ALASD Chloride Variance Public Meeting

The meeting will be starting shortly…

ALASD is working to address chloride (salt) levels in the wastewater it discharges to Lake Winona. The lake has 400 milligrams of salt per liter, which is above the water quality standard of 230 mg/L. Lakes downstream of Winona also have elevated salt levels. Too much salt in the water can negatively impact aquatic insect communities that fish and other creatures depend on for food. ALASD has explored the cost of building a centralized system for removing chloride in its discharge water. This work showed implementing any of the various centralized treatment options would result in significant cost increases to local residents above a certain threshold that made ALASD eligible to apply for a variance to water quality standards to give it more time to study the problem and develop solutions. This variance is the topic of our discussion tonight.

ALASD Chloride Variance public meeting

Today's agenda

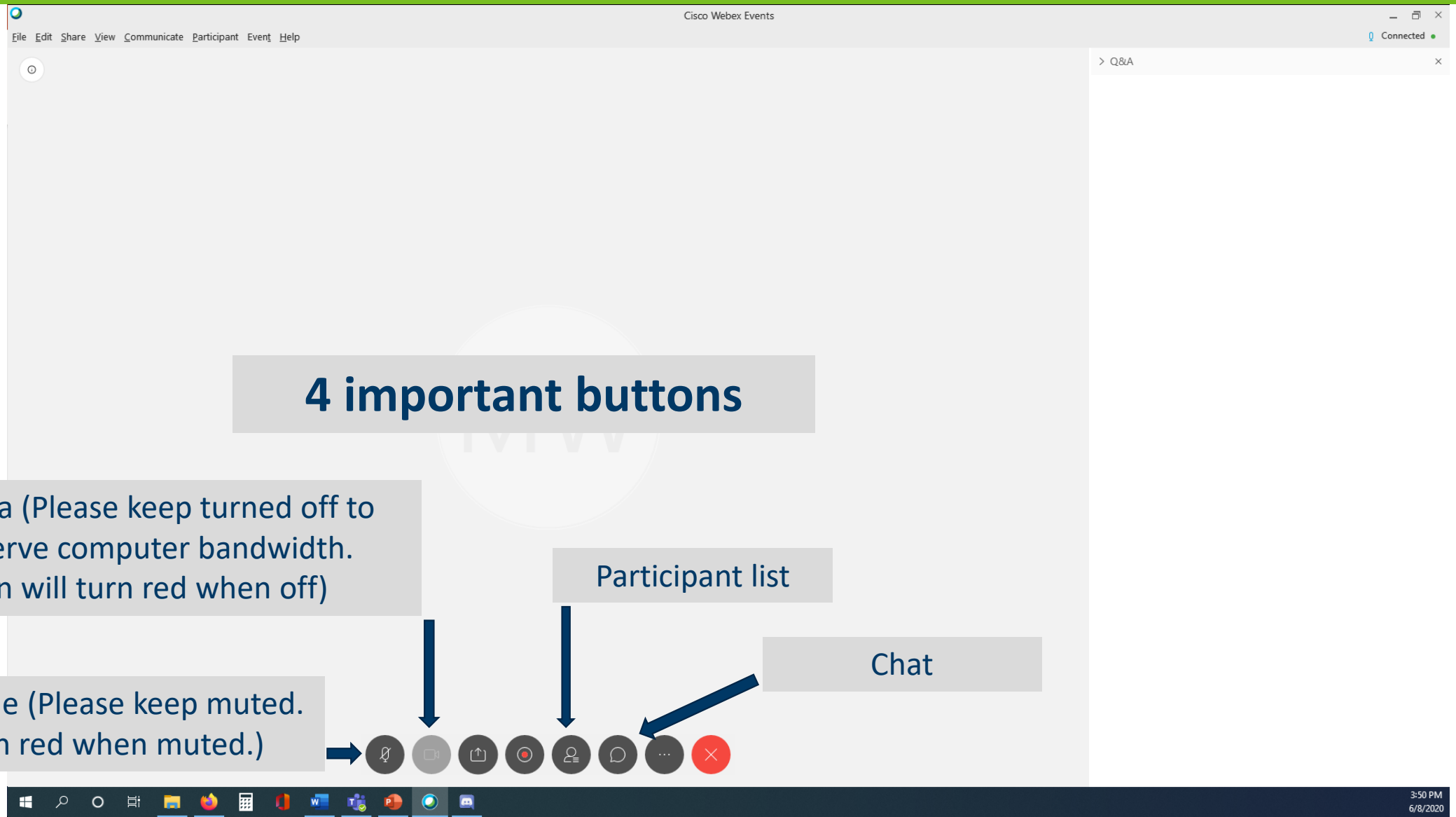
Introductions

How to use Webex (virtual meeting)

What is a chloride variance? (Elise Doucette–MPCA)

Questions

Webex-Audio and Video Buttons

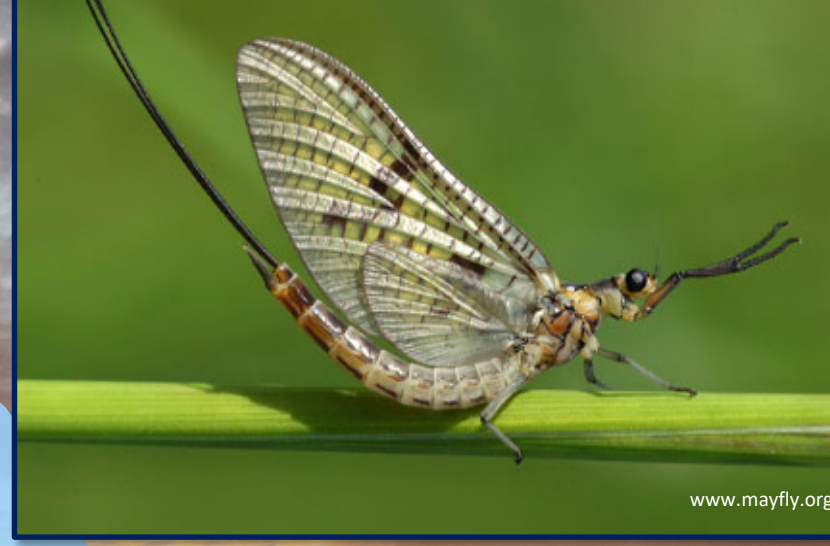


Alexandria Lake Area Sanitary District (ALASD) Public Meeting for Proposed Chloride Variance

Elise Doucette | Policy Specialist

MINNESOTA POLLUTION CONTROL AGENCY

Why is chloride a problem?



Toxic to aquatic life

230 mg/L

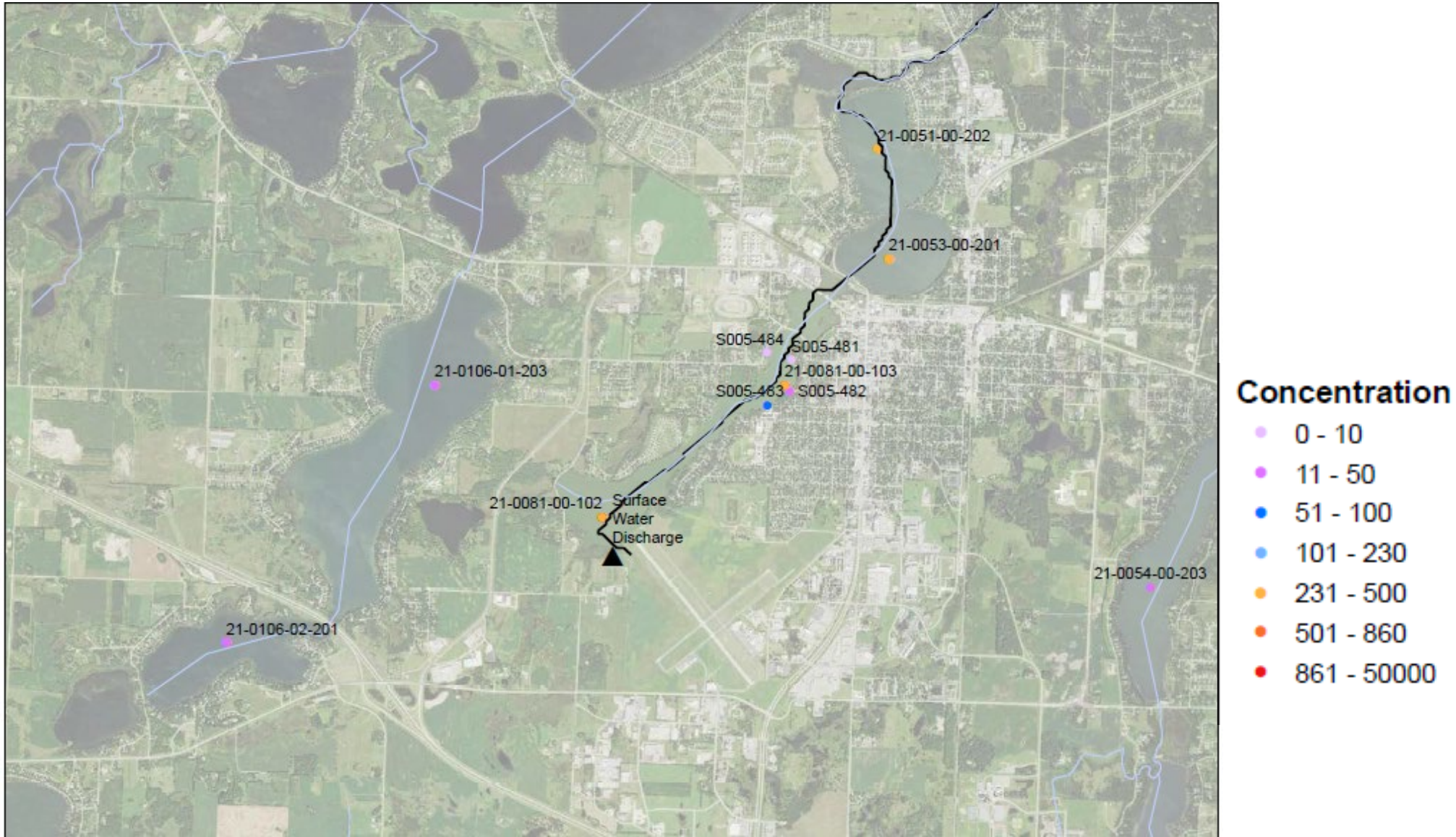
860 mg/L

4-day average

24-hour daily maximum

1 tsp. of salt pollutes **5 gallons** of water

Chloride and Lake Winona



How does wastewater permitting work?

MINNESOTA POLLUTION CONTROL AGENCY

National Pollutant Discharge Elimination System/State Disposal System

MN0040738

Permittee:	Alexandria Lakes Area Sanitary District
Facility name:	Alexandria Lakes Area Sanitary District Wastewater Treatment Facility
Receiving water:	Lake Winona - Class 2B, 3C, 4A, 4B, 5, 6 water
City:	Alexandria **County:** Douglas
Issuance date:	TBD
Expiration date:	TBD

The state of Minnesota, on behalf of its citizens through the Minnesota Pollution Control Agency (MPCA), authorizes the Permittee to operate a disposal system at the facility named above and to discharge from this facility to the receiving water named above, in accordance with the requirements of this permit.

The goal of this permit is to reduce pollutant levels in point source discharges and protect water quality in accordance with the U.S. Clean Water Act, Minnesota statutes and rules, and federal laws and regulations.

Although this permit is effective on the issuance date identified above, the limits and monitoring requirements are not effective until XX/01/XXXX. This permit is effective on the issuance date identified above. This permit expires at midnight on the expiration date identified above.

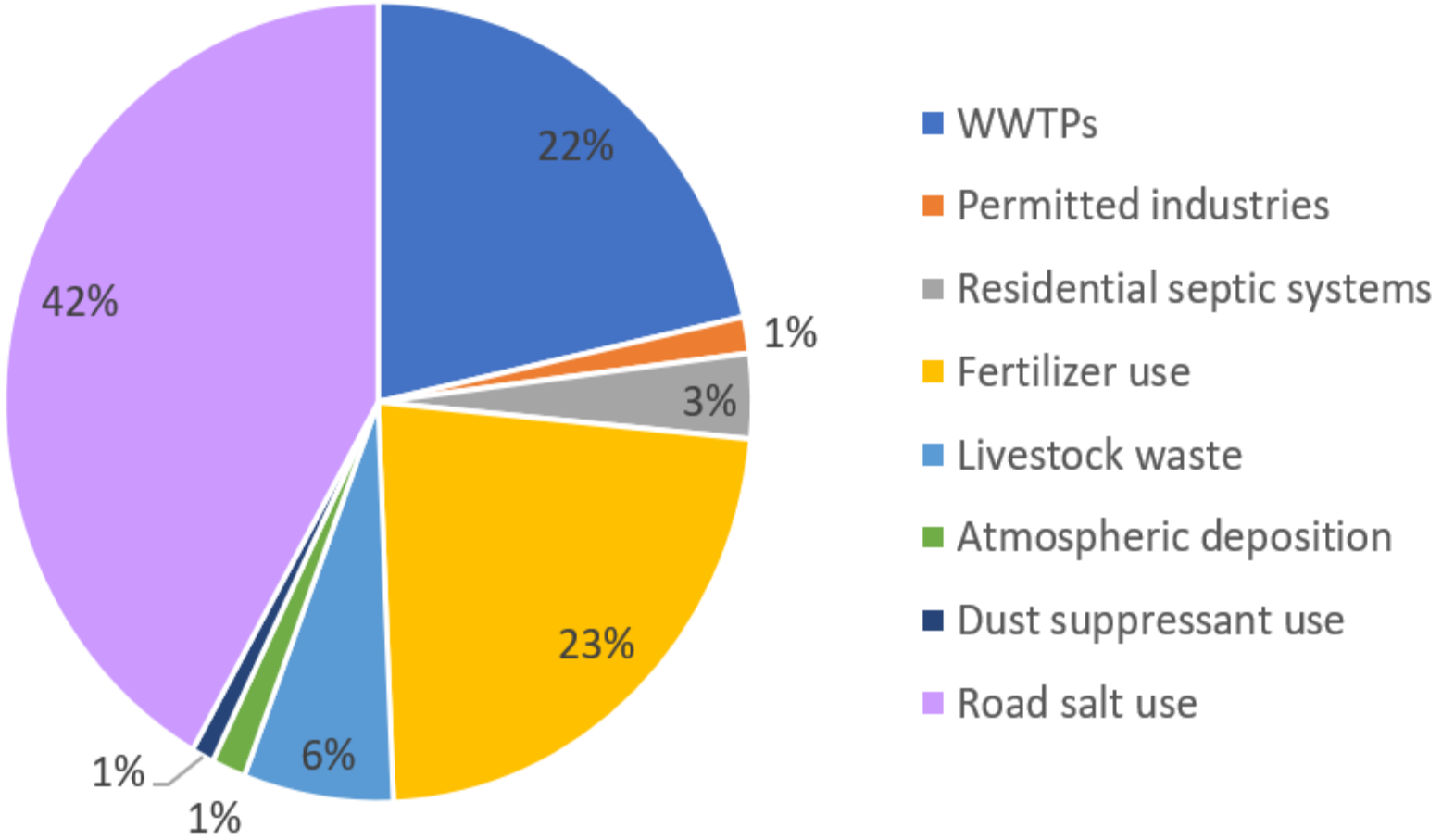
Signature: *(Type e-Signature)*
This document has been electronically signed.
for the Minnesota Pollution Control Agency

Paul C. Scheirer

ALASD photo

What is MPCA doing to combat chloride?

- Brooke Asleson
- Chloride Coordinator

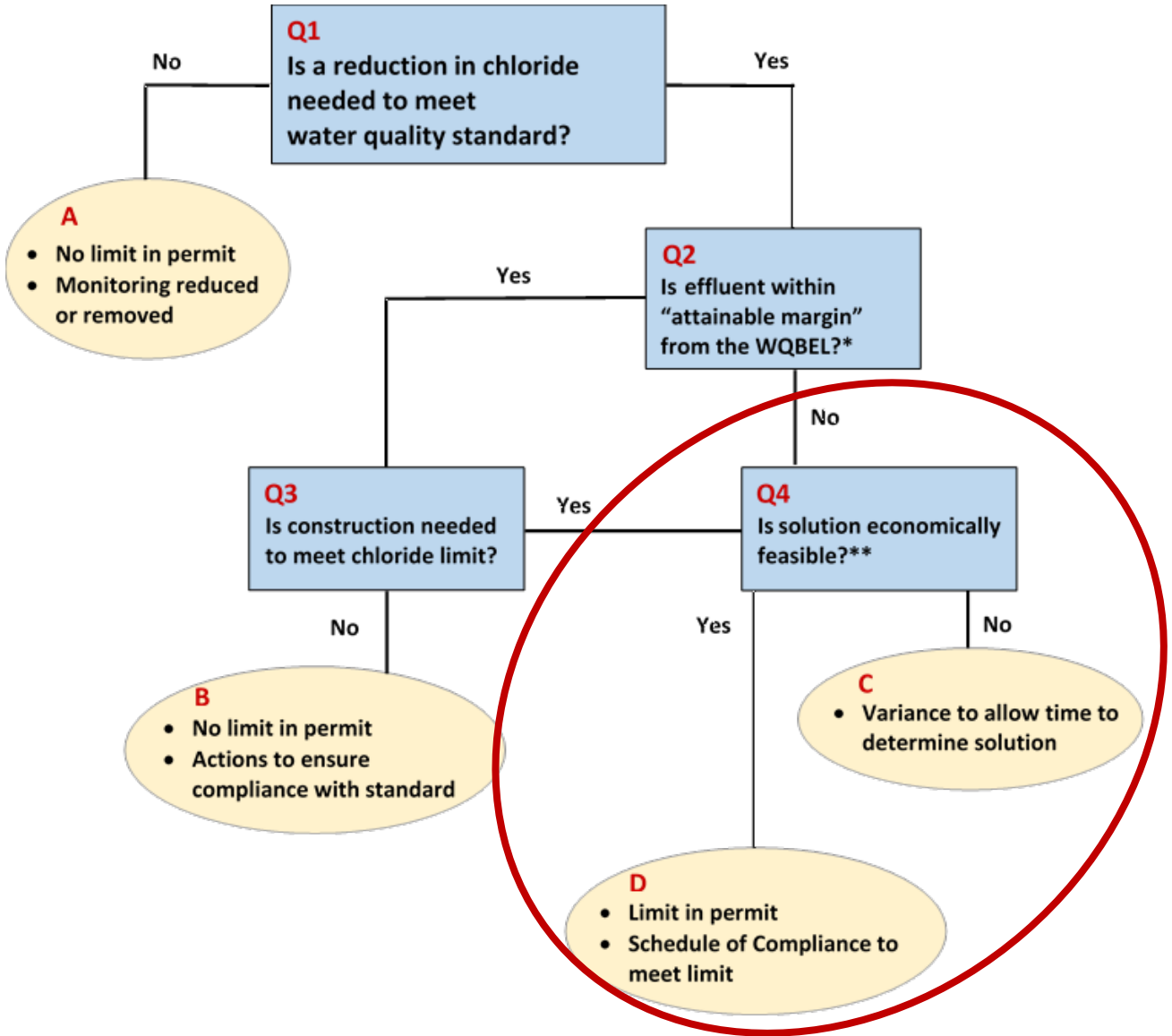


Fraction of annual chloride contributions from major point and nonpoint sources for State of Minnesota (Overbo et al. 2019)

What is MPCA doing to combat chloride in wastewater?

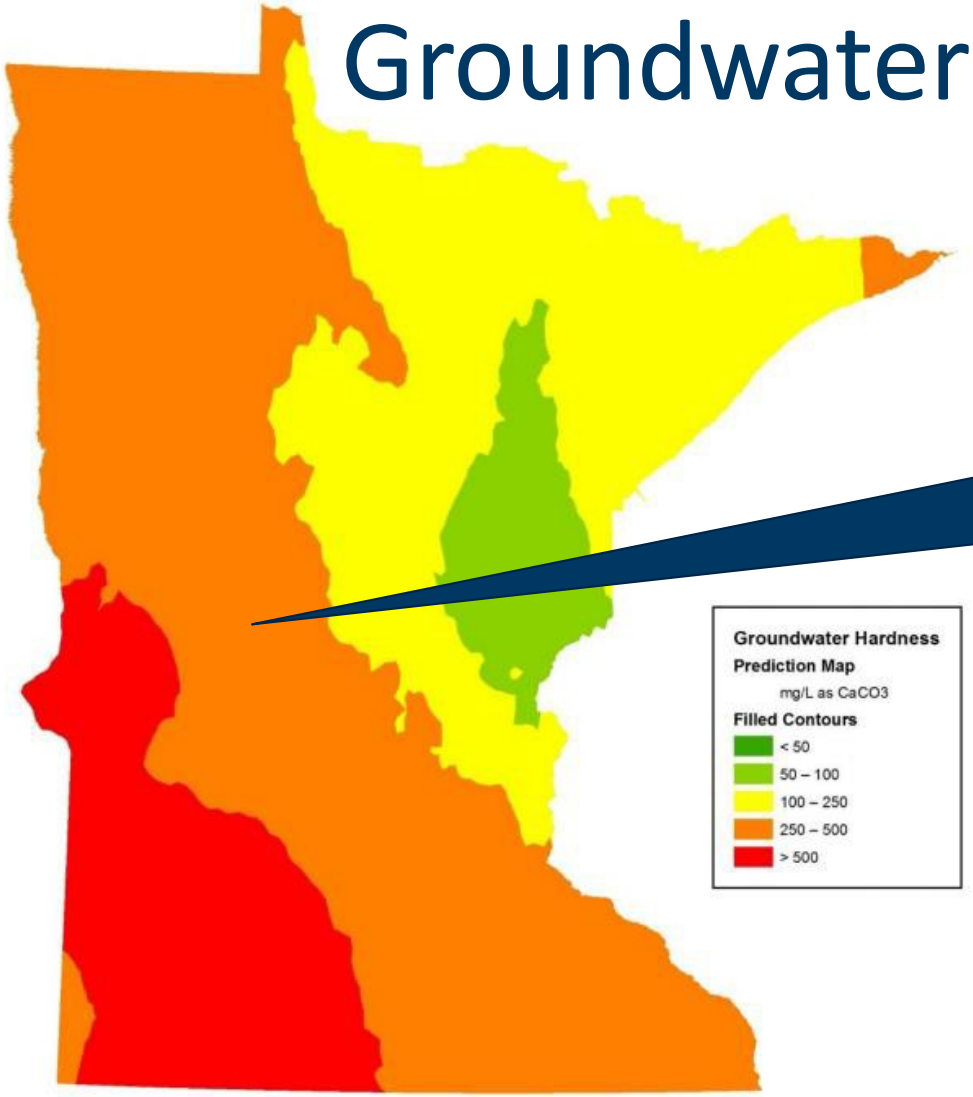
Chloride Work Group
Policy Proposal for Minnesota

Recommendations for addressing chloride in municipal wastewater effluent



How does chloride get into wastewater?

Groundwater



Most people run water softeners to manage hardness

Source Water
(High Hardness)

Ion
Exchange
Softener
Tank

Salt
Brine
Tank
(NaCl)

Treated Water
(Low Hardness)

Forward Cycle

Salt
Brine
Tank
(NaCl)

Backwash
(High NaCl)

Wastewater
Plant

Backwash Resin Regeneration Cycle

Can we treat chlori

Treating chloride at a WWTP

- Equipment needed to evaporate water away from salt is huge and expensive
- Very high capital costs and energy costs
- Equipment difficult to maintain
- Waste salt must be landfilled

Concentrate evaporator
0.36 MGD Flow, $12 million capital
$3 million annual O&M

Can we remove chlori


Hard water pipes

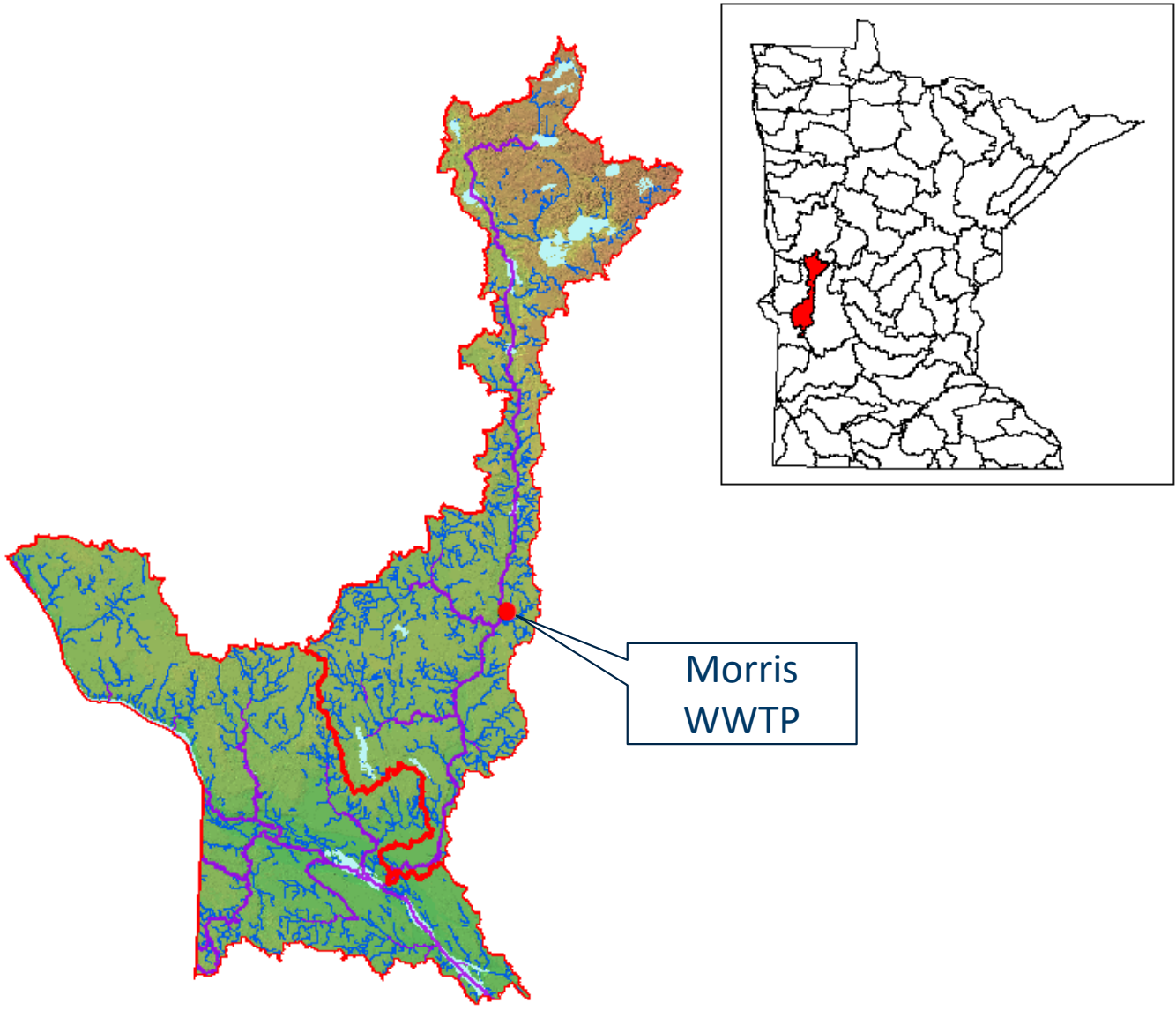

Soft water pipes

Can we reduce hardness at the source?

	Alternative	WWTP Chloride Reductions Possible?	Ability to bring WWTP into chloride compliance (~230 mg/L)?	Technical Feasibility	Implementation Feasibility	Estimated Relative Cost
Drinking Water Source Reduction	Centralized Lime Softening	Yes	Likely*	Feasible	Feasible	Very High
	Centralized RO Softening	Yes	Likely*	Feasible	Feasible	Very High
	Ferric Chloride --> Ferric Sulfate	Yes	Unlikely	Feasible	Feasible	Low
Softeners	Upgrade to High Salt Efficiency Home Softeners	Yes	Unlikely	Feasible	Feasible	Medium
	Upgrade Industry to High Efficiency Softeners	Yes	Unlikely	Feasible	Feasible	Medium
	Outlaw Ion Exchange Home Water Softeners	Yes	Likely	Not Feasible	Not Feasible	Medium
	Create Softener Column Exchange and Collection Program	Yes	Likely	Feasible	Feasible	High
	Switch to Non Ion Exchange Softeners	Yes	Likely	Feasible Yet Unproven	Feasible	Medium
	Increase Residential Softening Target	Yes	Unlikely	Not Feasible	Not Feasible	Medium
WWTP Chloride Treatment	RO effluent - Concentrate Discharged to Surface Water	Yes	Likely	Not Feasible	Not Feasible (Permitting)	Very High
	RO effluent - Concentrate Crystalized/Evaporated	Yes	Likely	Feasible	Not Feasible (Energy)	Extremely High
	RO effluent - Concentrate Deep Well Injection	Yes	Likely	Not Feasible	Illegal	Extremely High
	Chlorination to UV disinfection	Yes	Unlikely	Feasible	Feasible	Medium
	Ferric Chloride to Ferric Sulfate	Yes	Unlikely	Feasible	Feasible	Low
	Chloride Precipitation with Silver Nitrate	Yes	Yes	Not Feasible	Not Feasible	Extremely High
	Chloride Anion Exchange	Yes	Possible	Not Feasible	Not Feasible (Untested)	Extremely High
	Electrodialysis	Yes	Possible	Feasible	Feasible	Extremely High
	Biological Treatment	No	Unlikely	Not Feasible	Not Feasible (Not Possible)	NA
			*If all residential wells eliminated and in-home softeners disconnected			

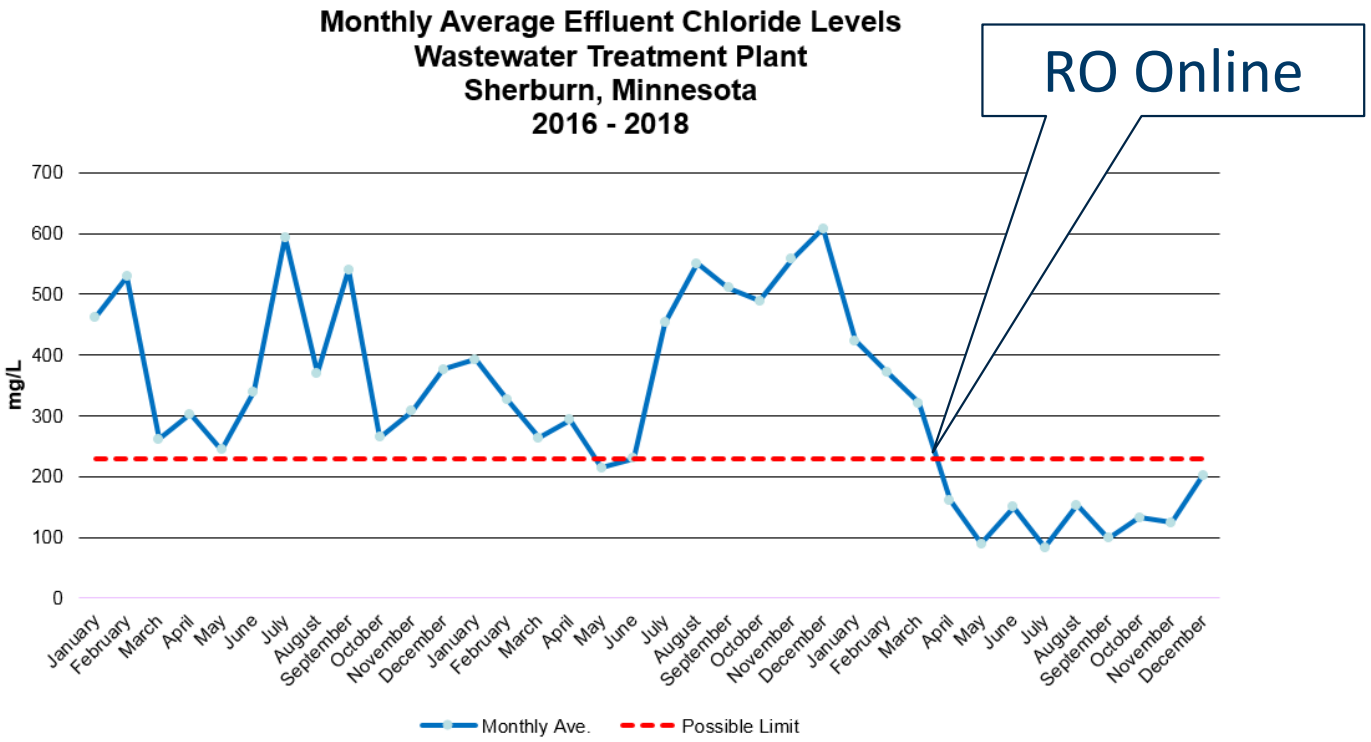
City of Morris

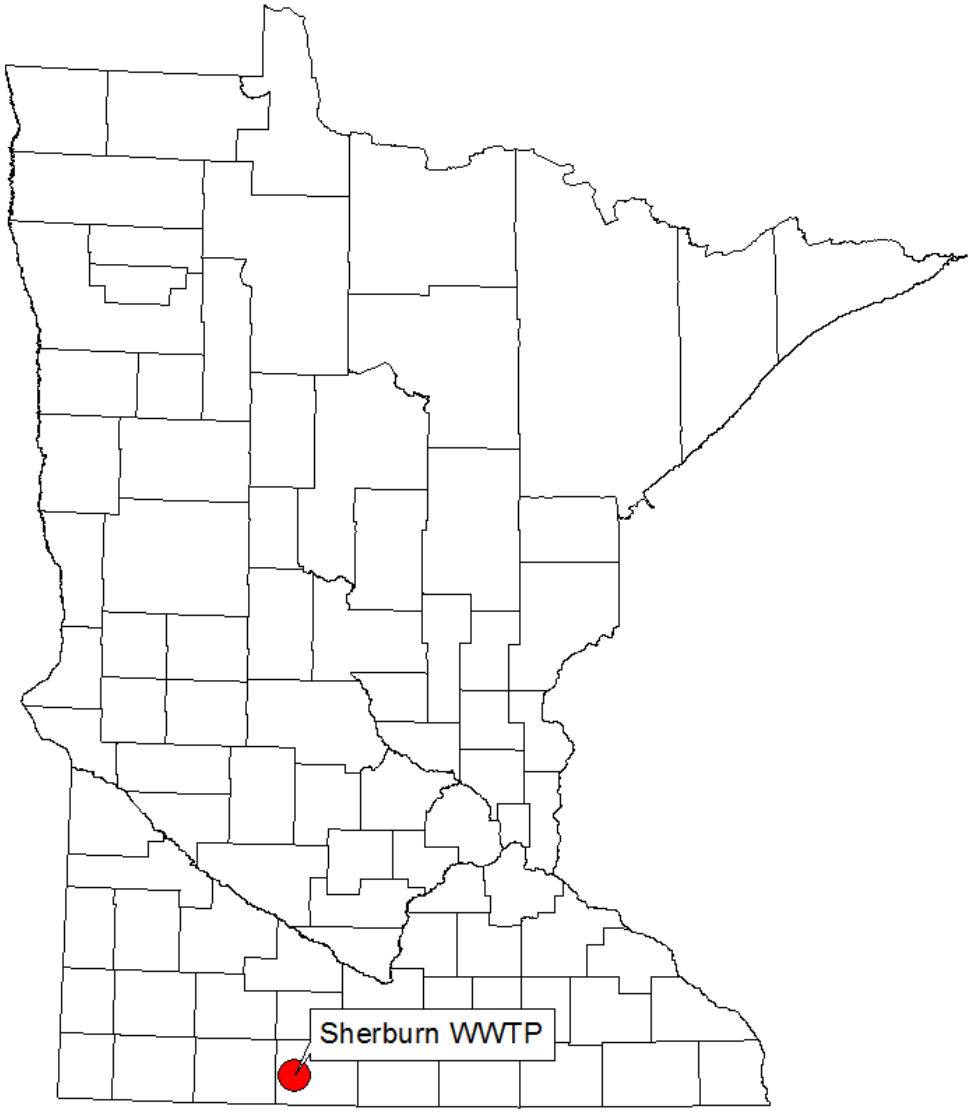
- Morris WWTP has received a chloride limit at WWTP
- Built a new lime softening drinking water plant
  - Provides softened water to local ethanol plant and residents
  - Residences still allowed to use high efficiency softeners

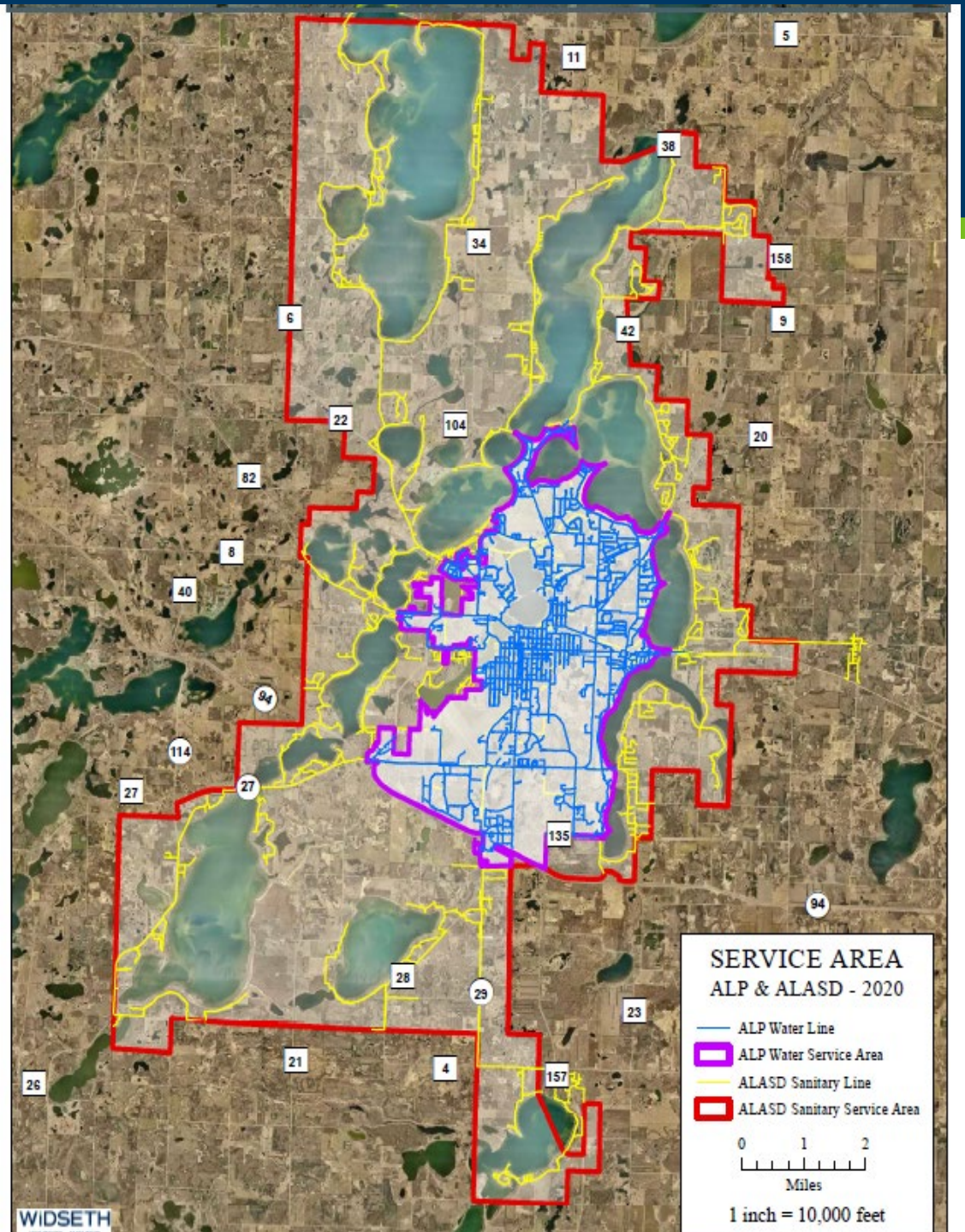


City of Sherburne

Compliant using centralized RO softening






SERVICE AREA
ALP & ALASD - 2020
ALP Water Line
ALP Water Service Area
ALASD Sanitary Line
ALASD Sanitary Service Area
0 1 2
Miles
1 inch = 10,000 feet
WIDSETH

What is a variance?

A time-limited modification of a water quality standard:

- For a specific pollutant
- From a specific discharger
- That reflects the highest attainable condition for a specific time period.

It is a legal bridge between WQS and NPDES permit limits that allows permitting authorities:

- To establish a less stringent Water Quality Based Effluent Limit (WQBEL) for a specific pollutant
- For a specified period of time (only as long as necessary to achieve the Highest Attainable Condition, or HAC)

- It is based on “substantial and widespread economic and social impact”
  - Greater that 2% of Median Household Income (MHI) is considered a hardship
  - Financial health of the community

Is ALASD eligible for a variance?

Alexandria Lakes Area Sanitary District

Reduction Strategy	Lime Softening at DWP	Reverse Osmosis at DWP	Membrane Filtration/ Reverse Osmosis at WWTP
Projected capital costs for your community:	$ 211,244,834.04	$ 207,730,805.32	$ 107,000,000.00
Projected annual cost per household:	$2,370.31	$2,153.86	$1,342.12
Your Municipal Preliminary Screener estimate:	**4.5%**	**4.1%**	**2.5%**
Your Secondary Score estimate:	**2.50**	**2.50**	**2.50**
Eligibility:	**Eligible**	**Eligible**	**Eligible**

		Municipal Screener		
		Less than 1 percent	**Between 1 and 2 percent**	**Greater than 2 percent**
	Secondary score			
Secondary score	**Less than 1.5**	Uncertain - low cost and low affordability	Eligible	Eligible
	Between 1.5 and 2.5	Unlikely to be Eligible	Uncertain - medium cost and medium affordability	Eligible
	Greater than 2.5	Unlikely to be Eligible	Unlikely to be Eligible	Uncertain - high cost but high affordability

What's next?

- ALASD's permit will have:
- An alternate limit of 839 mg/L daily maximum
- An Investigation and Minimization Plan that considers all sources
- Provide funding to the City of Alexandria for staff to attend Smart Salting Training and use the WMAt within 3 years of permit issuance.
- Annual progress reports on actions taken/reductions made
- Update the Plan as more information on the sources, source reduction, and centralized water treatment plant options are known.
- Make good faith efforts to collaborate with the City and Alexandria Light and Power (ALP) throughout the development and implementation of the Plan.
- MPCA will:
- Post variance for public comment during triennial standards review (TSR)
- Re-evaluate the variance every 5 years (corresponds to permit reissuance)

Questions?

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ALASD Chloride Variance public meeting (rehearsal)

Agenda

How to use WebEx (virtual meeting)

What is a chloride variance?

(Elise Doucette–MPCA)

Questions

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Questions

For more information, how to comment: Search “MPCA water quality variances.”

For more information on chloride pollution, search “MPCA chloride resources.”