



# Sharing the Road with the Environment

EPA's Stormwater Pollution Prevention  
Webinar Series: Road Salt Pollution  
Prevention Strategies

January 31, 2013

Minnesota Pollution Control Agency  
Brooke Asleson





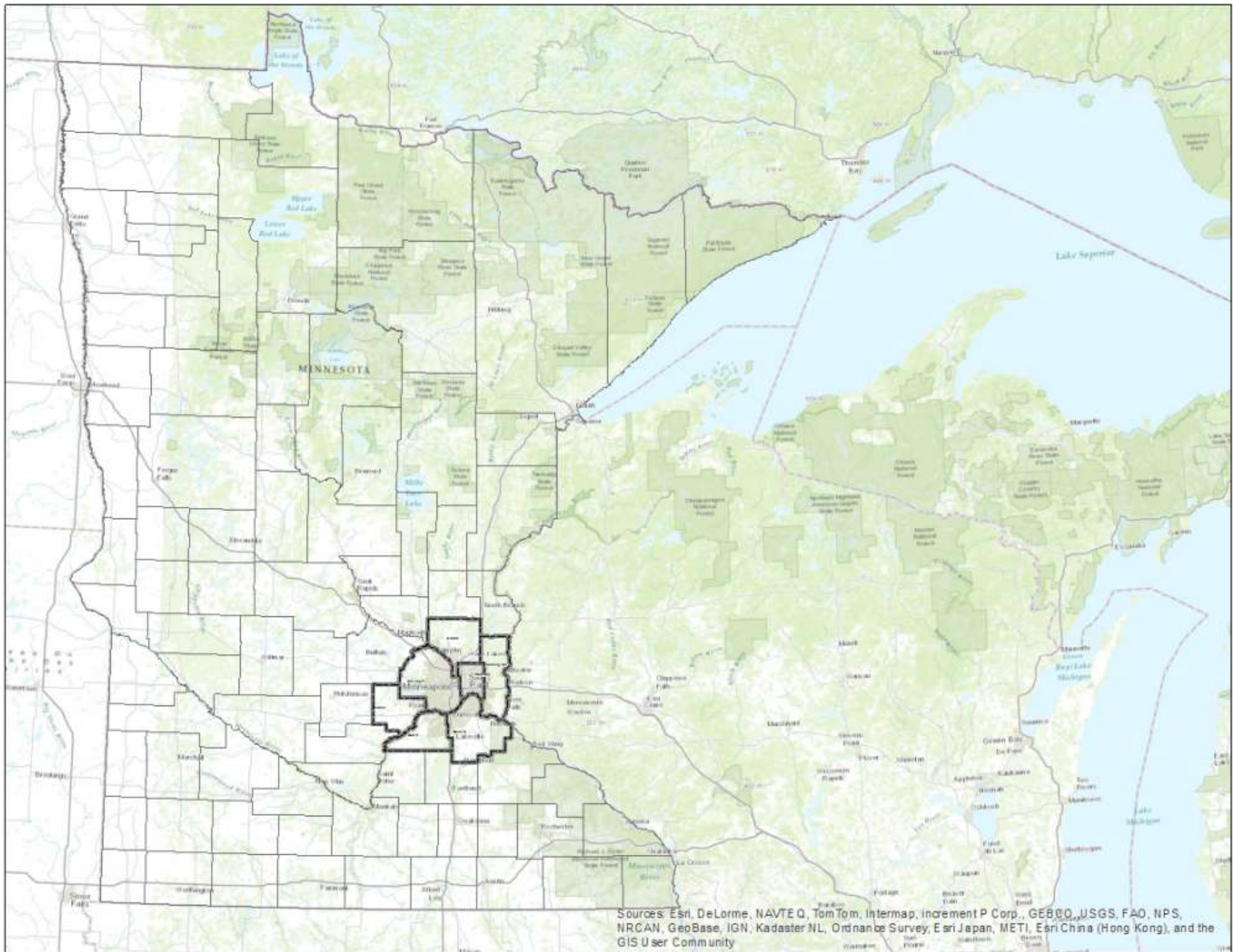
# WHAT'S THE PROBLEM?

Finding a Balance  
between  
Safe Roads and Clean Water



# Problem

- Chloride is toxic to aquatic life and once in our waters there is no feasible way to remove it
- Road Salt (~75%) is primary source of Chloride in Twin Cities Metropolitan Area (TCMA), 25% is from other sources such as Wastewater Treatment Plants (water softening)
- University of Minnesota study found that 78% of the chloride applied is being retained in the TCMA
- 365,000\* tons of road salt are applied in TCMA each year \*this is an estimate based on purchasing records
- The Public expects & needs safe roads, parking lots and sidewalks



Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

# Path to Achieving Balance

(Safe Roads + Clean Water)



# What Is Being Done?

- Understand Current Water Quality Conditions
- Developing Partnerships- Building a Shared Vision/Common Goals
- Level I Certification: Snow & Ice Control Best Practices
- TCMA Chloride Management Plan project
  - Monitoring, Partnerships with stakeholders, Significant outreach efforts, TMDLs
- MPCA draft MS4 permit requires covered storage of road salt
- MPCA NPDES “Salty Discharges” being required to monitor for Chloride

# Chloride Criteria

- Water Quality Standard
  - 230mg/L Chronic,  
860 mg/L Acute
  - 1 teaspoon of salt  
pollutes 5 gallons of water



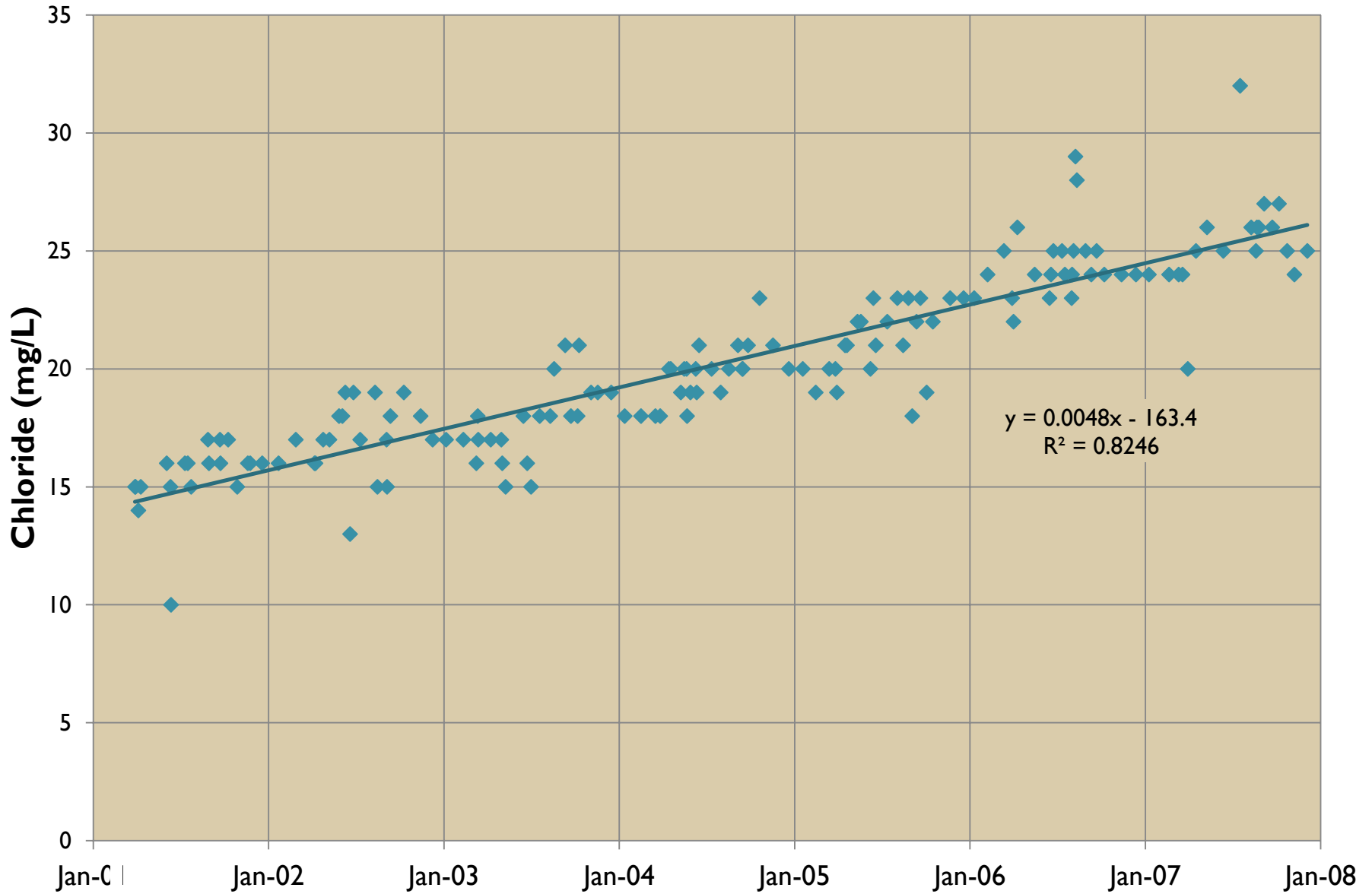


# Understanding Water Quality Conditions: Streams

- The data points which exceeded the chloride standard occurred primarily (75%) during Nov. – March (Winter)
- Only 20% of the TCMA data was collected in winter
- General trend of increasing baseflow chloride levels (Max chloride concentration in Shingle Creek of 35,000 mg/L)
- 51 Monitoring stations on streams exceed the chloride standard
- Conclusion: Even though we have a lot of stream data only 20% tells us the story in winter, the critical time and groundwater concentrations increasing



# Eagle Creek Chloride Concentrations 2001 - 2007





# Understanding Water Quality Conditions: Lakes

- Chloride levels are typically higher in deeper portions of the lake, even for shallow lakes
- 28 lakes that exceed the chloride standard – assessment to occur June 2013
- Limited number of deep lake samples
- Unlike streams the higher chloride values seem to occur across the year, spring may be critical
- Conclusion: Current sampling methods are missing the highest concentrations of chloride that are in the deep part of the lakes. Critical time to sample unknown.

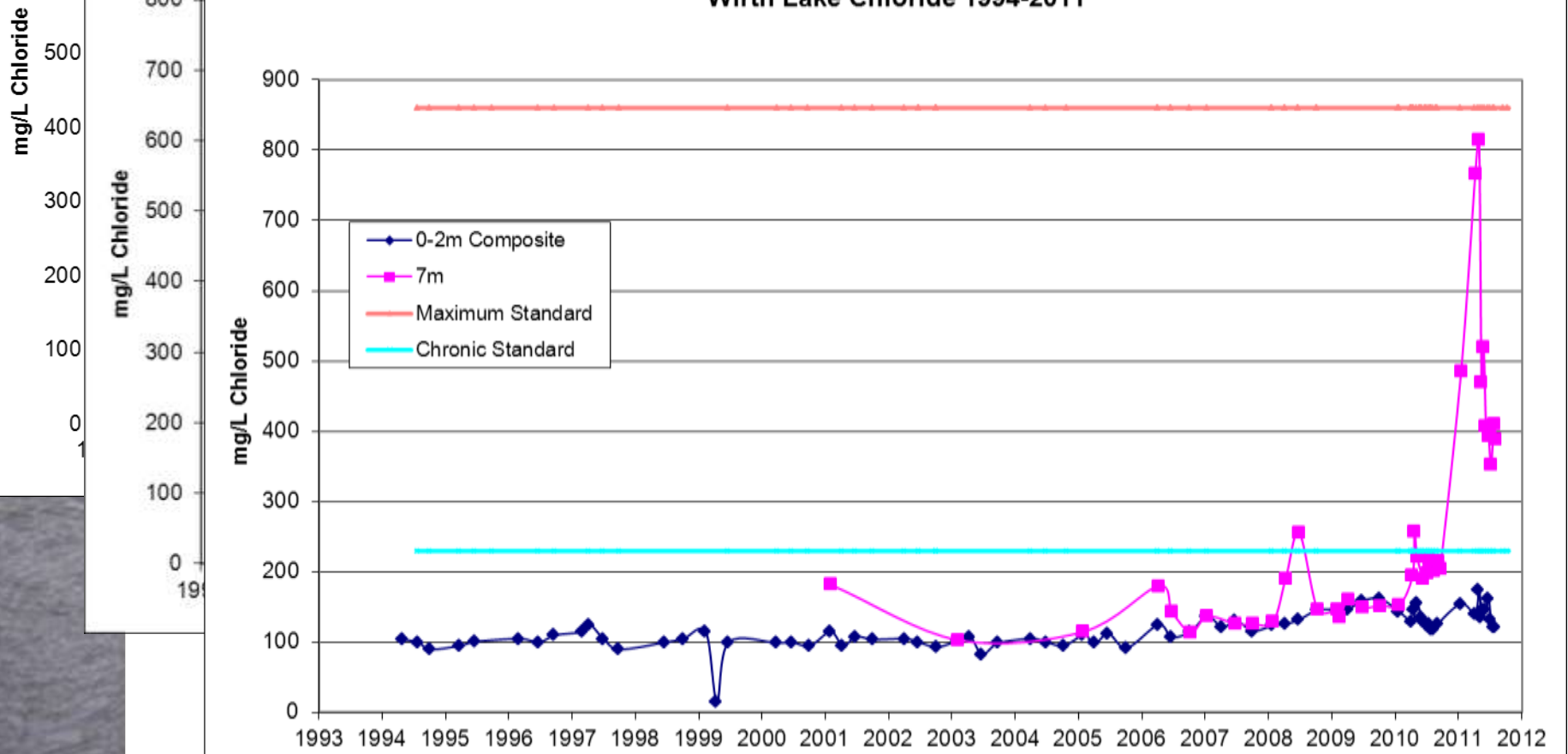
# Powderhorn Lake Chloride 1994-2011



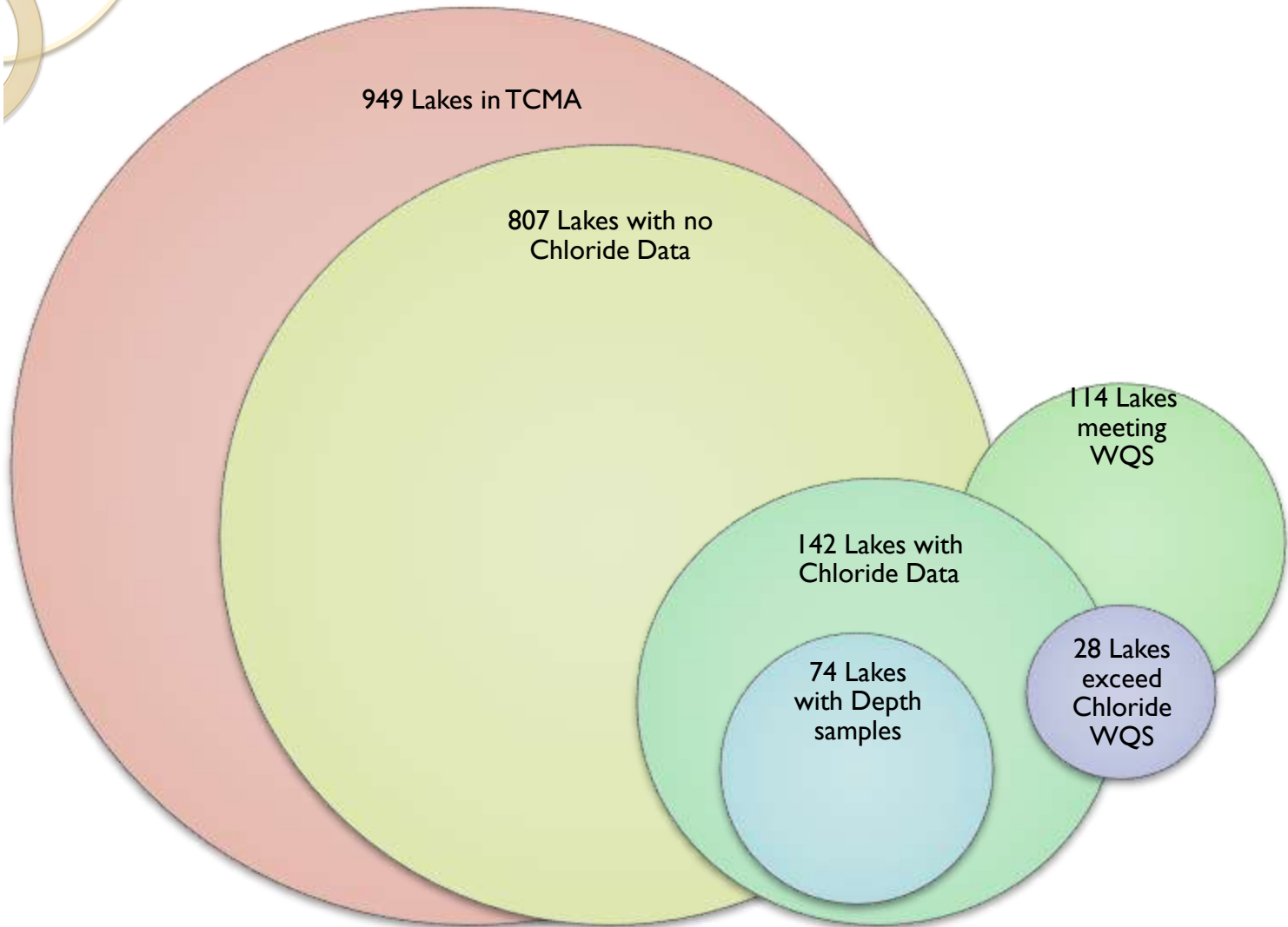
# Wirth Lake Chloride 1994-2011



# Wirth Lake Chloride 1994-2011



# TCMA Lake Data





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# Goals & Shared Vision

- Understand the public safety needs & limitations
- Understand the environmental condition
- Evaluate those conditions against desired water quality goals
- Set realistic and achievable goals
- Develop a collaborative strategy to meet those goals





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# Level I Certification: Snow & Ice Control Best Practices

- MPCA, Fortin Consulting, Minnesota Local Technical Assistance Program (U of M) MnDOT, many local watershed partners
- Voluntary training program established in 2005
- Certification given to participants – must pass test
- 3,500 individuals certified in MN & 1,400 out of state
- Teach Best Practices to Reduce Chloride Impacts
- Targeted to private applicators & local government
- Highly Successful Program: Dakota County applied 405 tons of salt per event in 2009 and in 2010 cut to 355 tons per event

For more Information: <http://www.pca.state.mn.us/sbiz41>





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# TCMA Chloride Management Plan Project

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

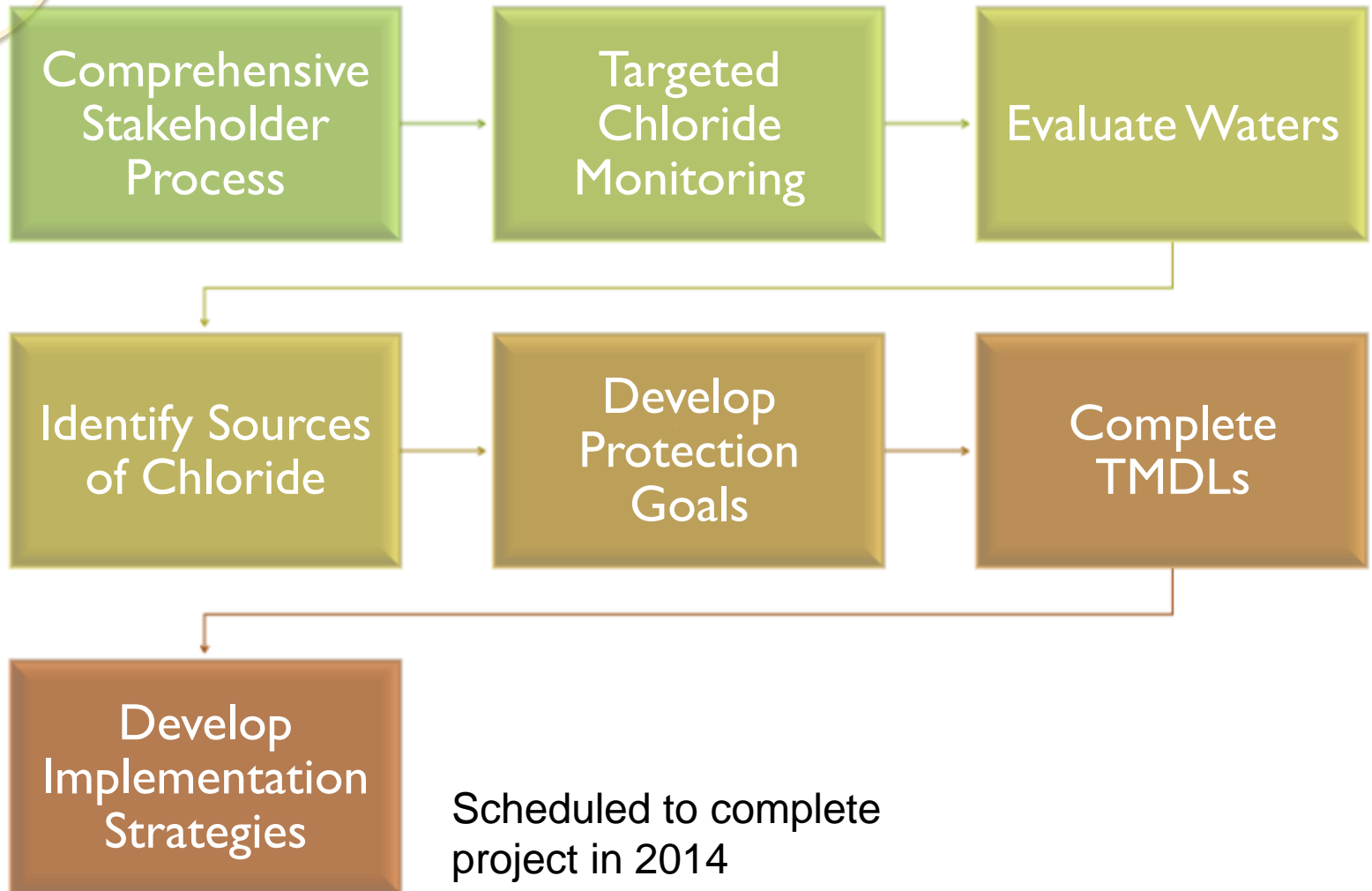
## How?

- Develop Chloride Management Plan for the 7-county metro:
  - Complete Chloride TMDLs for all impaired waters
  - Set goals to protect the remaining surface waters
  - Layout implementation strategies to achieve water quality goals

Opportunity lies in the process of developing plan

# TCMA Chloride Project: Activities

Began process in 2010



# Inter-Agency Advisory Team

MPCA, MnDOT, Met Council, BWRSR, DNR, USGS, U of M

## Monitoring Sub-Group

MPCA, DNR, Met Council, USGS, local partners

## Implementation Plan Committee

Winter Maintenance Professionals, Cities, Counties, MnDOT

## MPCA project team

## Technical Advisory Committee

WMOs, WDs, Cities, Counties, MnDOT

## Outreach Group

WMOs, WDs, MS4s, road salt applicators, Citizens

## Technical Expert Group

Hands-on road salt applicators and suppliers

## Education & Outreach Committee

MPCA & local education specialists

# TCMA Chloride project monitoring locations & road density

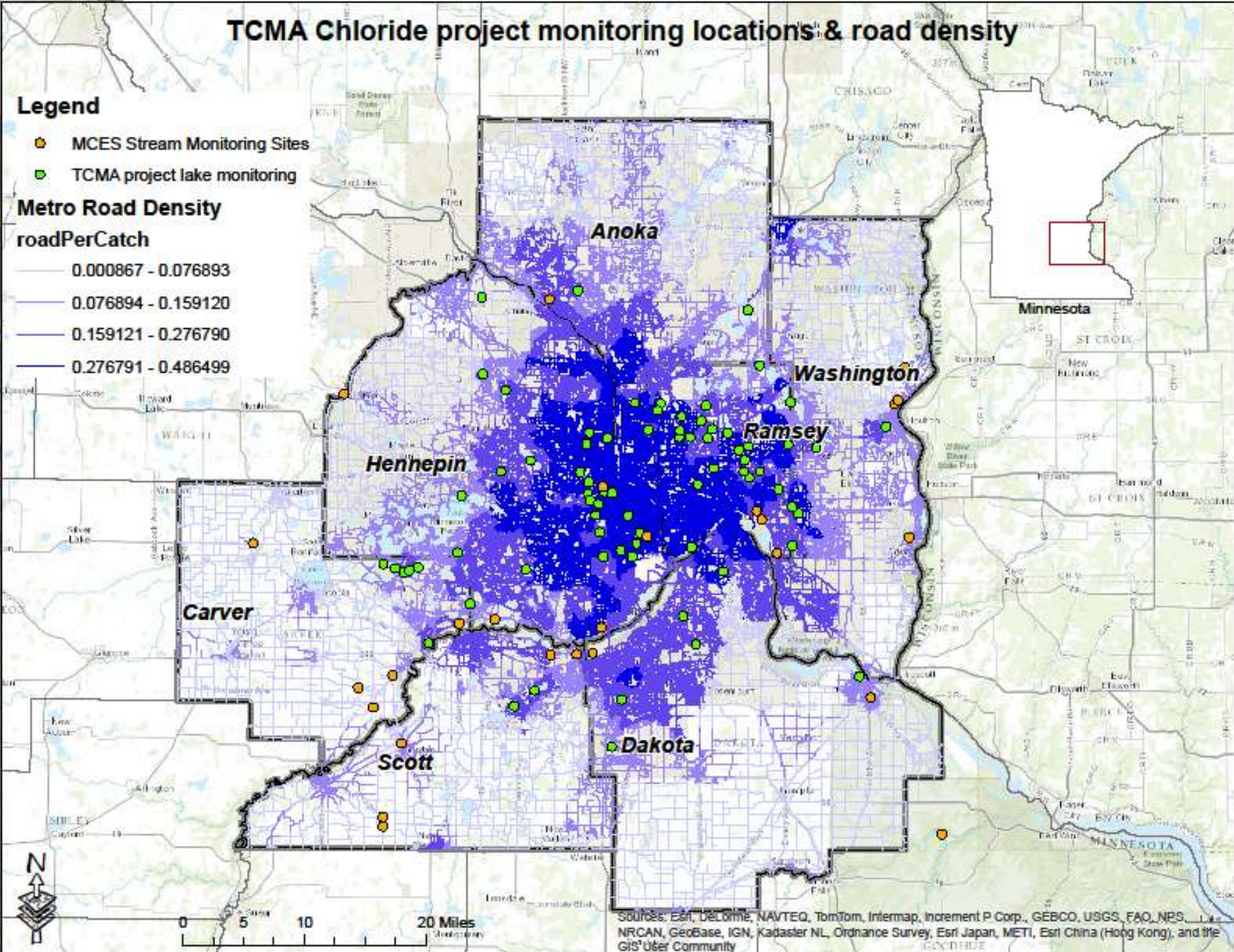
## Legend

- MCES Stream Monitoring Sites
- TCMA project lake monitoring

## Metro Road Density

### roadPerCatch

- 0.000867 - 0.076893
- 0.076894 - 0.159120
- 0.159121 - 0.276790
- 0.276791 - 0.486499





# TCMA Chloride Project: Next Steps

- Conduct formal “Water Quality Assessment (303(d) list)” in June 2013
- Working with stakeholders to select modeling approach
- Will work with stakeholders to develop protection goals
  - May be numeric targets or performance based goals
- Developing Best Management Practices Winter Maintenance Assessment Tool to layout implementation options



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# Resources: Monitoring Guidance

## Chloride Monitoring Guidance for Lakes



## Chloride Monitoring Guidance for Streams and Storm Sewers





# Resources: MPCA Website

<http://www.pca.state.mn.us/r0pgb86>

## Road salt and water quality

MPCA recommends a **low-salt diet for Minnesota waters**. Doctors tell us to stick to a low-salt diet. Our lakes and streams should follow the same advice.

When winter comes and snow and ice build up on Minnesota roads, parking lots, and sidewalks, one of the most common reactions is to apply salt, which contains chloride, a water pollutant.


**Salt pollutes.** When snow and ice melts, the salt goes with it, washing into our lakes, streams, wetlands, and groundwater. It takes only 1 teaspoon of road salt to permanently pollute 5 gallons of water. Once in the water, there is no way to remove the chloride, and at high concentrations, chloride can harm fish and plant life. Less is more when it comes to applying road salt.



## In the news

- Check out this WCCO radio interview/article dated March 25, 2011: [Road Salt: Essential For Winter Roads, Toxic For Lakes](#)
- StarTribune article, March 23, 2011: [Road salt turning Twin Cities lakes into dead seas](#)
- KAALTV segment on the [Dangerous Side Effects of Road Salt](#)
- Twin Cities DAILY PLANET article dated December 26, 2010: [Hold the Salt](#)
- Ice management article: [Ahead of the pack](#)
- StarTribune article, January 2, 2010: [State's roads aim for low-salt diet](#)
- Environmental Science and Technology journal: [A Fresh Look at Road Salt: Aquatic Toxicity and Water-Quality Impacts on Local, Regional, and National Scales](#): free download

## NEW REPORT

- The MPCA and several local partners are sampling Twin Cities lakes, streams, and storm sewers for chloride. The study will help us to better manage the Twin Cities' water resources with respect to chloride while balancing our need for road safety. Learn more about this effort:  Twin Cities Metropolitan Area Chloride Monitoring (wq-iv11-06x)

## Overview

Environmental concerns

Training/resources

Activities

Contacts

## Tips

Follow these simple tips to protect our clean water! There are many ways to reduce salt use while maintaining high safety standards.

- **Shovel.** The more snow and ice you remove manually, the less salt you will have to use and the more effective it can be. Whether you use a shovel, snow blower, snow plow, or ice scraper, get out there as early as you can and keep up with the storm. You may even decide that salt isn't needed.
- **15°F is too cold for salt.** Most salts stop working at this temperature. Use sand instead for traction, but remember that sand does not melt ice. Use the reference table below to apply the correct product for the conditions.

• **Stay Dry.** Drive for the conditions and make sure to give your tires plenty of space to do their job.

# Resources: Road Salt and Water Quality Press Releases

- You Tube video: **Chloride and Our Water - Monitoring the Mix**

<http://www.youtube.com/watch?v=ZRSO3VLDkgM>

## News you can use: Put Minnesota waters on low-salt diet

Feel free to use this press release in your newsletters and on your websites:

For years doctors have told people to stick to a low salt diet. According to the MPCA, our waters should follow the same advice.

When snow and ice start to accumulate on Minnesota roads, parking lots and sidewalks, one of the more common reactions is to apply salt, which contains chloride, a water pollutant. When snow and ice melt, most of the salt goes with it, washing into our lakes, streams and rivers. Once in the water, there s no way to remove the chloride, and it becomes a permanent pollutant.

According to Brooke Asleson, MPCA project manager for the Twin Cities Metro Area chloride project, Salt is a real threat to water quality. It only takes one teaspoon of road salt to permanently pollute five gallons of water. We are trying to spread the word that less is more when it comes to applying road salt because at high concentrations, chloride can harm the fish and plant life in our waters.

There are many ways to reduce salt use while maintaining high safety standards:

- Shovel. The more snow and ice you remove manually, the less salt you will have to use and the more effective it can be. Break up ice with an ice scraper and decide whether application of a de icer or sand is even necessary to maintain traction.
- More salt does not mean more melting. Use less than four pounds of salt per 1,000 square feet (an average parking space is about 150 square feet). One pound of salt is approximately a heaping 12 ounce coffee mug.
- 15 degrees is too cold for most salt to work. Most salts stop working around this temperature. Instead, use sand for traction.
- Sweep up extra salt. If salt or sand is visible on dry pavement, it is no longer doing any work and will be washed away.

To learn more about what you can do to reduce chloride in our waters, or to read more about MPCA s role on this issue, visit the agency s [road salt and water quality webpage](#).

# The Salt Dilemma: Clean Water and Public Safety

When it comes to applying salt in the winter,  
*less is more.*



Sidewalks attract salt to corners. To avoid snow and ice this winter, shovel, which is safe for our kids, lawns, gardens, and greenhouses. [Go](#)

Salt left on the road after snow has melted. [Go](#)



At Highways 168 and 169, salt trucks have been used to spread the salt. [Go](#)

University of Minnesota researchers have estimated that the Twin Cities Metro Area uses about 317,000 tons of road salt each year.\* Approximately 78 percent of all salt remains in local Twin Cities waters, while the rest heads down the Mississippi River.



**Brochure Rack**





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**THANK**  
**YOU**

**Questions?**

<http://www.pca.state.mn.us/r0pgeb86>