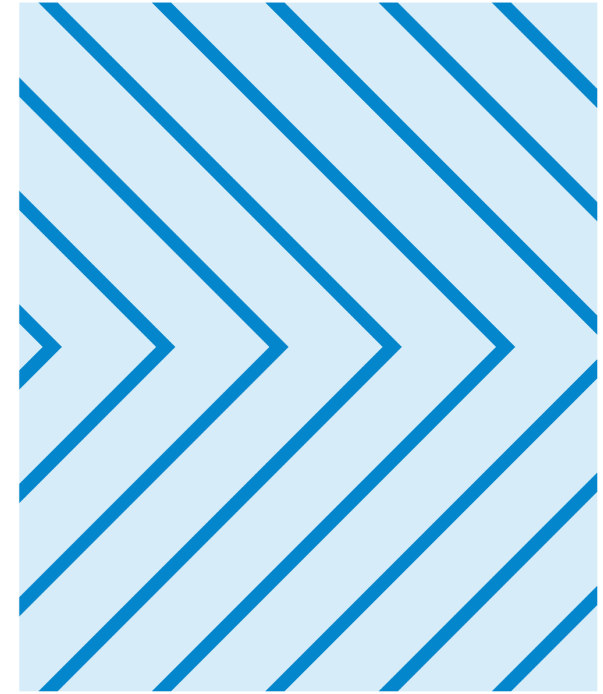




BCWMC 2025 Street Sweeping Prioritization Study



Prepared for Bassett Creek Watershed Management Commission

September 18, 2025



Street Sweeping Study Overview



- Survey on practices
- Evaluating pollutant removal for existing sweeping
- Evaluating pollutant removal for a Baseline Scenario
- Prioritizing areas for enhanced street sweeping
- Consider effectiveness of street sweeping for chloride management
- Recommendations
- Project reporting



Street Sweeping Survey



Survey distributed to BCWMC cities, Hennepin County, and MnDOT.

Included questions on current street sweeping practices:

- Areas swept
- Frequency of sweeping
- Currently performing any 'enhanced sweeping'?
- Currently tracking/reporting to MPCA?
- What are barriers to performing more sweeping?

Received responses from all BCWMC cities and Hennepin County. No response from MnDOT.



Survey Results

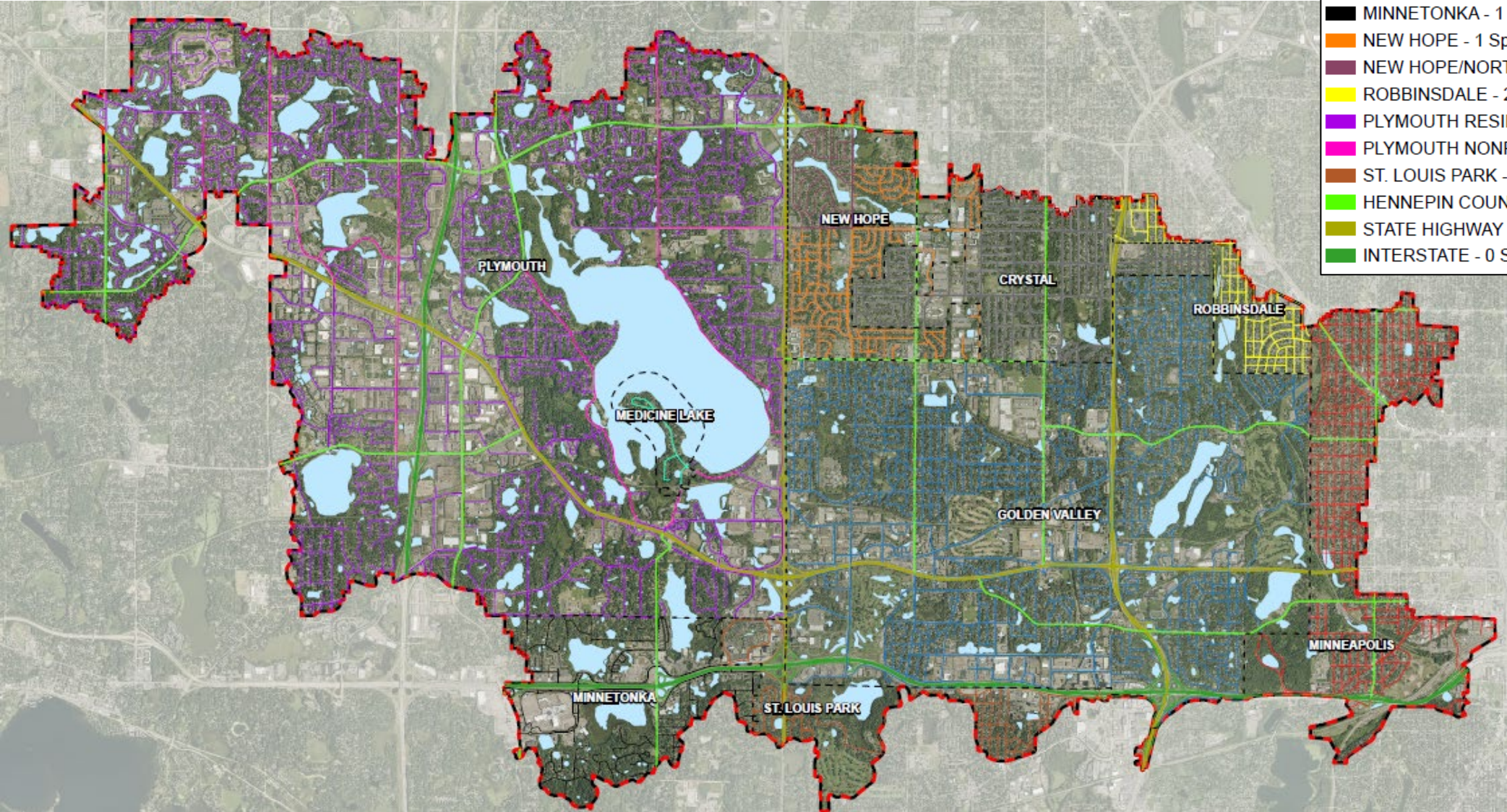


Survey results show:

- Cities are sweeping at varying frequencies
 - Minnetonka: 1 sweep/yr
 - Robbinsdale: 7+ sweeps/yr
- Barriers to performing more sweeping varies by city
- Some cities have already identified priority areas, where they're sweeping more frequently

Organization	Question: How many routine street sweeping events are conducted per year and when does sweeping usually occur?	Question: Are certain areas swept more frequently than others?	Question: What are your biggest barriers to street sweeping?
Crystal	Typically sweep once in the spring and summer and two to three times in the fall, weather permitting.	There is an area by the lake that has become a priority area	Time and budget
Golden Valley	Three full sweeping events: spring, summer, and fall.	No. We do start in priority areas that drain directly to the creek.	Weather, staff time, and budget
Medicine Lake	1 time in the spring; 1 time in the fall	--	--
Minneapolis	Two comprehensive sweeps in the spring and fall, entertainment and event areas 7-day cycles, chain of lakes, parkways on a 15-day cycle through the summer. Commercial node and AD50 area 30-day cycle, and residential neighborhoods 3-5 times a summer.	Yes, due to location to water bodies, economic, commercial activity, and the number of people using the area.	On-street parking and sweep transfer points for handling materials
Minnetonka	One citywide sweep in the spring, and one specialized sweeping area in a subwatershed in the fall in the Nine Mile Creek Watershed.	One subwatershed area is swept in the fall as part of a water quality improvement project (Nine Mile Creek Watershed).	The frequency of sweeping is limited by available staff.
New Hope	Complete one city-wide sweep in the spring, and one city-wide sweep in the fall. We sweep both the Meadow Lake and Northwood Lake areas at least once per month. If we have a big storm event that drops leaves/debris, we will sweep these areas again.	Aside from these city-wide contracted sweepings, the city operates one sweeper that sweeps Meadow Lake and Northwood Lake subwatersheds on a routine basis (monthly or more).	Staff availability and budget
Plymouth	Sweep at least 3 times a year (spring, early summer and late summer/early fall) and try to get a 4th if possible. Sweep main roads that don't have residential properties off them to collect leaves/ debris. We do not sweep residential area roads in the fall, due to storage limitations.	Yes, we typically sweep some trouble spots after heavier rain events. Most are around Medicine Lake.	Garbage cans placed in the streets. We try to schedule not to sweep in garbage zones for that day.
Robbinsdale	Streets are swept 2 times in the spring, then approx. once each month after that until freeze. Usually twice in the fall. So, depending on spring melt, April-Nov, 7 to 9 times annually.	Yes, heavy traffic areas, mostly State Aid roads and streets near the lakes.	Staffing. On-street parking is also a challenge. Screening and disposal is time consuming and expensive.
St Louis Park	Typically early spring, late spring, summer, and fall.	We have priority areas that are swept first, as determined by traffic volumes, street slopes, and proximity to water bodies.	Typically seasonal conditions in the fall and spring; can't sweep the ice.

BCWMC Road Ownership & Current Sweeping



Street Sweeping Frequency	
CRYSTAL	- 1 Sp/1 Su/2 F
GOLDEN VALLEY	- 1 Sp/1 Su/1 F
MEDICINE LAKE	- 1 Sp/0 Su/1 F
MINNEAPOLIS	- 1 Sp/4 Su/1 F
MINNETONKA	- 1 Sp/0 Su/0 F
NEW HOPE	- 1 Sp/0 Su/1 F
NEW HOPE/NORTHWOOD LAKE	- 4 Sp/4 Su/4 F
ROBBINSDALE	- 2 Sp/3 Su/2 F
PLYMOUTH RESIDENTIAL	- 2 Sp/1 Su/0 F
PLYMOUTH NONRESIDENTIAL	- 2 Sp/1 Su/1 F
ST. LOUIS PARK	- 2 Sp/1 Su/1 F
HENNEPIN COUNTY	- 1 Sp/0 Su/1 F
STATE HIGHWAY	- 0 Sp/0 Su/0 F
INTERSTATE	- 0 Sp/0 Su/0 F

BCWMC Current Sweeping



City/Area	Spring Sweeps	Summer Sweeps	Fall Sweeps
Crystal	1	1	2
Golden Valley	1	1	1
Medicine Lake	1	0	1
Minneapolis	1	4	1
Minnetonka	1	0	0
New Hope	1	0	1
New Hope (Northwood Lk Area)	4	4	4
Robbinsdale	2	3	2
Plymouth Residential	2	1	0
Plymouth Nonresidential	2	1	1
St. Louis Park	2	1	1
Hennepin County	1	0	1
State & Interstate Highway	0	0	0

Street Sweeping Analysis & Estimating Benefits



Street Sweeping Analysis:

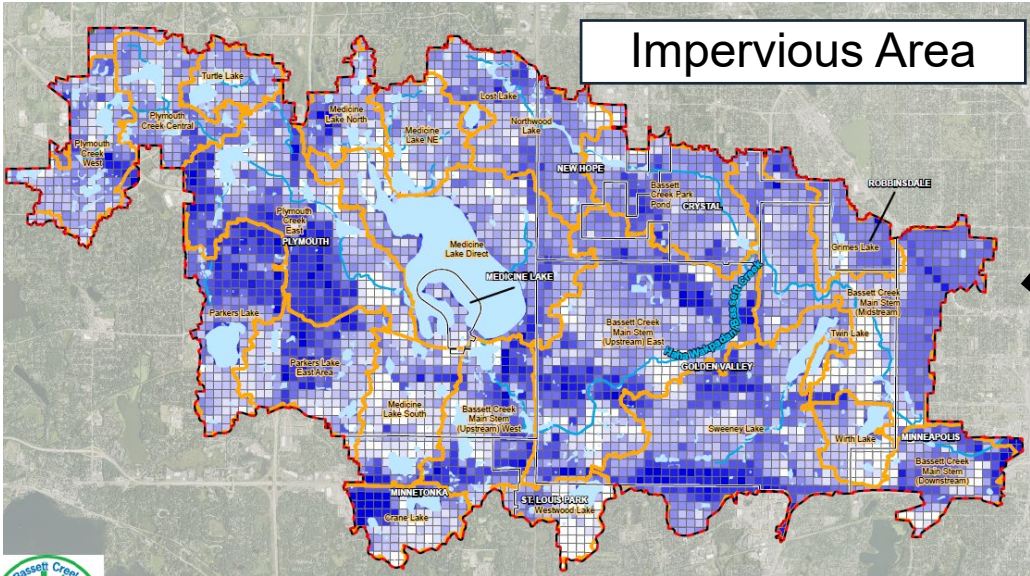
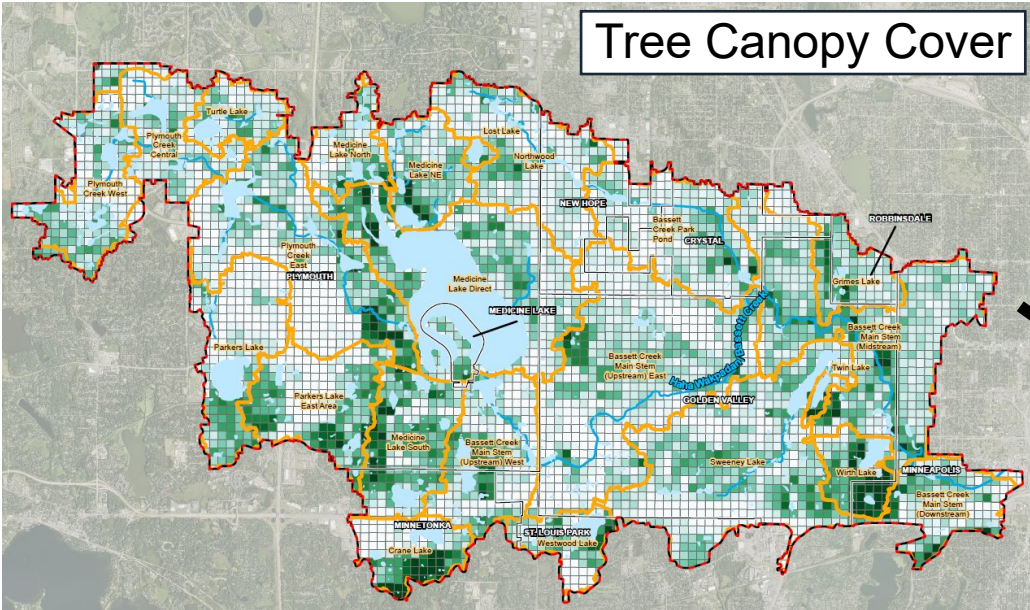
- Impervious area
- Road surfaces
- Canopy cover
- Seasonal street sweeping frequency

Pollutant Recovery vs. Reduction

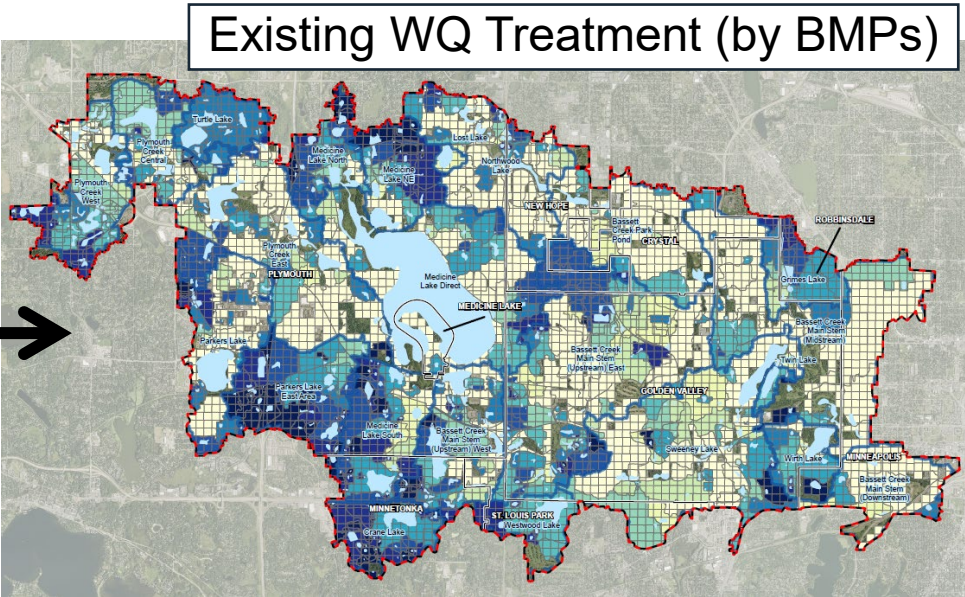
- Pollutant recovery: the mass of pollutants collected from the swept surface during street sweeping operations.
- Pollutant reduction: the mass of pollutants prevented from reaching downstream waterbodies.



Street Sweeping Analysis & Estimating Benefits (cont.)



Nutrient Load



Estimated Pollutant Removals: Existing Conditions



BCWMC Existing Street Sweeping Performance: Pollutant Recovery (collected by sweepers)

Pollutant	Estimated Current Total Loading (lb/yr)	Estimated Street Sweeping Recovery (lb/yr)	Estimated Street Sweeping Recovery (%)
TP	17,447	617	3.5%
TSS	5,270,976	121,667	2.3%

BCWMC Existing Street Sweeping Performance: Pollutant Reduction (prevented from entering downstream waterbodies)

Pollutant	Estimated Current Total Loading (lb/yr)	Estimated Street Sweeping Reduction (lb/yr)	Estimated Street Sweeping Reduction (%)
TP	17,447	455	2.6%
TSS	5,270,976	67,684	1.3%

Estimated Pollutant Removals: Baseline Scenario (1-1-2)



BCWMC Street Sweeping Recovery Results for Existing Conditions vs. Baseline Scenario

Pollutant	Estimated Current Total Loading (lbs/yr)	Estimated Street Sweeping Recovery by Scenario			
		Existing Conditions		Baseline Scenario (1-1-2)	
		Recovery (lbs/yr)	Recovery (%)	Recovery (lbs/yr)	Recovery (%)
TP	17,447	617	3.5%	820	4.7%
TSS	5,270,976	121,667	2.3%	136,223	2.6%

BCWMC Street Sweeping Reduction Results for Existing Conditions vs. Baseline Scenario

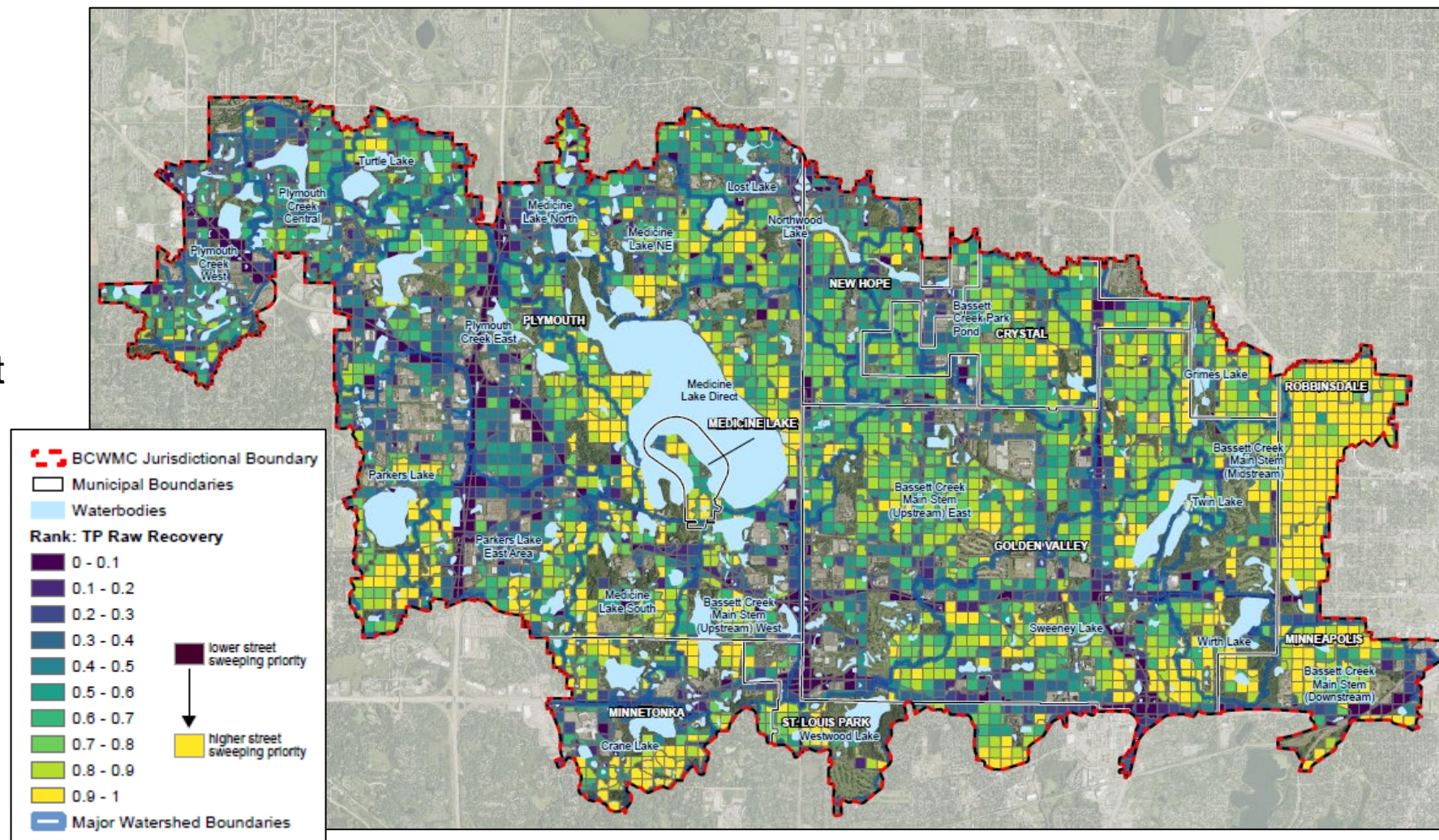
Pollutant	Estimated Current Total Loading (lbs/yr)	Estimated Street Sweeping Reduction by Scenario			
		Existing Conditions		Baseline Scenario (1-1-2)	
		Reduction (lbs/yr)	Reduction (%)	Reduction (lbs/yr)	Reduction (%)
TP	17,447	455	2.6%	569	3.3%
TSS	5,270,976	67,684	1.3%	72,212	1.4%

BCWMC TP Recovery Prioritization – Bassett Creek Watershed



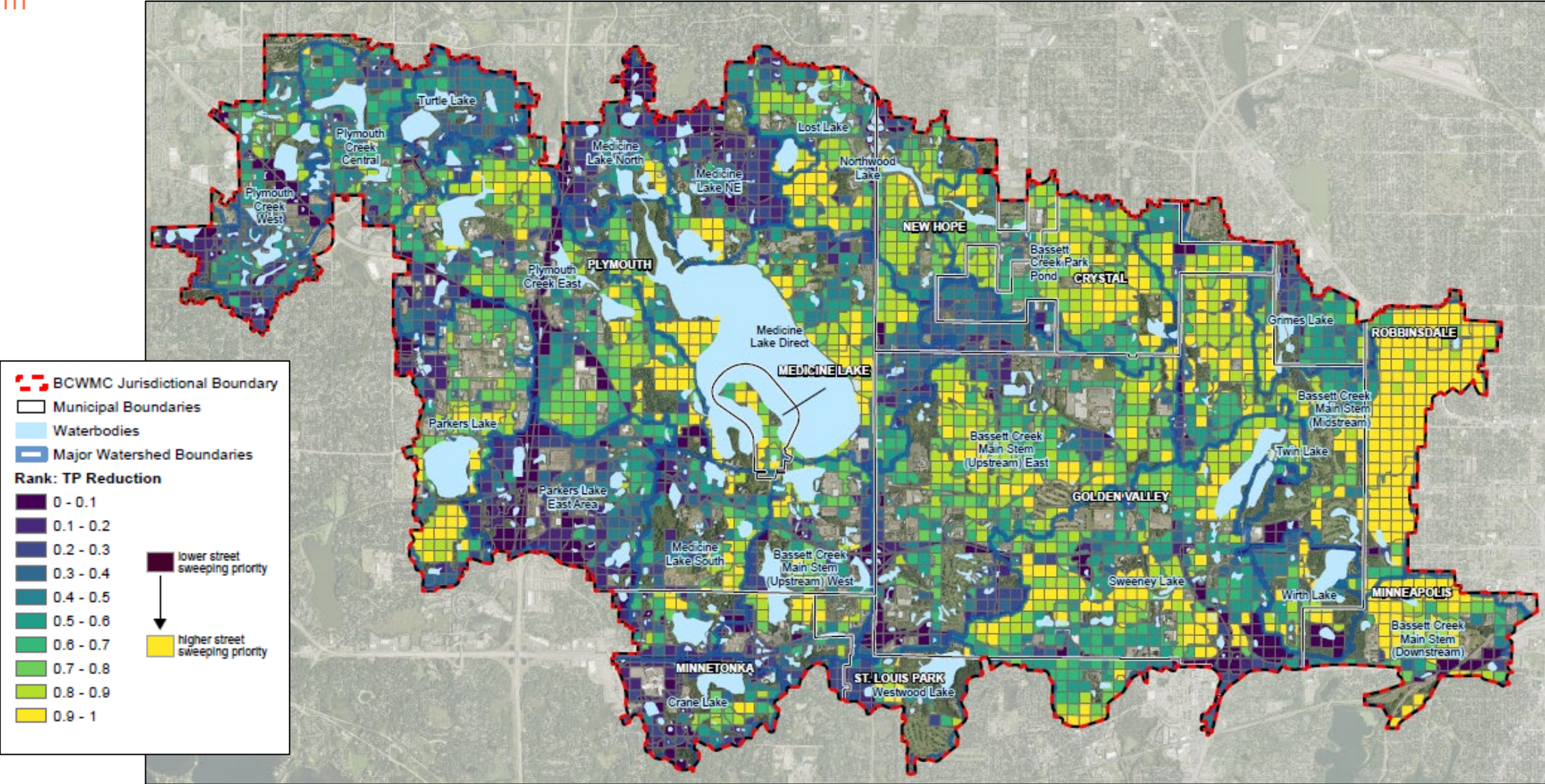
What is “Prioritization”:

- Analysis to determine highest/lowest priority areas to sweep
- Relative comparison of street sweeping efficiency in each subwatershed
- Function of street density, canopy cover, sweeping assumptions, scale, and “recovery” vs “reduction”



***Prioritization based on “recovery” at scale of entire BCWMC based on 1-1-2 baseline sweeping operations*

BCWMC TP Reduction Prioritization – Bassett Creek Watershed

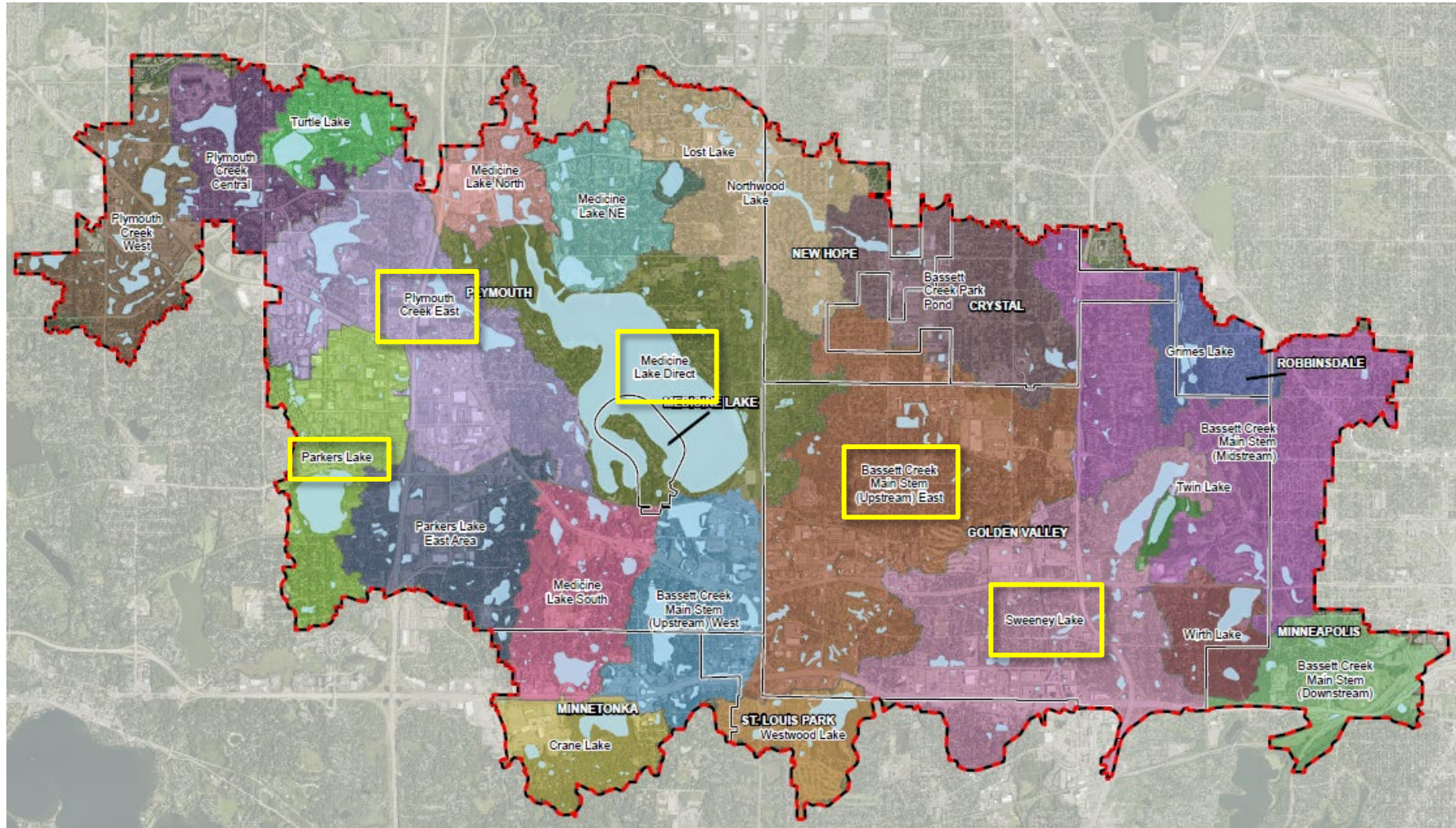


TP Recovery and Reduction Ranking by Major Watershed

|||||||

Major Subwatershed	Existing Conditions: TP Recovery (lbs/year)	Baseline Scenario (1-1-2)			Existing Conditions: TP Reduction (lbs/year)	Baseline Scenario (1-1-2)		
		Recovery (lbs/year)	Increase (lbs/year)	Recovery Increase Ranking (#)		Reduction (lbs/year)	Increase (lbs/year)	Reduction Increase Ranking (#)
Medicine Lake Direct	37	59	22	1	27	43	16	2
Plymouth Creek East	26	48	22	2	21	39	18	1
Bassett Creek Main Stem (Upstream) East	62	81	19	3	44	58	14	4
Sweeney Lake	64	83	18	4	50	64	14	3
Crane Lake	5	23	18	5	1	5	4	12
Medicine Lake South	12	29	17	6	6	14	8	7
Parkers Lake East Area	16	32	16	7	3	7	4	14
Bassett Creek Main Stem (Upstream) West	13	28	16	8	9	18	9	6

Top 5 Ranked Major Subwatersheds – Additional TP Reduction



TP Recovery and Reduction Ranking by Municipality

|||||||

Municipality	Existing Conditions: TP Recovery (lbs/year)	Baseline Scenario (1-1-2)			Existing Conditions: TP Reduction (lbs/year)	Baseline Scenario (1-1-2)		
		Recovery (lbs/year)	Increase (lbs/year)	Recovery Increase Ranking (#)*		Reduction (lbs/year)	Increase (lbs/year)	Reduction Increase Ranking (#)*
Plymouth	158	295	138	1	98	181	83	1
Golden Valley	164	216	52	2	124	163	39	2
Minneapolis	148	125	-23	--	135	113	-22	--
Crystal	48	49	1	7	39	40	1	6
New Hope	35	39	3	4	30	31	1	7
Minnetonka	11	46	35	3	4	15	11	3
St. Louis Park	22	25	3	5	13	15	2	4
Robbinsdale	29	21	-8	--	10	8	-2	--
Medicine Lake	2	4	2	6	2	3	1	5
Total	617	820	203	N/A	455	569	114	N/A

* 1 = highest priority; 7 = lowest priority; -- = already sweeping more than baseline scenario

Relative Cost-Benefit



Relative Cost-Benefit of TP Recovery and Reduction for watershed-wide Baseline Sweeping Scenario

Season	Sweeping	Conducted by Municipality		Contracted	
		Recovery (\$/lb-TP/yr)	Reduction (\$/lb-TP/yr)	Recovery (\$/lb-TP/yr)	Reduction (\$/lb-TP/yr)
Spring	1	 \$349.8	\$504.2	 \$607.8	\$876.1
Summer	1	\$481.3	\$693.8	\$836.4	\$1205.6
Fall	1	 \$171.7	\$247.4	 \$298.3	\$430.0
	2	 \$371.5	\$535.6	 \$645.6	\$930.6
Relative Total Annual Cost		\$242,863		\$422,016	

Range of recent BCWMC CIP projects annual cost/lb TP removal: \$210 - \$5,900
(Lagoon Dredging Project & Northwood Lake underground storage and raingardens)

Street Sweeping for Chloride Management



- Literature review of:
 - Current research
 - Survey of current deicing practices in Bassett Creek watershed
 - Review of relevant TMDL studies
- Conclusions:
 - While street sweeping can be an important component of a city's larger effort for addressing chlorides and collecting excess salt before it's transported downstream, it is not an effective overall strategy for managing chloride loading.
 - Under current practices, < 0.01% of chloride applied to roads annually is removed through street sweeping practices in the Bassett Creek watershed.
 - While increased sweeping could increase chloride reduction, there are challenges associated with this including:
 - Difficulties sweeping during icy conditions
 - Ineffectiveness of filters during wet conditions
 - Concerns about equipment corrosion

Study Results: Takeaways & Recommendations



- Street sweeping is a cost-effective BMP for water quality improvements.
- Street sweeping is most beneficial (for addressing TP loading) in areas where there is high canopy cover, and most effective seasonally in the fall, followed by spring, then summer.
- Mapping of prioritized sweeping areas, tabular summaries, and rankings of relative effectiveness of evaluated sweeping scenarios can be used to inform implementation of enhanced sweeping throughout the Commission.
- Results can be used to help BCWMC prioritize areas for working with cities to encourage additional sweeping.
- BCWMC may consider review of their Capital Equipment Cost Share Policy to incorporate findings from this study.
- Individual cities can use the study results to improve their street sweeping efforts.

What Are Others Doing?



Nine Mile Creek Watershed District:

- Street sweeping analyses performed as part of lake management studies
- To-date, using results to show where highest priority sweeping areas are and to inform partnerships
- Not yet providing cost share for additional sweeping, but have noted could be a potential
- Currently undertaking District-wide street sweeping study

Capitol Region Watershed District:

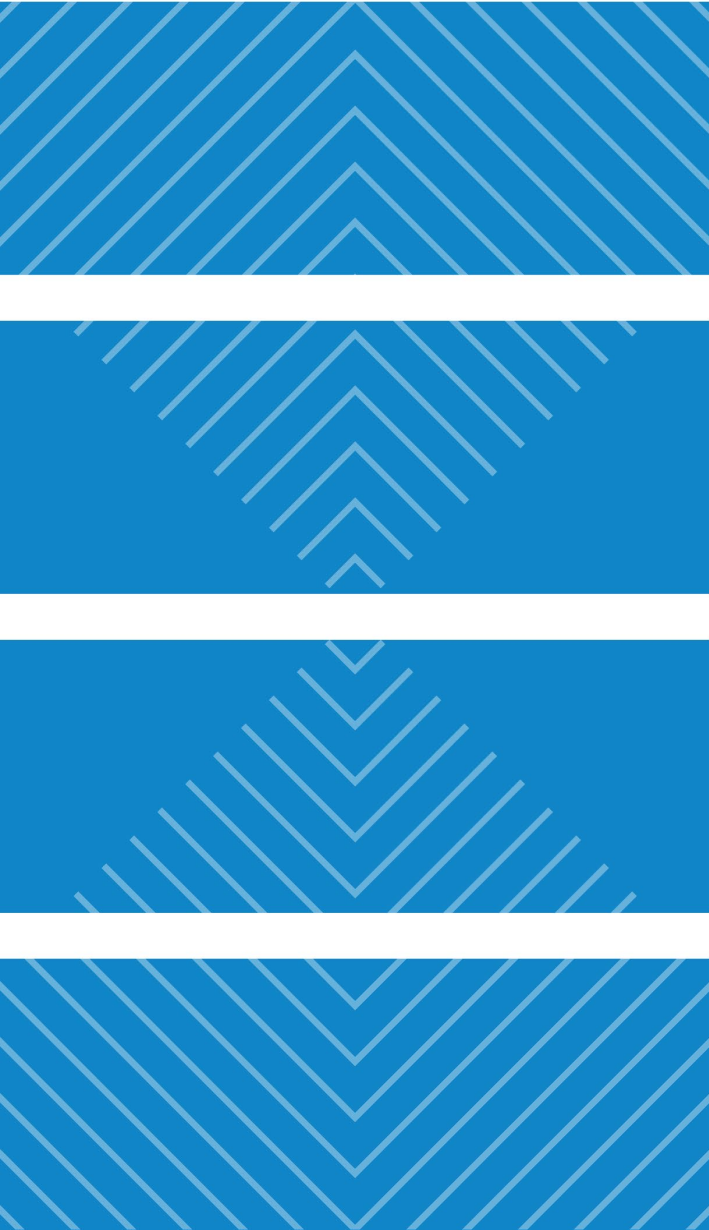
- Completed District-wide study in 2024
- Using results to identify high priority areas for additional sweeping and to coordinate with cities

South Washington Watershed District:

- Used results to inform (pilot) Enhanced Street Sweeping programs with member cities
- Cost sharing for above-and-beyond costs of enhanced sweeping

Lower St. Croix Watershed Partnership:

- Offer up to \$125/curb mile incentive payment for 3 years to road authorities to implement jurisdiction-specific Enhanced Street Sweeping Plan targeting priority waters



Thank you.

