TCMA Chloride Project
Sand Creek Community Meeting

July 30, 2014
1:00 pm-3:00 pm
Scott County Regional Training Facility, Jordan

Meeting Invite

Did you know that Sand Creek and Raven Creek have chloride levels higher than the state water quality standard? We would like to have a discussion about this issue, why it's important and a project we have underway that is looking into chloride primarily from road salt and water softening in the Twin Cities Metropolitan Area.

Please join us **July 30, 1-3pm** at the Scott County Regional Training Facility located in Jordan to have a discussion about chloride and water quality.

The goal of this meeting is to provide information about the Twin Cities Metro Area Chloride Management Plan project and discuss possible opportunities within your communities to reduce the amount of chloride entering local streams.

Check out the MPCA's website for more information:
http://www.pca.state.mn.us/r0pgb86

Please respond to this email if you can join us for this interesting discussion!!

Invitees: Steven Griep- Jordan WWTP, Scott Haas- Jordan WWTP, Shane Oksanen- Montgomery WWTP, Glen Sticha- New Prague WWTP, Scott Warner- New Prague WWTP, Jerald Zaske- Seneca Foods Corp, Jon Halloran- Seneca Foods Corp, Al Fahey- City of Belle Plaine, Leroy Schommer- Credit River Township, Tom Terry- City of Elko New Market, Rose Menke- Jackson Township, Scott Haass- City of Jordan, Cheryl Doucette- Louisville Township, Glen Sticha- City of New Prague, Pete Young- City of Prior Lake, Joe Swentek- City of Shakopee, Stacy Siegle- Spring Lake Township, Kathy Nielsen- Spring Lake Township, Jean McDermand- Belle Plaine Township, Arnita Novotny- Cedar Lake Township, Sharon Kaisershot- Erin Township, DeAnn Croatt- Helena Township, Russ Vlasak- City of Lonsdale, Ron Smisek- City of Montgomery, Sue Prchal- Montegomery Township, Leroy Clausen- New Market Township, Ramona Bischof- Saint Lawerence Township, Rita Tauer- Sand Creek Township, Joe Wiita- Scott County, Vikki VanVeldhuizen- Webster Township, Jim Duban- Wheatland Township, Lauren Klement- LeSuer County , Julie Runkel- Rice County, Melissa Bokman- Scot County WMO, Paul Nelson- Scott County WMO, Mike Briese- Scott County, Jenny Mocol-Johnson- Rice County, Gerald Williams- Cedar Lake Township, Paul Hendrickson- Seneca Foods Corp, Bill Heimkes- Sand Creek Township, Cy Wohf- Sand Creek Township, Joe Wiita- Scott County

Twin Cities Metro Area CHLORIDE PROJECT

SAND CREEK WATERSHED MEETING

JULY 30, 2014

Minnesota Pollution Control Agency

Chloride & Water Quality

Water Quality Concerns

- Chloride is toxic to aquatic life
  - 230mg/L Chronic, 860 mg/L Acute
- Chloride is a permanent pollutant, once in our waters there is no feasible way to remove it
- Road Salt and water softening salt are the main sources of Chloride in Twin Cities Metropolitan Area (TCMA)
- University of Minnesota study found that 78% of the chloride used is being retained in the TCMA

Water Quality Problems

- 40 lakes, streams & wetlands on DRAFT 303(d) list for chloride in the TCMA (roughly 10% assessed)
- 40 waters determined to be “High Risk”
  - *Defined as having values within 10% of the standard or at least one exceedance of the standard*
- Groundwater levels of chloride in the TCMA are increasing - 30% of wells above the standard
  - *Impact on baseflow levels of chloride is important*
- USGS groundwater data also shows Significant increase in chloride since 1996 in Upper Mississippi River Basin

Public Safety Concerns:
Road Salt

- 365,000* tons of road salt are applied in TCMA each year
  **this is an estimate based on purchasing records*
- We need safe roads, parking lots and sidewalks in winter months
- Currently no alternative de-icer without negative impacts to the environment
- Applied at all levels; State, County, City, Businesses/Schools/Churches and Homeowners
- Private applicators up against fear of slip & fall lawsuits – default is to apply more product
- Public expectations are difficult to meet
- Challenging winter conditions

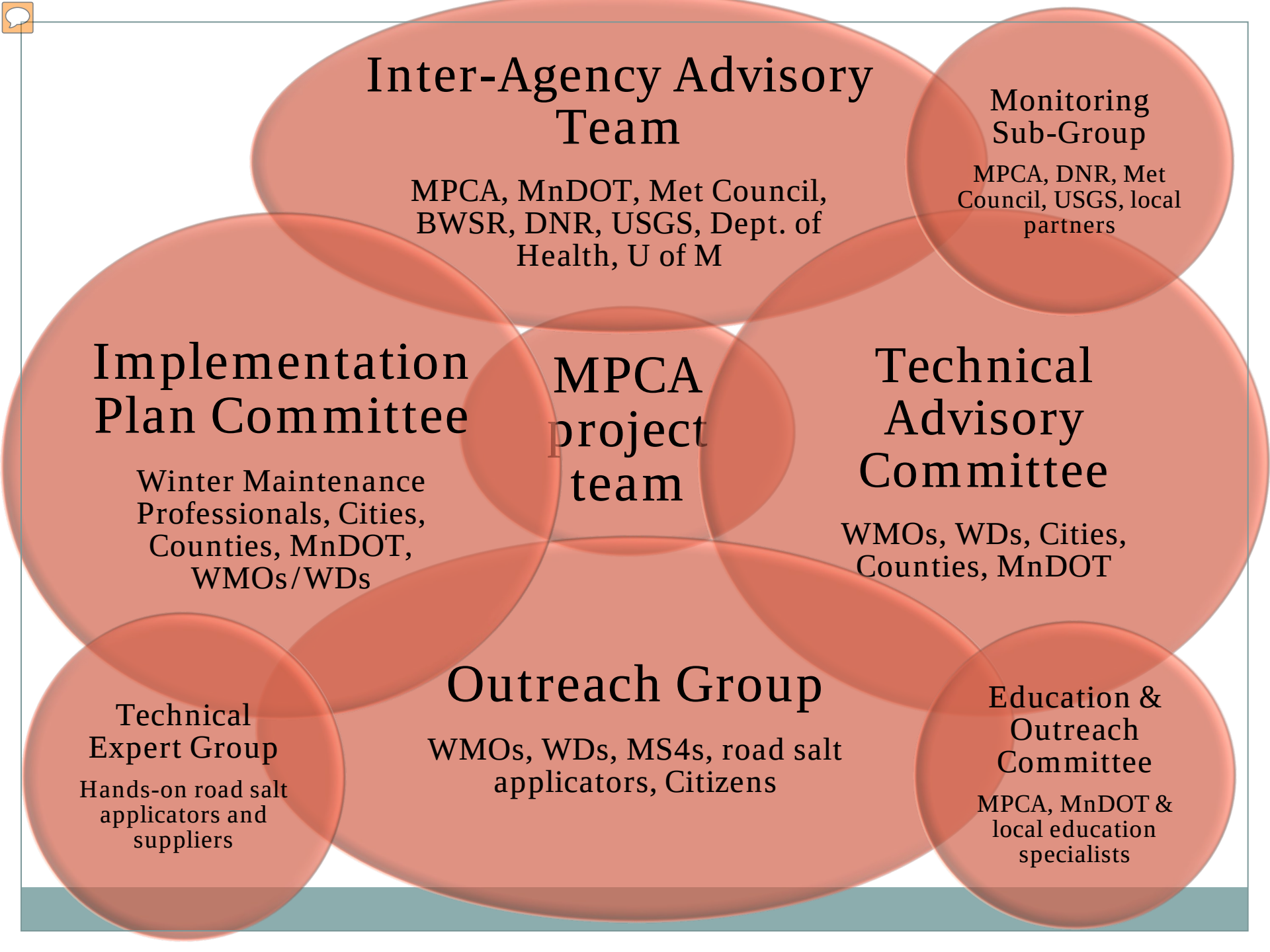
Public Concerns:
Water Softening

- The public desires soft water (minimal hardness levels)
- Individual water softeners are used in many households without much thought given to amount of salt used
- Treatment to remove chloride from wastewater effluent is costly

TCMA Chloride Management Plan

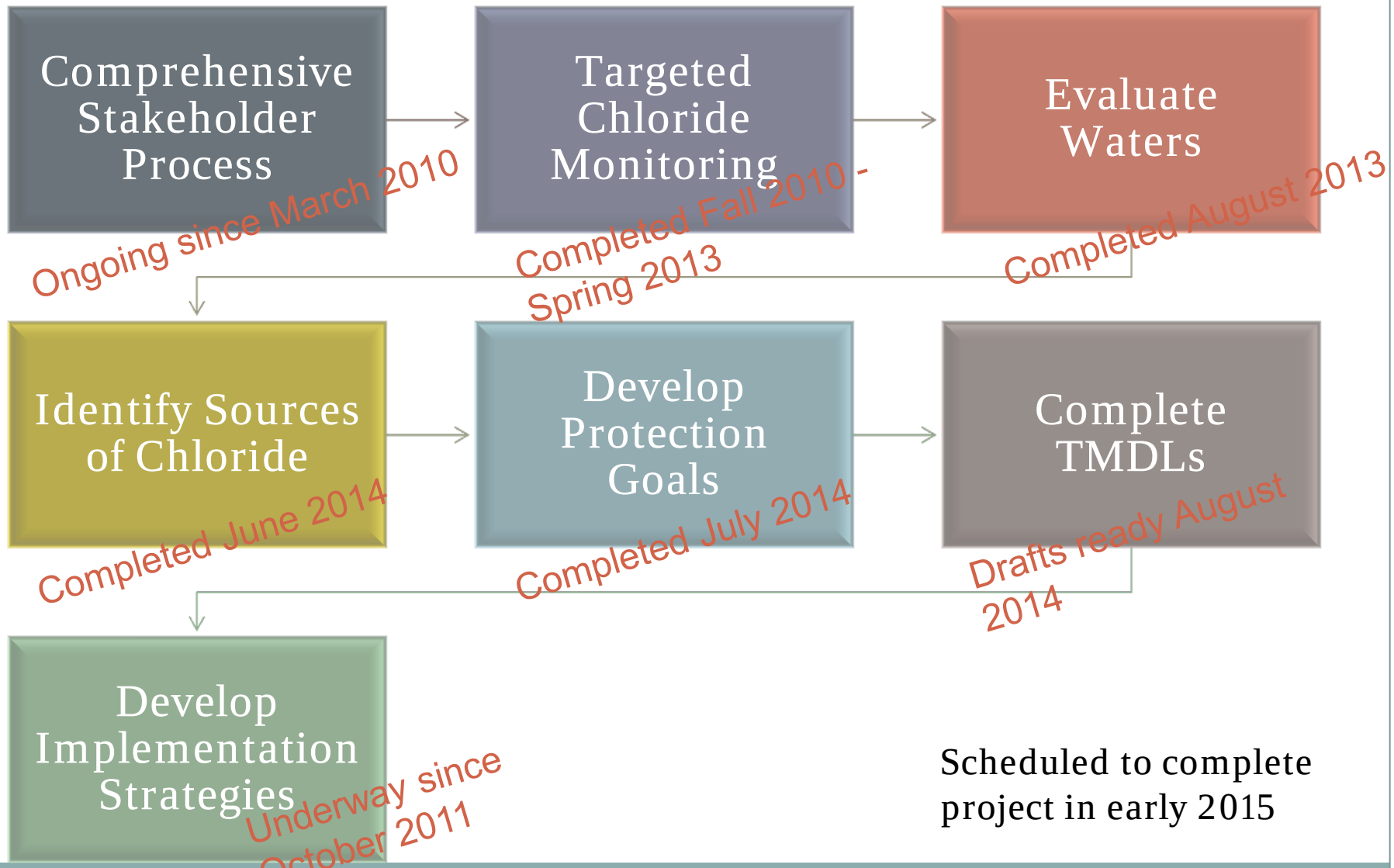
TCMA Chloride Management Plan

- Develop Chloride Management Plan for the 7-county metro *(project began 2010, draft plan Sept. 2014)*:
  - Create shared vision & develop partnerships
  - Evaluate existing water quality conditions
  - Identify sources of chloride in TCMA
  - Set realistic goals to protect all surface waters
  - Complete Chloride TMDLs for all impaired waters
  - Layout flexible implementation strategies that will help achieve water quality goals
  - Provide resources to assist with implementation and tracking progress


Inter-Agency Advisory Team
MPCA, MnDOT, Met Council, BWSR, DNR, USGS, Dept. of Health, U of M
Monitoring Sub-Group
MPCA, DNR, Met Council, USGS, local partners
Implementation Plan Committee
Winter Maintenance Professionals, Cities, Counties, MnDOT, WMOs/WDs
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, MnDOT & local education specialists

TCMA Chloride Project: Timeline

Began process in 2010



Scheduled to complete project in early 2015

Project Monitoring

- Fall 2010 – Spring of 2013
- Included 74 Lakes, 27 Streams, 8 Stormsewers
- Targeted monitoring based on:
  - Osgood index, available local partners, existing data near standard
- Sampled once each season (4 events/year)
- Lakes included surface & deep lake sample
- Involved 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

Monitoring Results – Interactive Map

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

Source Identification

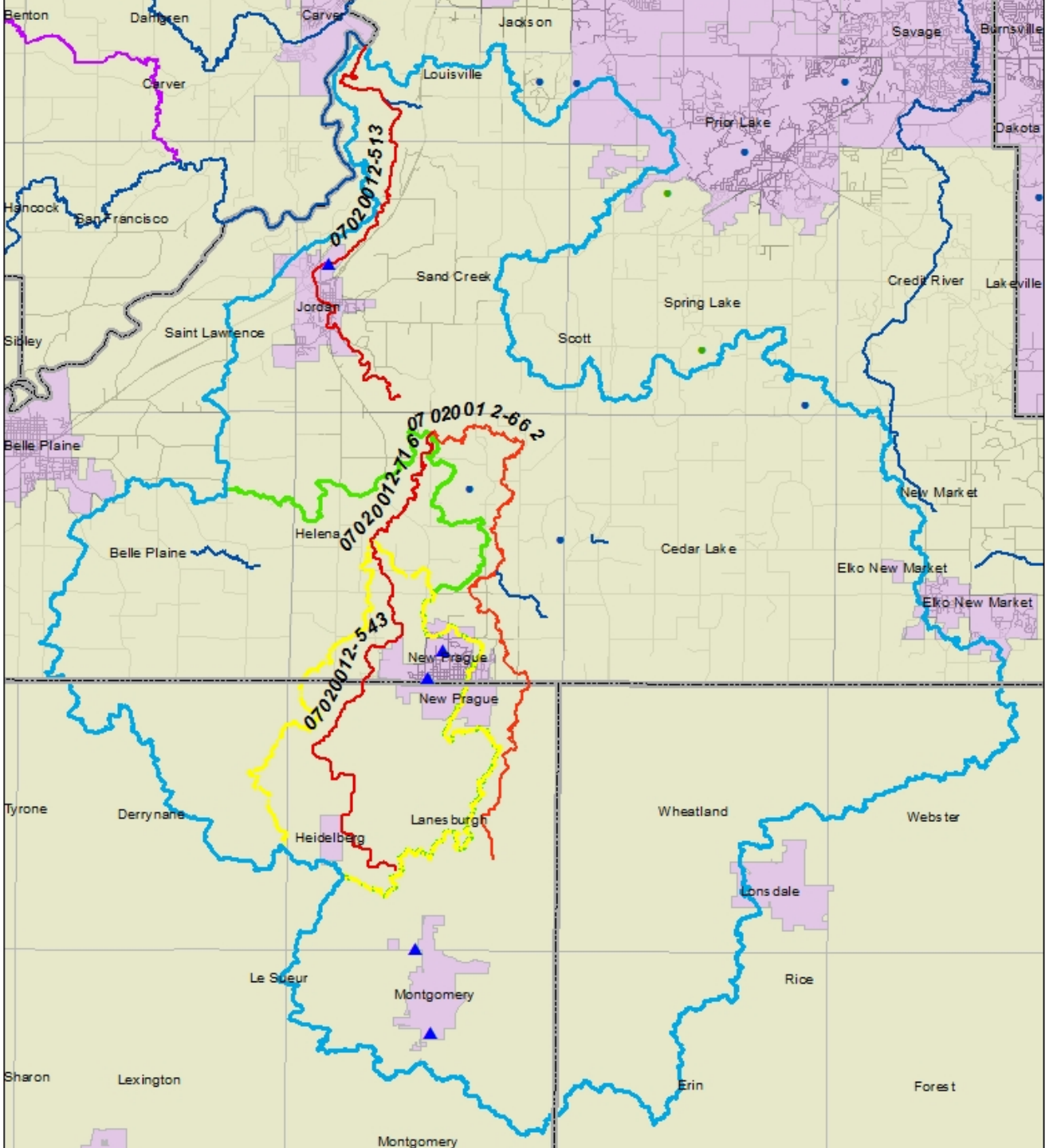
- Researched existing studies and information
- Refined estimate of private Parking Lot & Sidewalk application rates for MN (6.4 tons/acre/year)
- Identified all permitted entities with potential chloride discharges
  - MS4s, WWTPs (water softening), Industrial dischargers
- Others potential sources to consider:
  - Septic Systems (only where there are issues)
  - Fertilizers (literature values)
  - Natural Background (very minimal in TCMA)

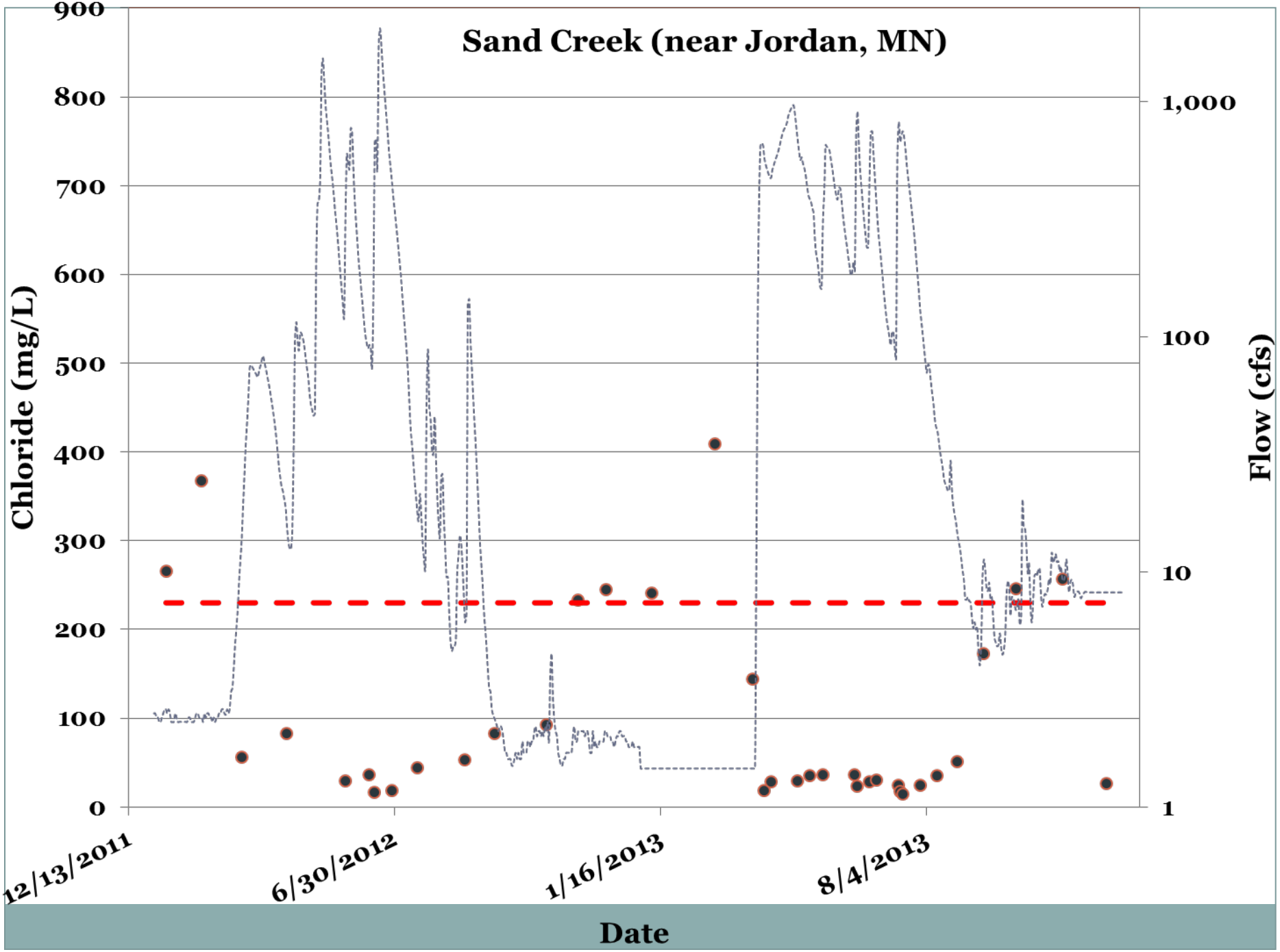
Protection & Restoration Strategy

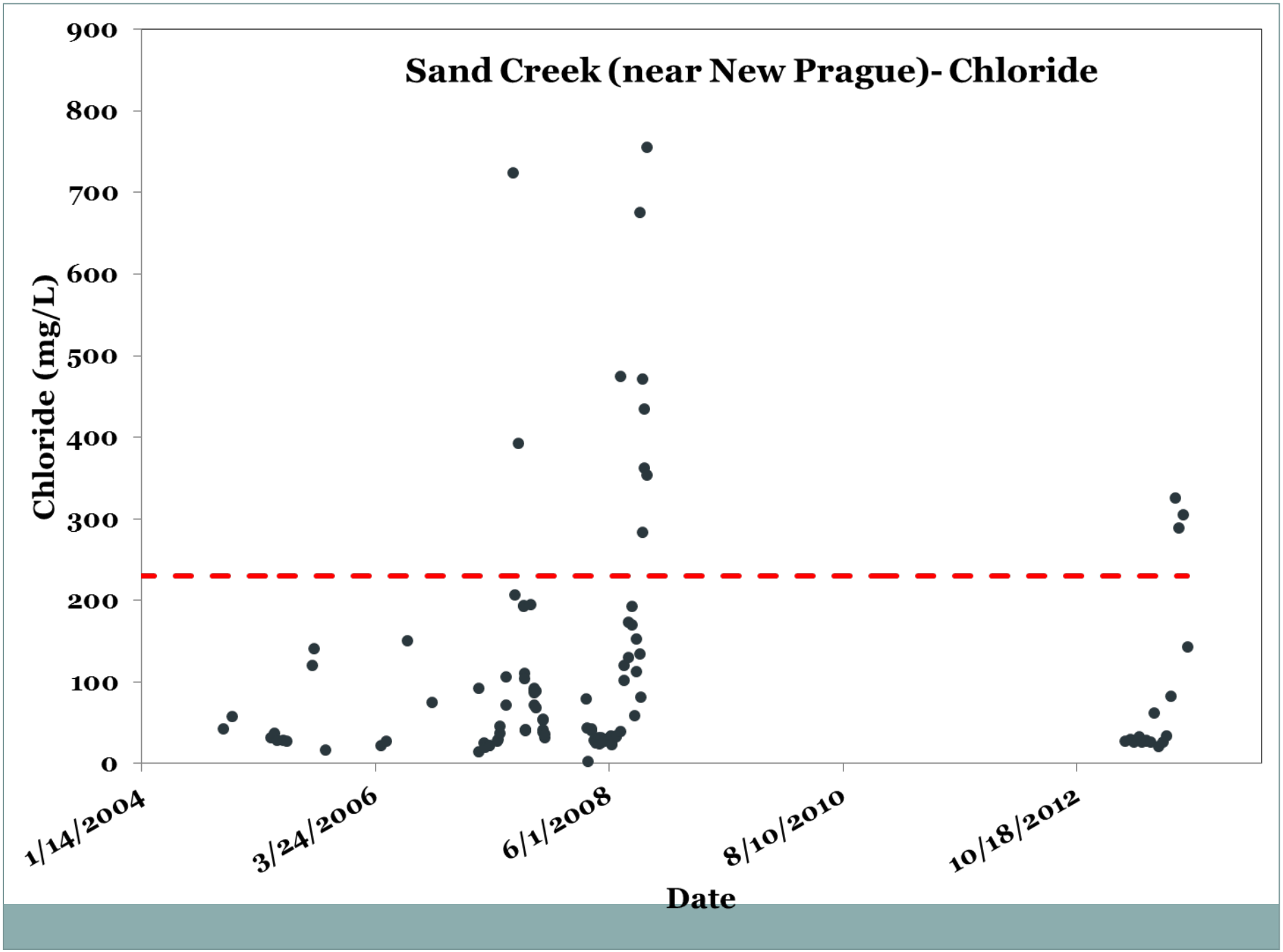
- Same BMPs for protection as for impaired waters
- Prevention is the only option for reducing salt loadings (removal from surface waters is not viable)
- Primary objective is to get all winter maintenance programs performing at a level that is using minimal amount of salt
- Set water quality goals for point sources to work towards meeting
- Allow flexibility in implementation

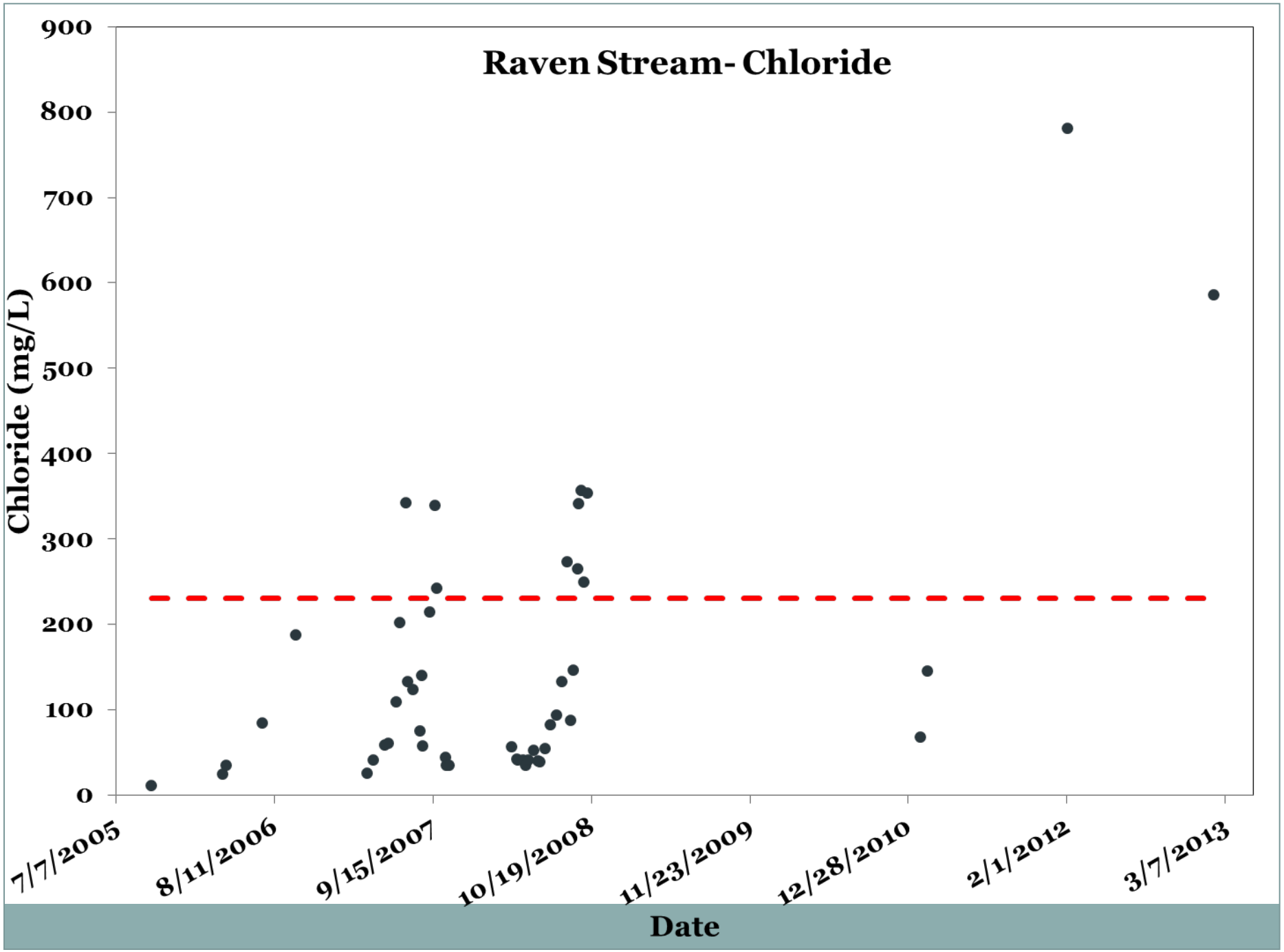
Sand Creek Watershed

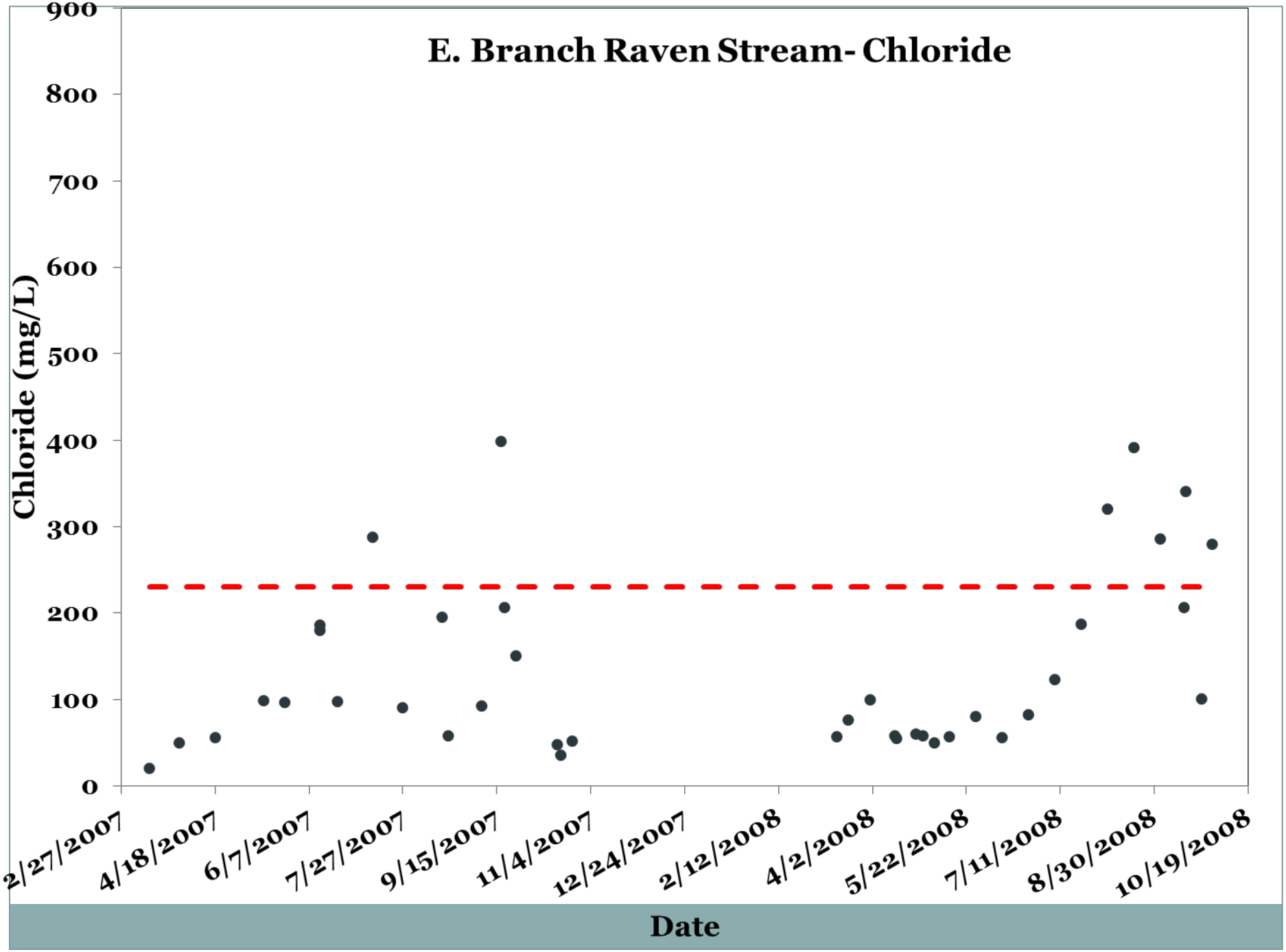
DRAINAGE AREA
WATER QUALITY DATA
CHLORIDE TMDLS

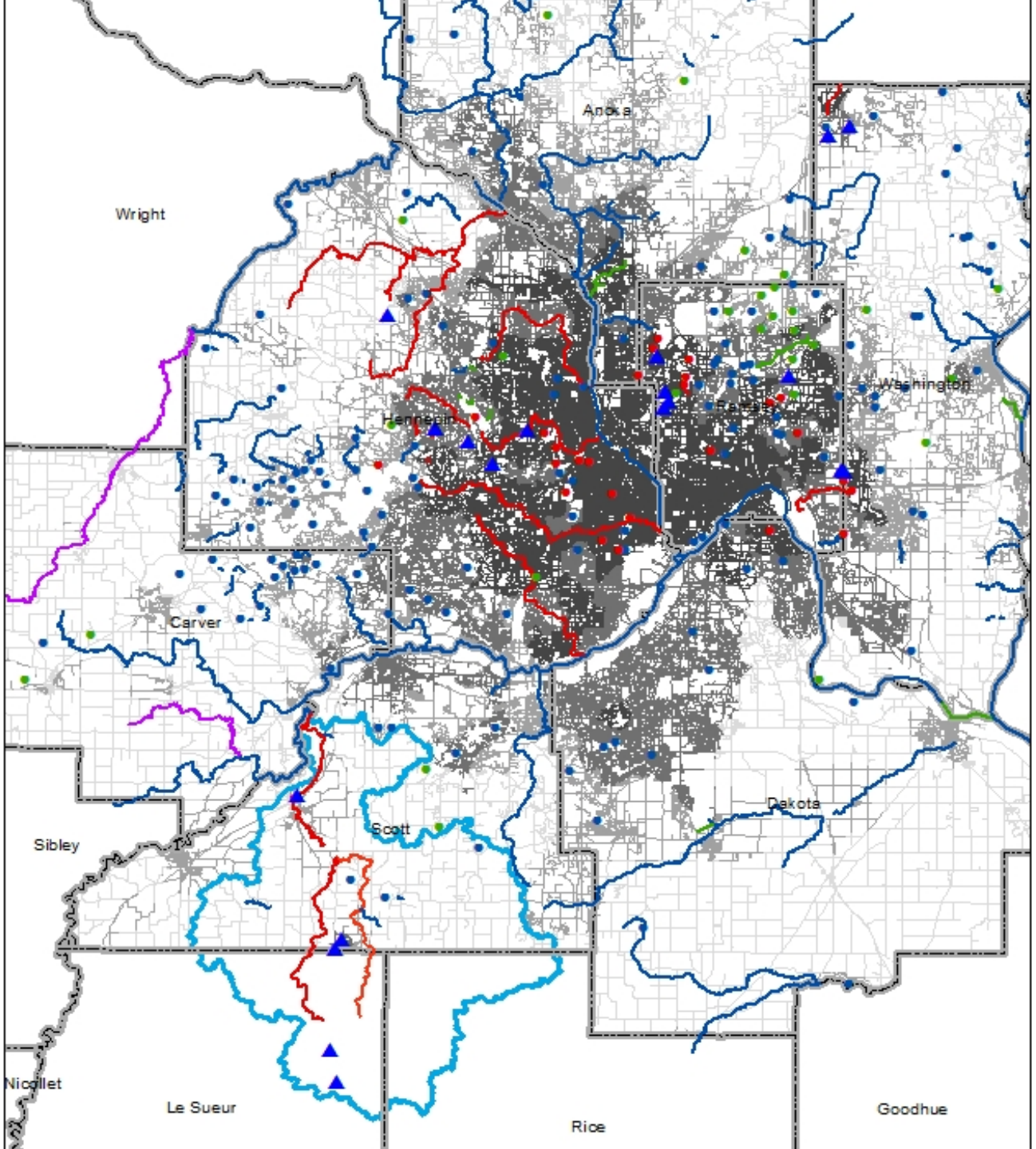

Benton
Dahlgren
Carver
Jackson
Savage
Burnsville
Louisville
Prior Lake
Dakota
Hancock
San Francisco
07020012-513
Sand Creek
Jordan
Credit River
Lakeville
Spring Lake
Sibley
Saint Lawrence
Scott
07020012-662
Belle Plaine
07020012-716
New Market
Helena
Belle Plaine
Cedar Lake
Elko New Market
Elko New Market
07020012-543
New Prague
New Prague
Tyrone
Derrynane
Heidelberg
Lanesburgh
Wheatland
Webster
Lonsdale
Le Sueur
Montgomery
Rice
Sharon
Lexington
Erin
Forest
Montgomery


Sand Creek (near Jordan, MN)
Chloride (mg/L)
900
800
700
600
500
400
300
200
100
0
Flow (cfs)
1,000
100
10
1
12/13/2011
6/30/2012
1/16/2013
8/4/2013
Date


Sand Creek (near New Prague)- Chloride
Chloride (mg/L)
900
800
700
600
500
400
300
200
100
0
1/14/2004
3/24/2006
6/1/2008
8/10/2010
10/18/2012
Date


Raven Stream- Chloride
Chloride (mg/L)
900
800
700
600
500
400
300
200
100
0
7/7/2005
8/11/2006
9/15/2007
10/19/2008
11/23/2009
12/28/2010
2/1/2012
3/7/2013
Date


E. Branch Raven Stream- Chloride
Chloride (mg/L)
900
800
700
600
500
400
300
200
100
0
2/27/2007
4/18/2007
6/7/2007
7/27/2007
9/15/2007
11/4/2007
12/24/2007
2/12/2008
4/2/2008
5/22/2008
7/11/2008
8/30/2008
10/19/2008
Date


Anoka
Wright
Washington
Carver
Dakota
Scott
Sibley
Nicollet
Le Sueur
Rice
Goodhue

What is a TMDL

The TMDL is simply the maximum load (pollutant quantity per year or day) that cannot be exceeded in order to meet water quality standards.

- A TMDL is a load that is determined through a scientific process
- How that load is met is determined with the stakeholders and detailed in the implementation plan
- Depending on the water quality of the stream and watershed conditions achieving the required loading may take several years.

The heart of a TMDL study is the pollutant load allocation

Formula–

LA(s) + WLA(s) + Margin of Safety + Reserve Capacity =

Total Maximum Daily Load

LA	Load allocations from nonpoint sources
WLA	Waste load allocations from point/permitted sources
Margin of Safety	To account for potential scientific error
Reserve Capacity	Set aside for future development

Modeling Approach – Watershed Load

- Simple runoff-dilution model to determine loading capacity of the waterbody
- Modeling considers runoff and the chronic water quality standard for chloride
- Modeling does not consider existing loading
- Modeling does not look at the amount of reduction needed to achieve standard

Modeling Approach – Watershed load

- Calculate average seasonal runoff volume (Qv)
  - Qv = area * runoff coefficient * average winter precipitation
  - winter precipitation = Nov. 1 – March 31 = 6.29 inches (w.e.)
  - Runoff coefficient for frozen conditions = 0.98
- Calculate Allowable Watershed loading
  - Allowable Watershed load = Qv * 230 mg/L chloride (water quality standard) * conversion factor
- Allowable Watershed loading = WLA (permitted non-point) + LA (non-permitted non-point)
  - Separated out by land area

Point Source WLA determination

- Determine maximum daily flow (Qmax)
  - Qmax = maximum daily flow
  - Obtained from permit information
- Calculate permitted loading (WLA)
  - WLA = maximum daily flow * chronic water quality std.
  - WLA = Qmax * 230 mg/L chloride
  - WLA = Qmax (mgd) * 230 mg/L chloride * 8.34 (conversion factor)
- Actual effluent for each permit may differ – will be discussed later

Loading Capacity (WLA + LA)

- MS4's – Categorical WLA
  - this includes all land area within MS4
- Permitted point sources will be given an individual WLA
- Non-permitted non-point sources will be given a categorical LA
- Natural Background = 18.4 mg/L (Novotny, 2008)
  - 8% of total loading capacity
  - TCMA only

Raven Creek Watershed TMDLs

Stream	WBID	Watershed Area (ac)	TMDL (lbs/day)	Scientific Uncertainty (8%) MOS - (lbs/day)	Background (10%) LA - (lbs/day)	LA - non-permitted LA Categorical	LA - non-permitted LA Categorical (lbs/day)	MS4 Categorical WLA	MS4 Permit #	MS4 Categorical WLA (lbs/day)	Additional Point Source WLA	Point Source Permit #	Point Source WLA (lbs/day)*
E Branch Raven Stream	07020012-543	14,751	34,976	3,140	2,512	Derrynane (Township)	22,878	New Prague	future	2,870	New Prague WTP	MNG640117	65
						Heidelberg (City)					New Prague WWTP	MN0020150	3,511
						Lanesburgh (Township)							
						Helena (Township)							
						LeSeuer (County)							
						Scott (County)							
						MNDOT							
Raven Stream	07020012-716	42,750	91,000	9,100	7,280	Derrynane (Township)	71,668	New Prague	future	2,952			
						Heidelberg (City)		Belle Plain	future				
						Lanesburgh (Township)							
						Helena (Township)							
						Belle Plain (Township)							
						LeSeuer (County)							
						Scott (County)							
						MNDOT							

Sand Creek Watershed TMDLs

Stream	WBID	Watershed Area (ac)	TMDL (lbs/day)	Scientific Uncertainty (8%) MOS - (lbs/day)	Background (10%) LA - (lbs/day)	LA - non-permitted LA Categorical	LA - non-permitted LA Categorical (lbs/day)	MS4 Categorical WLA	MS4 Permit #	MS4 Categorical WLA (lbs/day)	Additional Point Source WLA	Point Source Permit #	Point Source WLA (lbs/day)*
Sand Creek	07020012-513	175,579	382,854	37,370	29,896	Cedar Lake (Township)	286,508	Prior Lake City MS4	MS400113	19,926	New Prague WTP	MNG640117	65
	07020012-538					Derrynane (Township)		Shakopee City MS4	MS400120		New Prague WWTP	MN0020150	3,511
	07020012-662					Erin (Township)		Credit River Township MS4	MS400131		Jordan WWTP	MN0020869	2,473
						Heidelberg (City)		Jackson Township MS4	MS400140		Montgomery WWTP	MN0024210	1,857
						Lanesburgh (Township)		Louisville Township MS4	MS400144		Seneca Foods Corp - Montgomery	MN0001279	1,247
						Lonsdale (City)		Spring Lake Township MS4	MS400156				
						Lexington (Township)		Elko New Market City MS4	MS400237				
						Montegomery (Township)							
						Saint Lawrence (Township)		New Prague	future				
						Sand Creek (Township)		Belle Plain	future				
						Webster (Township)		Jordan	future				
						Wheatland (Township)							
						Helena (Township)							
						Montegomery (City)							
						Belle Plain (Township)							
						Rice (County)							
						LeSeuer (County)							
						Scott (County)							
						MNDOT							

Chloride Management Plan

- Bringing it all together
- Goals of the CMP:
  - Create a common understanding of the problems

- Set realistic goals for everyone to work towards
- Layout flexible strategies for achieving the goals
- Provide resources available to assist with implementation
- Track progress

MS4 Stormwater Permit

MS4 Permit Language

Part II.D.6

6. For each applicable Waste Load Allocation (WLA) approved prior to the effective date of this permit, the applicant shall submit the following information as part of the SWPPP document:

a. TMDL project name(s)

b. Numeric WLA(s), including units

c. Type of WLA (Le., categorical or individual)

d. Pollutant(s) of concern

e. Applicable flow data specific to each applicable WLA

f. For each applicable WLA not met at the time of application, a compliance schedule is required. Compliance schedules can be developed to include multiple WLAs associated with a TMDL project and shall include:

(1) Interim milestones, expressed as BMPs or progress toward implementation of BMPs to be achieved during the term of this permit

(2) Dates for implementation of interim milestones

(3) Strategies for continued BMP implementation beyond the term of this permit

(4) Target dates the applicable WLA(s) will be achieved

g. For each applicable WLA the permittee is reasonably confident is being met at the time of application, the permittee must provide the following documentation:

(1) Implemented BMPs used to meet each applicable WLA

(2) A narrative describing the permittee's strategy for long-term continuation of meeting each applicable WLA .

MS4 Permit Language

Part III.E

E. Discharges to Impaired Waters with a USEPA-Approved TMDL that Includes an Applicable WLA

For each applicable WLA approved prior to the effective date of this permit, the BMPs included in the compliance schedule at application constitute a discharge requirement for the permittee. The permittee shall demonstrate continuing progress toward meeting each discharge requirement, on a form provided by the Commissioner, by submitting the following:

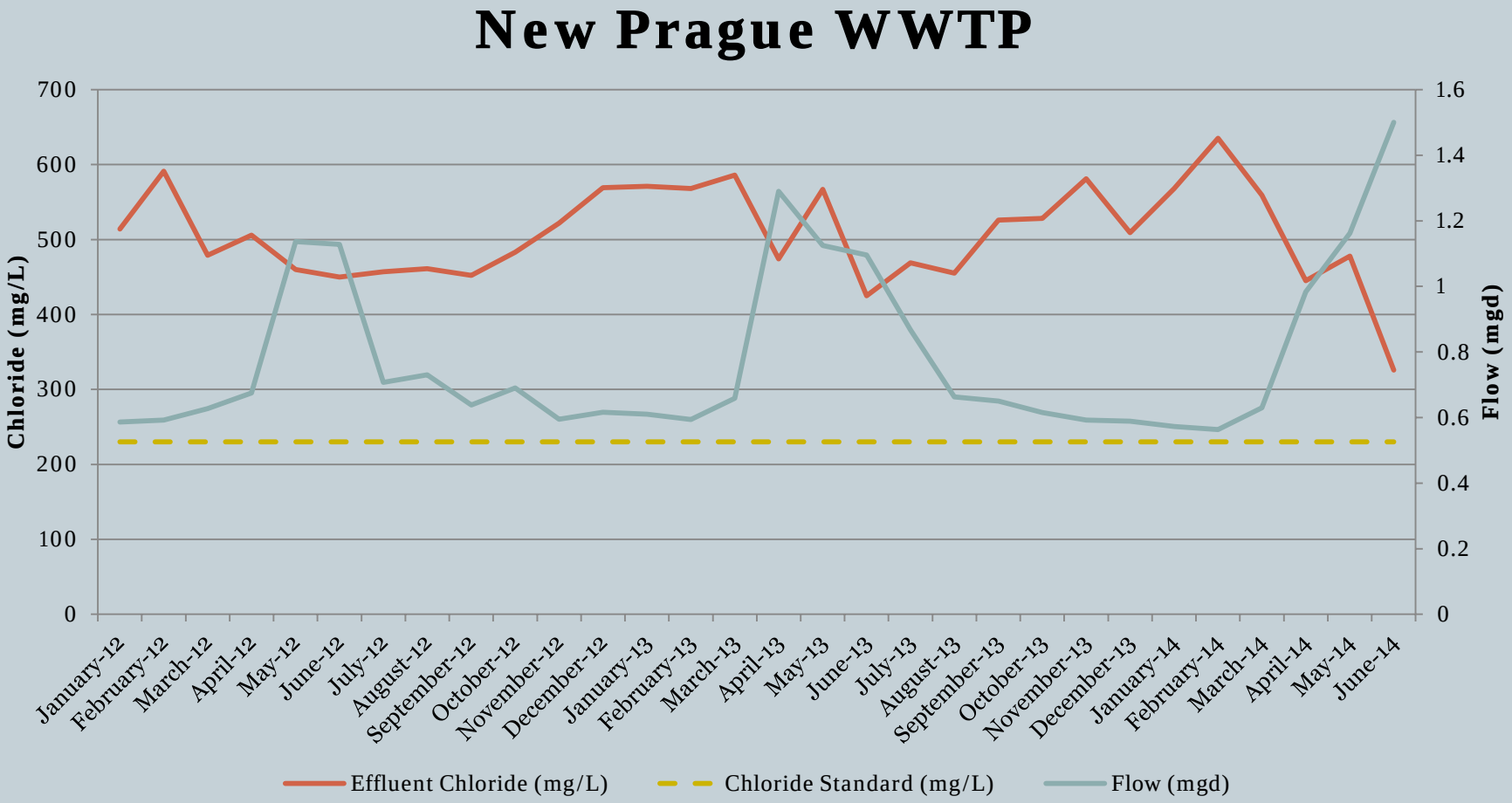
1. An assessment of progress toward meeting each discharge requirement, including a list of all BMPs being applied to achieve each applicable WLA. For each structural stormwater BMP, the permittee shall provide a unique identification (ID) number and geographic coordinate. If the listed structural stormwater BMP is also inventoried as required by Part III.C.2, the same ID number shall be used.
2. A list of all BMPs the permittee submitted at the time of application in the SWPPP document compliance schedule(s) and the stage of implementation for each BMP, including any BMPs specifically identified for the small MS4 in the TMDL report that the permittee plans to implement
3. An up-dated estimate of the cumulative reductions in loading achieved for each pollutant of concern associated with each applicable WLA
4. An up-dated narrative describing any adaptive management strategies used (including projected dates) for making progress toward achieving each applicable WLA

Required Submittals

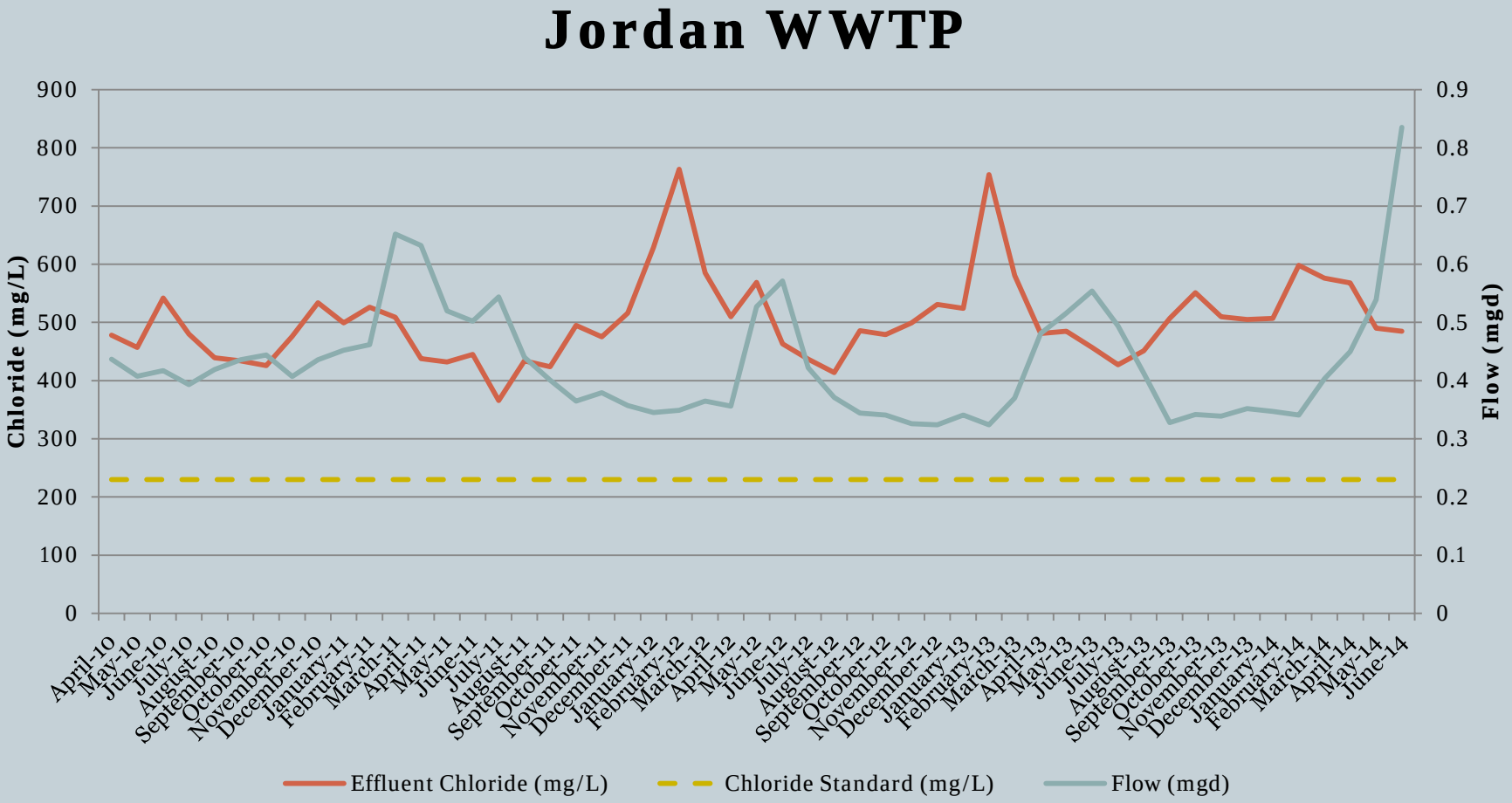
- At application (all application materials are subject to public notice)
  - List of TMDLs and applicable WLAs approved prior to the effective date of the permit (August 1, 2013)
  - Compliance schedules
  - Long term implementation strategy
  - Target date
- Annual reports
  - All BMPs receiving credit
  - Cumulative progress
  - Any changes
- **Note:** Permit requirements for this TMDL will not be effective until the following permit term (roughly 2019).

Wastewater Permits

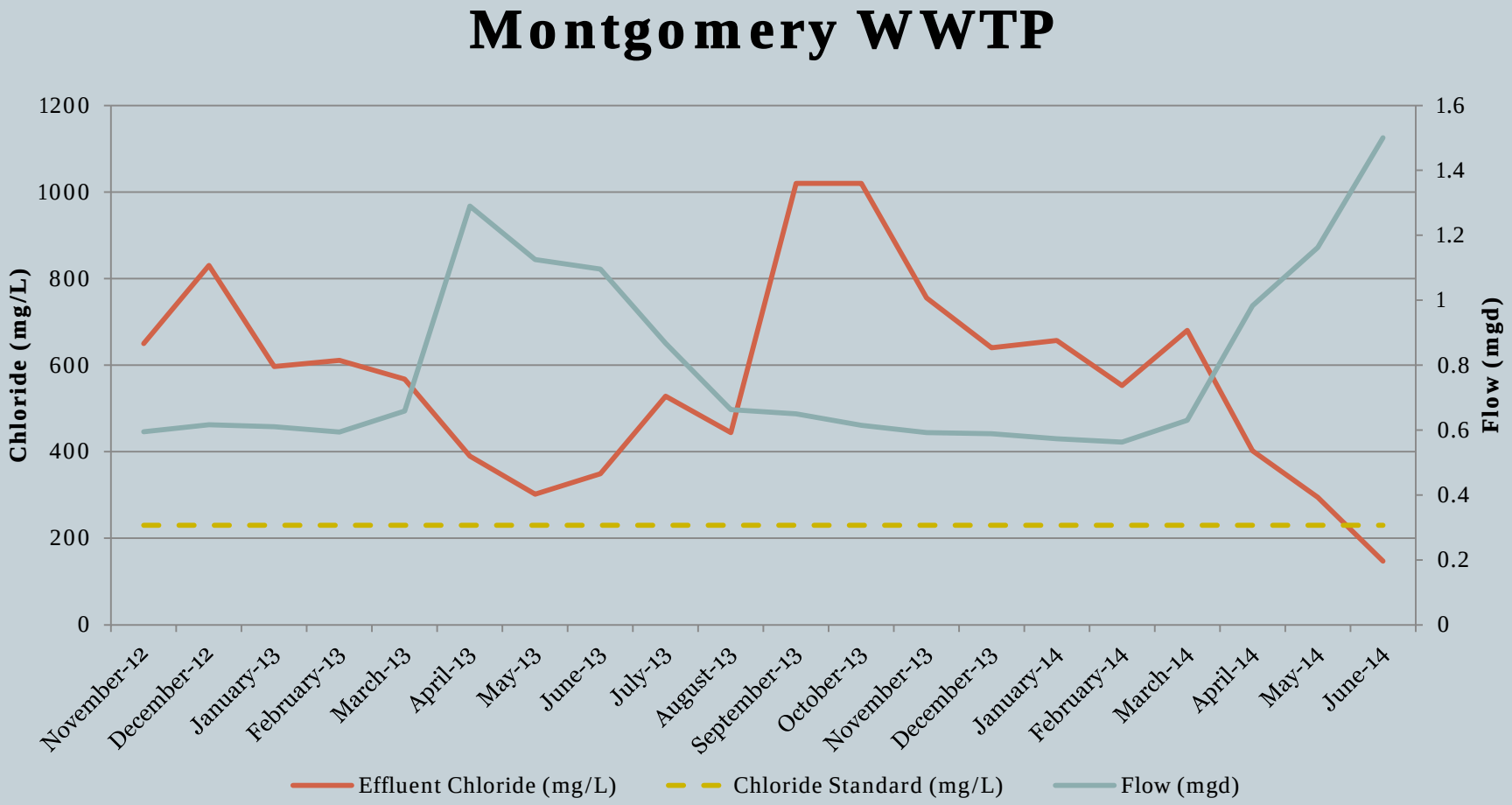
Current Chloride in effluent

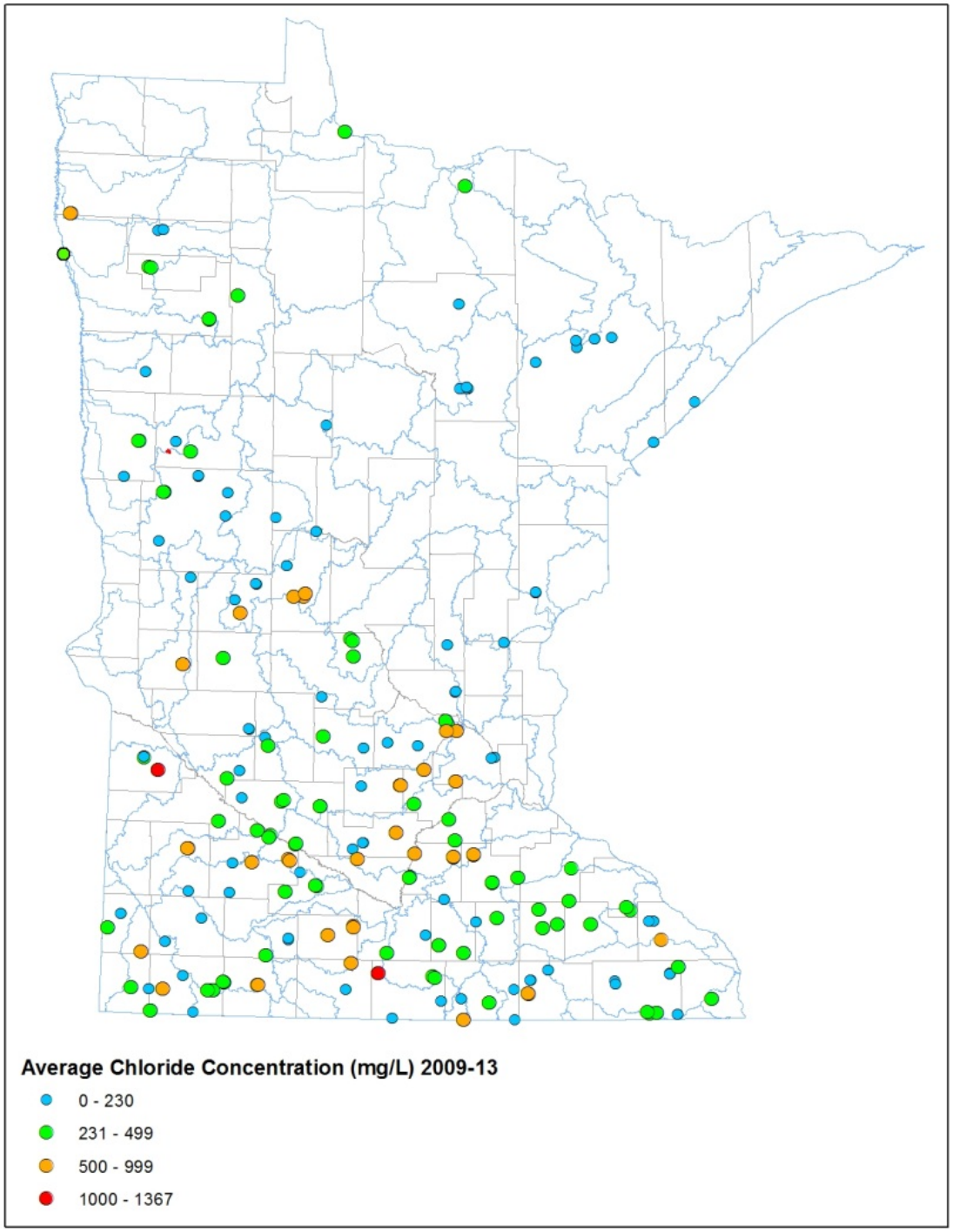


Current Chloride in effluent



Current Chloride in effluent




Average Chloride Concentration (mg/L) 2009-13
0 - 230
231 - 499
500 - 999
1000 - 1367

Draft Limits based on Reasonable Potential Analysis

Facility	Calendar Month Average (mg/L)	Daily Maximum (mg/L)	Permit Expiration
Jordan WWTF	229.4	267.9	2/28/2015
New Prague WWTF	229.4	266.9	11/30/2016
Montgomery	222	356.7	3/31/2017
New Prague Water Treatment Plant	Monitory Only	Monitor Only	6/30/2017
Seneca Foods-Montgomery	Monitor Only	Monitor Only	3/31/2013

Implementation Strategies

Water Softening

- Inform homeowners of local hardness values and recommended levels
- Convert to centralized water softening – eliminate individual water softeners
- Offer rebate program to switch out old home water softeners with on-demand systems (use less salt)
- Consider non-salt water softening options
- Others???

Level 1 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/r0pgb86

Winter Maintenance Assessment Tool

Winter Maintenance Assessment Tool (WMAt)

- Offers insight that is unique to winter maintenance practices of parking lots, sidewalks, low speed roads, and high speed roads
- Looks at small areas of winter maintenance where improvements can be made, much more manageable
- Offers a unique collection of many salt reduction informational resources (written and communicated)
- Develop a strategy unique to each operation
- Allows a flexible approach for improving winter maintenance
- Document a path towards improved practices

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

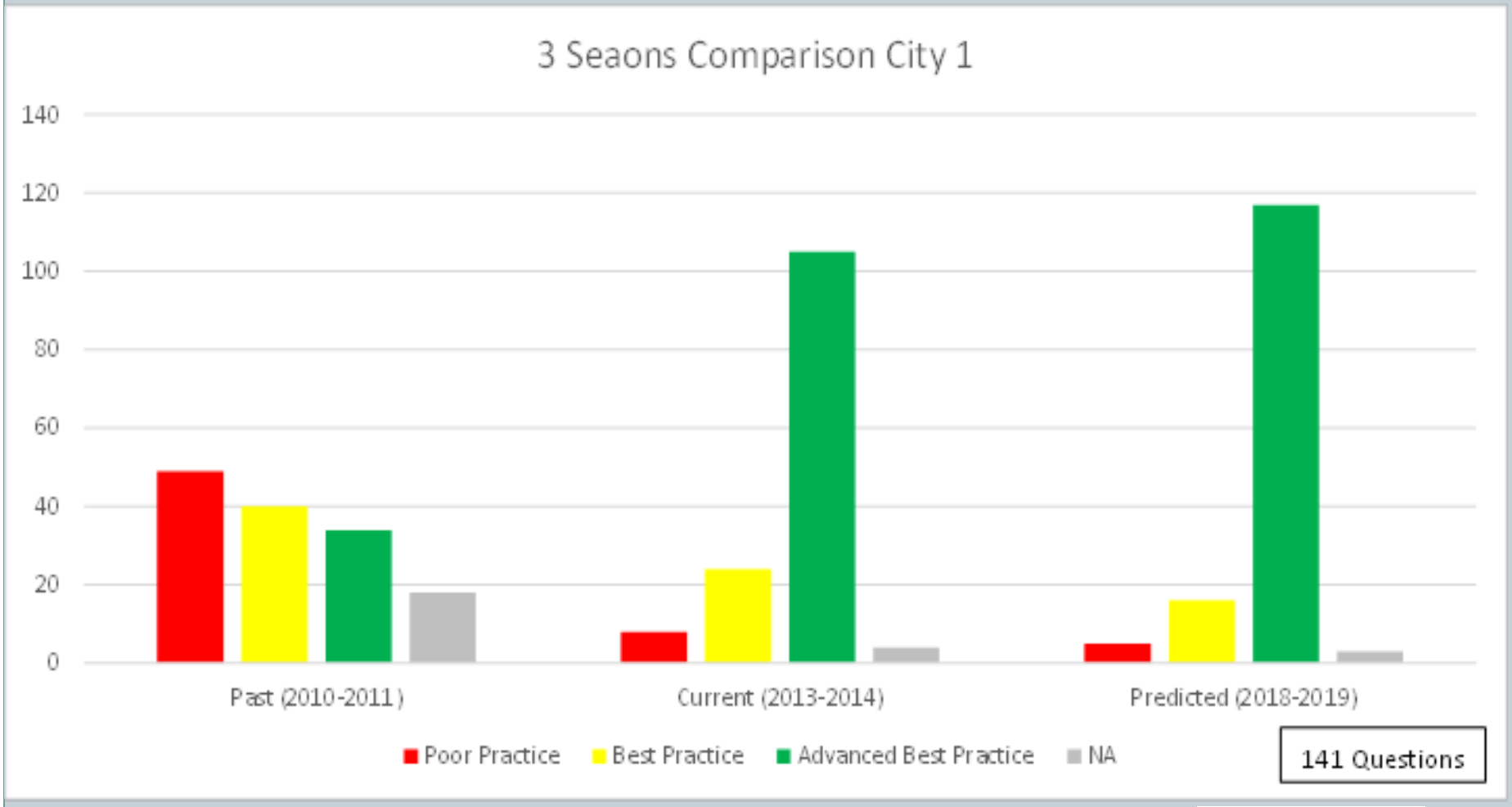
Summary:
30 Poor Practices
80 Best Practices
20 Advanced Best Practices

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

Legend:

- Poor Practice
- Best Practice
- Advanced Best Practice

City #1



2010-2011 **2013-2014** **2018-2019**

Possible Uses for Winter Maintenance Organizations

- Use tool to assess at a detailed level, operations
- Use as a teaching tool and compare it to routine practices
- **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.
- Possibly show results to meet MPCA requirements

Discussion Questions

Brooke Asleson

Watershed Project Manager

651/757-2205

brooke.asleson@state.mn.us

Elise Doucette

Effluent Limits

651/757-2316

elise.doucette@state.mn.us

Josh Stock

Stormwater

651/757-2235

josh.stock@state.mn.us

TCMA Chloride Project

Sand Creek Watershed Community Meeting

Attendees: Brooke Asleson, Rachel Olmanson, Josh Stock, Marco Graziani, Elise Doucette, Andy Ronchak, Shoua Thao, Joe Wiita, Jeremy Walgrave, Melissa Bokman, Jenny Mochol-Johnson, Kathy Nielson, Gerald Williams, Shane Ohsamen, Scott Warner, Jerry Connolly, Steven Griep, Scott Haas, Paul Hendrickson, Bill Heimkes, Cy Wolf, Russ Vlasak

July 30, 2014, 1-3 pm, Scott County Association for Leadership and Efficiency (SCALE) Regional Public Safety Training Facility, Jordan, MN

- **Purpose:** The purpose of the meeting is to discuss how chloride impacts water resources, the main sources of chloride to water resources, and the Twin Cities Metro Area (TCMA) Chloride Management Plan project that we are working on to determine how we can meet state water quality standards for chloride. We will also discuss potential implementation strategies that will reduce the amount of chloride entering local streams.

- **Presentation:** Twin Cities Metro Area Chloride Project (Overview) – *Brooke Asleson, MPCA*
  - The Twin Cities Metro Area (TCMA) Chloride Project is a large project that has been underway for the past 4 years. The project is focusing on chloride issues in the 7 county metro area.
  - Chloride is a toxic pollutant; the MN state water quality standard for chloride is 230 mg/L (chronic standard), and 860 mg/L (acute standard). Chloride impacts our lakes, wetlands, and groundwater and is a permanent pollutant that does not break down over time. The main sources of chloride in the TCMA are road salt, and water softening salt. A University of MN study found that 78% of the chloride used is being retained in the TCMA.
  - Currently, there are 40 lakes, streams, and wetlands on the impaired waters list in the TCMA, there are also 40 waters that are considered "high risk" in the TCMA. We want to prevent these "high risk" waters from exceeding the standard. The MPCA did a groundwater study, and found that 30% of wells are above the chloride standard. The USGS has also done a study showing that chloride in groundwater has significantly increased since 1996.
  - When determining chloride reductions for this project, we need to ensure that public safety is maintained. Homeowners, private applicators, state, county, city, townships, etc., are all important to consider.
  - The public desires soft water, many people do not understand that there is a link to water quality. We also need to consider what would be involved in removing chloride form wastewater effluent.
  - Do you have specific numbers to how much chloride goes out in the wastewater effluent? Brooke: Yes, we will share that data later.
  - One of the goals of this project is to develop partnerships with winter maintenance professionals to learn more about what practices they are doing and to understand road safety considerations. We want to set realistic goals to protect all surface waters. We also want to understand the needs of wastewater facilities.
  - We are required by the US Environmental Protection Agency (EPA) to do a Total Maximum Daily Load (TMDL) Study for impaired waters. The study involves investigating sources of pollutants, and evaluating data. We will complete TMDLs for all waters impaired by chloride in the TCMA. We will also provide resources for local partners to assist with implementation.
  - We have been working with over 115 stakeholders in the TCMA over the past 4 years. The project involves several committees, to try and meet everyone's needs.
  - The main components of the study are: the stakeholder process, chloride monitoring, evaluate and compare data to water quality standard, identify sources, develop protection goals, complete TMDLs, and develop implementation strategies.

- For this project, lakes, streams, and stormsewers were monitored throughout the metro. The monitoring was targeted based on existing data, and local partners.
- Primary sources of chloride in the TMCA are private applicators, road authorities, WWTPs, and industrial dischargers. Other sources of chloride that were identified were septic systems, fertilizer, and natural background conditions (which are minimal in TCMA, SE MN has higher natural background levels of chloride).
- We will allow flexibility in implementation activities; the only option is prevention. We would like to see winter maintenance activities functioning at a high level, and set goals for point sources to meet effluent limits.

- **Presentation:** Twin Cities Metro Area Chloride Project (Sand Creek Watershed) – *Brooke Asleson, MPCA*
  - In the Sand Creek Watershed, Sand Creek, South Sand Creek, Raven Creek, and East Branch Raven Creek are impaired for chloride. These streams have higher concentrations of chloride occurring at low flow conditions, indicating that wastewater effluent is driving the chloride impairments in the Sand Creek Watershed.
  - In Sand Creek, near New Prague there are quite a few measurements above the standard. Raven Stream also has quite a few measurements above the standard. There are 4 reaches in the Sand Creek watershed that are impaired for chloride that we will be doing TMDLs for. There is a strong correlation of increasing road density and chloride concentrations. This area is unique compared to the rest of the project in that wastewater could be a bigger contributor to the chloride impairment, rather than road salt, the primary source of chloride in the metro as a whole.
  - A TMDL estimates the maximum amount of chloride that can enter a water body in order to meet the water quality standard. The TMDL equation has multiple components. The Load Allocation (LA) consists of non-regulated sources (nonpoint) and natural background conditions. The Wasteload Allocation (WLA) consists of regulated (permitted sources). The Margin of Safety (MOS) accounts for scientific error, and the Reserve Capacity (RC) accounts for future development.
  - The watershed loading is used to determine the loading capacity (WLA+LA); this modeling approach considers runoff and the chloride standard. The allowable load is based on the standard, average winter precipitation, and a runoff coefficient. The point source WLA determination is based on the maximum daily flow, which is obtained from the permit information.
  - MS4's will receive a categorical WLA, permitted point sources will receive an individual WLA. The overall TMDL number is expressed in lbs/day, if you see your organization in both the Sand Creek and Raven Creek TMDL, make progress to the TMDL that is more restrictive.
  - Are only the cities permitted MS4s? Brooke: No, townships can be permitted too; Spring Lake Township is an example. There can also be non-traditional MS4s which would be colleges or watershed districts but there are none in the Sand Creek watershed.
  - We currently have a categorical WLA for a previous TMDL. What is the proposal for who is responsible? Brooke: We would like to see all winter maintenance activities performing at a similar level. We have created a tool that people will be able to use to help assess what level they are at with their winter maintenance practices. We will be using flexible strategies and track progress over time.

- **Presentation:** Twin Cities Metro Area Chloride Project (MS4 Stormwater Permits) – *Josh Stock, MPCA*
  - If you are an MS4 permittee there are requirements associated with TMDLs; at the time of application we want everyone to acknowledge the WLA. Include project name and type of WLA; tell us if you are meeting goals, and provide verification that BMPs are in place. You also need to provide a compliance schedule of BMPs that you will implement over a 5 year term and a target date of when you think you could meet the WLA.
  - The Annual Report will include all the BMPs that you are taking credit for; this includes BMPs that will be implemented within the next 5 years and previous BMPs you have already implemented. You will need to report cumulative reductions in loading achieved, and any changes that have been made to your Stormwater Pollution Prevention Plan (SWPPP). There will not be any permit requirements for this TMDL until the next permit cycle, roughly 2019.

- Brooke: However, you can still implement BMPs, even though you don't have to report until 2019. When you do report it, you can take credit for previous BMPs that have been implemented to reduce chloride.
- Josh: Implementation efforts can be started before any permitting is required; if this is the case, you would continue maintaining practices you have already implemented.

- **Presentation:** Twin Cities Metro Area Chloride Project (Wastewater Permits) – *Elise Doucette, Marco Graziani, MPCA*
  - In doing this project, chloride from WWTFs was identified as a concern. The only option for treatment of chloride at WWTF is reverse osmosis at the end of the pipe. One way chloride requirements could be met is to control the source- in this case, water softeners. This is a unique challenge, in that individuals will have to change their personal behaviors. The MPCA wants to help maintenance staff at facilities make changes. The end of pipe treatment is very undesirable and we would also have to manage the wastewater product if treating at the end of the pipe, which could be a very costly process. Pre-treatment and source control are the preferred option.
  - The New Prague WWTP has been monitoring their effluent for a couple years (since 2010). There is a significant amount of chloride coming out of the WWTP in Jordan, 400-600 mg/L is the concentration measured coming out of the pipe.
  - Chloride is unique compared to other pollutants in that when flow decreases the concentration increases. This problem occurs at low flows and we will take this into account.
  - We have some data for the WWTP in Montgomery, but once we have more data points we will have a better idea of what is going on here.
  - We have done some analysis on average chloride at WWTF across the state of MN. This is a state wide issue; the source of water may be an indicator of where pollution is coming from- where citizens are softening. Across the state the locations of higher average concentrations are areas is likely where the water is harder. The lower average chloride concentrations are dispersed throughout the state. How many communities are meeting the standard, is this level at the municipal scale, what is the culture of water softeners?
  - We are looking at this issue statewide; we are taking into account individual behaviors and WWTF when it comes to treatment. We are looking for volunteers to help out with this project, who can give some insight on compliance with limits at facilities.
  - There will likely be limits applied in the next permit cycle and we would like to see compliance schedules. Recently there have been 10 year compliance schedules for facilities to meet limits (2 permit cycles) - sources and methods to reduce sources, methods to treat water before distributed.
  - We are hoping to finish this project by the end of the year.
  - Are these the effluent limits that we will have to meet? Elise: Yes, these are draft limits, the permit expiration is a ways out, the numbers we have calculated now are based on the data we have.
  - In the TMDL process, we look at pollutant loading in terms of lbs/day, but in this case we are talking about concentrations, chloride is a toxic pollutant that is concerning at low flows. Effluent limits are concentrations. When we have one pipe, we are talking about the reasonable potential- Does discharge have potential to cause exceedance of water quality standard? The daily maximum is based on a 4-day average. You will need to meet both the daily and calendar month limits. The permit will focus on these numbers- site specific standards. We are pulling data from many WWTPs in the state- a lot of data analysis will go into this.
  - Could we inform homeowners of local hardness values and recommended levels for water softeners, could we convert to a centralized water softening system, which would eliminate the source from individual water softeners? We need to better understand how these options would reduce chloride levels.
  - WI has a rebate program for homeowners to switch out old home water softeners. We could consider non-salt water softening options; we are very open to ideas. Permits would include outlines and plans to do source reduction, but open to cities to reach out to citizens, work with water treatment plants.
  - Is groundwater chloride contamination a concern for MPCA? Elise: Yes, we monitor groundwater and regulate sources. Brooke: We do not do TMDLs for ground water at this point, but there are possibilities of calling out pollutants of concern in groundwater (common detect). Likely something we will look at in the future. Drinking water standards do not have the same regulatory structure, but we could look at common detect. We have already identified chloride as a groundwater issue.

- Will effluent limits be in the next permit? Elise: We will only be monitoring at this point, but we will likely put in compliance schedules that will have an end date at which time we will reevaluate. We would like a compliance schedule as soon as possible - when do you think this standard will be met? We are looking at each facility case by case.
- The city of Redwood Falls has had success in a public relations campaign to get homeowners to reduce softening use.
- Do they use lime softening? Marco: The costs of using lime have come down; this is a better option than it used to be.
- Marco: How would we pay for something like this? Does it come out of the Health Department, MPCA funds, or other sources of funds?
- Some water softeners don't use salt, would that make a difference? Andy: We will look at all options, come up with costs to give options. At this point we don't know that much about non-chloride water softening systems, we are in the process of understanding all options.
- Is MPCA going to do any education to public in terms of road salt? You could inform the public that they need to change habits, ice-free roads? It all comes down to public safety. Elise: Yes, and for the water softening issue we need to explore the best ways to communicate with people- is cost an issue? Use less salt if we change habits- but how do we quantify? We will develop a Communication Plan later on.
- Are you looking at this issue in other watersheds? Elise: Yes, we are looking at it statewide. Brooke: For the Chloride Project we are focusing on the 7 county Twin Cities Metro Area.

- **Presentation:** Twin Cities Metro Area Chloride Project (Implementation Strategies) – *Brooke Asleson, MPCA*
  - For implementation strategies we need to keep public expectations and road safety in mind. Currently we have a certification program for snow and ice best practices for winter maintenance professionals. This is a voluntary training that informs of opportunities to reduce salt by improving winter maintenance operations.
  - Joe Wiita: This is a good training, you learn about basic application rates, and equipment calibration. Connie from Fortin Consulting has instructors that are in the field that help her out. The instructors share real life experiences and there is good information. The next training class is Aug. 14th.
  - There are numerous trainings throughout the state. The focus of the trainings is winter maintenance changes. Through the TCMA Chloride project we are creating a Winter Maintenance Assessment tool. The development of this tool involved winter maintenance experts. The tool walks you through questions about current operations to help determine what practices can be improved. The tool allows you to look at very specific operations of winter maintenance program, and opportunities to improve practices. The tool will be an automated web-based tool.
  - The tool identifies where improvements can be made. The goal is to get everyone operating at the same level- way to track progress and takes into account everyone's unique situation. Use the tool to assess current operations. This tool could also be used as a teaching tool, you could show supervisors that changes will save money and reduce costs- baseline for operations and a goal for improvements. If you have an MS4 permit, you could use the tool to show that you are making progress. MS4 only applies if you have a permit with agency.

Discussion/Questions:

- When is the BMP tool going to be available? Brooke: The tool will be tested by a stakeholder group this fall/early winter. We will receive feedback from them and hopefully the tool will be ready by early next year.
- Is there a website to explain the effects of chloride on water resources? Brooke: Yes, we do have a website called Road Salt and Water Quality on the MPCA site. The website includes information on the environmental effects of road salt, educational materials and training opportunities. We are planning to include more educational information and changes in behavior to address water softening issues.
- A website would be great to include in an article for the newspaper. Brooke: Every year the MPCA does a press release that has a link to the MPCA Road Salt and Water Quality website. This year we will include water softening information in the press release.
- It would be good idea for local news stations to feature stories on chloride. It would have been helpful to have local reporters at these meetings to listen to the presentations. Individuals need to change their behaviors. Brooke: Yes, articles in local papers will increase people's awareness of the issue. We will have a couple larger

meetings in next couple months to discuss implementation strategies for this project. It is a good suggestion to notify the media.

- Marco: Industrial users may also be sources of chloride, for example in Albert Lea it was found that a meat processing plant was a source of chloride.