Stormwater and TMDLs: Minnesota's Experience

Andrea Plevan | TMDL Program Coordinator, Watershed Div.

Anna Bosch | Stormwater TMDL Liaison, Municipal Div.

June 23, 2023





Outline

- TMDLs in MN
- MS4 general permits
- MS4 WLA calculation approaches
- Challenges with implementing current MS4 permit
- New approaches
- Next permit



MN Water Management Framework

The framework connects state programs and local partners, encourages public participation, and uses the best available science to support decisions.

Local partners carry out actions to address sources of both point and non-point source pollution with state support. **Implementation** State and local agencies systematically monitor and Local partners commit to prioritized, targeted and assess the condition of lakes and streams on a 10-year measurable action through the One Watershed, Monitoring, cycle. The timing of groundwater monitoring and Comprehensive One Plan (1W1P) program, which connects state assessment varies. Other resource monitoring is Assessment, and Watershed and other information with local values. GOAL: tailored to specific state and local needs. Characterization Management Plan Clean, Sustainable **Vate** Agencies support or create watershed and State and local partners develop Watershed

State and local partners develop Watershed Restoration and Protection Strategies (WRAPS) and Groundwater Restoration and Protection Strategies (GRAPS).

Restoration and Protection Strategy Development Problem Investigation and Applied Research Agencies support or create watershed and groundwater models, maps, research projects, and tools to provide technical information to water planning efforts and support best management practices.

Watershed Lake and Stream Monitoring Schedule 2018 - 2028 Lower Rainy Rivers Rainy Lake Red Lk Lake R Lk Superior (N) Rainy R (Headwaters) Blg Fork R Clearwater R (Headwaters) Wild Rice R St. Louis R Leech Lk R Major Watersheds Monitoring year 2018 Upper Nemadji R 2019 2020 2021* 2022 2023 Mustinka 2024 Minnesota 2025 (Headwater 2027 Yellow Bank R 2028 Minnesota River S Fk Crow R Mississippi R *Social distancing requirements (Lk Pepin) prevented the start of Lower Minnesota R watersheds in 2021. Upper Big Sloux R Mississippi R Lower Blg Sloux R Mississippi R (La Crescent) Des Molnes R Cedar R Mississippi R Lower E Fk Des Upper Iowa R Sloux R Des Moines Moines R

River Rock R

Upper Wapsipinicon R

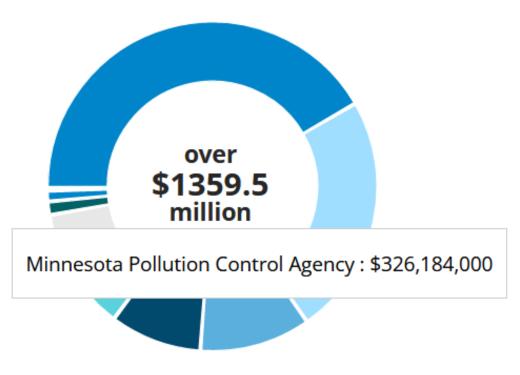
MN Watershed Approach

• 80 HUC8 ("major") watersheds, 10-year cycle

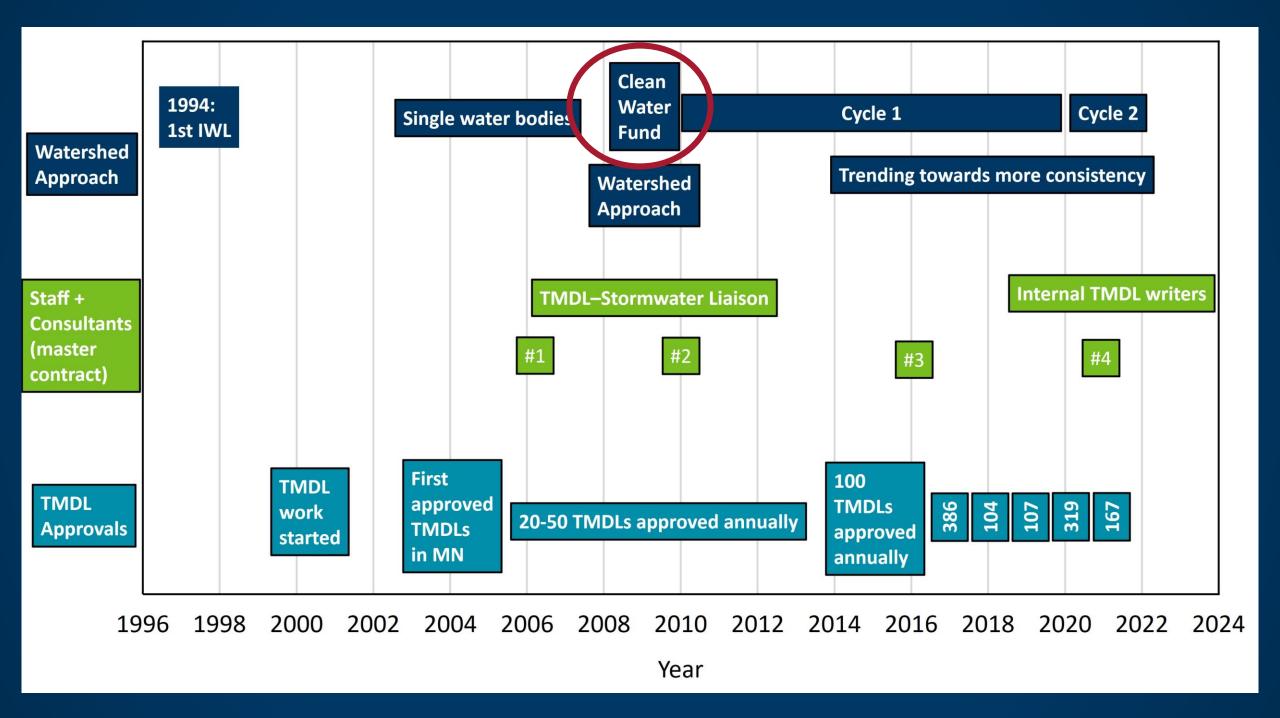
MN Clean Water Fund



Funded by 2008 amendment



Clean Water Legacy Appropriations from All (2010-Present)



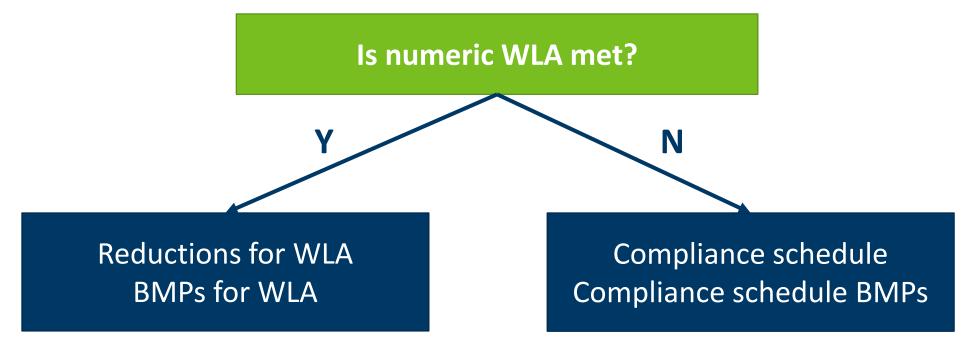
MS4 general permit history

	2006	2013	2020	
# statewide approved TMDLs	48	339	1,576	
# MS4s w/WLAs	~30	126	216	
WLA compliance approach	Permittee checks 303(d) list, determines compliance, adjusts SWPPP as needed	MPCA provides WLA list spreadsheet; permittee lists WLAs, states whether meeting WLA; and lists BMPs (interim milestones as applicable)	BMP implementation: Bacteria, chloride, temperature Numeric implementation: TP, TSS, oxygen demand, nitrate	

6/16/2023 7

2020 permit application

- BMP implementation: Bacteria, chloride, temperature
- Numeric implementation: TP, TSS, oxygen demand, nitrate



Why numeric limits based on WLA?

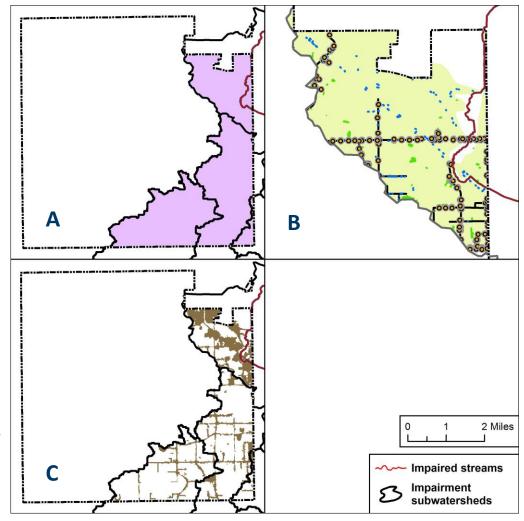
- Previous permits: not enough progress
- Numeric limits based on WLA to hold MS4s more accountable

Table 82. TSS TMDL summary, Porter Creek (07020012-817)

TMDL Parameter		Flow Zones						
		Very High	High	Mid-Range	Low	Very Low		
		TSS Load (lbs/day)						
Loadi	ng Capacity	36,156	10,039	4,175	1,798	688		
Unallocated Load		0	0	0	867	0		
	Total WLA	320	89	37	7.8	6.1		
WLA	Elko New Market City MS4	162	45	19	4.0	3.1		
	(MS400237)	102						
	Construction Stormwater	79	22	9.2	1.9	1.5		
	(MNR100001)	, ,						
	Industrial Stormwater	79	22	9.2	1.9	1.5		
	(MNR050000)	,,,	22	3.2	1.5	1.5		
Load Allocation		34,028	9,448	3,929	833	648		
MOS		1,808	502	209	90	34		

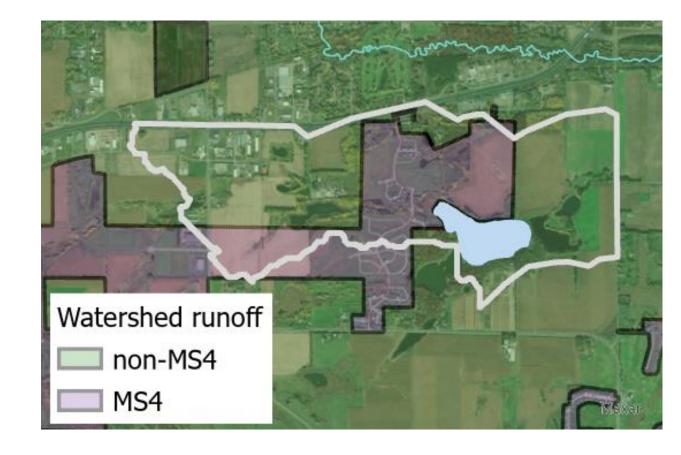
Approaches to delineating MS4-regulated areas

- Cities and townships
 - A. Entire jurisdictional area
 - B. Delineating area as watershed to regulated stormwater conveyance
 - C. Approximate with land cover data: impervious or developed area
- Linear MS4s (road authorities)
 - Mapped by MnDOT
 - Approximate right-of-way width of roads applied to GIS road (line) layers



Approaches to developing MS4 WLAs

- Area
- Concentration target in runoff
- Model scenario



Challenges with implementing current MS4 permit

- Unachievable WLAs
- MS4 boundaries
- Overlapping WLAs

Unachievable WLAs

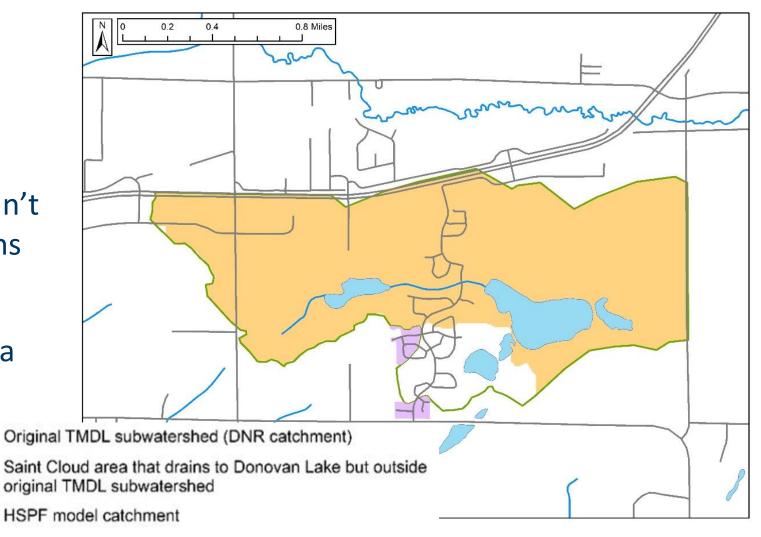
		Flow Regime					
TMDL Parameter		Very High (37–1,128 cfs)	High (6–37 cfs)	Mid-Range (3–6 cfs)	Low (0.6–3 cfs)	Very Low (0.1–0.6 cfs)	
			TSS Load (lbs/day)				
Wasteload Allocation	Duluth City MS4 (MS400086)	198	38	12	3.9	1.0	
	Rice Lake City MS4 (MS400151)	181	35	11	3.6	1.0	
	St. Louis County MS4 (MS400158)	8.3	1.6	0.50	0.16	0.044	
	Industrial Stormwater (MNR050000) ^a	65	12	3.9	1.3	0.34	
	Construction Stormwater (MNR100001) ^a	33	6.2	2.0	0.64	0.17	
Load Allocation		2,765	527	167	54	15	
MOS		361	69	22	7.1	1.9	
Loading Capacity		3,611	689	218	71	19	
Existing Load		270,110	11.599	387	17	-	
Percent Load Reduction		99%	94%	44%	0%	-	

- Permitted MS4s assigned WLAs
- High percent load reduction needs
- Channel erosion not allocated a load

Contested case hearing petition filed during public notice

MS4 boundaries

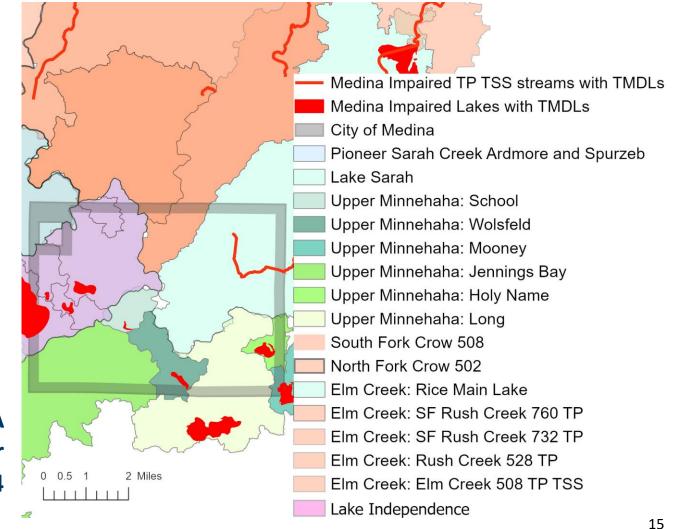
- Changing MS4 boundaries (development changes watershed boundaries)
- Incorrect in TMDL report: didn't consider stormsewer locations
- Unclear in TMDL report (e.g., scale of maps, land cover data as "boundary")



Overlapping WLAs

 Multiple TMDLs for different water bodies at different scales.

TSS and TP WLA study areas for one municipal MS4



Recent WLA approach: Runoff concentration target

 In addition to load, express WLA either as concentration or unit area load (export coefficient)

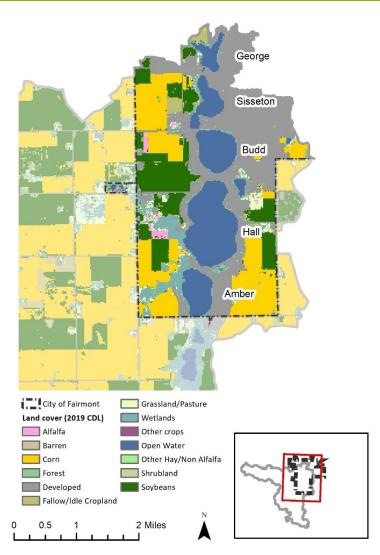
Table 22. Permitted MS4 WLA for phosphorus.

MS4 name and permit number	Estimated regulated area (ac) ^a	Estimated regulated percent area of the watershed	Impaired water body	Impaired water body AUIDs	Phosphorus wasteload allocation (lb/season)	Target watershed runoff phosphorus concentration (μg/L)
			Fairmont			
			Chain:	46-0034-00		
			Amber, Hall,	46-0031-00		
City of			Budd,	46-0030-00		
Fairmont			Sisseton,	46-0025-00		
(MS400239)	5,095	19%	George	46-0024-00	1,855 b	183

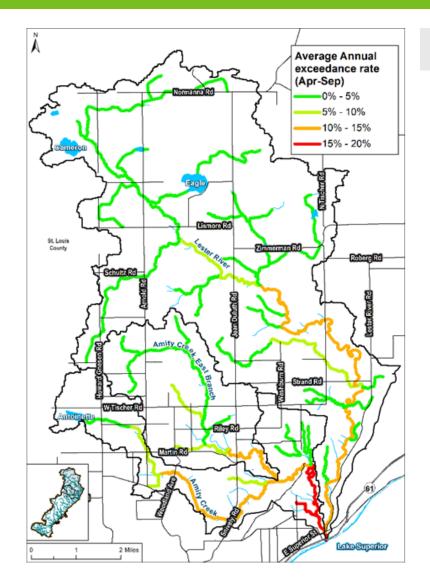
Does not include surface area of impaired lakes.

-, --, ----

b. Assumes a TP watershed runoff concentration of 183 μg/L.

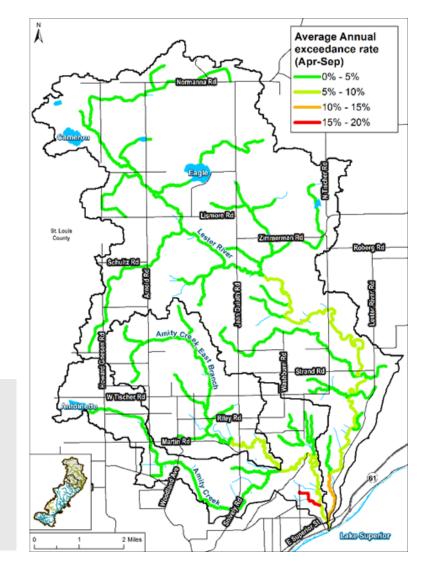


Recent WLA approach: Percent reductions from HSPF model scenario



Baseline

60% reduction in TSS from developed land and near-channel sources



Moving forward

- What should the next permit look like?
 - BMP-based (state-wide) for more pollutant types?
 - Stick with current approach?



Thank you!

Andrea Plevan

TMDL Program Coordinator

Andrea.Plevan@state.mn.us

Anna Bosch

Stormwater TMDL Liaison

Anna.Bosch@state.mn.us



