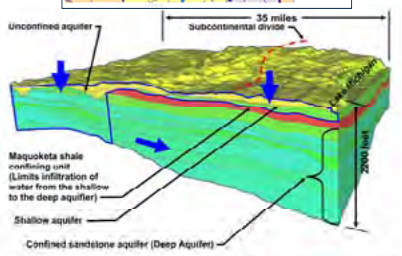
Impacts of Chloride

- Study would primarily address impacts on surface and groundwater resources
  - Streams, rivers, and lakes (effects on water quality and aquatic life)
  - Shallow groundwater aquifer, source of potable water for many communities and private wells in the Region and baseflow to streams, rivers, lakes, and wetlands
- Study would also consider potentially-affected elements of the terrestrial natural resources base (trees and plants)



Private residential wells are generally in the shallow aquifer and 100 to 165 feet deep. Most municipal wells are 200 to 800 feet deep with some up to 2,200 feet deep, and are in both the shallow and deep aquifer.

Source: USGS

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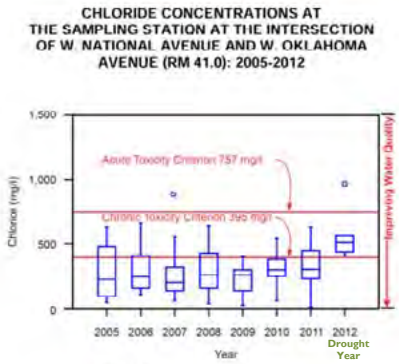
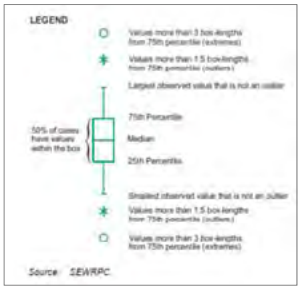
Evidence of Chloride in Groundwater





Source: Milwaukee Metropolitan Sewerage District.

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Analyses and Forecasts

- Compile existing data on chloride concentrations, specific conductance (surrogate for chloride), and streamflow
- Over a two-year surface water quality sampling period:
  - Deploy continuous recording data loggers to measure water temperature and specific conductance at 30 to 40 stream, river, and lake locations
  - At data logger locations, collect 10 to 20 individual water samples to be analyzed for concentrations of chloride, total hardness, sodium, potassium, and sulfate
  - Establish relationships between specific conductance and chloride concentration
- Groundwater
  - WDNR chloride concentration data
  - Information from SEWRPC regional water supply plan
  - USGS observation wells
  - UW-Stevens Point private well water chemistry data
  - Municipal well data

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Description of State-of-the-Art of Activities Affecting Chloride in the Environment

- Examine various aspects of chloride sources in the environment
- Evaluate
  - Toxicity of anti-icing and deicing substances
  - Identify and evaluate best practices and technologies for:
    - Anti-icing and deicing
    - Water softening
    - Fertilizer application
  - Effects of chloride on transportation infrastructure
- Explore legal and policy aspects related to mitigating the effects of chloride on the environment (e.g., New Hampshire liability waiver)
- Develop performance and cost information for practices and management approaches

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Alternative Chloride Management Scenarios

- Alternative anti-icing and deicing materials
- Alternative anti-icing and deicing practices
- Legal and policy aspects related to mitigating the effects of chloride
- Meet public safety objectives
- Minimize harm to environment
- Cost-effective

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Current Effort: Pilot Testing of Data Loggers

- Deploy several types at a common location to compare
  - Compare how they perform relative to one another and chemical testing
  - See how the telemetry performs

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Great Lakes Compact

- The Wisconsin DNR's Water Use program was created to implement the Great Lakes–St. Lawrence River Basin Water Resources Compact and to focus on water quantity challenges statewide.

Great Lakes Compact

- The Compact provides a framework for each State to enact programs and laws protecting the Basin. The Compact includes the following points:
  - Economic development will be fostered through sustainable use and responsible management of Basin waters.
  - In general, there is a ban on new diversions of water from the Basin, but limited exceptions could be allowed in communities near the Basin when rigorous standards are met. (Waukesha)
  - Communities that apply for an exception have a clear, predictable decision-making process; standards to be met; and, opportunities to appeal decisions.
  - The States will use a consistent standard to review proposed uses of Basin water. The States have flexibility regarding their water management programs and how to apply this standard.

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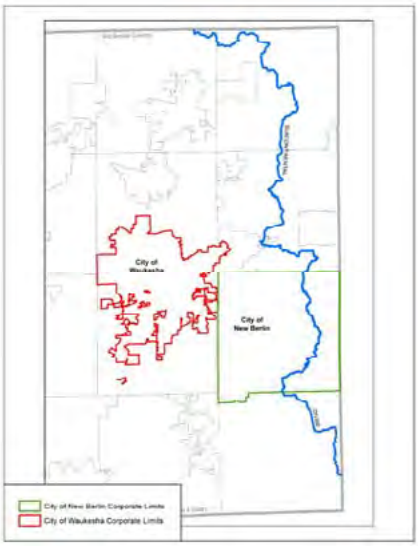
Great Lakes Compact

Community in straddling County but outside the Great Lakes Basin – Lake Michigan water supply applications reviewed by eight Great Lakes states and two provinces, and approved or rejected by governors of eight Great Lakes states



Community straddling the Subcontinental Divide – Lake Michigan water supply applications approved or rejected by WDNR

Great Lakes Compact

Upcoming Timeline for Implementation

Water Supply Service Area Plan – December 2025

Wisconsin's compact implementing legislation calls for all communities with populations over 10,000 to have an approved water supply service area plan by the end of 2025.

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FEMA Great Lakes Mapping

Great Lakes Flood Study

- Comprehensive study of the Coastal Great Lakes flood hazards
- Latest technology, data, and models – including response based modelling concepts

Partners involved:

FEMA

US Army Corps of Engineers Detroit District

ERDC

RAMPP

STARR

FEMA

RiskMAP

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FEMA Great Lakes Mapping

Step 2: Transect Analysis: Wave Setup and Runup

- Wave Runup is the uprush of water on a barrier
  - Barriers include dune, seawall, revetment, bluff, or other steep shoreline feature

Wave Height
Wave Period
SWEL
Profile Slope
→
Wave Setup
Wave Runup

FEMA

RiskMAP

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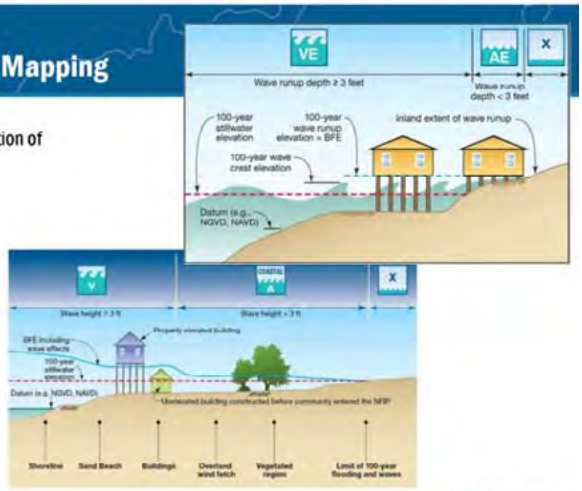
Step 3: Mapping

- Identification of
- VE
- AE
- AO
- X



FEMA

RiskMAP

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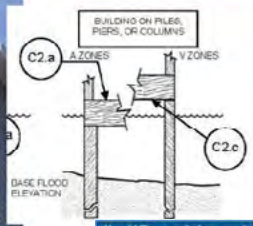
FEMA Great Lakes Mapping

Lowest horizontal structural member



Key V Zone minimum standard: 44 CFR 60.3(e)

The community must require that all new construction and substantial improvements have the lowest horizontal structural member of the lowest floor elevated to or above the base flood level,

... with the space below the lowest floor either free of obstruction or constructed with non-supporting breakaway walls ...

Source: FEMA

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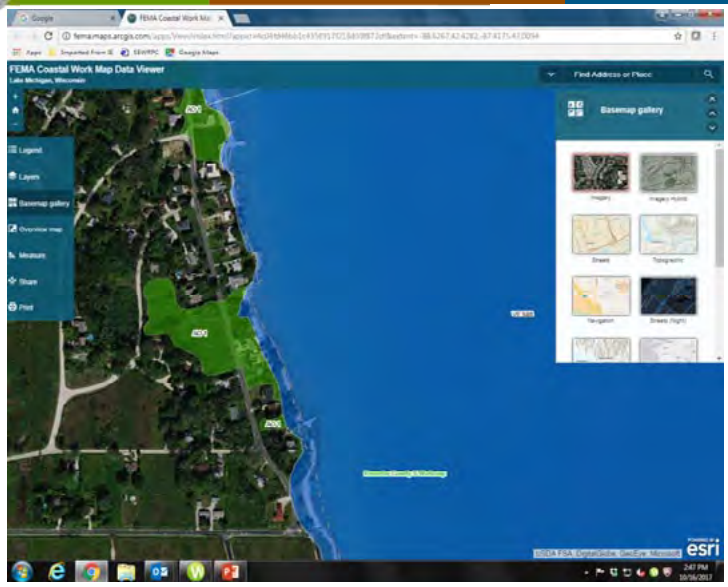

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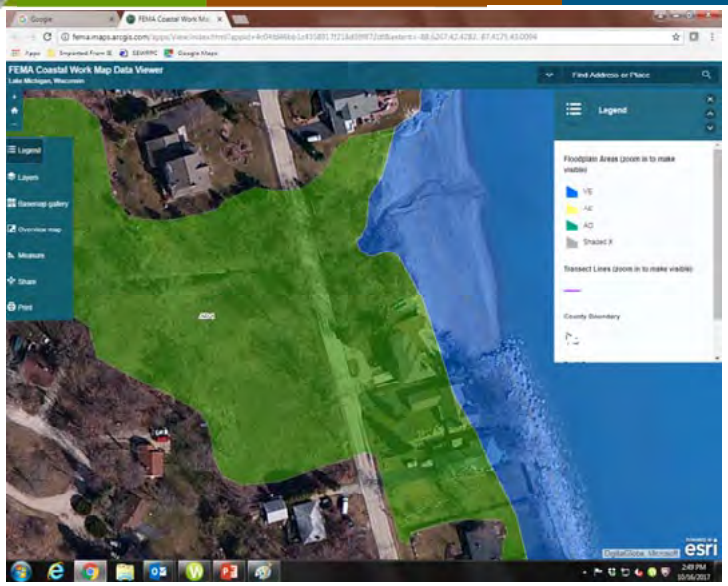

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FEMA Great Lakes – Oblique Photos

Bark Point, Bayfield County

https://greatlakes.erdc.dren.mil/

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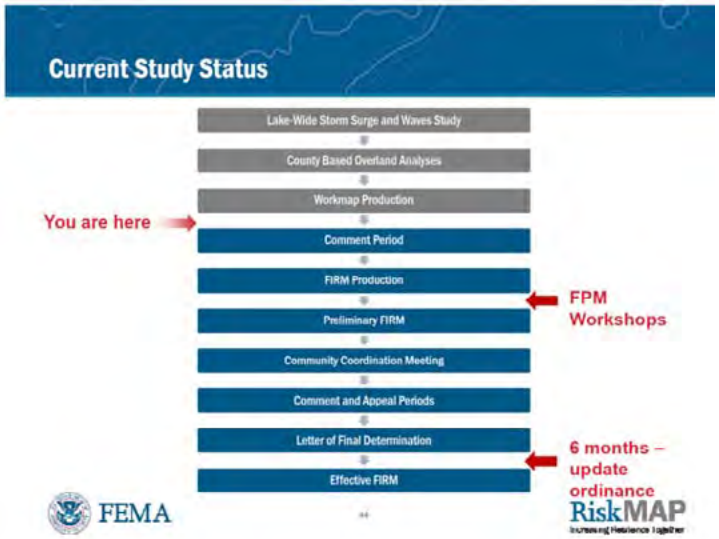
FEMA SE WI Lake Michigan Mapping



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Questions

Source: SEWRPC – Oak Creek

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