



**CDM**

## **Regulatory Overview and Water Quality Issues**

APWA / DRSCW Deicing Program Seminar

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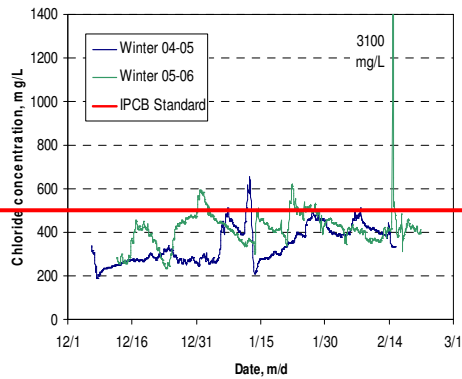
### **Impacts of Chloride**

- ◆ On snow and ice: melting
- ◆ On infrastructure and vehicles: corrosion
- ◆ On vegetation: adverse growth effects
- ◆ On aquatic life: impairment
- ◆ On drinking water: salty taste
- ◆ Chloride does not biodegrade

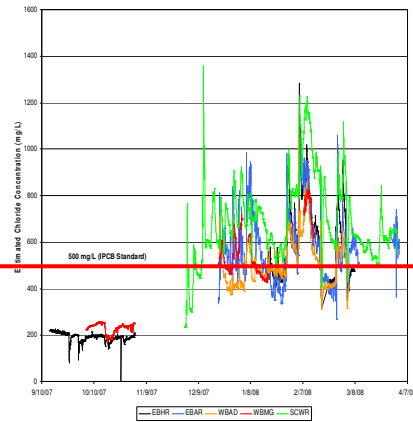


## Water Quality Monitoring

Hanover Park  
2004 - 2006



and Other Locations  
2007/08



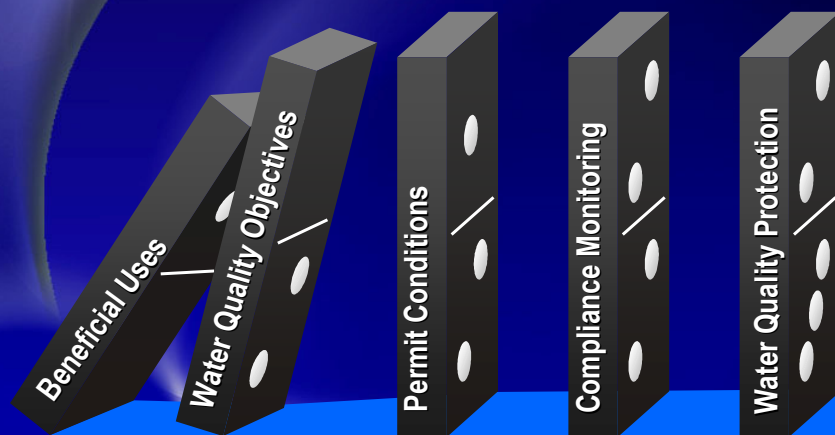
## Sources of Chloride

- ◆ Natural sources
- ◆ Point source discharges – e.g., wastewater treatment plants
- ◆ Non-point runoff sources – e.g., deicing operations
  - ◆ Determined to be major source

## Regulatory Control

- ◆ Federal Clean Water Act - USEPA
  - ◆ Waters shall be “fishable” and “swimmable”
  - ◆ NPDES Program
- ◆ IL Pollution Control Board
  - ◆ Sets water quality standards and objectives
- ◆ IEPA
  - ◆ Administers programs and NPDES permits
  - ◆ Develops TMDLs for impaired waters
- ◆ Counties / Communities
  - ◆ NPDES Phase II permit holders
  - ◆ Implementation guidance / ordinance, BMPs

## Beneficial Uses Lead to Permit / Program Requirements



## NPDES General Permit ILR40

- ◆ **Within six minimum control measures required:**
  - ◆ Pollution prevention for municipal operations
    - prevent and reduce the discharge of pollutants to the maximum extent practicable
    - training to prevent and reduce storm water pollution
    - BMPs for fleet and building maintenance, operation of storage yards, snow disposal
    - define appropriate BMPs for this minimum control measure and measurable goals for each BMP
  - ◆ Goals must ensure the reduction of all of the pollutants of concern in your storm water discharges to the maximum extent practicable
- ◆ **Additional requirements for TMDL waters**

## DuPage County Technical Guidance - Water Quality Best Management Practices

- ◆ **Section 2: GENERAL OVERVIEW OF BEST MANAGEMENT PRACTICES (BMPs)**
  - ◆ Includes “pollution prevention BMPs – often termed *good housekeeping activities*.”
  - ◆ E.g. “municipal street sweeping, commercial grease traps, roadway salt alternatives and spill prevention plans and/or structures.”

## DuPage County Technical Guidance - Water Quality Best Management Practices

### ◆ 3.2.1 Avoidance and Minimization

- ◆ “This manual strongly recommends avoidance and minimization as a high priority BMP. With regard to treating stormwater runoff for pollutants, avoiding and minimizing activities that cause pollutants to become entrained in stormwater runoff is a cost effective, efficient step.”

## DuPage County Technical Guidance - Water Quality Best Management Practices

### ◆ 4.1 BMP Selection Guide

- ◆ Mandatory BMPs  
“Consider avoidance and minimization of activities that cause pollutants to become entrained in stormwater runoff”

## Questions?

## Chloride Reduction Study - Background

- ◆ DuPage River Salt Creek Workgroup responding to impending water quality requirements for chloride
- ◆ DRSCW waterbodies impaired for chloride
  - ◆ Water quality standard for chloride: 500 mg/L
- ◆ TMDL requirements for chloride reduction
  - ◆ East Branch DuPage River: 33% reduction
  - ◆ West Branch DuPage River: 35% reduction
  - ◆ Salt Creek: 14% reduction

## Current Salt Usage

- ◆ Municipalities and townships questionnaire (included DuPage DOT and ISTHA)
  - ◆ Responses covered 70% of watershed area
  - ◆ Estimated 120,000 tons of salt / yr total
  - ◆ Higher than TMDL baseline
- ◆ Private companies – contacted 8/130
  - ◆ Salt use ranged from 8 tons to 500 tons / yr
- ◆ In the six county Chicago area, IDOT uses 140,000 tons salt / yr
- ◆ Total is possibly between 150,000 and 200,000 tons / yr in the DRSCW region

## Municipality Coordination

- ◆ Deicing practices questionnaire from DRSCW
  - ◆ Received 39 responses
  - ◆ Many interested in pilot programs
- ◆ Two workshops with PW managers and directors
  - ◆ December 11, 2006
  - ◆ July 26, 2007

## Approaches for Chloride Reduction

- ◆ Maintain or improve levels of service
- ◆ Alternative practices
  - ◆ Storage and handling
  - ◆ Applicator training “Just enough”
  - ◆ Pre-wetting
  - ◆ Anti-icing
- ◆ Alternative products
  - ◆ Acetate deicers, e.g. CMA
  - ◆ Organic process derivatives

## Management and Training

- ◆ Using “just enough”
- ◆ Timing and forecasting
- ◆ Benchmarking and record-keeping
  - ◆ Toronto, ON – Training program enhancements and fleet instrumentation resulted in 25% reduction in chloride usage, with benefit-cost ratio 17:1



## Pre-wetting

- ◆ Pre-wetting salt with select additives
  - ◆ At the manufacturer
  - ◆ At the stockpile
  - ◆ On the truck
- ◆ Cost and materials savings (30% typical)
- ◆ Minimal adaptations to equipment or strategy
- ◆ Used by most municipalities already
  - ◆ 29/39 questionnaire respondents already do at least some pre-wetting

## Anti-icing

- ◆ Application in advance
- ◆ Chloride reduction
- ◆ Cost reduction
- ◆ Accident reduction
- ◆ Reduced patrol times
- ◆ Used by some municipalities already
  - ◆ MNDOT – Anti-icing uses  $\frac{1}{4}$  material at  $\frac{1}{10}$  cost
  - ◆ Michigan DOT – Anti-icing reduced chloride by 38%
  - ◆ Colorado – Anti-icing saved 52% in overall costs



## Anti-icing

- ◆ **Challenges:**
  - ◆ Need tank-equipped vehicle
  - ◆ Need quality local weather forecasting
  - ◆ Change in operations: mobilizing in advance

## Current Anti-icing Usage

- ◆ From questionnaire – local anti-icing with liquids:
  - ◆ Aurora
  - ◆ Bolingbrook (major intersections, overpasses, over culverts, bridges)
  - ◆ Carol Stream
  - ◆ DuPage DOT (curves and bridge decks)
  - ◆ Hanover Park (all stop intersections)
  - ◆ Itasca (major intersections)
  - ◆ Lisle Township
  - ◆ McHenry County
  - ◆ Naperville (arterial roads)
  - ◆ Wheaton

## Anti-icing

- ◆ From questionnaire – local pre-salting (no liquids):
  - ◆ Bartlett
  - ◆ Bloomingdale
  - ◆ Hinsdale
  - ◆ Hoffman Estates
  - ◆ Warrenville

## DRSCW Chloride Reduction Program

- ◆ Public outreach and education
  - ◆ Staff training
  - ◆ Storage and handling improvements
  - ◆ Alternative deicing methods
  - ◆ Alternative deicing products
  - ◆ Long term monitoring
- Chloride reduction and cost savings often go hand and hand

## Education and Outreach

- ◆ Chloride reduction fact sheets
- ◆ Presentations / workshops
- ◆ Identification of sensitive areas
- ◆ Private deicing controls



## Improved Storage and Handling

- ◆ Salt storage on an impervious pad
- ◆ Drainage from storage area controlled
  - ◆ Vehicle wash water contained
- ◆ Structural covering for salt
- ◆ Entrance and loading area covered

## Alternative Deicing Methods

- ◆ Encourage full implementation of pre-wetting and anti-icing



## Alternative Deicing Products

- ◆ Calcium magnesium acetate (CMA)
  - ◆ Used by DuPage DOT, Elmhurst, Hanover Park and Naperville
- ◆ Potassium acetate (KA, CF7®)
  - ◆ Used by Lisle
- ◆ Sodium acetate (Cryotech NAAC®)
- ◆ Urea – used by Naperville
- ◆ Organic process derivatives
  - ◆ Proprietary products including Caliber®, Geomelt®, Ice Ban® and many others

## In-stream Monitoring

- ◆ Water quality monitoring to establish baseline chloride levels completed
- ◆ Long term monitoring to demonstrate effectiveness of chloride reduction measures

## Questions and Discussion

