TCMA Chloride Project – Phase 2

IAT meeting

November 16, 2010 1-3pm

MPCA #RM 2-A Conserve

Agenda

- Review previous meetings notes (3/17/10) – 10 minutes, Brooke Asleson
- Overview of stakeholder process & role of the IAT in phase 2 – 10 minutes, Brooke Asleson
- Timeline & Funding of project – 5 minutes, Brooke Asleson
- Chloride monitoring update – 35 minutes, Brooke Asleson & Kelly O'Hara
- Work Plan review & discussion – 60 minutes, team
- Next meeting (TBD ~ Spring 2011)

TCMA Chloride Project IAT Meeting – meeting notes

November 16, 2010

1. Attendees: John Hensel, Judy Sventek, Jennifer Anthony, Brooke Asleson, Marcey Westrick, Cathy Jensen, Doug Wetzstein, Jack Frost, Kent Johnson, Anna Kerr, Kelly O'Hara, Sherry Kroening, Nick Tiedeken, Mark Fischbach, Beth Neuendorf, Andy Ronchak

2. Summary of previous meeting:

    a. Stakeholder Involvement:

        i. Fact sheet for Feasibility study is now on the project website.

        ii. Gave update at MS4 meeting (phase 1 results), road salt symposium (phase 1 results), MnDOT Hydraulics Workshop (phase 1 results & scope of phase 2).

        iii. Poster at WRC. Good discussion and very fruitful event from the project's perspective.

        iv. Any other events or opportunities for outreach let Brooke know!

        v. After work plan is complete we will develop a fact sheet for Phase 2 & post on the project website for your use.

    b. Phase 2 Objectives:

        i. Monitoring guidance document is in development with focus so far on lakes. We are planning on getting a draft prepared for the Streams by Jan./Feb. This will be used by all the local partners who are collecting samples for this project and will be the basis for the long-term monitoring plan & guidance that will be distributed to the entire TCMA once it is final.

        ii. Road salt application rates are being addressed through the project. A task has been added to validate or refine the private application rates information. In this project we will solicit application rate information from all public applicators.

        iii. Restoration & Protection Plan (now called Management plan) discussion from the last meeting was used to develop draft work plan.

3. Review of Stakeholder Process diagram and member lists (located on project page).

    a. TAC-Consider adding all MS4 contacts because they have a vested interest in how this will impact them. The goal was is to keep the TAC to a small working group with

representatives from all of the vested stakeholder groups, there is representation from MnDOT, WMOs/WDs, and Cities, and we were unable to get a willing county rep on the TAC. Anna & Beth will contact the MS4 contact with Hennepin County. There will be meetings & other outreach activities to communicate with all the MS4s in the TCMA. We did make sure to get a representative from each geographic area that has current chloride impairments, however we expect this list to expand as the project collects additional data. All MS4s impacted by a WLA will have opportunities to engage in the process.

b. Monitoring sub group has grown as interested local partners have volunteered to assist us with the data collection for the waters in their jurisdictions. The members of this group are those who are conducting the monitoring that will be used for this project.

c. Outreach group- plan for now is to find events & meetings to give us an opportunity to talk about the project. Need to add APWA (talk to Tom Struve). There is also the option to host a large TCMA Chloride meeting (1-2) specifically to discuss this project.

d. Implementation plan committee has not been formed yet, but will start being formed once we have the consultants in place to assist with this.

e. An education/outreach committee is being added to the project to assist with the task of pulling together existing education information and creating a chloride toolbox for local partners to utilize, this group need to be added to the project stakeholder process diagram.

4. Timing and funding. Plan to have the workplan finalized in the next 1-2 months. Then get a consultant get involved (one from the master contract, and we are also hoping for a single source contract with Fortin consulting for their particular expertise in road salt application education). The project is expected to go through 2014, which will require requesting funding from multiple fiscal years. There will be one overall project workplan that will need to broken up into fiscal years with 2 separate contracts.

5. Monitoring update-monitoring is not part of the work plan because it is being done internally and by partners. Draft guidance has been created for the lake monitoring. Once all info is finalized, we will pull together a final monitoring plan for the project that will be posted on the project website. This plan will included the QA plan for the project as well as the locations of monitoring.

    a. Lakes-2010 fall samples have been taken. Going out 4 times per year. Surface water, deep water sample, and profile conductivity. Making sure we are consistent with data collection (QA/QC). Once finalized, the lakes selected will be mapped and posted on the project website. Good mix of location and types of lakes. Can modify data collection

methods if needed after we evaluate data from this first year of monitoring. Suggested adding a column for county name to current lake site information spreadsheet.

b. Streams-still working out details. Don't have sampling guidance drafted at this time, but the plan is to use the Met Councils QA plan as the sampling protocol. The focus is on collecting event based grab samples over the winter months at existing flow stations. This will be in addition to other continuous samples that are already being collected (primarily by Met Council). Add Sharon to the list to review and provide comments on guidance for stream monitoring.

6. Work plan: TAC has reviewed and comments on work plan. Changes have been incorporated.

IAT comments on draft workplan:

a. Page 3: general comment that we don't discount sodium.

b. Task 1: Targeted Chloride Monitoring - monitoring is not part of work plan budget, so there are limited details in the work plan. A separate monitoring plan will be created.

c. Task 2: Update existing data compilation with recent data - look at existing data as well as pull in new data and information that was not in STORET during the Feasibility Study data compilation. Looking for other opportunities to collect existing chloride data from local partners who may not submit their data to MPCA on a routine basis.

   i. Page 4, 4th bullet is not part of the feasibility study, but rather is the standard.

   ii. Page 5-Project summary- Brooke will be having conversations with EPA on what they are willing to accept and work with us on. Brooke is also talking with Assessment Folks on assessing/streamlining the metro on a metro wide basis for chloride (on a 10 yr schedule).

   iii. Page 6, remove reference to STORET as we are changing to EQUIS.

d. Task 3: Categorize & define waterbodies for protection and restoration - page 6, this is where we sort out impaired waters using all the data we have collected plus existing data in STORET/EQuIS.

   i. #1, 2, 3 are non-impaired-what does sufficient data mean? Need a clarification.

   ii. Change "priority" to "high-risk". What parameters/criteria is that based on?

   iii. Define "all waters".

   iv. Do we want our protection numbers to be as rigorous as our WLAs? How do we prioritize?

e. Task 4: Develop target concentrations for non-impaired waters - be consistent with anti-degradation.

f. Task 5: Source Identification – will work with consultant to expand on how they would do this task.

    i. Define where 'sub-watersheds' are.

    ii. What are the timeframes?

    iii. How do the numbers vary from year to year depending on large events?

g. Task 6: Modeling and Analysis – this will mostly be based on feasibility study work. Will work with consultant to determine if it is reasonable or if a different approach is necessary. Will also determine how to address lakes.

h. Task 7: Develop education/outreach materials - this is a new task based on feedback from the TAC. The plan is to develop a tool box of general info to be used by local partners.

    i. Tap into Shingle Creek and Nine Mile experience.

    ii. Planning to use MPCA staff on this task with assistance from the Outreach team that will be pulled together for this task.

    iii. Expansion would be to do an economic evaluation on how much can be saved by reducing road salt.

    iv. Local government officials are not hearing the message that is getting put out there.

    v. U of M is a good case study in retrofitting success story.

i. Task 8: Write draft & final TCMA Chloride Management Plan - no comments.

j. Task 9: Write draft & final Implementation Plan & long-term monitoring plan – The implementation plan itself will be populated by the Implementation Plan Committee, hopefully facilitated by Fortin Consulting. We will target road salt applicators.

    i. Bullet 3, clarify that it is treated for chloride, not other impairments.

    ii. Provide enough info and detail for the contract, but leave enough room for the Implementation Plan Committee to not be locked into specifics.

iii. Add a bullet to develop a long term monitoring plan-what type of data do we need to make informed decisions in the future? Future BMP implementation activities.

7. Additional comments on the work plan are due to Brooke by Nov 19.

8. We are planning to have the consultants on board to fill in specific details in December sometime. Once a final work plan is complete that will be sent to everyone for final rreview.

TCMA Chloride Project

IAT meeting
March 17, 2010 2-3:30pm
MPCA Office, St. Paul
Board Room (lower level)

Agenda

- Review results of Feasibility Study

- Stakeholder involvement

    - disseminate feasibility study results
    - next phase

- Phase 2 funding & timeline

- Discuss Phase 2 objectives

Metro Chloride Project
Team Meeting Notes

Team Members Present: Barb Loida, Judy Sventek, Brooke Asleson, Sharon Kroening, Nick Proulx, Pam Anderson, Kelly O'Hara, Dana Vanderbosch, Kent Johnson, Barb Peichel, Cathy Jensen, Phil Monson, Joel Chirhart, Glenn Skuta, Marcey Westrick, Anna Kerr, Nick Tiedeken, Denise Leezer, John Hensel

1. Review results of Feasibility Study

Assume folks reviewed the final Chloride Feasibility Study (particularly Section 5) – posted at http://www.pca.state.mn.us/programs/roadsalt.html, Brooke handed out a print-out of a presentation that summarized Phase 1 of this project, highlights discussed were:

- Not much winter chloride stream data
- Chloride levels higher in deeper portions of lakes
- Not much wetland/groundwater data
- Lakes had a good chloride/conductivity relationship
- Literature review – good to have all this information in one place – not much lake biota research, additives that contain cyanide could be a problem
- Survey – found out what some folks are using for snow/ice control and what is prohibiting their actions to reduce road salt use
- We may be able to target certain watersheds for monitoring/implementation based on road salt application rates (based on road salt purchases) and/or road density because these were both good predictors of chloride concentrations
- Section 5 of the report listed monitoring/research priorities and strategies for implementation (management/TMDL/regulatory) – we will likely use a combination of these three approaches as we move forward

General questions on the Phase 1 Chloride Feasibility Study

- Do we have funding for Phase 2? Yes, but we aren't sure how much yet.
- The report is still confusing as written as far as how the chloride standard is applied. The chronic standard of 230 mg/L is shown as an exceedance of the standard in the report, but this is supposed to be a 4-day average, right? Actually, MPCA's application of the water quality standard is that two or more exceedances (of individual samples) of the chronic standard in three years is considered impaired (we do not require 4 days of sampling in a row) - http://www.pca.state.mn.us/publications/wq-iw1-04.pdf. We agree that we should clarify this language in future reports.
- Also, when we explain the data/charts in the report that refer to road salt application rates, we need to clarify that these are not actual road salt application rates, that this data is based on road salt purchase records. We need to move in the direction where we are actually tracking real application rates in some sort of database/system.

Stakeholder involvement (disseminate feasibility study results)

First, we need to let folks know about the Chloride Feasibility Report.

- We likely need a 1-page factsheet summarizing the project that can be sent to folks with a link to where the report is posted on the website
- Ideas – present at MN Association of Watershed Districts, contact the League of MN Cities and MN Cities Stormwater Coalition and have them forward it to their list serves, also need to include Counties and non-traditional MS4s (i.e. Universities), could use the Mn/DOT State Aid distribution list – this goes to city and county engineers and public works staff (they also have a meeting every March if we wanted to present information to this group), there is a Public Works meeting every fall, Leslie Stovring from Eden Prairie has a Metro Area coordinators group (http://www.metrowater.org/) that could be notified – or we could present at one of their monthly meetings, MPCA convenes a MS4 stakeholder group for

stormwater at least annually that could be informed (*next meeting is May 11*), we could hold our own stakeholder meeting, and/or Judy S. has a list of watershed contacts that if we had a 1-pager we could pass that along to her.

Stakeholder involvement (next phase)

- How do we want stakeholders involved in this phase? It would be helpful to have them involved in the development phase instead of just the review stage.
- Public education should include a discussion of safety & people's expectations of snow/ice removal on roads.
- The Stormwater UMN (http://www.extension.umn.edu/stormwater/) Program has 1/2 day sessions that could cover this topic.
- Freshwater Society is doing a Channel 11 news spot so we could have this topic covered next fall.
- Early buy-in from stakeholders would be helpful – you could ask them what type of involvement they want in the project. We need to them what we want from them up front so they know whether or not to be involved.
- Some of the stakeholders seem more technical – we could get advice from them on technical issues.
- Who is the primary audience? Public and private road salt applicators, cities (public works and water resources staff), watershed groups, non-traditional MS4s, and property owners.
- What is it we want them to do? We want them to adopt Best Management Practices to reduce road salt use and improve water quality.
- It would be helpful to have stakeholders involved in the monitoring design so they have ownership about the results.

Phase 2 funding & timeline

- We are hoping to develop a work plan over the next few months (aiming for Jul/Aug 2010 start date) for Phase 2. We expect to have between $100-250K for this Phase of the project. It is Clean Water Amendment funding and the work plan/contract could extend until June 30, 2013.

Discuss Phase 2 objectives

Brooke passed out a handout of draft objectives for Phase 2.

- Develop a chloride monitoring guidance document (gaps, protocols for winter monitoring, types of lakes and streams to target)
    - Phil and Pam are working on a separate guidance document for MPCA for using the chloride water quality standards for listing lakes on our 303(d) list of impaired waters – we will likely plan to start listing lakes in 2011.
    - Met Council has a Stream Quality Assurance Plan that provides guidance - http://www.metrocouncil.org/environment/RiversLakes/streams/Stream%20Monitoring%20QAPP_Final.pdf
    - Met Council could consider adding chloride to their volunteer monitoring, but they would have to change their monitoring design (currently it is surface samples only for TP, chl-a, and secchi) and train volunteers – would have to figure out if just surface samples would be adequate or not
    - We should involve USGS (i.e. James Fallon) on our team for Phase 2 as they have conducted chloride sampling too.
    - We need to add groundwater and wetland monitoring to this guidance document too.
    - For wetlands, MPCA has developed relationships between plant data and chloride concentrations. The wetland monitoring schedule is in flux right now so we could maybe add some Metro wetland sites that MPCA staff could monitor. We could also work with our wetland volunteers (these are city and county staff and they actually pick their own wetlands to monitor) to collect some chloride samples.
    - For groundwater sampling, Sherri has SOPs that could be used – probably we just want to provide information for shallow well sampling. MPCA is currently targeting sand/gravel aquifers in urban areas so we could target groundwater sampling near those areas.

- Mn/DOT and other MS4s are required to put in infiltration areas, but we are concerned about chloride (for example large projects in Capitol Region and Shoreview) getting into groundwater areas or wellhead protection areas. We need to know more about this. Maybe pursue this idea as part of a separate research grant.
- Is the purpose of monitoring focused on understanding the drivers and where chloride is going in the environment or is it to list more impaired waters? We are more interesting in understanding the problem right now. Is MPCA listing wetlands right now on the impaired waters list? No, but we are establishing trends (and wetlands can be listed as impaired and included in TMDLs if they are hydrologically connected to other impaired surface waters).

- Road salt application tracking for public and private applicators (this may be more of a long-term project and separate funding)
  - We should at least start the discussion of what this system would look like and how we could get applicators to buy-in to using it
  - It is hard to make conclusions about this type of data because of all the caveats that applicators have about the information
  - We need to pursue getting information from private applicators too
  - Would be good to involve Mn/DOT's Salt Solutions staff (Kathleen Schaefer) - http://www.dot.state.mn.us/maintenance/training.html, Connie Fortin, UMN Stormwater Extension Group, and LRRB (Local Road Research Board)
  - We should pursue the existing certification programs for both public and private applicators (particular on state property)
- Developing a Metro Chloride Restoration and Protection Plan
  - This could help us track over time where we are with water quality and reductions in road salt use and chloride levels
  - We may need to revisit this document every 5-10 years
  - This document should help us focus on high priority areas and be primarily be organized around watersheds (WDs/WMOs)
  - We already have criteria for priority areas – road density/road salt application, impervious cover, water chemistry – we should focus monitoring and implementation in these areas first.
  - This could be for lakes, streams, wetlands, and groundwater.
  - The general idea is that we could estimate chloride loadings for each watershed (scale still to be determined) – to get existing chloride loadings as a baseline.
  - For waterbodies listed on the impaired waters, we would have a TMDL equation, for waterbodies/watersheds without known impaired waters, we could generate "target loads and/or target goals and/or target reductions".
  - What if we don't have enough data for allocations? These targets would be more at a coarse level and we wouldn't have separate allocations as we would for TMDLs.
  - It may be that it is difficult to put these target loadings together without more data – this seems like we are jumping ahead too fast.
  - It would be impossible to conduct enough monitoring with current resources to develop allocations for all the Metro waters, but it would be helpful for this report to help us know what the general trends/concentrations/loads are so we can target both BMPs and long-term monitoring activities. Also, the funding is through 2013 so we can conduct some targeting monitoring to help us ground-truth our assumptions.
  - The main goal is for this plan to have enough information in it that we can start reducing road salt use and chloride concentrations in surface waters of the Metro.
  - For other watersheds, we are on a 10-year monitoring cycle so it might make sense to move ahead with the information we have as far as listing and then assess/list more waters in 10 years and revisit this plan.
  - Who would approve this Plan? EPA for the TMDL sections and MPCA. We would hope that it count for BWSR funding (but some entities such as Mn/DOT and Universities may not be eligible for funding so would have to work with other local partners).
  - The idea is that we would only have one document.

    - Could folks put BMP ideas in their Watershed Management Plan? They could, but the purpose of this plan is that all the information is in one place.
    - We should add all funding opportunities/grants in this Plan.
- We are also looking for opportunities for agencies to conduct some of the projects themselves. For example, we could develop a chloride monitoring guidance document for partners without spending of the project funding. We could also figure out ways to change our own and partner monitoring activities to better address the gaps in the report.
    - Surface Water Assessment Grants (MPCA) – we could maybe target chloride in this next round
- MPCA is also in the process of developing a pre-proposal for internal review for the LCCMR (Legislative Citizen Commission on Minnesota Resources) funding round. If we decide to move it forward and if it was funded, it would supplement Phase 2 of this project and focus on monitoring, BMP effectiveness, and training. Please let us know if you would be interested in being a partner in this project. The funding would start in July 2011.

Next Steps

- Disseminate information about the Phase 1 Chloride Feasibility Study
- Revise Phase 2 Work Plan ideas (develop a Work Plan for June/July)
- Start getting a stakeholder group together
- Work on the Monitoring Guidance document

TCMA Chloride Project

IAT meeting
January 16, 2014 2-3:30pm
MPCA Office, St. Paul
Board Room (lower level)

Agenda

- Introductions – 5 minutes, Barb Peichel, MPCA
- Review of TCMA Project progress – 15 minutes, Brooke Asleson/Barb Peichel, MPCA
- Update on progress of watershed modeling – 15 minutes, Jeremy Walgrave, LimnoTech
- Timeline & process for draft Chloride Management Plan – 10 minutes, Brooke Asleson, MPCA
- Road Salt BMP tool development – 30 minutes, Connie Fortin, Fortin Consulting
- Next steps – 5 minutes, Brooke Asleson, MPCA

Twin Cities Metro Chloride Project

IAT Meeting

January 16, 2014

LimnoTech

Water Environment | Scientists Engineers

IAT Meeting

- Twin Cities Metro Area (TCMA) – Metro Chloride Project (MCP) Overview
  - Modeling for Lakes and Streams
  - Chloride Management Plan
  - Implementation and Monitoring Plan

Project Overview - LimnoTech

Water Quality Data Compilation

Categorize Waters

Develop Targets

Source Identification

Modeling and Analysis

Management, Implementation, and Monitoring Plans

Modeling objective

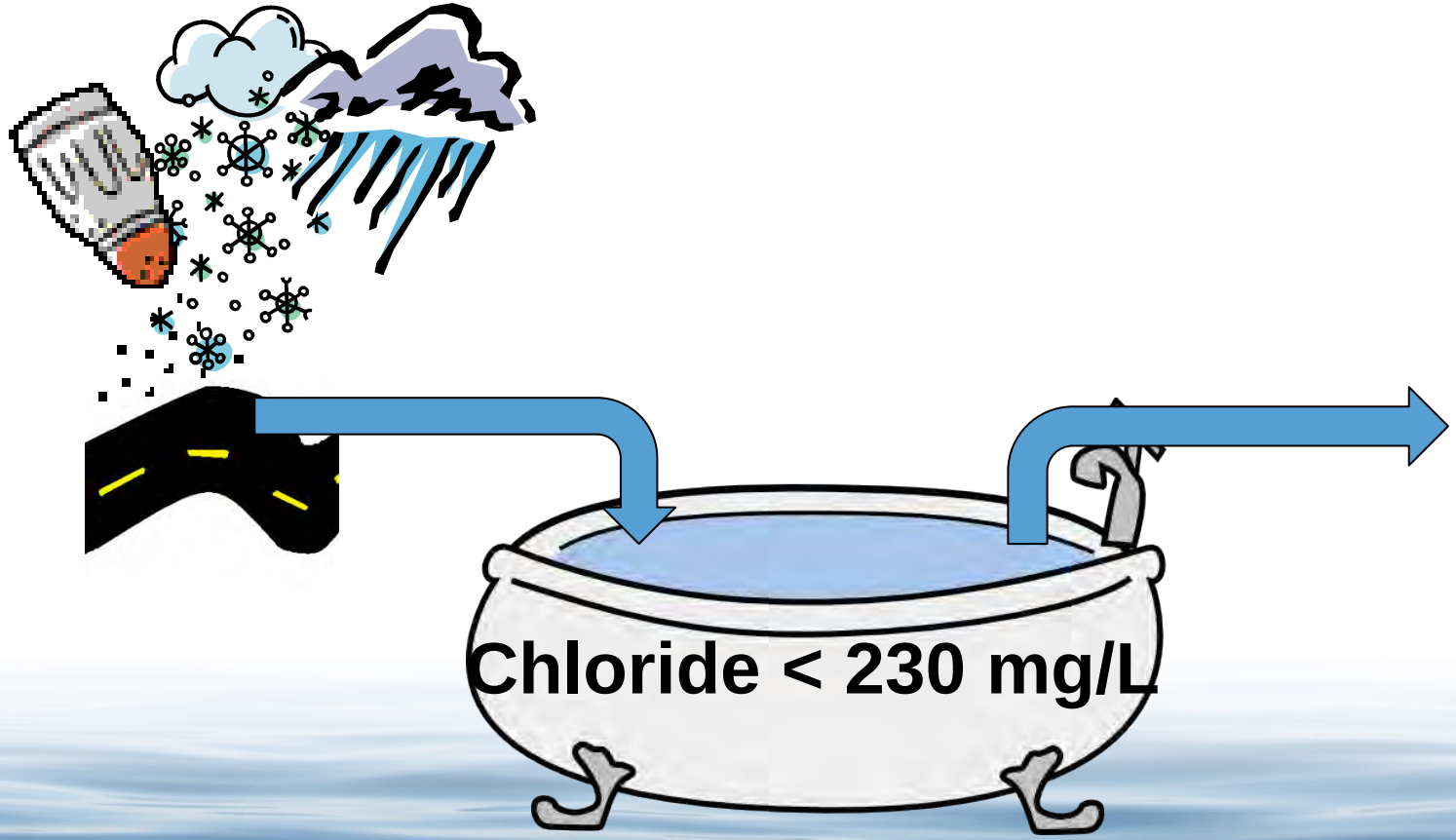
- Establish the TMDL: Determine how much chloride can get into lakes and streams and still be protective of water quality standards

- Modeling approach developed through stakeholder involvement (primarily Technical Advisory Committee input)

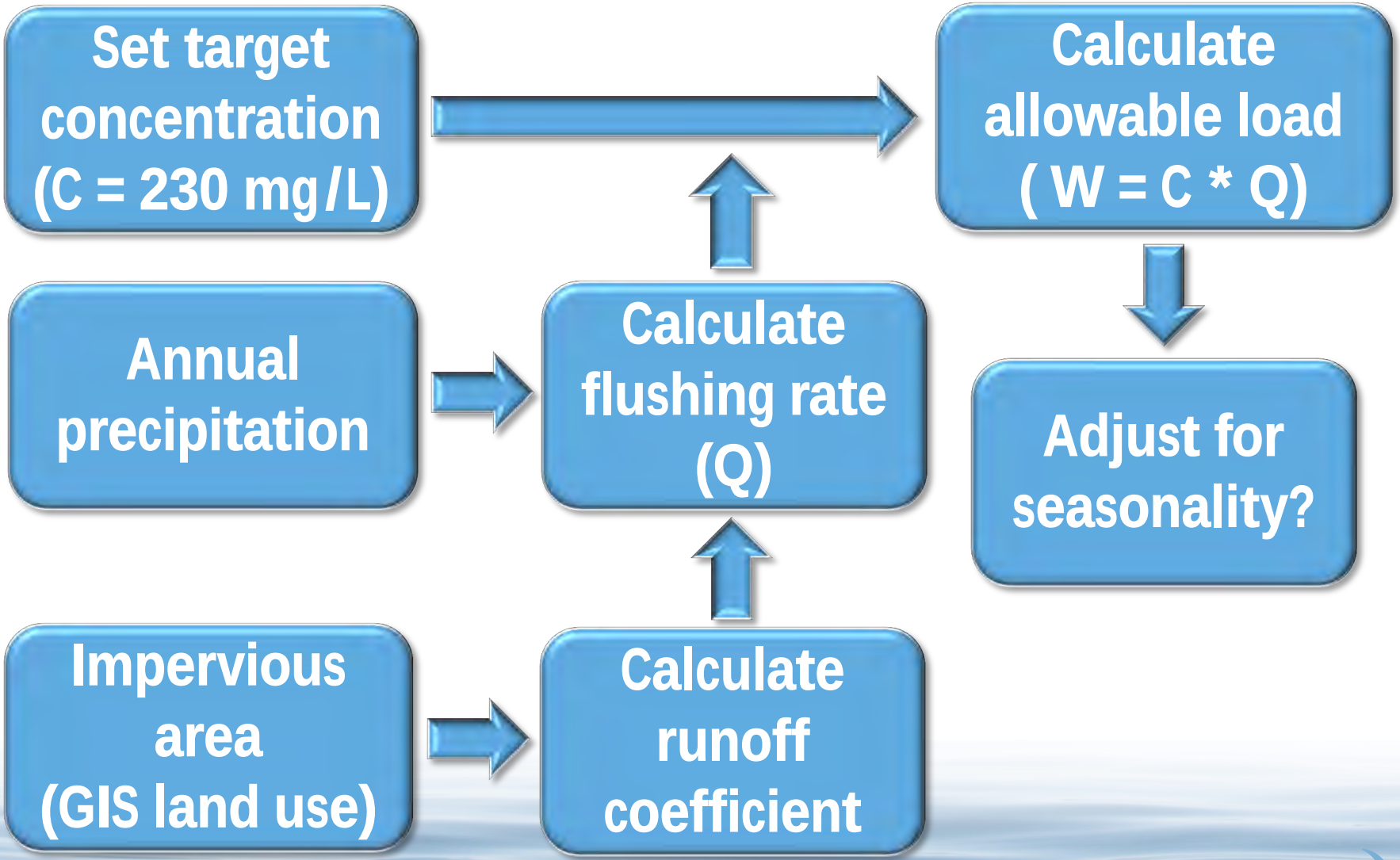
TMDL approach for lakes

- Simple runoff and dilution modeling approach
  - Lakes benefit from mixing/dilution outside of loading timeframe
- Considers impervious surface
- Considers average annual runoff volume

Lake Model



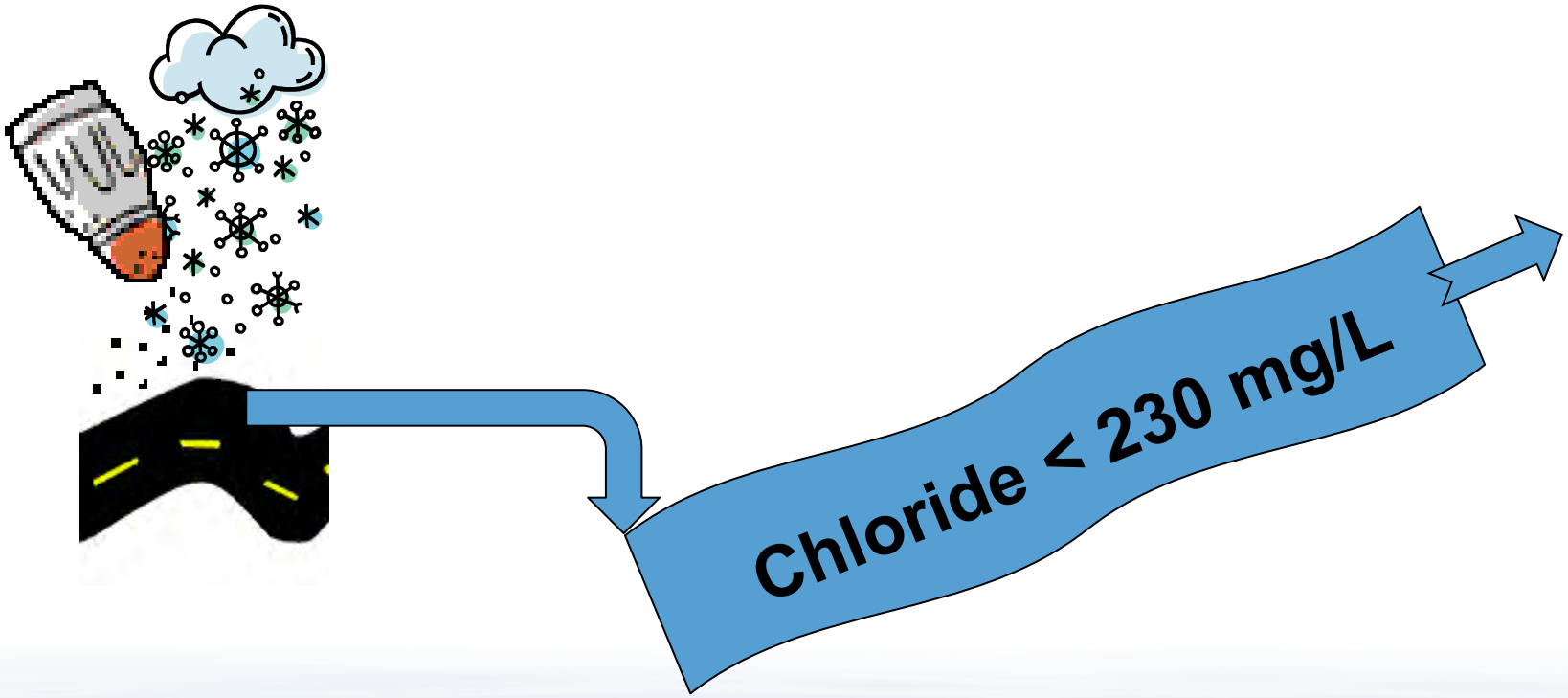
TMDL approach for lakes



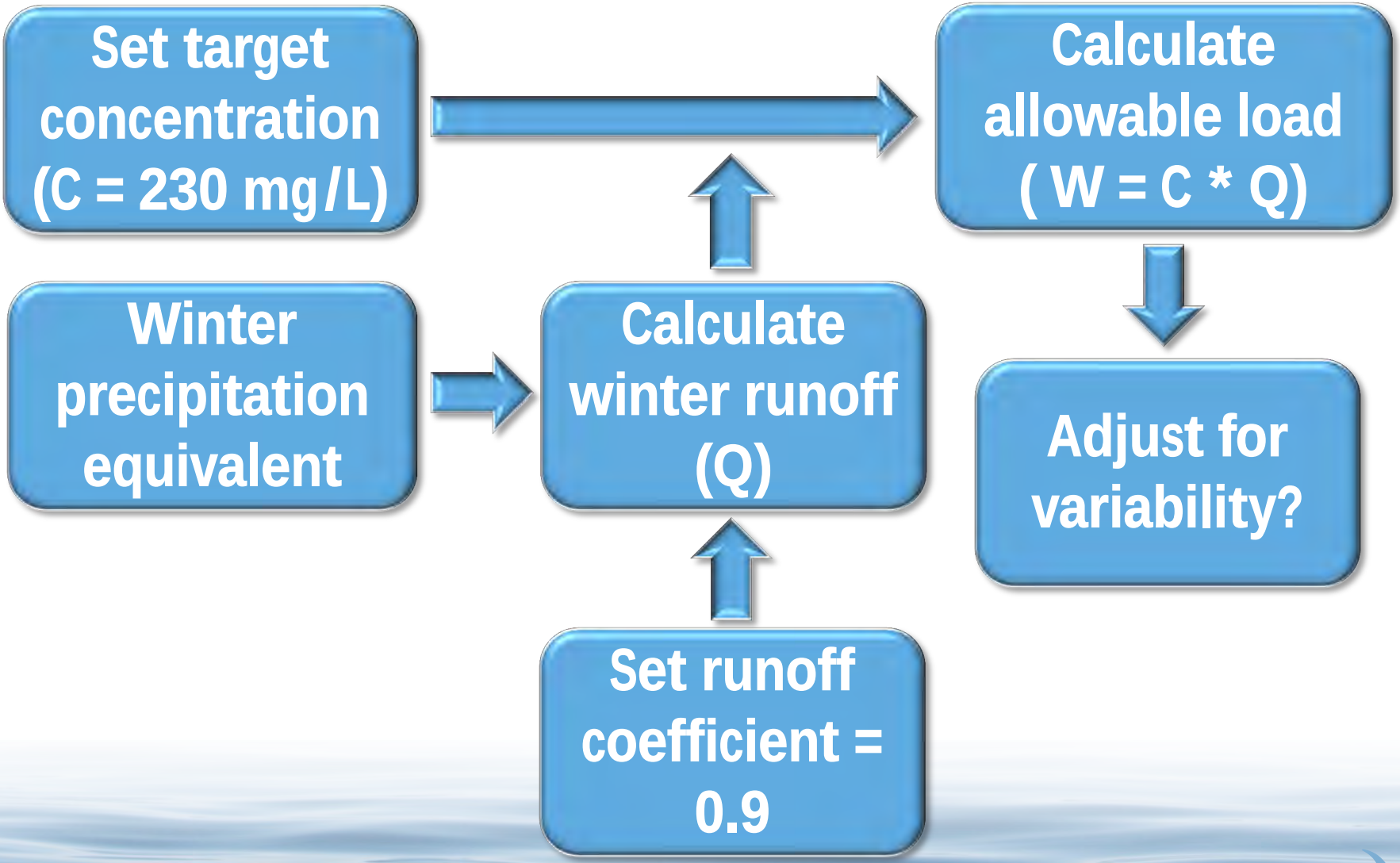
TMDL approach for streams

- Simple runoff and dilution modeling approach
- Streams respond on an event basis/spring snowmelt rather than annual or longer
- Considers frozen ground conditions
- Considers winter season runoff only

Stream model



TMDL approach for streams



Additional considerations

- Situations where criteria exceedances occur in summer/non snowmelt
- Non-MS4 point sources (municipal and industrial wastewater)
- Situations with potentially significant inputs from agricultural runoff or septic systems

Questions

Twin Cities Metro Area (TCMA) Chloride Project

Brooke Asleson
Watershed Project Manager, Minnesota Pollution Control Agency (MPCA)

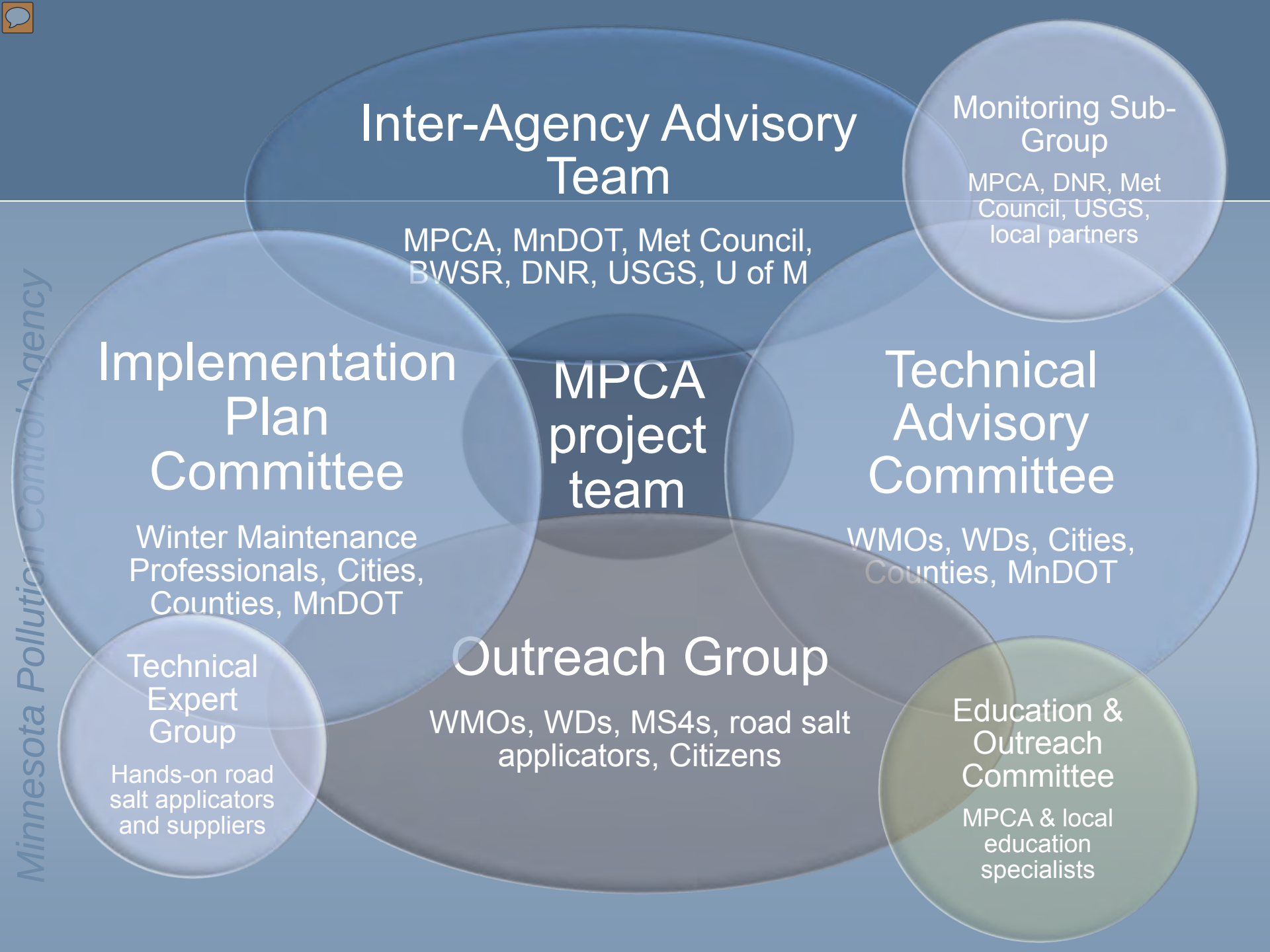
TCMA Chloride Management Plan

- 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

This is a partnership process driven by the stakeholders


Inter-Agency Advisory Team
MPCA, MnDOT, Met Council, BWSR, 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
Minnesota Pollution Control Agency

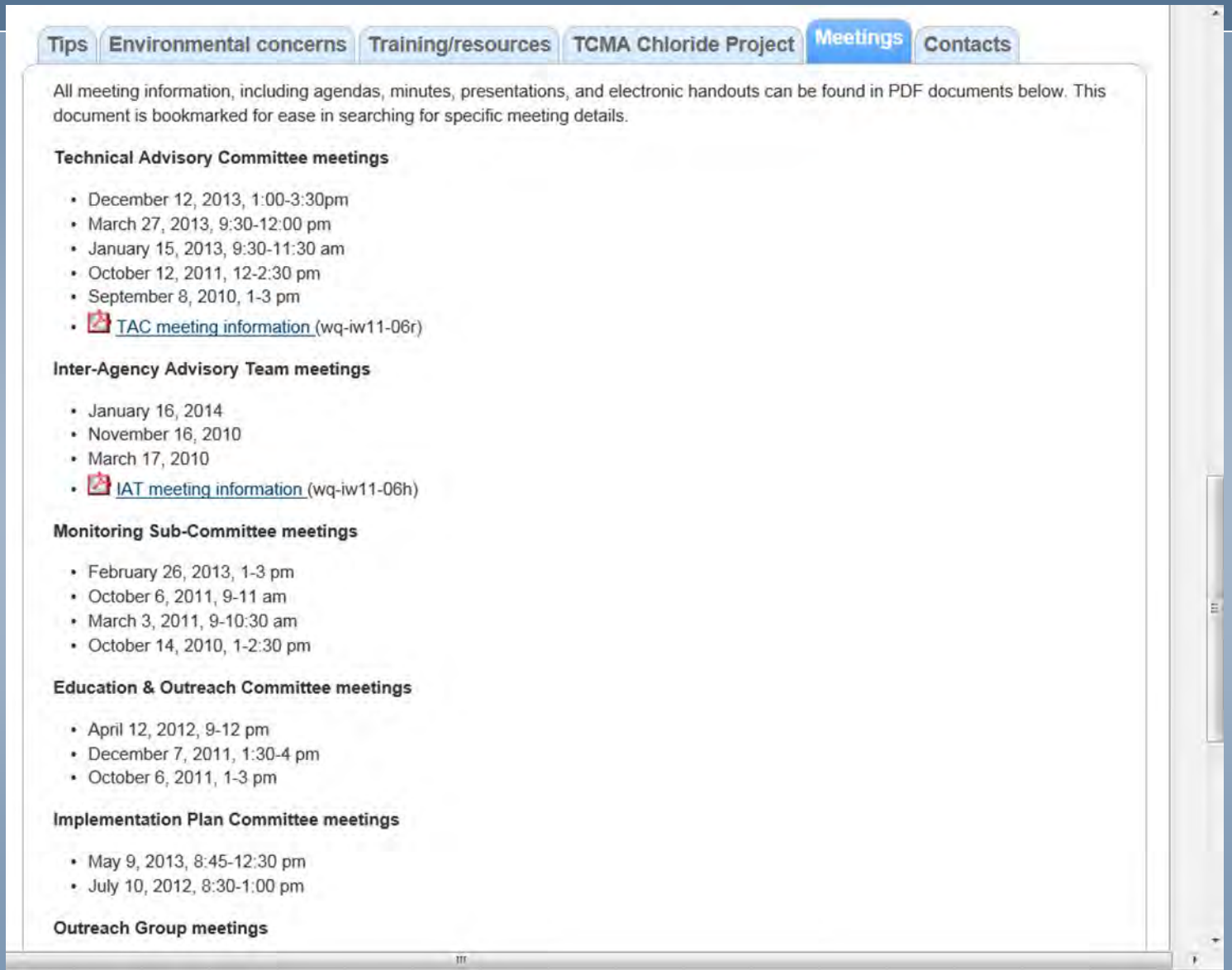
TCMA Chloride Project: Timeline

Began process in 2010

Scheduled to complete project in 2014

Minnesota Pollution Control Agency

Stakeholder Team meetings



Outreach & General Communications

Minnesota Pollution Control Agency

- New MPCA Road Salt & Water Quality Website
- October 2011 - Poster at WRC
- August 2012 - Salt Dilemma Display
- Jan. 2013 - EPA's Stormwater Pollution Prevention Webinar Series: Road Salt Pollution Prevention Strategies
- Numerous press releases and media interviews since 2010

- Presentations at Road Salt Symposium annually since 2010

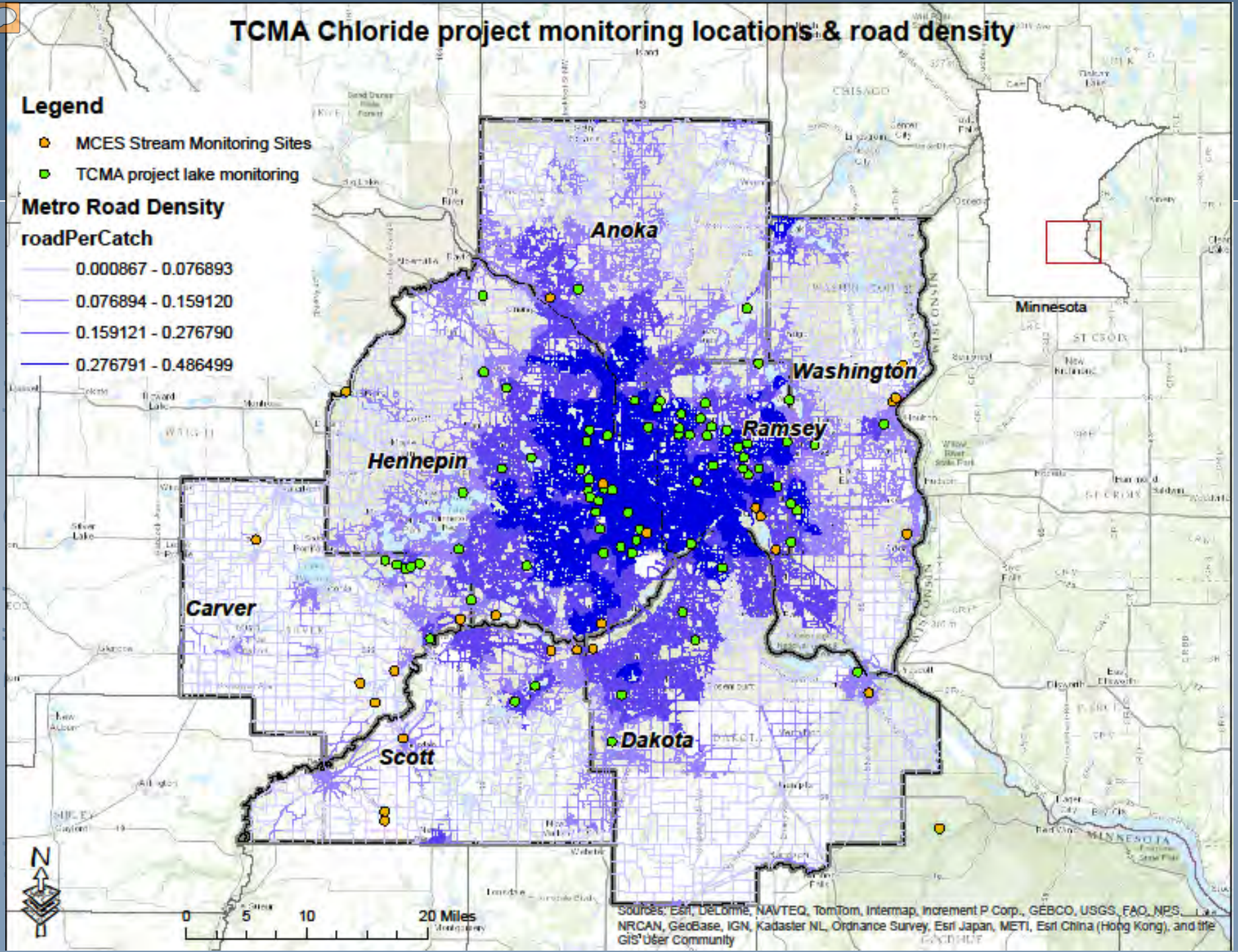
Project Monitoring Goals

- Collect data for TCMA Chloride project to:
  - Determine status of waters
  - Calculate chloride concentrations for TMDLs and protection plan
- Long-term Trends/Effectiveness data:
  - Develop baseline chloride levels
  - Track long-term trends
- Confirm findings of feasibility study
- Develop new monitoring guidelines for chloride in Metropolitan areas

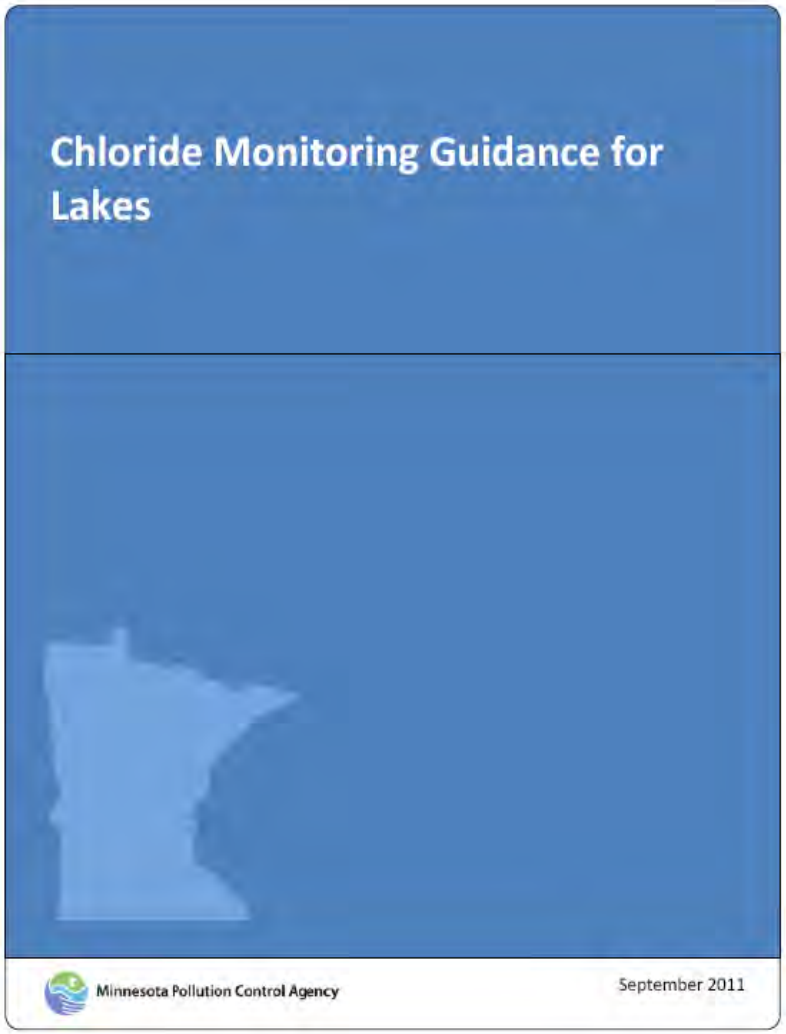
Project Monitoring Plan

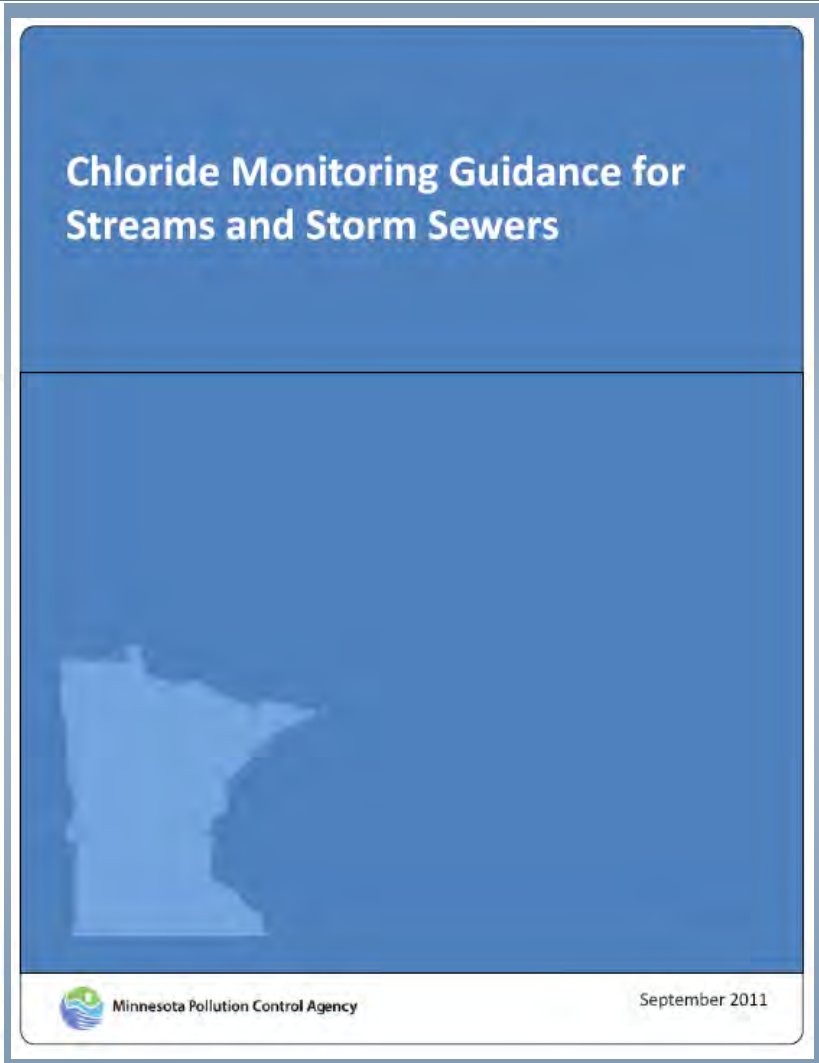
- Monitoring Sub-Group (MSG) formed for project
  - Advise on monitoring approaches
  - Collect chloride data
  - Share results with MPCA
- Included 74 Lakes, 27 Streams & 8 Stormsewers
- Fall 2010 – Spring of 2013
- Involves several local partners:
  - Capitol Region WD, City of Prior Lake, DNR, Met Council, Minnehaha Creek WD, Minneapolis Parks and Recreation Board, MPCA, Mississippi WMO, Ramsey County Environmental Services, Ramsey-Washington Metro WD, Rice Creek WD, Three Rivers Park District, USGS

TCMA Chloride project monitoring locations & road density



Chloride Monitoring Guidance





Final Metro Chloride Assessment (Oct. 2013)

- Assessed 335 lakes, wetlands, & stream/river reaches*
- 7-county Twin Cities Metro Area
- Impairment to aquatic life from chloride concentrations that exceed state water quality standards
  - 44 waterbodies listed as impaired (35 new to 2014 list)
    - Shingle Creek & Nine Mile Creek TMDLs completed already
  - 250 waterbodies meet standards (note: winter/depth)
  - 39 waterbodies had some data, but insufficient for assessment
  - 2 waterbodies proposed to be delisted

Monitoring Results – Interactive Map

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

Source Identification

- Researched existing studies and information – 2012
- Refined estimate of Parking Lot & Sidewalk application rates for MN
- Working with MPCA staff to identify all permitted entities with chloride discharges
  - Includes WWTP
  - Industrial dischargers
- Others potential sources to consider:
  - Septic Systems (only where there are issues)
  - Fertilizers (literature values)

Protection Goals

- Protecting waters from continued degradation is crucial
- Consensus from IPC & TAC is to develop performance based goals (focus on the BMPs rather than a number)
- Working with TAC to determine how to implement a performance based approach

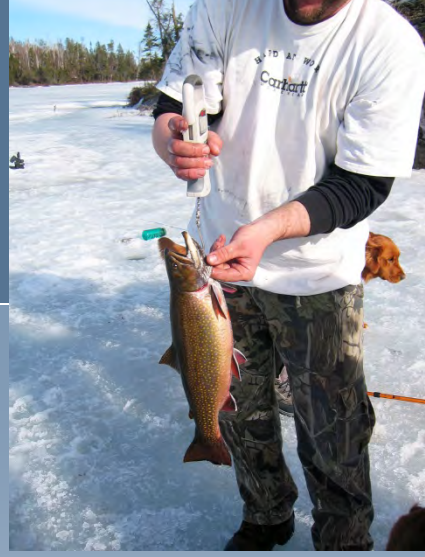
Performance Based Goals

- Primary objective is to get all winter maintenance programs performing at a level that is using minimal amount of salt
- Prevention is the only option for reducing salt loadings (removal is not viable)
- Same BMPs for protection as for impaired waters
- BMP tool in development is critical to assisting as a planning tool for this approach

Performance Based Goals

- Coordinating with MS4 program to ensure compliance with NPDES requirements for TMDLs
- Will begin working with TAC to work out the details of what this will look like
  - What will the goals be?
  - Will there be different levels of goals?
  - How will we know when goals are met?
- Measuring water quality will be critical to determining if implementation of BMPs is improving water quality conditions

Next Steps – next 6 months



- Finalize source identification in impaired watersheds
- Complete modeling for TMDLs
- Work with TAC & IPC to develop goals for performance based approach (to be used for Protection and TMDLs)
- Prepare draft TMDLs and Management Plan for stakeholder review and input

For More Information – TCMA Web Pages

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

Winter Maintenance Assessment Tool

Connie Fortin

FORTIN CONSULTING, INC.
serving the environment

Minnesota Pollution Control Agency

Vision

To develop the logic for a computer based tool that will provide a way for winter maintenance organizations to:

- Document their current practices
- Chart a path towards improved practices (salt reduction)
- Develop a strategy unique to their operation

What makes this different

- In the past Chloride TMDLs we have made a static list of Best Practices for all to follow
- Human Nature: None of us want to be told what to do, we want to be able to apply our knowledge to our situation and make the best decisions

Target Audience:

Winter maintenance supervisors
Twin Cities Metro Area

Areas of Maintenance:

- High speed roads
- Low speed roads
- Parking lots
- Sidewalks

How to use the tool

Enter Organizational Information

- Organization Name: City of Roundville
- Department: Public Works Department
- Contact Person: Jim Smith
- Address: 211 Main Street, Roundville MN 55444
- Email Jim@roundville.gov
- Phone 763-111-2222
- Date of Assessment 6-06-2012
- For winter operations 2011 - 2012
- Notes: We do both streets and parks

Select the mode:

- Mode 1: Best Management Practice assessment and prediction.
  - Use: see at a detailed level all of your maintenance practices and how they rate (Excellent, ok, poor)
- Mode 2: Salt use assessment and salt reduction prediction tool.
  - Use: chart a path towards change and see what your salt savings might be. Compare to MPCA salt reduction goals. Make different paths to see how your salt savings might change.
- Mode 3: Both

Mode 1: Best Management Practice Assessment and Prediction

- Requires very little prep time and data entry, just need a good overall knowledge of your winter maintenance operation
- About 100 multiple choice questions

69. We select the appropriate material for the pavement temperature

Now?	In next 5 years ?	Practices	code	Salt savings calculation?	Citation	Comments
			★	NO		
	✓	Always	3			For example rock salt does not work well at pavement temperatures below 15 f.
✓		Most of the time	2			
		Don't adjust our product selection based on pavement temperatures	1			
		Don't know	1a			

Efficiency Section: Deicers Subsection

12. What materials do you calibrate for?

Now?	In next 5 years?	Practices	code	Salt savings calculation?	Citation	Comments
			★			
		For every product used that flows differently	3			Matt M, City of St.Paul 3/13 calibrate for one, tried some calibration for second procuct didn't see flow difference so didn't calibrate
✓	✓	For most commonly used product(s)	2			Steve S. UMD. Calibrate for 2 probably will calibrate for more in future 3/13
		Don't' calibrate	1			

Accuracy Section: Calibrate Subsection

Wikipedia?

- The group has suggested that users are allowed to (but not forced to):
- look at background information, citations, rate calculations
- Add information for others to look at

Now?	In next 5 years ?	Practices	code	Salt savings calculation?	Citation	Comments
				NO		
		Always	3			For example rock salt does not work well at pavement temperatures below 15 f.
		Most of the time	2			
		Don't adjust our product selection based on pavement temperatures	1			
		Don't know	1a			

Reports

- Summary of current practices
- Summary of predicated changes

Current Winter Maintenance Practices

City of Roundville Winter of 2011-2012

For maintenance of: High speed roads, low speed roads

ADVANCED BEST PRACTICES

2. How many anti-icing systems do you calibrate: All

34. Where do you anti-ice: All areas where we salt

62. Do you use a salt/sand mix: uncommon

66. Are you using liquids for deicing: Yes

76. Do your snow piles melt into your salt or salt/sand piles: No

133. Do you have a written winter maintenance policy: yes

137: How often do you update your policy: each year

BEST PRACTICES

1. How often do you calibrate your spreaders: Yearly

35. When do you anti-ice: On a regular schedule

134. Does the crew understand the winter maintenance policy: some of them

172. How do you dispose of truck wash water. Sanitary sewer

POOR PRACTICES

3. How many liquid pre-wet systems do you calibrate: less than half

36. How do you treat frost: Apply granular after frost is formed

63. As you increase liquids do you decrease granular: No

75. Do you prevent moisture from entering your salt shed: Poor quality buildings

77. Any leaching out of your storage area: Yes

173. Where does your salt storage runoff go. Storm sewer

Summary:
30 Poor Practices
80 Best Practices
20 Advanced Best Practices

Entry # 114
Joe Smith
8-18-2013
763-444-5555
joe@roundville.gov

Legend:

- Poor Practice
- Best Practice
- Advanced Best Practice

Predicted Changes in Winter Maintenance Practices

City of Roundville Winter of 2011-2012

For maintenance of: High speed roads, low speed roads

Improve Best Practices

35. When do you anti-ice:

current:On a regular schedule

Predicted:Before a predicted frost or snow

134. Does the crew understand the winter maintenance policy:

Current: some of them

Predicted: All of them

Improve Poor Practices

3. How many liquid pre-wet systems do you calibrate:

Current: less than half

Predicted: more than half

75. Do you prevent moisture from entering your salt shed:

Current: Poor quality buildings

Predicted: Ok quality buildings or a mix of good and bad buildings

173. Where does your salt storage runoff go.

Predicted: Storm sewer

Predicted: collect and reuse in brine

Summary:

30 Poor Practices

80 Best Practices

20 Advanced Best Practices

5 Year Prediction:

15 Poor Practices

80 Best Practices

35 Advanced Best Practices

Entry # 114

Joe Smith

8-18-2013

763-444-5555

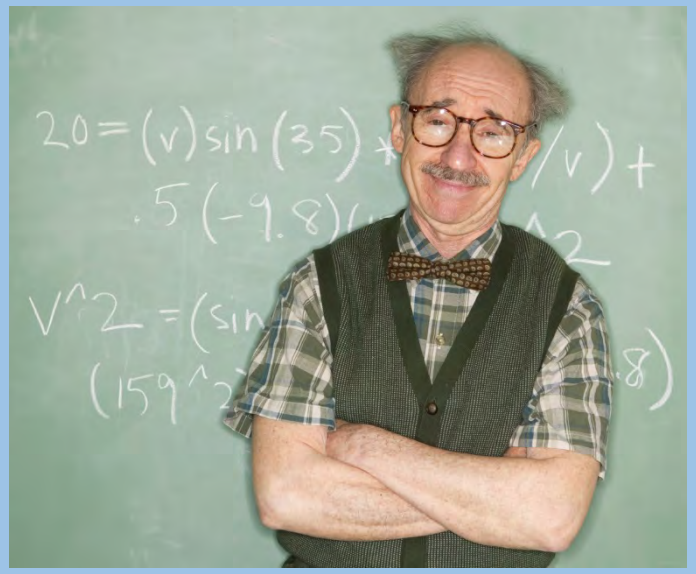
joe@roundville.gov

Legend:

- Poor Practice
- Best Practice
- Advanced Best Practice

Mode 2: Salt Use Assessment and Salt Reduction Prediction Tool

- Requires user to supply more detailed data



The Questions

- About 25 data entry questions
- Some multiple choice questions (which will not be repeated if they have selected the “both” mode).

74. How do you store your salt in the winter?

Now ?	In next 5 years?	Practices	code	Salt savings calculation?	Citation	Comments
			★	YES calculate in winter storage		High salt savings here
✓		Bulk salt pile uncovered	1	1 to 3 = 7% 1a to 3 = 7% x tons of salt typically stored (from input screen)		.125 to 2.5% of the initial weight of an uncovered stockpile is lost per year by leaching for each inch of rainfall on that pile. From Environmental stewardship practices, procedures, and policies for highway construction and maintenance requested byAASHTO, prepared by venner consulting and parsons brinckerhoff 2004. cited in this is the hogbin research. Hogbin, L.E. "loss of salt due to rainfall on stockpiles used for winter road maintenance." RRL report 30, road research lab, crownthorne, UK (1966), in burtwell, M. "Assessment of the performamce of prewetted salt for snow removal and ice control" Transportation research record 1741, trb , washington DC (2001)
		Pile tarped but not strictly maintained	1a			Foudray: Says tarps is not good. Too hard to keep in place. get caught in pile or equipment doesn't work well to protect salt from elements. 12/12/12 cargo boxes can be rented for about $100 per month. Work and look much better than tarpsPut wood along sides to help prevent loader damage to container.
		pile tarped & strictly maintained	2	2 to 3 = 5%		Bob vasek mndot, says tarp is ok if done right. 12/12/12 Woody woodruff Retired mndot mankato 2/18/13 thought minimal loss during winter 5-7%. Barry underdahl city of invergrove. 5% loss from tarped to indoors
	✓	Bulk salt pile indoors or in container	3			Lee flandrich city of st.paul park 2/18/13. All of the salt in the salt sand pile that was not used during the winter and stored over the summer wouid be gone by fall. Had to start over with the mix. (3 scoop block sand, 1 scoop pea gravel, 1 scoop salt) Over the winter months the loss would be minimal 5-7% guess.

33. How many miles of your salted surfaces are being anti-iced?

Now?	In next 5 years?	Practices	code	Salt savings calculation?	Citation	Comments
10	50		h,I	YES	**use this question in rate reduction report only**	large salt savings
		Enter % amount	3	25%	Minnesota Snow and Ice Control Field Handbook for Snowplow Operators 2005	will have to calculate the % change from anti-icing today to anti-icing in near future. Using this percent change (x%) we can do the math: 25% reduction over x% of the route = Y% savings. For example if today we anti-ice 10 % and in the near future we plan to anti -ice 30% x = 20% so 25% of 20% = 5%decrease in salt use.
				50-80%	The FHWA document Planning for Snow and Ice Control states that the use of anti-icing results in a 50 to 80 percent reduction in chemical application required to achieve the same result.	this seems high…? SEE NOTES ON NEXT PAGE

Before the Storm: Anti-icing

INTERNAL CALCULATION

25% is the estimated savings

Calculate your application rate for deicing
A = application rate for deicing
B = A-(A*25%) = application rate for deicing areas that have been anti-iced

How many miles are anti-iced?
C = total miles
D = anti-iced miles

De-iced miles without anti-icing
E = C-D

Total salt use with anti-icing =
F = (D/C)*B + (E/C)*A

Total salt use without anti-icing =
G = A*C

Total salt savings =
G-F

This does not take into account salt use for anti-icing, nor the number of passes after a storm.

City of Roundville Salt saving potential for one year based Winter of 2011-2012 and predicted changes

For maintenance of: High speed roads, low speed roads

2011-2012 Information

5000 tons salt stored
4000 tons salt/sand stored
salt/sand 30/70 mix
1000 gallons brine stored

2000 tons salt used
1500 tons salt/sand used
500 gallons brine used

$70.00 per Ton of salt
$1.00 per gallon of brine

80% salt used on low speed roads
20% salt used on high speed roads

Prediction based on changes

Total = 234.6 tons of salt likely to be saved

Reduction Potential = 11.7%

Had these changes been made for the winter of 2011-2012**, Roundville would have saved $16,422** in salt purchases and used only 1,765.4 tons of salt

Entry # 114
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Salt Savings Potential for One Year

City of Roundville Parks Department 6-06-2011

List of predicted changes

BEFORE WINTER:

0% reduction potential

DURING WINTER:

0% reduction potential

ACCURACY DURING THE STORM:

10% Reduction Potential

*0 Ground Speed Controllers with MDSS>10 Ground speed controllers with MDSS>10% Salt Savings on salt applied salt

EFFECTIVENESS DURING THE STORM

0% reduction potential

REDUCE WASTE DURING THE STORM:

22.05% reduction potential

Bulk salt pile uncovered > Bulk salt pile indoors > Salt Savings 17% of salt in storage

Salt/sand pile uncovered> Bulk salt pile indoors > Salt Savings 17% of salt in sand pile

Receive shipments outdoor with good clean up > Receive shipments indoors > Salt savings .05% of salt ordered

Use up all salt at end of winter > give away salt at end of winter> 5% of total salt purchased

RECOVERY OF SALT:

0% reduction potential

Legend:

- Poor Practice
- Best Practice
- Advanced Best Practice

The analysis in this mode is limited by:

- Available published research
- Willingness of maintenance organizations to provide unpublished research or educated guesses of salt reductions based on changes in a particular maintenance practice
- It is incomplete
- To make it better it should be continually updated as research is done
- We can use the voids to request research or fund research projects

….But it is better than anything the industry has ever had

What can it accomplish?

- Increased awareness of current practices
- A clear list of places where the organization is doing well or could improve
- In rate reduction mode, a list of predicted practice changes and the associated salt savings

Why this is a better approach

- It looks at small areas of winter maintenance where improvements can be made, much more manageable
- Provides insight into current operations
- Allows a flexible approach for improving winter maintenance (ex.: maybe you can't purchase new equipment, but you could alter plowing routes)
- Offers insight that is unique to winter maintenance practices of parking lots, sidewalks, low speed roads, and high speed roads
- Offers a unique collection of many salt reduction informational resources (written and communicated)

Stakeholder Process

Research for this project started in 2011 and has continued into 2014

- Road Salt Symposium survey. The 200 attendees at the 2013 Road Salt Symposium were surveyed for unpublished research information that could be used in the rate reduction section of the tool.
- Literature Searches. Many hours of internet research was done to mine data that exists on the salt savings potential of various maintenance practices.
- Phone calls, phone interviews with members of the advisory team and industry experts to gain insight into various winter maintenance practices.
- Email correspondence with members of the advisory team and industry experts to gain insight into various winter maintenance practices.
- The implementation plan committee formed and led by the MPCA consists of a broader range of professionals dealing with water quality and winter maintenance. This group has approved the concept of the tool and contributed to refining it at a higher level.

The technical expert team has been formed that reflects maintenance leaders in Minnesota. These leaders represent winter maintenance of high speed roads, low speed roads, parking lots, sidewalks, deicer sales and equipment. This team has reviewed all of the logic in the questions, input screens and reports. The members are:

- Tom Broadbent -EnviroTech Services
- Bob Vasek- MnDOT
- Mike Greten -Dakota County
- Mike Scherber-Hennepin County
- Craig Eldred -City of Waconia
- Ryan Foudray -Prescription Landscape
- Joe Wiita-Scott County
- Brian Brown-Three Rivers Park District
- Kevin Nelson-City of St. Paul
- Mike Kennedy-City of Minneapolis
- Matt Morriem-City of St.Paul
- Jeff Warner -Force America
- Mark Fischbach-MnDOT

How it might be hosted?

- As a stand alone software program
- On MPCA website (in the next 5 years?)
- Organizations can access and use it
- MPCA doesn't see results unless user hits submit to MPCA button

NOT SURE THE BEST WAY BUT:

- users will want to save their data/session so they can go back in and change wrong answers or finish their analysis a different day
- Next year go in and make changes so don't have to answer all questions again

Possible uses for MPCA

- Ask organizations to use tool on their own to improve winter maintenance operations
- Ask organizations to voluntary submit reports so MPCA can see where the industry is with the various practices.
- Require organizations that want level 2 certification (in development) to submit results to MPCA.
- Could accompany annual report for MS4s within an impaired watershed, or perhaps a separate report could be generated that will meet permit requirements.
- Use the concept of this tool, and develop it for other industries and other pollutants as a way to customize a practical path for pollutant reduction.

Possible uses for Winter Maintenance Organizations

- Use tool to assess at a detailed level, their operations
- Use as a teaching tool to supervisory staff, forcing each person to think about the questions asked and comparing it to their routine practices.
- Compare results with organizations of similar size or traffic
- Set a baseline for operations & a goal for improvements
- Use by organization like APWA, Street Superintendents Association, MNLA or others to recognize and award top achievers in an unbiased format.
- Comply with MPCA requests, perhaps easier than writing a report.

Questions?

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Michigan State University: Grounds Facility

Twin Cities Metro Area (TCMA) Chloride Project
Interagency Team (IAT) Meeting minutes
January 16, 2014 2-3:30pm
MPCA Office, St. Paul, Board Room (lower level)

Introductions:
Brooke Asleson, Josh Stock, Brad Wozney, Beth Neuendorf, Brian Johnson, Bob Vasek, Terry McDill, Marni Karnowski, Andy Ronchak, Connie Fortin, Tanya Maurice, Jeremy Walgrave, Nick Proulx, Sheri Kroening, Barb Peichel, Glenn Skuta, Marco Graziani, Karen Jensen, Ryan Anderson, Jim Walsh

- As part of the introduction, attendees were asked to share a positive story about winter maintenance.

Review of TCMA Project progress presentation, Brooke Asleson, MN Pollution Control Agency

- Assist local partners to better manage the balance between clean water and road safety.
- Main goal is to develop a TCMA Chloride Management Plan
- The IAT is one of the stakeholder groups that are part of this project. Monitoring Sub-Group helped conduct monitoring over the past few years. Implementation Plan Committee and Technical Advisory Committee sometimes meet together. Education and Outreach Committee shared the materials they have with each other and will be more involved in the future. Technical Expert Group helps consultant develop winter maintenance Best Management Practice (BMP) Tool.
- TCMA Chloride Project timeline – this project started in 2010, monitoring is complete,
- Meeting notes and presentations for sub-teams are on the project website.
- There have been a number of outreach and general communication efforts such as update MPCA web pages, EPA webinar, display at State Fair, a poster at the Water Resources Conference, presentations at the Road Salt Symposium, and other press releases and media interviews. Next Road Salt Symposium is February 6th, 2014.
- TCMA Chloride Project monitoring efforts – wanted to determine the status of waters, start tracking long-term trends, confirm findings of the Phase I Feasibility Study, and develop new monitoring guidance for chloride (available on the MPCA website). Noticed that salt concentrations were higher in deeper part of lakes. Developed guidance for monitoring in winter months. Many local partners assisted in the monitoring of 74 lakes, 27 streams, and 8 stormsewers from 2010-2013. Monitored locations both in the more dense urban areas and also in less dense areas.
- Metro chloride assessment – MPCA assessed 335 lakes, wetlands, and stream/river reaches in the 7-County Metro area to determine if waters were impaired for aquatic life due to chloride concentrations. 44 waterbodies are impaired in the TCMA (two of which already have completed TMDLs).
- Question – how does 74 lakes with the additional monitoring play into those 335 waterbodies? These are part of the 335 total waterbodies we have data on. We only have chloride data on about 10% of waterbodies in the 7-County Metro.
- Of waterbodies meeting standards, how close are these and do we need to do prevention? Yes, we do need to do prevention. We may not have depth data for some of these that are not impaired. Most chloride data we have for streams is from the summer months so we probably don't have the full picture.
- What is the standard? 230 mg/l is the chronic standard. For lake depth samples, how did you determine impairment? We looked at the highest concentration at either deep or shallow samples.

- Website – note the new interactive GIS map of impaired waters. You can download your own GIS information to your own maps from the website.
- Source identification – researched existing studies and information in 2012, refined estimates of Parking Lot and Sidewalk application rates for Minnesota, working with MPCA staff to determine chloride discharges from permitted entities (e.g. WWTP and industrial dischargers). Other potential sources may be septic systems and fertilizers.
- Protection Goals – the Implementation Planning and Technical Advisory Committees for this project recommend that we develop performance based goals (focus on BMPs rather than setting a number).
- Performance Based Goals – primary objective is to get all winter maintenance programs performing at a level that is using minimal amount of salt, prevention is only option for reducing salt loadings (removal not viable), same BMPs for protection and restoration (impaired waters), BMP tool development is critical to assisting as a planning tool, coordinating with MS4 program, will be working with TAC to work out the details, and measuring water quality will be critical.
- Next steps – finalize source identification in impaired watersheds…have an implementation
- Question – was there any effort to co-analyze for bromide. MPCA has this information for groundwater. We are not monitoring bromide for surface waters.

<u>Update on progress of watershed modeling – Jeremy Walgrave, LimnoTech</u>

- LimnoTech is compiling the water quality data, categorize waters (how close to impaired status) – some waters have shown increasing trends, develop targets, source identification, modeling and analysis, and then final management and monitoring plans.
- Modeling – determine how much chloride can get into lakes, streams, and wetlands and still meet water quality standards.
- Lakes – simple runoff and dilution modeling approach. Need to consider impervious surfaces and annual runoff. Flowchart was shared (use water quality concentration as target and calculate allowable load using annual precipitation and impervious area).
- Streams – simple runoff and dilution modeling approach. Streams respond on an event basis (e.g. spring snowmelt). Flowchart was shared (use water quality concentration as target and calculate allowable load using winter precipitation equivalent).
- Additional considerations – need to look at other sources other than road salt (e.g. municipal and industrial water or agricultural sources).
- If high salinity if found in the bottom of lakes how is that incorporated in model? The model is simple so that even if lakes are stratified, the model is more long-term so will capture the
- Have you thought about looking at some of the biological indicators? We are doing that across the state for WRAPS studies. For this project, we are not using that as an endpoint. Some folks from Illinois are doing this, but we just don't have the data for that. DNR has data for lakes, but we haven't developed Lake IBIs yet. We also have considered revising the standard, but we are waiting for EPA guidance (which may include hardness and sulfate too). The current standard is a toxicity-based standard. Iowa has already adopted a new standard.
- Was there any thought in looking at the water budgets at some of these lakes so it would include groundwater influence? We considered that, but TAC recommended the more simple approach since the implementation actions wouldn't change. May not see progress as quickly in groundwater-fed waterbodies. We should have some of this information from local partners too. If you have this type of information, we are interested.

- At Met Council stations, we have water budgets for those so could share this information. Valley Creek we are seeing elevated concentrations (not above the standard).
- What will you propose for monitoring frequency for the TMDLs? We haven't developed this yet. Wouldn't need to monitor annually, maybe every 5 years or so. Will work with partners on developing the monitoring plan. Met Council sites that are monitored more often could help with trends analysis.
- Consider how TMDLs will be expressed as units? We are working on this.

<u>Winter Maintenance Assessment Tool – Connie Fortin, Fortin Consulting</u>

- Winter maintenance classes next week if anyone is interested – free class.
- Develop the logic for a computer based tool that will provide a way for winter maintenance organizations.
- Past projects have had a static list of BMPs.
- Working with winter maintenance supervisors in TCMA.
- Have 3 areas of maintenance – high speed roads, low speed roads, parking lots, and sidewalks.
- Tool would be used by the supervisor on a higher level to look at these operations.
- Select tool mode (BMP mode, self-assessment and salt reduction tool, both).
- In classes, we focus on 6 broad areas – but we need more detail.

Mode 1

- Mode 1 – BMP mode – no prep time needed – about 100 questions about their winter maintenance practices. Green (best practices), yellow (okay practices), red (bad practices) color coding in tool. Example question is "we select the appropriate material for the pavement temperature". What are you doing today and in 5 years from now? Another example question – "what materials do you calibrate for?"
- Group has asked for a chloride Wikipedia type of thing so they could see what the discussion is.
- Tool would have different reports – look at areas where you are doing good practices or could improve your practices. Also could have a report on predicted changes (what they are saying they will do in 5 years).

Mode 2

- Mode 2 – salt use assessment and salt reduction prediction tool – requires user to supply more detailed data. So someone could see if we invested in a building versus equipment what would be more helpful.
- There are 25 data entry questions so need to have that information. For example, "how do you store your salt in the winter?" Looks like if you moved from BMP A to BMP B, then you could get 7% salt savings if you make this change.
- Another example, "how many miles of your salted surfaces are being anti-iced?" Would have to know the lane miles you are doing this for.
- Report could be how much salt is saved and maybe cost savings. The report would show where the savings would come from.
- Research is very spotty for this aspect of the tool – to determine salt reductions from BMPs. Could maybe help us determine research gaps.
- Tool will increase awareness of current practices and what you can improve on. Good collection of research in the tool. This is a very thorough stakeholder process.
- May be hosted on MPCA website but this is still under discussion.

- Would like to develop a Level 2 Certification Program. Level 1 has been for plow drivers, but Level 2 could be for supervisors. Could maybe work for MS4 stormwater permit reports or help them do that. Could use this type of tool for other pollutants.
- Many possible uses of the tool for different winter maintenance organizations.
- When would beta testing happen? In the next year – will hire contractor in next few months. May be a downloadable tool over the next couple years or hosted somewhere else.
- Are we doing anything for homeowners? We did do a survey of homeowners and what they know.
- Clear roads group working on an aquatic toxicity of deicers so they are considering that acetates are very toxic. No such thing as an environmentally-friendly deicer.