Minnesota Case Study: Status of Efforts to address Chloride TMDLs in Twin Cities region

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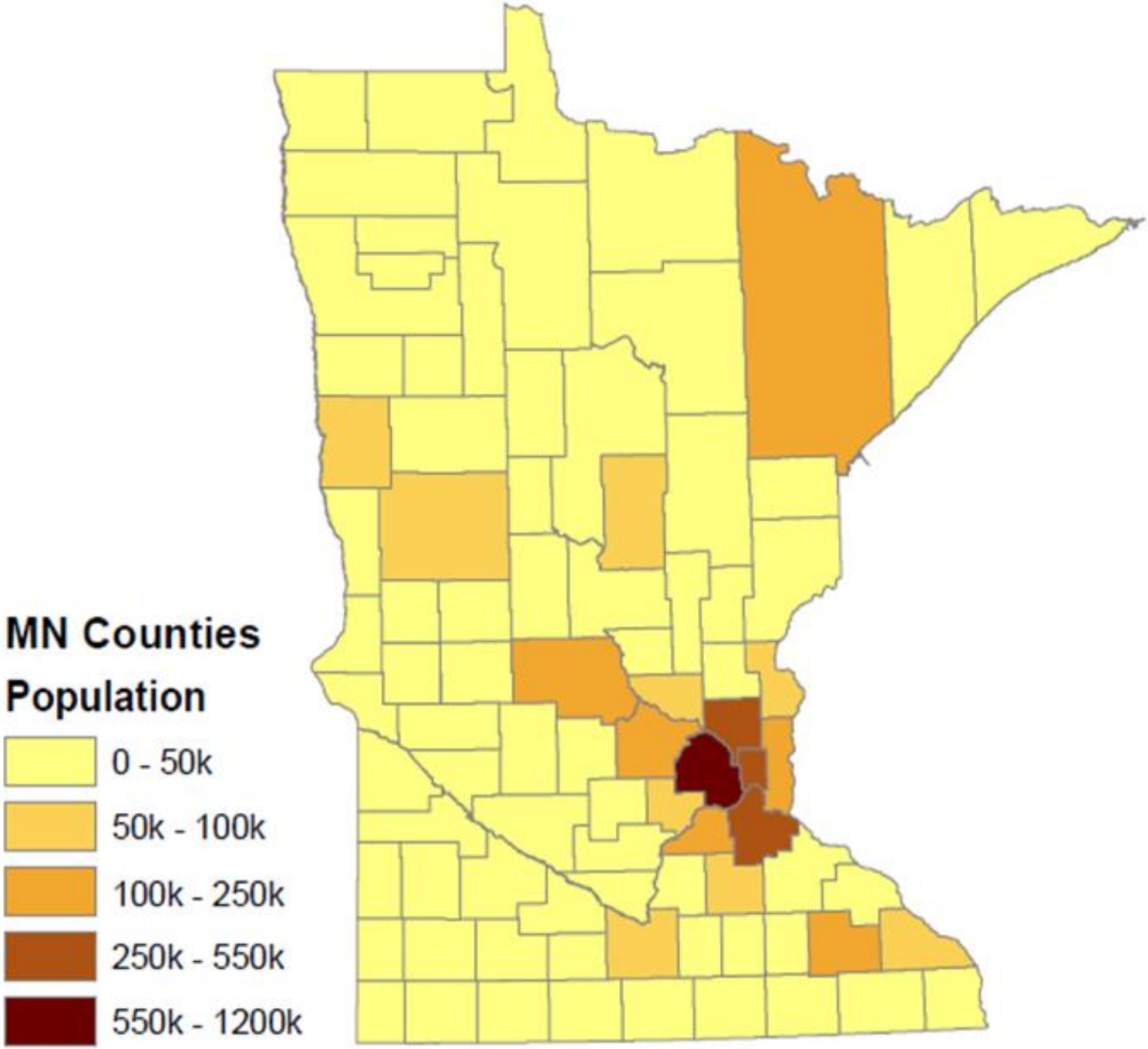

MN Counties
Population
0 - 50k
50k - 100k
100k - 250k
250k - 550k
550k - 1200k

Overview

What's the problem?

What's been done about it?

Metrics for measuring progress?

What's the problem?

54 inches of snow annually

36 days with 0.1 inch or more

14 days with 1 inch or more

7 days with 2 inches or more

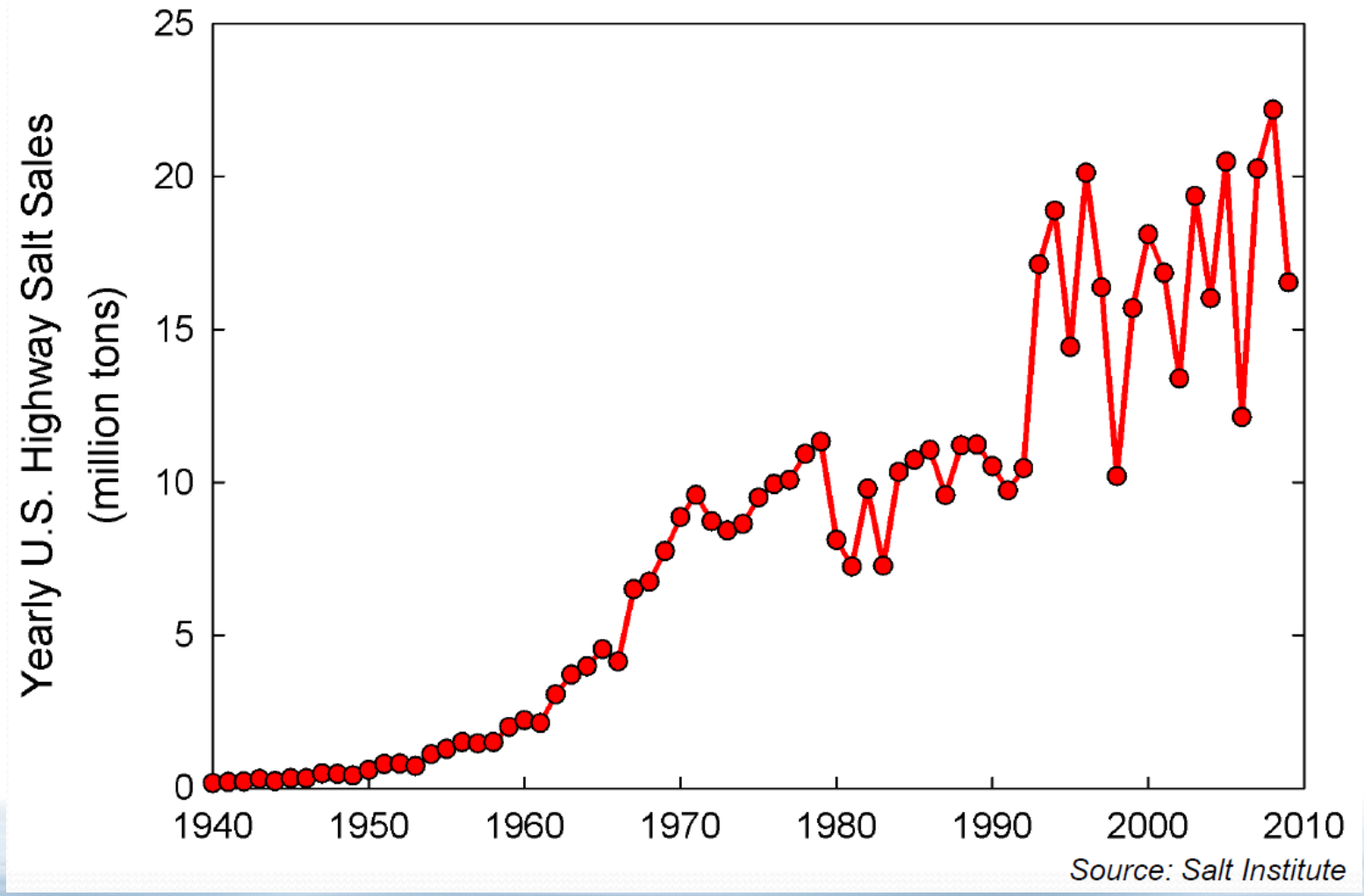
What's the problem?

The public expects & needs safe roads, parking lots and sidewalks

What's the problem?

~365,000 tons of road salt are applied in metro area each year

Road salt usage has increased



What's the problem?

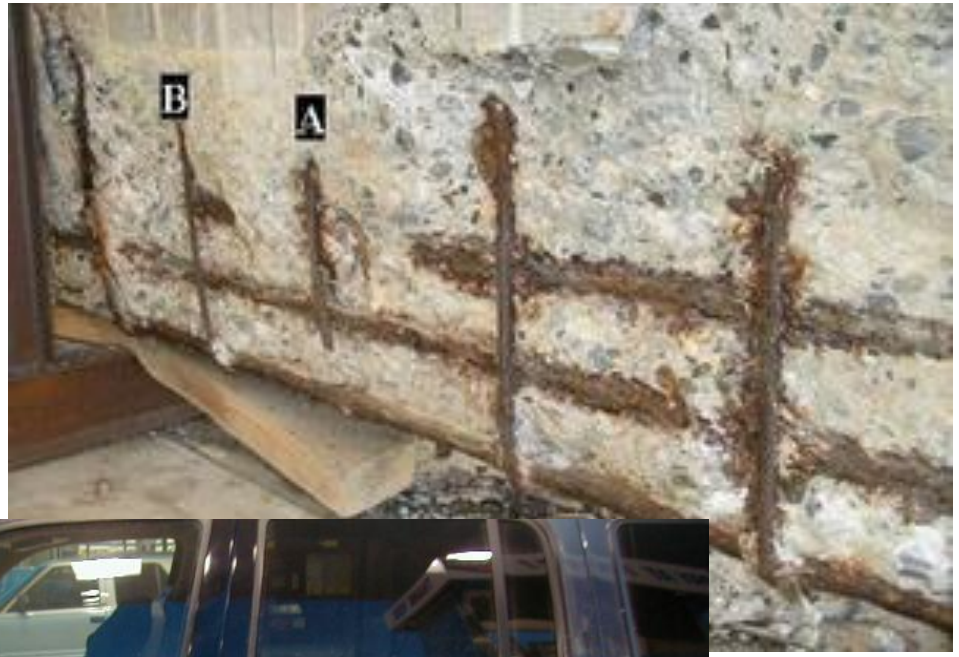
Chloride is toxic to aquatic life

- State standard = 230 mg/l

  ~1 teaspoon salt in 5 gallons water

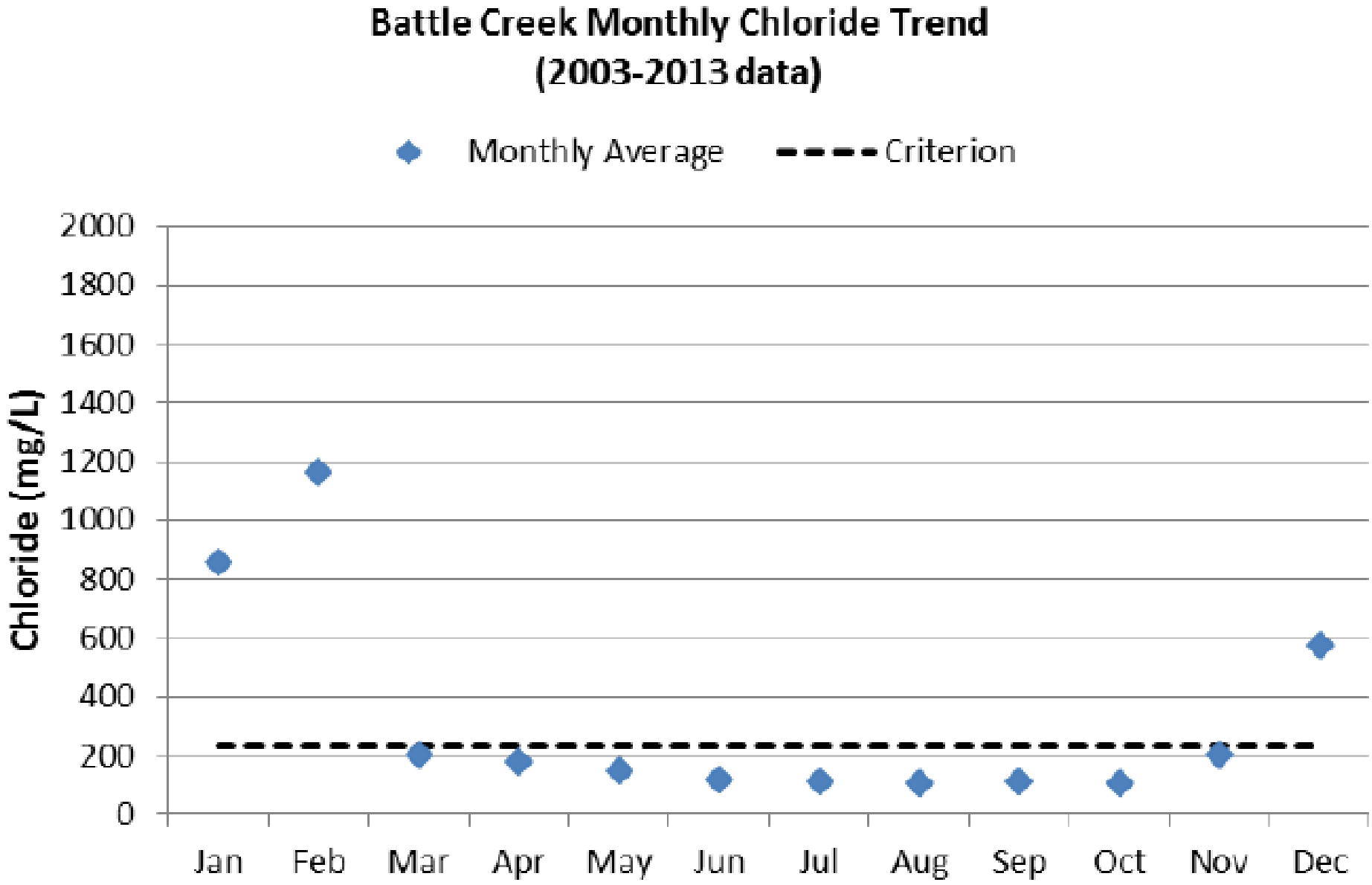
Other problems with road salt

- Source water protection
- Corrosion
- Vegetation
- Cost

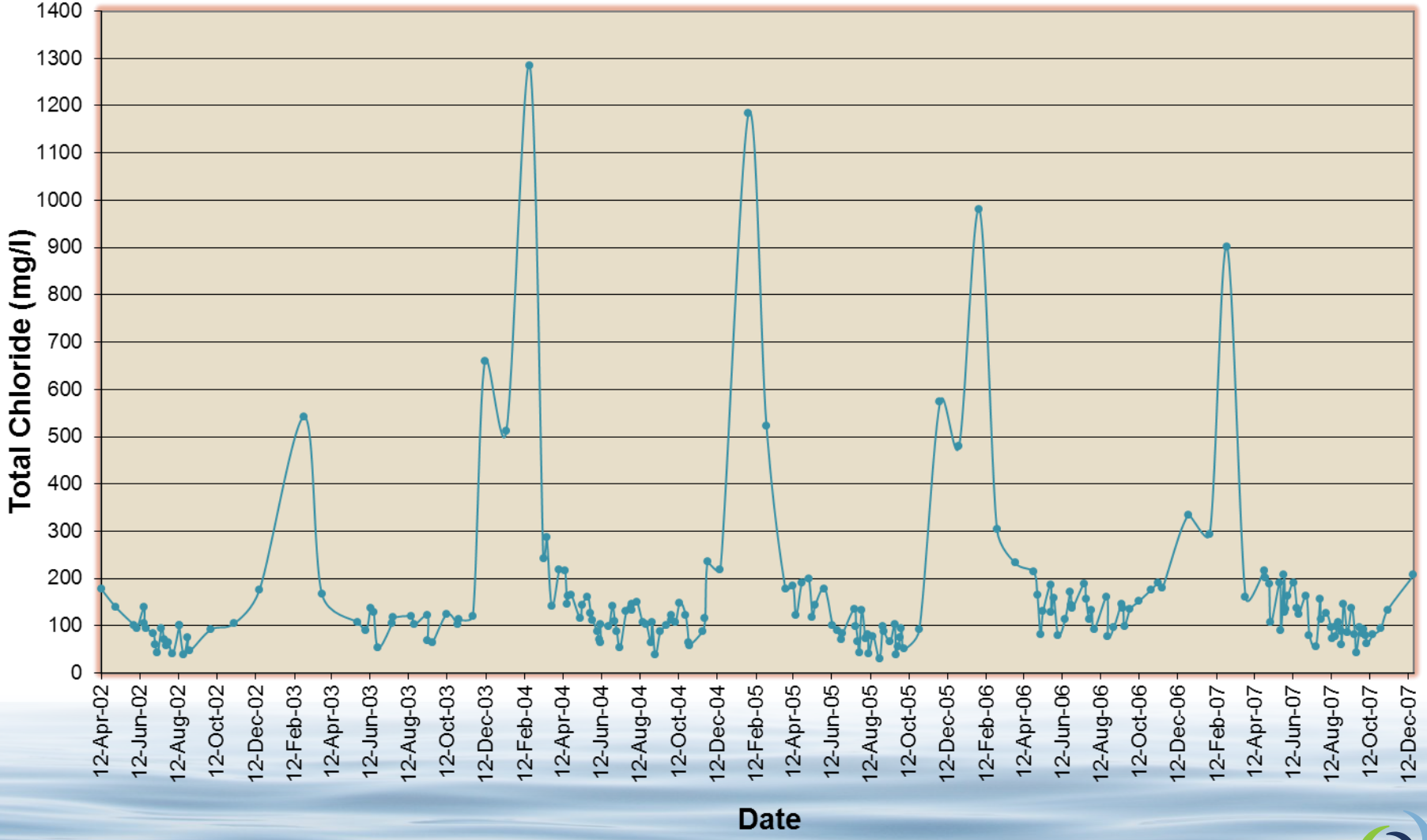


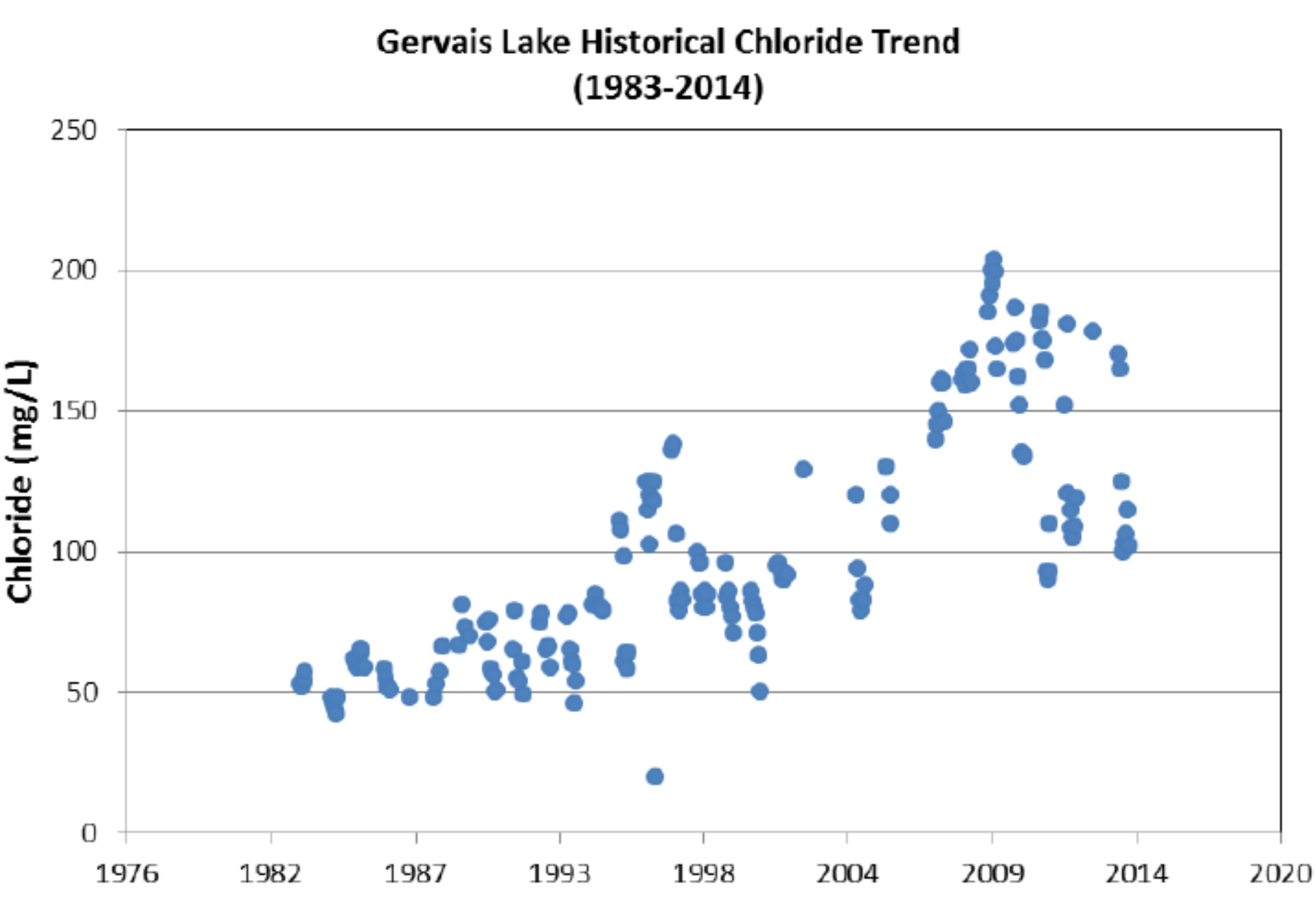
MPCA's response

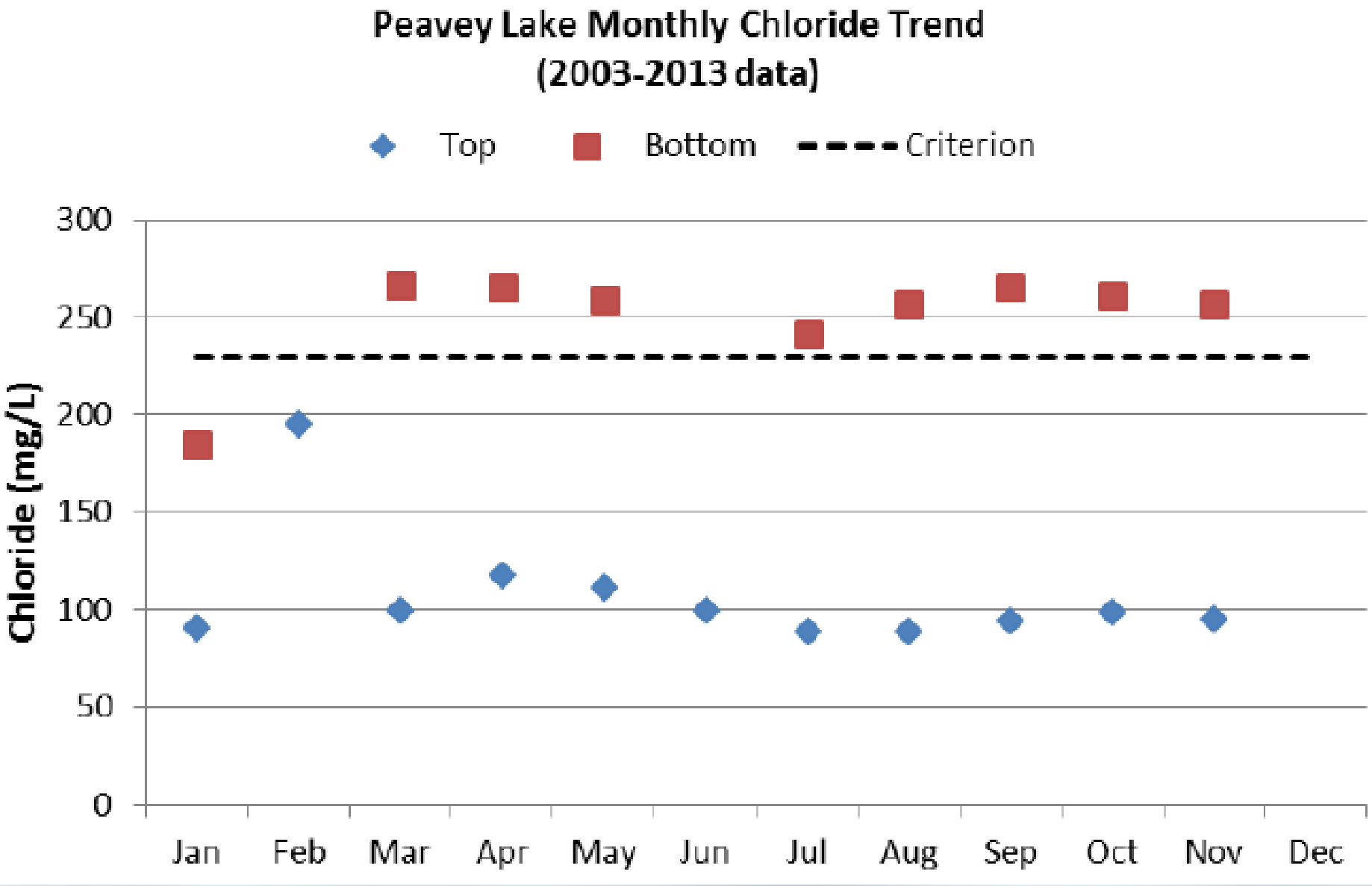
- Initial awareness in early 2000's
- Early winter maintenance training efforts ~2004
- First chloride TMDL in 2007
- "Feasibility Study" in 2008-2009
- Intensive monitoring 2010-2013
  - Initiation of stakeholder groups
- 2014 303(d) listing added 37 impairments
- Metro TMDLs and management plan in 2016
- Finalizing statewide management plan in 2019


Battle Creek Monthly Chloride Trend
(2003-2013 data)
Monthly Average
Criterion
Chloride (mg/L)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

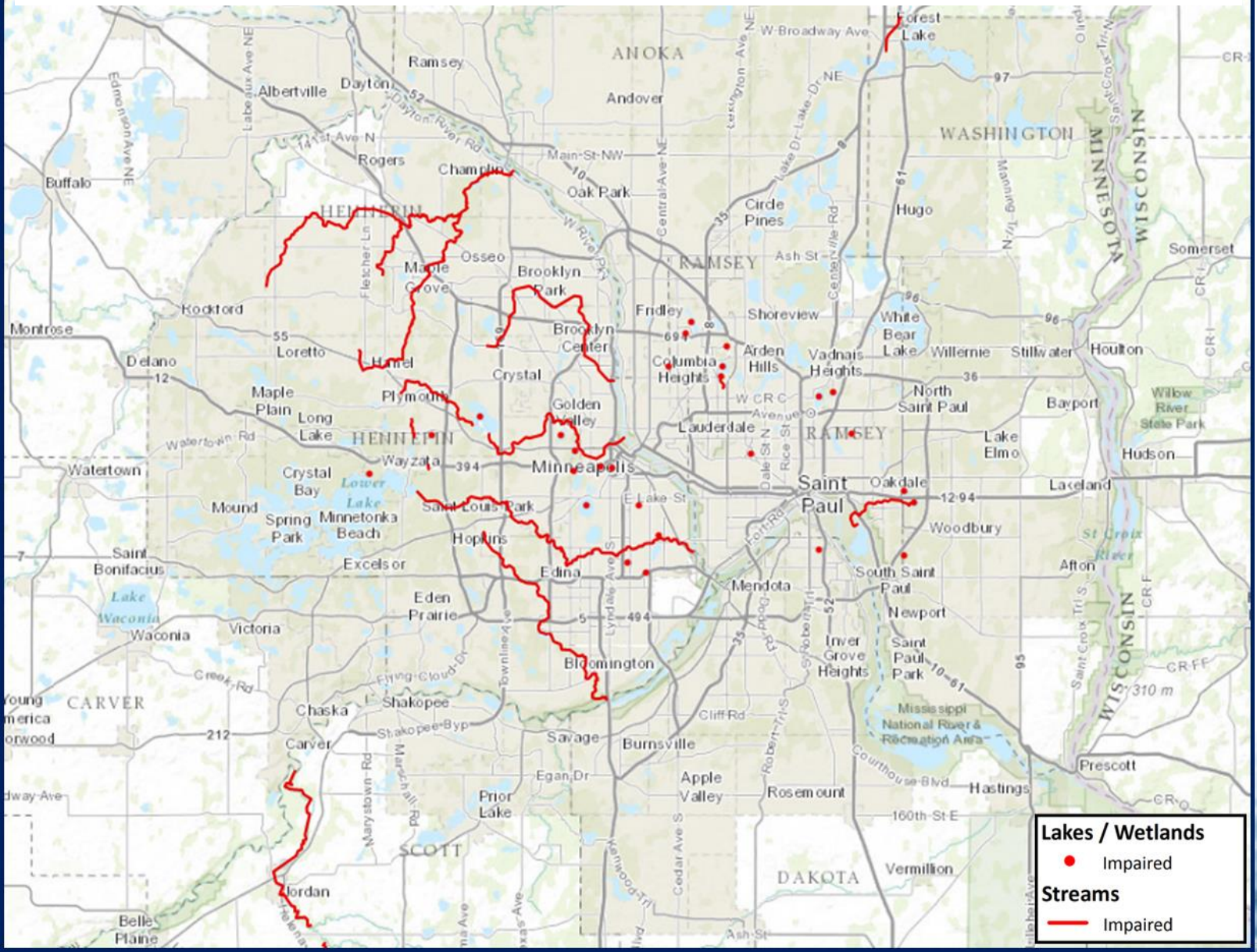
Battle Creek chloride 2002-2007




Gervais Lake Historical Chloride Trend
(1983-2014)
Chloride (mg/L)
250
200
150
100
50
0
1976
1982
1987
1993
1998
2004
2009
2014
2020


Peavey Lake Monthly Chloride Trend
(2003-2013 data)
Top
Bottom
Criterion
Chloride (mg/L)
300
250
200
150
100
50
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

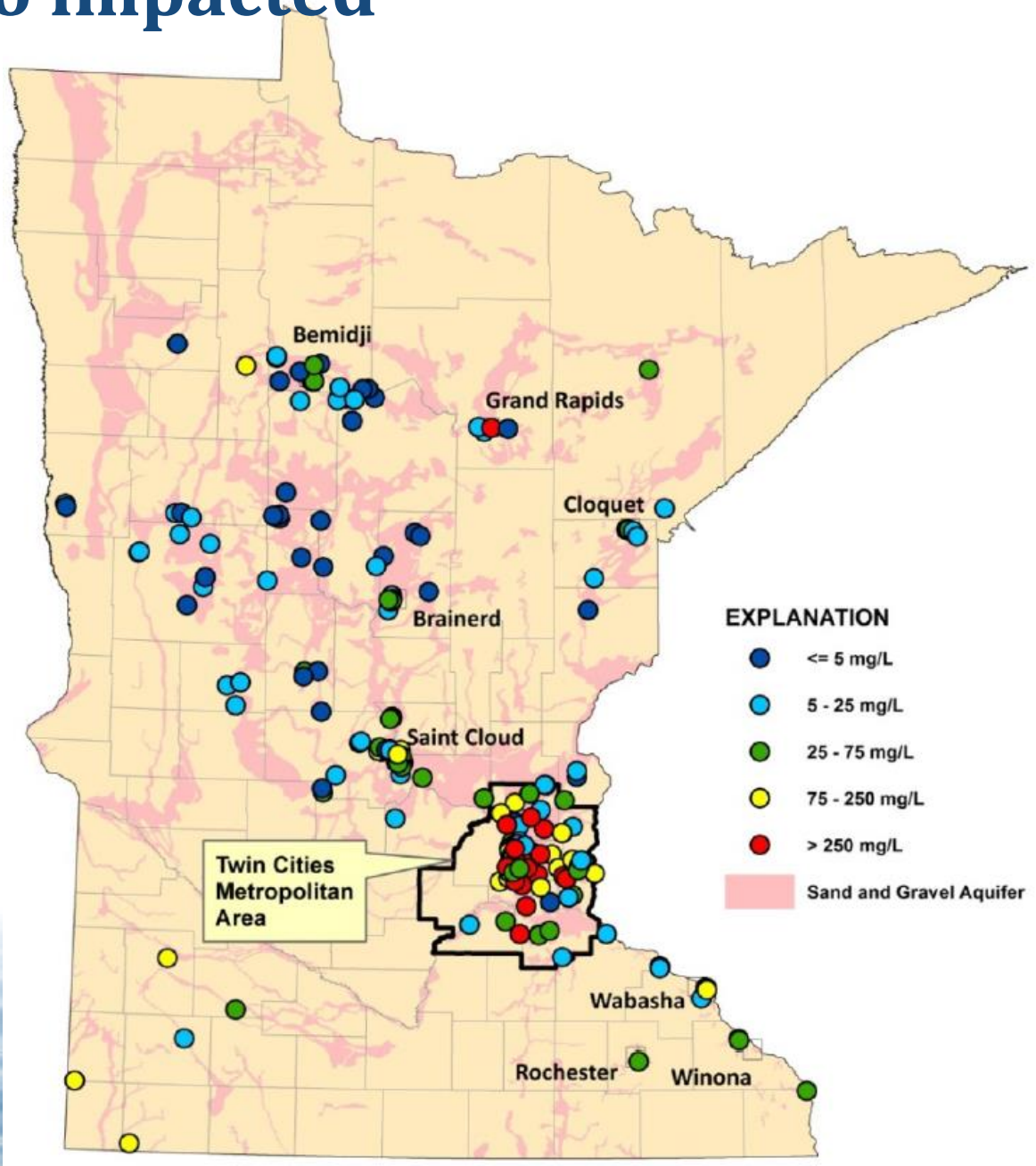
2014 303(d) list of impaired waters



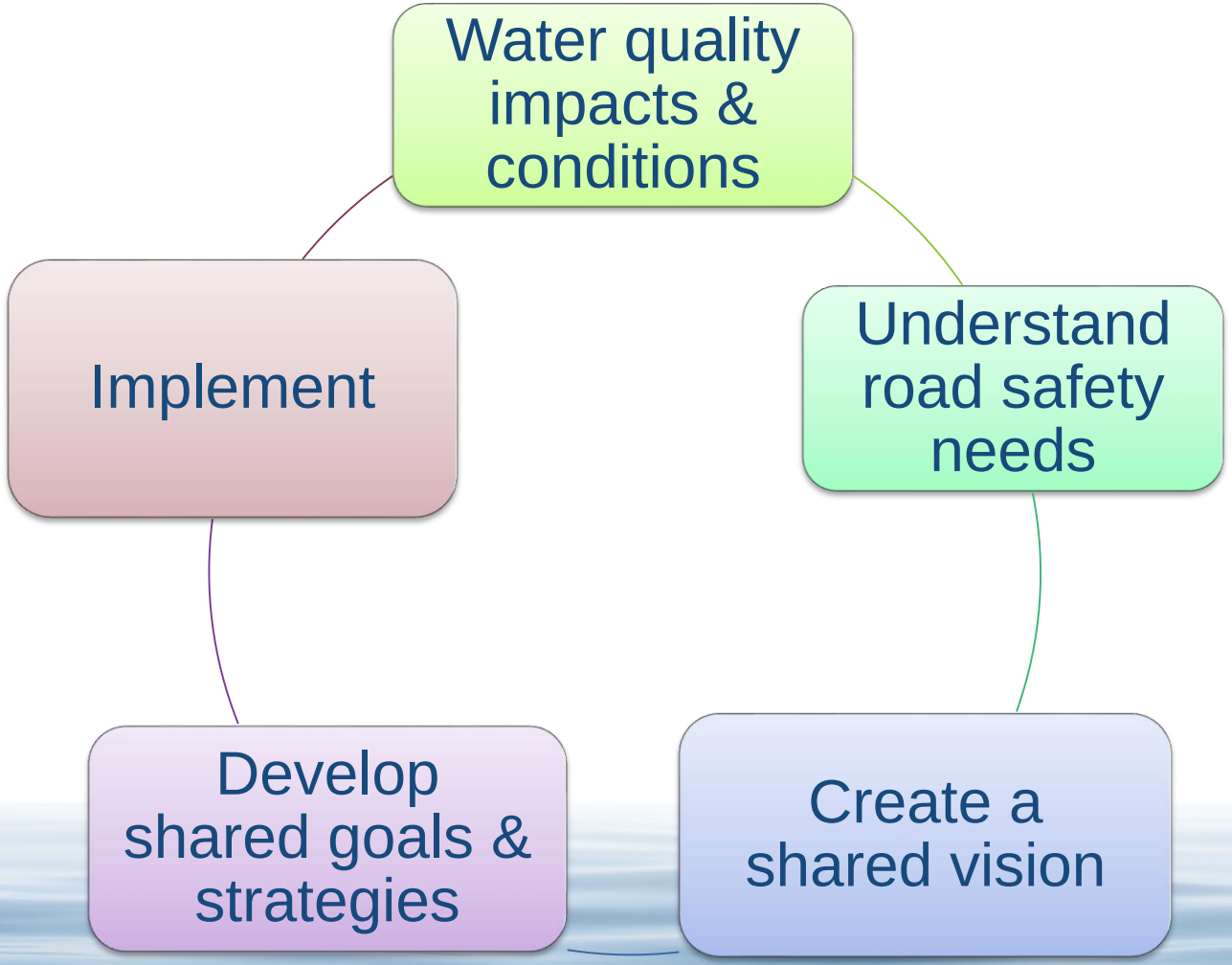
Groundwater also impacted

27% of shallow monitoring wells in metro had chloride > 250 mg/L

Concentrations are increasing



What's the solution? - *Find a balance between safe roads and clean water*



Chloride Management Plan

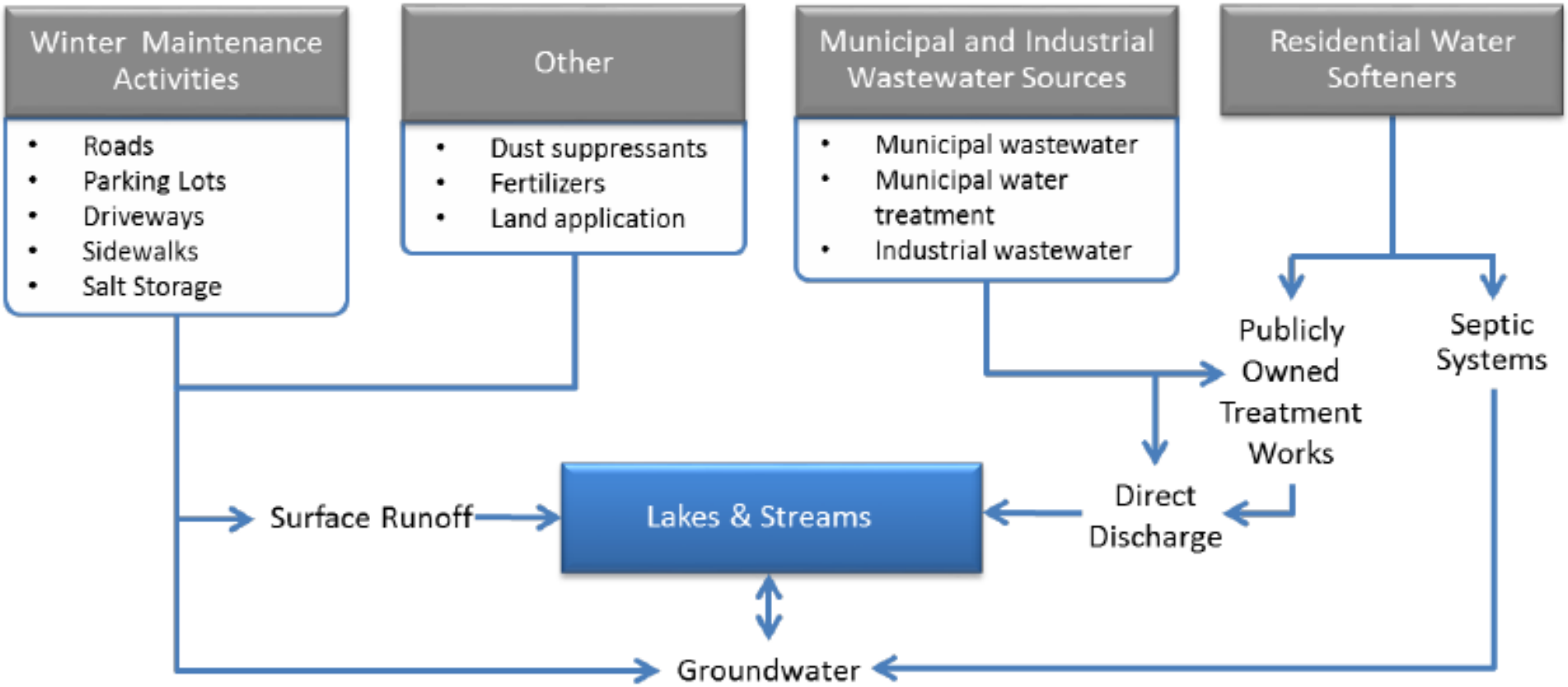
- Assist local partners to better manage the balance between the clean water and road saftey

How?

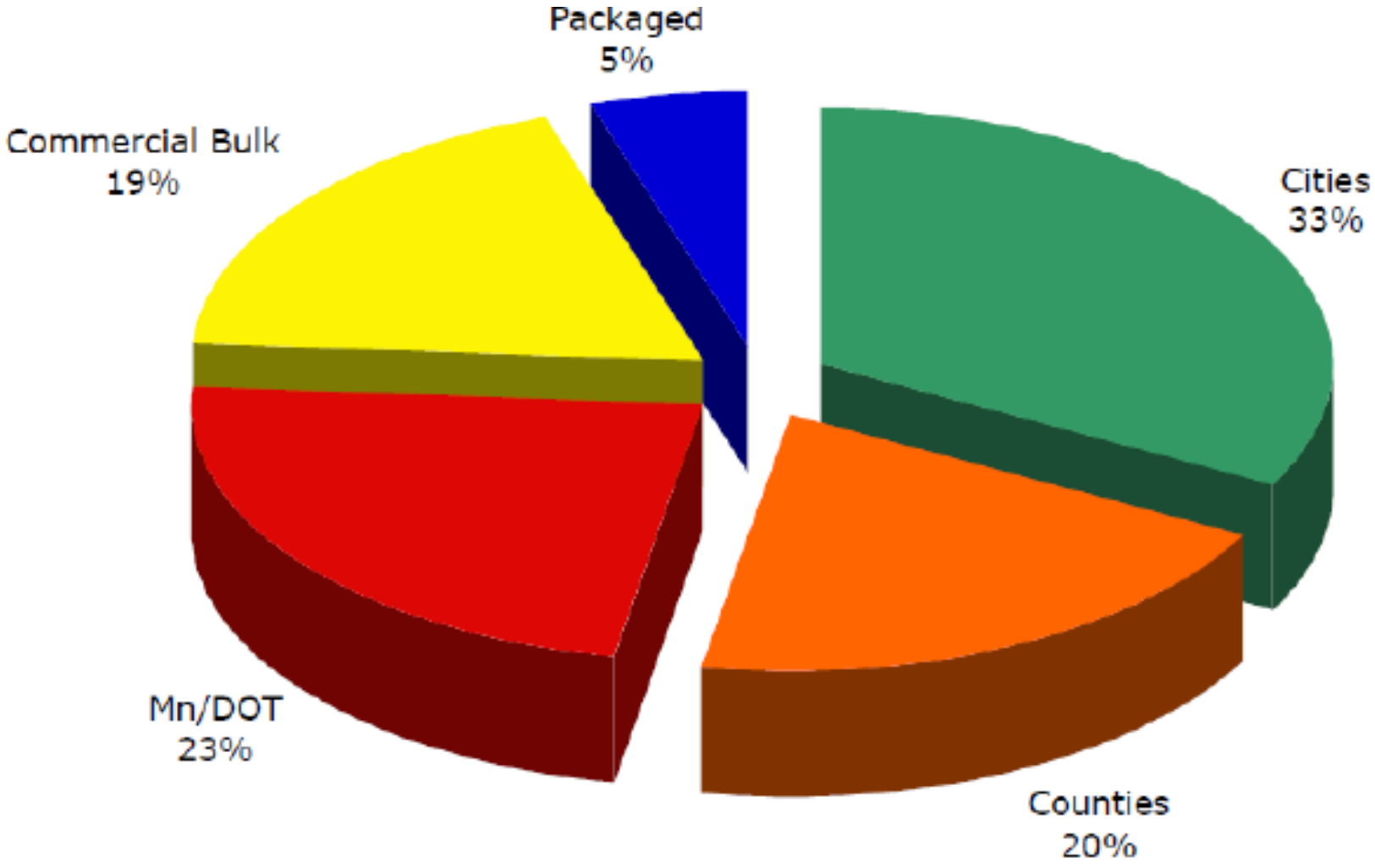
- Develop Chloride Management Plan for the 7-county metro:
  - Chloride TMDLs for all impaired waters
  - Performance based goals to restore impaired waters and protect the remaining surface waters
  - Layout implementation strategies/best practices

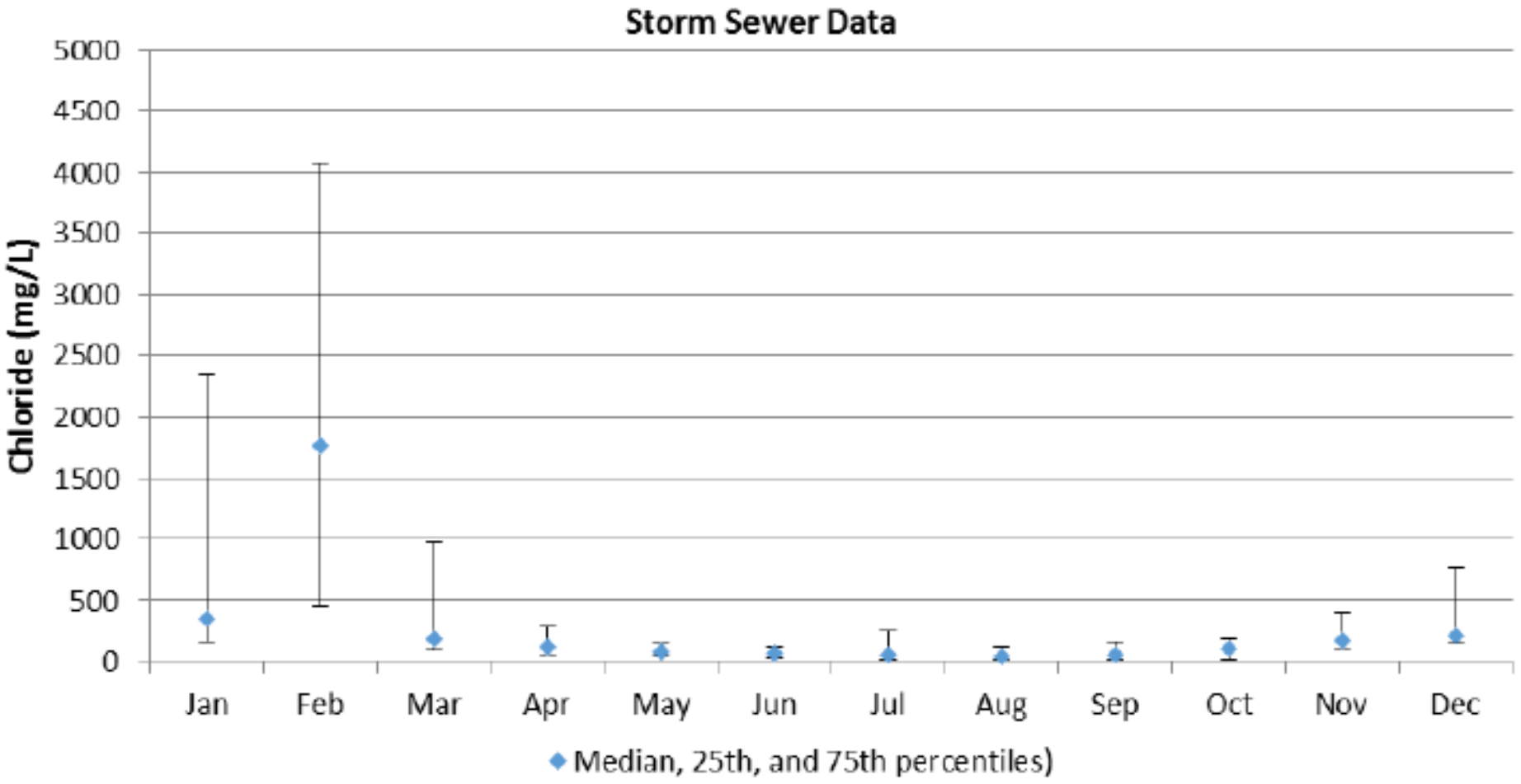
Opportunity lies in the process of developing plan

Sources of Chloride



Distribution of Road Salt Across the Metro



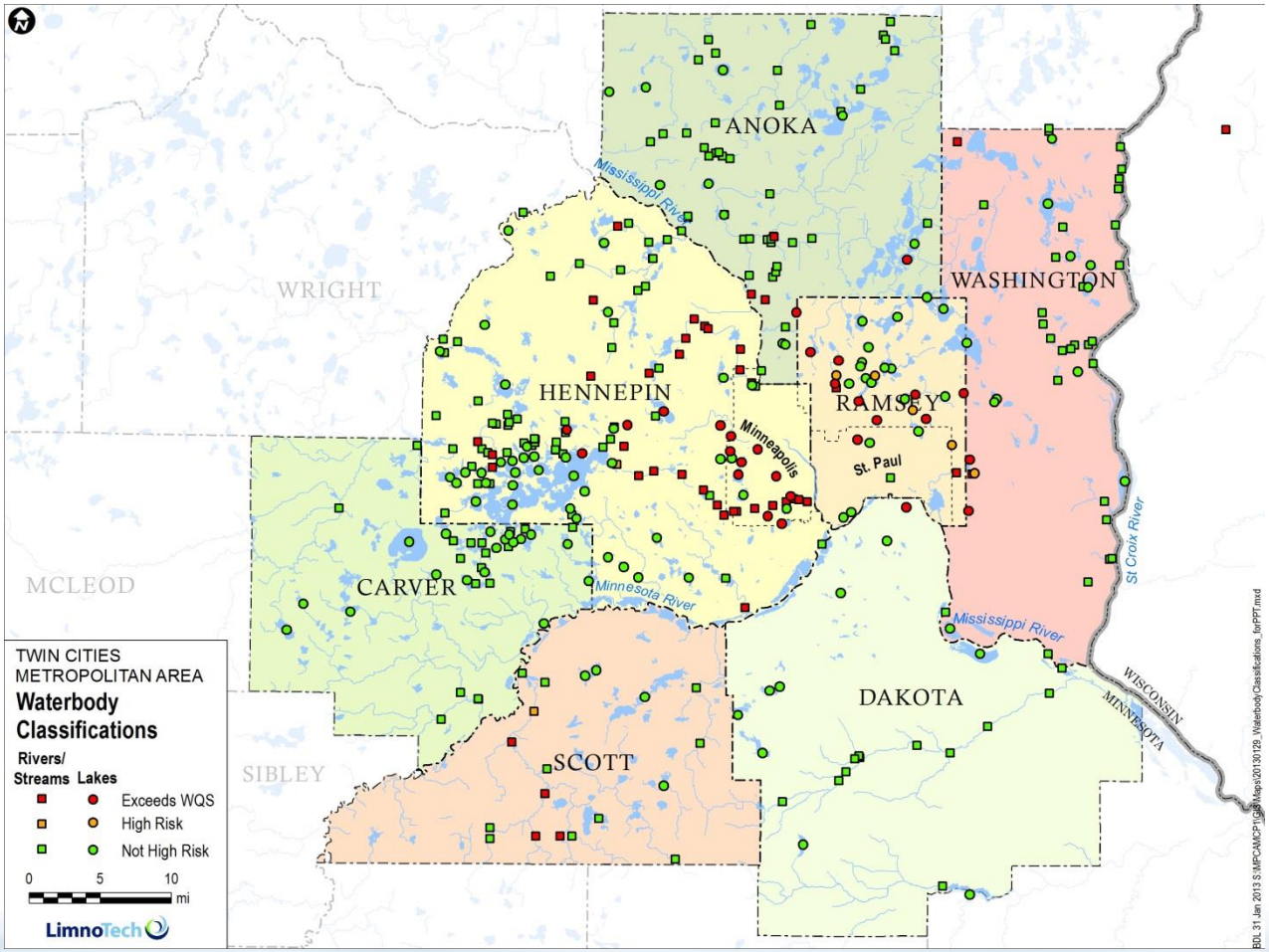

Storm Sewer Data
Chloride (mg/L)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Median, 25th, and 75th percentiles)

Source Data Collection Considerations

- What product?
- How much?
  - Purchasing
  - Usage
  - Application rates
- Where?
  - Entity
  - Route
  - Watershed
- How?
  - Technologies
- When?
  - Annual
  - Storm events

TMDL and Implementation Plan

- Developed nearly 40 TMDLs as part of the Twin Cities Plan
- 50 chloride TMDLs statewide to-date



Performance-based approach for meeting TMDL and allocations

- Optional approaches for implementing TMDL:
  - Percent reduction
  - Numeric limit
  - Performance-based BMP approach

- Performance based BMP approach
  - Selected as a way to start making progress quickly
  - Minimize disputes over specific numbers

What's been done?

- Education and outreach
- Certification
- Tool development
- Improved BMPs
- Continued monitoring

Education and Outreach

Political Buy-In

Public Buy-In

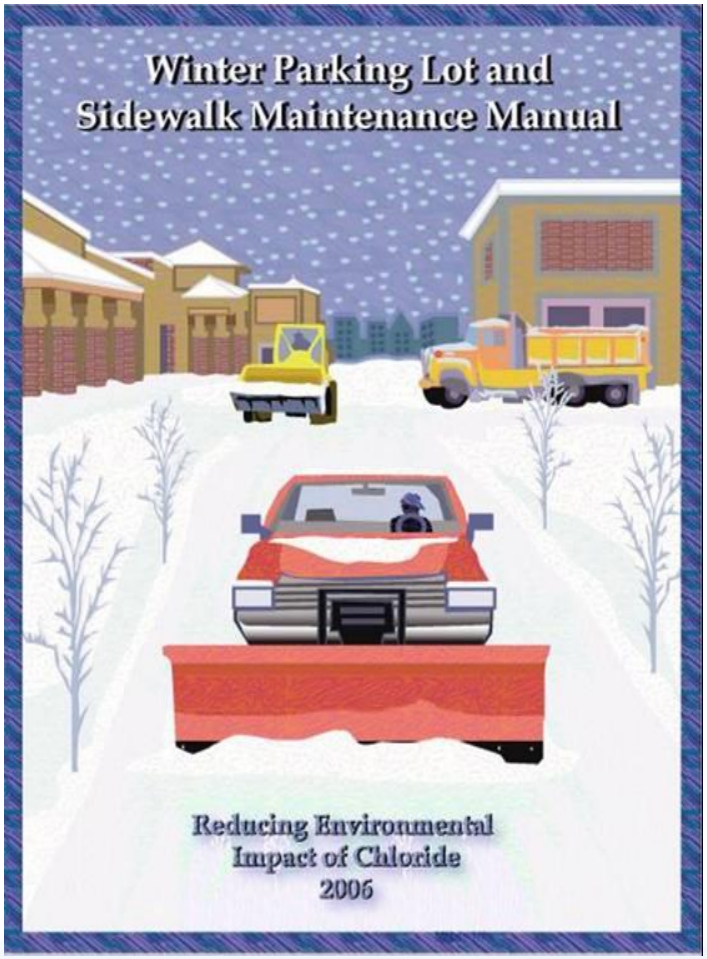
Salt Applicator Buy-In

Education and Outreach - Public

- Multi-faceted Public Messaging
- Media – Newspaper, City Newsletters, Radio, TV, Social Media
- Message delivered by City, MnDOT, MPCA, Watershed Districts, Schools

Education and Outreach - Applicators

- Smart Salting Training and Certification Program
- Minnesota DOT
  - Leadership role
- Local Technical Assistance Program
  - University leadership
- Annual Road Salt Symposium – going on 15 years



Certification

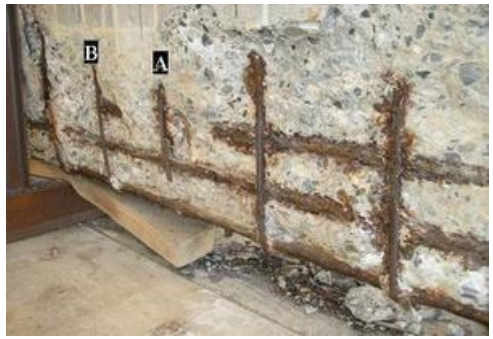
- *Teach best practices to reduce chloride impacts:*
  - Proper storage
  - Removing snow and ice first (shovel, sweep, blow, plow)
  - Choosing the right product for conditions
  - Applying proper amount at the right times

Certification

- Voluntary training program established in 2005
- Certification given to participants – must pass test
- 3,500+ individuals certified in MN
- Targeted to private applicators & local government
- Limited liability legislation being considered for certified applicators (example in New Hampshire)
- Local ordinances can require certification

Certification Program Drivers

- Save Money
- Competitive Edge
- Prevent Water Pollution
- Peer Pressure
- Pressure from Clients
- Liability Protection
- Reduce Corrosion on Infrastructure and Vehicles



Smart Salting Assessment tool (SSAt)

- Online tool to track BMPs and assess where improvements can be made
- SSAt serves as a tool for
  - Tracking progress
  - Certification
  - MS4 reporting requirements

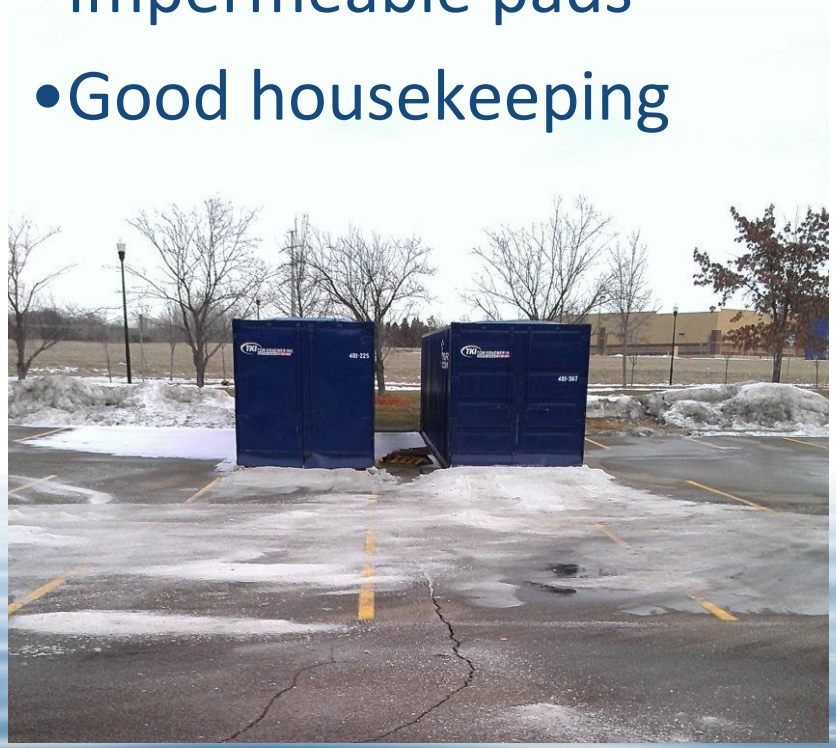
Use chemical only if needed

50 pounds less protects over 10,000 gallons of water from being polluted

Reduced salt application has a direct impact on reducing chloride in our water

Proper storage

- Inside storage
- Sufficient capacity
- Cover outside piles
- Impermeable pads
- Good housekeeping



Choose the right product

Deicers

- Melt ice and snow

Sand

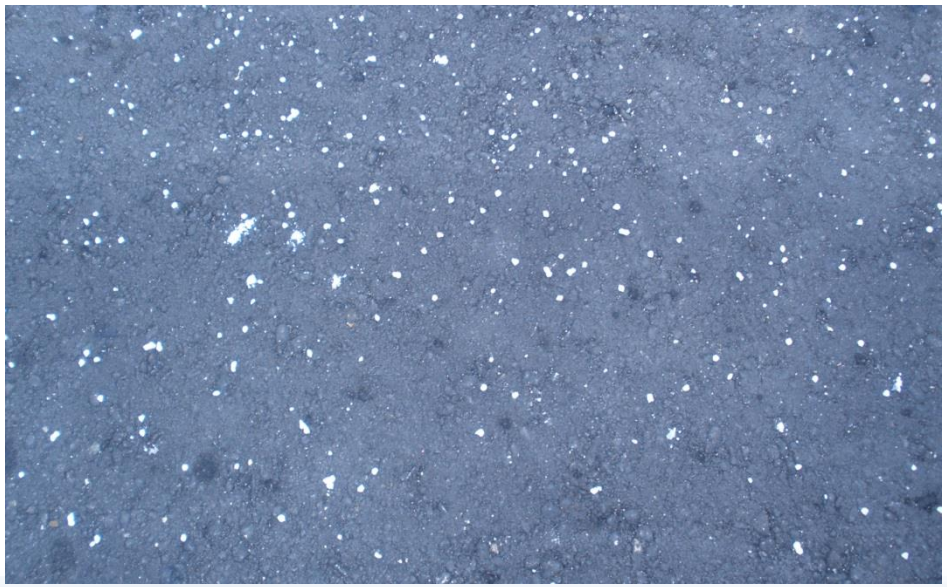
- Traction on top of ice and snow

NaCl – sodium chloride

- Works well on pavement warmer than 15º F
- *If it's colder – it won't work effectively! You should consider other products:*
  - KCl: 12º F
  - $MgCl_2$: 5º F
  - $CaCl_2$: -25º F

Apply the right amount – don't waste money!

- Just under 4 pounds/1,000 sq feet
  - The warmer it is the LESS you need



Apply it properly – pay attention to spread

- A drop spreader or spreader guards prevent overshooting

Calibrate equipment

Use wet salt for more effective performance

- Works faster
- Stays on target better
- Reduce salt use by 30% or more

Switch to liquids / brine

- Pre-treat pavement before the storm
- Melts from bottom up
- Fast working

Measuring Success

- Certification numbers
- BMP tracking
- Gross salt purchasing by year
  - More refined tracking by some entities
- Water quality monitoring
  - Will take time to see improvement

Examples of progress

- Dakota County, MN: applied 405 tons of salt per event in 2009 and in 2010 cut to 355 tons per event

- Nine Mile Creek TMDL: City of Richfield, MN achieved nearly 50% reduction in the first year.

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