



# Working Together to Protect Minnesota Waters



Katrina Kessler | MPCA Assist. Commissioner for Water

19<sup>th</sup> Annual Road Salt Symposium

# Chloride

Toxic to  
aquatic life

230 mg/L  
860 mg/L

Permanent  
pollutant

Building  
up in MN  
waters

Contaminates  
groundwater

Disrupts  
lake  
mixing

Minnesota has 11,842 lakes and 92,000 miles of rivers and streams.

# Chloride sensitive species in Minnesota

## Macroinvertebrates

- Mussels
- Mayflies
- Amphipods (side-swimmers)

## Fish

- Least darter
- Pugnose shiner
- Walleye
- Northern pike

## Plants

- Canada Bluejoint
- Lake Sedge
- Spike Rush
- Bulrush

## Amphibians

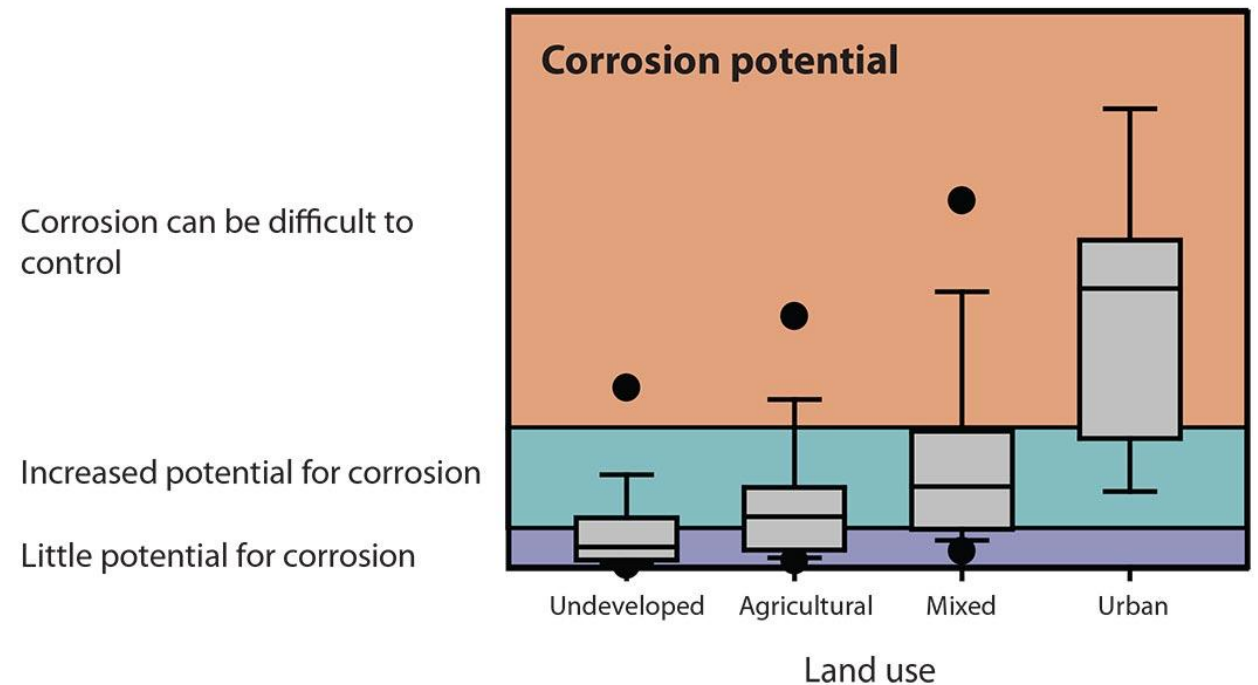
- Wood frogs
- Tiger salamander
- Eastern newt



# Drinking water concerns

- Secondary drinking water standard for taste: 250 mg/L
- 75% of Minnesotans rely on “hard” groundwater for drinking
- High chloride can increase tendency of water to cause corrosion in distribution systems
- Elevated chloride concentration can increase the rate of release of lead into the water.

Urban streams have an elevated potential to cause corrosion



<https://www.usgs.gov/media/images/urban-streams-have-elevated-potential-cause-corrosion>

# MPCA strategic plan

## Our strategic plan

Sixteen strategic **goals** for our agency | 2018-2022



### Water



Reduce chloride (salt) entering surface waters and groundwater.



Accelerate prioritized and targeted reductions in nutrient pollution by integrating strategies with local watersheds.



Achieve wastewater pollutant reduction goals and maximize cost-effectiveness of public infrastructure investment.

### Land



Reduce food waste from households and businesses by generating less and rescuing and recycling more.



Identify and address emerging risks by completing assessment of backlogged contaminated sites.



Prevent and reduce risks to groundwater from unlined construction and demolition landfills.

### Air



Improve air quality in population centers.



Offset excessive emissions and advance diesel reductions via the Volkswagen Settlement.



Reduce air permitting backlog.



Reduce Minnesota's greenhouse gas emissions from transportation.

### Cross agency



Incorporate strategies to address environmental justice concerns in all programs.



Increase involvement of communities in decisions and actions that affect them.



Act on opportunities to increase resilience of communities and the environment to climate change impacts.

### Excellence



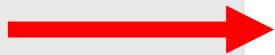
Increase the diversity of the agency's workforce, through best efforts in recruitment, hiring and retention.



Accelerate the availability of data and information in a self-service format.

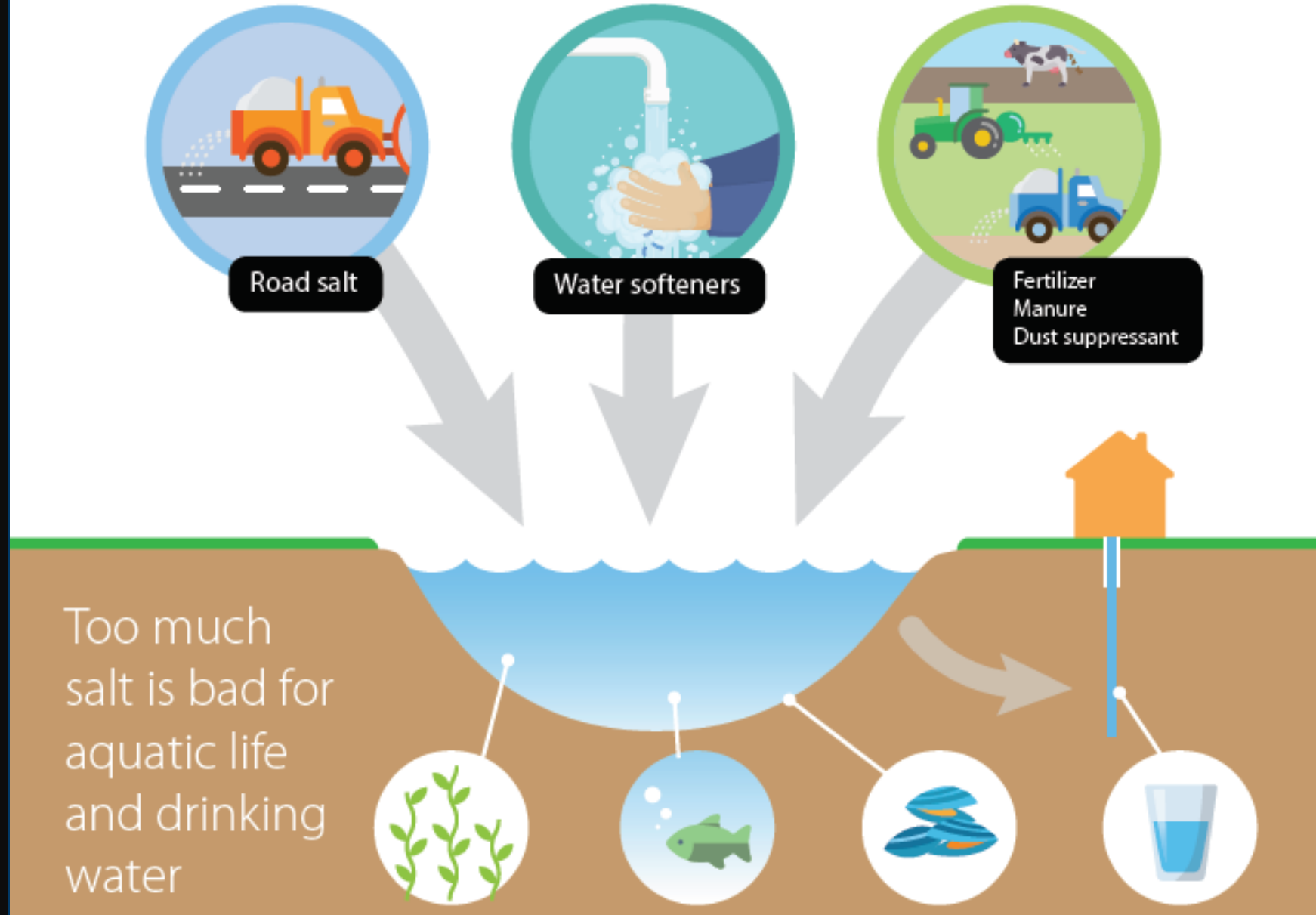


Improve agency's ability to identify, manage and sustain organizational improvement.



# Sources of chloride

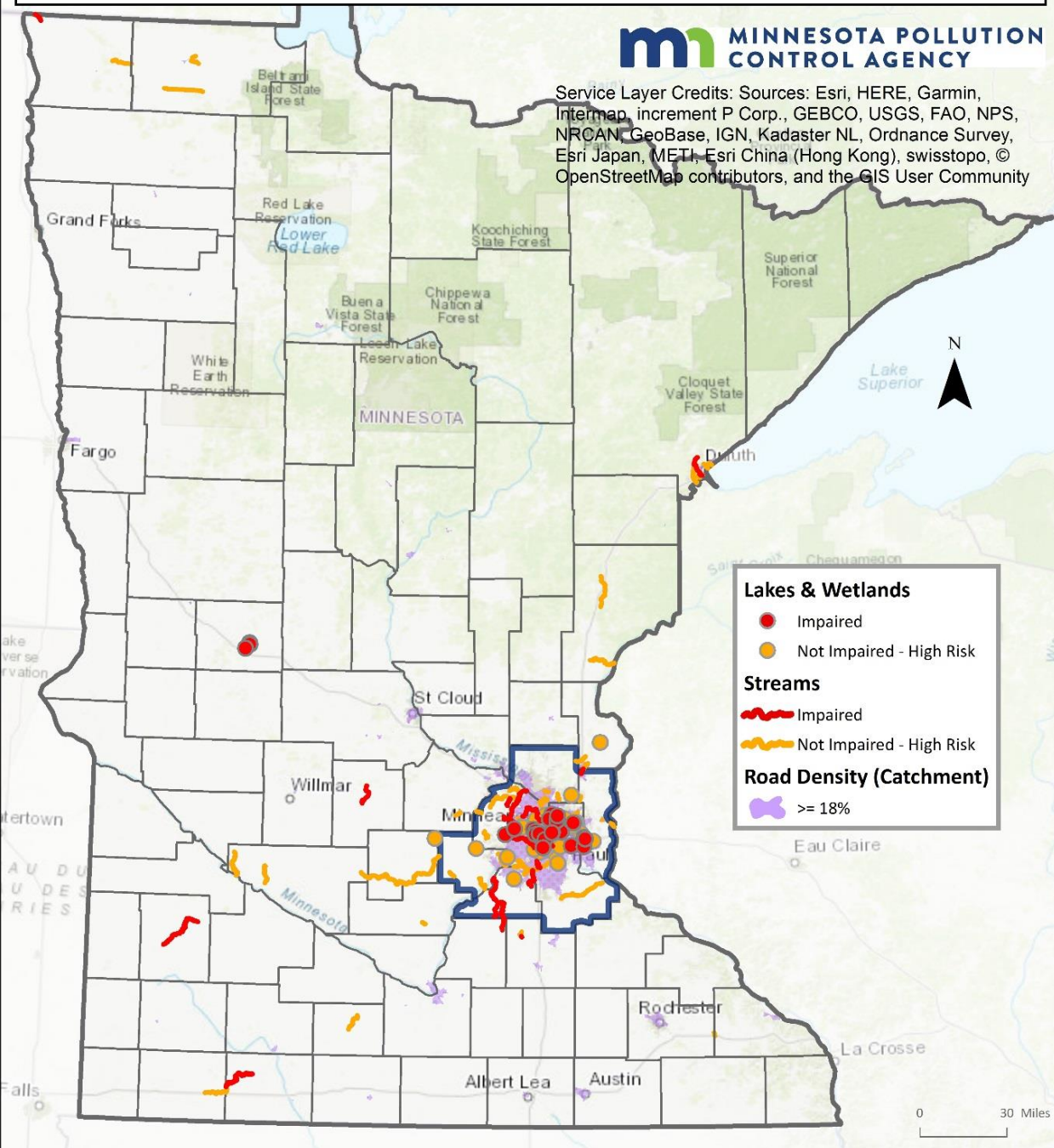
## Salt pollution comes from several sources



## Chloride Impairments and High Risk Waterbodies: Minnesota



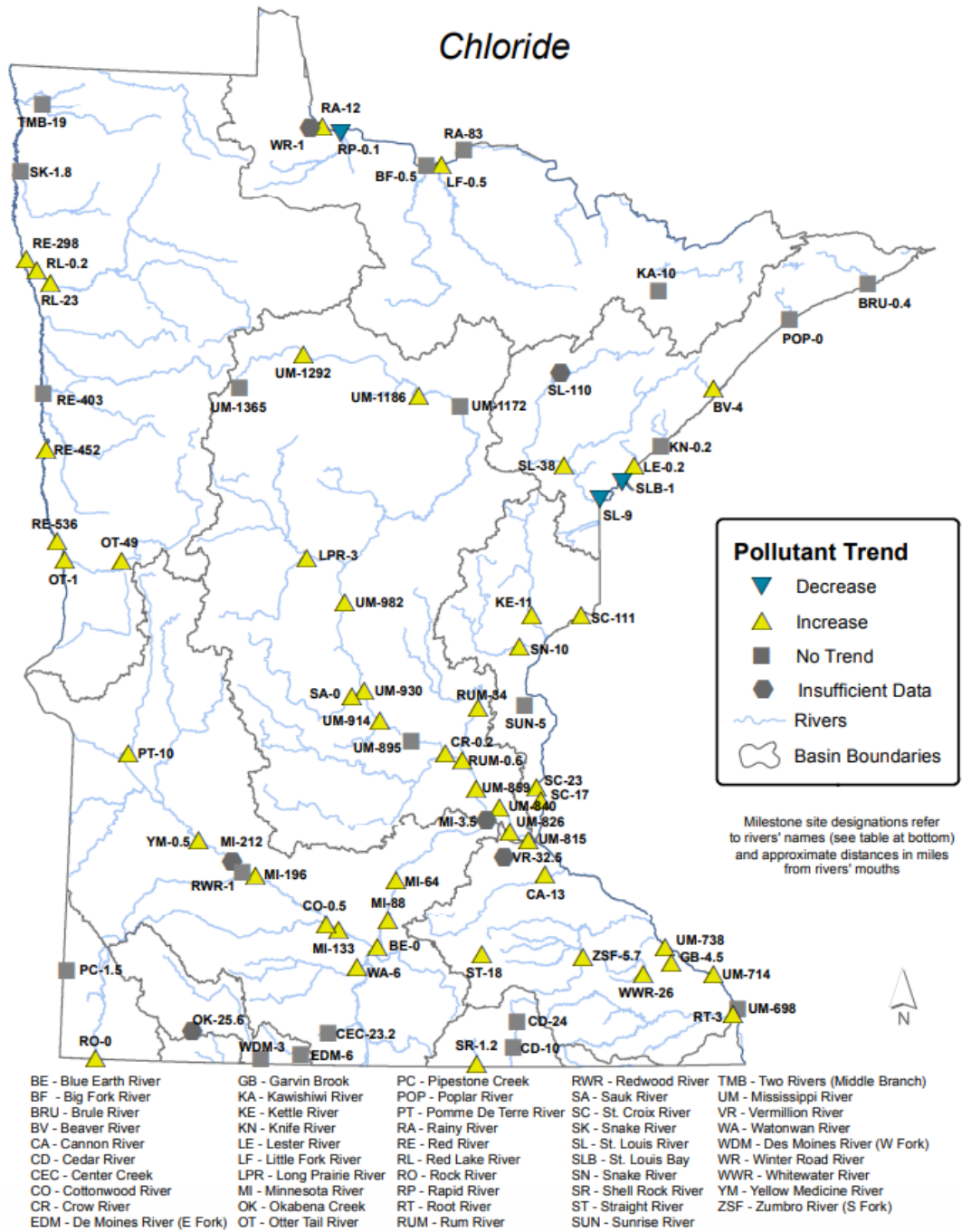
Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community



# Chloride in lakes and streams

- 50 chloride impairments
  - 3 new listings added 2018
- 75 high-risk waters
  - Values within 10% of the standard ( $\geq 207$  mg/L) or at least one exceedance
- 80% of surface water chloride data is in Twin Cities Metro Area

# Long-term chloride trends in streams



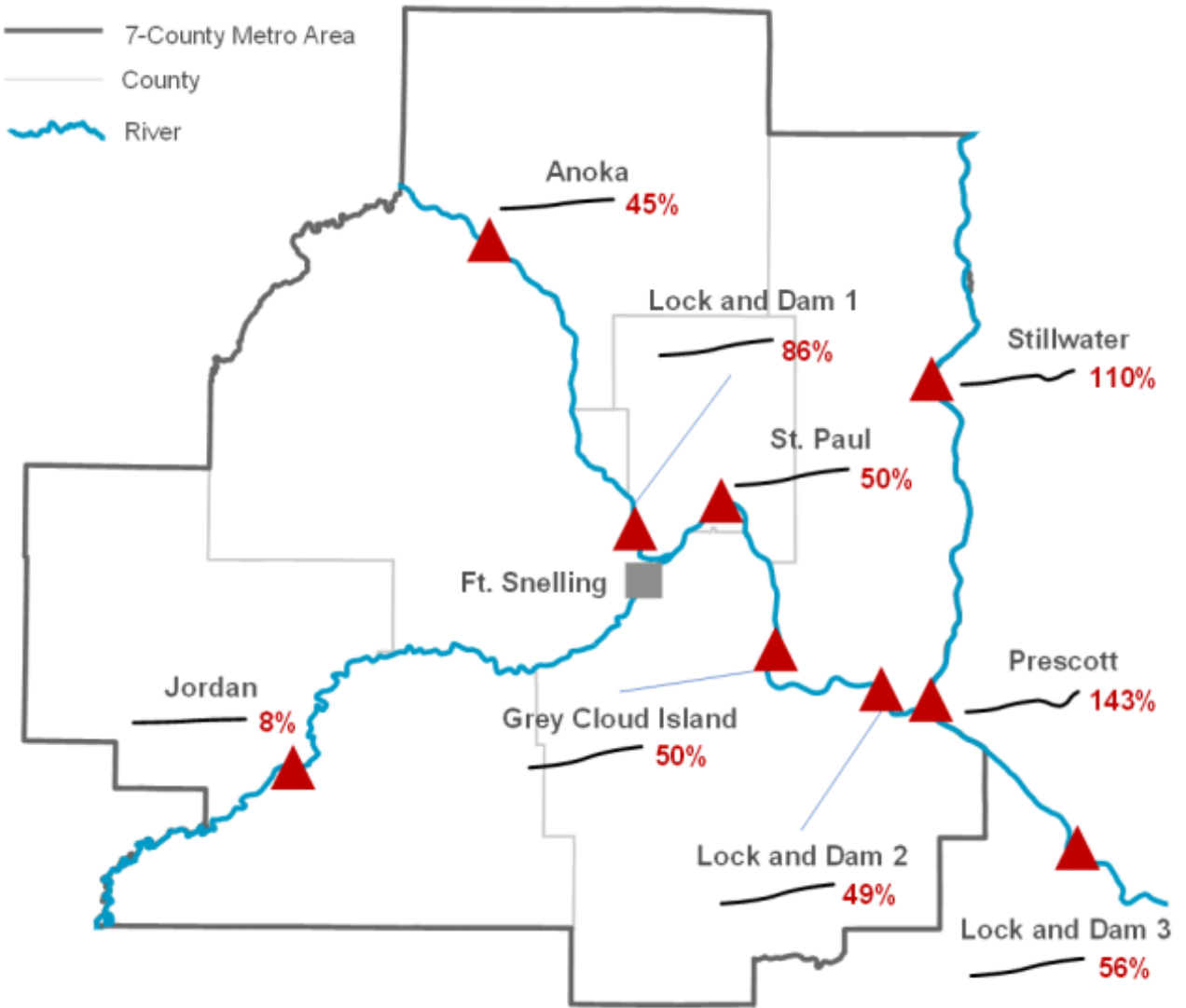
- Minnesota Milestone Monitoring Program
- Includes 80 monitoring sites on rivers and streams
- Long-term data set, 30 years or more
- Chloride and nitrate the 2 pollutants with overall increasing trends



Lake	Period	Percent change/year	Trend Description
Beaver	1984-2016	+2.42%	Increasing
Brownie	1978-2016	+2.8%	Increasing
Calhoun	1991-2014	+1.74%	Increasing
<b>Cedar Island (Main Bay)</b>	<b>1978-2009</b>	<b>+2.1%</b>	<b>Increasing</b>
<b>Clearwater</b>	<b>1988-1997</b>	<b>+11.6%</b>	<b>Increasing</b>
Gervais	1983-2014	+3.72%	Increasing
Hiawatha	1994-2014	--	No trend
Johanna	1988-2014	+3.37%	Increasing
Keller (Main Bay)	1983-2014	+3.85%	Increasing
Kholman	1983-2014	+3.62%	Increasing
Lake of the Isles	1991-2014	--	No trend
Loring	1995-2014	--	No trend
McCarron	1985-2014	+2.41%	Increasing
<b>Osakis</b>	<b>1985-2009</b>	<b>+1.9%</b>	<b>Increasing</b>
<b>Shaokotan</b>	<b>1985-2017</b>	<b>+1.6%</b>	<b>Increasing</b>
Silver	1979-2014	+2.92%	Increasing
South Long Lake	1984-2014	+3.66%	Increasing
Spring	1995-2014	+4.34%	Increasing
Tanners	2004-2014	+3.63%	Increasing
Valentine	1990-2014	+5.56%	Increasing
Wabasso	1984-2014	+1.92%	Increasing
Wirth	1994-2014	+2.49%	Increasing

**Long-term  
chloride  
trends in  
lakes**

Figure 104: Flow-Adjusted Chloride Concentration Trends in the Mississippi, Minnesota, and St. Croix Rivers, 1985-2015



Trend Summary

Trend Shape\* 
 Decrease 
 Increase 
 No Trend

Presented with overall percentage change

\*Different scaling is applied to the lines of each site to visually emphasize the trend shapes. For accurate magnitudes of the trends, refer to the Results section of the report.

# Large river chloride trends

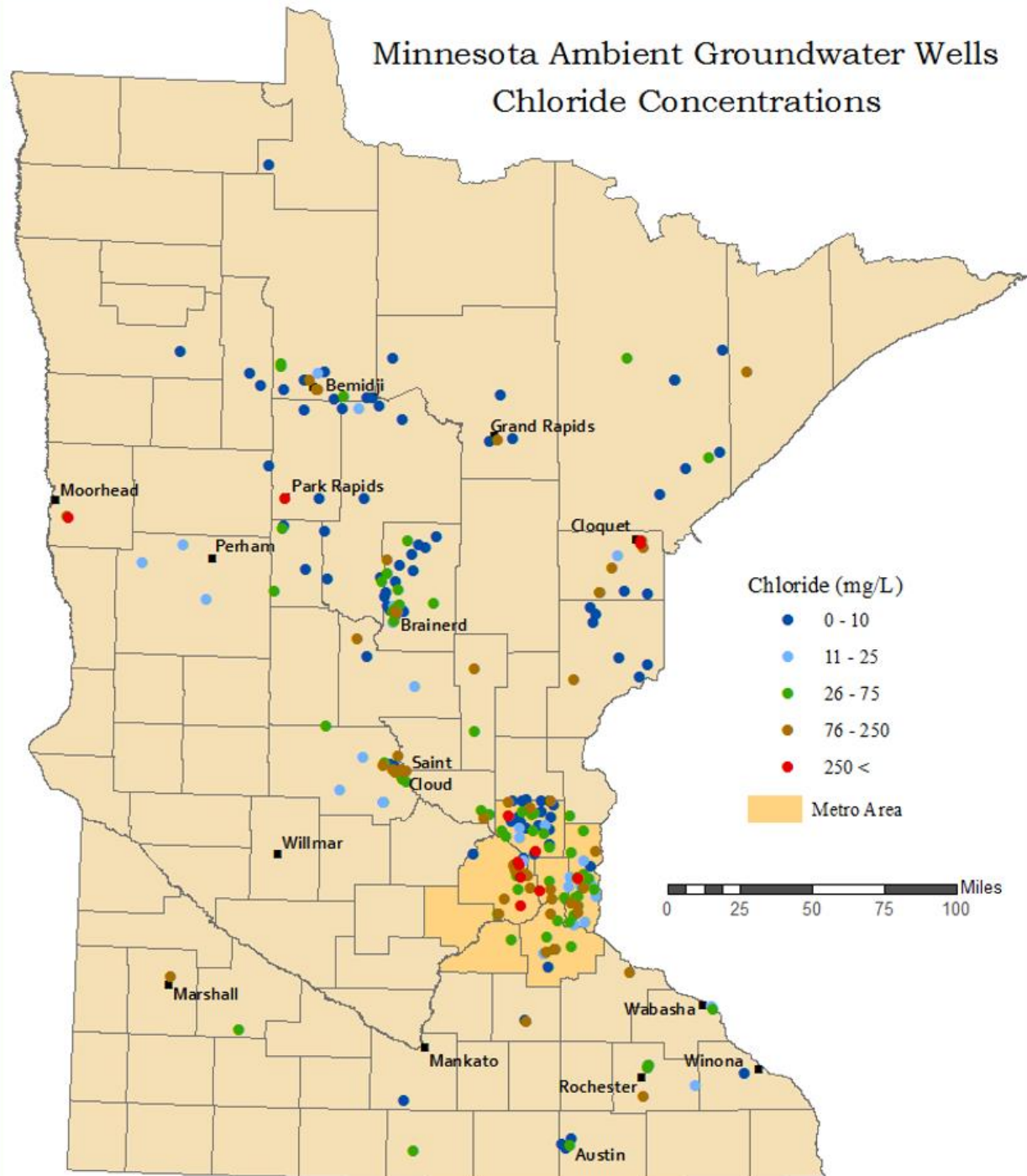
*Regional Assessment of River Water Quality in the Twin Cities Metropolitan Area 1976-2015*  
 Minnesota, Mississippi, St. Croix Rivers  
 (Metropolitan Council Environmental Services)

- Overall chloride trends in the metro area: Mississippi, Minnesota and St. Croix rivers
- Trend results show chloride has significantly increased during the past 31 years

<https://metro council.org/Wastewater-Water/Publications-And-Resources/WATER-QUALITY-MONITOR-ASSESS/Regional-Assessment-of-River-Quality.aspx>

# Chloride in groundwater

Minnesota Ambient Groundwater Wells  
Chloride Concentrations



30% of shallow monitoring wells in the TCMA above standard

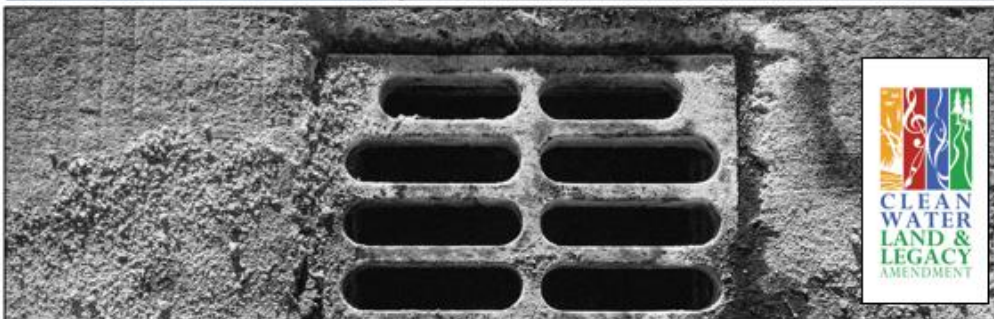
↑  
About 1/3 of shallow wells across the state are increasing in chloride

Land Use	Chloride (mg/L)
Residential	45
Commercial/ Industrial	60
Undeveloped	15

# Statewide Chloride Management Plan

**m1** MINNESOTA POLLUTION CONTROL AGENCY

DRAFT MAY 2018



wq-iw11-06ff

## Purpose

- Highlight chloride impacts on water quality
- Inform and guide best practices
- Demonstrate success and cost savings of improved practices

## Scope

- Surface and groundwater trends
- Chloride sources identified
- Goals for protecting MN waters

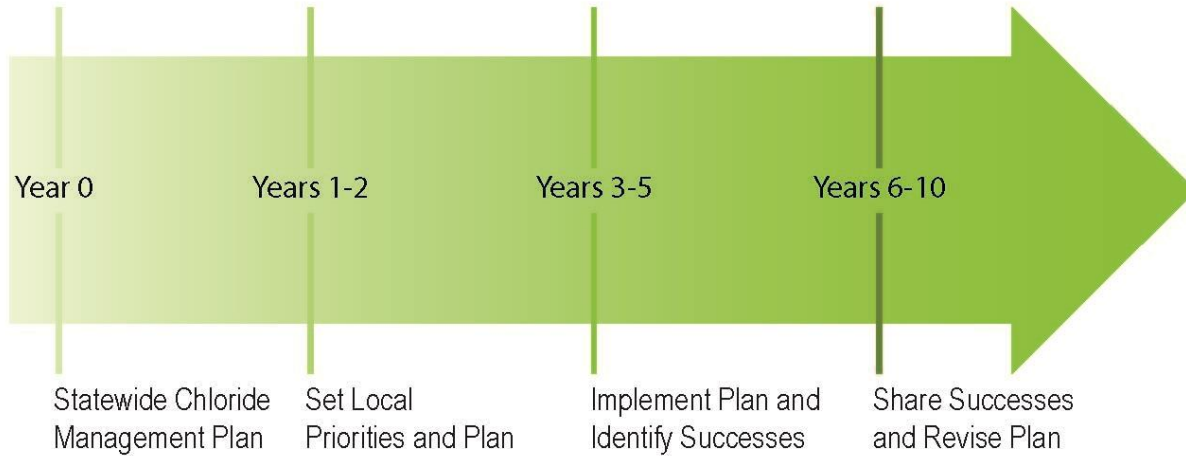
## Audience

- State and local government entities
- Winter maintenance workers
- Elected officials and general public

# Partnership Approach

American Public Works Association - Minnesota Chapter  
 Bassett Creek Watershed Management Commission  
 Becker County  
 Big Stone County  
 Board of Soil and Water Resources  
 Capitol Region Watershed District  
 Casper Construction  
 Chippewa County  
 City of Burnsville  
 City of Cohasset  
 City of Detroit Lakes  
 City of Duluth  
 City of Fargo  
 City of Grand Rapids  
 City of Granite Falls  
 City of Hermantown  
 City of LaPrairie

City of Luverne  
 City of Marshall  
 City of Minneapolis  
 City of Montevideo  
 City of Moorhead  
 City of Nisswa  
 City of Pipestone  
 City of Plymouth  
 City of Red Wing  
 City of Redwood Falls  
 City of Rice Lake  
 City of Rochester  
 City of Sartell  
 City of Shoreview  
 City of St. Cloud  
 City of St. Paul  
 City of Superior  
 City of Willmar



City of Waconia  
 City of Wadena  
 Clay County  
 Crow Wing County  
 D & G Excavating Inc  
 DeSaer Outdoor Creations  
 Dakota County  
 Dodge County  
 Dust Be Gone  
 Eagle Lawn & Labor  
 East Metro Water Resource Education  
 Enviro Tech Services  
 Force America  
 Freshwater Society  
 Friends of the Mississippi River  
 Grant County  
 Hennepin County  
 Hammerlund Construction  
 Hough Inc  
 Houston County  
 Itasca County  
 ISD 318  
 Jackson County  
 Jeseritz Construction  
 Kanabec County  
 Kandiyohi County  
 Lacina Siding  
 Lac Qui Parle County  
 Lake County  
 Lanier Parking  
 LimnoTech  
 Lincoln County  
 Lyon County  
 Marshall Municipal Utilities  
 Metropolitan Council Environmental Services  
 Minnesota Association of Townships  
 Minneapolis Park and Recreation Board  
 Minnehaha Creek Watershed District  
 Minnesota Cities Stormwater Coalition  
 Minnesota Department of Health

Minnesota Department of Natural Resources  
 Minnesota Department of Transportation  
 Minnesota Pollution Control Agency  
 Minnesota State University Mankato  
 Mississippi Watershed Management Organization  
 Murray County  
 National Park Service  
 Nicollet County  
 Nine Mile Creek Watershed District  
 Olmsted County  
 Ottertail County  
 Prescription Landscape  
 Ramsey County  
 Ramsey-Washington Metro Watershed District  
 Redwood County  
 Renville County  
 Rice Creek Watershed District  
 Riley Purgatory Bluff Creek Watershed District  
 Scott County  
 Scott County Watershed Management Organization  
 Smith Lawn  
 SNOW REMOVAL 24/7  
 Southwest Minnesota State University  
 SSC Services  
 Stevens County  
 St. Louis County  
 Stearns County  
 Thomas Tree and Landscape  
 Three Rivers Park District  
 Turf and Tree  
 Twin Lakes Services, Inc.  
 United States Geological Survey  
 University of Minnesota - Duluth  
 University of Minnesota - Twin Cities  
 University of Minnesota Extension  
 Waseca County  
 Widseth Smith Nolting  
 Yellow Medicine County

# Implementation Ideas for Everyone

## Winter Maintenance Professionals

*EXAMPLE: YEARS 1-2*

- Clean out salt from truck thoroughly before washing truck.
- Avoid plowing off other's salt, communicate with other drivers.
- Bring extra salt back to the pile, do not use it up on the route if not needed.
- Add tanks to 5 trucks a year starting now.
- Work out agreement to buy brine from neighboring agency.
- Supervisors and senior crew attend Smart Salting training.
- Speed up physical removal of snow by changing our call out policy to 2 inches of snow.
- Reduce speed of application on high speed roads to 30mph.
- Calibrate most equipment yearly.

## MPCA

*EXAMPLE: YEARS 3-5*

- Continue to monitor lakes, rivers, and groundwater for chloride.
- Continue to update impaired waters list with waterbodies exceeding the state's chloride standard.
- Collaborate with local partners and stakeholders on important chloride related activities.
- Create & support a Statewide Smart Salting training program.
- Support and provide access to the "Salt Dilemma" display at various events and develop a water softening display for the State Fair.
- Continue to provide technical assistance to permittees for reducing chloride and fulfilling permit requirements.

## Watershed Management Organizations & Districts and Soil & Water Conservation Districts

*EXAMPLE: YEARS 1-2*

- Partner with the MPCA to offer the Smart Salting winter maintenance training for local private and public winter maintenance professionals each winter.
- Educate 50% of constituents on the benefits of smart salt use.
- Create awareness about the environmental impacts of chloride through education, outreach, and other activities to local residents, applicators, elected officials and businesses.
- Monitor local surface waters for chloride concentrations to track trends, track progress and understand the movement of chloride through the watershed.
- Develop incentive based program for chloride reduction strategies.
- Host yearly workshops for local winter maintenance professionals to encourage the use of the SSA and track progress of BMPs implemented.
- Coordinate end of winter excess salt drop off locations for private contractors.
- Provide a measuring cup type salt scooper to homeowners and small businesses at the point of sale of salt in order to raise awareness of the amount of salt they are using.



Working  
together to  
protect our  
waters

A scenic sunset over a lake with pine branches in the foreground. The sky is filled with soft, colorful clouds in shades of orange, yellow, and blue. The water reflects the colors of the sky. In the foreground, the dark silhouettes of pine branches are visible against the bright sky. The background shows a dense forest of trees along the far shore of the lake.

Thank you for all that you do to  
protect Minnesota's waters

**KATRINA KESSLER**

**MPCA WATER COMMISSIONER**

**m1** MINNESOTA POLLUTION  
CONTROL AGENCY