WATERBODY & WATERSHED QUALITY

Issue Statements, Desired Future Conditions, 10-year Goals: APPROVED FEBRUARY 2024

Impaired Waters – High Priority

Issue Statement: Some lakes and streams within the Bassett Creek watershed do not meet State water quality standards; some are listed as impaired for aquatic life function and recreational use due to pollutants such as nutrients, chloride, bacteria, and other stressors.

Desired Future Condition	Goal (10-year)	Implementation Activities (some potential examples; **highlight** = new activity) – estimated costs in 2023 dollars	
Water quality in priority waterbodies meets or is better than applicable State water quality standards	Achieve State eutrophication standard in Medicine Lake (see table)	- Assess TMDL implementation status and existing conditions ($ TBD; scope being developed) - Manage curly-leaf pondweed in Medicine Lake ($14,000) - Assess feasibility/perform alum treatment to manage sediment TP load - CIP - Identify and implement stormwater treatment projects in tributary subwatersheds – CIP - Provide education to lake homeowners including shoreland restoration workshops – new activity ($5,000) - Encourage/fund buffers on private lakeshore property – new activity ($10,000) - Monitor Medicine Lake water quality ($14,000 every 3 years) - Review development and redevelopment projects for compliance with BCWMC standards (fee for service) - Ensure compliance with BCWMC standards (enforce/inspect) – new activity ($ unknown)	
	Make statistically significant improvement in water quality toward achieving State eutrophication standards (see table) in: - Northwood Lake - Lost Lake	- Perform subwatershed analyses for Lost and Northwood Lakes (or cooperate on TMDL) – new activity (one time $50,000 possible estimate) - Identify and implement stormwater treatment projects in tributary subwatersheds – CIP - Provide education to lake homeowners including shoreland restoration workshops new activity ($5,000) - Encourage/fund buffers on private lakeshore property - new activity ($10,000) - Monitor water quality of Lost and Northwood ($71,000 every 3 years) - Review development and redevelopment projects for compliance with BCWMC standards – fee for service - Ensure compliance with BCWMC standards (enforce/inspect) – new activity ($ unknown)	

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Desired Future Condition	Goal (10-year)	Implementation Activities (some potential examples; highlight = new activity) – estimated costs in 2023 dollars	
	Maintain current conditions or improve water quality in priority lakes currently meeting State eutrophication standards: - Cavanaugh Pond, Crane Lake, Parkers Lake, Sweeney Lake, Twin Lake, Westwood Lake, Wirth Lake,	- Monitor water quality of priority waterbodies ($30,000/lake every 1 to 3 years) - Cooperate on any future TMDLs – new activity ($ unknown) - Review development and redevelopment projects for compliance with BCWMC standards – fee for service - Ensure compliance with BCWMC standards (enforce/inspect) – new activity ($ unknown) - Education and outreach to watershed residents ($46,000 current education programs)	
	Reduce sources of bacteria to Bassett Creek Main Stem, North Branch Bassett Creek, Plymouth Creek, and Sweeney Branch Bassett Creek	- Establish baseline of bacteria concentrations – new activity ($20,000 possible estimate) - Identify possible sources – new activity ($20,000 possible estimate) - Install signage regarding pet waste and other best practices to reduce bacterial loading - $0 (city expense) - Identify and implement projects to improve shoreline integrity along priority streams (indirect benefit) – CIP - Continue to participate in the Metropolitan Council's watershed outlet monitoring program (WOMP) ($27,000) - Education and outreach to watershed residents ($46,000 current education programs) - Promote goose management (coordinates with lakeshore management)	
	Maintain or improve water quality in priority streams to achieve State eutrophication standards (see table) – Bassett Creek Main Stem, North Branch Bassett Creek, Plymouth Creek, and Sweeney Branch Bassett Creek.	- Identify and implement projects to improve shoreline integrity along priority streams - CIP - Identify and implement watershed stormwater treatment projects - CIP - Continue to participate in the Metropolitan Council's watershed outlet monitoring program (WOMP) ($27,000) - Review development and redevelopment projects for compliance with BCWMC standards – fee for service - Ensure compliance with BCWMC standards (enforce/inspect) – new activity ($ unknown) - Education and outreach to watershed residents ($46,000 current education programs)	-

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Desired Future Condition	Goal (10-year)	Implementation Activities (some potential examples; highlight = new activity) – estimated costs in 2023 dollars	
	Maintain total phosphorus loading to the Mississippi River of 0.35 lb/acre/year or less (as defined in the Lake Pepin TMDL)	- Identify and implement watershed stormwater treatment projects - CIP - Continue to participate in the Metropolitan Council's watershed outlet monitoring program (WOMP) ($27,000) - Review development and redevelopment projects for compliance with BCWMC standards - fee for service - Ensure compliance with BCWMC standards (enforce/inspect) – new activity ($ unknown)	
	Maintain or improve macroinvertebrate indices of biological integrity (MIBI) in priority streams (see table) – Bassett Creek Main Stem, North Branch Bassett Creek, Plymouth Creek, and Sweeney Branch Bassett Creek	- Encourage/fund buffers on private riparian property – new activity ($10,000) - Identify and implement projects to stabilize degraded riparian areas – CIP/channel maintenance funds - Continue MIBI monitoring ($8,000) - Data review to identify areas/zones where specific stressors are most significant – new activity ($10,000 possible estimate) - Incorporate elements to improve in-stream habitat or address stream impairment stressors on all stream-focused BCWMC capital improvement projects - CIP - Review development and redevelopment projects for compliance with BCWMC standards – fee for service - Ensure compliance with BCWMC standards (enforce/inspect) – new activity ($ unknown)	
	Maintain or improve lake floristic quality indices (FQIs) and number of species towards achieving State standards for aquatic vegetation in Cavanaugh Pond, Crane Lake, Lost Lake, Medicine Lake, Northwood Lake, Parkers Lake, Sweeney Lake, Twin Lake, Westwood Lake, and Wirth Lake (see table).	- Vegetation surveys of priority lakes ($1,500) - In-lake aquatic plant management (e.g., AIS treatment) (see AIS issue below) - Education and outreach to watershed residents ($46,000 current education programs)	

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Desired Future Condition	Goal (10-year)	Implementation Activities (some potential examples; highlight = new activity) – estimated costs in 2023 dollars	
	Maintain or improve fish index of biologic integrity for applicable priority lakes		

Summary of Priority Lake Eutrophication Data vs. State Standards

Priority Lake	State Std TP (ug/L)	Current Condition TP (ug/L)[1]	State Std Chl a (ug/L)	Current Condition Chl a (ug/L)[1]	State Std Secchi (m)	Current Condition Secchi (m)[1]
Cavanaugh Pond	60	39	20	9.1	≥1.0	1.8
Crane Lake	60	28	20	7.0	≥1.0	0.9[4]
Lost Lake	60	95	20	50	≥1.0	0.8
Medicine Lake[2]	40	54	14	30	≥1.4	1.8
Northwood Lake	60	223	20	72	≥1.0	0.7
Parkers Lake	40	27	14	11	≥1.4	2.8
Sweeney Lake[3]	40	34	14	14	≥1.4	1.6
Twin Lake	40	15	14	3.6	≥1.4	3.5
Westwood Lake	60	32	20	4.9	≥1.0	1.3
Wirth Lake	40	28	14	8.1	≥1.4	2.8

TP = total phosphorus; Chl a = chlorophyll a; SD = Secchi disc transparency
Red = does not meet standard/goal
(1) Based on summer average data collected 2013-2022
(2) Main basin
(3) North basin
(4) Crane Lake Secchi disc depth is limited due to dense aquatic plant growth impeding travel of the Secchi disc

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Issue Statements, Desired Future Conditions, 10-year Goals: APPROVED FEBRUARY 2024

Summary of Priority Stream Water Quality Data vs. State Standards

Priority Stream	State Std TP (ug/L)	Current Condition TP (ug/L)[1]	State Std TSS (mg/L)	Current Condition TSS (mg/L)	State Std E. coli (#/100 mL)[2]	Current Condition (#/100 mL)
Bassett Creek Main Stem	100	195	30	19.7	126	168
North Branch Bassett Creek	100	91	30	73	126	--
Plymouth Creek	100	227	30	23.8	126	853
Sweeney Branch Bassett Creek	100	101	30	21.4	126	257

TP = total phosphorus; TSS = total suspended solids; E. col = Escherichia coli

Current condition is based on data collected from: 2013-2022 for Main Stem Bassett Creek, 2018 for North Branch Bassett Creek, 2020 for Sweeney Branch Bassett Creek, and 2022 for Plymouth Creek

Red = does not meet standard/goal

(1) based on summer average values (June through September)

(2) 126 organisms per 100 mL as a geometric mean of not less than five samples within any month, nor shall more than 10% of all samples within a month exceed 1,260 organisms per 100 mL (note that BCWMC monitoring is limited to fewer than 5 samples per month)

(3) A stream is considered impaired if two or more measurements exceed the chronic criterion (230 mg/L) within a 3-year period or if one measurement exceeds the acute criterion (860 mg/L)

Summary of Priority Stream Macroinvertebrate Data vs. State Standards

Priority Stream	Location	State Std MIBI	Current Condition MIBI[1]	Years of Current MIBI
Bassett Creek Main Stem	East of Brookridge	≥37	22.9	2015, 2018
Bassett Creek Main Stem	Irving Avenue	≥37	22.0	2015, 2018
Bassett Creek Main Stem	Rhode Island Avenue	≥37	17.6	2015, 2018
North Branch Bassett Creek	34th Street	≥37	23.0	2015, 2018
Plymouth Creek	Industrial Park Blvd	≥37	15.9	2015, 2022
Sweeney Branch Bassett Creek	Woodstock Avenue	≥43	45.5	2015, 2020

MIBI = Macroinvertebrate Index of Biological Integrity

State MIBI standards are based on "general use" category for Class 5 southern high-gradient streams (MIBI = 37) or Class 6 southern forest low-gradient stream (MIBI = 43)

Red = does not meet standard/goal

(1) based on average of listed years

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Summary of Priority Lake Floristic Quality Index (FQI) and Species Richness vs. State Standards

Priority Lake	State Std FQI	Most Recent FQI[1]	10-year Average FQI[2]	State Std Species Richness	Most Recent Species Richness[1]	10-year Average Species Richness[2]	Year of Most Recent Data	Years of Average Data
Cavanaugh Pond	>17.8	25.0	25.0	11	19	19	2019	2019
Crane Lake	>17.8	18.6	18.8	11	13.5	14	2021	2016, 2021
Lost Lake	>17.8	20.6	11.8	11	8.0	14.5	2022	2017, 2022
Medicine Lake	>18.6	27.6	25.3	12	21	23.5	2020	2016, 2020
Northwood Lake	>17.8	14.1	14.5	11	11.2	11	2022	2016, 2019, 2022
Parkers Lake	>18.6	19.5	18.9	12	13	13	2021	2018, 2021
Sweeney Lake	>18.6	25.2	21.7	12	15.3	19.5	2020	2014, 2017, 2019, 2020
Twin Lake	>18.6	28.3	24.7	12	19	23	2020	2014, 2017, 2019, 2020
Westwood Lake	>17.8	20.1	19.0	11	13.7	15.5	2021	2015, 2018, 2021
Wirth Lake	>17.8	--	--	11	--	--	--	--

FQI = Floristic Quality Index; FQI is a measure of the quality of aquatic vegetation

Red = does not meet standard/goal based on 10-year average FQI

(1) Reflects the average of June and August measurements during the most recent monitoring year

(2) Reflects average of all measurements in the 10-year period from 2014-2023

Chloride Loading – High Priority

Issue Statement: High chloride loading from use of winter deicers across the Bassett Creek watershed negatively impacts lakes streams, and groundwater water quality.

Desired Future Condition	Goal (10-year)	Implementation Activities (some potential examples; highlight = new activity)	
Priority waterbodies meet applicable State chloride standards	Reduce chloride loading to and concentrations in lakes and streams at risk of chloride impairment and those not meeting State standards.	- Perform subwatershed analyses for chloride-impaired lakes to identify pollution hotspots and to target implementation – new activity ($75,000 possible estimate) - Aside from the above, identify waterbodies and/or subwatersheds at greatest risk to chloride pollution or impairment (overlays?) – new activity ($10,000 possible estimate) - Incentivize/require Smart Salt training – new activity ($2,000) - Require winter maintenance plans for applicable projects/locations – new activity $0 - Develop/identify/require(?) design strategies to minimize salt use – new activity ($10,000 possible estimate) - Update development and redevelopment standards (watershed-wide or select areas?) – new activity ($ unknown; could do during plan development) - Develop plans for priority waterbodies similar to Parkers Lake Chloride Reduction Study – new activity ($45,000 per lake) - Education targeted to private applicators – new activity ($10,000) - Monitor chlorides in priority waterbodies ($ included with monitoring budgets) - Provide or improve methods for residents to report oversalting – new activity	
	Reduce average chloride concentrations in Bassett Creek by 10% at the Watershed Outlet Monitoring Program (WOMP) station.	- *All action items from goal above*	

Summary of Priority Lake Chloride Data vs. State Standards

Priority Waterbody	State Chronic Std Chloride (mg/L)	Current Condition Average Chloride[1] (mg/L)	State Acute Std Chloride (mg/L)	Current Condition Maximum Chloride[2] (mg/L)	Number of Observations
Cavanaugh Pond	230	59	860	70	12
Crane Lake[4]	230	718	860	820	6
Lost Lake	230	31	860	33	12
Medicine Lake	230	162	860	375	318
Northwood Lake	230	104	860	274	12
Parkers Lake[4]	230	257	860	716	103
Sweeney Lake[4]	230	276	860	371	48
Twin Lake	230	117	860	139	26
Westwood Lake	230	81	860	99	12
Wirth Lake	230	200	860	512	306
Bassett Creek Main Stem[3,4]	230	165	860	664	259
North Branch Bassett Creek	230	88	860	219	12
Plymouth Creek	230	180	860	382	25
Sweeney Branch Bassett Creek	230	218	860	348	18

Red = does not meet standard/goal
(1) Based on all measurements 2013-2022
(2) Based on maximum concentration observed between 2013-2022
(3) As measured at watershed outlet monitoring program (WOMP) location
(4) A stream is considered impaired if two or more measurements exceed the chronic criterion within a 3-year period or if one measurement exceeds the acute criterion

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Streambank and Gully Erosion – Medium Priority

Issue Statement: Excessive erosion along streambanks and gullies negatively impacts stream geomorphology, water quality, aquatic habitat, and floodplain function.

Desired Future Condition	Goal (10-year)	Implementation Activities (some potential examples; highlight = new activity)
Streambanks and gullies throughout the watershed are naturally stable with no excessive erosion that negatively impact the beneficial functions of waterbodies or infrastructure.	Achieve stable streambanks along all priority streams (Bassett Creek Main Stem, North Branch Bassett Creek, Plymouth Creek, and Sweeney Branch Bassett Creek) such that streambanks are not contributing to pollution downstream nor threatening infrastructure or public health. Stabilize gullies that most significantly contribute to reduced water quality downstream.	- Monitor and evaluate stream habitat and macroinvertebrate communities. ($8,000/creek) - Biennially assess the condition of streambanks along BCWMC priority streams and prioritize areas for action – new activity ($25,000 possible estimate) - Monitor and evaluate impact of eroding streambanks and gullies on water quality in downstream impaired waters including lakes and streams partially new activity ($ unknown) - Identify and implement streambank restoration projects to stabilize banks, limit erosion, and improve ecological health - CIP - Continue setting aside funds in Channel Maintenance Fund – ($25,000) - Require vegetated buffers adjacent to priority streams for projects triggering BCWMC review (ensure enforcement of existing stream buffer standards) $0

Lakeshore Erosion – Medium Priority

Issue Statement: Erosion along lake shorelines degrades water quality and negatively impacts lake ecology.

Desired Future Condition	Goal (10-year)	Implementation Activities (some potential examples; highlight = new activity)
Shorelines along priority lakes have buffers with native vegetation and no excessive erosion.	Establish a baseline of lakeshore conditions along all priority lakes. Increase percentage of properties with native buffers on nutrient impaired lakes.	- Inventory lakeshore conditions in priority lakes – new activity ($10,000/lake) - Provide education to lake homeowners including shoreland restoration workshops – new activity ($5,000) - Encourage/fund buffers on public or private lakeshore property – new activity ($10,000) - Sponsor vegetated buffer project for purpose of public education for shoreland property owners and general public (need more info) - Support existing city/partner programs to stabilize shorelines

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Wetland Health and Restoration – Medium Priority

Issue Statement: The function, value and quantity of wetlands within the Bassett Creek watershed have been negatively impacted by development and the changing climate.

Desired Future Condition	Goal (10-year)	Implementation Activities (some potential examples; highlight = new activity)
Wetland function and values are sustained and enhanced, and no additional wetland acres are lost to development.	Establish baseline wetland conditions through watershed wide wetland inventory and assessment; identify priority wetlands	- Inventory wetlands and their conditions throughout watershed - Require vegetated buffers adjacent to wetlands for projects triggering BCWMC review $0 - Ensure enforcement of existing wetland buffer standard – new activity ($ unknown) - Assist partners with education to residents on wetland health and native buffers – ($46,000 current education programs)
	Restore or enhance priority wetlands as opportunities arise or adjacent CIP projects are planned	- Work with cities to create list of priority wetlands in need of restoration - Encourage cities to restore or enhance wetlands during city projects or through development processes - $0 - Identify opportunities for wetland restoration and enhancement through BCWMC CIP projects