

Technical Memorandum

To: Tina Carstens and Paige Ahlborg, RWMWD
From: Tyler Olsen and Erin Anderson Wenz
Subject: Project Prioritization Tool Development
Date: October 23, 2020
Project: 23-62/1006.00

1.0 Introduction

The Ramsey-Washington Metro Watershed District (RWMWD) has a long history of identifying BMP implementation opportunities throughout the watershed for water quality improvements and flood risk reduction projects.

Typically, water quality improvement project opportunities are retrofit projects identified through subwatershed feasibility studies; the District's school, commercial, and faith-based sites initiative; or ideas from RWMWD partners. With the completion of the Beltline Resiliency Study, dozens of flood risk areas and potential mitigation projects have been identified.

With a wide variety of project types, scales, and foci, RWMWD is looking for an objective way to assess all of its projects to help prioritize which should be pursued, and in which order. Water quality improvements and flood risk reduction are high priorities as reflected in the District's Water Management Plan (WMP) goals. RWMWD often looks for opportunities where multiple goals can be met in a single project—developing water quality improvement features alongside the urgent flood control work while also making progress toward other District initiatives (i.e., equity).

This memorandum outlines a prioritization framework and tool that the District can use to assess potential watershed projects based on quantitative and qualitative metrics and other project features. Ultimately, the tool ranks projects from highest priority to least priority across water quality improvements and flood risk reduction categories so that RWMWD staff and Managers can plan for future work using an objective methodology that aligns with the District's priorities. Natural resources projects were not included in this tool, and will be evaluated using a separate methodology.

2.0 Methodology

This section outlines Barr and District staff's methodology for developing the RWMWD project prioritization tool.

2.1 Data aggregation and review of prioritization strategies

Barr reviewed information related to the District's current pool of potential projects including projects from the church/school/faith-based site search projects, subwatershed feasibility studies, and the flood areas prioritized in the Beltline Resiliency study. Barr also reviewed past prioritization strategies that RWMWD has used, such as the Beltline Resiliency prioritization framework for flood areas, as well as examples from other metro watershed districts and cities.

Additionally, Barr reviewed the District's WMP and Strategic Overview to provide an overarching framework for the prioritization strategy that aligns with the goals and action items outlined in both documents. Barr also compared the WMP and Strategic Overview goals with the ISI Envision™ sustainability framework to ensure that project metrics including life cycle, community engagement, and project sustainability were included in the prioritization framework.

2.2 Development of project metrics and prioritization tool framework

After reviewing the data and prioritization strategies outlined in Section 2.1, Barr developed the quantitative and qualitative metrics by which to evaluate each project in the prioritization tool. These metrics are grouped into six categories that correspond to each of the six goals in the WMP including:

1. Achieve quality surface water
2. Achieve healthy ecosystems
3. Manage risk of flooding
4. Support sustainable groundwater
5. Inform and empower communities
6. Manage organization effectively

For each goal category, projects are evaluated by are several different project criteria that have specific scoring schemes and weights. The scoring schemes are based on thresholds defined from past studies, trends observed in the data aggregation phase, or feedback provided by RWMWD staff. For example, one point is given to projects that have a cost per pound of total phosphorus removed of less than \$10,300 but no points are given if the cost benefit is greater than \$10,300. This threshold was set based on Barr's review of RWMWD cost share project investments and their cost efficiency. Barr assigned weights for each criterion based on discussions with RWMWD staff.

The majority of the project criteria have weights of 1 (i.e., no more weight than other criteria); however, several project criteria have larger weights including cost efficiency of total phosphorus removal, longevity of in-lake phosphorus treatment, habitat enhancement or preservation, flood storage potential, and whether the project is within a District Priority Equity Area. Additionally, project criteria related to

structural impacts of flooding can have weights lower than 1, depending on the frequency of the storm event that starts to impact structures. If a structure is impacted by flooding during a high-frequency event (i.e., 2-year or 10-year storm), a project to reduce the flood risk to that structure would be given a weight that is higher than if a structure is impacted by low-frequency event flooding (i.e., 50-year or 100-year storm).

After the project information is entered into the tool, the score for each criterion is multiplied by its weight. This weighted score is summed for all criteria to calculate the total project score. The tool ranks the projects by their total score in a compiled list. This list can be sorted based on project type (water quality, flooding, or natural resources), by the primary District goal the project is meeting, or by subwatershed.

The following tables show the criteria and their corresponding score and weights by criteria category.

Table 1 Water Quality Improvements Criteria (RWMWD Goal 1)

Criteria	Score	Weight
\$/lb TP Removed	<\$10,300 = 1 >\$10,300 = 0	2
\$/lb TSS Removed ¹	<\$50 = 1 >\$50 = 0	1
Project in/tributary to impaired subwatershed	Yes = 1 No = 0	1
% of TMDL reduction goal addressed by project	>10% = 1 <10% = 0	1
Reduce impervious area?	Yes = 1 No = 0	1
TP Removal (lbs/yr)	< 1 lb = 0 1-4 lbs = 0.5 5-10 lbs = 1 > 10 lbs = 2	1
TSS Removal (lbs/yr) ¹	< 50 lbs = 0 50-200 lbs = 0.5 200 - 1000 lbs = 1 >1000 lbs = 2	1
Longevity of in-lake treatment ²	>= 10 years = 1 < 10 years no points	2
Internal load as % of total load to lake ²	< 10% no points 10%-60% = 0.5 >60% = 1	2

¹Points only assigned for projects in a subwatershed with TSS impairment

²Points only assigned for in-lake treatment projects

Table 2 Natural Resources Restoration Criteria (RWMWD Goal 2)

Criteria	Score	Weight
Habitat connection opportunities	Yes = 1 No = 0	1
Proximity to existing features	< 2 = 0 2-5 = 0.5 >5 = 1	1
% of site restored	<50% = 0 >50% = 1	1
Preserve or enhance habitat	Yes = 1 No = 0	2
Preserve or enhance species biodiversity	Yes = 1 No = 0	1
Protect wetlands	Yes = 1 No = 0	1
Reduce pesticide and fertilizer impacts	Yes = 1 No = 0	1
Control invasive species	Yes = 1 No = 0	1

Table 3 Flood Risk Reduction Criteria (RWMWD Goal 3)

Criteria	Score	Weight
Potential flood storage	Yes = 1 No = 0	2
Near District-managed water body	Yes = 1 No = 0	1
Adjacent to District-managed facility	Yes = 1 No = 0	2
Does the project address local or regional flooding?	Local = 0.5 Regional = 1	1
Does the project address road flooding on evacuation route	Yes = 1 No = 0	1
Does the project reduce road depth of flooding greater than 2 ft (non-evacuation route)	Yes = 1 No = 0	1
Residential - Number of impacted structures during 2-year event	# of structures	1
Residential – Additional number of impacted structures during 10-year event	# of structures	0.75
Residential - Additional number of impacted structures during 50-year event	# of structures	0.5
Residential - Additional number of impacted structures during 100-year event	# of structures	0.25
Non-Residential Number of impacted structures during 2-year event	# of structures	0.75
Non-Residential Additional number of impacted structures during 10-year event	# of structures	0.5
Non-Residential Additional number of impacted structures during 50-year event	# of structures	0.25
Non-Residential Additional number of impacted structures during 100-year event	# of structures	0

Table 4 Sustainable Groundwater Criteria (RWMWD Goal 4)

Criteria	Score	Weight
Project promotes infiltration	Yes = 1 No = 0	2
Groundwater recharge potential ¹	Score divided by 24 to normalize to score range from feasibility study	1

¹Recharge potential assigned based on Barr 2015 study

Table 5 Community Criteria (RWMWD Goal 5)

Criteria	Score	Weight
Is the project within a District Priority Equity Area?	ACP50 Area = 2 ACP or District priority area = 1	2
Does the project have a planned educational component, public art, or other visible signage to increase awareness of the District's efforts?	Yes = 1 No = 0	1
Does the project improve community attractiveness or value?	Yes = 1 No = 0	1
Does the project provide opportunity for volunteer engagement in the District?	Yes = 1 No = 0	1
Does the project improve community businesses or economic growth/benefit?	Yes = 1 No = 0	1
Does project reduce any public health risk?	Yes = 1 No = 0	1
Does the project minimize ambient pollution (noise, light, vibration)?	Yes = 1 No = 0	1
Does the project provide leadership opportunities for community members (i.e. Citizens Advisory Commission involvement)?	Yes = 1 No = 0	1
Does the project foster collaboration with cities, watershed management organizations, educational institutions, and other stakeholders to develop and implement shared communication and messaging strategies?	Yes = 1 No = 0	2
Is there a public demand for this project?	Yes = 1 No = 0	1

Criteria	Score	Weight
Does the project provide for stakeholder engagement (comment, workshops, etc.)?	Yes = 1 No = 0	1

Table 6 Organization Management Criteria (RWMWD Goal 6)

Criteria	Score	Weight
Was a plan created for long term monitoring and maintenance?	Yes = 1 No = 0	1
Does the project extend the useful life of existing infrastructure?	Yes = 1 No = 0	1
Does the project use recycled materials?	Yes = 1 No = 0	1
Does implementation/construction reduce excavated materials taken off site	Yes = 1 No = 0	1
Does design provide for deconstruction/recycling of existing infrastructure/materials	Yes = 1 No = 0	1
Does design address changing climate trends/prepare for long-term resiliency	Yes = 1 No = 0	2
Is the project innovative?	Yes = 1 No = 0	1
Easy to construct/implement (i.e. logistically easy, shovel ready project)	Yes = 1 No = 0	1
Who will be responsible for maintenance (per project O&M agreement or anticipated agreement)?	District/Unknown = 0 Project Partner = 1	1
Project Partner	Public = 1 Willing = 0.5 Private = 0	1

In addition to the criteria outlined in Table 1 through Table 6, general project information is also included in the tool including: the subwatershed the project is located in, its corresponding implementation activity from the RWMWD Watershed Restoration and Protection Strategy report (where applicable), and the report or memo from which the project was recommended.

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3.0 Prioritization Tool and Results

The prioritization tool exists as a Microsoft Excel spreadsheet that RWMWD can alter as needed. For example, criteria weights can be changed, and scores are updated automatically. Figure 1 shows the tool for a selection of projects. The projects included in the prioritization tool are shown by project type in Figure 2.

ADD NEW PROJECT HERE BY
INSERTING COLUMN -->

Project No.		49	48	47	44	43	39
Rank		62	13	3	5	23	2
		Flood Area: Downstream of Battle Creek Lake	Knowlan's Fresh Foods rain garden	Beaver Lake Living Streets	Target BMP retrofits	I-94/I-494/I-694	Flood Area: Owasso Basin
Project Type		Flooding	Water quality	Water quality	Water quality	Water quality	Flooding
Subwatershed		Battle Creek	Beaver Lake	Beaver Lake	Kohlman Creek	Battle Creek Lake	Gervais Creek
Implementation Activity		BC-4	BL-4	BL-4	DW-6	BCL-4	GC-3
Report Title		Flood-Risk Project Identification and Prioritization (Beltline Resiliency)	Beaver Lake Subwatershed Feasibility Study	Beaver Lake Subwatershed Feasibility Study	North St. Paul Target Retrofits Summary	Battle Creek Lake Subwatershed Feasibility Study	Flood-Risk Project Identification and Prioritization (Beltline Resiliency)
Conceptual cost for projects or flood alternatives		--	\$292,500	\$6,620,000	\$619,268	\$413,500	\$14,922,000
Total Score Unweighted		3.0	10.0	21.5	224.0	8.0	135.5
Total Score		4.0	12.0	23.5	19.0	10.0	54.8
Primary Goal	Subcategory Weight	3. Flooding	5. Community	5. Community	5. Community	1. Water Quality	3. Flooding
1. Water Quality	1	1.0	1.5	5.0	5.0	4.0	0.0
2. Ecosystem	1	0.0	0.0	2.0	1.0	0.0	0.0
3. Flooding	1	3.0	0.0	0.0	0.0	2.0	43.3
4. Groundwater	1	0.0	2.5	2.5	2.5	0.0	0.0
5. Community	1	0.0	5.0	9.0	8.0	0.0	9.0
6. Manage Organization	1	0.0	3.0	5.0	2.5	4.0	2.5


RWMWD Goal	Criteria	Strategic Plan Action Item	Additional criteria description	Qualifiers	Weight						
 <p>RWMWD Goal 1. Achieve quality surface water</p>	\$/lb TP Removed	MO6	--	< \$10,300 = 1 > \$10,300 = No points	-- 2		\$12,100	\$4,000	\$8,900	\$690	--
	\$/lb TSS Removed	MO6	Only add data for subwatersheds with TSS TMDL	< \$50 = 1 > \$50 = No points	-- 1			1	1	1	
	Project in/tributary to impaired subwatershed?	WQ2	--	Yes = 1	1	1			1		
	TMDL Reduction Goal (% or lbs)	WQ2	--	--	--				209		
	% of TMDL goal addressed	WQ2	--	> 10 % = 1 < 10 % = 0	1						
	Reduce Impervious Area?	WQ17	--	Yes = 1	1		1	1	1		
	TP Removals (lbs/yr, %)	WQ2	--	< 1 lb = 0 1-4 lbs = 0.5 5-10 lbs = 1 >10 lbs = 2	-- -- 1		1.46	11.5	5.2	36.3	
	TSS Removals (lbs/yr, %)	WQ2	Only add data for subwatersheds with TSS TMDL	< 50 lbs = 0 50-200 lbs = 0.5 200 - 1000 lbs = 1 >1000 lbs = 2	-- -- --						
	Longevity of treatment (in-lake)	WQ2	--	>= 10 years = 1 < 10 years no points	2						
	Internal load as % of total load	WQ2	--	< 10% no points 10%-60% = 0.5 >60% = 1	2						

Figure 1



 <p>RWMWD Goal 2. Achieve healthy ecosystems</p>	Habitat connection opportunities	EC4	Provides connection between multiple restoration areas	Yes = 1	1			1		
	Proximity to existing features	--	Number of adjacent features	< 2 = no points 2-5 = 0.5 point >5 = 1 point	1					
	% of site restored	--	--	>50% = 1 <50% = no points	1					
	Preserve or enhance habitat	EC4	Does not degrade quality of existing habitat features	Yes = 1	2					
	Preserve or enhance species biodiversity	EC4	--	Yes = 1	1		1	1		
	Protect wetlands	EC4	Project provides wetland protection measures	Yes = 1	1					
	Reduce pesticide and fertilizer impacts	--	--	Yes = 1	1					
	Control invasive species	EC5	--	Yes = 1	1					
 <p>RWMWD Goal 3. Manage risk of flooding</p>	Potential flood storage	FL3	--	Yes = 1	2	1			1	
	Near District-managed water body	--	--	Yes = 1	1	1				
	Adjacent to District-managed facility	--	--	Yes = 1	2					1
	Does the project address local or regional flooding?	--	--	Local = 0.5 Regional = 1	1					1
	Does the project address road flooding on evacuation route	FL3	--	Yes = 1	1					
	Does the project reduce road depth of flooding greater than 2 ft (non-evacuation route)	FL3	--	Yes = 1	1					1
	Residential - Number of impacted structures during 2-year event	FL3	--	#	1					
	Residential - Number of impacted structures during 10-year event	FL3	additional structures from 2-year count	#	0.75					6
	Residential - Number of impacted structures during 50-year event	FL3	additional structures from 10-year count	#	0.5					17
	Residential - Number of impacted structures during 100-year event	FL3	additional structures from 50-year count	#	0.25					89
	Non-Residential Number of impacted structures during 2-year event	FL3	--	#	0.75					3
	Non-Residential Number of impacted structures during 10-year event	FL3	additional structures from 2-year count	#	0.5					3
	Non-Residential Number of impacted structures during 50-year event	FL3	additional structures from 10-year count	#	0.25					1
Non-Residential Number of impacted structures during 100-year event	FL3	additional structures from 50-year count	#	0					4	

Figure 1



 RWMWD Goal 4. Support sustainable groundwater	Project promotes infiltration	GW5/GW9	--	Yes = 1	2		1	1	1		
	Groundwater recharge potential (Barr 2015)	GW5/GW9	--	Score is divided by 24 to normalize	1		0.46	0.54	0.54		
 RWMWD Goal 5. Inform and empower communities	District Priority Equity Area	MO21	Is the project location in a priority area for the District's equity initiative? Does the project positively impact the community?	2 points for ACP50 1 point for ACP or District priority area	2				1		1
	Does the project have a planned educational component, public art, or other visible signage to increase awareness of the District's efforts?	IE1, IE3, IE4, IE7, IE9	Increases public awareness, visibility and interest in the District and its efforts, positively influences the actions of others, informs residents and other stakeholders about how individuals can be responsible stewards of the watershed	Yes = 1	1		1	1	1		1
	Does the project improve community attractiveness or value?	IE17	Add recreation access, aesthetic improvements, or other usable features	Yes = 1	1		1	1	1		1
	Does the project provide opportunity for volunteer engagement in the District?	IE2	Recruit and engage volunteers in District projects/programs	Yes = 1				1			
	Does the project improve community businesses or economic growth/benefit?	IE17	--	Yes = 1	1		1	1	1		1
	Does project reduce any public health risk?	--	--	Yes = 1	1			1			1
	Minimize ambient pollution (noise, light, vibration)	--	--	Yes = 1	1			1			
	Provide leadership opportunities for community members (i.e. Citizens Advisory Commission involvement)	IE15	--	Yes = 1	1			1			
	Foster collaboration with cities, watershed management organizations, educational institutions and other stakeholders to develop and implement shared communication and messaging strategies	IE5, IE12	--	Yes = 1	2		1	1	1		1
	Is there a public demand for this project?	IE15	--	Yes = 1	1						
Provide for stakeholder engagement (comment, workshops, etc.)	IE14	--	Yes = 1	1			1	1		1	

Figure 1


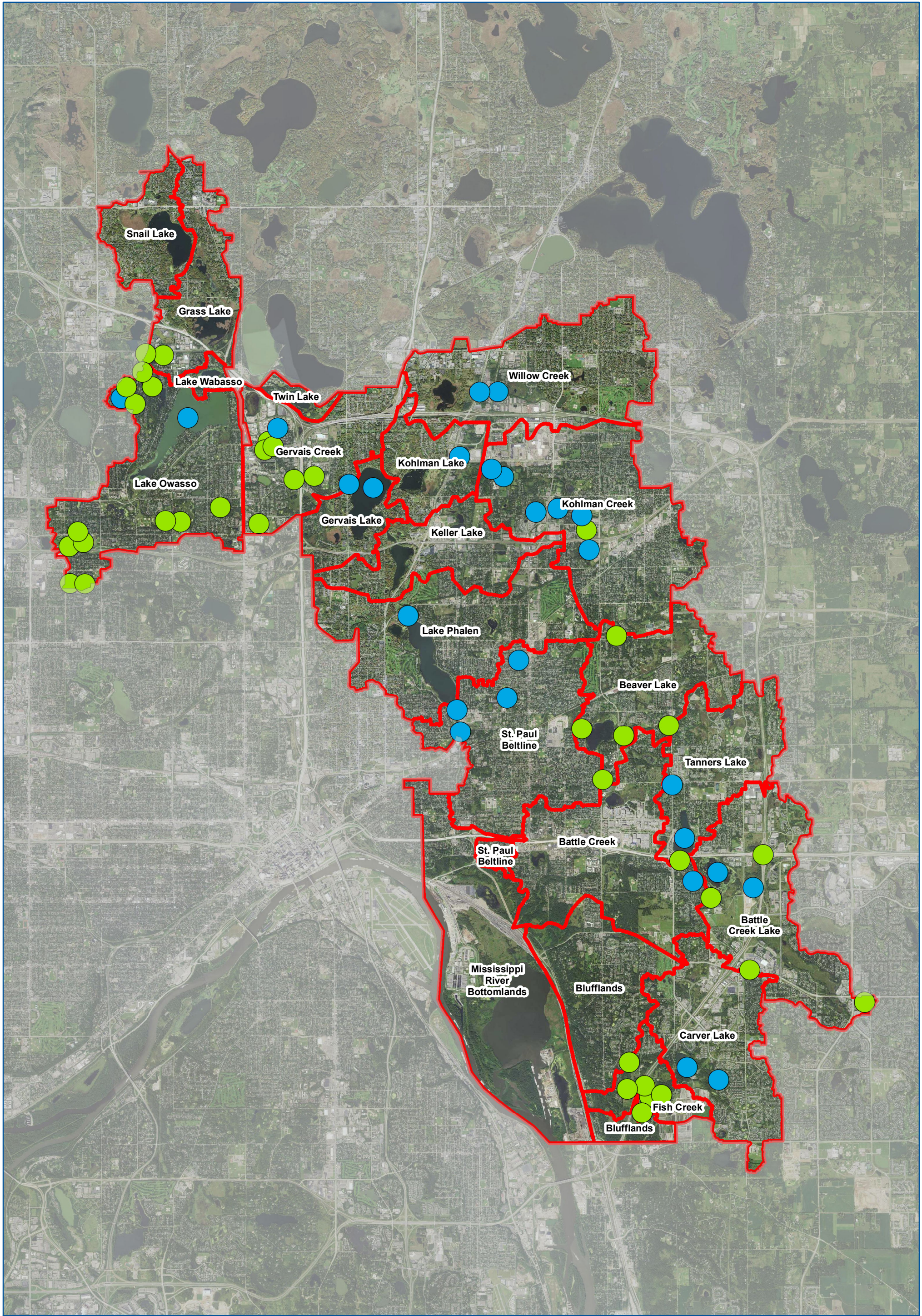




 <p>RWMWD Goal 6. Manage organization effectively</p>	Was a plan created for long term monitoring and maintenance?	WQ4/EC4/FL4	Include monitoring or maintenance plan?	Yes = 1	1		1	1	1	1	1
	Does the project extend the useful life of existing infrastructure?	Sustainability/Envision	--	Yes = 1	1					1	
	Does the project use recycled materials?	Sustainability/Envision	--	Yes = 1	1						
	Does implementation/construction reduce excavated materials taken off site	Sustainability/Envision	--	Yes = 1	1		1	1	1	1	
	Does design provide for deconstruction/recycling of existing infrastructure/materials	Sustainability/Envision	--	Yes = 1	1		1	1			
	Does design address changing climate trends/prepare for long-term resiliency	FL9, Sustainability/Envision	--	Yes = 2	1						1
	Is project innovative?	WQ11/MO13, Sustainability/Envision	Expand the use of innovative water quality improvement designs, products, equipment, and methods as necessary to address sites with limited land area for conventional treatment techniques. Is project unique to its subwatershed?	Yes = 1	1			1			
	Easy to construct/implement (i.e. logistically easy, shovel ready project)	--	--	Yes = 1	1						
	Who will be responsible for maintenance (per project O&M agreement or anticipated agreement)?	MO17		District/Unknown = 0 Project Partner = 1	1						
Project Partners	MO17	--	Public = 1 Willing = 0.5 Private = No points	1			1	0.5	1	0.5	

Figure 1



 Major Watersheds
Project Type
 Flooding
 Water Quality


0 6,000 12,000
Feet

Prioritized District Projects
Ramsey-Washington
Metro Watershed District
FIGURE 2